# Religion, economic attitudes, and household finance

Renneboog, L.D.R.; Spaenjers, C.

*Published in:*
Oxford Economic Papers

*DOI:*
10.1093/oep/gpr025

*Publication date:*
2012

*Document Version*
Publisher's PDF, also known as Version of record

*Oxford Economic Papers* 64 (2012), 103–127 **103**
doi:10.1093/oep/gpr025

# Religion, economic attitudes, and household finance

By Luc Renneboog* and Christophe Spaenjers†

*CentER, Tilburg University, P.O. Box 90153, 5000 LE Tilburg, The Netherlands; e-mail: luc.renneboog@uvt.nl
†CentER, Tilburg University; e-mail: c.spaenjers@uvt.nl

We investigate the differences in economic attitudes and financial decisions between religious and non-religious households. Using Dutch survey data, we find that religious households consider themselves more trusting, and have a stronger bequest motive and a longer planning horizon. Furthermore, Catholics attach more importance to thrift and are more risk averse, while Protestants combine a more external locus of control with a greater sense of financial responsibility. Religious households are more likely to save. Catholic households invest less frequently in the stock market. Economic attitudes are particularly helpful in explaining the financial decisions of Catholic households.

JEL classifications: D14, G11, Z12.

## 1. Introduction

Past literature has established the importance of religion at the aggregate economic level.[1] In contrast, it is still unclear whether it plays a role in the financial decision-making process of individuals. This lack of research is surprising given that religion

[1] Barro and McCleary (2003) find that economic growth is positively influenced by 'believing', but responds negatively to the degree of 'belonging' (church attendance) across countries. Landes (1998) builds on Max Weber's claim of a Protestant work-and-save ethic to partially explain international differences in economic growth. Blum and Dudley (2001) show that Protestant cities constructed beneficial economic networks in early-modern Europe, potentially made possible by the high cost of contractual defection in Protestantism. Stulz and Williamson (2003) find that Catholic countries have significantly weaker creditor rights than Protestant countries. Becker and Woessmann (2009) document Martin Luther's stress on the importance of education, and argue that the resulting higher literacy of Protestants enabled faster economic development in Protestant regions. In contrast, Cantoni (2009) finds no effect of Protestantism on economic growth in Germany over the very long run. A number of recent papers focus on the role of religion in firms and financial markets, using data at the county level in the United States. Hilary and Hui (2009) investigate how a firm's investment decisions are affected by the religiosity of its environment. Shu *et al.* (2010) link local religiosity to risk taking by mutual funds. Kumar *et al.* (2011) see religion as a proxy for gambling propensity and relate geographical heterogeneity in religion to differences in corporate decisions and stock returns.

has been identified as an important factor in other economically relevant behaviour (Iannaccone, 1998). Also, a number of recent studies suggest that religion has a significant impact on individuals' economic attitudes. For example, Arruñada (2010) shows that Protestants have a stronger 'social ethic' than Catholics. Guiso *et al.* (2003) find that, in general, religious people have economic attitudes that are favourable to economic development. While Guiso *et al.* (2003) and Arruñada (2010) link religion-induced variation in economic attitudes to international differences in economic growth, we are concerned with within-country heterogeneity in the financial choices of households.

Following the increased accessibility and democratization of financial markets and the wave of product innovations in the consumer financial services sector during the 1990s, the analysis of household finance has become a fast-growing academic area (Guiso *et al.*, 2002). It is well-documented that both demographic variables (such as age, gender, family size, and education) and background risk factors (such as private business risk and health) are important determinants of households' portfolio decisions (Campbell, 2006). Over the last few years, an expanding literature has explored the roles played by optimism (Puri and Robinson, 2007), cognitive abilities and biases (Christelis *et al.*, 2009; Stango and Zinman, 2009), and households' financial literacy (Guiso and Jappelli, 2009; Alessie *et al.*, 2011) in household financial decision-making. Furthermore, there has been an increased attention to socio-cultural forces. For example, Hong *et al.* (2004) and Brown *et al.* (2008) study the impact of social interaction and peer effects on stock market participation in the United States. Guiso *et al.* (2008) look into the effects of trust on international stockholding behaviour; Georgarakos and Pasini (2010) consider both household sociability and regional trust. Breuer and Salzmann (2009) examine the impact of national culture on the portfolio structure in a cross-country comparison.

In the current literature on household finance, religion and religiosity have only been mentioned in passing.[2] It is still unclear to what extent individual differences in religious background are also translated into differences in financial decision-making. Therefore, in this paper, we investigate whether religious households have different economic attitudes and take other financial decisions than non-religious households. Moreover, we try to assess whether the different economic beliefs and preferences may explain the differences in savings and investment decisions, by combining religion, economic attitudes, and household finance into one analysis.

Our data cover the period 1995–2008 and come from the DNB Household Survey. This survey collects detailed information on a yearly updated sample of about 2,000 Dutch households, by means of weekly questionnaires. It includes data

[2] Hong *et al.* (2004) use church attendance as a measure of social interaction, while Christelis *et al.* (2009) control for religious participation in their analysis. Guiso *et al.* (2008) note that a person's trust may be influenced by his ethnic and religious background. Recent research has also related the religious environment to both the ownership (Hood *et al.*, 2009) and returns (Salaber, 2009) of so-called 'sin stocks', i.e., stocks in companies associated with alcohol, tobacco, or gambling.

on religious affiliation, demographic variables, wealth and income, psychological and economic concepts, and portfolio decisions. In the past, the DNB Household Survey has also been used to study the effects of financial literacy (Alessie *et al.*, 2011), trust (Guiso *et al.*, 2008), and loss aversion (Dimmock and Kouwenberg, 2010) on stock market participation.

We find clear evidence that the economic attitudes of religious households differ from those of non-religious ones. In the Netherlands, Catholic and Protestant individuals are more likely to consider themselves as trusting, have a stronger bequest motive (i.e., they care more about the inheritance of their children), and have longer planning horizons. In addition, especially Catholics attach more importance to thrift and are less willing to take on risks, while Protestants seem to have a weaker internal locus of control (i.e., they feel less able to influence the course of their life) but a higher awareness of individual financial responsibility. Controlling for a large number of demographic characteristics and background risk factors, we show that religious households are more inclined to save money than non-religious ones. Catholic households are less likely to invest in stocks. We find that the different views on economic beliefs and preferences outlined before partially explain the higher propensity to save and the lower probability of investing in stocks of Catholic households.

There are two limitations of our study that we want to raise at this point. First, there is the issue of causality. Since the information we use is self-reported, and many variables are correlated, causal relationships are hard to pin down. This is a problem of much of the research in the field (Guiso *et al.*, 2003); one exception is the recent study by Benjamin *et al.* (2009) which creates exogenous variation in religiosity in a controlled laboratory setting. Most of our results should thus be interpreted as precisely estimated correlations rather than causal relationships. We believe that it is nevertheless interesting to look at whether religious households take different financial decisions, and why they may do so.

Second, it is not clear that our results can be generalized worldwide. Indeed, our finding that especially Catholics are more risk averse goes against recent evidence for the U.S. that Catholics (or firms in Catholic regions) exhibit less risk aversion than Protestants (Kumar *et al.*, 2011; Shu *et al.*, 2010). More generally, our results shed doubt on the external validity of all country-specific studies on the economic effects of religious beliefs.

The remainder of this paper is structured as follows. Section 2 sketches the cultural background of our research. In Section 3, we give an overview of the relevant economic attitudes. Section 4 describes our data set, variables, and empirical strategy. Section 5 outlines the empirical results and Section 6 concludes.

## 2. Cultural background

The impact of religion on the individual is very heterogeneous across the European continent. The Atlas of European Values (Halman *et al.*, 2005) shows that in countries such as Poland, Ireland, and Romania more than 90% of the people

celebrate their poignant moments of life in the church, while in others less than half of the population appreciates a religious service. Still, in most countries, pure atheists are a small minority, and there are more people who consider themselves religious than there are church-goers. This is the phenomenon of 'believing without belonging'.

