Essays in Cultural Economics

Von der Fakultät Wirtschaftswissenschaften
der Leuphana Universität Lüneburg

zur Erlangung des Grades
Doktorin der Wirtschafts- und Sozialwissenschaften (Dr. rer. pol.)
genehmigte

Dissertation

von
Anja Köbrich León (geb. Klaubert)

aus Rodewisch

Die einzelnen Beiträge des kumulativen Dissertationsvorhabens sind oder werden wie folgt in Zeitschriften veröffentlicht:

"Religion and Economic Outcomes - Household Savings Behavior in the USA", University of Lüneburg Working Paper Series in Economics 268, 2013 (eingereicht).

"Religious Activity, Risk Taking Preferences, and Financial Behavior: Empirical Evidence from German Survey Data", University of Lüneburg Working Paper Series in Economics 269, 2013 (eingereicht); with Christian Pfeifer.

"An Empirical Note on Religiosity and Social Trust using German Survey Data", Economics Bulletin, 33(1), 753-763; 2013; with Christian Pfeifer.

"Does Cultural Heritage affect Employment decisions – Empirical Evidence for First- and Second-Generation Immigrants in Germany", University of Lüneburg Working Paper Series in Economics 270, 2013.

Elektronische Veröffentlichung des gesamten kumulativen Dissertationsvorhabens inkl. einer Zusammenfassung unter dem Titel:
Essays in Cultural Economics - Economic Consequences of Religion

Veröffentlichungsjahr: 2013

Veröffentlicht im Onlineangebot der Universitätsbibliothek unter der URL:
http://www.leuphana.de/ub

Acknowledgements

Contents

List of Tables

1 Introduction

In 1980, the Arab world realized a GDP per capita (adjusted for purchasing power parity) PPP of USD 2,958, while North America reached USD 12,067, and the Euro area USD 8,889. While comparing these values in 2010, little has changed in this pattern. While the Arab world doubled its GDP per capita in PPP, the Euro area and North America almost quadrupled their GDP per capita in PPP. In the same period, the GDP per capita of China rose from USD 250 to USD 7,533. However, these countries differ not only in their living standards, but also display a high heterogeneity with respect to social and political indicators, as *Table 1.1* reveals.

Table 1.1: Economic development indicators

Region	GDP per capita, PPP 2010	GDP per capita, PPP 1980	% Primary school enrollment	Life expectancy
North America	45,862.02	12,067.40	95.95	78.50
Euro area	34,326.86	8,889.25	98.90	80.73
Latin America & Caribbean	11,422.10	3,423.76	95.39	74.14
East Asia & Pacific	9,629.18	1,214.75	96.09	73.25
Arab World	8,683.49	2,958.21	85.65	70.38
China	7,533.00	250.16		
South Asia	3,069.93	424.52	92.28	65.29

Notes: Data is drawn from the World Bank's World Development Indicators Database for the year 2010. GDP is in PPP current international dollars.

While neoclassical growth theories emphasize the role that diminishing returns to capital play in explaining these distinct patterns in economic and social development, Abramovitz (1994) expands these thoughts and introduces the concept of "social capability". While determining whether countries have the potential to increase productivity to catch up with more developed countries or even forging ahead of them, social capability encompasses productivity growth relevant factors, apart from capital and labor, which are not directly considered in neoclassical production functions. Thus, country specific factors, such as political and legal institutions as well as historical conditions and cultural values may also play a crucial role in determining a country's productivity growth.

This thesis focuses on culture since recently, in light of the global financial crisis, the discourse on management earnings and a stereotyping fear of Islamic culture the public

awareness of the importance of cultural values and behavioral norms is increasing. However, neoclassical economists tend to neglect the role cultural values may play in determining, at least partly, human behavior, because they are more concentrated on the analysis of differences in individual or aggregate economic outcomes attributable to distinct incentives, such as special taxes or prices, and differing opportunity sets, such as those given by an institutional framework or certain property rights. Thereby individual values und preferences are assumed to be stable over time and not to vary substantially between individuals (Becker, 1996). However, cultural values may also be seen in light of utility maximization, incentives, and opportunity sets. Cultural norms as informal institutions impose moral and ethical rules to individuals to encourage them to behave in a specific way. Exemplarily, just as specific religious rules may facilitate the establishment of property rights, certain moral values may restrict risky behavior or impose restrictions on women to participate at the labor market. Thus, in line with Becker and Tomes (1994), one may argue that a child's upbringing in a specific cultural environment may affect individual opportunity sets. Consequently, cultures may have significant effects on individual economic behavior, such as labor market choices, savings decisions, or educational attainment. Given that culture is mostly a time-invariant factor at the country level, another reason why economists recently ignored cultural influences on economic outcomes may be seen in challenges to establish "a causal effect of culture [since] it is endogenous to economic development" (Tabellini, 2010, p. 678). That is, separating its causal effect from other country-specific characteristics, such as a country's economic institutions or its legal framework, is difficult. Applying aggregated data at the country and regional level may lead to a distorted relation between culture and economic outcomes due to other unobserved characteristics, such as a religious war centuries ago, for which one cannot control (Guiso et al., 2003). Thus, the link between culture, attitudes, and economic behavior, respectively, can be best studied with microdata on the individual and household level.

This thesis aims to make a contribution to the question of whether culture may play a quantitatively important role in explaining different economic outcomes across individuals. Thereby, to keep it simple, no detailed distinctions are made between "values", "tastes", "preferences", and "attitudes" throughout the thesis, and, thus, these terms are used interchangeably. The argument suggested is that, since culture, defined as "those customary beliefs and values that ethnic, religious and social groups transmit fairly unchanged from

generation to generation" (Guiso et al., 2006, pp. 24), is mainly acquired by internalizing the attitudes, beliefs and values as well as the behavioral norms of a cultural group (Bisin and Verdier, 2011), upbringing in a certain cultural environment, or more specifically, in a certain religious tradition, might endow individuals with specific cultural capital. This may be seen as those ethical and moral codes governing an individual's incentives and opportunity sets. For cultural capital to affect individual economic outcomes, two conditions must be established. First, cultural values and norms need to be shown to have an influence on individual economic attitudes, such as thriftiness, risk aversion, or working tastes. Second, these attitudes need to affect actual individual economic behavior, such as individual savings and investment choices, or individual working behavior. Using distinct econometrical methods to quantify the assumed relation between culture and economic attitudes and behavior, respectively, this thesis provides four empirical studies applying individual and household level data for either the USA or Germany, two major developed economies that are known to face distinct cultural frameworks. Thereby the focus is on individual savings, investing and labor supplying behavior as the main driving forces of economic growth at the aggregate level. While *Chapter 2* considers the reduced form approach, that is, the direct relation between cultural variables and individual economic outcomes, *Chapters 3* to *5* take explicitly individual economic attitudes into consideration.

Since culture is a broad concept that is hard to quantify, it is common among economists to use proxies for measuring culture, such as religious belief or ethnicity, which are assumed to capture the underlying normative values and rules of culture. *Chapters 2* to *4* use individual religious belief, as the most common proxy for culture. The importance of religious factors is recently apparent, when Protestant Europe strives against the ongoing debt crisis of mainly Catholic and Orthodox countries. However, the importance of religious traditions is very heterogeneous across various countries in the world. While some show religiosity rates from more than 90% of the population, other countries display lower religious commitment accompanied with higher rates of personal religiosity. Nevertheless, in the vast majority of the countries, people who consider themselves pure atheists are the minority. In contrast, *Chapter 5* culture is proxied by cultural values prevalent in the individual's country of ancestry.

Assuming that religious beliefs, as a proxy for one's cultural background, may inhibit wealth accumulation by imposing conservative investment rules, C*hapter 2*[1] analyzes the causal relation between individual religiosity, as measured by one's religious affiliation and the frequency of attending religious services as a measure for religious commitment, and individual savings behavior in the USA. On the one hand, according to its GDP per capita in PPP, the USA has the strongest economy in the world. On the other hand, the USA may be characterized by a vital religious market (Iannaccone, 1998). While other Western countries, such as Germany, "suffer" from an ongoing secularization trend and a growing tendency of private forms of religiosity since the beginning of the 1990's, the majority of the U.S. 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). Further, the religious market in the USA is determined by a vast number of religious traditions and denominations. Using individual survey data, namely the Panel Study of Income Dynamics (PSID), covering the period from 2003 to 2009, cross-sectional empirical methods are used to get an impression of the relationship between religiosity and savings behavior. Examining the relation between the probability of owning money in a savings account and religiosity, probit estimations reveal substantial differences in savings behavior between religious individuals in comparison to non-religious. Furthermore, the amount saved by individuals was found to vary across religious groups and between religious people and non-religious people applying the Ordinary Least Squares (OLS) approach. However, these findings are likely to be biased due to the endogeneity of religiosity to savings behavior. In this context, endogeneity may partly arise due to an omitted variables bias, caused by unobserved individual heterogeneity, and partly due to reverse causality. Addressing the endogeneity problem of religiosity, a longitudinal analysis as well as an instrumental variable (IV) approach is carried out. However, neither the fixed effects approach nor the IV

---

[1] "Religion and Economic Outcomes - Household Savings Behavior in the USA" presented at the Society for the Scientific Study of Religion (SSSR, Annual Meeting, Denver, USA, October 2009), the 12th Annual Conference on Regional Discrepancies in Economic and Social Development in Europe (Bulgaria, Sofia, October 2009), the Workshop "Glück im Diskurs zwischen Ökonomie, Philosophie und Religion" (Münster, Germany, April 2010), 85th Annual Conference Western Economic Association (WEA, Portland, USA, October 2010) and the Graduate Workshop of the Institute for the Study of Religion, Economics, and Society (IRES, Santa Ana, USA, June 2012).

estimation, where the religious composition of the region of ancestry origin is used as an instrument for individual religious belief, supports the findings from the cross-sectional analyses. While analyzing the impact of religiosity on an individual's savings behavior may contribute to a better understanding of individual economic decision-making, a deeper knowledge of the motives that drive a household's savings choices may be of importance for policy makers and not only in the USA. Exemplarily, it is exceptional for the planning of welfare spending of governments to know whether individuals were able to save adequately for retirement, education, or healthcare expenditures.

The second study, which is presented in *Chapter 3*[2], examines whether there are religion-induced differences across individuals regarding their savings and investment behavior in Germany. In contrast to the reduced-form approach of *Chapter 2*, this chapter explicitly models the link between religious beliefs, attitudes, and individual behavior. One particular personal attitude, which is of exceptional importance in individual savings and investment decision-making, is an individual's attitude towards taking risks. It is argued that individual religiosity is a determinant of household willingness to take risks, since it shapes relevant individual values and norms. Thus, religious norms are assumed to influence savings and investment choices of households only indirectly. While also being a highly developed country, religiosity is said to play no important role in the everyday life of most Germans, as opposed to Americans. The religious landscape in Germany is characterized by a division between around two-thirds of the population belonging to religious organizations and one-third not being religiously-affiliated. However, in Germany more private forms of religiosity are important, as a study from the Bertelsmann Stiftung revealed. Using data drawn from the German Socio-Economic Panel (GSOEP) for the years 2003 and 2004, we find in an OLS regression that different religious affiliations are associated with distinct financial risk-taking attitudes, controlling for overall level of general risk assessment. Adherents to the two main Christian religions in Germany (Protestants and Catholics) are less risk-tolerant in general,

---

[2] "Religious Activity, Risk Taking Preferences, and Financial Behaviour: Empirical Evidence from German Survey Data" (with Christian Pfeifer) presented at the 10th Tiber Symposium on Psychology and Economics (Tilburg, Netherlands, August 2011), the Association for the Study of Religion, Economics, and Culture (ASREC, Annual Conference, Santa Ana, USA, March 2012), the Scottish Economic Society (Annual Conference, Perth, Scotland, April 2012), 4th Tagung des Arbeitskreises quantitative Religionsforschung (Leipzig, Germany, October 2012).

but not in financial concerns. The same holds for Muslims. Further, religious involvement is associated with higher risk aversion. Secondly, we examine the extent to which religion-induced heterogeneity in risk-taking preferences actually influences investment decisions of individuals in Germany while applying a probit approach. We provide evidence suggesting that religious beliefs and religious involvement influence individual portfolio decisions.

Following the approach in *Chapter 3*, *Chapter 4*[3] analyzes in a research note the correlation between religiosity and social trust using the waves for 2003 and 2004 from the GSOEP. At the individual and household level, social trust, as one form of social capital, plays a crucial role in interpersonal exchange (Putnam, 1993) and in investment decisions (Guiso et al., 2008), since it lowers transaction costs of economic exchange. Religions shape an individual's view on other persons, and hence, how to interact with them. Especially active involvement in religious organizations was found to foster the forming of individual social trust in others by means of the building up of social networks and cooperativeness (Putnam, 2000; Ruffle and Sosis, 2007). Religiosity takes into account religious affiliations (Catholic, Protestant, other Christian, Muslim/Islam, Other religions, none) and the frequency of church attendance. In order to measure social trust, we use three outcome variables (willingness to take risks in trusting strangers, frequency of lending personal belongings and money to friends). Our main findings in multivariate linear and ordered probit regressions are: (1) Muslims tend to be less trusting towards strangers and they less often lend personal belongings but not money to friends than other religious groups and not-affiliated persons. (2) Catholics and Protestants do not differ significantly from each other and tend to be more trusting towards strangers but not towards friends than other religious groups and non-affiliated persons. (3) Church attendance seems to play only a minor role in the context of our social trust measures.

Finally, in contrast to the approach of using religious affiliation and one's level of religious involvement as proxies for cultural background, *Chapter 5* describes in a more general framework how culture, as proxied by values prevalent in the individual's country of ancestry regarding working women, is related to female labor force participation (LFP) in Germany. The participation rate of women in the labor market shows a sizeable variation across

---

[3] "An Empirical Note on Religiosity and Social Trust using German Survey Data ", Economics Bulletin, 33(1), 753-763; 2013 (with Christian Pfeifer).

countries and across time. Following epidemiological studies conducted for North America (Fernández, 2007; Fernández and Fogli, 2009; Gevrek et al., 2011), this section tests the hypothesis whether, next to structural conditions, cultural norms with regard to existing role models within society about working women influence a woman's participation decision. The persistence of heterogeneity in labor market outcomes across immigrant groups in Germany is used to assess the role cultural norms regarding working women may play in explaining these differences for first- and second-generation immigrant women. To overcome the problems associated with separating the effects of cultural norms from economic and instructional factors relevant for individual working decisions, the impact of culture on women's working behavior is measured by past female LFP rates from the woman's country of origin or their parents, respectively. Further, using this quantitative measure for culture as compared to qualitative measures, such as religiosity and ethnicity, has the advantage to explicitly model how cultural values may have an effect on female working choices. Using data from the GSOEP for the years 2001 to 2011, compared to findings from Fernández and Fogli (2009) and Gevrek et al (2011), who use large census data sets, I find statistically significant results for the association between cultural norms towards labor market behavior of women merely for first-generation immigrant women in Germany. However, while cultural heritage was found to play an inferior role for second-generation immigrant women's working outcomes, religious identity, especially in the form of Muslim beliefs, exhibits a strong negative relation to labor market behavior of both generations.

Chapter 6 summarizes the main results of the four empirical analyses. Furthermore, some concluding remarks and further research directions are presented.

2 Religion and Economic Outcomes - Household Savings Behavior in the USA

2.1 Introduction

Aggregate savings are the basis for business financing and investment, and, thus, economic growth. Likewise, savings at the individual level are 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) indicates a personal savings 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 background, which here is to be understood as "those customary beliefs and values […] that are inherited [mostly unchanged] by an individual from previous generations" (Guiso et al., 2006, pp. 24). However, since culture is a broad concept that is difficult to measure, the objective of this paper is to test whether individual religious beliefs and religious activity, as the key proxy of one's cultural identity, have explanatory power for heterogeneity in individual savings behavior in the USA. Religious traditions 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. Exemplarily, certain religious rules may impose conservative investment rules and, thus, restrict risky financial behavior and

savings strategies. While Buddhists are asked to renounce worldly pleasures, due to the prohibition of interest (riba), Islam instructs its followers to accumulate capital only in Sharia and Qur'an conform assets.

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 thus 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 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 examining individual savings propensities, 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.

The cross-sectional analysis reveals substantial differences in savings behavior between religious individuals in comparison to non-religious ones using individual survey data, namely the Panel Study of Income Dynamics (PSID), covering the period from 2003 to 2009. Religious people save significantly more than non-religious individuals. These results are robust when 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 variable 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 affects 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 of what Guiso et al. (2006) called 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 savings behavior in different countries of ancestry, such as the aggregate savings ratio, may not be used as instruments for a person's religious background. This would provide an explicit channel through which cultural norms of the individual's ancestry impact recent savings behavior (Fernández and Fogli, 2009). Finally, PSID merely provides a 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. 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.

2.2   Religiosity and Savings Behavior

2.2.1   Institutional background

A central question is whether differences in savings behavior may be partly influenced by religiosity or 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, education, wealth holdings, stage in life-cycle, and availability of information) as well as on the willingness to save (Hussein and Thirlwall, 1999). On the one hand, 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, factors such as individual consumption and time preferences as well as opportunity sets vary substantially between individuals.

There are mainly two channels through which religious beliefs may be associated with both the ability and the willingness to save, and, thus, may shape capital accumulation. First, certain religious teachings may affect savings behavior indirectly and directly. By internalizing 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 indirectly 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 may directly shape individual savings behavior by establishing moral and ethical rules. To maximize their utility devotees have to respect both secular and religious behavioral rules, because they gain utility only from both the consumption of secular and religious goods, like beliefs, values or services. Establishing rules on thriftiness and risk-taking, hence, religious people, ceteris paribus, face a distinct set of behavioral constraints compared to non-religious individuals. Consequently, I suggest finding different savings pattern between the two groups. Likewise, individuals of different religions face divergent incentives to act according to religious rules. Preferring thriftiness before luxury and activity before laziness, major world religions favor similar economic behavioral patterns while asking for different individual efforts to earn salvation (McCleary, 2007; Arruñada, 2010). The more individual effort is required to attain salvation, as a central part of all major world religions, the more religious people will perform the actions necessary to achieve it. While some faiths stresses 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. Exemplarily, obtaining salvation through divine grace alone, "Protestantism led to a set of beliefs which emphasized hard work, thrift, saving, and where economic success was interpreted as consistent with (if not actually signaling) being chosen by God" (Acemoglu et al., 2005, p. 401). While Protestantism encourages worldly success as a sign to be blessed (Predestination theory), Catholics foster the role of faith, confession and good works. Since "worldly achievement is seen as a barrier to being blessed in the afterlife" (Cavalcanti et al., 2007, p. 107), Catholics focus more on less productive virtues, such as charity or daily prayer. Due to the historical regional spreading of the Jewish religion, Jews play a special role. The "Diaspora hypothesis" suggests that, since Jewish families were dispossessed and displaced from their land, they rather accumulate both human and financial capital, instead of physical capital, because the former is less prone to expropriation (Chiswick, 1983). Since human

capital and wealth are crucial for individual savings, Jews are suggested to save more as compared to adherents to other religions.

Second, participation in religious services may also alter an individual's savings preferences and opportunity sets. "[R]eligious 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, participants, who attend religious activities frequently, internalize more profound religious rules related to economic behavior compared to religious individuals who are less involved. As a consequence, they get higher returns on their time and money investments in "religious human capital" (Iannaccone, 1998), and, thus, their religious belief is strengthened. Further, while religious teachings may affect mainly the willingness to save, involvement in religious organizations and participating in religious activities may also affect the ability to save. 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.

2.2.2   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 on the Protestant Ethic [2005 (1904/05)], a growing number of studies[4] 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

---

[4] Due to the variety of contributions studying the impact of culture on economic outcomes, they can solely be reviewed incompletely.

propensity to save and work for Protestants. Today a wide range of macroeconomic factors, like (per capita) GDP growth (Barro and McCleary, 2003; McCleary and Barro, 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) and McCleary and Maro (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 a causal effect of cultural factors on economic development. Culture was proxied by measures of trust, of respect for others, and of reliance on a link between individual effort and economic success. After controlling for country fixed effects, contemporaneous regional education and past urbanization rates, he found that those individual cultural traits are significant positively correlated with per capita GDP levels and growth rates across 69 regions in 8 European countries. Heath et al. (1995) examined the relation between religious doctrine and per capita state income in the USA. They used data from the Statistical Abstract church membership dataset and the Jewish Yearbook for the years 1952, 1971, and 1980. In a pooled cross-section analysis they found that Jewish membership has a positive 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 on educational levels and income. Furthermore, he showed religious market density to negatively affect levels of welfare receipt. Using data from the GSS for the USA, the contribution by Guiso et al. (2006) revealed that the positive attitudes of Catholics towards the value of teaching thriftiness, compared to Protestants and non-religious people, have a positive impact on the national savings rate. However, their analysis did not consider the impact of the attitude towards thriftiness fostered by religion on the individual savings 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 Protestantism 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 (WVS) for 48 countries, H'madoun (2010) showed that the intensity of religious belief is negatively associated to female labor force participation, while participation in religious activities were found to be positively correlated to it. Stulz and Williamson (2003) examined 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, examining a cross-section of countries, Acemoglu et al. (2005) 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. They showed 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 savings ratio, Horioka (2007) doubted that culture is an important explanation of Japan's high savings rate in the past. He showed that the high savings 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 gave a comprising descriptive explanation of Japans high savings rate, a further testing of cultural and religious impacts is missing. Alesina et al. (2003) did not reveal a clear pattern within the correlation of religious diversity and measures of economic growth, such as GDP per capita growth and school enrollment. However, as they stated, religious fractionalization 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, 1983; 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 WVS 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 disappeared. 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 few contributions state 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 savings 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 savings pattern. In contrast to these findings are their results when replicating 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 savings pattern. However, their results do not support the hypothesis that cultural conditions of the country of origin impacts individual savings behavior, "since the savings pattern 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), by now 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.

2.3   Data and Econometric Specification

The data used here is drawn from the PSID, a representative longitudinal study of private households across the United States 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[5] is used. Since, according to the 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, the elderly might dissave by using their savings, on the other hand, 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 a 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, the PSID assigns the country of ancestry to fifteen bread regions in the world.[6]

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 a *Catholic*, *Jew*, or Protestant in the form of *Mainline* and *Conservative*, in the sense of more traditional Protestant denominations, or adherent to *Other religions*.[7] The religious composition in the sample used reflects the heterogeneity in the religious landscape of the USA. *Table 2.1* 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

---

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

[6] A classification of world regions according to PSID can be found in Appendix 2.A, *Table 2.A.1*.

[7] Appendix 2.B provides a categorization of the different world religions.

Protestantism and to the Catholic Church, respectively. 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 as 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 2.1* also reports the distribution of the regularity of church attendance in the sample. Almost half of the persons are taking part regularly 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 a month.

Table 2.1: Descriptive statistics

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 (reference not-affiliated):				
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 (reference: 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
Endogenous 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.

2.3.1 Pooled cross-sectional models

One way to model a household's savings decision would be to consider only cross-sectional information and to pool the data, which has the advantage of a sample enlargement and a higher precision of the estimated coefficients. 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

$$(2.1) \qquad y_{it} = \alpha + \beta\, Religiosity_{it} + \lambda\, X'_{it} + \varepsilon_{it} \qquad\qquad i = 1,...,N,\ t = 1,\ ...,T.$$

In *Equation (2.1)* 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 (2.2)*, is assumed

$$(2.2) \qquad S_{it}^{*} = \alpha + \beta\, Religiosity_{it} + \lambda\, X'_{it} + \varepsilon_{it}.$$

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},

$$(2.3) \qquad S_{it} = \begin{cases} 1 & if & y_{it}^{*} > 0 \\ 0 & if & y_{it}^{*} \leq 0 \end{cases}.$$

Given the latent-variable models in *Equation (2.2)* and *Equation (2.3)*, the probability of savings, assuming ε_{it} to follow a normal distribution function Φ, is given by the pooled probit model in *Equation (2.4)*, which is estimated by maximum-likelihood (ML)

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

The empirical discussion of how much to save may be expressed by a log-linear specification of a pooled model using OLS regressions, as in *Equation (2.5)*

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

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.

2.3.2   Longitudinal analyses

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 savings tastes or socialization effects, then both the pooled probit and the OLS estimator of β in *Equations (2.4)* and *(2.5)* 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. Exploiting the longitudinal structure of the PSID, a fixed effects model is one method to address the endogeneity issue due to omitted variable bias and, thus, to deal with unobserved individual-specific-effects. When analyzing the effect of religiosity on the probability to save, while considering individual unobserved factors, the fixed effects logit[8] model is the appropriate estimation technique. For ε_{it}, independently logistic the probability of savings is given in *Equation (2.6)*

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

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

---

[8] An application of the fixed effects probit model would lead to inconsistent estimators due to the unsolvable "incidental parameters problem".

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}, ..., S_{iT}) conditioning on $s_i = \sum_{t=1}^{T} S_{it}$ is given by *Equation (2.7)*

$$(2.7) \quad Pr(S_{i1}, ..., S_{iT}|controls_{i1}, ..., controls_{iT}, z_i, s_i) = \frac{\prod_{t=1}^{T} exp(controls_{it}'\beta S_{it})}{\sum_{d \in D_i} \prod_{t=1}^{T} exp(controls_{it}'\beta d_t)} \ ,$$

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'.

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 (2.8)*

$$(2.8) \quad ln(Stock\ of\ Savings)_{it} = \alpha + \beta Controls_{it} + z_i + \varepsilon_{it}$$

2.3.3 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). Exemplarily, immigrants from South Korea in the USA often chose to convert from Buddhism to Protestantism when they move up the career ladder.

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[9], 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. 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 who 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 (2.9)* displays the first-stage in the IV framework

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

Here, the causal variable of interest, namely religious affiliation (*Religious belief*) is regressed on the instrument, *Share Religion $_{i,\ Ancestry\ origin}$ x 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 (2.10)*, the predicted values of *$\overline{Religious\ belief}$* are used to estimate its effect on the savings behavior

(2.10) $Savings_{it} = \beta\overline{Religious\ belief}_{it} + \lambda\ X'_{it} + \varepsilon_{it}.$

In *Equation (2.10)* 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

---

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

ancestry instead of relying on self-reported religious tradition. While the 2SLS estimator is used to overcome the possible bias of OLS, it is less efficient. The higher standard errors are caused by the fact that the 2SLS estimator uses only that part of the variance in religious belief that appears as variance in *Religious belief* (Murray 2006).

2.3.4   Explanatory variables

A variety of common control variables related to individual savings decisions is used. Age and a squared age term are included while expecting them to capture the common u-shaped relationship between age and savings suggested by the 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 a 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, missing values were replaced by their predicted values which were obtained by OLS regressions in two rounds. Both income and net worth are censored below at zero. However, including income and assets as regressors 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.[10] 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 a categorical variable measured by dummies for the size of the largest city in the area of residence to control for social conditions related to urban environment. The categories are 10,000-24,999; 25,000-49,999; 50,000-99,999; 100,000-499,999; 500,000 or more inhabitants, where cities with inhabitants less than 10,000 are the reference category. To account for structural differences and varying welfare systems across states s*tate* fixed effects are used. *Table 2.1* 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 the sample is not equally split into males and females, as *Table 2.1* indicates, separate analyses for the genders did not yield noteworthy differences. Approximately 55 percent in the sample are White and married persons. Further, a clear majority of individuals are employed. The empirical results are outlined in the following section.

2.4   Results

2.4.1   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 cross-section non-linear and linear savings functions are estimated. The regression results for the binary savings decisions as a dependent variable are outlined in *Table 2.2*. Given the nonlinearity of probit models, the coefficients represent marginal effects computed at the means of the explanatory variables.

---

[10] 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.

Using the baseline specification, which considers religious affiliation and exogenously determined individual characteristics as explanatory variables, in column (1) of *Table 2.2* 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 differences in the savings behavior between religious and non-religious people 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 in a savings account. Mainline Protestants have a 9.2 percentage point higher probability to save money than non-religious people, whereas they have a statistically significant 5.4 percentage point higher propensity to save money than Conservative Protestants, who display the lowest savings affinity. Notwithstanding they have a 3.8 percentage point higher probability to save money than non-religious people. Catholics compared to Mainline Protestants own almost half often money in a savings account. Both Catholics and adherents to Other religions also show a statistically higher likelihood to save money than non-religious individuals.

Even when controlling for commonly used background variables that are possibly endogenous to religiosity, in column (2) the effects of religious preferences on the probability of positive saving remain positive and statistically 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 point 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 was found. Belonging to an 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 decisions 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 2.2*, 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 point 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.[11]

---

[11] 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

Table 2.2: Cross-sectional analysis on the binary savings decision

	(1)	(2)	(3)
Religion (reference: not-affiliated):			
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 (reference: 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 2.1*	yes	yes	yes
Endogenous control variables as in *Table 2.1*	no	yes	yes
Pseudo-R²	0.1552	0.2791	0.2792
Wald test	2345.688***	4023.093***	2317.766***

Notes: ML-Probit regressions for the probability to hold a savings account. Estimates report marginal effects at the mean of all covariates. Number of observations is 26,724 in specifications (1) and (2) and 12,736 in specification (3). Robust standard errors in parentheses. At the bottom, results for chi-square Wald 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.