The Netherlands is an interesting country to study the effect of religion on individual decision-making, for two different reasons. First, there is considerable variety in types of religious beliefs. As a consequence of the sixteenth-century religion-based wars between the Catholic Spanish rulers and Protestants rebels, the Dutch population has traditionally been half Protestant and half Catholic. Since the 1950s, however, the Netherlands have quickly turned into one of the most secularized countries in Europe. Nowadays, a small majority of the Dutch population is religious. The largest religious denomination is the Roman Catholic Church: almost 27% of the Dutch population is a member (Wetenschappelijke Raad voor het Regeringsbeleid, 2006). Taken together, mainstream Protestant churches—the 'Protestant Church in the Netherlands' and two smaller groups of Reformed churches—account for about 15% of the population. Evangelicals (and Pentecostals), conservative Protestants who share a strong belief in a literal interpretation of the Bible and the importance of rebirth, make up around 1%. In virtually all cities and villages of the Netherlands, both Catholic and Protestant churches are present, but the proportion differs by area (Knippenberg, 1991). Almost 6% of the Dutch population is Muslim; 2% has other non-Christian religious beliefs. The remaining 49% of the population in the Netherlands does not formally belong to a specific denomination.

Second, the distinction between religious and non-religious individuals is probably easier to make in the Netherlands than in other countries. Generally, those who declare that they belong to a specific religious denomination also practice, whereas adults who have been raised within a religious tradition but do not believe, do not consider themselves as religiously affiliated (Halman *et al.*, 2005).[3]

## 3. Religion and economic attitudes

In this section, we identify economic beliefs and preferences that, according to previous research, are influenced by the religious background. Where necessary, we also indicate how these attitudes may have an impact on financial decisions. Demographic variables (such as gender, education, and income) and background risks (such as health status and employment) are traits that may be correlated with both religion and portfolio decisions, and will therefore be used as control variables in our empirical analysis. We focus on Christian religions, since Catholics and

[3] Judging from the Atlas of European Values, this is not always the case in other countries. For instance, more than 55% of the German population considers itself religious but only about 33% prays regularly. Similarly, almost 75% of the Danes regard themselves as religious, but merely 20% pray on a regular basis.

Protestants are by far the largest religious groups in the Netherlands. An essential difference between Catholics and Protestants is that the former rely on salvation by works with enforcement by the Church, whereas the latter believe that salvation comes from divine grace with enforcement from social interaction (Arruñada, 2010).[4]

### 3.1. Thrift

Keister (2003) notes that 'religious doctrine seldom discourages saving and nearly always encourages correct and conventional living'. It is thus not surprising that Guiso *et al.* (2003) find that religiosity is associated with a higher emphasis on the importance of saving. In their research, Catholics appear to value thrift more than Protestants, which somewhat contradicts the Weberian claim that it was mainly Protestant thriftiness that stimulated the growth of capitalism. Indeed, Arruñada (2010) argues that the Protestant effort-based work ethic supports saving, by disapproving of excessive consumption.

### 3.2. Risk preferences

Previous research has shown that religiosity is in general positively related to risk aversion (Miller and Hoffmann, 1995; Hilary and Hui, 2009), but there is less consensus about the relative magnitude of the effect across denominations. Based on a univariate analysis, Barsky *et al.* (1997) report that Catholics are more risk tolerant than Protestants, but less than Jews. Halek and Eisenhauer (2001) find that the effect depends on the situation: Catholics and Jews are more averse to 'pure' risk (as measured by their coefficient of relative risk aversion in a model of life insurance demand), but more tolerant of 'speculative' risk taking (as measured by the willingness to accept a job with equal chances of doubling or reducing the household income).

### 3.3. Locus of control and individual responsibility

Religious beliefs may be correlated with different views on the degree to which life's outcomes depend upon one's own behaviour (internal locus of control) or external forces (external locus of control). Intuitively, individuals with religious beliefs—and especially Protestants, who believe in predestination—are expected to have a more external locus of control. At the same time, however, there is evidence that religious people have a 'greater sense of individual responsibility' and 'are more inclined to believe that people in need are lazy and lack will power' (Guiso *et al.*, 2003). This sense of individual responsibility may be

[4] These views can also have an important bearing on the way institutions and the economy function. Whereas Catholics rely more on personalized trade, Protestants favour anonymous trade and markets. Stulz and Williamson (2003) argue that this explains why there was less need for creditor protection in Catholic countries than in Protestant ones.

particularly relevant in Protestantism, in which 'each individual determines on his own what is right' (Stulz and Williamson, 2003).

It is well-known that the locus of control can have an impact on a wide range of behaviours and decisions, including financial ones. For example, Boone *et al.* (1996) show that a CEO's locus of control influences corporate performance. It is thus possible that differences in the locus of control and the awareness of individual financial responsibility are also reflected in the financial decisions that households make.

### 3.4. Social capital

According to Dekker *et al.* (1997), one of the consequences of the secularization in the Netherlands is the loss of social capital (e.g., involvement with others, trust).[5] In an international context, however, the evidence on the relation between religion and social capital is mixed. Alesina and La Ferrara (2002) and Bellemare and Kröger (2007) report that religious beliefs do not affect the level of trust. Guiso *et al.* (2003) find that religious upbringing negatively affects trust for Catholics, but not for Protestants. In contrast, more religious participation seems associated with more trust in all religions. The authors conclude that 'overall, Christian religions foster trust, but more so for Protestants'. Similarly, Welch *et al.* (2007) and Arruñada (2010) find that Protestants are more likely to trust people they are not acquainted with. Religiosity may also play a role in forming social capital through the social networks built by attending religious services or participating in activities organized by religious charity organizations. Glaeser and Sacerdote (2008) show how differences in returns to social connections may explain the positive correlation between church attendance and education found in the United States.

In recent years, there has been an increasing interest for the link between social capital and financial decision-making. For instance, Guiso *et al.* (2008) examine the impact of trust on stock market participation. Both generalized trust and personalized trust in one's banker have a large positive effect on the probability of stock market participation and on the share of an individual's wealth invested in stocks (conditional on participation). Likewise, Hong *et al.* (2004) and Brown *et al.* (2008) find that sociability and social interaction have a strong impact on the decision to buy stocks. Georgarakos and Pasini (2010) confirm the positive effects of both trust and sociability.

[5] The authors use survey data from 1966 until 1996 to highlight the differences in social attitudes not only between religious and non-religious people, but also across denominations. For instance, Protestants have a stronger political commitment and trust their churches more than Catholics. Catholics are more likely to rely on family and friends. In general, religious people are significantly more likely to undertake voluntary work.

### 3.5. Bequest motive and planning horizon

Religion may induce different views on intergenerational transfers and planning horizons. For example, Fink and Redaelli (2005) report that Catholic households are more likely to leave a bequest. These households may therefore also have longer time horizons (Christelis *et al.*, 2009).

In turn, these factors may affect financial decisions. Although there is little empirical work on how the existence of a bequest motive influences savings and investments decisions, one can reasonably expect households with a strong bequest motive to save more. There is no unambiguous theoretical prediction about how the household's portfolio should change with the planning horizon, although it seems that financial advisors often recommend to decrease the fraction of wealth invested in risky assets as the horizon gets shorter (Campbell and Viceira, 2002; Ameriks and Zeldes, 2004).

## 4. Data and empirical strategy

### 4.1. Data

The basis for this study is the DNB Household Survey, managed by CentERdata at Tilburg University. The Household Survey collects data from an online panel of about 2,000 households. Households without internet access are given a device to access the internet by means of their television sets. Households that do not have a television are provided with one by CentERdata. The panel is representative of the Dutch-speaking population of the Netherlands and changes slowly over the years. Until the end of the 1990s, the DNB Household Survey included a disproportionately large number of high income households. To mitigate concerns that this may impact our results, we will control for both income and year effects, and cluster standard errors on the level of the household.

Every year, CentERdata puts the collected data online [http://www.centerdata.nl/en/index.html]; most of the information is freely available to scholars. The data are grouped in eight categories. Six basic categories cover these topics: (i) general information on the household; (ii) household and work; (iii) accommodation and mortgages; (iv) health and income; (v) assets and liabilities; (vi) economic and psychological concepts. Two more aggregated categories comprise: (vii) information on income and (viii) information on assets, liabilities, and mortgages of the households.

In our analysis, we use data covering the period 1995–2008, whenever possible. For each household, we start from the data of the individual labeled as the household head. If more than one member of the household reports to be the household head, we start from the data of the main wage earner or the person who does the financial administration of the household. In the following paragraphs, we outline the variables used in this study. An overview of all variables is provided in Table 1.

**Table 1** Definition of variables

| Variable | Description | Values |
|---|---|---|
| *Religion* | | |
| CATHOLIC | Religious denomination | Roman-Catholic=1; other=0 |
| PROTESTANT | Religious denomination | mainline Protestant=1; other=0 |
| OTHER RELIGION | Religious denomination | {Evangelical, Muslim, etc.}=1; other=0 |
| *Economic attitudes* | | |
| THRIFT | 'Being careful with money is an important character trait' | totally disagree=1; . . . totally agree=7 |
| RISK AVERSION | 'I think it is more important to have safe investments and guaranteed returns, than to take a risk to have a chance to get the highest possible returns' | totally disagree=1; . . . totally agree=7 |
| INTERNAL LOCUS | 'My life is determined by my own actions' | totally disagree=1;. . .totally agree=7 |
| LOW RESPONSIBILITY | 'It is chiefly a matter of fate whether I become rich or poor' | totally disagree=1; . . . totally agree=7 |
| DISTRUST | 'Please indicate for each pair of qualities which number would best describe your personality' | trusting, credulous=1; . . . suspicous=7 |
| BEQUEST MOTIVE | 'How important is it to you to have some money saved [. . .] so I can leave a house and/or other valuable assets to my children?' | very unimportant=1; . . . important=7 |
| TIME HORIZON | 'Which of the time-horizons mentioned below is in your household most important with regard to planning expenditures and savings?' | next couple of months=1; next year=2; next couple of years=3; next 5 to 10 years=4; more than 10 years from now=5 |
| *Financial decisions* | | |
| SAVED | 'Did your household put any money aside in the past 12 months?' | yes=1; no=0 |
| STOCKS | Sum of household investments in stocks | larger than zero=1; zero=0 |
| % STOCKS | Ratio of STOCKS to total financial assets | [0,1] |

(continued)

Table 1 Continued

| Variable | Description | Values |
|---|---|---|
| *Control variables* | | |
| AGE | Year of survey − year of birth | |
| MALE | Sex of the respondent | male=1; female=0 |
| PARTNER | 'Is there a partner present in the household?' | yes=1; no=0 |
| CHILDREN | Number of children in the household | |
| BAD HEALTH | 'In general, would you say your health is. . .' | {fair, not so good, poor}=1; {excellent, good}=0 |
| EMPLOYED | Primary occupation of the respondent | employed on a contractual basis=1; other=0 |
| SELF-EMPLOYED | Primary occupation of the respondent | {works in own business, free profession, free-lance}=1; other=0 |
| RETIRED | Primary occupation of the respondent | retired=1; other=0 |
| UNIVERSITY | Highest level of education completed | university education=1; other=0 |
| VOCATIONAL | Highest level of education completed | vocational colleges=1; other=0 |
| PRE-UNIVERSITY | Highest level of education completed | HAVO, VWO (pre-university education)=1; other=0 |
| LN(INCOME + 1) | Ln(net income in year 2007 euro + 1) | |
| LN(NET WORTH + 1) | Ln(max[0, net worth in year 2007 euro] + 1) | |

*Notes*: Table 1 defines our variables. The second column shows the source in the DNB Household Survey. The data are from 1995 until 2008. The third column shows how the information translates to the values used in this study.

With respect to religion, we make a distinction between CATHOLIC, PROTESTANT, and OTHER RELIGION. The main focus of our study is on the first two categories; the last category contains Muslims, Evangelicals, religious humanists, and other smaller religious groups. Our religion variable measures affiliation, in contrast to some previous studies (Guiso *et al.*, 2003; Arruñada, 2010) which capture upbringing and religious attendance. Although the latter variables are arguably more direct indicators of religious background and religiosity, and thus would be better suited to measure the relationship between religion and economic attitudes or household finance, the DNB Household Survey has historically not included this information. However, we added a number of questions on upbringing and participation to the 2008 survey, to investigate to which degree our denomination variable also proxies for other dimensions of religiosity. 91.1% of the respondents who indicate a religious affiliation describe their upbringing as 'somewhat religious' to 'very religious'. Also, while 90.2% of the respondents who are not religiously affiliated never attend a regular church service, this proportion drops to 17.8% for those individuals that are classified as being religious in this study. This implies that even if our indirect religion variables are imperfect proxies for religious upbringing or church attendance, they are not noisy instruments. The statistics also confirm our earlier claim that the distinction between religious and non-religious individuals is relatively clear in the Netherlands.

Next, we consider a number of different economic attitudes.[6] Between 2004 and 2007, all individuals in the DNB Household Survey were asked to which degree they agree with the statement 'Being careful with money is an important character trait'. This variable THRIFT takes values between 1 (totally disagree) and 7 (totally agree).[7] In all years, household members are asked whether they agree, again on a scale from 1 to 7, with the statement 'I think it is more important to have safe investments and guaranteed returns, than to take a risk to have a chance to get the highest possible returns'. The resulting variable (RISK AVERSION) should measure the household head's risk preferences. The variable INTERNAL LOCUS proxies for the individual's locus of control. It indicates to which degree the respondent agrees with the statement 'My life is determined by my own actions', on a scale from 1 to 7. LOW RESPONSIBILITY focuses on the sense of individual financial responsibility: 'It is chiefly a matter of fate whether I become rich or poor', with a scale where 1 is 'totally disagree' whereas 7 stands for 'totally agree'. Unfortunately, the data for the last two variables variable are only available from 2005 until 2007. To explore the role of social capital, we rely on a measure of self-reported trust in the DNB Household Survey. This variable, labeled DISTRUST, is measured on a scale of

[6] All economic attitudes are self-reported. As emphasized before, this makes it hard to interpret the relations as being causal. Also, there is the possibility that sincerity varies across religions. For example, Glaeser and Glendon (1998) build a model in which individuals perform no unobservable moral actions—and hypocrisy is therefore more common—in 'predestination societies'. We thank an anonymous referee for pointing this out.

[7] This variable could also partially proxy for risk aversion.

1 (trusting, credulous) to 7 (suspicious) and is available for all years until 2002 (except in 1996). The variable BEQUEST MOTIVE measures how important parents believe it is 'to save so I can leave a house and/or other valuable assets to my children' on a scale from 1 (very unimportant) to 7 (very important). The variable TIME HORIZON contains the answer to the question 'Which of the time-horizons mentioned below is in your household most important with regard to planning expenditures and savings?' on a scale from 1 (the next couple of months) to 5 (more than 10 years from now).

Finally, we use a number of different financial decisions as dependent variables in our analysis. The variable SAVED is a dummy variable that equals one if the respondent indicates that the household has put some money aside over the last twelve months. The dummy variable STOCKS equals one if a household invests in individual stocks. Finally, % STOCKS measures the share of total financial assets invested in stocks.[8]

We consider a wide range of demographic control variables, starting with AGE and the dummy variable MALE. The composition of the household is measured by the dummy variable PARTNER (which equals one if the household head has a partner who is also part of the household) and the variable CHILDREN (the number of children in the household). BAD HEALTH is a dummy variable that equals one if the respondent indicates his health to be 'fair', 'not so good', or 'poor', as opposed to 'excellent' or 'good'. The employment status of the household head is captured by the dummy variables EMPLOYED (on a contractual basis), SELF-EMPLOYED (in own business, on a freelance basis, etc.), and RETIRED, where the left-out category includes all other unemployed household heads. Three dummy variables capture the level of completed education by the household head: UNIVERSITY, VOCATIONAL (degree from a vocational college), and PRE-UNIVERSITY (scientific secondary or high school degree). The left-out category includes all individuals with another degree, or none at all. The natural log of the total net income of the household is indicated by LN(INCOME + 1). We also calculate the log of each household's net wealth, LN(NET WORTH + 1). Net worth is calculated as the value of all assets (except private business equity) minus debts and mortgages, but is censored below at zero. All income and net worth figures were first transformed to euros for the years prior to the introduction of the European currency, and to real terms using the official consumer price index of Statistics Netherlands.

[8] In an unreported analysis, we also use the variables RISKY and % RISKY as dependent variables. RISKY equals one if the household has a positive investment in risky financial assets, such as bonds, growth funds, mutual funds, stocks, or (put or call) options. The results are generally in line with those reported for STOCKS, albeit somewhat weaker. Hochguertel *et al.* (1997) and Alessie *et al.* (2002) provide more general information on Dutch households' financial choices.