In order to avoid the results being driven by individual background characteristics, in columns (2) and (3) further explanatory variables are added. To economize on space these results are omitted from the tables. Detailed regression results including all controls from the cross-sectional models can be found in Appendix 2.C (*Tables 2.C.1* and *2.C.2*). 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 the probability of holding money in a savings account, since they may choose forms of

to save. Therefore, I don't look further at them in the following analysis. Full results on interaction terms are available upon request.

investments with higher returns. Further, different savings patterns 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 the father's grade was, the higher is the respondent's savings propensity. Both family net worth and income are positively related to savings decisions, as is employment. Higher educational attainment is associated with accumulating more assets in the form of money in a savings account, as already Bernheim (1997) showed. 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 2.3* 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 amount 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 do Other religions have saved 61 percent more money, compared to non-religious people, Conservative Protestants save the fewest amount of all religions.

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 in their savings account. While the effects for Jews, Catholics and Mainline Protestants are significant at the 1%-level, the estimates for Conservative Protestants and adherents 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 in their savings accounts than Mainline Protestants. Again behavioral differences between Mainline and Conservative Protestants

were found. 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 the different savings patterns.

Table 2.3: Cross-sectional analysis on the ln(Stock of savings)

	(1)	(2)	(3)
Religion (reference: not-affiliated):			
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 (reference: 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 2.1*	yes	yes	yes
Endogenous control variables as in *Table 2.1*	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). 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.

Since these results might vary with levels of religious participation, the last column of *Table 2.3* considers the frequency of church attendance. The positive relation between being Jewish and being Mainline Protestants 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.[12]

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.

2.4.2   Results for longitudinal analyses

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 models were estimated in *Table 2.4* 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. They can be found in Appendix 2.C, *Table 2.C.3*.

Columns (1) and (2) examine the effect of religious beliefs and participation, respectively, on the binary savings decision of whether to save money, which is coded as 1 if the individual

---

[12] 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.

saved money in a savings account and zero otherwise. Both columns give fixed effects logit estimates estimated by conditional maximum likelihood. Columns (3) and (4) show fixed effects estimates for the impact of religiosity on the amount saved, as measured by the ln(Stock 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.

Before interpreting the coefficients of columns (1) and (2), 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, is used to test for individual fixed effects. The results 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 at the 1% significance level. Thus, estimating random-effects models is not appropriate due to the likely correlation of the unobserved individual effects with other explanatory variables.[13]

---

[13] Using the hybrid method, suggested by Allision (2009), yielded a statistically significant positive association between both religious affiliation, except for Catholics, savings behavior. Further, religious commitment was found to be significantly positive related to individual savings choices. A hybrid model combines a fixed-and a random-effects model. Thereby the time-varying covariates are decomposed into person-specific-means (between-person component) and into deviations from these person-specific means (within-person component). Both components as well as the untransformed time-invariant variables are then included in a random-effects model. The main advantage of using hybrid models in the present context may be seen in the efficient estimation of the mainly time-invariant religiosity coefficients, as the main variable of interest. However, since unobserved individual heterogeneity is likely to be correlated with religiosity, these estimates are biased.

Table 2.4: Fixed effects estimates for the effect of religiosity on the binary savings decision and the ln(Stock of savings)

	(1)	(2)	(3)	(4)
Religion (reference: not-affiliated):				
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 (reference: 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: Columns (1) and (2) show conditional ML-logit fixed effects regressions for the probability to hold a savings account. Columns (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 for a 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.

While interpreting the findings in the first two columns one has to keep in mind that, even though the fixed effects approach is the preferable estimation technique, since it is controlled for all time-invariant unobserved individual characteristics without making the restrictive assumption that the individual effects are uncorrelated with other covariates included in the model, there is a trade-off between reduced omitted variable bias and loss of information as

well as efficiency. First, 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. Individuals who either saved or did not save money are dropped out of the conditional likelihood function. Further, including fixed effects not only "controls" for unobserved individual heterogeneity, but also removes all individual characteristics which do not vary over time. Consequently, a substantial amount of information cannot be used for the estimation. 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. Second, fixed effects models produce inefficient estimates of variables with low within variance, such as religious affiliation and church attendance, where most variance occurs due to between-variation. This lead to high standard errors, as one may see in Table 2.4, and unreliable inferences. ´

Compared with pooled probit in columns (1) and (2) of *Table 2.2*, results from the fixed effects model in column (1) of *Table 2.4* 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 a statistically significant determinant of the savings probability, although the estimates point in the direction expected. On the one hand, 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 are driven by some unobserved time-invariant variables, which affect savings decisions and are correlated with religiosity. On the other hand, 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, columns (3) and (4) of *Table 2.4* 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,

the impact of religious affiliation on the amount saved vanishes in column (3) when compared to the cross-sectional log-linear regressions of *Table 2.3*. While the direction of the effect as well as the magnitude of being a 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 from obtaining 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 the 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.

2.4.3   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 2.6* presents the 2SLS estimates for the influence of religious affiliation on the binary savings decision in columns (1) and (2) as well as on the continuous savings decision in columns (3) and (4). All specifications include the full set of explanatory variables as given in *Table 2.1*. Since these explanatory variables all behave well, they are neither discussed in further detail nor are they shown in *Table 2.6*. However, they can be found in Appendix 2.C., *Table 2.C.4*.

Evaluating the appropriateness of the IV used in column (2), a robust Durbin-Win-Hausman test is performed testing the fact that religious affiliation is exogenous. The null hypothesis that religious affiliation is exogenous is rejected at the 1% significance level. 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 the 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). 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. While this premise is not really testable, Hansen's J test is used to test the null hypothesis that all excluded instruments are valid under the assumption that there are at least enough valid instruments to identify the equation exactly. The Hansen's J test fails strongly to reject the hypothesis of over-identifying restrictions for the binary savings decision.

Table 2.5: First stager egression for the binary savings decision

Share individual religion * ancestry region (reference: not-affiliated individuals with Native American ancestries)	First stage for binary savings decision			
	Catholic	Jew	Protestant	Other religion
	(1)	(2)	(3)	(4)
Share religion * British	0.6836***	-0.0825***	0.3606***	-0.1487***
	(0.0360)	(0.0113)	(0.0417)	(0.0154)
Share religion * Western European	1.1295***	-0.0693***	-0.2141***	-0.1305***
	(0.0174)	(0.0097)	(0.0306)	(0.0131)
Share religion* Eastern European	1.9545***	-0.0708***	-1.1239***	0.4254***
	(0.2320)	(0.0160)	(0.0804)	(0.1138)
Share religion* Northern European	0.0224	-0.0435***	0.5108***	-0.0731***
	(0.0136)	(0.0066)	(0.0214)	(0.0084)
Share religion * Middle Eastern	-0.0042	-0.0509***	-0.4975***	1.0079***
	(0.0391)	(0.0122)	(0.0447)	(0.0140)
Share religion * East Asian	-0.0636**	0.002	-0.6315***	0.9836***
	(0.0307)	(0.0116)	(0.0802)	(0.0203)
Share religion * South / Southeast Asian	-0.1082***	-0.0350***	-0.4743***	0.9656***
	(0.0312)	(0.0083)	(0.0387)	(0.0197)
Share religion * Pacific Islander	1.2561***	-0.0662***	-0.9532***	0.5967**
	(0.3844)	(0.0221)	(0.1355)	(0.2348)
Share religion * Canadian	0.5710***	-0.0856***	0.5099***	-0.1419***
	(0.2067)	(0.0215)	(0.1711)	(0.0191)
Share religion * Latin American	0.9924***	-0.0094***	-0.4415***	-0.1117***
	(0.0188)	(0.0036)	(0.0349)	(0.0203)
Share religion * Caribbean	0.7838***	-0.0681***	-0.0379	-0.0960***
	(0.1320)	(0.0163)	(0.1155)	(0.0252)
Share religion * African	-0.0391***	-0.0023	-0.8269***	1.0740***
	(0.0090)	(0.0021)	(0.0166)	(0.0041)
R^2	0.5768	0.0897	0.3379	0.5388
Overall F-test	868.8617***	0.7409	170.5333***	2872.302***
F-test of excluded instruments	639.30***	4.60***	344.70***	6499.05***
A.-P. multivariate F-test of excluded instruments	42.55***	3.07***	8.59***	131.43***

Table 2.5 (continued)

Share individual religion * ancestry region (reference: not-affiliated individuals with Native American ancestries	First stage for continuous savings decision			
	Catholic	Jew	Protestant	Other religion
	(5)	(6)	(7)	(8)
Share religion * British	0.6879***	-0.0825***	0.3660***	-0.1527***
	(0.0366)	(0.0116)	(0.0422)	(0.0156)
Share religion * Western European	1.1314***	-0.0692***	-0.2070***	-0.1342***
	(0.0176)	(0.0099)	(0.0310)	(0.0133)
Share religion* Eastern European	2.0531***	-0.0691***	-1.1291***	0.3684***
	(0.2306)	(0.0167)	(0.0827)	(0.1127)
Share religion* Northern European	0.0215	-0.0431***	0.5152***	-0.0751***
	(0.0140)	(0.0067)	(0.0217)	(0.0086)
Share religion * Middle Eastern	-0.0062	-0.0530***	-0.4766***	1.0041***
	(0.0420)	(0.0135)	(0.0467)	(0.0136)
Share religion * East Asian	-0.0690**	0.0025	-0.6386***	0.9867***
	(0.0331)	(0.0134)	(0.0909)	(0.0195)
Share religion * South / Southeast Asian	-0.1131***	-0.0375***	-0.4753***	0.9737***
	(0.0325)	(0.0089)	(0.0405)	(0.0199)
Share religion * Pacific Islander	1.1835***	-0.0701***	-0.9330***	0.6484***
	(0.3875)	(0.0228)	(0.1360)	(0.2370)
Share religion * Canadian	0.5654***	-0.0853***	0.5180***	-0.1452***
	(0.2053)	(0.0223)	(0.1724)	(0.0189)
Share religion * Latin American	0.9942***	-0.0092**	-0.4427***	-0.1146***
	(0.0194)	(0.0036)	(0.0361)	(0.0212)
Share religion * Caribbean	0.8372***	-0.0651***	-0.0761	-0.1022***
	(0.1359)	(0.0165)	(0.1192)	(0.0269)
Share religion * African	-0.0363***	-0.002	-0.8274***	1.0731***
	(0.0090)	(0.0022)	(0.0172)	(0.0042)
R^2	0.5776	0.0888	0.3325	0.5189
Overall F-test	877.183***	0.7076992	163.7161***	2798.996***
F-test of excluded instruments	619.28***	4.40***	326.46***	6342.53***
A.-P. multivariate F-test of excluded instruments	39.49***	2.95***	8.57***	124.43***

All regressions control for endogenous and exogenous explanatory variables as given in *Table 2.1* and include a constant. Number of observations is 16,716 in the upper panel of *Table 2.5* and 15,762 in the lower panel of *Table 2.5*. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Analyzing one's decision of whether to save money in the first two columns of Table 2.6, column (2) reveals 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 indicated that the 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. Thus, one may conclude that an individual's 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 certain religious belief because 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 "treasres in heaven" as opposed to "treasures on earth" (Lipford and Tollison, 2003, p. 251). Assuming that traditionalist religionists value present economic outcomes less, to the extent that they may express their strong faith by charitable giving to their congregation, which is an integral part of all major world religions (McCleary, 2007), this financial support may be seen as opportunity costs of savings. Thus, giving away more of their money they exhibit a lower probability to save money in a savings account as compared to people not rooting so deeply in their religious belief. Summing up, although the results for the impact of religious affiliation on the decision of 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 2.6: Probit, OLS and 2SLS estimates for the effect of religious affiliation on the binary savings choice and the ln(Stock of savings)

	Probit	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)
Religion (reference: not-affiliated):				
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 2.1	yes	yes	yes	yes
Robust Durbin-Wu-Hausman test		13.622***		20.551***
Hansen's J statistic		13.008		15.689**

Notes: Column (1) shows ML-Probit regressions for the probability to hold a savings account. Estimates report marginal effects at the mean of all covariates. Column (2) displays conditional ML-logit fixed effects regressions for the probability to hold a savings account. The dependent variable in columns (3) and (4) is the ln(Stock of savings). Column (3) shows OLS estimates and column (4) displays 2SLS estimates. Robust standard errors are in parentheses. At the bottom, results for the Durbin-Wu-Hausman test for exogeneity and Hansen's J-test of over-identifying restrictions are given. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Substantial differences between the estimated coefficients for religious affiliation obtained by OLS in column (3) and the IV approach in column (4) were also found for the ln(Stock of savings) being the dependent variable. Further, standard errors are also substantially higher in column (4) using IV compared to the cross-sectional analysis in column (3). The robust Durbin-Win-Hausman test rejects the null hypothesis that religious affiliation is exogenous at the 1% significance level. 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 a weak correlation between the instruments and religious affiliation is more than 5 percent can be rejected for the effect of Catholicism and Other religions. However, for the effect of Protestantism the maximal relative bias is 20 percent and for being

Jewish it is more than 30 percent. Furthermore, the over-identifying restrictions are rejected at the 5% significance level for the continuous savings decision. As a consequence, the IV estimator will be biased and inconsistent and the IV estimates of the effect of religious belief on the amount saved are not highly credible. Thus, they are not going to be discussed in further detail. On the one hand, 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, one may argue that, while religious belief influence the willingness to save negatively for individuals tied strongly to their religious tradition, it is not a good predictor for individual choices on how much to save.

2.5 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 Carroll et al. (1994, 1999), my results mirror that cultural factors, such as one's religiosity, are robust determinants of individual savings choices, even when 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 2.A

Table 2.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)
Oceanian	South or Southeast Asian (India, Vietnam, Cambodia, Laos, Thailand)
African	Caribbean (etc., Cuba, Haiti, Aruba, Bahamas, Barbados, Guadalupe, Jamaica, Puerto Rico, Republican Dominican)

Table 2.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 2.B

Religious affiliation according to PSID was dived into 5 categories:

<u>Catholics</u>

<u>Jews</u>

<u>Mainline Protestants</u>	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
<u>Conservative Protestants</u>	Baptist; Amish; Mennonite; Christian; Church of God; Seventh Day Adventist; Pentecostal/Assembly of God; Churches of Christ; Christian Science
<u>Other religions</u>	Greek/Russian/Eastern Orthodox; Hindu/Buddhist; Latter Day Saints; Mormon; Jehovah's Witnesses; Other non-Christian: Muslim, Rastafarian, etc.; Other religions

Appendix 2.C

Table 2.C.1: Detailed results for cross-sectional analysis on the binary savings decision

	(1)	(2)	(3)	(4)
Religion (reference: not-affiliated):				
Jews	0.1257***	0.0707**	0.0913**	0.0200
	(0.0263)	(0.0326)	(0.0387)	(0.0880)
Catholic	0.0493***	0.0104	-0.0046	-0.0140
	(0.0124)	(0.0126)	(0.0172)	(0.0191)
Mainline Protestant	0.0924***	0.0476***	0.0370**	0.0174
	(0.0113)	(0.0115)	(0.0155)	(0.0178)
Conservative Protestant	0.0382***	0.0200*	0.0037	-0.0235
	(0.0112)	(0.0104)	(0.0142)	(0.0205)
Other religion	0.0641***	0.0388***	0.0290	0.0048
	(0.0148)	(0.0146)	(0.0239)	(0.0328)
Church attendance (reference: never):				
Less than monthly			0.0543***	0.0300
			(0.0107)	(0.0226)
At least monthly			0.0586***	0.0139
			(0.0115)	(0.0326)
At least weekly			0.0626***	0.0146
			(0.0113)	(0.0321)
Interaction term religious affiliation * church attendance				
Jew * Less than monthly				0.0259
				(0.0233)
Jew * At least monthly				-0.0361
				(0.0417)
Jew * At least weekly				0.0065
				(0.1003)
Catholic * Less than monthly				0.0257
				(0.0275)
Catholic * At least monthly				0.0507
				(0.0363)
Catholic * At least weekly				0.0097
				(0.0371)
Mainline Protestant * Less than monthly				0.0113
				(0.0244)
Mainline Protestant * At least monthly				0.0277
				(0.0316)
Mainline Protestant * At least weekly				0.0240
				(0.0307)
Conservative Protestant * Less than monthly				0.0287
				(0.0324)
Conservative Protestant * At least monthly				0.0574
				(0.0461)
Conservative Protestant * At least weekly				0.0697*
				(0.0411)
Other religion * Less than monthly				-0.0212
				(0.0527)
Other religion * At least monthly				0.0196
				(0.0645)

Table 2.C.1 (continued)

	(1)	(2)	(3)	(4)
Other religion * At least weekly				0.0841
				(0.0542)
Male	0.0997***	-0.0350***	-0.0483***	-0.0358***
	(0.0087)	(0.0098)	(0.0125)	(0.0091)
Age	0.0055**	-0.0098***	-0.0106***	-0.2081***
	(0.0023)	(0.0023)	(0.0030)	(0.0282)
Age squared / 100	-0.0016	0.0119***	0.0132***	0.2198***
	(0.0028)	(0.0028)	(0.0038)	(0.0634)
Race (reference: White):				
Negro	-0.2582***	-0.1765***	-0.1914***	-0.1881***
	(0.0099)	(0.0106)	(0.0140)	(0.0129)
Latino	-0.1878***	-0.1294***	-0.1032***	-0.0959***
	(0.0180)	(0.0183)	(0.0246)	(0.0212)
Other race	-0.0490**	-0.0294	0.0155	0.0132
	(0.0243)	(0.0226)	(0.0258)	(0.0206)
Economic situation as child (reference: poor):				
Varying	0.0473***	0.0222***	0.0302***	0.0241***
	(0.0076)	(0.0072)	(0.0101)	(0.0080)
Pretty well	0.0153*	-0.0015	0.0141	0.0112
	(0.0090)	(0.0087)	(0.0118)	(0.0091)
Education father (reference: No high school degree):				
High school father	0.0929***	0.0465***	0.0446***	0.0381***
	(0.0081)	(0.0078)	(0.0102)	(0.0091)
Some college father	0.1193***	0.0618***	0.0801***	0.0678***
	(0.0093)	(0.0099)	(0.0123)	(0.0119)
College graduated father	0.1620***	0.0706***	0.0724***	0.0455***
	(0.0087)	(0.0110)	(0.0143)	(0.0101)
ln(Net Worth+1)		0.0121***	0.0127***	0.0967***
		(0.0007)	(0.0010)	(0.0088)
ln(Income+1)		0.0779***	0.0718***	0.6663***
		(0.0059)	(0.0084)	(0.0326)
Employment (reference: out of labor force):				
Unemployed		-0.0615***	-0.0463**	-0.0442**
		(0.0145)	(0.0211)	(0.0183)
Employed		0.0513***	0.0687***	0.0549***
		(0.0114)	(0.0164)	(0.0127)
Education (reference: No high school degree):				
High school graduated		0.0648***	0.0669***	0.0687***
		(0.0083)	(0.0104)	(0.0119)
Some college		0.1229***	0.1223***	0.1202***
		(0.0080)	(0.0102)	(0.0116)
College graduated		0.1585***	0.1508***	0.1129***
		(0.0084)	(0.0114)	(0.0113)
More than college		0.1607***	0.1503***	0.1080***
		(0.0089)	(0.0125)	(0.0123)
Marital status		0.0593***	0.0561***	0.0418***
		(0.0106)	(0.0142)	(0.0112)
Number of children		-0.0191***	-0.0220***	-0.0184***
		(0.0030)	(0.0040)	(0.0034)
Metropolitan area fixed effects	no	yes	yes	yes
State fixed effects	no	yes	yes	yes
Pseudo-R²	0.1552	0.2791	0.2792	0.2794
Wald-Test	2345.688***	4023.093***	2317.766***	
Number of observations	26,724	26,724	12,736	12,736

Table 2.C.2: Detailed results for the cross-sectional analysis on the ln(Stock of savings)

	(1)	(2)	(3)	(4)
Religion (reference: not-affiliated):				
Jews	1.7066***	0.6193***	0.5824***	0.6293*
	(0.2216)	(0.1911)	(0.2240)	(0.3729)
Catholic	0.6684***	0.2046**	0.0622	-0.0276
	(0.1175)	(0.0941)	(0.1215)	(0.1948)
Mainline Protestant	0.7588***	0.3355***	0.2100*	0.2205
	(0.1105)	(0.0900)	(0.1152)	(0.1810)
Conservative Protestant	0.2530**	0.1468*	-0.0126	-0.2858*
	(0.1041)	(0.0828)	(0.1086)	(0.1605)
Other religion	0.4772***	0.2270*	0.0598	0.0003
	(0.1558)	(0.1264)	(0.1954)	(0.3439)
Church attendance (reference: never):				
Less than monthly			0.2940***	0.1649
			(0.0834)	(0.1973)
At least monthly			0.4791***	0.1946
			(0.0931)	(0.2720)
At least weekly			0.4814***	0.1897
			(0.0908)	(0.2870)
Interaction term religious affiliation * church attendance				
Jew * Less than monthly				0.0578
				(0.4541)
Jew * At least monthly				-0.0025
				(0.8126)
Jew * At least weekly				-0.5801
				(0.7228)
Catholic * Less than monthly				0.1662
				(0.2748)
Catholic * At least monthly				0.4704
				(0.3396)
Catholic * At least weekly				0.1177
				(0.3537)
Mainline Protestant * Less than monthly				0.0709
				(0.2597)
Mainline Protestant * At least monthly				0.2324
				(0.3285)
Mainline Protestant * At least weekly				0.0393
				(0.3374)
Conservative Protestant * Less than monthly				0.2818
				(0.2432)
Conservative Protestant * At least monthly				0.4110
				(0.3096)
Conservative Protestant * At least weekly				0.6140*
				(0.3188)
Other religion * Less than monthly				-0.0845
				(0.4859)
Other religion * At least monthly				-0.1692
				(0.5641)
Other religion * At least weekly				0.4835
				(0.4933)
Male	1.2187***	-0.1383*	-0.3099***	-0.3097***
	(0.0755)	(0.0820)	(0.1047)	(0.1046)

Table 2.C.2)continued)

	(1)	(2)	(3)	(4)
Age	0.0965***	-0.0434***	-0.0437**	-0.0448**
	(0.0191)	(0.0166)	(0.0217)	(0.0218)
Age squared/100	-0.0452*	0.0649***	0.0695**	0.0712***
	(0.0236)	(0.0207)	(0.0271)	(0.0271)
Race (reference: White):				
Negro	-2.5844***	-1.6180***	-1.7207***	-1.7158***
	(0.0878)	(0.0804)	(0.1023)	(0.1023)
Latino	-1.6974***	-1.1906***	-1.0736***	-1.0744***
	(0.1478)	(0.1308)	(0.1721)	(0.1722)
Other race	-0.2376	-0.1217	0.1544	0.1692
	(0.2004)	(0.1595)	(0.1845)	(0.1840)
Economic situation as child (reference: poor):				
Varying	0.5181***	0.2433***	0.3229***	0.3276***
	(0.0692)	(0.0562)	(0.0791)	(0.0791)
Pretty well	0.3350***	0.1264*	0.2749***	0.2793***
	(0.0805)	(0.0659)	(0.0906)	(0.0908)
Education father (reference: No high school degree):				
High school father	1.0958***	0.5275***	0.5193***	0.5174***
	(0.0837)	(0.0667)	(0.0843)	(0.0842)
Some college father	1.4274***	0.5992***	0.6706***	0.6645***
	(0.1061)	(0.0850)	(0.1030)	(0.1031)
College graduated father	2.0705***	0.7505***	0.7362***	0.7330***
	(0.1003)	(0.0885)	(0.1102)	(0.1101)
ln(Net Worth+1)		0.1677***	0.1682***	0.1675***
		(0.0059)	(0.0083)	(0.0083)
ln(Income+1)		0.6217***	0.6336***	0.6320***
		(0.0304)	(0.0491)	(0.0490)
Employment (reference: out of labor force):				
Unemployed		-0.1763*	-0.0027	-0.0109
		(0.0977)	(0.1450)	(0.1451)
Employed		0.5785***	0.7374***	0.7336***
		(0.0822)	(0.1124)	(0.1124)
Education (reference: No high school degree):				
High school graduated		0.6058***	0.5623***	0.5534***
		(0.0789)	(0.0963)	(0.0964)
Some college		1.2986***	1.2505***	1.2398***
		(0.0842)	(0.1045)	(0.1045)
College graduated		2.0241***	1.8185***	1.8095***
		(0.0985)	(0.1215)	(0.1217)
More than college		2.0555***	1.7881***	1.7709***
		(0.1112)	(0.1382)	(0.1382)
Marital status		0.6058***	0.5952***	0.5960***
		(0.0825)	(0.1066)	(0.1066)
Number of children		-0.2179***	-0.2363***	-0.2325***
		(0.0226)	(0.0294)	(0.0295)
Metropolitan area fixed effects	no	yes	yes	yes
State fixed effects	no	yes	yes	yes
Constant	1.2416***	-3.5590***	-4.3823***	-4.2477***
	(0.3719)	(0.4601)	(0.6181)	(0.6218)
R^2	0.2753	0.4485	0.4435	0.4445
F-Test	330.5651***	204.6419***	118.6016***	101.9746***
Number of observations	25,164	25,164	11,987	11,987

Table 2.C.3: Detailed results for the fixed effects estimates for the binary savings choice and the ln(Stock of savings)

	Binary savings choice Model I		ln(Stock of savings) Model II	
	(1)	(2)	(3)	(4)
Religion (reference: not-affiliated):				
Jews	dropped		2.1823	
			(3.2622)	
Catholic	0.5593		0.238	
	(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 (reference: 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)
Age	-0.02	0.0664	0.1121***	0.1587*
	(0.0416)	(0.1294)	(0.0314)	(0.0943)
Age squared/100	0.0724	-0.0812	-0.0775**	-0.1681
	(0.0501)	(0.1568)	(0.0370)	(0.1123)
Employment status (reference: out of labor force):				
Unemployed	-0.1325	-0.0042	-0.1316	0.0027
	(0.1345)	(0.2630)	(0.1064)	(0.2069)
Employed	0.2905**	0.3745	0.1422	0.3808**
	(0.1163)	(0.2377)	(0.0910)	(0.1834)
ln(Income+1)	0.2507***	0.2161**	0.1815***	0.1323***
	(0.0416)	(0.0882)	(0.0224)	(0.0456)
ln(Net Worth+1)	0.0167**	0.0226	0.0316***	0.0372***
	(0.0074)	(0.0141)	(0.0063)	(0.0122)
Marital status	0.3828***	-0.0078	0.4730***	0.1305
	(0.1287)	(0.2597)	(0.1041)	(0.2105)
Number of children	0.0746*	0.0672	0.0315	0.0319
	(0.0437)	(0.0934)	(0.0339)	(0.0741)
Metropolitan area fixed effects	-0.3104	-0.4039	-0.239	-0.5635*
Constant			0.3685	0.1756
			(0.7623)	(1.9914)
R²			0.0146106	0.0107176
F-Test			13.07265***	3.235908***
Wald-Test	131.3807***	34.00942***		
Number of observations	7,870	2,000	25,164	11,987

Table 2.C.4: Detailed results for Probit, OLS and 2SLS estimates for the effect of religious affiliation on the binary savings choice and the ln(Stock of savings)

	Binary savings choice		ln(Stock of savings)	
	Probit	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)
Religion (reference: not-affiliated):				
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)
Male	-0.0341***	-0.0573***	-0.1318	-0.4367**
	(0.0098)	(0.0207)	(0.0821)	(0.2074)
Age	-0.0098***	-0.0082**	-0.0433***	-0.0489
	(0.0023)	(0.0038)	(0.0166)	(0.0390)
Age squared/100	0.0121***	0.0104**	0.0656***	0.0845*
	(0.0028)	(0.0048)	(0.0207)	(0.0499)
Race (reference: White):				
Negro	-0.1822***	-0.1732***	-1.6544***	-1.7141***
	(0.0105)	(0.0171)	(0.0792)	(0.1702)
Latino	-0.1303***	-0.1232***	-1.1906***	-1.4600***
	(0.0184)	(0.0241)	(0.1307)	(0.2279)
Other race	-0.0326	-0.1020***	-0.1380	-1.2201***
	(0.0228)	(0.0372)	(0.1598)	(0.3676)
Economic situation in childhood (reference: poor):				
Varying	0.0221***	0.0349***	0.2430***	0.4614***
	(0.0072)	(0.0126)	(0.0562)	(0.1263)
Pretty well	-0.0016	0.0345	0.1274*	0.6209***
	(0.0087)	(0.0215)	(0.0659)	(0.2200)
Education father (reference: No high school degree):				
High school father	0.0472***	0.0443***	0.5324***	0.5167***
	(0.0078)	(0.0126)	(0.0667)	(0.1257)
Some college father	0.0627***	0.0630***	0.6057***	0.6449***
	(0.0099)	(0.0178)	(0.0850)	(0.1860)
College graduated father	0.0722***	0.1450***	0.7643***	1.6066***
	(0.0110)	(0.0328)	(0.0883)	(0.3280)
ln(Net Worth+1)	0.0122***	0.0137***	0.1682***	0.1790***
	(0.0007)	(0.0014)	(0.0059)	(0.0139)
ln(Income+1)	0.0781***	0.0688***	0.6221***	0.7286***
	(0.0059)	(0.0053)	(0.0305)	(0.0591)
Employment status (reference: out of labor force):				
Unemployed	-0.0608***	-0.0758***	-0.1721*	-0.3473*
	(0.0145)	(0.0215)	(0.0978)	(0.2030)
Employed	0.0521***	0.0531***	0.5819***	0.4614**
	(0.0115)	(0.0185)	(0.0823)	(0.1885)

Table 2.C.4 (continued)

	Binary savings choice		ln(Stock of savings	
	Probit (1)	2SLS (2)	OLS (3)	2SLS (4)
Education (reference: No high school degree):				
High school graduated	0.0651***	0.0460**	0.6073***	0.1841
	(0.0084)	(0.0195)	(0.0789)	(0.1925)
Some college	0.1233***	0.1218***	1.3013***	0.9587***
	(0.0080)	(0.0196)	(0.0842)	(0.2001)
College graduated	0.1600***	0.1740***	2.0389***	2.0355***
	(0.0084)	(0.0271)	(0.0983)	(0.2933)
More than college	0.1619***	0.1673***	2.0678***	2.0907***
	(0.0088)	(0.0326)	(0.1110)	(0.3640)
Marital status	0.0583***	0.0534***	0.5986***	0.6722***
	(0.0107)	(0.0196)	(0.0826)	(0.2009)
Number of children	-0.0190***	-0.0224***	-0.2169***	-0.2475***
	(0.0030)	(0.0049)	(0.0226)	(0.0494)
Metropolitan area fixed effects	no	yes	yes	yes
State fixed effects	no	yes	yes	yes
Constant		0.3108**	-3.5989***	-0.5872
		(0.1312)	(0.4604)	(1.2656)
Robust Durbin-Wu-Hausman test		13.622***		20.551***
Hansen J statistic		13.008		15.689**
Number of observations	26,722	16,716	25,163	15,762

3 Religious Activity, Risk Taking Preferences, and Financial Behavior: Empirical Evidence from German Survey Data[14]

3.1 Introduction

According to Edmund Phelps, 'values and attitudes are as much a part of the economy as institutions and policies are […]' (Newsweek, 2007, p. 66). Norms capturing how decision-makers should, or how they should not, behave should be incorporated in macroeconomic analysis as the appropriate way for its microfoundation instead of solely presuming the constrained maximization of profit and utility functions, as Akerlof (2007) put it. Further, he argued that 'religious identity gives us a good example of such norms' (Akerlof, 2007, p. 8). Being a recent topic in economics (Alesina et al., 2003; Barro and McCleary, 2003; McCleary and Barro, 2006; Guiso et al., 2003, 2006; Tabellini, 2010), the link, in which macroeconomists are interested, runs from culture to economic performance: cultural values and norms have a direct impact on personal attitudes and preferences, which for their part influence individual economic decisions, and hence, aggregate economic outcomes.