**Table 2** Descriptive statistics

| Variable | N | Mean | SD | Min. | Median | Max. |
|---|---|---|---|---|---|---|
| *Religion* | | | | | | |
| CATHOLIC | 27,381 | 0.3059 | 0.4608 | 0 | 0 | 1 |
| PROTESTANT | 27,381 | 0.2047 | 0.4035 | 0 | 0 | 1 |
| OTHER RELIGION | 27,381 | 0.0716 | 0.2579 | 0 | 0 | 1 |
| *Economic attitudes* | | | | | | |
| THRIFT | 5,238 | 5.8624 | 1.0442 | 1 | 6 | 7 |
| RISK AVERSION | 16,408 | 5.0223 | 1.6943 | 1 | 5 | 7 |
| INTERNAL LOCUS | 3,848 | 4.9914 | 1.2618 | 1 | 5 | 7 |
| LOW RESPONSIBILITY | 3,847 | 3.2298 | 1.5227 | 1 | 3 | 7 |
| DISTRUST | 8,655 | 4.1334 | 1.2355 | 1 | 4 | 7 |
| BEQUEST MOTIVE | 18,394 | 2.7158 | 1.7769 | 1 | 2 | 7 |
| TIME HORIZON | 18,598 | 2.2331 | 1.1818 | 1 | 2 | 5 |
| *Financial decisions* | | | | | | |
| SAVED | 18,660 | 0.7115 | 0.4531 | 0 | 1 | 1 |
| STOCKS | 21,629 | 0.1315 | 0.3380 | 0 | 0 | 1 |
| % STOCKS | 20,627 | 0.0352 | 0.1354 | 0 | 0 | 1 |
| *Control variables* | | | | | | |
| AGE | 27,924 | 48.7544 | 14.4653 | 14 | 47 | 95 |
| MALE | 27,926 | 0.7947 | 0.4039 | 0 | 1 | 1 |
| PARTNER | 27,927 | 0.7225 | 0.4478 | 0 | 1 | 1 |
| CHILDREN | 27,927 | 0.7775 | 1.1084 | 0 | 0 | 7 |
| BAD HEALTH | 20,404 | 0.2050 | 0.4037 | 0 | 0 | 1 |
| EMPLOYED | 27,854 | 0.6380 | 0.4806 | 0 | 1 | 1 |
| SELF-EMPLOYED | 27,854 | 0.0421 | 0.2008 | 0 | 0 | 1 |
| RETIRED | 27,854 | 0.1692 | 0.3749 | 0 | 0 | 1 |
| UNIVERSITY | 27,925 | 0.1317 | 0.3382 | 0 | 0 | 1 |
| VOCATIONAL | 27,925 | 0.2571 | 0.4370 | 0 | 0 | 1 |
| PRE-UNIVERSITY | 27,925 | 0.1073 | 0.3095 | 0 | 0 | 1 |
| LN(INCOME + 1) | 18,600 | 10.1156 | 0.8478 | 0.4337 | 10.2435 | 14.2058 |
| LN(NET WORTH + 1) | 19,255 | 10.4389 | 3.6670 | 0.0000 | 11.7747 | 18.3029 |

*Notes*: Table 2 gives the descriptive statistics (number of observations, mean, standard deviation, minimum, median, and maximum) for the variables used in this study. All variables are defined in Table 1.

## 4.2. Descriptive statistics

Table 2 gives the descriptives (number of observations, mean, standard deviation, minimum, median, and maximum) for the variables outlined above, based on our panel consisting of household-year observations. Table 2 shows that in 71% of the cases the household has saved in the preceding year, and in 13% of the observations the household owns stocks. In our sample, slightly more than half of our data points concern households with a religious head. The biggest religious group is the Catholic one, followed by the Protestants, in line with the overall Dutch population. It also becomes clear from Table 2 that there is variation in economic attitudes, which will enable us to get an understanding of the interplay between religious background, economic beliefs and preferences, and financial decisions.

### 4.3. Empirical strategy

We first investigate to which degree religiosity is associated with differences in economic attitudes. We estimate the following multivariate model:

$$E_{it} = \alpha_1 + X'_{it}\beta + C'_{it}\gamma + T + \varepsilon_{1it}, \quad (1)$$

where $E_{it}$ is the economic attitude of interest (e.g., THRIFT) for household $i$ in year $t$. $X_{it}$ are the religion dummy variables (e.g., CATHOLIC) and $C_{it}$ are our control variables (e.g., AGE, MALE).[9] In all equations, $T$ stands for time fixed effects (i.e., year dummies), while the alphas ($\alpha$) are intercepts and the epsilons ($\varepsilon$) are error terms. Given the nature of our dependent variables, we estimate ordered probit models. In line with Petersen (2009), we cluster standard errors per household to account for unobserved household effects: residuals may be correlated across time for the same household.[10] Our interest mainly lies in the coefficient $\beta$, which gives information on the relationship between religiosity and economic attitudes, but we will also discuss the coefficients on the control variables ($\gamma$). Section 5.1 discusses the results of this analysis.

Second, we estimate the reduced-form relationship between religion and financial decision-making:

$$Y_{it} = \alpha_2 + X'_{it}\lambda + C'_{it}\mu + T + \varepsilon_{2it}, \quad (2)$$

where $Y_{it}$ captures the household finance variable (SAVED, STOCKS, or % STOCKS), while $X_{it}$, $C_{it}$, and $T$ stand for the same religion dummies, control variables, and time fixed effects as before. The coefficients $\lambda$ measure the correlation between religious background and financial decisions. We now estimate our models using probit or tobit, depending on the nature of the left-hand side variable. Again, we cluster standard errors per household. The relationship between religion and household finance is documented in Section 5.2.

Third, we want to investigate whether the economic attitudes can serve as channels through which religion 'affects' household finance. We therefore expand eq. (2) with the economic attitude variables:

$$Y_{it} = \alpha_3 + E'_{it}\kappa + X'_{it}\lambda^* + C'_{it}\mu^* + T + \varepsilon_{3it}. \quad (3)$$

We are interested in how the coefficients on the religious affiliation dummies change (from $\lambda$ to $\lambda^*$) after controlling for the economic attitudes. The results are presented in Section 5.3.

[9] For AGE, LN(INCOME + 1), and LN(NET WORTH + 1), we also include squared terms.

[10] An alternative way to account for unobserved household effects is estimating a random effects model, which will result in correctly sized confidence intervals as long as the household effect is permanent (Petersen, 2009). Therefore, as a robustness check, we repeat all analyses with household random effects. We find that the results (not reported) and conclusions are very similar to the ones shown in Section 5.

## 5. Results

### 5.1 Religion and economic attitudes

We first want to verify that the economic attitudes outlined in the literature review indeed differ over religious affiliations. Table 3 outlines the results of the ordered probit estimation of eq. (1), with the different economic attitudes as dependent variables, and the religion dummies and control variables as independent variables. As explained before, each model also includes a constant and time fixed effects, but those results are not shown. At the bottom of Table 3, we show the number of observations, the pseudo R-squared, and the results for a joint significance Wald test and a similar test on the equality of the coefficients for CATHOLIC and PROTESTANT.

Table 3 shows that different religious denominations are associated with different economic attitudes, even when controlling for a wide range of demographic and background characteristics. Our interest lies with the coefficients on the Catholic and Protestant dummies. Catholic households attach significantly more importance to thrift. Holding all controls constant at the mean, a calculation of the marginal effects (not reported) shows that Catholics have a chance to 'totally agree' that 'being careful with money is an important character trait' that is 5.3 percentage points above that of non-Catholics. In the overall population, about 30% of all respondents 'totally agree' with this statement, making the effect also economically significant. In line with this result, we also see a highly significant positive coefficient on CATHOLIC in the model on RISK AVERSION. Next, the results on the INTERNAL LOCUS model indicate that Protestants are less likely to 'totally agree' that their life is determined by their own actions; a Protestant affiliation decreases the probability with 4.6 percentage points. At the same time, the results for LOW RESPONSIBILITY indicate that Protestants still find it important to assume responsibility over financial decisions. We see significantly negative coefficients on the religion dummies in the DISTRUST model: both Catholics and Protestants are more trusting than the overall population. They also have stronger bequest motives; the coefficient on CATHOLIC implies a 10.1 percentage point lower likelihood of finding it 'very unimportant' to leave money or other assets to their children. Finally, Catholics and Protestants have significantly longer planning horizons than non-religious households.

The test statistics at the bottom of Table 3 indicate that in all cases the coefficients on CATHOLIC and PROTESTANT are jointly significant at the 0.10 level. The equality of coefficients is rejected in the models that explain INTERNAL LOCUS, LOW RESPONSIBILITY, and BEQUEST MOTIVE. Protestants have a significantly more external locus of control, higher sense of financial responsibility, and weaker bequest motive than Catholics.

We generally find strong effects on our religion variables. This is striking given that we include a lot of control variables. With respect to these controls, we see that age comes out significantly in many of our models. Based on the coefficients on $AGE^2$, it seems that older people are more thrifty and less trusting, and have a

**Table 3** Religion and economic attitudes

| | Thrift | Risk aversion | Internal locus | Low responsibility | Distrust | Bequest motive | Time horizon |
|---|---|---|---|---|---|---|---|
| CATHOLIC | 0.1497** | 0.1171*** | −0.0525 | −0.0010 | −0.2003*** | 0.2724*** | 0.0923*** |
| | 0.0642 | 0.0382 | 0.0587 | 0.0600 | 0.0459 | 0.0408 | 0.0360 |
| PROTESTANT | 0.0931 | 0.0620 | −0.3796*** | −0.1409** | −0.2470*** | 0.1266*** | 0.0717* |
| | 0.0672 | 0.0431 | 0.0674 | 0.0657 | 0.0500 | 0.0449 | 0.0390 |
| OTHER RELIGION | −0.0038 | 0.0044 | −0.2369** | −0.1793* | −0.2877*** | 0.2631*** | 0.0005 |
| | 0.0948 | 0.0653 | 0.1090 | 0.0949 | 0.0736 | 0.0751 | 0.0604 |
| AGE | −0.0444*** | 0.0066 | 0.0001 | 0.0256** | −0.0243** | −0.0503*** | 0.0440*** |
| | 0.0137 | 0.0086 | 0.0128 | 0.0116 | 0.0103 | 0.0088 | 0.0074 |
| $AGE^2$ | 0.0005*** | 0.0000 | 0.0000 | −0.0001 | 0.0003*** | 0.0005*** | −0.0005*** |
| | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| MALE | −0.0467 | −0.2789*** | −0.0244 | 0.1167* | 0.1160** | 0.0292 | −0.0228 |
| | 0.0693 | 0.0479 | 0.0693 | 0.0649 | 0.0572 | 0.0512 | 0.0437 |
| PARTNER | 0.0105 | 0.0598 | −0.0856 | 0.1654*** | 0.0577 | 0.0425 | 0.0488 |
| | 0.0643 | 0.0452 | 0.0670 | 0.0622 | 0.0525 | 0.0470 | 0.0392 |
| CHILDREN | 0.0053 | −0.0192 | −0.0372 | 0.0505* | 0.0044 | 0.2058*** | −0.0346** |
| | 0.0297 | 0.0154 | 0.0311 | 0.0273 | 0.0189 | 0.0163 | 0.0153 |
| BAD HEALTH | −0.0928 | −0.0165 | −0.2354*** | 0.2394*** | 0.1269*** | 0.0009 | 0.0411 |
| | 0.0580 | 0.0371 | 0.0633 | 0.0580 | 0.0467 | 0.0385 | 0.0340 |
| EMPLOYED | −0.0933 | 0.0132 | 0.2547*** | −0.0559 | −0.0624 | −0.1447*** | 0.0307 |
| | 0.0846 | 0.0539 | 0.0990 | 0.0866 | 0.0630 | 0.0521 | 0.0498 |
| SELF-EMPLOYED | −0.4108** | −0.0055 | 0.3847** | −0.0185 | −0.2500** | −0.0164 | 0.1082 |
| | 0.1918 | 0.0818 | 0.1527 | 0.1463 | 0.1127 | 0.0900 | 0.0820 |
| RETIRED | −0.0078 | −0.0321 | 0.3424*** | −0.2608*** | −0.0676 | −0.0004 | −0.0370 |
| | 0.1111 | 0.0594 | 0.1160 | 0.1013 | 0.0676 | 0.0557 | 0.0514 |
| UNIVERSITY | −0.1066 | −0.0534 | 0.0139 | −0.3064*** | 0.0006 | −0.1507*** | 0.1649*** |
| | 0.0753 | 0.0453 | 0.0740 | 0.0763 | 0.0575 | 0.0498 | 0.0429 |
| VOCATIONAL | −0.0652 | −0.0114 | 0.0617 | −0.2412*** | 0.0373 | −0.1625*** | 0.1231*** |
| | 0.0629 | 0.0384 | 0.0607 | 0.0601 | 0.0463 | 0.0406 | 0.0345 |
| PRE-UNIVERSITY | −0.0900 | −0.0992* | 0.0260 | −0.1987*** | 0.0667 | −0.1020* | 0.0935* |
| | 0.0883 | 0.0524 | 0.0821 | 0.0775 | 0.0579 | 0.0534 | 0.0507 |
| LN(INCOME + 1) | 0.3961*** | 0.3617*** | −0.0986 | 0.2092 | 0.0337 | 0.0753 | −0.1540* |
| | 0.1054 | 0.1088 | 0.1994 | 0.2110 | 0.1313 | 0.1004 | 0.0864 |
| $LN(INCOME + 1)^2$ | −0.0229*** | −0.0190*** | 0.0071 | −0.0164 | −0.0020 | −0.0061 | 0.0107** |
| | 0.0068 | 0.0061 | 0.0110 | 0.0114 | 0.0075 | 0.0058 | 0.0050 |
| LN(NET WORTH + 1) | −0.0724*** | −0.0017 | −0.0463* | 0.0704*** | −0.0283 | −0.1306*** | −0.0825*** |
| | 0.0262 | 0.0160 | 0.0255 | 0.0267 | 0.0181 | 0.0156 | 0.0150 |
| $LN(NET WORTH + 1)^2$ | 0.0072*** | 0.0011 | 0.0026 | −0.0078*** | 0.0024* | 0.0114*** | 0.0095*** |
| | 0.0020 | 0.0012 | 0.0019 | 0.0019 | 0.0014 | 0.0012 | 0.0011 |
| N | 3,606 | 11,435 | 2,762 | 2,761 | 5,535 | 12,416 | 12,526 |
| (Pseudo) $R^2$ | 0.02 | 0.01 | 0.02 | 0.03 | 0.01 | 0.03 | 0.03 |
| $H_0$: C = P = 0 | 5.68* | 9.46*** | 33.57*** | 5.32* | 31.73*** | 44.58*** | 7.42** |
| $H_0$: C = P | 0.62 | 1.55 | 21.60*** | 3.95** | 0.75 | 9.92*** | 0.25 |

*Notes*: Table 3 shows the results of a multivariate ordered probit regression analysis, with the economic attitudes as dependent variables (eq. (1)). All variables are defined in Table 1. The model also includes a constant and year dummies. Standard errors (below coefficients) are clustered on the household level. At the bottom, we show the results for chi-square Wald tests on the joint significance and equality of the coefficients on CATHOLIC (C) and PROTESTANT (P). ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

stronger bequest motive and shorter time horizon. We find that males consider themselves less risk averse and more suspicious, in line with previous research (e.g., Kulich *et al.*, 2011). Another result is that people in bad health have a more external locus of control, are more likely to agree that becoming rich or poor is mainly 'a matter of fate', and are less trusting. Self-employed people attach less importance to thrift, strongly believe that life is what you make of it, and are more trusting. People with a higher education—be it university, a vocational college, or pre-university education—seem to have a higher awareness of individual financial responsibility, a lower bequest motive, and a longer time horizon. Income and net worth variables are also strongly significant in many of our models.

## 5.2 Religion and household finance

The correlation between religious background and financial decision-making is analysed in Table 4. We apply a probit (for the dummy variables SAVED and STOCKS) or tobit (for the variable % STOCKS) model. As before, we include all control variables. Standard errors are again clustered on the level of the household.

Table 4 shows that Catholic and Protestant household heads are more likely to put aside money (SAVED), controlling for age, gender of the respondent, household structure, health status, employment status, educational level, income, net worth, and year effects. The effect is similar in magnitude for Catholic and Protestant households: the probit coefficients imply that both household types have about three percentage point higher probabilities to have saved than non-religious ones, holding all other variables constant at their mean. Catholics are significantly less likely to invest in stocks. Only 13.2% of the overall population holds stocks, but being Catholic decreases the likelihood of stock ownership with 2.3 percentage points. The same pattern emerges when considering the share of financial assets invested in stocks (% STOCKS).