The purpose of this paper is to examine whether religious values and norms, as key factors of one's cultural background, have any effect on one particular personal attitude which is of exceptional importance in economic decision-making – an individual's attitude towards taking risks. In particular, this paper analyses the extent to which cultural background, as measured by religious beliefs and religious activity, is associated with individual risk attitudes. We aim to explain individual heterogeneity in general and in context-specific risk preferences in Germany. In a second step, we analyze whether religion-induced differences in individual and household investment patterns exist. We examine the extent to which individual heterogeneity in risk assessment caused by distinct cultural convictions leads to distinctive actual individual investment. Since people are willing to take risks depending on

---

the context of the decision (Dohmen et al., 2011), in the context of individual investment decisions an individual's financial risk-taking attitude is considered.

Recently, due to the availability of new data sets, several studies have been published on differences in individual risk-taking preferences and their determinants (e.g., Barsky et al., 1997; Halek and Eisenhauer, 2001; Hartog et al., 2002; Dohmen et al., 2011). However, there are only a few contributions pointing additionally to cultural factors as determinants of risk attitudes. 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 both risk aversion and individual propensity to save. Following Dohmen et al. (2011), we also include not only a general risk measure in our analysis of religion-induced heterogeneity in financial portfolio choices, but also a context-specific risk measure, namely risk taking in financial matters. Moreover, our present paper adds to the literature a specific within-country analysis, as opposed to cross-country studies, to provide further empirical evidence on the impact of religiosity. Studying the economic consequences of religion in Germany may shed light on the distinctiveness of economic values within Christianity. Due to reformation history and recent ecumenical movements, Catholics and Protestants might be adjusted to each other. Instead of focusing mainly on Christian religions, we are explicitly taking Non-Christian religions into consideration, which in Germany are mostly Muslims. Mainly due to migration within recent decades between 3.8 and 4.3 million Muslims recently lived in Germany ((Statistisches Bundesamt, 2012b). In addition to the religious affiliation, a measure for religious involvement, namely church attendance frequency, is considered.

Using representative survey data on the individual level, the German Socio-Economic Panel (GSOEP), from the years 2003 and 2004, we found substantial differences in risk-taking attitudes as well as household financing behavior between religious individuals and non-religious ones, which replicates results found for the Netherlands (Renneboog and Spaenjers, 2012; Noussair, 2012). Religiously affiliated people are, in general, more risk-averse than not-affiliated people. However, differences exist between distinct religious groups with respect to individual risk assessment in financial affairs. While, compared to non-religious individuals, Christians are more willing to take financial risks, Muslims are less risk taking in financial matters. When controlling for the overall level of general risk, these differences disappear. Involvement in religious organizations also influences individual risk

attitudes. Compared to people who are not involved in religious networks, frequent churchgoers are, in general, more risk-averse, while they show more risk-tolerant attitudes in financial matters. Secondly, individual religiosity also influences an individual's actual economic behavior. We found that individuals with distinct religious backgrounds show distinct investment behavior, as measured by the probability to invest in savings accounts, building contracts, life insurances, or in fixed-interest securities (e.g., bonds), other securities (e.g., stocks), firm assets or not at all. Compared to non-religious people, Christians in Germany are more likely to invest in financial products, except for bonds and non-rated firm assets. In contrast, Muslims are less likely than non-religious people to invest in financial products, especially in stock. However, they display a higher propensity than non-religious people to invest in building contracts.

The paper proceeds as follows. In the next section, we provide a literature review and delineate a theoretical background concerning the effect of culture, approximated by religion and church attendance, on risk-taking preferences and economic behavior. The data and the empirical strategy are described in Section III. The results are presented in Section IV. The paper concludes with a short summary and discussion in Section V.

3.2 Religious identity and financial risk-taking

3.2.1 Institutional background information

The question is why should religion influence individual attitudes towards financial risk? As social identity theory suggests, the process of self-categorization forms an individual's identity, which is therefore derived, at least largely, from such membership in a social group as one's religious denomination (Benjamin et al., 2012). This embeddedness has substantial influence on people's behavior, since they internalize the attitudes, beliefs and values as well as the behavioral norms of their group (Stets and Burke, 2000). Consequently, by providing moral and ethical teachings for their adherents to encourage them to behave in a specific way, religions might directly influence individual economic behavior by its impact on traits and attitudes (Barro and McCleary, 2003).

Exemplarily, the Bible directly promotes risk-averse individual financial decisions. Ecclesiastes 11:2 suggests the diversification of financial portfolios and risk. Investment

capital should be divided into several parts and not be risked all in one place: 'Divide your portion to seven, or even to eight, for you do not know what misfortune may occur on the earth.' Furthermore, the Bible warns against investing in assets which the investor does not exactly know: 'Desire without knowledge is not good, and whoever makes haste with his feet misses his way' (Proverbs 19:2). The Qur'an also tries to limit the riskiness of financial-related behavior by prohibiting gambling not only in the sense of games of chance, but also in the sense of investment in risky assets: 'O you who believe, intoxicants, and gambling, and the altars of idols, and the games of chance are abominations of the devil; you shall avoid them, that you may succeed' (Qur'an 5:90). The promoted risk aversion even leads to the rejection of fair gambles with an expected value of zero. Next to the prohibition of investment in forbidden products, like alcohol, tobacco, pork, weapons or pornography, Islamic law prohibits gharar: speculative economic transactions. Hence, it forbids investing in highly hazardous or excessively risky assets where details with respect to the traded item are unknown or uncertain. The Qur'an itself bans trades that are considered to have severe risk due to uncertainty. Furthermore, taking interest (Riba) is forbidden, since it is seen as a form of usury. 'In the modern world, that translates into an attitude toward money that is different from that found in the West: Money cannot just sit and generate more money. To grow, it must be invested in productive enterprises' (Saleh Ambah, 2008). Summarizing, religious rules explicitly show, in both the Bible and the Qur'an, how much financial risk taking is allowed and in which assets adherents are permitted to invest. Since religious people behave according to risk-limiting religious rules, they might tend to be more risk-averse in financial matters than non-religious people. Regarding the institutional character of religion, religious networks might influence individual finance risk-taking preferences by its impact on individual commitment. The more deeply religious people are involved in their religion, the more risk-averse they are, since they might have internalized the religious rules more profoundly.

3.2.2 Previous empirical literature

Given the importance of individual risk-taking attitudes for individual economic decisions, like an individual's entrepreneurship choice (Grilo and Thurik, 2008) or the holding of stocks (Guiso et al., 2008; Dorn and Huberman, 2010), recent attention has been riveted to

determinants of individual heterogeneity in risk attitudes (e.g., Barsky et al., 1997; Halek and Eisenhauer, 2001; Hartog et al., 2002; Dohmen et al., 2011). Based on a calculation of the upper and lower bounds on relative risk aversion, Barsky et al. (1997) examined how risk tolerance varies by individual demographic characteristics. Among others, he reported that risk tolerance differs significantly by religion. Catholics are less risk averse than Protestants, whereas Jews are the most risk tolerant. Moreover, they showed, that the preference for risk tolerance predicts risky behaviors, like having insurance, choosing risky employment, or holding risky assets. For example, less risk-tolerant respondents hold a higher portion of safe assets, like treasury bills and savings accounts, in their portfolios. Like these authors, Halek and Eisenhauer (2001) also used for their analysis of personal risk aversion determinants data from Wave I of the University of Michigan Health and Retirement Study (HRS) from 1992. In addition to the results of Barsky et al. (1997) they estimated the Pratt-Arrow coefficient of relative risk aversion for nearly 2,400 households. They showed that, although a respondent's religious faith has little effect on risk aversion, the effects depend on the situation: Compared to the average population Catholics and Jews are more averse to pure risk than members of other faiths are, yet at the same time, they are more tolerant of speculative risk-taking. They traced this result to the distinct religious teachings regarding gambling. Hartog et al. (2002) as well relate individual risk aversion to personal characteristics, like gender, marital status, educational training, employment decisions, income, and wealth. Using three independent data sources, they analyzed the answers of 20,707 respondents with an ordinary least squares (OLS) regression and a Heckman-two step procedure to state the reservation price for a lottery ticket. Determining the Arrow-Pratt coefficient of absolute risk aversion, he confirmed that people belonging to a religion, which promotes specific norms with respect to gambling and investing, could not decide which price to pay without considering their religious convictions (Hartog et al., 2002, p. 9). These previous contributions (Barsky et al., 1997; Halek and Eisenhauer, 2001; Hartog et al., 2002) found a broad spectrum of individual-specific characteristics, ranging from gender, age and body height to education, income and wealth, to influence individual risk-taking attitudes. Further, although they mentioned a significant influence of religious beliefs and church attendance, no explicit link from religion to risk attitudes was established.

However, less attention has been paid to the underlying cultural background of individuals. Some recent studies, though, examine explicitly the impact of religion, as a key feature of

culture, on personal attitudes, such as thrift, work ethic and trust toward others (Guiso et al., 2006, 2003; Arruñada, 2010). In particular, several studies have been published pointing to religion as a determinant of differences in individual risk-taking preferences (Bartke and Schwarze, 2008; Dohmen et al., 2011; Renneboog and Spaenjers, 2012; Noussair et al., 2012). Using a constructed sub-data set of the German Socio-Economic Panel (GSOEP) considering immigrants in Germany, Bartke and Schwarze (2008) analyzed whether people of different nationalities show distinct general risk attitudes. They found that, compared to Protestants, Muslims displayed higher risk aversion, whereas non-religious people are relatively risk-tolerant. Next to the impact of religious identity on individual general risk assessment, religious affiliation was found to affect risk attitudes in specific contexts, such as individual financial risk-taking preferences (Dohmen et al., 2011). Based on the 2004 wave of the GSOEP, Dohmen et al. (2011) analyzed 22,019 individuals in 11,803 different households and found gender, age, body height and parental background to be determinants of the willingness to take risks in general and in specific contexts. Moreover, they validated the behavioral consequences of their risk measures by running a lottery experiment based on a representative sample of 450 adults living in Germany. In their appendix they listed that Catholics, other Christian religions and non-Christian religions are, in general, more risk-averse than Protestants. Contrary, non-religious people are less risk-averse than Protestants. However, their results do not show distinctive attitudes towards taking financial risk for the different religious traditions. Only non-religious people are willing to face more risk with respect to financial investments than Protestants.

Focusing on Catholics and Protestants in the Netherlands, Renneboog and Spaenjers (2012) looked at the effect of religious affiliation on both economic attitudes and household finance behavior using data from the annual Dutch National Bank (DNB) Household Survey covering the period 1995–2008. While not considering explicitly religious attendance as a more direct indicator of individual religiosity, they found that Catholics are, in general, more risk-averse than non-religious individuals. Their results show that, compared to non-religious people, religious people are more likely to save. Additionally, Evangelicals are significantly more likely to hold risky assets, while Catholics are less likely to invest in stocks and bonds. Also, analysing data for the Netherlands, Noussair et al. (2012) concentrated on the effects of church attendance and parental religious background. They used a representative internet-based longitudinal panel study of the Dutch population, the LISS panel. Their results show a

positive correlation between church membership and risk aversion, which was measured by incentivized experiments. Furthermore, they find that Protestants are more risk-averse than non-members, and Catholics are less risk-tolerant than Protestants.

Analyzing risky investment choices, some authors recently found evidence for the effect of religious identity (Diaz, 2000; Hilary and Hui, 2009; Kumar et al., 2011; Benjamin et al., 2012). Diaz (2000) studied the impact of religiosity on risky financial decisions by conducting a telephone survey with Las Vegas residents to analyze whether religious practices affect gambling patterns and, consequently, the underlying willingness to take a certain speculative risk. In a univariate analysis of a random sample containing 513 adults, he found a negative relation between the attendance of religious services, the self-reported level of importance of religion and religious affiliation and the frequency of gambling. Also, Benjamin et al. (2012) examined whether there are religion-induced differences in financial risk taking. Using priming techniques they derived measures of risk aversion in an incentive-compatible experimental choice. Analyzing a randomly selected sample of 827 Cornell University students with interval regression techniques, they observed that 'Catholicism increases risk-taking, rather than Protestantism reducing risk-taking' (Benjamin et al., 2012, p. 4).

On the more aggregated level, some authors examined how religious risk norms affect the investment and portfolio decisions of firms and institutional investors. Hilary and Hui (2009) used data from the American Religion Data Archives (ARDA), Compustat and Center for Research on Security Price (CRSP) databases to observe how religious participation at the county level in the U.S. affects a firm's real investment decisions located in this county. They found that firms located in counties with high levels of religiosity engage less often in investment projects with more uncertain pay-offs as measured by variances in equity returns or in returns on assets. This result remained significant when they disaggregated by religious groups, namely Protestants and Catholics. On the other hand, studying the effects of local religions on the risk-taking behavior of institutional investors, like banks or insurance companies, Kumar et al. (2011) showed that Protestant views on gambling cause Protestants to hold more risk-averse attitudes than Catholics. Institutional investors located in regions with a high proportion of Catholics relative to Protestants 'assign larger portfolio weights to lottery-type stocks' (Kumar et al., 2011, p. 3).

3.3 Data, variables, and empirical strategy

3.3.1 Data description

The link between religion and attitudes behavior respectively can be best studied with microdata on the individual and household level. Applying aggregated data at the regional level might lead to a distorted relation between religion and economic outcomes due to other unobserved characteristics, such as a religious war centuries ago. However, country fixed effects cannot be applied to solve the omitted variable problem due to the largely time-invariant character of religion (Guiso et al., 2003). Additionally, microdata show better statistical properties than macro data due to the larger sample size of the former. Containing the necessary information for the analysis, our data are the GSOEP,[15] a large representative panel survey of private households and persons in Germany (Dohmen et al., 2011). The GSOEP provides a rather stable set of core questions asked every year (e.g., employment, education, income) and yearly topics with additional detailed questions. The 2003 wave includes information about individual religions as well as church attendance. The 2004 wave includes questions about risk-taking preferences in general and in different aspects of people's lives as well as questions on an individual's choice of financial products. We focus on a sample of 13,754 individuals who are aged between 18 and 65 years and have no missing values in the variables used in this analysis.

---

[15] In the past, the GSOEP has already been used to study the determinants of individual risk assessment, however, not in the realm of different cultural backgrounds. Hence, our paper is related to Dohmen et al. (2011) and Bartke and Schwarze (2008). Dohmen et al. (2011) analyzed the determinants of individual risk assessment. In contrast, we are focusing on culture as our key determinant of risk aversion and trust. Additionally, we study culture-induced differences in investment behavior, controlling for individual risk assessment. Bartke and Schwarze (2008) looked at the influence of different nationalities on individual general risk assessment. While they contemplate immigrants to Germany, however, they neither consider the degree to which distinct religions causing variation in economic attitudes is associated with differences in investment behavior, nor do they deal with different risk assessments in different life situations, as we do.

3.3.2 Religious affiliation and church attendance

Our main explanatory variable of interest is an individual's cultural background, as measured by religious affiliation and church attendance. Since the overall cultural background of a country roots in its history and is transmitted from one generation to another, present individual values and customary beliefs of individuals are affected by culture (Guiso et al., 2006). Consequently, even the economic behavior of those individuals who consider themselves as non-religious might be affected by religious norms and rules (Inglehart and Baker, 2000; Kumar et al., 2011). However, since individual religiosity might be endogenous to an individual's risk assessment, the majority of the authors dealing with the effect of culture on economic variables assume that cultural and religious convictions 'are inherited by an individual from previous generations, rather than [being] voluntarily accumulated' (Guiso et al., 2006, p. 24). Hence, '[b]ecause of the difficulty of changing culture and its low depreciation rate, culture is largely a "given" to individuals throughout their lifetimes' (Becker, 1996, p. 16). Consequently, we assume the causal link running from religion to risk attitudes and not vice versa, since religion and its practice seem to be exogenous – at least to a large extent. In order to mitigate this endogeneity issue further, we use data for religiosity from the 2003 wave, while taking the data for the dependent variables from the subsequent wave of the GSOEP. The variable religious affiliation indicates whether an individual is attributed to one of the following religions: Catholicism, Protestantism, Other Christian religions, Non-Christian religions, Islam and adherents to Other religions. For each religion, we create dummy variables, whereas non-religious people are the reference category, which includes agnostics and atheists. It equals one if the individual considers herself to have a certain religious affiliation and zero otherwise.

Table 3.1 gives a first description of the sample used. It reflects the heterogeneity in the religious landscape in Germany. Almost two-thirds of the sample belongs to a church or other religious organizations. With 28 per cent and 32 per cent of the sample, the Roman Catholic Church and the Protestant Church mainly represent the Christian belief in Germany. Although Protestantism is mainly uniformly organized, some Methodists, Baptists and Mennonites and Evangelical trends might be observed. Two per cent of the sample belongs to Islam. Next to these main religions, there are further Other religions, like Hindus and Buddhists, and Other Christian religions, like Christian Orthodox religions. These two groups might hold too

heterogeneous norms and values to yield clear effects of individual religious preference on individual risk attitudes. However, 35 per cent are not affiliated and do not belong to any religious affiliation. We refer to this last group as non-religious people.

Table 3.1: Descriptive statistics

Variable	Mean	Std. Dev.	Minimum	Maximum
Risk taking preferences (0: risk averse, 10: fully prepared to take risks):				
General risk taking	4.7031	2.2291	0	10
Willingness to take risk in financial affairs	2.6281	2.2034	0	10
Financial investments (reference: none):				
Savings account (d)	0.7604		0	1
Savings contract for building a home (d)	0.5188		0	1
Life insurance (d)	0.6749		0	1
Fixed interest securities, e.g. bonds (d)	0.1922		0	1
Other securities, e.g. stocks (d)	0.3925		0	1
Firm assets (d)	0.0761		0	1
None (d)	0.0872		0	1
Religious affiliation (reference: not-affiliated):				
Catholic (d)	0.2859		0	1
Protestant (d)	0.3219		0	1
Other Christian (d)	0.0165		0	1
Islam/Muslim (d)	0.0204		0	1
Other religion (d)	0.0042		0	1
Church attendance (reference: never):				
Less than monthly (d)	0.3067		0	1
At least monthly (d)	0.0825		0	1
At least weekly (d)	0.0699		0	1
Control variables:				
Female (d)	0.5135		0	1
German Citizenship (d)	0.9599		0	1
Medium school degree (d)	0.3698		0	1
High school degree (d)	0.3099		0	1
Apprenticeship degree (d)	0.6981		0	1
University degree (d)	0.2220		0	1
Unemployed (d)	0.0835		0	1
Employed (d)	0.7209		0	1
Age (in years)	42.9439	12.7297	18	65
Age square/100	20.0621	10.9640	3.24	42.25
Monthly net household income (in 1000 Euros)	2.9962	2.2577	0.24	99.99
16 German federal states				

Notes: Number of observations is 13,754 for all variables. (d) denotes dummy variables.

Individual attitudes and behavior were found to be correlated with social interaction (Hong et al., 2004; Ahern et al., 2012). Organizational membership to religions, as a more direct indicator of individual religiosity, is one form of social interaction. There are two channels through which church attendance influences real economic behavior. First, going to church frequently is assumed to strengthen one's belief (Iannaccone, 1998). Second, attending religious activities builds up social network in a community (Putnam, 2000). Interacting with peers and learning from their financial experience (Hong et al., 2004) might influence one's investment choices. The variable church attendance is a categorical variable illustrating how often on average a person attends religious services per year. The categories are 'less than monthly', 'at least monthly', 'at least weekly', or 'never attend religious services'. *Table 3.1* also reports the distribution of the regularity of church attendance in the sample. While 65 per cent of the sample are still religiously affiliated, 85 per cent attend religious services never or less than once month. Only 15 per cent regularly take part in religious activities. This ambivalence towards religious affiliation might be an indicator of the growing privatization of religiosity in Germany.

3.3.3 Risk attitudes

At first, we analyze the impact of religious activity on risk aversion in order to assess the extent to which religion contributes to the heterogeneity in individual risk attitudes. Using the 2004 questionnaire, we measure a respondent's self-assessed risk propensity on an 11-point Likert scale between '0 – Risk-averse' and '10 – Fully prepared to take risks'. A disadvantage of the survey data might be that such risk attitudes are not objective measures but rather qualitative indicators, since stating one's willingness to take risks relies on the individual. Qualitative measures include the problem that underlying factors other than risk attitudes could lead to different responses across individuals and, therefore, the responses are not comparable. However, Dohmen et al. (2011) validated the survey risk measures by a field experiment and found that the answers to risk attitude questions predict actual behavior in their lottery. They confirmed that the risk attitude measure not only reflects subjective beliefs and self-assessment but predicts actual investment behavior. Unlike Bartke and Schwarze (2008) and Renneboog and Spaenjers (2012), we not only consider a one-dimensional view on risk attitudes, but rather we disaggregate the measurement of risk attitudes by different

contents. Next to the main question on general risk assessment, we further take into consideration a question on the willingness to take risks in financial affairs. To elicit information about risk taking in financial affairs, people were asked again to rate their willingness to take risks in financial matters on an 11-point risk scale between '0 – Risk-averse' and '10 – Fully prepared to take risks'.

In order to estimate the impact of individual religiosity, i.e., religious affiliation and church attendance, on measures for individual risk attitudes, namely individual risk attitudes in general and risk attitudes towards financial concerns, we apply ordinary least squares (OLS) regressions, because the variables measuring risk-raking attitudes can be treated as quasi-continuous. We estimate the following multivariate model:

(3.1) $Risk\ attitude_i = \alpha + \beta\ Religiosity_i + X'_i\gamma + \varepsilon_i$

In *Equation (3.1) i* indexes a specific individual, and *Risk attitude* is the outcome variable which denotes individual risk attitudes either in general or in financial matters. α is a constant. *Religiosity* is either the vector of explanatory variables for individual religious affiliation, i.e., being Catholic, Protestant, Other Christian, Muslim, adherent to Other religions or non-religious, or the vector for religious involvement. The impact of religiosity on risk attitudes is measured by the coefficient *β*. *X* denotes other regressors, namely, gender, German citizenship, education, employment status, monthly net household income, age and dummies for federal states. *γ* specifies the strength of this impact. ε is an unobserved stochastic error term. All results report robust standard errors in parenthesis to deal with possible heteroskedasticity.

Table 3.1 further shows summary statistics for the variables, which are included in the subsequent regression analyses. On average, individuals in the sample used are moderately willing to take risks in general. However, on average, they are only partly prepared to face risk in financial concerns, namely 2.6 risk points. *O*ur sample is nearly equally split between males and females. Separate analyses for the genders did not show noteworthy differences, so we decided to run the subsequent regressions for the complete sample. We include a dummy variable for German citizenship as the nature of some religions is rooted in different national cultures. However, since only 4 per cent of the individuals in the sample are non-Germans, a further breakdown of nationality would cause high correlations to variables such as religion. Binary variables for secondary schooling, apprenticeship and university degrees are also

included. The employment status of workers is considered through dummies for unemployment and employment, whereas non-employed individuals serve as a reference group. Wealth effects are covered by including the monthly net household income which is measured in €1000. As religious activity and risk taking are likely to vary systematically by age, age in years and its squared term are included. To control for regional differences (e.g., east vs. west, north vs. south), dummies for the 16 German federal states are included.

3.3.4 Investment behavior

Next, the impact of religious belief and activity as well as of individual financial risk attitudes on actual individual investment choices will be studied. Therefore we apply seven different binary outcome variables on self-reported information on financial investments: (1) holding a savings account, (2) holding a savings contract for building a home, (3) holding a life insurance, (4) investments in fixed-interest securities (e.g., savings bonds, bonds or federal savings bonds), (5) holding other securities (e.g., stocks, funds), (6) holding firm assets, and (7) holding no assets. These financial assets can be distinguished not only by their expected returns, but also by their potential risk, which individuals have to face when investing (Barasinska et al., 2012). In each category, systemic risks, like default risks of the issuer or market breakdowns, and non-systemic risks, such as value losses, might be distinguished. Savings accounts are deemed as squeaky-clean assets, that is, except for the risk that the market interest rates are changing, losses in value and reliability risks are almost excluded. When holding a savings contract for building a home, individuals do not have to face risks with respect to value changes in their savings or default risks of the issuer. Instead, risks with respect to the allocation of the mortgage savings amount exist. Life insurances also incorporate risk elements. This is partly due to the possibility that the guaranteed interest payments fall, or the insurance company becomes insolvent. Obviously, there are also risks when investing in fixed-interest securities and other securities. Next to reliability risks, investors investing in fixed-interest securities mainly have to face risks due to changes in the market-price of their security papers. While fixed-interest securities promise to pay regular and guaranteed interests, they show lower expected returns than other securities, like stocks. Consequently, the risk of changes in market-prices might be less for fixed-interest securities. Finally, when investing in company assets, operative risks have to be taken into consideration.

Table 3.1 further reports average values for the different financial investments. Sorted in ascending order by their associated potential risk, 76 per cent of the people in the sample own a savings account. Half of the sample stated that they put money aside in a savings contract for building a home. Next to these low-risk asset types, two-third save money in a life insurance, which involves a moderate risk. While only 19 per cent invested in fixed-interest securities with moderate risk-return trade-off, 39 per cent decided to invest in other security papers, e.g., in papers of listed companies. This asset type is assumed to involve high risk. Only 8 per cent invested in companies not listed.

Since the variables for investment decisions are binary coded, we apply a probit model to estimate the effects of religious activity and financial risk-taking preferences on the probability that an individual invested in the different investments. Using the latent variable approach, we specify the probit model as follows:

(3.2) $\quad y_i^* = \alpha + \beta\, Religiosity_i + \delta\, Risk_{Finance_i} + X'_i \gamma + \varepsilon_i$

In *Equation (3.2)* the variables used are the same as in the above *Equation (3.1)*. Additionally, δ measures the influence of individual willingness to take financial risks on individual investment choices. The unobserved latent variable is connected to the observable binary response categories via the following measurement model:

(3.3) $\quad Investment_i = \begin{cases} 1 & if\ y_i^* > \tau \\ 0 & if\ y_i^* \leq \tau \end{cases}.$

In *Equation (3.3)* the observed categories change when the latent variable crosses a threshold τ. Since the probability to observe a positive investment behavior depends on the distribution of the error term, we estimate the model

(3.4) $\quad Pr(Investement=1|x_i) = F(\alpha + \beta\, Religiosity_i + \delta\, Risk_{Finance_i} + X'_i \gamma).$

In *Equation (3.4)* F is the cumulative distribution function for the normal distribution with $Var(\varepsilon) = 1$. For each asset class, *Investment* represents the binary choice variable whether to invest money in a certain asset or not. Given the nonlinearity of probit models, we report average marginal effects.

3.4 Microeconometric results

3.4.1 Religious activity and risk-taking preferences

In order to determine whether religion and church attendance are robust determinants of risk attitudes once we control for differences in individual characteristics, we first estimate regressions where the dependent variable is an individual's response to the general risk question and the specific risk content. *Table 3.2* presents the results of the regression of the answers to the general risk question as well as to the specific financial risk-taking question considering different religious affiliations and different levels of religious involvement.

Column (1) of *Table 3.2* shows a significant negative relationship between most religious affiliations and the general risk-taking attitudes of individuals. Except for Other religions, for which we do not find statistically significant results, religious people are significantly less willing to take risks in general than non-affiliated people. Not only are these results highly statistically significant, but the impact of religious affiliation on general risk assessment is also sizeable. A Catholic individual reports a 0.36 risk points and a Protestant a 0.26 points lower willingness to take risks in general on the 11-point scale than a non-religious person. Hence, Catholics are more risk-averse than non-religious people and Protestants. These results are not only statistically, but also economically relevant. Being Catholic, compared to non-religious people, decreases an individual's willingness to take risks in general by about 7.66 per cent of the mean. Comparing these results with the impact of religious minorities on risk attitudes, we find that Other Christians and Muslims are in general more risk-averse than Catholics and Protestants. Being Muslim, as opposed to being non-religious, increases the individual will to be risk-averse in general by 14.98 per cent of the mean. This result is also highly statistically significant. Contrary to the negative and significant relation between general risk-taking preferences and religiosity, as column (1) had shown, considering the impact of religious beliefs on individual risk attitudes towards investments in risky financial assets, column (2) shows no significant impact of religiosity. Muslims and Other religions, however, are an exception. Both are more risk-averse in financial concerns. Muslims display a 0.27 risk point lower willingness to take financial risks. This result is significant at the 10 per cent level only. Adherents to Other religions show a 0.50 risk points lower willingness to take financial risks, which is significant at the 5 per cent level.

Table 3.2: The impact of religion on the willingness to take risks in financial affairs

	(1)	(2)	(3)	(4)	(5)
Religion (reference: not-affiliated):					
Catholic	-0.3626***	0.0746	0.2268***	-0.2803***	0.1945***
	(0.0546)	(0.0546)	(0.0500)	(0.0626)	(0.0562)
Protestant	-0.2639***	-0.0073	0.1035**	-0.2075***	0.0529
	(0.0487)	(0.0486)	(0.0445)	(0.0545)	(0.0494)
Other Christian	-0.7699***	-0.0621	0.2611**	-0.6294***	0.2826**
	(0.1556)	(0.1510)	(0.1301)	(0.1639)	(0.1372)
Islam/Muslim	-0.7046***	-0.2739*	0.0219	-0.6189***	0.0147
	(0.1733)	(0.1593)	(0.1377)	(0.1755)	(0.1414)
Other religion	0.1997	-0.5043**	-0.5881**	0.3551	-0.5373**
	(0.2963)	(0.2569)	(0.2580)	(0.3007)	(0.2608)
Church attendance (reference: never):					
Less than monthly				-0.0868*	0.1369***
				(0.0477)	(0.0420)
At least monthly				-0.1161	0.0155
				(0.0749)	(0.0619)
At least weekly				-0.2321***	-0.0868
				(0.0826)	(0.0703)
General risk-taking			0.4198***		0.4198***
			(0.0079)		(0.0079)
Control variables as in *Table 3.1*	Yes	Yes	Yes	Yes	Yes
Constant	6.3216***	2.8376***	0.1839	6.2808***	0.1858
	(0.2842)	(0.2738)	(0.2424)	(0.2842)	(0.2426)
R²	0.0884	0.0987	0.2631	0.0890	0.2640

Notes: OLS regressions for the willingness to take risks (0: risk averse, 10: fully prepared to take risks). In column (1) and (4) the dependent variable is general risk-taking. In column (2), (3) and (5) the dependent variable is the willingness to take risk in financial affairs. Number of observations is 13,754 in all specifications. Robust standard errors in parentheses. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

However, an underlying general risk attitude exists which drives specific risk assessments, as Dohmen et al. (2011) stated. Consequently, column (3) controls additionally for general risk preferences to account for the "stable, underlying risk trait […] that is common across contexts" (Dohmen et al., 2011, p. 18). In line with Dohmen et al. (2011), the general risk attitude is found to be positively correlated to financial risk attitudes. As column (3) indicates, although all religions are in general more risk-averse, when controlling for the overall general risk attitude, Christian people are less risk-averse in financial concerns than non-religious people, that is, for example, they might invest more in risky assets. Catholics report a 0.22 risk points (8.63 per cent of the mean) higher willingness to take risk in financial affairs than

non-religious people, while Protestants state a 0.10 risk point higher willingness to face risks in financial concerns. When controlling for the overall level of general risk, a Muslim's belief is not statistically significantly associated with the individual attitudes towards taking risk in financial concerns. Other religions are not only more risk-averse in general than non-religious people, but also with respect to financial decisions.

These results remain striking when adding the frequency of church attendance as a measure for individual involvement in religious organizations, although the magnitude of the coefficients on individual religious beliefs reduces. Thus, attending religious services regularly helps to explain distinct risk-taking attitudes. Column (4) shows that the more strongly people are involved in religious activities, the more risk-averse they are in general, since they might have internalized the religious rules more profoundly. Individuals attending religious service at least weekly are more risk-averse than people never attending religious services. The same picture arises when considering the influence of involvement in religious organizations on financial risk assessment in column (5). The less people attend religious services, the less risk-averse they are in financial concerns. That is, individuals who are more involved in their religion might invest in a more cautious way. Column (5) shows that even when individuals have the same general risk assessment and are equally involved in religious activities, differences in the risk assessment of financial choices between religious and non-religious people stay robust.

To preclude that the found results are driven by differences in individual characteristics, we control for a wide range of covariates. These results are omitted from the tables for brevity. In line with former research results (Dohmen et al., 2011), we find that females are less willing to take risks in general, and with respect to financial decisions, than males. Older individuals are less likely to take risks in general, as well as in the considered specific situation, than younger individuals are. When assuming an equal general risk level, older people are, however, more willing to invest in risky assets. The results for both measures of education show that better-educated people are willing to face more general risks. The willingness to face financial risks is higher among well-educated individuals than among less well-educated people. With respect to employment status, one has to differentiate. While both employed and unemployed individuals are less risk-averse in general than non-employed individuals are, employed individuals report a 2.3 points higher and unemployed a 2.4 points lower willingness to take risks in financial matters than non-employed individuals. Since a

higher net monthly income might smooth the impact of negative income shocks (Dohmen et al., 2011), it is not surprising to find that a net monthly income is positively correlated with the willingness to take risks. Moreover, richer people take more risks in financial affairs. However, as Dohmen et al. (2011) pointed out, the direction of the relationship is far from being clear, since wealthier people might also be more risk-tolerant. Controlling for the overall level of risk aversion, these results remain robust.

3.4.2 *Religious activity, risk-taking preferences and individual investment behavior*

In *Table 3.3* we now focus on financial decisions and estimate probit regressions where the explanatory variables of interest are an individual's religious affiliation, the level of religious involvement and individual willingness to take risk in financial matters. The dependent variable is an individual's binary response with regard to her financial asset management. Since Dohmen et al. (2011) pointed out that the best predictor of investing in financial assets is the question about willingness to take risks in financial matters, rather than the general risk question or questions incorporating different contexts, we include the risk attitude towards financial investments in our analysis.

As *Table 3.3* indicates more financial risk-taking preferences, as expected, are positively correlated with the likelihood of investments, especially with investments in stocks. The higher the individual financial risk aversion, the less individuals are willing to invest in risky assets. We further find evidence that even when controlling for financial risk-taking attitudes, religious adherence still has consequences for real financial behavior, that is, religious beliefs not only influence individual financial risk-taking attitudes directly, but also have a direct effect on financial outcomes. However, since the coefficients on individual religiosity barely change when controlling for individual finance risk preferences, individual religiosity might influence investment decisions mainly through other channels, such as education. While controlling for overall level of financial risk aversion, column (1) in *Table 3.3* shows that Catholics are 7.8 percentage points more likely to own a savings account, and Protestants have a 5.58 percentage point higher likelihood of owning a savings account than non-religious people. As suggested above, the behavioral differences between Catholics and Protestants in Germany are not very big and not statistically significant. In contrast, Muslims and adherents to Other religions display a lower savings propensity than non-religious people. However,

believing in Islam raises the probability of owning a savings contract for building a home by 10.77 percentage points compared to non-religious people. Both Catholics and Protestants also have a higher probability of saving money in contracts for building a home than non-religious people. Though showing a slightly positive attitude towards financial concerns when controlling for overall risk assessment, Muslims are less likely to invest in relatively secure life insurances than non-religious people. This behavior is contrary to Christian religions. While Muslims display a 6.65 percentage point lower willingness to invest in life insurances, Catholics and Protestants display almost the same likelihood of investing in life insurances, which is, nonetheless, higher than for non-religious people. Furthermore, Christian religions have a higher likelihood than non-religious individuals not only of investing in fixed-interest securities, but also in other securities which are more risky. Conversely, Muslims have a higher aversion to investing in highly risky assets than non-religious people do. They are 19.82 percentage points less likely to invest in other, highly volatile and risky other securities.

Comparing the results between the different financial products, *Table 3.3* reveals evidence that, Christian religions in Germany, compared to non-affiliated people, have the highest probability of investing in relatively secure financial products, like savings accounts, savings contracts for building a home and life insurances. Further, they also have a higher probability of investing in more risky assets, like stocks and firm assets, than non-religious people. Although Muslims are less likely to own a savings account than Christians and non-religious people, they focus on investing in savings contracts for building a home. Since the Qur'an fosters investments in real financial assets, investments in building contracts seem to be more related to real life than investing in other assets, or not investing at all in conventional financial assets. Furthermore, Muslims show the lowest probability of investing in more volatile stocks and bonds.

Table 3.3: The impact of religious affiliation on investment behavior

	savings account	savings contract for building a home	life insurance	fixed interest securities (e.g. bonds)	other securities (e.g. stocks)	firm assets	none
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Religion (reference: not-affiliated):							
Catholic	0.0780***	0.1114***	0.0662***	0.0499***	0.0456***	0.0103	-0.0217***
	(0.0101)	(0.0128)	(0.0118)	(0.0106)	(0.0134)	(0.0064)	(0.0046)
Protestant	0.0558***	0.0776***	0.0543***	0.0387***	0.0343***	0.0115**	-0.0175***
	(0.0093)	(0.0116)	(0.0107)	(0.0094)	(0.0121)	(0.0056)	(0.0042)
Other Christian	0.0131	0.0680*	0.0312	-0.0418	-0.0239	-0.0153	-0.0103
	(0.0280)	(0.0348)	(0.0311)	(0.0261)	(0.0361)	(0.0144)	(0.0097)
Islam/Muslim	-0.0255	0.1077***	-0.0665*	-0.0361	-0.1982***	-0.0370***	0.0089
	(0.0304)	(0.0355)	(0.0357)	(0.0303)	(0.0334)	(0.0127)	(0.0133)
Other religion	-0.0821	0.1317**	0.059	0.0513	-0.0791	-0.0427**	0.0205
	(0.0591)	(0.0626)	(0.0561)	(0.0574)	(0.0624)	(0.0191)	(0.0259)
Risk finance	0.0031*	0.0071***	0.0099***	0.0090***	0.0479***	0.0039***	-0.0035***
	(0.0018)	(0.0021)	(0.0020)	(0.0016)	(0.0021)	(0.0009)	(0.0009)
Control variables as in *Table 3.1*	yes	yes	yes	yes	yes	yes	yes
Predicted probability	0.7604	0.5188	0.6749	0.1922	0.3925	0.0761	0.0872
Pseudo-R²	0.0299	0.0378	0.0693	0.0717	0.1348	0.0945	0.167

Notes: ML-Probit regressions for the probability to hold financial assets. Marginal effects at the mean of all covariates. Number of observations is 13,754 in all specifications. Robust standard errors in parentheses. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Since these results might vary with levels of religious involvement, we include the frequency of attending religious services as an additional variable in *Table 3.4*. The results of the impact of religious beliefs on investment decisions remain robust; however, changes in the magnitude of the coefficients occur. While for Christian religions the effect of religious affiliation on investment decisions decreases when controlling for church attendance, the negative coefficient for Islam belief increases. Further, *Table 3.4* shows a positive relationship between the frequency of attending religious services and the probability of investing in financial products. However, the results do not indicate that more involved individuals have a higher likelihood of holding financial assets. The effects seem to be strongest when attending religious services at least monthly. Column (1) illustrates that people attending religious services are more likely to hold a savings account. Therefore, people attending religious services less frequently have a 6 percentage point lower probability of holding a savings account than people attending at least monthly. However, non-statistically significant differences were found between people attending at least monthly and people attending at least weekly, although the latter have a 7.4 percentage point higher probability of owning a savings account than people never attending. The same pattern occurs with respect to the likelihood of investing in savings contracts for building a home, life insurances and fixed-interest securities. However, the probability of investing in highly volatile and risky assets, such as other securities, is negatively correlated with the frequency of church attendance. The more people are involved in their religion, the lower their probability is of investing, for example, in stocks, although this result is not statistically significant. As expected, people attending religious services have a lower probability of not investing at all. Summing up, taking part in institutionalized religion fosters the individual probability of investing in secure assets rather than in unsecure financial products. This result supports the hypothesis that not only religious beliefs but also religious organizations affect individual risk assessment and investment behavior.

Table 3.4: The impact of religious affiliation and church attendance on investment behavior

	savings account	savings contract for building a home	life insurance	fixed interest securities (e.g. bonds)	other securities (e.g. stocks)	firm assets	none
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Religion (reference: not-affiliated):							
	0.0360***	0.0517***	0.0269**	0.0078	0.0349**	0.0019	-0.0084
	(0.0120)	(0.0147)	(0.0137)	(0.0113)	(0.0152)	(0.0067)	(0.0055)
Protestant	0.0231**	0.0326**	0.0215*	0.01	0.0201	0.0058	-0.0059
	(0.0107)	(0.0130)	(0.0120)	(0.0101)	(0.0133)	(0.0060)	(0.0048)
Other Christian	-0.0518	-0.0224	-0.0192	-0.0864***	-0.0215	-0.0229*	0.0082
	(0.0336)	(0.0379)	(0.0351)	(0.0210)	(0.0379)	(0.0131)	(0.0141)
Islam/Muslim	-0.0760**	0.0508	-0.1074***	-0.0710***	-0.2017***	-0.0403***	0.0278*
	(0.0337)	(0.0377)	(0.0374)	(0.0252)	(0.0334)	(0.0114)	(0.0168)
Other religion	-0.1586**	0.0383	0.0122	-0.0155	-0.0707	-0.0458***	0.0483
	(0.0650)	(0.0686)	(0.0619)	(0.0479)	(0.0646)	(0.0162)	(0.0343)
Church attendance (reference: never):							
Less than monthly	0.0486***	0.0757***	0.0560***	0.0353***	0.0331***	0.0037	-0.0216***
	(0.0091)	(0.0112)	(0.0103)	(0.0090)	(0.0115)	(0.0053)	(0.0039)
At least monthly	0.1080***	0.0913***	0.0827***	0.0993***	0.0211	0.0332***	-0.0290***
	(0.0118)	(0.0172)	(0.0148)	(0.0157)	(0.0184)	(0.0100)	(0.0045)
At least weekly	0.0743***	0.1380***	0.0620***	0.0950***	-0.0188	0.0105	-0.0195***
	(0.0139)	(0.0185)	(0.0171)	(0.0176)	(0.0197)	(0.0103)	(0.0056)
Risk finance	0.0031*	0.0072***	0.0099***	0.0093***	0.0478***	0.0040***	-0.0034***
	(0.0018)	(0.0021)	(0.0020)	(0.0016)	(0.0021)	(0.0009)	(0.0009)
Control variables as in *Table 3.1*	yes	yes	yes	yes	yes	yes	yes
Predicted probability	0.7604	0.5188	0.6749	0.1922	0.3925	0.0761	0.0872
Pseudo-R²	0.0351	0.0419	0.0717	0.0766	0.1355	0.0964	0.1725

Notes: ML-Probit regressions for the probability to hold financial assets. Marginal effects at the mean of all covariates. Number of observations is 13,754 in all specifications. Robust standard errors in parentheses. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Again, we include a wide range of control variables in both analyses. These findings, which are not presented in the table to economize on space, are in line with former results (Barasinska et al., 2012). In general, women have a lower probability of investing in financial assets, except for other securities, like stocks, which are very volatile and therefore imply high risk. Although we did not find statistically significant results with respect to the impact of German nationality on risk attitudes, one's nationality is significantly positively associated with an individual's investment decisions. Age not only influences individual attitudes towards risk negatively, but also the probability of investing in savings accounts or fixed-interest securities. However, the older the individual, the higher is the likelihood of investments in relatively liquid assets, like life insurances, other securities or not at all. Being more risk-tolerant, higher-educated individuals are also more likely to invest in financial assets. As expected, unemployment is negatively correlated with the holding of financial assets. In comparison to non-employed individuals, on average unemployed individuals display a 12 percentage point lower probability of possessing a savings account, while having a higher probability of not investing at all. Conversely, employed individuals have a higher likelihood of investing in relatively safe financial assets, such as savings contracts for building a home and life insurances.

3.5 Discussion and conclusion

Only recently economic research considered cultural determinants in its analysis. Studying the effects of religiosity on individual risk attitudes, in a first step, and on individual investment decisions in financial assets, in a second step, we aimed to shed light on the intermediate step in the link running from cultural conditions via individual attitudes to aggregate economic outcomes. Although Germany is a secular country, we found that one's cultural background, measured by religious tradition and activity, affects individual risk attitudes. Although some contrary studies on a more aggregated level stated that Catholics display a higher willingness to take risks than Protestants (Kumar et al., 2011; Shu et al., 2012), we found that Catholics are in general more risk-averse than Protestants. This is in line with other recent research (Dohmen et al., 2011; Renneboog and Spaenjers, 2012). We further found Muslims in Germany to be less risk taking in general than Catholics, Protestants, and non-religious

people. Additionally to previous studies conducted, a context-specific risk attitude, namely financial risk taking, is explicitly considered. Christians were found to be less risk-averse in financial matters than non-religious people. In contrast, comparing Muslims and non-religious individuals, the former are less risk taking in financial concerns. However, their risk assessment in financial concerns depends on their general risk assessment. Furthermore, individual religiosity is associated with one's investment choices. Although Christians are less risk taking in general, they are more likely to invest in financial products, except for bonds and firm assets. In line with Renneboog and Spaenjers (2012), we also found that they are more likely than non-affiliated people to hold such risky assets as stocks. Conversely, Muslims are less likely than Christians and non-religious people to invest in financial products, especially in risky stocks, while they display a higher likelihood of investing in building contracts. Next to individual religiosity, religious activity helps to explain different attitudes towards taking risks. In line with the results of Noussair et al. (2012), deeply involved individuals are less risk taking in general and in financial matters, as expected. Attending religious services is also positively correlated with individual investment choices.

These findings might have important consequences. Culture-induced differences in risk preferences might be one factor contributing to the explanation of individual differences in socio-economic outcomes (Iannaccone, 1998; Hoffmann, 2012), such as entrepreneurship decisions, labor market outcomes (Lehrer, 2008; Becker and Woessmann, 2009; Fernández, 2010) and wage rates (Ewing, 2000), or wealth accumulation (Keister, 2003) and savings behavior of households (Fuchs-Schündeln and Schündeln, 2005). Culture-induced heterogeneity in individual risk attitudes yielding distinct economic choices might further provide a microeconomic foundation for divergent aggregate outcomes. Contributions to the literature document the macroeconomic consequences of religious beliefs on economic growth (Barro and McCleary, 2003; Acemoglu et al., 2005), economic development (Alesina et al., 2003), savings and investment ratios (Guiso et al., 2006), the quality of the governmental systems (La Porta et al., 1999; Arruñada, 2010) and expenditures for welfare systems (Tabellini, 2010).

What can policymakers learn from these findings? Since culture-induced individual heterogeneity in risk assessment was found, distinctive individual values and norms, which are mainly shaped by cultural factors, should be taken into the political decision-making process. Instead of strengthening only external constraints, such as enhanced monitoring of

financial institutions or issuing improved transparency rules, moral standards should be strengthened too. Recently, the importance of moral standards for risk-taking preferences and risky behavior has been seen in distinct risk-taking behavior by Islamic and conventional banks in the ongoing financial crisis. Since 'earning returns based on chance is strongly discouraged and gambling is strictly forbidden' (Bohnet, 2010, p. 816), Islamic banks tend to invest more conservatively than Western banks. Following the principles of Islamic law (Sharia) and the Qur'an, the former are not permitted to handle excessive risk-taking transactions. Islamic law requires risk-sharing strategies to be pursued, and hence profits and losses of financial transactions to be shared, consequently using less risk-seeking financial instruments and choosing customers' projects to finance more selectively (Hassan, 2009). These cultural constraints prevented them from accumulating high losses during the first wave of the recent financial crunch, the sub-prime mortgage crisis in the USA, compared to conventional banks (Hasan and Dridi, 2010; Baele et al., 2012; Bourkhis and Sami Nabi, 2011). However, more risk aversion in financial concerns, in the sense that it might be harder to get a loan from an Islamic bank than from a conventional one, might hamper the economic development of Islamic countries and might lead to a shortage of cash supply for business financing. Positive effects of religion on individual risk-taking attitudes and economic risky behavior would further justify public subsidies. Although influencing individual religiosity is difficult, organized religion might be supported. For example, introducing a tax system to raise church taxes and foster governmental church subsidies might lower church costs.

Appendix 3.A

Table 3.A.1: Detailed results for the impact of religion on the willingness to take risks in financial affairs

	(1)	(2)	(4)	(6)	(7)
Religion (reference: not-affiliated):					
Catholic	-0.3626***	0.0746	0.2268***	-0.2803***	0.1945***
	(0.0546)	(0.0546)	(0.0500)	(0.0626)	(0.0562)
Protestant	-0.2639***	-0.0073	0.1035**	-0.2075***	0.0529
	(0.0487)	(0.0486)	(0.0445)	(0.0545)	(0.0494)
Other Christian	-0.7699***	-0.0621	0.2611**	-0.6294***	0.2826**
	(0.1556)	(0.1510)	(0.1301)	(0.1639)	(0.1372)
Islam/Muslim	-0.7046***	-0.2739*	0.0219	-0.6189***	0.0147
	(0.1733)	(0.1593)	(0.1377)	(0.1755)	(0.1414)
Other religion	0.1997	-0.5043**	-0.5881**	0.3551	-0.5373**
	(0.2963)	(0.2569)	(0.2580)	(0.3007)	(0.2608)
Church attendance (reference: never):					
Less than monthly				-0.0868*	0.1369***
				(0.0477)	(0.0420)
At least monthly				-0.1161	0.0155
				(0.0749)	(0.0619)
At least weekly				-0.2321***	-0.0868
				(0.0826)	(0.0703)
General risk-taking			0.4198***		0.4198***
			(0.0079)		(0.0079)
Female	-0.7919***	-0.8835***	-0.5511***	-0.7870***	-0.5509***
	(0.0374)	(0.0369)	(0.0339)	(0.0374)	(0.0339)
German Nationality	-0.0184	-0.0691	-0.0614	-0.0075	-0.0463
	(0.1205)	(0.1160)	(0.0988)	(0.1209)	(0.0996)
Education (reference: low school degree):					
medium school degree	0.2347***	0.2528***	0.1543***	0.2397***	0.1544***
	(0.0492)	(0.0476)	(0.0428)	(0.0492)	(0.0428)
high school degree	0.3628***	0.5801***	0.4278***	0.3694***	0.4260***
	(0.0604)	(0.0609)	(0.0547)	(0.0604)	(0.0547)
Apprentice	0.1351***	0.1719***	0.1152***	0.1382***	0.1120***
	(0.0479)	(0.0468)	(0.0422)	(0.0479)	(0.0422)
University degree	0.1866***	0.2767***	0.1984***	0.1887***	0.1994***
	(0.0595)	(0.0606)	(0.0546)	(0.0595)	(0.0546)
Employment status (reference: non-employed):					
unemployed	0.3581***	-0.2399***	-0.3902***	0.3513***	-0.3905***
	(0.0784)	(0.0719)	(0.0669)	(0.0784)	(0.0669)

Table 3.A.1 (continued)

	(1)	(2)	(4)	(6)	(7)
employed	0.3858***	0.2348***	0.0729*	0.3827***	0.0712*
	(0.0513)	(0.0475)	(0.0428)	(0.0513)	(0.0428)
Age (in years)	-0.0884***	-0.0068	0.0303***	-0.0876***	0.0293***
	(0.0108)	(0.0106)	(0.0096)	(0.0108)	(0.0096)
Age square/100	0.0762***	-0.0083	-0.0403***	0.0759***	-0.0389***
	(0.0126)	(0.0122)	(0.0111)	(0.0126)	(0.0111)
Monthly household income (in 1000 Euros)	0.0598***	0.0749***	0.0498***	0.0607***	0.0492***
	(0.0086)	(0.0118)	(0.0101)	(0.0087)	(0.0101)
Federal states	yes	yes	yes	yes	yes
Constant	6.3216***	2.8376***	0.1839	6.2808***	0.1858
	(0.2842)	(0.2738)	(0.2424)	(0.2842)	(0.2426)
R²	0.0884	0.0987	0.2631	0.089	0.264
Number of observations	13,754	13,754	13,754	13,754	13,754

Table 3.A.2: Detailed results for the impact of religious affiliation on investment behavior

	savings account	savings contract for building a home	life insurance	fixed interest securities (e.g. bonds)	other securities (e.g. stocks)	firm assets	none
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Religion (reference: non)							
Catholic	0.0780***	0.1114***	0.0662***	0.0499***	0.0456***	0.0103	-0.0217***
	(0.0101)	(0.0128)	(0.0118)	(0.0106)	(0.0134)	(0.0064)	(0.0046)
Protestant	0.0558***	0.0776***	0.0543***	0.0387***	0.0343***	0.0115**	-0.0175***
	(0.0093)	(0.0116)	(0.0107)	(0.0094)	(0.0121)	(0.0056)	(0.0042)
Other Christian	0.0131	0.0680*	0.0312	-0.0418	-0.0239	-0.0153	-0.0103
	(0.0280)	(0.0348)	(0.0311)	(0.0261)	(0.0361)	(0.0144)	(0.0097)
Islam/Muslim	-0.0255	0.1077***	-0.0665*	-0.0361	-0.1982***	-0.0370***	0.0089
	(0.0304)	(0.0355)	(0.0357)	(0.0303)	(0.0334)	(0.0127)	(0.0133)
Other religion	-0.0821	0.1317**	0.0590	0.0513	-0.0791	-0.0427**	0.0205
	(0.0591)	(0.0626)	(0.0561)	(0.0574)	(0.0624)	(0.0191)	(0.0259)
Risk finance	0.0031*	0.0071***	0.0099***	0.0090***	0.0479***	0.0039***	-0.0035***
	(0.0018)	(0.0021)	(0.0020)	(0.0016)	(0.0021)	(0.0009)	(0.0009)
Female	-0.0089	-0.0066	-0.0156*	0.0093	0.0411***	0.0000	0.0029
	(0.0076)	(0.0091)	(0.0085)	(0.0069)	(0.0092)	(0.0042)	(0.0034)
German Nationality	0.0606***	0.1232***	0.1452***	0.0690***	0.1090***	0.0169	-0.0214*
	(0.0235)	(0.0259)	(0.0263)	(0.0164)	(0.0250)	(0.0112)	(0.0117)
Education (reference: low school degree):							
medium school degree	0.0371***	0.0340***	0.0351***	0.0611***	0.1178***	0.0085	-0.0169***
	(0.0094)	(0.0116)	(0.0110)	(0.0096)	(0.0126)	(0.0060)	(0.0039)
high school degree	0.0572***	-0.0092	0.0189	0.0862***	0.1833***	0.0171**	-0.0331***
	(0.0117)	(0.0148)	(0.0144)	(0.0124)	(0.0161)	(0.0076)	(0.0046)
Apprentice	0.0654***	0.0638***	0.0588***	0.0134	0.0698***	0.0018	-0.0263***
	(0.0098)	(0.0112)	(0.0107)	(0.0083)	(0.0112)	(0.0052)	(0.0049)