The coefficients on CATHOLIC and PROTESTANT are also jointly significant in the three models presented in Table 4. However, while we cannot reject equality of coefficients in the case of the savings decision, there seems to be an important difference between Catholics and Protestants in their attitude with respect to stocks.

The financial decisions to save and to invest in stocks are also correlated with most of the demographic and background risk factors included in our analysis. Male household heads are more likely to invest in stocks, but this behaviour is attenuated in two-partner households. This reflects the more cautious investment behaviour of women, which has been frequently documented (e.g., Barber and Odean, 2001) The presence of children and poor health seem to make it more difficult to save money, while retired household heads are more likely to save. More highly educated individuals are more likely to invest in stocks, even when controlling for the employment status and income. As expected, there are also income and net worth effects: as indicated by the squared terms, households with a very high net income or net worth are much more likely to own risky assets such as stocks.

**Table 4** Religion and household finance

| | Saved | Stocks | % Stocks |
|---|---|---|---|
| CATHOLIC | 0.0910* | −0.1278* | −0.0572* |
| | 0.0480 | 0.0668 | 0.0296 |
| PROTESTANT | 0.1054** | 0.0437 | 0.0318 |
| | 0.0538 | 0.0715 | 0.0315 |
| OTHER RELIGION | 0.0722 | 0.1674 | 0.0741 |
| | 0.0842 | 0.1156 | 0.0506 |
| AGE | −0.0101 | −0.0303** | −0.0184*** |
| | 0.0099 | 0.0129 | 0.0058 |
| $AGE^2$ | 0.0000 | 0.0003** | 0.0002*** |
| | 0.0001 | 0.0001 | 0.0001 |
| MALE | −0.1010* | 0.1997** | 0.0894** |
| | 0.0575 | 0.0832 | 0.0395 |
| PARTNER | 0.1487*** | −0.1691** | −0.0974*** |
| | 0.0542 | 0.0762 | 0.0358 |
| CHILDREN | −0.1353*** | 0.0053 | 0.0016 |
| | 0.0192 | 0.0280 | 0.0127 |
| BAD HEALTH | −0.0995** | −0.0027 | −0.0161 |
| | 0.0435 | 0.0617 | 0.0274 |
| EMPLOYED | 0.4331*** | −0.1394 | −0.0543 |
| | 0.0589 | 0.0939 | 0.0423 |
| SELF-EMPLOYED | −0.0837 | −0.1600 | −0.0475 |
| | 0.1002 | 0.1303 | 0.0585 |
| RETIRED | 0.1822*** | −0.0593 | −0.0161 |
| | 0.0663 | 0.0886 | 0.0383 |
| UNIVERSITY | 0.0324 | 0.2318*** | 0.1027*** |
| | 0.0584 | 0.0792 | 0.0346 |
| VOCATIONAL | 0.0614 | 0.1810*** | 0.0691** |
| | 0.0483 | 0.0657 | 0.0289 |
| PRE-UNIVERSITY | −0.1035* | 0.3006*** | 0.1358*** |
| | 0.0625 | 0.0864 | 0.0392 |
| LN(INCOME + 1) | −0.5012*** | −0.3353*** | −0.1869*** |
| | 0.1729 | 0.1224 | 0.0598 |
| $LN(INCOME + 1)^2$ | 0.0350*** | 0.0265*** | 0.0132*** |
| | 0.0096 | 0.0072 | 0.0034 |
| LN(NET WORTH + 1) | 0.0643*** | −0.2783*** | −0.1313*** |
| | 0.0183 | 0.0289 | 0.0135 |
| $LN(NET WORTH + 1)^2$ | 0.0003 | 0.0283*** | 0.0131*** |
| | 0.0014 | 0.0023 | 0.0011 |
| N | 12,543 | 14,010 | 13,726 |
| (Pseudo) $R^2$ | 0.09 | 0.15 | 0.16 |
| $H_0$: C = P = 0 | 5.47* | 6.02** | 3.74** |
| $H_0$: C = P | 0.06 | 5.22** | 7.02*** |

*Notes*: Table 4 shows the results of a multivariate regression analysis, with the financial decisions as dependent variables (eq. (2)). The first two models are estimated using the probit technique, while the third model is estimated using a tobit regression. All variables are defined in Table 1. The models also include a constant and year dummies. Standard errors (below coefficients) are clustered on the household level. At the bottom, we show the results for chi-square Wald tests on the joint significance and equality of the coefficients on CATHOLIC (C) and PROTESTANT (P). ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

## 5.3 Religion, economic attitudes, and household finance

We now want to identify which economic attitudes may explain why religious people take different financial decisions. In Table 5, we therefore add each economic attitude to the model outlined in the previous section, in separate models. Panels A, B, and C show the results for SAVED, STOCKS, and % STOCKS, respectively. The first column of each panel repeats the relevant results of Table 4, to simplify comparison. In the last column, we include all economic attitudes jointly, except DISTRUST for which data are not available for a time frame that overlaps with that of the other variables. All control variables are included in the estimation, but the coefficients on these variables are not reported for reasons of conciseness.

Panel A of Table 5 shows that thrift, higher risk aversion, a higher sense of financial responsibility, and a longer horizon are correlated with the decision to save. These results are in line with expectations. When including all economic attitudes (except DISTRUST), we mainly find evidence in favour of a role for the latter two attitudes. (Surprisingly, we also see a negative coefficient on BEQUEST.) Adding economic attitudes in several cases reduces the coefficients on CATHOLIC. In the last column of Panel A, which includes nearly all economic attitudes, the coefficient on CATHOLIC is no longer statistically significant. The magnitude of the coefficient is about half that of the coefficient in the first column, which does not control for differences in attitudes. Economic attitudes thus help in explaining the higher propensity to save by Catholic households. For Protestants, the results are somewhat less convincing. Although the coefficient in the last column is not significantly different from zero—hinting at a role for economic attitudes—it is very similar to that in the baseline model.

Panel B presents the results for the models with STOCKS as a dependent variable. Lower risk aversion and a longer horizon highly significantly affect stock market participation, while we see marginally significant effects on three other variables. In the last column of Panel B, we see that risk aversion and the awareness of financial responsibility are particularly important in explaining the decision to invest in stocks. The coefficient on CATHOLIC is in some cases still significantly different from zero, but not if we control for all economic attitudes. The different economic beliefs and preferences of Catholics thus also partially rationalize their lower stock market participation. Again, in the last column, we observe a coefficient that is about half the one in the first column. Throughout all models, the coefficient on PROTESTANT is not significantly different from zero.

The results in Panel C of Table 5 generally confirm those in Panel B. Risk aversion, the sense of financial responsibility, and the investment horizon independently impact the decision whether and how much to invest in stocks. When pooling the different variables, the first two are still statistically significantly different from zero. The coefficient on CATHOLIC is now very close to zero.

Summing up, many of the economic attitudes that we have considered seem relevant in the context of religion and household finance, in the sense that they are

**Table 5** Religion, economic attitudes, and household finance

**Panel A: Dependent variable is SAVED**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| THRIFT | | 0.0654** | | | | | | | 0.0377 |
| | | 0.0273 | | | | | | | 0.0317 |
| RISK AVERSION | | | 0.0480*** | | | | | | 0.0061 |
| | | | 0.0100 | | | | | | 0.0193 |
| INTERNAL LOCUS | | | | 0.0358 | | | | | 0.0176 |
| | | | | 0.0237 | | | | | 0.0251 |
| LOW RESPONSIBILITY | | | | | −0.0629*** | | | | −0.0568*** |
| | | | | | 0.0209 | | | | 0.0219 |
| DISTRUST | | | | | | 0.0162 | | | |
| | | | | | | 0.0188 | | | |
| BEQUEST | | | | | | | −0.0103 | | −0.0388** |
| | | | | | | | 0.0105 | | 0.0197 |
| HORIZON | | | | | | | | 0.1469*** | 0.1220*** |
| | | | | | | | | 0.0146 | 0.0293 |
| CATHOLIC | 0.0910* | 0.0562 | 0.0740 | 0.0791 | 0.0787 | 0.1092* | 0.0953** | 0.0783* | 0.0492 |
| | 0.0480 | 0.0748 | 0.0500 | 0.0825 | 0.0822 | 0.0598 | 0.0481 | 0.0477 | 0.0842 |
| PROTESTANT | 0.1054** | 0.1191 | 0.0968* | 0.1377 | 0.1070 | 0.1215* | 0.1054* | 0.0951* | 0.1013 |
| | 0.0538 | 0.0896 | 0.0563 | 0.0999 | 0.0992 | 0.0651 | 0.0539 | 0.0536 | 0.1020 |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 12,543 | 3,606 | 11,434 | 2,605 | 2,605 | 5,392 | 12,416 | 12,525 | 2,485 |
| (Pseudo) $R^2$ | 0.09 | 0.08 | 0.08 | 0.09 | 0.09 | 0.10 | 0.08 | 0.10 | 0.10 |
| $H_0$: C = P = 0 | 5.47* | 1.86 | 3.80 | 2.17 | 1.55 | 4.91* | 5.68* | 4.28 | 1.05 |
| $H_0$: C = P | 0.06 | 0.44 | 0.14 | 0.31 | 0.07 | 0.03 | 0.03 | 0.09 | 0.24 |