Table 3.A.2 (continued)

	savings account	savings contract for building a home	life insurance	fixed interest securities (e.g. bonds)	other securities (e.g. stocks)	firm assets	none
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
University degree	0.0104	0.0233	0.0365***	0.0475***	0.0989***	0.0058	0.0001
	(0.0124)	(0.0146)	(0.0141)	(0.0115)	(0.0153)	(0.0067)	(0.0062)
Employment status (reference: non-employed):							
unemployed	-0.1260***	-0.1340***	-0.0968***	-0.0569***	-0.1115***	-0.0180**	0.0481***
	(0.0171)	(0.0178)	(0.0181)	(0.0121)	(0.0176)	(0.0087)	(0.0093)
employed	-0.0003	0.0570***	0.0602***	-0.0192**	-0.0280**	0.0248***	-0.0094**
	(0.0101)	(0.0119)	(0.0114)	(0.0092)	(0.0123)	(0.0053)	(0.0046)
Age (in years)	-0.0042**	0.0042*	0.0193***	-0.0081***	0.0043	0.0043***	0.0030***
	(0.0021)	(0.0025)	(0.0024)	(0.0019)	(0.0027)	(0.0013)	(0.0010)
Age square/100	0.0058**	-0.0090***	-0.0238***	0.0131***	-0.0037	-0.0048***	-0.0044***
	(0.0025)	(0.0029)	(0.0027)	(0.0022)	(0.0031)	(0.0015)	(0.0011)
Monthly household income (in 1000 Euros)	0.0130***	0.0135***	0.0367***	0.0178***	0.0535***	0.0143***	-0.0371***
	(0.0036)	(0.0043)	(0.0086)	(0.0033)	(0.0092)	(0.0023)	(0.0015)
Federal states	yes	yes	yes	yes	yes	yes	yes
Predicted probability	0.7604	0.5188	0.6749	0.1922	0.3925	0.0761	0.0872
Pseudo-R²	0.0299	0.0378	0.0693	0.0717	0.1348	0.0945	0.167
Number of observations	13,754	13,754	13,754	13,754	13,754	13,754	13,754

Table 3.A.3: Detailed results for the impact of religious affiliation and church attendance on investment behavior

	savings account	savings contract for building a home	life insurance	fixed interest securities (e.g. bonds)	other securities (e.g. stocks)	firm assets	none
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Religion (reference: non)							
Catholic	0.0360***	0.0517***	0.0269**	0.0078	0.0349**	0.0019	-0.0084
	(0.0120)	(0.0147)	(0.0137)	(0.0113)	(0.0152)	(0.0067)	(0.0055)
Protestant	0.0231**	0.0326**	0.0215*	0.0100	0.0201	0.0058	-0.0059
	(0.0107)	(0.0130)	(0.0120)	(0.0101)	(0.0133)	(0.0060)	(0.0048)
Other Christian	-0.0518	-0.0224	-0.0192	-0.0864***	-0.0215	-0.0229*	0.0082
	(0.0336)	(0.0379)	(0.0351)	(0.0210)	(0.0379)	(0.0131)	(0.0141)
Islam/Muslim	-0.0760**	0.0508	-0.1074***	-0.0710***	-0.2017***	-0.0403***	0.0278*
	(0.0337)	(0.0377)	(0.0374)	(0.0252)	(0.0334)	(0.0114)	(0.0168)
Other religion	-0.1586**	0.0383	0.0122	-0.0155	-0.0707	-0.0458***	0.0483
	(0.0650)	(0.0686)	(0.0619)	(0.0479)	(0.0646)	(0.0162)	(0.0343)
Church attendance (ref.: never)							
Less than monthly	0.0486***	0.0757***	0.0560***	0.0353***	0.0331***	0.0037	-0.0216***
	(0.0091)	(0.0112)	(0.0103)	(0.0090)	(0.0115)	(0.0053)	(0.0039)
At least monthly	0.1080***	0.0913***	0.0827***	0.0993***	0.0211	0.0332***	-0.0290***
	(0.0118)	(0.0172)	(0.0148)	(0.0157)	(0.0184)	(0.0100)	(0.0045)
At least weekly	0.0743***	0.1380***	0.0620***	0.0950***	-0.0188	0.0105	-0.0195***
	(0.0139)	(0.0185)	(0.0171)	(0.0176)	(0.0197)	(0.0103)	(0.0056)
Risk finance	0.0031*	0.0072***	0.0099***	0.0093***	0.0478***	0.0040***	-0.0034***
	(0.0018)	(0.0021)	(0.0020)	(0.0016)	(0.0021)	(0.0009)	(0.0009)
Female	-0.0120	-0.0100	-0.0182**	0.0067	0.0407***	-0.0006	0.0039
	(0.0076)	(0.0091)	(0.0085)	(0.0069)	(0.0092)	(0.0042)	(0.0034)

Table 3.A.3 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
German Nationality	0.0593**	0.1196***	0.1451***	0.0653***	0.1121***	0.0168	-0.0220*
	(0.0235)	(0.0260)	(0.0263)	(0.0169)	(0.0248)	(0.0112)	(0.0117)
Education (reference: low school degree):							
medium school degree	0.0341***	0.0307***	0.0330***	0.0594***	0.1178***	0.0081	-0.0159***
	(0.0094)	(0.0116)	(0.0110)	(0.0096)	(0.0126)	(0.0060)	(0.0039)
high school degree	0.0535***	-0.0143	0.0159	0.0839***	0.1830***	0.0166**	-0.0315***
	(0.0117)	(0.0148)	(0.0143)	(0.0123)	(0.0161)	(0.0076)	(0.0046)
Apprentice	0.0635***	0.0615***	0.0570***	0.0124	0.0692***	0.0016	-0.0251***
	(0.0098)	(0.0112)	(0.0107)	(0.0083)	(0.0112)	(0.0052)	(0.0048)
University degree	0.0090	0.0221	0.0357**	0.0462***	0.0993***	0.0052	0.0004
	(0.0124)	(0.0147)	(0.0141)	(0.0115)	(0.0153)	(0.0067)	(0.0062)
Employment status (reference: non-employed):							
unemployed	-0.1204***	-0.1297***	-0.0930***	-0.0525***	-0.1112***	-0.0169*	0.0460***
	(0.0170)	(0.0178)	(0.0180)	(0.0123)	(0.0176)	(0.0087)	(0.0091)
employed	0.0024	0.0595***	0.0622***	-0.0170*	-0.0279**	0.0254***	-0.0102**
	(0.0101)	(0.0119)	(0.0114)	(0.0091)	(0.0123)	(0.0053)	(0.0046)
Age (in years)	-0.0049**	0.0035	0.0187***	-0.0088***	0.0040	0.0041***	0.0031***
	(0.0021)	(0.0025)	(0.0024)	(0.0019)	(0.0027)	(0.0013)	(0.0009)
Age square/100	0.0064**	-0.0086***	-0.0234***	0.0136***	-0.0033	-0.0047***	-0.0045***
	(0.0025)	(0.0029)	(0.0028)	(0.0022)	(0.0031)	(0.0015)	(0.0011)
Monthly household income (in 1000 Euros)	0.0123***	0.0129***	0.0361***	0.0173***	0.0534***	0.0142***	-0.0359***
	(0.0035)	(0.0042)	(0.0085)	(0.0033)	(0.0093)	(0.0023)	(0.0015)
Federal states	yes	yes	yes	yes	yes	yes	yes
Predicted probability	0.7604	0.5188	0.6749	0.1922	0.3925	0.0761	0.0872
Pseudo-R²	0.0351	0.0419	0.0717	0.0766	0.1355	0.0964	0.1725
Number of observations	13,754	13,754	13,754	13,754	13,754	13,754	13,754

4 An Empirical Note on Religiosity and Social Trust using German Survey Data[16]

4.1 Introduction

Social trust, as one form of social capital, was found to be positively associated with important economic outcomes. From a macroeconomic perspective, the level of individual trust towards others is essential for economic growth (Tabellini, 2010), the investment to GDP ratio (Knack and Keefer, 1997), and governmental efficiency (La Porta et al., 1997). Because a high level of social trust in a society lowers transaction costs of economic exchange, social capital also plays a crucial role in interpersonal exchange (Putnam, 1993) and in investment decisions (Guiso et al., 2008). While building up social trust, individual religiosity was found to be important (Putnam, 2000). The effect of religion on generalized trust might partly arise because of specific religious teachings and partly due to the institutional character of religiosity. Religions shape an individual's view on other persons and hence how to interact with them. Religious participation fosters the forming of an individual's attitude towards trust in others through the building up of social networks and cooperativeness (Putnam, 2000; Ruffle and Sosis, 2007). Through regular engagement in religious organizations individuals can learn how to interact with others and how to cooperate.

As the empirical link between religiosity and trust can best be studied at the microeconomic level (Guiso et al., 2003, 2006), the focus of this empirical research note is on the extent to which religious beliefs and religious activity are associated with differences in individual trusting attitudes and behavior in Germany. While most contributions to the literature dealing with the impact of religion on social trust focus on a cross-section of countries (La Porta et al., 1997; Guiso et al., 2003; Arruñada, 2010) or on North America (Putnam, 2000; Welch et al., 2004), only few further country case studies for Israel (Ruffle and Sosis, 2010), the Netherlands (Renneboog and Spaenjers, 2012), and Germany (Traunmüller, 2009, 2011) are available. Our research note differs in some important ways

---

[16] with Christian Pfeifer

from, and complements, previous research. Compared to most studies, which focus mainly on Christian religions, we are explicitly taking non-Christian religions into consideration, which in Germany are mainly Muslims. Furthermore, we study individual risk assessments in trusting matters and we assess the consequences of heterogeneity in religiosity and risk attitudes for actual trusting behavior. For this purpose, we use data from the German Socio-Economic Panel (GSOEP), which is a large scale household survey and contains information about religiosity and trust. At first, we analyze the individual willingness to take risks in the area of interpersonal interaction with strangers. Showing faith in other people is a risky decision in the sense that, for example, due to imperfect contracts or information asymmetries, one's good faith in others might be betrayed. In order to assess the behavioral relevant impact of individual trusting attitudes, we further study the influence of trusting attitudes on individual trusting behavior as measured by the frequency of lending personal belongings or money to friends.

4.2   Data and empirical strategy

The German Socio-Economic Panel (GSOEP) is a large representative panel survey of private households and persons in Germany, which provides a rather stable set of core questions asked every year (e.g., employment, education, income) and yearly topics with additional detailed questions (e.g., Dohmen et al., 2011). The 2003 wave includes information about individual religion, church attendance, and behavioral trust measures. The 2004 wave includes questions about risk taking preferences in different aspects of peoples' lives. We focus on a sample of 13,414 individuals who are aged between 18 and 65 years and have no missing values in any of the variables used in the subsequent analysis.

Our explanatory variables of main interest are individuals' religious affiliation and church attendance. The religious affiliation indicates whether an individual is attributed to one of the following religions: Catholicism, Protestantism, other Christian religions, Islam, or adherents to Other religions. For each religion, we generate a dummy variable and non-religious people serve as the reference category in our regressions. *Table 4.1* gives a first description of the religious composition in our sample. The Roman Catholic Church and the Protestant Church, as the main representative organizations of the Christian belief in Germany, account for

almost 61 percent of the sample. Mainly due to migration within the last decades (e.g., many Turkish guest workers stayed permanently with their families in Germany), with a share of about 2 percent in our sample, Muslims represent the largest portion of non-Christian religions in Germany. In addition to these main religions, there are other religions (0.4 percent) such as Hindus and Buddhists as well as other Christian denominations (1.7 percent) such as Christian Orthodox. A large proportion of the sample, namely 35 percent, does not belong to any religious affiliation. We refer to this last group, which includes agnostics and atheists, as non-religious people.

Table 4.1: Descriptive statistics for religious affiliations and religious activity

Religious affiliation		Total	Church attendance			
			Never	Less than monthly	At least monthly	At least weekly
No religion (34.84%)	n	4,673	4,280	359	27	7
	% (row)	100%	91.59%	7.68%	0.58%	0.15%
Catholic (28.64%)	n	3,842	1,129	1,563	568	582
	% (row)	100%	29.39%	40.68%	14.78%	15.15%
Protestant (32.38%)	n	4,343	1,669	2,052	439	183
	% (row)	100%	38.43%	47.25%	10.11%	4.21%
Other Christian (1.68%)	n	225	40	54	32	99
	% (row)	100%	17.78%	24.00%	14.22%	44.00%
Islam/Muslim (2.06%)	n	276	117	83	40	36
	% (row)	100%	42.39%	30.07%	14.49%	13.04%
Other religion (0.41%)	n	55	11	5	7	32
	% (row)	100%	20.00%	9.09%	12.73%	58.18%
Total (100%)	n	13,414	7,246	4,116	1,113	939
	% (row)	100%	54.02%	30.68%	8.30%	7.00%

Regular engagement in organizations was found to create and contribute to generalized trust among individuals (Putnam, 1993). While building up social relationships and networks in these organizations, individuals learn how to interact with others and how to cooperate. In order to illustrate the social dimension inherent in trust we use church attendance as proxy for public religious practice in religious organizations. Being actively involved in a religious community as well as taking actively part in church rituals, as opposed to personal prayer or money donations, has the potential to build up trust between the attendees. Moreover, the frequency of church attendance can be interpreted as a proxy for religious commitment. We consider a categorical variable for church attendance, which measures how often a person

attends religious services on average. The categories are less than monthly, at least monthly, at least weekly, or never attending religious services, which serves as reference group in our regressions. *Table 4.1* reports the distribution of the regularity of church attendance in the sample. Although almost two thirds of all observations in the sample are religiously affiliated, about 54 percent of all observations in the sample never attend religious services. Only about 15 percent are taking regularly part in formal religious activities, i.e., they visit a church at least monthly or weekly. The cross tabulation shows interesting differences between the affiliations. About 29 percent of Catholics, 38 percent of Protestants, and 43 percent of Muslims never attend church. About 30 percent of Catholics, 14 percent of Protestants, and 28 percent of Muslims visit a church at least monthly or weekly. For other Christian and other religious affiliations, the church attendance frequencies are much higher.

At first, we analyze the impact of religiosity on risk taking preferences in trusting strangers in order to assess the extent to which religion contributes to the heterogeneity in individual risk attitudes. Following Dohmen et al. (2011), risk taking depends on the context of the situation. For our analysis we rely on a question on the willingness to take risks in trusting strangers. To elicit information about the propensity to trust strangers, respondents were asked to rate their willingness to take risks in trusting strangers on an 11-point Likert scale between "0 - risk-averse" and "10 - fully prepared to take risks". We apply ordinary least squares (OLS) regressions, because the dependent variable measuring risk-raking attitudes can be treated as quasi-continuous.

The explanatory variables of interest are religious affiliation and church attendance that have been discussed above. In order to control for individual differences that might be correlated with religiosity as well as risk taking preferences, we include variables for gender, German citizenship, secondary schooling degrees, apprenticeship and university degree, employment status, monthly net household income, age and its squared term, health status, number of children in the household, number of friends, and the German Federal States. In an additional specification, we also include individuals' general risk taking preferences. This approach can mitigate potential unobserved heterogeneity issues, as the general risk taking variable controls for unobserved factors that might influence risk taking preferences in general and not trust towards strangers. Thus, the estimated parameters can be interpreted as deviation of the risk preferences in trusting strangers from general risk taking preferences. *Table 4.2* presents descriptive statistics for all variables.

Table 4.2: Descriptive statistics

	Mean	Std. Dev.	Minimum	Maximum
Risk taking preferences (0: risk averse, 10: fully prepared to take risks):				
Willingness to trust strangers	3.4971	2.3646	0	10
General risk taking	4.7046	2.2294	0	10
Trust behavior towards friends (1: very often, 2: often, 3: sometimes, 4: seldom, 5: never):				
Frequency of lending personal belongings to friends	3.1910	1.0201	1	5
Frequency of lending money to friends	4.2537	0.8353	1	5
Religious affiliation (reference: not-affiliated):				
Catholic (d)	0.2864		0	1
Protestant (d)	0.3238		0	1
Other Christian (d)	0.0168		0	1
Islam/Muslim (d)	0.0206		0	1
Other religion (d)	0.0041		0	1
Church attendance (reference: never):				
Less than monthly (d)	0.3068		0	1
At least monthly (d)	0.0830		0	1
At least weekly (d)	0.0700		0	1
Control variables:				
Female (d)	0.5139		0	1
German citizenship (d)	0.9597		0	1
Medium school degree (d)	0.3679		0	1
High school degree (d)	0.3118		0	1
Apprenticeship degree (d)	0.6965		0	1
University degree (d)	0.2231		0	1
Unemployed (d)	0.0833		0	1
Employed (d)	0.7206		0	1
Age (in years)	42.8783	12.7421	18	65
Age squared/100	20.0089	10.9677	3.24	42.25
Monthly net household income (in 1000 Euros)	2.9991	2.2673	0.25	100.00
Health status (1: very good, 5: bad)	2.4732	0.8941	1	5
Number of children in household	0.8796	1.0541	0	12
Number of friends	4.5891	3.8647	0	60
16 German federal states (d)				

Notes: Number of observations is 13,414 for all variables. (d) denotes dummy variables.

In the next step, we analyze actual individual trusting behavior towards friends. Using survey questions, we are following Glaeser et al. (2000), who found that survey questions on an individual's past trusting behavior are good predictors of actual trusting behavior. These questions are also given by the GSOEP in the year 2003:

‘‘How often do you lend personal possessions to your friends (e.g., CDs, clothes, bicycle, etc.)?’’

‘‘How often do you lend money to your friends?’’

As the frequencies of lending personal possession and money to friends are ordinal measures (1: very often, 2: often, 3: sometimes, 4: seldom, 5: never), we apply ordered probit regressions to estimate the impact of religiosity on the frequency of lending personal possession or money to friends. We use in principal the same set of explanatory variables as in the OLS regressions for risk taking preferences. In order to account explicitly for differences in risk taking with respect to trust, we include the above risk preference measure for trust in an additional specification.

4.3   Regression results

Table 4.3 presents the OLS regression results for religiosity and the willingness to take risks in trusting strangers. The first specification includes only religious affiliation and the control variables (gender, German citizenship, secondary schooling degrees, apprenticeship and university degree, employment status, monthly net household income, age and its squared term, health status, number of children in the household, number of friends, and German Federal States). In order to save space, the results for the control variables are not presented and discussed in this research note but can be requested from the authors. It can be seen that the only statistical significant coefficient has been estimated for Muslims, whereas the other religious affiliations (Catholics, Protestants, other Christian and Other religions) do not seem to significantly differ from each other and from not-affiliated persons. Muslims are on average 0.42 points less willing to take risks in trusting strangers compared to the reference group of non-affiliated persons and in this case also to Catholics and Protestants. As the mean willingness to take risks in trusting strangers is about 3.5 (see *Table 4.2*), the absolute mean effect of 0.42 points is a relative mean effect of 12 percent. This result is robust to the inclusion of our variables for church attendance in the second specification. Church attendance itself has no significant effect on the willingness to take risks in trusting strangers.

Table 4.3: The impact of religion on the willingness to take risks in trusting strangers

	(1)	(2)	(3)
Religious affiliation (reference: not-affiliated):			
Catholic	0.0001	0.0344	0.1357**
	(0.0604)	(0.0681)	(0.0647)
Protestant	0.0106	0.0368	0.1101*
	(0.0539)	(0.0596)	(0.0568)
Other Christian	-0.1970	-0.1531	0.0766
	(0.1827)	(0.1893)	(0.1726)
Islam/Muslim	-0.4197**	-0.3881**	-0.1481
	(0.1642)	(0.1666)	(0.1576)
Other religion	-0.0380	0.0046	-0.0980
	(0.3235)	(0.3281)	(0.2858)
Church attendance (reference: never):			
Less than monthly		-0.0366	0.0101
		(0.0514)	(0.0483)
At least monthly		-0.1009	-0.0349
		(0.0802)	(0.0747)
At least weekly		-0.0538	0.0655
		(0.0926)	(0.0831)
General risk taking			0.3721***
			(0.0093)
Control variables as in *Table 4.2*	Yes	Yes	Yes
Constant	4.0142***	4.0026***	1.6875***
	(0.3129)	(0.3129)	(0.2964)
R^2	0.0723	0.0724	0.1835

Notes: OLS regressions for the willingness to take risks in trusting strangers (0: risk averse, 10: fully prepared to take risks). Number of observations is 13,414 in all specifications. Robust standard errors in parentheses. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

The third specification additionally includes the general risk taking preferences of individuals in order to reduce potential omitted variables biases stemming from unobserved heterogeneity. The estimated coefficients in this third specification can therefore be interpreted as the deviation of the willingness to take risks in trusting strangers from general risk taking preferences, i.e., we estimate in principal the effects on the difference between the willingness to take risks in trusting strangers and general risk taking. Whereas the coefficients for church attendance are still not significant, the results for religious affiliation change noteworthy. Because religious people are on average more risk averse in general (Bartke and Schwarze, 2008; Dohmen et al., 2011), the estimated coefficients in the first and second specifications largely reflect this general risk attitude. When controlling for the general risk

preference, Catholics and Protestants seem to be more willing to take risks in trusting strangers than other religious groups and non-affiliated persons, whereas the effect for being Muslim is not statistical significant anymore. In order to check the robustness of our results, we have re-estimated all three specifications with ordered probit regressions for the willingness to take risks in trusting strangers, which support our OLS results.

In the next step, we analyze trust towards friends, for which the frequencies of lending personal belongings or money to friends are used as proxies. The ordered probit regression results for the frequencies of lending personal belongings to friends are presented in *Table 4.4*. We have again estimated three specifications, for which the estimated coefficients are presented in the first three columns. The only significant coefficient for religious affiliation is estimated for Muslims, which indicates that Muslims less often lend personal belongings to friends than other religious groups and non-affiliated persons. Based on the third specification, we have computed average marginal effects for the probabilities to be in the five different frequency categories. It can be seen that Muslims are on average 2.2 percentage points less likely to very often, 5.2 percentage points less likely to often, 2.6 percentage points less likely to sometimes, 4.8 percentage points more likely to seldom, and 5.3 percentage points more likely to never lend personal belongings to friends. This result is at least partly in line with our previous finding that Muslims show lower willingness to trust in strangers, because the definition of strangers might include friends and Muslims might favor family ties. The results for church attendance indicate a non-uniform relationship, because persons with few church attendances per year lend more often personal belongings to friends than persons who attend church more frequently or who never go to church. Furthermore, the results from the third specification support the consistency of our trust measures, because we find indeed a strong correlation between the willingness to take risks in trusting strangers and the frequency of lending personal belongings to friends.

Table 4.5 presents the ordered probit regression results for the frequencies of lending money to friends. The first noteworthy finding is that Muslims do not significantly differ in this trust dimension from Catholics, Protestants, and non-affiliated persons. Other Christian affiliations show the only significant difference, as they more often lend money to friends than all other groups. We find again a non-uniform relationship of church attendance and the frequency of lending money to friends. Persons attending church less than monthly more often and persons attending church at least weekly less often lend money to friends. Again,

the results from the third specification support the consistency of our trust measures, because the willingness to take risks in trusting strangers is strongly correlated with the frequency of lending money to friends

Table 4.4: The impact of religion on the frequency of lending personal belongings to friends

	(1)	(2)	(3)	very often	often	sometimes	seldom	never
				Average marginal effects based on specification (3)				
Religious affiliation (reference: not-affiliated):								
Catholic	-0.0105	0.0352	0.0369	-0.0035	-0.0071	-0.0022	0.0068	0.0061
	(0.0276)	(0.0311)	(0.0311)	(0.0030)	(0.0060)	(0.0019)	(0.0057)	(0.0051)
Protestant	-0.0143	0.0308	0.0328	-0.0031	-0.0063	-0.0020	0.0061	0.0054
	(0.0248)	(0.0276)	(0.0276)	(0.0027)	(0.0053)	(0.0016)	(0.0051)	(0.0045)
Other Christian	-0.0332	0.0134	0.0069	-0.0007	-0.0013	-0.0004	0.0013	0.0011
	(0.0742)	(0.0776)	(0.0779)	(0.0076)	(0.0151)	(0.0045)	(0.0145)	(0.0126)
Islam/Muslim	0.2632***	0.2959***	0.2793***	-0.0222***	-0.0519***	-0.0261**	0.0476***	0.0526***
	(0.0889)	(0.0897)	(0.0909)	(0.0060)	(0.0160)	(0.0114)	(0.0138)	(0.0194)
Other religion	0.0386	0.0777	0.0781	-0.0072	-0.0150	-0.0052	0.0143	0.0131
	(0.1652)	(0.1674)	(0.1657)	(0.0145)	(0.0316)	(0.0128)	(0.0297)	(0.0291)
Church attendance (reference: never):								
Less than monthly		-0.1108***	-0.1130***	0.0109***	0.0219***	0.0066***	-0.0210***	-0.0184***
		(0.0238)	(0.0238)	(0.0023)	(0.0046)	(0.0014)	(0.0045)	(0.0038)
At least monthly		0.0014	-0.0032	0.0003	0.0006	0.0002	-0.0006	-0.0006
		(0.0370)	(0.0369)	(0.0033)	(0.0071)	(0.0027)	(0.0067)	(0.0064)
At least weekly		-0.0684	-0.0709*	0.0066	0.0137*	0.0046*	-0.0131*	-0.0118*
		(0.0426)	(0.0425)	(0.0041)	(0.0083)	(0.0025)	(0.0079)	(0.0069)
Willingness to trust strangers			-0.0452***	0.0043***	0.0087***	0.0029***	-0.0083***	-0.0075***
			(0.0041)	(0.0004)	(0.0008)	(0.0003)	(0.0008)	(0.0007)
Control variables as in *Table 4.2*	Yes	Yes	Yes					
Cut point 1	-0.9844***	-0.9706***	-1.1584***					
	(0.1401)	(0.1402)	(0.1414)					
Cut point 2	0.0371	0.0510	-0.1292					
	(0.1399)	(0.1400)	(0.1411)					
Cut point 3	1.1283***	1.1431***	0.9695***					
	(0.1402)	(0.1403)	(0.1413)					
Cut point 4	2.1573***	2.1739***	2.0035***					
	(0.1409)	(0.1410)	(0.1419)					
Pseudo R²	0.0478	0.0485	0.0518					

Notes: ML-Ordered Probit regressions for the frequency of lending personal belongings to friends (1: very often, 2: often, 3: sometimes, 4: seldom, 5: never). Number of observations is 13,414 in all specifications. Robust standard errors in parentheses. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Table 4.5: The impact of religion on the frequency of lending money to friends

| | (1) | (2) | (3) | Average marginal effects based on specification (3) | | | | |
				very often	often	sometimes	seldom	never
Religious affiliation (reference: not-affiliated):								
Catholic	0.0393	0.0523	0.0540	-0.0006	-0.0028	-0.0090	-0.0071	0.0196
	(0.0296)	(0.0339)	(0.0339)	(0.0004)	(0.0018)	(0.0056)	(0.0045)	(0.0123)
Protestant	0.0001	0.0183	0.0197	-0.0002	-0.0011	-0.0033	-0.0025	0.0071
	(0.0262)	(0.0295)	(0.0295)	(0.0004)	(0.0016)	(0.0049)	(0.0038)	(0.0107)
Other Christian	-0.2148***	-0.2070**	-0.2130**	0.0034**	0.0137**	0.0375**	0.0213***	-0.0759**
	(0.0810)	(0.0855)	(0.0853)	(0.0017)	(0.0062)	(0.0155)	(0.0067)	(0.0299)
Islam/Muslim	-0.0688	-0.0657	-0.0853	0.0012	0.0050	0.0146	0.0099	-0.0307
	(0.0907)	(0.0919)	(0.0928)	(0.0014)	(0.0057)	(0.0162)	(0.0100)	(0.0333)
Other religion	-0.1812	-0.1804	-0.1813	0.0028	0.0114	0.0317	0.0189	-0.0648
	(0.1611)	(0.1646)	(0.1617)	(0.0030)	(0.0114)	(0.0292)	(0.0133)	(0.0569)
Church attendance (reference: never):								
Less than monthly		-0.0673***	-0.0690***	0.0009**	0.0038***	0.0116***	0.0087***	-0.0249***
		(0.0259)	(0.0260)	(0.0003)	(0.0014)	(0.0044)	(0.0032)	(0.0094)
At least monthly		0.0871**	0.0830**	-0.0009**	-0.0041**	-0.0134**	-0.0118*	0.0302**
		(0.0411)	(0.0411)	(0.0004)	(0.0019)	(0.0065)	(0.0061)	(0.0149)
At least weekly		-0.0220	-0.0247	0.0003	0.0013	0.0041	0.0032	-0.0089
		(0.0451)	(0.0452)	(0.0005)	(0.0024)	(0.0075)	(0.0058)	(0.0164)
Willingness to trust strangers			-0.0481***	0.0006***	0.0026***	0.0080***	0.0062***	-0.0174***
			(0.0044)	(0.0001)	(0.0003)	(0.0007)	(0.0006)	(0.0016)
Control variables as in Table 4.2	Yes	Yes	Yes					
Cut point 1	-0.7287***	-0.7246***	-0.9159***					
	(0.1488)	(0.1488)	(0.1505)					
Cut point 2	0.1229	0.1265	-0.0636					
	(0.1459)	(0.1459)	(0.1474)					
Cut point 3	1.1249***	1.1288***	0.9444***					
	(0.1459)	(0.1459)	(0.1472)					
Cut point 4	2.2443***	2.2492***	2.0721***					
	(0.1465)	(0.1465)	(0.1477)					
Pseudo R²	0.0632	0.0638	0.0680					

Notes: ML-Ordered Probit regressions for the frequency of lending money to friends (1: very often, 2: often, 3: sometimes, 4: seldom, 5: never). Number of observations is 13,414 in all specifications. Robust standard errors in parentheses. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

4.4 Conclusion

In sum, our regression results indicate that Muslims are on average less willing to take risks in trusting strangers compared to Christians, who seem to be even more willing to trust strangers than non-religious people, at least if the lower general risk taking preference of religious people is taken into account. This might indicate that Muslims strongly favor interactions within a tight network of family and friends as opposed to unknown transaction partners. Moreover, we find no significant differences between the two major religious affiliations in Germany, namely between Catholics and Protestants. Church attendance does not seem to play an important role in this trust dimension. The regression results for trusting behavior towards friends suggest that Muslims less often lend personal belongings but not money to friends, whereas other Christian religions (e.g., Orthodox) than Catholics and Protestants more often lend money but not personal belongings to friends. Furthermore, we find no differences between non-affiliated persons, Catholics, and Protestants with respect to trust behavior towards friends. The impact of church attendance is not so clear cut, as persons with low church attendance rates more often lend personal belongings and money to friends than persons with higher church attendance rates and than non-church goers. At last, we want to mention a major caveat in the causal interpretation of our results for religious affiliation in the context of our trust variables. Although we can expect religious affiliations to be exogenous to a large extent, the belonging to a minor religious group such as being Muslim can be correlated with discriminatory experiences that might reduce the willingness to take risks in trusting strangers or in making social relationships.

Our findings for religiosity and trust differ to some degree from previous findings. Traunmüller (2009, 2011) does not find negative correlations between Muslims and general trust attitudes, whereas we find evidence that Muslims have a lower willingness to face risks when trusting strangers and that Muslims less frequently lend personal belongings to friends. Moreover, Traunmüller (2009, 2011) reports evidence for Germany that Protestants tend to be more trusting in general than other religious groups and non-affiliated persons, whereas we do not find any significant differences between Catholics and Protestants. Our findings for Germany are in line with findings for the USA by Welch et al. (2004), who also find few significant effects of denominations on social trust (general trust, trust towards co-workers and neighbors) and no significant differences between Catholics and mainline Protestants.

Unlike La Porta et al. (1997) for macro data, we do not find in our German micro data that hierarchical religions such as Christianity reduce trust and social capital. Like Renneboog and Spaenjers (2012) for the Netherlands, we find that Catholics and Protestants have on average even a higher willingness than non-religious people to trust strangers. Thus, these findings contradict the notion of Putnam (1993) that many religions and their organizations such as the Catholic Church discourage the formation of social capital due to hierarchical structures and restrictions imposed on society. Christian religions seem rather to build up social capital and thus might encourage cooperation and trade with personally unknown individuals (Guiso et al., 2009). Contrary, personal connections play a more important role in commercial lives of Muslims, which might be problematic in a globalized world in which anonymous social interactions are of increasing importance.

5 Does Cultural Heritage affect Female Employment decisions? – Empirical Evidence for First- and Second-Generation Immigrants in Germany

5.1 Introduction

In 2010, in 59 per cent of the families without migration background in Germany, both partners were in paid work. In contrast, this merely holds for 39 per cent of the families with a migration background. Further, in 40 percent of these families with migration history only the father pursued an occupational activity (Statistisches Bundesamt, 2012a). Migration based differences in labor market behavior are mainly explained by highlighting the importance of demographic characteristics, like educational attainment and family composition, and structural variables, such as differences in the institutional and economic environment in the country of origin, assimilation, and social integration as well as the number of years since migration. Instead of focusing on individual and structural determinants of employment choices alone, the main thesis of this paper is that cultural norms regarding existing gender role models within society may play a major role for labor market decisions, especially for females.

To test this hypothesis, this paper purposes to replicate studies conducted in North America (Fernández and Fogli, 2009; Gevrek et al., 2011) on the extent to which culture, defined as those preferences and beliefs transferred from previous generations, rather than being voluntarily accumulated (Guiso et al., 2006), has explanatory power for the persistent gap in female labor market outcomes across women with a migration background in Germany. While the analysis focuses on second-generation immigrants, who were born in Germany, or migrated before the age of 7, and have at least one foreign-born parent, first-generation females are taking into account as a comparison group. This contribution uses the fact that cultural norms were found to persist over time and are transmitted to the next generation (see

e.g., Borjas, 1992; Guiso et al., 2006; Bisin and Verdier, 2011). When emigrating from their home country, parents take with them the prevalent cultural values and preferences with regard to the division of labor and gender roles to the host country. By transmitting these cultural attitudes to the second generation, parents endow their children with specific "family commodities" (Becker and Tomes, 1994). Given that children's attitudes were found to be correlated with parental attitudes (see Dohmen et al., 2012 for transmission of risk attitudes and Farré and Vella, 2012 for the transmission of attitudes regarding gender roles in the labor market), parents may, thus, directly affect their descendants working attitudes. Consequently, adapting a major part of their own attitudes and preferences from their parents, the labor supplying behavior of second-generation female immigrants may mirror the labor market relevant system of values and norms in the home country of their parents.

In order to separate the cultural effects on women's work outcomes from the role that economic and institutional factors play, following Fernández and Fogli (2009), I use past female labor force participation (LFP) rates in the second generation's parents' country of origin as a direct channel through which culture may affect employment choices. The idea is that considering the female LFP rate in their parents' country of origin controls for individual heterogeneity among second-generation immigrants attributable to institutional and economic differences in labor markets, as well as labor market related preferences in the country of origin. Since economic and institutional conditions of the country of ancestry that are relevant for female working behavior are not portable to Germany, solely cultural preferences regarding women's work may still matter for second-generation immigrants, assuming that parents transmit them to their descendants. Consequently, while second-generation females face the same economic and institutional constraints in Germany as individuals without a migration background do, individuals with migration background may chose different employment levels due to distinct cultural origins. That is, assuming that female LFP rates in the ancestry country reflect the perceptions of working women in the relevant society, women who stem from countries with low female LFP rates are expected to recently display a lower probability to work as well as working less hours per week compared to women who themselves, or their parents, come from high female LFP countries.

This paper belongs to a growing research field suggesting an impact of culture on aggregate economic outcomes, such as economic development (Alesina et al., 2003), trade patterns (Guiso et al., 2004), savings ratios (Guiso et al., 2006), economic growth (Barro and

McCleary, 2003), and expenditures for welfare systems (Tabellini, 2010). Further, empirical evidence was found on the microeconomic level showing that culture may determine individual economic choices, such as financial portfolio decisions (Guiso et al., 2008; Renneboog and Spaenjers, 2012) and educational attainment (Becker and Woessmann, 2009) as well as fertility and labor market decisions (Fernández and Fogli, 2009). As this paper purposes to explain culture-induced differences in labor market behavior of first and second generation-immigrants, in particular, this study is directly related to the "epidemiological" approach[17] (see e.g., Carroll et al., 1994; Antecol, 2000, Fernández, 2007; Fernández and Fogli, 2009; Alesina and Giuliano, 2010; Blau et al., 2011, Gevrek et al., 2011). Relying "on the analysis of "immigrants (or, better yet, descendants of immigrants) to a country [, this recent line of research in economics tries] to isolate the effect of culture from other factors, thus exploiting the differential portability of culture relative to markets and institutions" (Fernández, 2007, p. 310).

In order to replicate findings on the influence of different cultural norms about the organization of work in the labor market and at home on recent working behavior, the purpose of this contribution is to add to these literature empirical findings for second-generation immigrants facing a distinct migration history compared to the USA (Kurthen and Heisler, 2009), for which most studies on the effect of culture on labor market outcomes have been conducted. In fact, although Germany may not be considered as the typical immigrant country, it is a good case for testing the cultural hypothesis, since in recent decades Germany is the "key European country of immigration" (Bauer et al., 2005, p. 203). The first major migration wave after World War II to Germany in the late 1950s and 1970s consisted primarily of immigrants with German ancestry, so called *Aussiedler*, and of guest workers due to labor recruitment agreements between Germany and mainly southern European states and Turkey. A second wave of immigration occurred at the end of the 1980s where mainly ethnic Germans (*Spätaussiedler*) entered the country (Bauer et al., 2005). Accounting for nearly one fifth of the German population in 2011, individuals with a migration background are an integral part of everyday life. Recently, most of them originate from Turkey (18.5 %), Poland (9.2 %), and the Russian Federation (7.7 %) (Statistisches Bundesamt, 2012b). One third of

---

[17] However, although focusing on labor market choices of second-generation immigrant may be beneficial compared to the studying cultural effects on economic outcomes for immigrants directly, this approach may be questioned for a variety of reasons (see Fernández, 2010, pp. 495).

them were born in Germany and, hence, may be considered as the second generation. However, the present paper differs in some remarkable points from previous contributions. First, given the importance of host country orientation and the identification with the country of origin, respectively, for second-generation immigrant's labor market choices, measures for individual identification with both are considered. Further, since religious belief was found to be a determining factor of economic attitudes and behavior, a woman's religious affiliation is considered as a further explanatory factor. Finally, the empirical strategy of the present analysis takes into account that previous results that account for clustering at the country of origin level, while having only a small number of heterogeneously sized clusters, may be distorted.

As the labor market in Germany becomes more and more heterogeneous due to migration issues, investigating how individuals with distinct labor market relevant values and norms interact in the labor market is crucial. Given the current discussion on the shortage of skilled labor, integrating well-educated second-generation immigrants is of exceptional importance for attaining high productivity standards. Recently, Riphahn et al.(2010) found that since 2006 skilled Turks have been leaving Germany for their home country to work and live there. Further, to cope with an increasing dependency ratio due to an ageing population, employment rates are required to increase in order to prevent fiscal instability of the welfare state. Thus, attracting highly skilled immigrants for the German labor force is crucial to handle the consequences of demographic change. A side effect of higher employment rates would be a reduction of the burden on public finances due to lower utilization of welfare benefits.

Since the present study attempts to replicate the epidemiological approach, following Fernández (2007) and Fernández and Fogli (2009), culture is operationalized by past female LFP rates in ancestral country in 1950 and 1990. Assuming that cultural values last long and evolve slowly (Guiso et al., 2006), these values may mirror the parents' values and norms regarding women's working behavior prevalent in their home societies at the time of the two major migration waves: the period of labor migration in the second half of the 1950s as well as the migration of ethnic Germans at the end of the 1980s. For the analysis data for the years 2001 to 2011, which was drawn from the German Socio-Economic Panel (GSOEP), is used. Controlling for a wide range of individual level characteristics, empirical findings from a multivariate analysis suggests that cultural norms are a relevant factor for female working

probability as well as their actual hours worked per week merely for first-generation females. However, the relation is significantly negative, that is, first-generation women, who stem from a country with low female LFP rates, display a higher probability to work than women from a country of origin with high female LFP rates. These results remain stable while carrying out different specifications and using alternative measures of cultural heritage. In contrast, unexpectedly, no statistically significant results were found for second-generation women. While the direction of the association between cultural norms with regard to working women and working probabilities as well as actual hours worked is found to be positive, none of the specifications these results attain significance. However, religious identity, and especially Muslim belief, was found to be more important for female labor market choices. Further, the Muslim belief is significantly negatively correlated with female labor supply.

The remainder of the paper proceeds as follows. In the next section recent contributions to the literature are discussed shortly. The data and the empirical strategy used are described in section 5.3. Section 5.4 analyzes the results for the main measure of cultural background, namely past female LFP rates in the country of origin. Section 0 reports results for the use of alternative cultural measures as well as for the inclusion of further control variables, which were previously found to affect female labor force choices. Finally, section 5.6 summarizes the obtained results and discusses alternative explanations for these findings.

5.2   Previous findings

The present empirical analysis is mostly related to epidemiological studies conducted in the USA and Canada. Using the gender gap in LFP in the home country as a proxy for culture, Antecol (2000) examined labor market outcomes of both first-generation and second- and higher-generation immigrants in the USA on the basis of the 1990 U.S. Census. Her results indicate that culture plays a role in explaining the heterogeneity in the gender gap in LFP rates, especially for first-generation immigrants. In contrast to Antecol (2000), who decided not to control for individual level determinants of labor force participation, such as parental background, Fernández and Fogli (2009) controlled for a wide range of personal and home country characteristics to explain cultural differences in working hours per week. Using a one per cent sample of the 1970 US census, they concentrated on second-generation American

women who are married and between the ages of 30 and 40 years old. In their framework, culture was proxied by past values of female LFP rates in the immigrants' countries of origin. They found female LFP rates in 1950 in the women's country of ancestry to be statistically significant determinants for hours worked in the US in 1970, measured by eight intervals including zero hours worked. While finding the same pattern when using LFP rates in the ancestry country in 1990 as a cultural proxy to predict hours worked in 1970, Fernández (2007) additionally used individual attitudes towards working women in the women's country of origin, which she drew from the second wave of the WVS. Her results indicate that variation in cultural attitudes towards women's work in 1990 in the country of ancestry is negatively associated with hours worked of second-generation immigrant American women in 1970. Focusing on Canada, Gevrek et al. (2011) examined the impact of relative female LFP rates in the country of ancestry in 2000, as a measure for one's cultural background, on the number of hours worked of second-generation immigrant women. Using the 2001 Canadian Census with a 2.7 per cent sample of the population, they replicated the findings obtained for the USA. Their results show a positive relationship between relative LFP rates in the country of the women's parents and their hours worked. Taking the role of intermarriage between parents of different ethnic background into consideration, they further showed that the effect of the cultural proxies is larger for women with parents from the same cultural origin compared to women with intermarried parents from different ethnic backgrounds.

A large body of literature documents a persistent gap between labor market outcomes for immigrants compared to natives for Germany (Burkert and Seibert, 2007, Fertig and Schurer, 2007; Liebig, 2007; Algan et al., 2010; Euwals et al, 2010; Luthra, 2013). While second-generation migrants are advantaged compared to first-generation migrants, these studies consistently show that, compared to native Germans, they face higher unemployment rates and gain less income. Exemplarily, Luthra (2013) compares employment and occupational status of German natives to second-generation immigrants from Turkey, ex-Yugoslavia, other guest worker countries and ethnic Germans drawing on data from the 2005 Mikrozensus. While no significant differences between ethnic and native German women with respect to their employment chances were found, second-generation females of other migrant groups show a lower working propensity. Further, all second-generation men display a lower employment probability compared to native Germans. Algan et al. (2010) found in a comparative country study that first-generation women from Turkey, Central and Eastern

Europe, Turkey, the former Yugoslavia, Italy and Greece have lower employment probabilities compared to native German women. Second-generation women from these regions, though exhibiting lower employment probabilities than native women, do better than their corresponding first-generation counterparts. Based on data from the GSOEP for 2002 and the Dutch Social Position and Use of Provision Survey 2002, Euwals et al. (2010) examine, among other things, the labor market position of first- and second-generation Turkish immigrants in both countries. They found second-generation Turkish women in Germany to have a higher employment probability compared to the first-generation.

Against this large number of contributions, less attention has been paid to cultural background variables as determinants of heterogeneous working patterns across migrant groups. Contributions, claiming to deal with the impact of cultural differences regarding the employment status and working behavior across immigrant groups, mainly focus on the role the "ethnic identity" of immigrants may play. As opposed to ethnicity, ethnic identity, measured by origin- and host-country orientation, is self-chosen by individuals and therefore open to endogeneity. Casey and Dustmann (2010) used the GSOEP to assess the relation between ethnic identities of immigrants in general and labor market outcomes. They constructed a measure of ethnic identity based on questions on how strongly first- and second-generation immigrants feel connected to Germany and their country of origin, respectively. The authors found evidence that self-identification with Germany is positively associated with the employment probabilities of first-generation immigrants and negatively with unemployment for first-generation females, but not for males. In contrast, home-identity is negatively related to first-generation employment probabilities. While ethnic identity was found to be correlated across generations, neither German nor home identity are associated with labor market outcomes for second-generation female immigrants. For male second-generation migrants only home country identity was found to be positively correlated with participation and employment, and negatively related to unemployment. Aldashev et al (2009) focused on the relation between language proficiency, as one part of individual host-country orientation, and individual earnings as well as the labor market participation probability considering different sources of selection. Using the GSOEP for the years 1996 to 2005, they showed that immigrants with higher language proficiency in German, as measured by language usage in the household and self-assessed language proficiency, have a higher probability to participate in the labor market and to be employed.

Considering explicitly differences between ethnicities in this discussion, Constant et al. (2007) and Constant and Zimmermann (2008) used the GSOEP for the years 2000 to 2002 to examine the association between first-generation immigrants' commitment to both the German culture and their home society and the probability to work. They constructed a composite measure of ethnic identity using host- and home country orientation, respectively, with respect to language, visible cultural elements, ethnic self-identification, ethnic networks, and future citizenship plans. While they did not find empirical evidence for the probability of working for either male or female immigrants to significantly vary by ethnicity, their findings revealed a positive effect of ethnic identity on work participation depending on gender. While no significant differences in working probability were found for immigrant men who are assimilated compared to those who are integrated, those who are ethnically separated and marginalized have a lower likelihood to work. Also drawing data from the GSOEP, though for the years 1988-2006, Höhne and Koopmans (2010) analyzed whether ethnic identity, as proxied by host-country language proficiency, interethnic contacts, host-country media consumption, and religiosity, is a significant factor in determining unemployment and employment durations of first- and second-generation immigrants from Turkey, ex-Yugoslavia, Greece, Spain and Italy in Germany. Further, they investigated transition patterns from domestic work to employment for female migrants. In line with results from Uhlendorff and Zimmermann (2006), their findings indicate that employment and unemployment durations differ significantly by ethnicity. Male and female immigrants with ex-Yugoslav, Greek, Italian or Spanish origin displayed more stable employment patterns compared to Turkish migrants. Further, male Turks showed a lower hazard of finding a job compared to male ex-Yugoslav, Greek, Italian or Spanish immigrants. These differences were not found for female migrants. However, while these results strongly depend on the labor market context (e.g., unemployment rate, share of low qualified workers), host-country orientation and religiosity were also found to be significant factors influencing employment patterns of immigrants and, especially, the transitions into employment of male migrants and married migrant housewives. With respect to the second generation, they did not find significant effects on labor market outcomes.

This paper is also related to a few studies for Germany that have been published pointing explicitly to culture in the sense of shared preferences and beliefs, which are transmitted from parents to children, as an influencing factor of labor market outcomes. Although focusing on

heterogeneity in attitudes towards gender roles and work commitment within Germany, and not between different ethnicities, Tolciu and Zierahn (2012) apply data from the Labor Market and Social Security (PASS) data set. The authors explicitly modeled channels through which attitudes towards working women may affect women's labor market decisions, namely through belonging to the same household, peer group, and the same region. They provided empirical evidence for the role of attitudes towards working women on female participation decisions and employment status as well as on the number of working hours. Examining the impact of religiosity, as one part of one's cultural heritage, on married women's labor supplying behavior in Germany, Heineck (2004) found for several waves of the GSOEP between 1992 and 1999 that the labor supply of married woman is only weakly affected by convictions of the religion towards female labor force participation. However, women who actively take part in religious activities or who are married to a spouse with a strong belief have a lower propensity to be employed. Their results were challenged by Spenkuch (2011), who used the GSOEP to show that, while the probability of being Protestant (compared to being Catholic or Atheist) depends on the share of Protestants in 1624 in the county where the respondent currently lives, Protestantism induces individuals to work longer hours, which thereby leads to higher earning.

Opposed to the vast majority of studies conducted for Germany focusing on the heterogeneity in labor market outcomes for second-generation immigrants, the purpose of the present study is to assess the role distinct cultural norms with respect to labor market preferences play in determining female employment decisions. While recent studies claim to consider cultural factors in their analysis of first- and second-generation immigrant's labor market choices, culture is mainly understood as ethnic identity, proxied by host- and home country language proficiency, interethnic contacts, or host-and home country media consumption. Due to the inherent endogeneity in the relation between self-chosen ethnic identity and economic choices, I use a measure based on given individual ethnicity, namely LFP in country of origin. Opposed to a few recent studies taking individual ethnicity into consideration to explain distinct working patterns (Uhlendorff and Zimmermann, 2006; Constant and Zimemramann, 2008; Höhne and Koopmans, 2010; Luthra, 2013), using this quantitative measure of culture provides an explicit channel through which cultural norms impact recent working behavior. Using merely dummies for individual country of origin do not provide a direct link why it should matter to be from one ancestry instead of being from

another for labor market outcomes (Fernandez 2010), though they may capture a broader channel through which culture may affect economic outcomes. In contrast to previous research, this paper also considers individuals originating in Eastern Europe, since they account for a major part of the migrant population in Germany.

Furthermore, previous epidemiological findings (Fernández, 2007; Fernández and Fogli, 2009; Gevrek et al., 2011) are completed by including measures for ethnic identity due to the importance of host country orientation and the identification with the country of origin, respectively, for second-generation immigrant's labor market choices (Luthra, 2013, Casey and Dustmann, 2010). Given the importance of religious belief for individual economic outcomes and attitudes (Iannaccone, 1998; Guiso et al, 2003, 2006; Arruñada, 2010) and especially for labor supply (Heineck, 2004; Spenkuch, 2011), expanding upon previous studies, women's religious affiliation is considered as a further explanatory factor. Further, given that naturalization as a part of the integration process might have consequences for labor market outcomes (Liebig et al., 2010), all regression specifications control for whether respondents have German nationality. Finally, as opposed to epidemiological studies conducted in Northern America which deal with culture and labor market outcomes (Fernández, 2007; Fernández and Fogli, 2009; Gevrek et al., 2011), analyzing the relation between cultural heritage and the level of labor supply, the present study takes into account that clustering at country of ancestry level, which may be a good strategy due to the fact that the variable of interest, female LFP rates in country of ancestry, varies by country of origin only, may distort results due to a small number of clusters.

5.3   Data and methodology

5.3.1   *Data sets and sample selection*

Studying the effect of cultural factors on labor market outcomes can best be tested at the individual level, since separating economically relevant effects of culture from more traditional institutional explanations is difficult on the aggregate level. Further, cross-country comparisons cannot account for heterogeneity across countries due to distinct definitions of immigrants as well as distinct attractiveness to immigrant groups. The data used in this study is drawn from the GSOEP, a representative cross-section survey on the attitudes, behavior,

and social structure of persons resident in Germany collected since 1984. While using data for the years 2001 to 2011, as the most recent decades which contain relevant information on the respondents' migration history, the sample used is restricted to women aged 18, the official age of majority in Germany, and 60 in order to avoid distorted results stemming from early retirement. The focus of this paper is on first- and second-generation females. The latter were born in Germany, or were foreign born but arrived in Germany before reaching school age, and have at least one foreign-born parent. Although former research pointed to the strength of a large sample size, which may allow one to obtain precise results, for the multivariate analysis a sample covering 1,889 individuals and 9,676 observations in 11 years is used. Although this may lead to less precise estimates, and, thus, may distort ρ-values, it may be seen as a robustness check of analyses using a quite larger number of observations. *Table 5.1* describes the characteristics of the sample used. Females from the second generation are on average 10 years younger than first-generation women. They, further, have slightly more years of education, reflecting the usual pattern that second-generation immigrants outperform first generations with respect to educational attainment (Kristen and Granato, 2007). While average actual hours worked by week and employment participation differ slightly between the generations, on average, 77.6 percent of second-generation immigrant women are in the labor force as compared to 72.1 percent of first-generation females. Furthermore, while the large difference in the presence of young children in the household may be explained by age differentials, no large differences regarding religious affiliation between first- and second-generation immigrants revealed, except for Islam and Protestantism,. It appears that, while the Protestant belief is not transferred to descendants, there are, on average, 7.27 percent more women of the Muslim belief in the second generation.

Table 5.1: Sample properties

	1st generation women		2nd generation women	
	Mean	Std. Dev.	Mean	Std. Dev.
Age	42.7199	-10.437	31.5475	-9.1608
Age at arrival	23.1056	-9.1071	4.1766	-2.1529
Years of completed education	10.7397	-2.4531	11.3893	-2.3148
Weekly working hours' for those working	29.7293	-13.1907	32.6879	-12.8092
% Labor force participation	72.05		77.6	
% Working	58.29		60.62	
% Married	79.84		46.06	
% Child younger than 3 in household (d)	16.13		24.8	
Religious affiliation (reference: not-affiliated)				
% Catholic	36.03		36.75	
% Protestant	18.65		12.82	
% Other Christian religion	11.56		13.43	
% Muslim	21.67		28.94	
Number of Individuals	1,262		627	
Sample Size	6,591		3,085	

Notes: Female immigrants in Germany. GSOEP, 2001 - 2011.

To test the explanatory power of cultural factors for heterogeneous female employment rates of second-generation immigrants, following Fernández and Fogli (2009), the respondent's culture is proxied by past values of female LFP rates in the country of ancestry. While the variable country of origin was constructed following Scheller (2011), the cross-country data on LFP rates are drawn from the information given by Fernández and Fogli (2009) as well as from the International Labor Organization (ILO)[18]. In order to account for the two main different immigration entry cohorts, depending on the individual's age in 2001, female LFP in the country of ancestry in 1950, for those over 30 years, and in 1990 for younger individuals, is used. In contrast to Fernández and Fogli (2009), respondents with ancestry from Eastern European countries are considered in the analysis due to the high share of immigrants from former Eastern bloc countries and the importance of ethnic Germans within the German context. Finally, in order to make findings comparable across immigrant groups, countries of ancestry of the second generation with fewer than 20 observations and 5

---

[18] The ILO provides a database containing information on the labor market activity rates of the economically active population since 1945 by gender. The economically active population comprises persons older than 15 who furnish the supply of labor, employed and unemployed, for the production of goods and services.

individuals were dropped. Showing the composition of the final country sample, *Table 5.2* mirrors source country characteristics for 2000. The descriptive results reveal that countries of origin still differ widely in their economic and social conditions. As expected, Western European countries and the United States display a higher GDP per capita as compared to Eastern European countries and Turkey. While Turkey shows the lowest secondary school enrollment rate, it has the highest number of births by women. Life expectancy, as an indicator for overall country development, also varies widely across nations. Further, the rate of women in the LFP is very heterogeneous. Female participation rates range from a low of 13.5 percent for women from Spain in 1950 to a high of 62.4 for women from Kazakhstan in 1990. Thereby, in 1950, female LFP rates averaged 31.3 percent across the 20 countries used in the sample with a standard deviation of 10.7 percentage points, and an average of 41.9 with a standard deviation of 10.8 percentage points in 1990.

In order to indicate the attitudes held in each country with respect to working women, column (7) displays the percentage of women from each country that either "agreed" or "strongly agreed" with the statement "Being a housewife is just as fulfilling as working for pay" from the fourth wave of WVS. Consequently, the more women agreed with this statement, the more conservative the country may be considered. Averagely, 58.81 percent of women thought that being a housewife is just as fulfilling as doing paid work with a standard deviation across countries of 10.71 percentage points.