(continued)

Table 5 Continued

**Panel B: Dependent variable is STOCKS**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| THRIFT | | 0.0160 | | | | | | | 0.0551 |
| | | 0.0347 | | | | | | | 0.0431 |
| RISK AVERSION | | | −0.1500*** | | | | | | −0.1493*** |
| | | | 0.0130 | | | | | | 0.0245 |
| INTERNAL LOCUS | | | | 0.0610* | | | | | 0.0539 |
| | | | | 0.0345 | | | | | 0.0367 |
| LOW RESPONSIBILITY | | | | | −0.0532* | | | | −0.0587** |
| | | | | | 0.0274 | | | | 0.0288 |
| DISTRUST | | | | | | 0.0438* | | | |
| | | | | | | 0.0252 | | | |
| BEQUEST | | | | | | | 0.0232 | | −0.0232 |
| | | | | | | | 0.0143 | | 0.0266 |
| HORIZON | | | | | | | | 0.0718*** | 0.0490 |
| | | | | | | | | 0.0174 | 0.0347 |
| CATHOLIC | −0.1278* | −0.0720 | −0.1118 | −0.0992 | −0.1002 | −0.1470* | −0.1496** | −0.1489** | −0.0626 |
| | 0.0668 | 0.1108 | 0.0720 | 0.1166 | 0.1168 | 0.0795 | 0.0706 | 0.0703 | 0.1222 |
| PROTESTANT | 0.0437 | 0.0388 | 0.0530 | 0.0849 | 0.0540 | 0.0149 | 0.0248 | 0.0288 | 0.0908 |
| | 0.0715 | 0.1240 | 0.0765 | 0.1291 | 0.1277 | 0.0817 | 0.0754 | 0.0751 | 0.1342 |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 14,010 | 3,606 | 11,435 | 2,762 | 2,761 | 5,535 | 12,416 | 12,526 | 2,485 |
| (Pseudo) $R^2$ | 0.15 | 0.13 | 0.17 | 0.14 | 0.14 | 0.18 | 0.15 | 0.16 | 0.16 |
| $H_0$: C = P = 0 | 6.02** | 0.81 | 4.50 | 1.92 | 1.44 | 4.52 | 6.24** | 6.38** | 1.18 |
| $H_0$: C = P | 5.22** | 0.74 | 4.13** | 1.87 | 1.32 | 3.46* | 4.84** | 5.05** | 1.18 |

(continued)

Table 5 Continued

| Panel C: Dependent variable is % STOCKS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| THRIFT | | 0.0029 | | | | | | | 0.0133 |
| | | 0.0127 | | | | | | | 0.0157 |
| RISK AVERSION | | | −0.0648*** | | | | | | −0.0600*** |
| | | | 0.0058 | | | | | | 0.0101 |
| INTERNAL LOCUS | | | | 0.0208 | | | | | 0.0173 |
| | | | | 0.0145 | | | | | 0.0148 |
| LOW RESPONSIBILITY | | | | | −0.0237** | | | | −0.0260** |
| | | | | | 0.0115 | | | | 0.0117 |
| DISTRUST | | | | | | 0.0159 | | | |
| | | | | | | 0.0126 | | | |
| BEQUEST | | | | | | | 0.0090 | | −0.0063 |
| | | | | | | | 0.0061 | | 0.0106 |
| HORIZON | | | | | | | | 0.0234*** | 0.0030 |
| | | | | | | | | 0.0073 | 0.0137 |
| CATHOLIC | −0.0572* | −0.0100 | −0.0380 | −0.0159 | −0.0154 | −0.0794** | −0.0612** | −0.0609** | 0.0056 |
| | 0.0296 | 0.0414 | 0.0286 | 0.0461 | 0.0461 | 0.0391 | 0.0297 | 0.0295 | 0.0457 |
| PROTESTANT | 0.0318 | 0.0358 | 0.0412 | 0.0557 | 0.0451 | 0.0157 | 0.0273 | 0.0287 | 0.0630 |
| | 0.0315 | 0.0483 | 0.0310 | 0.0529 | 0.0525 | 0.0395 | 0.0320 | 0.0319 | 0.0539 |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 13,726 | 3,583 | 11,294 | 2,745 | 2,744 | 5,409 | 12,212 | 12,304 | 2,471 |
| (Pseudo) $R^2$ | 0.16 | 0.14 | 0.19 | 0.15 | 0.15 | 0.19 | 0.17 | 0.17 | 0.17 |
| $H_0$: C = P = 0 | 3.74** | 0.42 | 2.83* | 0.84 | 0.59 | 2.96* | 3.76** | 3.83** | 0.72 |
| $H_0$: C = P | 7.02*** | 0.80 | 5.64** | 1.58 | 1.13 | 4.94** | 6.77*** | 6.93*** | 0.97 |

*Notes*: Table 5 shows the results of a multivariate regression analysis, with the financial decisions as dependent variables (eq. (3)). The models in Panels A and B are estimated using the probit technique, while the models in Panel C are estimated using tobit regressions. All variables are defined in Table 1. The models also include a constant, year dummies, and all previously used control variables. Standard errors (below coefficients) are clustered on the household level. At the bottom of each panel, we show the results for chi-square Wald tests on the joint significance and equality of the coefficients on CATHOLIC (C) and PROTESTANT (P). ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

useful in explaining the higher (resp. lower) propensity to save (resp. invest in stocks) of Catholic households. We find weaker evidence that they also explain Protestants' savings behaviour.

## 6. Conclusion

Although recent research has made clear that religion can be an important force on the macro level, less is known about the role religion plays on the micro level of the individual or the household. Therefore, this study tries to answer three related questions, using Dutch data from the DNB Household Survey (1995–2008). First, do households belonging to specific religious denominations have different economic attitudes than non-religious households? Second, do they take different financial decisions? Third, can the differences in economic attitudes explain the differences in financial decisions?

With respect to economic attitudes, we conclude that Catholics and Protestants consider themselves more trusting, care more about leaving money to their children, and have longer planning horizons than non-religious households. Additionally, Catholics attach more importance to thrift and are relatively averse to taking risks, while Protestants are less likely to think that their life is determined by their own actions and have a relatively greater sense of individual responsibility. Next, we show that religious household heads are more likely to put aside money than non-religious individuals, and that especially Catholic households are less likely to invest in risky assets such as stocks. That we find (statistically and economically) significant results on our religion variables in these models is striking given the wide range of control variables included. Many of these demographic variables and background risk factors have a strong and consistent impact on both economic attitudes and household finance. For example, in line with previous research, we find that male household heads are less risk averse, and are also more likely to invest in stocks.

After including both economic attitudes and religious affiliation dummies as independent variables, we conclude that the higher propensity to save and lower stock market participation of Catholics can to a substantial extent be explained by differences in economic beliefs and preferences. Although our results suggest that religious beliefs may impact financial decision-making through differences in economic attitudes, future research will have to use more exogenous measures of religiosity to infer causality.

## Acknowledgements

A previous version of this paper circulated under the title 'Where angels fear to trade: the role of religion in household finance'. The authors thank CentERdata for help in the data collection, and the editor, two anonymous referees, Fabio Braggion, Marcel Das, Johannes De Latre, Michael Haliassos, Staf Hellemans, Dick den Hertog, Tullio Jappelli, Lisa Keister, Bertrand Melenberg, Radomir Todorov, Vera Toepoel, and seminar participants at Tilburg University for valuable comments and suggestions.