Table 5.2: Ancestry country characteristics

Country of origin	1st generation	2nd generation	Sec. school enrollment	GDP per capita	Fertility rate	Life expectancy	Female LFP 1950	Female LFP 1990	% agree housework is fulfilling
			(1)	(2)	(3)	(4)	(5)	(6)	(7)
Austria	37	26	97.67	31,775.73	1.36	78.03	34.96	36.01	
Belgium	9	5	145.13	30,398.96	1.67	78.17	18.98	31.18	60.40
Bosnia and Herzegovina	21	8		5,095.98	1.41	74.31	31.07	35.39	67.90
Croatia	19	28	85.19	12,370.60	1.39	72.81	31.07	46.54	56.10
Czech Republic	18	8	87.33	17,340.76	1.14	74.97	35.38	51.59	70.70
Ex-Yugoslavia	105	42		7,561.37	1.92	73.02	31.07	32.95	
France	19	18	108.25	28,209.95	1.90	78.96	27.88	38.84	59.40
Great Britain	11	8	101.58	29,126.03	1.64	77.74	29.27	41.16	63.00
Greece	44	41	89.46	20,316.73	1.26	77.89	17.95	28.83	33.50
Italy	77	107	93.23	27,717.07	1.26	79.43	21.73	30.68	51.40
Kazakhstan	154	19	93.67	5,405.80	1.80	65.52	41.48	62.35	
Macedonia, FYR	4	8	83.93	7,388.37	1.67	72.91	31.07	42.46	51.20
Netherlands	16	7	123.42	33,690.78	1.72	77.99	18.65	35.54	48.00
Poland	199	51	100.59	11,753.35	1.35	73.75	42.44	55.24	55.80
Romania	69	11	81.90	6,837.97	1.31	71.16	52.80	51.80	48.00
Russia	161	13		8,612.66	1.21	65.34	41.48	60.14	59.30
Serbia and Montenegro	21	9	90.03	6,501.34	1.48	72.14	31.07	43.85	62.00
Spain	20	23	111.42	25,147.12	1.23	78.97	13.49	27.49	58.50
Turkey	244	184	71.43	9,827.63	2.38	69.45	52.76	30.34	75.20
United States	14	11	93.03	39,544.96	2.06	76.64	21.48	56.39	79.40

Notes: Data in columns (1) to (4) is drawn from the World Bank's World Development Indicators Database for 2000. GDP is in PPP constant 2005 international dollars. Data for Ex-Yugoslavia is from 1990. Columns (5) to (6) show labor force participation rates based on ILO data for economically active population for 1950 and 1990. Data for the former Yugoslavian countries (Bosnia and Herzegovina, Croatia, Macedonia, and Serbia) for 1950 is given by the data for Yugoslavia and LFP in 1950 for Kazakhstan is drawn from data for USSR. Data for Ex-Yugoslavia for LFP 1990 is from 1981. Column (7) represents the percentage of females in each country that agrees with the statement "Being a housewife is just as fulfilling as working for pay." This data was drawn from the WVS for the year 1998 to 2000.

5.3.2   Methodology

To capture cultural effects on labor market outcomes, namely employment probability and weekly hours worked, regressions of the following type are run[19]

$$Y^{*G}_{iA} = \alpha^G + C_A\beta + X'_{iA}\gamma^G + \varepsilon_{iA} \, ,$$

where Y_{iA} either denotes the binary choice of women i from ancestry A t to work, or not, or the decision on her labor supply level, measured by weekly hours worked. G is an index indicating either first- or second-generation immigrant women. α is a constant term. C_i contains the cultural proxies considered, namely female LFP in country of ancestry A in 1950 and 1990, respectively, *w*hile X_i denotes the vector of individual characteristics that were found in previous research to influence female participation choices, such as age, education, marital status, employment status and labor income of the partner and the presence of young children and regional unemployment rates. Descriptive statistics for the full set of explanatory variables is given in Appendix 5.A, *Table 5.A.1.* However, since most of these explanatory variables are likely to be endogenous to one's cultural heritage, considering them in the estimations means to measure the explanatory power of culture beyond its influence on these endogenous variables. ε is an unobserved stochastic error term. Given 20 potential clusters in the recent study, standard errors may not be clustered at the country-of-ancestry level, since statistical inference were found to be incorrect when using cluster-robust standard errors in cases with fewer than 50 clusters (Nichols and Schaffer, 2007). Thus, all results report clustered standard errors at the individual level in parenthesis to deal with possible heteroskedasticity[20].

   Depending on the nature of *Y*,* the equation above is estimated either with a pooled probit model, where *Y** is a latent variable underlying the probability of women *i* of ancestry *A* to

---

[19] An alternative estimation technique would be the linear random effects models which allow to account for a non-zero covariance of the errors terms for repeated observations on the same individual and to estimate the time-invariant effect of culture on labor market choices. However, the null hypothesis that the unobserved individual effects are uncorrelated with the other explanatory variables is strongly rejected by a Durbin-Wu-Hausmann test, and thus, random effects models seem not appropriate.

[20] Fernández and Fogli (2009) and Gevrek et al. (2011) cluster their observations at the country of ancestry level, arguing that LFP in 1950 varies by parental country of origin. Using 25 clusters (Fernández and Fogli (2009) and 18 clusters (Gevrek et al. (2011), respectively, the inference of the obtained estimates from these analyses may be distorted due to the small number of clusters.

work, or with a Tobit model[21], where Y^* is a latent variable underlying the observed number of actual weekly hours worked of women i of ancestry A. Estimating reduced form regressions, a positive value for weekly hours worked is only observed for those women whose desired working hours are nonnegative. For non-working women, whose utility from paid work is negative, hours worked were replaced with a value of zero. Thus, it may be argued that the data on hours worked is censored at zero. 57.11 percent of the first generation and 58.44 percent of second-generation women worked positive hours. For those working, the weekly hours worked range from 1.5 to 80 hours.

5.3.3 Explanatory variables

Although it is assumed that labor market related cultural norms and values form the country of origin are portable and transferable to the next generation, while economic and institutional conditions are not, several different economic and institutional factors besides cultural beliefs may affect female labor supply. In order to preclude that systematic differences in underlying economic and institutional factors across countries, rather than cultural beliefs, are responsible for the results obtained, it is controlled for a wide range of individual and parental characteristics. Controlling for age and age squared is expected to capture the common non-linear relationship between age and female labor market behavior. Years of education as a proxy for accumulated human capital, representing the years of completed education, are expected to be positively correlated with female labor supply. Since naturalization may have labor market related benefits, such as reduction of labor market barriers and reduced discrimination (Liebig et al., 2010), German citizenship might have positive consequences for labor market outcomes of immigrants. To take the relation between employment likelihood and naturalization into consideration, a dummy variable is introduced which equals 1 if the respondent has German nationality and 0 otherwise. Married represents a dummy variable indicating whether a woman is married or not. It may be negatively related to women's labor

---

[21] Applying the Heckman selection model selection model yielded similar findings. A husband's educational attainment and his labor market income were used as the exclusion restrictions that entered the selection equation, but not the hours of work equation. Although Wooldrige (2002) stated that it is reasonable to use Tobit models for analyzing female hours worked, I am aware of possible associated problems while applying. However, to make findings more comparable to previous studies on the cultural determinants of female LFP, Tobit is used.

supply. Furthermore, for women who are married, husband characteristics are controlled for. All regressions simultaneously control for the educational level of the partner and his labor income, which may be seen as a proxy for women's non-labor income. While the effect of the partner's income on female labor supply is straightforward, the effect of his education is not. On the one hand, being married to a well-educated partner, who is supposed to also have a high level of income, may be expected to negatively affect female labor supply. On the other hand, assuming that working preferences are positively correlated with one's education, the spouse's educational level may reflect his attitudes towards working women. Thus, women with higher tastes for working tend to choose a more educated partner (Papps, 2010). As a consequence of these two opposing factors, the effect of partner's education on female labor supply is not clear. For single women, variables indicating spouse characteristics are given a value of zero. A child younger than three years is a dummy variably indicating whether there are young children under the age of three in the household for whom individuals need to care for. Furthermore, regional unemployment rates are considered to deal with structural differences within the German labor market. Every specification includes year fixed effects. Additionally, years since migration and its square are considered as further explanatory variables for first-generation women. The longer a woman already stays in Germany, the higher her potential may be to adapt to the local culture and, as a consequence, the higher her employment probability is expected to be.

5.4   Cultural heritage and economic outcomes

Now I investigate the extent to which cultural heritage is related to different economic outcomes in Germany for first- and second-generation immigrant females. Measures of labor market outcomes (employment and weekly hours worked) are regressed on measures of cultural heritage. Instead of solely using country dummies as a qualitative measure of culture, a quantitative measure of culture, namely female LFP in country of origin in 1950 and 1990, respectively, is used.

   Firstly, Table *5.3* reports marginal effects from a probit model regressing female employment status on female LFP in country of ancestry conditioning on a wide range of background characteristics. Column (1) presents the regression results for first-generation women. Against the expectation, the estimated coefficient of female LFP in either 1950 or

1990, depending on the age of the individual, has a negative sign, indicating that women coming from countries with a high female LFP rate, compared to women stemming from countries with a lower female LFP, have a lower probability to work. The coefficient implies a 48.61 percentage point lower propensity to work for women from a high LFP country as compared to women from a low LFP country, which is about 83.39 percent of the sample probability to work. In contrast, the estimated coefficient on the cultural variable is positive for second- generation women, as column (2) depicts. Though not statistically significant, this finding, which is consistent with my expectations, indicates that women, whose ancestries came from countries with higher female LFP, as compared to those whose parents came from lower female LFP countries, are more likely to work.

The second part of *Table* 5.3 presents the regression results for the correlation between weekly hours worked, as the dependent variable, and LFP in country of origin for first-generation females in columns (3) and (4) and for second-generation immigrant women in columns (5) and (6). Controlling for a wide range of covariates, the coefficients shown are Tobit estimates, since there is a large proportion of non-working women in the sample. However, Tobit coefficients may be directly interpreted only as the relation between the independent variable in question and a latent variable underlying the observed dependent variable. Thus, the corresponding marginal effects on the expected value of hours worked, while conditional on it being larger than zero, are reported. Column (3) shows that the coefficient of LFP in country of origin is negative and statistically significant at the 1% level, which indicates that first-generation women coming from high female LFP countries desire significantly less hours to work for pay per week than women from low female LFP countries. However, this result is against my expectation of a positive relation between home country LFP and female working behavior. Column (4) of *Table 5.3* shows that, conditioned on hours worked being positive, first-generation women from high female LFP countries tend to work 11.22 hours less than women from low female LFP countries, which is 37.74 percent of the sample mean of weekly hours worked for those women working. However, unexpectedly, no statistically significant results were found for the second generation, though again, as expected, women whose parents were born in high female LFP countries may tend to work more hours than women whose parents came from low female LFP countries.

Table 5.3: Probit/Tobit estimates of employment probability and weekly hours worked

	(A) Working		(B) Weekly hours worked			
	1st generation	2nd generation	1st generation		2nd generation	
	(1)	(2)	(3)	(4)	(5)	(6)
			coef	E(Hrs|Hrs>0)	coef	E(Hrs|Hrs>0)
Female LFP in country of origin	-0.4861***	0.1112	-25.4065***	-11.2202***	12.6758	5.8056
	(0.1330)	(0.1647)	(7.9225)	(3.4970)	(10.0214)	(4.5960)
Age	0.0373***	0.0303***	2.0455***	0.9033***	1.4416**	0.6603**
	(0.0100)	(0.0117)	(0.6098)	(0.2698)	(0.7107)	(0.3270)
Age squared/100	-0.0462***	-0.0302*	-2.4875***	-1.0986***	-1.4570	-0.6673
	(0.0119)	(0.0169)	(0.7156)	(0.3164)	(1.0051)	(0.4614)
Years of education	0.0309***	0.0345***	1.8573***	0.8202***	2.2236***	1.0184***
	(0.0068)	(0.0078)	(0.3612)	(0.1596)	(0.4380)	(0.1982)
German citizenship	0.1606***	-0.0359	9.3370***	4.1511***	-4.1667*	-1.9006*
	(0.0309)	(0.0371)	(1.8205)	(0.8072)	(2.2146)	(1.0079)
Married	-0.1582***	-0.1718***	-14.3578***	-6.9838***	-14.7054***	-6.6720***
	(0.0495)	(0.0591)	(2.8075)	(1.5056)	(3.3510)	(1.5029)
Partner's years of education	0.0097*	0.0094*	0.6502**	0.2872**	0.7831**	0.3586***
	(0.0053)	(0.0055)	(0.2803)	(0.1241)	(0.3050)	(0.1390)
Partner's labor income	-0.1177	-0.5242**	-12.6741*	-5.5973*	-40.8987***	-18.7318***
	(0.1333)	(0.2108)	(7.6363)	(3.3756)	(13.4050)	(6.1562)
Child under 3	-0.2958***	-0.1420***	-16.1238***	-6.3158***	-8.0910***	-3.5543***
	(0.0320)	(0.0384)	(2.2459)	(0.7795)	(2.4980)	(1.0634)
Unemployment rate	-0.0193***	-0.0197***	-1.1736***	-0.5183***	-1.3258***	-0.6072***
	(0.0051)	(0.0065)	(0.3256)	(0.1437)	(0.4037)	(0.1856)

Table 5.3 (continued)

	(A) Working		(B) Weekly hours worked			
	1st generation	2nd generation	1st generation		2nd generation	
	(1)	(2)	(3)	(4)	(5)	(6)
			coef	E(Hrs|Hrs>0)	coef	E(Hrs|Hrs>0)
Years since migration	0.0121*		0.7147*	0.3156*		
	(0.0063)		(0.3756)	(0.1660)		
Years since migration squared/100	-0.0305**		-1.5346*	-0.6777*		
	(0.0141)		(0.8320)	(0.3672)		
Constant			-31.1510**		-27.4027**	
			(13.3232)		(11.7683)	
Pseudo R2	0.1088	0.0750	0.0267		0.0197	
Wald test	270.8059***	121.0028***				
F-test			14.00683***		8.230647***	
Log likelihood	-3,844.5700	-1,913.2720	-19,038.6000		-9,552.5650	
Number of observations	6,357	3,085	6,357		3,085	

Notes: (A) ML-probit regressions for the probability to work. Estimates report marginal effects at the mean of all covariates. (B) Tobit estimates and corresponding marginal effects for expected hours worked condition on hours worked being positive. Robust standard errors in parenthesis. At the bottom, results for chi-square Wald test and F-test, respectively, are shown. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

To preclude that the results for working probability and hours worked are driven by differences in individual characteristics, all regressions condition on a large vector of background characteristics. In line with former research results (Fernández and Fogli, 2009), the relation between age and both working probability and hours worked by females display, as expected, a significant non-linear effect. One's educational attainment increases the probability to work and is positively related to female hours worked. Although the relation between labor market and naturalization choices is likely to be bi-causal, at the least statements on the relation between these two variables can be made. While naturalization is found to be positively associated with first-generation women's labor market outcomes, it is negatively related to the second generation's labor supplying behavior which points to a negative selection effect. That is, those second-generation women who may be less integrated or have language shortcomings, and, thus, face a relatively weaker position at the labor market, may choose more often to naturalize to obtain access to welfare programs (Euwals et al., 2010). While being married is associated with lower female labor supply, the education of the partner is positively associated to it. Both labor market income of the partner, as a proxy for women's non-labor income, and having young children at home decreases female labor supply, as expected. Regional unemployment is also found to be negatively related to women's labor supply. The longer first-generation women live in Germany, the higher is their supposed host-country specific human capital, such as knowledge about job access and German language proficiency, and, as a consequence, the higher are their probabilities to be employment, however, with a decreasing rate.

Summing up, cultural values regarding working women prevalent in the country of ancestry were found to partly explain the heterogeneity in labor market outcomes of first-generation immigrant women in Germany. However, no support was found for the hypothesis, that labor market related cultural norms, which were assumed to be transmitted from parents to their descendants, are related to labor market decisions of the second generation. While positive, the effect of cultural heritage on second-generation immigrant women in Germany was found to be not statistically significant.

5.5 Robustness of results

To test the robustness of the results found in the previous section, at first, two alternative measures of culture, namely country of origin dummies (*section 5.5.1*) and attitudes towards working women in country of origin (s*ection 5.5.2*), are used. Further analyses are conducted considering ethnic identity in *section 5.5.3* and religious identity in *section 5.5.4*, which were found in previous research to affect female labor supply, as these are channels through which cultural norms may affect female labor market outcomes. To preclude that the results are driven by individual or regional differences the following analyses control for age, educational attainment, German nationality, the presence of young children, marital status, husband characteristics, and regional labor market structure. Note, since these results are well behaving, just as the explanatory variables displayed in *Table 5.3*, they will neither be discussed in further detail nor are they shown in the tables. Full results for all following specifications are available upon request.

5.5.1 Country of origin and labor market outcomes

Next, ethnicity, as measured by country of origin dummies, is considered as a commonly used proxy for culture. It may impose specific cultural values capturing a broader channel through which culture may affect female labor supply than looking at female LFP rates in country of origin as a specific way. Given empirical support that living under a specific political system may lead to the adaptation of preferences (Alesina and Fuchs-Schündeln, 2007), at least partly, distinct incentives provided by states and societies related to female labor supply, such as in the form of the provision of public day-care, family related employment legislation, child benefits, and work-family balance regulations, may affect female labor market choices of immigrants.

   Table 5.4 reports empirical results from regressing female employment choices and hours worked on country of origin dummies controlling for the explanatory variables mentioned above. In all specifications Turkish first -or second-generation women are the reference, since those were found to have the weakest position at the labor market. Interpreting these results, however, one has to keep in mind the limited number of observations for several second generation women's country of origin, which may lead to a selection bias. Thus, only the results for countries with more than 20 individuals are discussed in further detail in the text,

while the results for all countries of origin are displayed in *Table 5.4*. Marginal effects from probit estimation in columns (1) and (2) as well as Tobit estimates in the second part of the table are reported. In contrast to findings from Constant et al. (2007) and Constant and Zimmermann (2008), empirical evidence was found for the probability of working to vary significantly by ethnicity for first-generation females. In line with Luthra (2013), Euwals et al. (2010), and Algan et al. (2010), compared to Turkish migrant women, females from other countries considered are more likely to work. Thus, Turkish women exhibit the weakest position at the labor market. The magnitude of the ethnicity effect ranges from a low of a 13.34 percentage points higher propensity to work for Austrian women compared to Turkish women, which is a relative mean effect of 22.88 percent, to a high of a 34.21 percentage points higher probability to be employed (58.68 percent of the mean) for first-generation women coming from Bosnia-Herzegovina compared to Turkish female first-generation migrants. Thereby, the difference between the working likelihood for women from these two countries is statistically significant at the 1%-level. Regarding the main guest worker-countries (Ex-Yugoslavia, Greece, Spain and Italy), statistically significant differences regarding working probabilities were further found between women from Ex-Yugoslavia and Greece, and between women from Greece and women stemming from Italy or Spain.

In order to analyze the effect of cultural origin, as measured by country of ancestry, for second-generation women's labor supply, column (2) of *Table 5.4* reveals evidence that their parents' country of origin is statistically significant related to their working choices. Thereby, except for women whose parents stemming from Croatia, most second-generation women in the sample are more likely to work than Turkish women. However, compared to the findings in column (1), the relative disadvantages of second-generation Turkish women, compared to second-generation females whose parents stemmed from other nations, decreased. This may point either to a relative improvement of the position of Turkish women or to an increasing disadvantage for second-generation women from other countries with respect to employment chances. Especially the employment gap between second-generation women whose parents came from the other guest worker nations and Turkish second-generation females decreased significantly. While women whose parents came from Ex-Yugoslavia, Greece or Italy, have an almost equally higher propensity to work, compared to second-generation Turkish women, no significant differences for the second generation's working behavior was found between women of Spanish as compared to Turkish descent.

Table 5.4: Country of origin indicator variables

	(A) Working		(B) Weekly hours worked			
	1st generation	2nd generation	1st generation		2nd generation	
	(1)	(2)	(3)	(4)	(5)	(6)
			Coefficient	E(Hrs|Hrs>0)	Coefficient	E(Hrs|Hrs>0)
Country of origin (reference: Turkey):						
Ex-Yugoslavia	**0.2032*****	**0.0841****	**15.0313*****	**7.6466*****	**5.3759**	**2.5916**
	(0.0216)	**(0.0386)**	**(3.6593)**	**(2.1273)**	**(4.0339)**	**(2.0318)**
Greece	**0.2872*****	**0.0779****	**17.6965*****	**9.4224*****	**4.4705**	**2.1332**
	(0.0237)	**(0.0362)**	**(4.9262)**	**(3.0941)**	**(4.5674)**	**(2.2655)**
Italy	**0.2254*****	**0.0849*****	**14.2895*****	**7.2628*****	**2.1147**	**0.9833**
	(0.0214)	**(0.0253)**	**(3.7135)**	**(2.1383)**	**(3.1859)**	**(1.4989)**
Spain	**0.2074*****	**-0.0612**	**15.5031****	**8.1051***	**-0.5130**	**-0.2342**
	(0.0364)	**(0.0631)**	**(6.8662)**	**(4.1788)**	**(7.0262)**	**(3.1914)**
Austria	**0.1334*****	**0.1255*****	**10.5364**	**5.2186**	**8.6006***	**4.2871**
	(0.0396)	**(0.0481)**	**(6.4838)**	**(3.5730)**	**(5.0690)**	**(2.7286)**
France	0.1301**	-0.0072	11.5071	5.7733	-7.1169	-3.0442
	(0.0543)	(0.0601)	(7.2067)	(4.0680)	(6.3427)	(2.5292)
Great Britain	0.2383***	0.0944	11.0548	5.5250	8.8093	4.4189
	(0.0479)	(0.0765)	(8.4444)	(4.7277)	(11.2762)	(6.1607)
USA	0.2819***	0.1014*	19.4057***	10.5693**	2.1700	1.0174
	(0.0332)	(0.0566)	(6.8906)	(4.4919)	(7.1588)	(3.4288)
Romania	**0.2126*****	0.1162*	**13.4978*****	**6.8483*****	2.0536	0.9621
	(0.0280)	(0.0660)	**(3.5967)**	**(2.0664)**	(7.2010)	(3.4418)
Poland	**0.2718*****	**0.0948****	**17.6022*****	**8.9282*****	**6.3703**	**3.0939**
	(0.0203)	**(0.0384)**	**(3.0607)**	**(1.7705)**	**(4.7911)**	**(2.4560)**
Czech Republic	0.2055***	0.2819***	10.8456	5.4055	11.1732	5.7395
	(0.0499)	(0.0612)	(8.1023)	(4.5118)	(8.0292)	(4.5630)
Russia	**0.2283*****	0.0886	**16.7481*****	**8.5694*****	8.4645	4.2311
	(0.0237)	(0.0771)	**(3.5903)**	**(2.1125)**	(7.6549)	(4.1427)

Table 5.4 (continued)

	(A) Working		(B) Weekly hours worked			
	1st generation	2nd generation	1st generation		2nd generation	
	(1)	(2)	(3)	(4)	(5)	(6)
			Coefficient	E(Hrs|Hrs>0)	Coefficient	E(Hrs|Hrs>0)
Country of origin (reference: Turkey):						
Kazakhstan	**0.2383*****	0.0791	**15.1428*****	**7.6261*****	2.8919	1.3657
	(0.0235)	(0.0594)	**(3.4593)**	**(1.9766)**	(5.2051)	(2.5237)
Belgium	0.1921***	-0.2306**	10.2537	5.0837	-19.8106**	-7.4194***
	(0.0609)	(0.1066)	(7.9051)	(4.3551)	(9.4360)	(2.8513)
Netherlands	0.1405***	-0.1843*	1.4644	0.6583	-7.1888	-3.0637
	(0.0497)	(0.0963)	(5.7601)	(2.6303)	(10.6392)	(4.2029)
Croatia	0.1619***	**-0.0924***	9.3460	4.5780	**-2.7446**	**-1.2264**
	(0.0462)	**(0.0500)**	(7.9814)	(4.3051)	**(6.5033)**	**(2.8271)**
Bosnia-Herzegovina	**0.3421*****	0.1084	**24.5131*****	**14.0792*****	6.1703	3.0141
	(0.0249)	(0.0722)	**(4.9433)**	**(3.4975)**	(6.0537)	(3.1310)
Macedonia	0.2248	0.0037	11.4898***	5.7820**	1.5071	0.7020
	(0.1512)	(0.0630)	(4.4388)	(2.5002)	(7.9101)	(3.7400)
Serbia	**0.0229**	0.1763**	**-5.3913**	**-2.2450**	13.7637**	7.2603**
	(0.0666)	(0.0812)	**(6.0649)**	**(2.3765)**	(5.3446)	(3.1797)
Controls as given in *Table 5.A.1*	yes	yes	yes	yes	yes	yes
Pseudo R²	0.1327	0.0884	0.0330		0.0221	
Wald test	1001.552***	350.449***				
F-test			10.40352***		5.196104***	
Log likelihood	-3741.6020	-1885.4610	-18915.4200		-9529.3760	
Number of observations	6,357	3,085	6,357		3,085	

Notes: (A) ML-probit regressions for the probability to work reporting marginal effects at the mean of all covariates. (B) Tobit estimates and corresponding marginal effects for expected hours worked condition on positive hours worked, which both include a constant term. Columns (1), (3) and (4) additionally control for years since migration and years since migration squared/100. Figures in bold denote countries of origin with more than 20 individuals. Robust standard errors in parenthesis. At the bottom, results for chi-square Wald test and F-test, respectively, are shown. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Columns (3) to (6) show Tobit estimates and the corresponding marginal effect on the expected value of hours worked given the individual is not censored, respectively. Columns (3) and (4) indicate that the association between the country of ancestry indicator variable and weekly hours worked replicate the pattern found for first-generation immigrant women's working probabilities, as expected. As may be seen from the Tobit coefficient in column (3), except for first-generation women who came from Serbia, immigrant women gain, on average, a higher utility from working compared to first-generation Turkish females. Further, those first-generation women who are employed work mostly more hours than Turkish immigrant women, as column (4) reveals. Exemplarily, working women who stemmed from Greece tend to work 9.42 hours more than first-generation women who came from Turkey, which corresponds to a relative mean effect of 31.69 percent for those women working. Further, compared to first-generation women of Turkish origin, working females of Spanish origin tend to work 8.11 hours more, although this result is only significant at the 10%-level. Compared to Turkish originating women, women with Yugoslavian origin tend to work 7.64 hours and women with Italian origin work 7.26 hours more condition on hours worked being positive. Again, women stemming from Bosnia-Herzegovina display a high value of desired working hours per week and those working tend to work 14.08 hours more per week compared to first-generation Turkish women. However, unexpectedly, no effects for culture on hours worked were found for second-generation immigrants, except for females with Austrian origin, who display a higher utility gain from working compared to Turkish women. Summing up, the country of origin, as a broad measure of cultural origin, reveals persisting differences across immigrant groups regarding their working behavior. While ethnicity seems to matter for the probability to be employed for both generations, no significant relation was found between cultural origin and second-generation women' hours worked.

5.5.2   *The role of attitudes towards working woman*

Further, cultural norms towards female LFP may not only be incorporated by a behavioral measure, such as past LFP in country of ancestry, but attitudes towards gender roles in the labor market prevalent in a society may also reflect cultural norms with respect to the supply of labor of women. There already exists empirical evidence that attitudes regarding women's role in the labor market, which vary systematically between countries (Albrecht et al., 2000)

influence female working behavior (Fernández, 2007). Women coming from countries that are more conservative with regard to working women were found to participate less in the labor market.

Following Fernández (2007), country specific attitudes towards women working are used to analyze culture-induced heterogeneity in female LFP in Germany. These attitudes reflect not solely women's preferences but also economic and institutional conditions in the respective society. Further, since attitudes towards working and leisure are likely to be related to one's own working experience and education, individual attitudes may be endogenous. However, analyzing attitudes towards women working from a woman's country of ancestry, that is, from a different period of time as well as from a distinct institutional framework, may mitigate endogeneity issues.

In *Table 5.5* employment status and weekly hours worked of first- and second-generation immigrant women in Germany are regressed on attitudes towards working women in country of ancestry. Answers to the question on "Being a housewife is just as fulfilling as working for pay." from the fourth wave (1999-2001) of the WVS, which contain representative national surveys on changing social and political values, are used to assess the extent to which cultural attitudes are correlated with female labor market involvement. Since no surveys in 1999 to 2001 were conducted for Austria and Kazakhstan, and Yugoslavia did not exist in 2000, the used observations dropped for that analysis to 4,867 for first-generation and to 2,722 for second-generation women. The first part of *Table 5.5* shows the results from a pooled probit regression for the propensity to work. As expected, while controlling for individual and regional differences, column (1) reveals evidence in the upper panel that first-generation migrants, stemming from countries where more females agree that housework is as fulfilling as working for pay, that is, from a more "conservative" country, work less. They exhibit a 81.79 percentage point lower likelihood to work than women coming from a country with more liberal views on women working. This result is highly statistically significant and in line with findings from Fernández (2007). Since both the time frame and the institutional-economic background where migrant women came from changed, one may argue that this result is mainly driven by the cultural component of attitudes towards working women. However, no statistically significant results were found for the second generation's probability to work in the lower panel of column (1). Second-generation women whose

parents come from more conservative countries seem not to behave differently from those whose parents originate from a more liberal country with respect to their working probability.