## Funding

Netherlands Organisation for Scientific Research (Toptalent-grant 021.001.004 to C.S.).

## References

**Alesina, A. and La Ferrara, E.** (2002) Who trusts others? *Journal of Public Economics*, **85**, 207–34.

**Alessie, R., Hochguertel, S., and Van Soest, A.** (2002) Household portfolios in the Netherlands, in L. Guiso, M. Haliassos, and T. Jappelli (eds) *Household Portfolios*, MIT Press, Cambridge, MA.

**Alessie, R., Lusardi, A., and Van Rooij, M.** (2011) Financial literacy and stock market participation, *Journal of Financial Economics*, forthcoming.

**Ameriks, J. and Zeldes, S.P.** (2004) How do household portfolio shares vary with age? Working Paper, Columbia University, New York.

**Arruñada, B.** (2010) Protestants and Catholics: similar work ethic, different social ethic, *Economic Journal*, **120**, 890–918.

**Barber, B.M. and Odean, T.** (2001) Boys will be boys: gender, overconfidence, and common stock investment, *Quarterly Journal of Economics*, **116**, 261–92.

**Barro, R.J. and McCleary, R.M.** (2003) Religion and economic growth across countries, *American Sociological Review*, **68**, 760–81.

**Barsky, R.B., Juster, F.T., Kimball, M.S., and Shapiro, M.D.** (1997) Preference parameters and behavioral heterogeneity: an experimental approach in the Health and Retirement Study, *Quarterly Journal of Economics*, **112**, 537–79.

**Becker, S.O. and Woessmann, L.** (2009) Was Weber wrong? A human capital theory of Protestant economic history, *Quarterly Journal of Economics*, **124**, 531–96.

**Bellemare, C. and Kröger, S.** (2007) On representative social capital, *European Economic Review*, **51**, 183–202.

**Benjamin, D.J., Choi, J.J., and Fisher, G.** (2009) Religious identity and economic behavior, Working Paper No. 15925, NBER, Cambridge, MA.

**Blum, U. and Dudley, L.** (2001) Religion and economic growth: was Weber right? *Journal of Evolutionary Economics*, **11**, 207–30.

**Boone, C., De Brabander, B., and Van Witteloostuijn, A.** (1996) CEO locus of control and small firm performance: an integrative framework and empirical test, *Journal of Management Studies*, **33**, 667–700.

**Breuer, W. and Salzmann, A.J.** (2009) National culture and household finance, available at http://ssrn.com/abstract=1448698.

**Brown, J.R., Ivković, Z., Smith, P.A., and Weisbenner, S.** (2008) Neighbors matter: causal community effects and stock market participation, *Journal of Finance*, **63**, 1509–31.

**Campbell, J.Y.** (2006) Household finance, *Journal of Finance*, **61**, 1553–604.

**Campbell, J.Y. and Viceira, L.M.** (2002) *Strategic Asset Allocation*, Oxford University Press, Oxford.

**Cantoni, D.** (2009) The economic effects of the Protestant Reformation: testing the Weber hypothesis in the German lands, Working Paper, Harvard University, Cambridge, MA.

**Christelis, D., Jappelli, T., and Padula, M.** (2009) Cognitive abilities and portfolio choice, *European Economic Review*, **54**, 18–39.

**Dekker, G., De Hart, J., and Peters, J.** (1997) *God in Nederland*, Anthos, Amsterdam.

**Dimmock, S.G. and Kouwenberg, R.** (2010) Loss-aversion and household portfolio choice, *Journal of Empirical Finance*, **17**, 441–59.

**Fink, G. and Redaelli, S.** (2005) Understanding bequest motives—an empirical analysis of intergenerational transfers, DNB Working Paper No. 42, De Nederlandsche Bank, Amsterdam.

**Georgarakos, D. and Pasini, G.** (2010) Trust, sociability and stock market participation, available at http://ssrn.com/abstract=1397236.

**Glaeser, E.L. and Glendon, S.** (1998) Incentives, predestination and free will, *Economic Inquiry*, **36**, 429–43.

**Glaeser, E.L. and Sacerdote, B.I.** (2008) Education and religion, *Journal of Human Capital*, **2**, 188–215.

**Guiso, L., Haliassos, M., and Jappelli, T.** (eds) (2002) *Household Portfolios*, MIT Press, Cambridge, MA.

**Guiso, L. and Jappelli, T.** (2009) Financial literacy and portfolio diversification, Working Paper No. 212, Centre for Studies in Economics and Finance, Naples.

**Guiso, L., Sapienza, P., and Zingales, L.** (2003) People's opium? Religion and economic attitudes, *Journal of Monetary Economics*, **50**, 225–82.

**Guiso, L., Sapienza, P., and Zingales, L.** (2008) Trusting the stock market, *Journal of Finance*, **63**, 2557–600.

**Halek, M. and Eisenhauer, J.G.** (2001) Demography of risk aversion, *Journal of Risk and Insurance*, **68**, 1–24.

**Halman, L., Luijkx, R., and Van Zundert, M.** (2005) *Atlas of European Values*, Brill Academic Publishers, Leiden.

**Hilary, G. and Hui, K.W.** (2009) Does religion matter in corporate decision making in America? *Journal of Financial Economics*, **93**, 455–73.

**Hochguertel, S., Alessie, R., and Van Soest, A.** (1997) Savings accounts versus stocks and bonds in household portfolio allocation, *Scandinavian Journal of Economics*, **99**, 81–97.

**Hong, H., Kubik, J.D., and Stein, J.C.** (2004) Social interaction and stock market participation, *Journal of Finance*, **59**, 137–63.

**Hood, M., Nofsinger, J.R., and Varma, A.** (2009) *Sin stocks and the religious investor*, Working Paper, Washington State University, Pullman, WA.

**Iannaccone, L.R.** (1998) Introduction to the economics of religion, *Journal of Economic Literature*, **36**, 1465–95.

**Keister, L.A.** (2003) Religion and wealth: the role of religious affiliation and participation in early adult asset accumulation, *Social Forces*, **82**, 175–207.

**Knippenberg, H.** (1991) *De Religieuze Kaart van Nederland: Omvang en Geografische Spreiding van de Godsdienstige Gezindten vanaf de Reformatie tot Heden*, Van Gorcum, Assen.

**Kulich, C., Trojanowski, G., Ryan, M.K., Haslam, S.A., and Renneboog, L.D.R.** (2011) Who gets the carrot and who gets the stick? Evidence of gender disparities in executive remuneration, *Strategic Management Journal*, **32**, 301–21.

**Kumar, A., Page, J.K., and Spalt, O.G.** (2011) Religious beliefs, gambling attitudes, and financial market outcomes, *Journal of Financial Economics*, forthcoming.

**Landes, D.** (1998) *The Wealth and Poverty of Nations: Why Some Are So Rich and Some So Poor*, WW Norton & Company, New York.

**Miller, A.S. and Hoffmann, J.P.** (1995) Risk and religion: an explanation of gender differences in religiosity, *Journal for the Scientific Study of Religion*, **34**, 63–75.

**Petersen, M.A.** (2009) Estimating standard errors in finance panel data sets: comparing approaches, *Review of Financial Studies*, **22**, 435–80.

**Puri, M. and Robinson, D.T.** (2007) Optimism and economic choice, *Journal of Financial Economics*, **86**, 71–99.

**Salaber, J.** (2009) The determinants of sin stock returns: evidence on the European market, available at http://ssrn.com/abstract=1443187.

**Shu, T., Sulaeman, J., and Yeung, E.** (2010) Local religious beliefs and organizational risk-taking behaviors, available at http://ssrn.com/abstract=1523770.

**Stango, V. and Zinman, J.** (2009) Exponential growth bias and household finance, *Journal of Finance*, **64**, 2807–49.

**Stulz, R.M. and Williamson, R.** (2003) Culture, openness, and finance, *Journal of Financial Economics*, **70**, 313–49.

**Welch, M.R., Sikkink, D., and Loveland, M.T.** (2007) The radius of trust: religion, social embeddedness and trust in strangers, *Social Forces*, **86**, 23–46.

**Wetenschappelijke Raad voor het Regeringsbeleid** (2006) *Geloven in het Publieke Domein: Verkenningen van een Dubbele Transformatie*, Amsterdam University Press, Amsterdam.