Table 5.5: Attitudes towards being a housewife is just as fulfilling as working for pay

	(A) Working	(B) Weekly hours worked	
	(1)	(2)	(3)
		Coefficient	E(Hours|Hours>0)
1st generation			
Housewife is fulfilling	-0.8179***	-40.7348***	-17.6332***
	(0.1577)	(8.8142)	(3.7975)
Controls as given in *Table 5.A.1*	yes	yes	yes
Pseudo R^2	0.1303	0.0306	0.0306
Wald test	223.9774***		
F-test		12.01865***	
Log likelihood	-2883.7790	-14344.9200	
Number of observations	4,867	4,867	
2nd generation			
Housewife is fulfilling	-0.1777	-8.5809	-3.8328
	(0.1582)	(9.5144)	(4.2472)
Controls as given in *Table 5.A.1*	yes	yes	yes
Pseudo R^2	0.0712	0.0176	0.0176
Wald test	101.6374***		
F-test		5.962753***	
Log likelihood	-1703.5160	-8343.7390	
Number of observations	2,722	2,722	

Notes: (A) ML-probit regressions for the probability to work. Estimates report marginal effects at the mean of all covariates. (B) Tobit estimates and corresponding marginal effects for expected hours worked condition on hours worked being positive. The upper panel of each column controls additionally for years since migration and years since migration squared/100. Robust standard errors in parenthesis. At the bottom, results for chi-square Wald test and F-test, respectively, are shown. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Columns (2) and (3) show Tobit estimates and corresponding marginal effects for expected weekly hours worked given that the woman is not censored. The upper panel displays in column (2) that immigrant women from the first generation from more conservative nations gain lower utility from working compared to women from a country where working women are seen as more positive. Furthermore, column (3) of the upper panel reports that if first-generation females from a more conservative country of origin are employed, they work 17.63 hours less per week than employed women from more liberal countries. This effect is about 59.63 percent of the sample mean of hours worked for those first-generation women

working. Though the relation of more conservative cultural values and weekly hours worked is also negative for second-generation immigrants, as given in the lower panel of columns (2) and (3), the result is not statistically significant. In sum, the pattern found in *Table 5.3* can be replicated when using attitudes towards women working as an alternative measure for one's cultural heritage. While more conservative attitudes in country of origin have explanatory power for labor market outcomes of first-generation women, no association was found to the labor market choices of the second-generation.

5.5.3 *The role of ethnic identity*

While vertical socialization from parents and the family are the primary source of socialization, next to this vertical socialization, children chose their own social and cultural identity as a member of a particular ethnic, religious or gender group (Bisin and Verdier, 2011). Belonging to a specific group may then impose incentives to behave in a certain way.

This section analyzes whether individual cultural heritage retains explanatory power once considering one's self-chosen ethnic identity and, thus, whether the effects of cultural origin on labor market outcomes may depend on how strongly individuals are connected to the host country's culture. Following Casey and Dustmann (2010), how strongly an immigrant woman self-identifies with the host country and the country of origin, respectively, is measured by two questions from the GSOEP. On a five-point scale, firstly, respondents were asked to quantify how strongly they feel as "German", and, secondly, how strongly they feel connected to their country of origin. Since these questions were asked in the period under consideration only for the years 2001, 2003 and 2010, the observations used for first-generation women fell to 1,642 and the observations used for second-generation women dropped to 638.

As the upper panel of column (1) in *Table 5.6* reveals, the obtained results from column (1) of *Table 5.3* were found to be robust to the inclusion of a first generation woman's ethnic identity as measured by her feeling of how strongly she is connected to Germany. Thus, cultural norms regarding female working decisions play an important role for first-generation women regardless of their ethnic identity. Stemming from a country with high female LFP rates is associated with a 49.26 percentage point lower probability to work, as compared to women from low female LFP countries. Furthermore, the analysis exhibits that individuals who feel not completely German, as compared to first-generation women who do, have a

lower working propensity. However, solely the effect for feeling hardly German, as compared to feel completely German, attains statistical significance. First-generation women who feel hardly German are 11.10 percentage points less likely to work. These results are in line not only with previous results for Germany (Casey and Dustmann, 2010), but also within a European context (Bisin et al., 2011). Column (1) shows in the lower panel the results for the second generation. While the direction of the correlation between cultural heritage and working probability had changed once controlling for individuals self-identification with Germany, compared to *Table 5.3*, the influence of culture on second-generation women's working probability again was not found to be statistically significant. However, the findings regarding the relation between second-generation employment choices and ethnic self-identification are consistent with results obtained by Casey and Dustmann (2010). Self-identification with Germany is not associated with employment probability for the second generation.

Columns (2) and (3) of *Table 5.6* show Tobit estimates for hours worked and marginal effects for expected hours worked. The relation between female LFP rates in the home country and both desired hours worked, upper panel of column (2), and actual hours worked for those first-generation women working, upper panel of column (3), is comparable in size to the results obtained without controlling for ethnic identity in columns (3) and (4) of *Table 5.3*. Thereby, first-generation women who self-identify as being hardly or not at all connected to Germany have a lower wish to work and if they are employed they work 2.78 and 2.48 hours less per week, respectively, than women feeling completely related to Germany. This corresponds to a 9.34 percent and a 8.33 percent, respectively, decrease in expected hours worked for those first-generation women working. In contrast, the lower panel of columns (2) and (3) do not show evidence for an association between cultural heritage and hours worked for second-generation women. However, women who feel mostly German, as compared to women feeling completely German, exhibit a higher wish to work and once working they are expected to work 4.01 hours more per week. Summing up, both cultural values and self-identification with Germany are negatively associated to first-generation women's labor market outcomes. In contrast, while individual cultural heritage was not found to be associated with second-generation women's labor market outcomes, second-generation females who are mostly connected to Germany, as compared to those who feel completely German, exhibit a greater wish to work and once employed, they work more hours.

Table 5.6: Ethnic identity – Feel as German

	(A) Working	(B) Weekly hours worked	
	(1)	(2)	(3)
		Coefficient	E(Hours|Hours>0)
1st generation			
Female LFP in country of origin	-0.4923***	-28.7888***	-12.2856***
	(0.1485)	(8.8707)	(3.7864)
Feel German (reference: completely):			
Mostly	-0.0266	-1.8359	-0.7747
	(0.0455)	(2.3207)	(0.9676)
In some respects	-0.0356	-0.8901	-0.3782
	(0.0489)	(2.5927)	(1.0966)
Hardly	-0.1110**	-6.8283**	-2.7783**
	(0.0540)	(2.8899)	(1.1196)
Not at all	-0.0807	-6.0938*	-2.4779**
	(0.0580)	(3.1159)	(1.2068)
Controls as given in *Table 5.A.1*	yes	yes	yes
Pseudo R^2	0.1150	0.0291	0.0291
Wald test	172.5494***		
F-test		12.6867***	
Log likelihood	-994.4217	-4807.5330	
Number of observations	1,642	1,642	
2nd generation			
Female LFP in country of origin	-0.0522	1.0128	0.4414
	(0.2347)	(15.0433)	(6.5582)
Feel German (reference: completely):			
Mostly	0.0920	8.8494**	4.0136**
	(0.0586)	(3.6085)	(1.7031)
In some respects	0.0196	3.4885	1.5407
	(0.0669)	(4.0709)	(1.8257)
Hardly	-0.0022	-0.2105	-0.0916
	(0.0861)	(5.4025)	(2.3472)
Not at all	-0.0132	3.6490	1.6394
	(0.0944)	(6.1213)	(2.8413)
Controls as given in *Table 5.A.1*	yes	yes	yes
Pseudo R^2	0.0890	0.0259	0.0259
Wald test	69.28408***		
F-test		7.533497***	
Log likelihood	-397.0795	-1891.4510	
Number of observations	638	638	

Notes: (A) ML-probit regressions for the probability to work. Estimates report marginal effects at the mean of all covariates. (B) Tobit estimates and corresponding marginal effects for expected hours worked condition on hours worked being positive. The upper panel of each column controls additionally for years since migration and years since migration squared/100. Robust standard errors in parenthesis. At the bottom, results for chi-square Wald test and F-test, respectively, are shown. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Table 5.7 reports probit estimates in column (1) for the probability to work and Tobit coefficients as well as the corresponding marginal effects for expected hours worked in columns (2) and (3). The upper panel shows the association between first generation's labor market outcomes and their cultural heritage as well as their identification with their home country. Again, results obtained in the analysis of the relation between past female LFP rates in country of origin, as a measure for labor market related cultural norms (see *Table 5.3*) were found to be robust to the inclusion of home-country identity. Further, in line with Casey and Dustmann (2010), home-identity is negatively related to employment probabilities. The less first-generation women are connected to their home country, the higher their employment probabilities, although merely the results for women who are hardly connected to their home country, as compared to women who are completely related to their home country, were found to be statistically significant. They are 8.82 percentage points more likely to work in Germany, as compared to women completely connected to their home country. While no significant relation regarding the association between female LFP rates in the ancestral country and second-generation working probabilities were found, in contrast to Casey and Dustmann (2010), second-generation women who are hardly connected to the country of their parents' origin were found to be 14.62 percentage points less likely to work than women completely with a very strong country of origin-identity. However, being merely significant at the 10%-level, this result may be driven by the large fraction of Turkish women in this analysis. They are supposed to rely on a dense network of Turkish decedents when finding a job. Thus, the lower their connection to the country of origin of their parents is, the lower their returns from those networks may be.

Table 5.7: Ethnic identity – Connected to country of origin

	(A) Working	(B) Weekly hours worked	
	(1)	(2)	(3)
		Coefficient	E(Hours|Hours>0)
1st generation			
Female LFP in country of origin	-0.5276***	-31.5442***	-13.4299***
	(0.1487)	(8.9564)	(3.8175)
Connected to home country (reference: completely):			
Mostly	0.0175	0.7143	0.3051
	(0.0412)	(2.5108)	(1.0757)
In some respects	0.0626	4.4559*	1.9287*
	(0.0438)	(2.6532)	(1.1684)
Hardly	0.0882*	5.4307*	2.4146*
	(0.0524)	(3.1021)	(1.4379)
Not at all	0.0866	3.9748	1.7570
	(0.0647)	(3.6585)	(1.6767)
Controls as given in *Table 5.A.1*	yes	yes	yes
Pseudo R^2	0.1148	0.0288	0.0288
Wald test	172.4019***		
F-test		12.27323***	
Log likelihood	-997.1374	-4812.7850	
Number of observations	1,645	1,645	
2nd generation			
Female LFP in country of origin	-0.0492	1.4924	0.6506
	(0.2357)	(15.0533)	(6.5644)
Connected to country of origin (reference: completely):			
Mostly	-0.0638	-3.7629	-1.6117
	(0.0660)	(3.9136)	(1.6453)
In some respects	-0.1024	-7.7290*	-3.3058*
	(0.0684)	(4.2029)	(1.7647)
Hardly	-0.1462*	-8.6996*	-3.5721*
	(0.0807)	(4.8339)	(1.8695)
Not at all	-0.1075	-12.9369**	-5.0413**
	(0.1055)	(6.0231)	(2.0925)
Controls as given in *Table 5.A.1*	yes	yes	yes
Pseudo R^2	0.0919	0.0263	0.0263
Wald test	67.9612***		
F-test		7.3549***	
Log likelihood	-395.8000	-1890.6750	
Number of observations	638	638	

Notes: (A) ML-probit regressions for the probability to work. Estimates report marginal effects at the mean of all covariates. (B) Tobit estimates and corresponding marginal effects for expected hours worked condition on hours worked being positive. The upper panel of each column controls additionally for years since migration and years since migration squared/100. Robust standard errors in parenthesis. At the bottom, results for chi-square Wald test and F-test, respectively, are shown. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Turning to the analysis of the Tobit estimates in columns (2) and (3) of *Table 5.7*, even when controlling for home-country orientation the cultural measure remains a significant component of first-generation female decisions of how many hours to work. Besides the negative effect of cultural norms on hours worked, home-country orientation was found to be positively related to the desire to work as well as to the expected weekly working hours of those working. This finding is in line with the results of the previous analysis, where first-generation women who were not completely connected to Germany were found to work less hours per week compared to women who are complete related to Germany. First-generation women who are connected to their home country only in some respects or hardly, as compared to women who are completely related to it, have a higher wish to work and, once employed, they work 1.93 and 2.41 hours more per week, respectively. With respect to the correlation of cultural heritage and a second generation woman's desired weekly working hours and her expected hours of work once working, the lower panel of columns (2) and (3) of *Table 5.7* reveal no empirical evidence. However, second-generation women who feel not completely as being part of the country of their parents' origin wish to work less and, if working, they work fewer hours per week compared to women completely connected to their parental country of origin. Especially second-generation women, who do not feel at all to belong to their parents' country of origin, wish to work fewer hours per week, and once employed, they work 5.04 hours less than second-generation immigrant women who are strongly connected to their country of ancestry. This corresponds to a 15.42 percent decrease of the mean expected hours worked for those women working. While the hypothesis that cultural heritage is related to the working behavior of the second generation is not supported by the data, in contrast to Casey and Dustmann (2010), empirical evidence was found for a second generation woman's orientation towards the country of origin of her parents to be significantly associated to her labor supplying behavior.

5.5.4   The role of religious identity

Closely related to the concept of ethnic identity is one's religious identity as Bisin et al. (2011) demonstrated. Given that parents endow their children with specific "family commodities" (Becker and Tomes, 1994), they may also transmit "religious capital" to the next generation which is understood as religious beliefs and teachings which have the

potential to govern labor market choices. While being primarily inherited by children rather than being voluntarily acquired, on the one hand, religious traditions may directly influence individual economic behavior by its impact on traits and attitudes (Barro and McCleary, 2003). With respect to labor market outcomes, religious preferences may influence the view about women in society as well as active female LFP. On the other hand, employers may use certain religious capital as signal for desirable individual traits related to labor productivity, such as diligence Tomes, 1985). Thus, this paragraph examines whether the individual cultural heritage retains explanatory power once controlling for religious identity.

Religiosity as a determining factor of labor market outcomes has been addressed in several papers. While some studies found wage premiums for religious people, and especially for Jews (Chiswick, 1983, Tomes, 1985) and Catholics (Ewing, 2000), others examined the relation between religiosity and labor supplying decisions. Lehrer (1995) for the USA and Maneschöld and Haraldsson (2007) for Sweden analyzed female labor supply decisions for married women and found that the strength of female religious beliefs and the strictness of her religious tradition is negatively associated to her labor supplying decision. For Germany, both Spenkuch (2011) and Heineck (2004) found individual religiosity to affect working patterns of individuals, especially those of married women.

The questions on one's religious affiliation were asked in the period of consideration only for the years 2003, 2005 and 2011. Thus, the used observations fell from 6,357 to 1,671 for first-generation women and from 3,085 to 819 for second-generation women. In each specification, not-affiliated people, defined as those not belonging to any religious organization, are the reference category. Considering explicitly religious identity as a specific channel through which working habits may be influenced, at least partly, *Table 5.8* shows the results for the association between one's religious affiliation and one's labor market outcomes as measured by employment and hours worked. Column (1) exhibits in the upper panel that once controlling for religious affiliation, cultural heritage is not related to working probability of first-generation women in Germany. Compared to the coefficients obtained from regressing employment status on female LFP rates in country of origin and controls for the same sample, for which the results are not presented here, the effect of past LFP in country of origin on working probabilities was almost halved, though this effect was not significant. However, in line with findings from Heineck (2004), being Muslim is statistically significant and negatively associated with a first-generation woman's probability to work. Being Muslim, as

opposed to being not-affiliated at all, decreases the employment likelihood by 15.95 percentage points, which equals 27.36 percent of the sample average. However, no statistically significant effects were found for the association between belonging to one of the other religions and female labor supply. The same pattern is found for second-generation immigrant women, as shown in the lower panel of column (1). While the female LFP rate in the parents' country of origin have no statistical significant explanatory power for second-generation female employment choices, being Muslim is significantly negatively related to second generation women's working decisions. Second-generation women belonging to Islam display a 16.22 percentage point lower working likelihood than not-affiliated people.

These results remain robust, when analyzing weekly hours worked as the dependent variable in columns (2) and (3). First-generation Muslim women, while gaining a lower utility from working, when employed, they work 4.43 hours per week less than not-affiliated first-generation women. Likewise, those second-generation Muslim women employed, work 4.41 hours less per week, as compared to not-affiliated second-generation females, which corresponds to 13.49 percent of the sample mean of weekly hours worked for those second-generation women working. Thus, while cultural norms with respect to working, as measured by past female LFP in country of origin, were neither found to be relevant for first- nor second-generation women, Muslim religious norms were consistently found to play an important role for female labor force choices for both generations

Table 5.8: Religious identity

	(A) Working	(B) Weekly hours worked	
	(1)	(2)	(3)
		Coefficient	E(Hours|Hours>0)
1st generation			
Female LFP in country of origin	-0.2381	-10.3979	-4.7593
	(0.1529)	(8.7658)	(4.0121)
Religious affiliation (reference: not-affiliated):			
Catholic	0.0566	3.2181	1.4887
	(0.0496)	(2.5963)	(1.2120)
Protestant	0.0076	0.2346	0.1076
	(0.0558)	(2.8497)	(1.3086)
Other Christian religion	0.0082	-0.2588	-0.1182
	(0.0600)	(3.3248)	(1.5150)
Muslim	-0.1595***	-10.3518***	-4.4330***
	(0.0596)	(3.2968)	(1.3253)
Controls as given in *Table 5.A.1*	yes	yes	yes
Pseudo R^2	0.1217	0.0298	0.0298
Wald test	196.3407***		
F-test		13.39846***	
Log likelihood	-987.9428	-5087.2140	
Number of observations	1671.0000	1671.0000	
2nd generation			
Female LFP in country of origin	0.0976	11.0777	5.2126
	(0.1955)	(11.4382)	(5.3946)
Religious affiliation (reference: not-affiliated):			
Catholic	-0.0376	-2.3884	-1.1163
	(0.0780)	(4.2267)	(1.9633)
Protestant	-0.1037	-8.7080*	-3.8227*
	(0.0941)	(5.0554)	(2.0716)
Other Christian religion	-0.0185	-2.4854	-1.1468
	(0.0906)	(5.0884)	(2.3004)
Muslim	-0.1622**	-9.7902**	-4.4110**
	(0.0814)	(4.4315)	(1.9076)
Controls as given in *Table 5.A.1*	yes	yes	yes
Pseudo R^2	0.0995	0.0263	0.0263
Wald test	98.14457***		
F-test		9.969486***	
Log likelihood	-490.9732	-2553.2250	
Number of observations	819	819	

Notes: (A) ML-probit regressions for the probability to work. Estimates report marginal effects at the mean of all covariates. (B) Tobit estimates and corresponding marginal effects for expected hours worked condition on hours worked being positive. The upper panel of each column controls additionally for years since migration and years since migration squared/100. Robust standard errors in parenthesis. At the bottom, results for chi-square Wald test and F-test, respectively, are shown. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

5.6 Discussion and concluding remarks

The purpose of this contribution was to examine the hypothesis of whether cultural norms regarding female labor working behavior are related to female labor market outcomes in Germany. It was assumed that females stemming from a country with a high female LFP take with them the cultural norms encompassed in that measure to Germany, whereas the institutional and economic factors that also determine the female LFP rates in the country of origin should not be relevant anymore. Further, these labor market related cultural norms were supposed to be transmitted from the parents to their descendants, and thus, labor market outcomes of the second generation may also be influenced by female LFP rates prevalent in the parental country of origin.

The previous sections yielded somehow unexpected results. While cultural norms, as measured by the female LFP rates in the country of ancestry, were found to be strongly negatively related to first-generation labor market behavior, no statistically significant results were found for the second generation. Based on the weakness of the epidemiological strategy outlined by Fernández (2007), one may think of several explanations for the obtained results. At the beginning, the obtained results for the first generation are discussed followed by a discussion of the findings for the second generation. Thereby, this section presents some thoughts on why different results, as compared to the USA (Fernández, 2007; Fernández and Fogli, 2009) and Canada (Gevrek et al., 2011), were found.

The significant and robust negative relation between past female LFP rates in the country of origin and working probability as well as hours worked for first-generation women, as opposed to the expectation of a positive association, may be explained by deviant behavior due to migration shocks. Although regression control for the years since migration, one may think of variables not necessarily captured by this variable. Exemplarily, uncertainty about the permission to stay in Germany may cause first-generation women to supply less work, though they come from high female LFP countries or though they may have positive attitudes towards working. Further, several empirical studies point to the existence of ethnic discrimination which may negatively affect the labor supply of first-generation women. Hunkler (2009) reports employer discrimination, especially for Turkish immigrants and Kaas and Manger (2012) recently found evidence for statistical discrimination based on foreign-sounding names in a field experiment. Consequently, immigrant females from high female

LFP countries, even if they wish to supply work, are forced to stay at home due to the presence of ethnic discrimination in the German labor market. Another reason which may prevent first-generation immigrant women to supply labor as desired may be found in the structural conditions of the German labor market, which may be seen as strongly emphasizing professional qualifications. However, since the recognition and transferability of foreign qualification to Germany is limited, even highly educated and motivated immigrant females may display a lower probability to work. Furthermore, given that culture is a social phenomenon, to replicate individual female behavior of the home country in Germany, a social environment is required, that provides the incentives to do so. Exemplarily, on the one hand, one may imagine women from high female LFP countries to find "German women" working less as compared to women in their home country, since the number of average weekly hours worked of women is comparably low in Germany in an international view. Thus, while having a high taste for working, they do not find the incentive structure to replicate their working behavior in Germany. Furthermore, on the other hand, women from low female LFP countries may find incentives in the form of higher relative wages in Germany compared to their home country, and thus, may deviate from their original behavior and supply more work, although they exhibit low working preferences.

Further, given that immigrants may differ in systematically ways from their average home country's population, and thus, are unlikely to represent the working preferences of their home country's population, concerns regarding the results to be driven by selection may occur. One may argue that, given an identical distribution of working preferences across countries, first-generation immigrants from high female LFP countries come from the lower part of the utility-of labor distribution, while immigrant women from low female LFP countries may be drawn from the upper part of the distribution. Exemplarily, immigrant women from former Eastern bloc countries consist mainly of Ethnic Germans, who are supposed to share the relative conservative attitudes with respect to working women prevalent in "German culture" (Albrecht et al., 2000). Thus, they are expected to show low labor supply in Germany, while their "home-countries" are supposed to exhibit high female LFP rates due to the historically important role of the Communist regime. Women from the classic guest worker countries, such as Spain, Greece and Italy, are another example. While these countries typically show low female LFP rates, it may be argued that women with a relatively high taste for working, that is those from the upper part of the distribution, immigrated to Germany to

work and earn money. While this selection argument may be plausible for women who came from former Eastern bloc countries and women of the guest worker countries, it seems not plausible for women immigrating from more western-oriented cultures, such as the USA or France.

However, an important factor pointing against selection as a driving force for the negative relation between cultural norms in home country and female labor supply of first-generation women in Germany is the finding with respect to the attitudes towards working women in the country of origin as an alternative measure for one's cultural heritage. Attitudes of females regarding the division of labor between market and homemaker reflect the views of an average woman in the country of origin. Since these *average* female attitudes towards working women in the country of origin have significant explanatory power for first-generation immigrant women's labor market behavior in Germany, selection may not be a severe problem.

With regard to the second generation, the relation between past female LFP rates in parental country of origin and working probability, as well as hours worked, were found to be of the expected direction, namely positive, and robust once alternative measures of culture or religious identity were included. However, neither of these findings attains statistical significance. There are some facts which may explain these insignificant results for second-generation immigrant women. The most prominent explanation may be the fact that second-generation immigrants have become more integrated and assimilated to Germany by investing in country specific human and social capital and, thus, cultural norms with regard to women working from the country of origin of their parents may only play an inferior role in determining their labor market position. Therefore, it is not surprising that empirical studies found that second-generation immigrants improved their position at the labor market due to better educational attainment (Euwals et al., 2010, Algan, 2010, Luthra, 2013). Furthermore, a selection bias may also explain the obtained insignificant results for the second generation. As outlined by Scheller (2011), a particular share of second-generation immigrants is not assignable to a particular country of origin in the GSOEP. In the period under consideration, no country of origin was assignable for 179 individuals with an indirect migration background. Apart from that, the limited number of individuals for the second generation, in combination with only little within variance, that I tried to explain, may yield insignificant results for this group.

Finally, there are likely a lot of unobserved factors, altering first- and second-generation woman's tastes for work independently of one's cultural heritage, such as individual labor market experience. However, since I am interested in the effect of culture on female labor supply, and not in the determinants of it, individual labor experience is not considered in the paper. However, results from auxiliary regressions, not presented here, show that the size of the cultural proxy coefficient was found to decrease once including labor market experience. Nevertheless, the pattern of results remained robust. Further, strong family ties, as have been revealed by Alesina and Giuliano (2010), are negatively associated to female labor force participation. Thus, while coming from a high female LFP country, the social environment of the women may emphasize a strong family culture which imposes restrictions on female labor supply. The effect of cultural norms on female labor choices may also be driven by unobserved differences in parental human capital. Parents stemming from a country recognizing the role of educational attainment more, as compared to parents from countries with a lower emphasis on education, may also invest more in their children's early childhood learning and schooling (Fernández and Fogli, 2009). One may expect higher parental education to positively affect labor market outcomes of their descendants independently of the cultural background. Differences across female labor market outcomes may then be traced back to an omitted variable bias due to unobserved parental human capital rather than to incentives set by distinct cultural norms. Regressing female employment probabilities and the weekly hours worked, respectively, on past female LFP in country of ancestry, as the quantitative measure for labor culture, and the commonly used explanatory variables including mother's and father's educational attainment reveals a significant negative association between female LFP in country of ancestry and working probability as well as hours worked for first-generation immigrant women. For second-generation women the relationship attains a positive, however, not statistically significant. These results, not shown here, are available upon request.

Summing up, while this study was not able to replicate findings for Northern America in Germany on a statistically significant level for second-generation immigrants, labor market outcomes of first-generation immigrants were found to vary systematically due to cultural norms, measured either by past female LFP in country of origin, country of origin indicator variables, or attitudes towards working women prevalent in their home country. Extending previous research attempts on the impact of cultural norms on labor market outcomes using

the epidemiological approach, I found that the results for first-generation immigrants are neither driven by their nationality nor by their ethnic identity, as measured by their feeling of affiliation with either Germany or the home country. However, religious identity, as a specific cultural trait, was found to be more import than the measures of cultural heritage for labor market behavior of both the first and the second generation. Especially the Islamic belief was found to be negatively associated with employment probabilities and actual hours of work. This finding may be seen as evidence for the disadvantaged position of Turkish females in Germany, since most of the adherents to Islam are of Turkish descendent.

Appendix 5.A

Table 5.A.1: Descriptive statistics

Variable	1st generation					2nd generation				
	Obs	Mean	Std. Dev.	Minimum	Maximum	Obs	Mean	Std. Dev.	Minimum	Maximum
Dependent variables										
Working (d)	6,591	0.5829		0	1	3,085	0.6062		0	1
Labor force participation (d)	6,591	0.7205		0	1	3,085	0.7760		0	1
Weekly working hours'	6,591	16.9779	17.7730	0	80	3,085	19.1041	18.8537	0	80
Weekly working hours' for those working	3,764	29.7293	13.1907	1.5	80	1,803	32.6879	12.8092	1	80
Cultural proxy										
Female LFP rate in country of origin	6,591	0.3925	0.1120	0.1349	0.528	3,085	0.3550	0.1377	0.1349	0.528
Control variables										
Years since migration	6,357	20.6376	9.7073	1	50	1,161	31.2214	9.9397	12	59
Years since migration squared/100	6,357	5.2013	4.4778	0.01	25	1,161	10.7349	6.4570	1.44	34.81
Age	6,591	42.7199	10.4370	18	60	3,085	31.5475	9.1608	18	60
Age squared / 100	6,591	19.3391	8.7929	3.24	36	3,085	10.7914	6.4434	3.24	36
Years of completed education	6,591	10.7397	2.4531	7	18	3,085	11.3893	2.3148	7	18
Child younger than 3 in household (d)	6,591	0.1613		0	1	3,085	0.2480		0	1
Married (d)	6,591	0.7984		0	1	3,085	0.4606		0	1
Years of education - Partner	6,591	9.3275	4.6151	0	18	3,085	5.6671	5.7805	0	18
Labor income - Partner (in 10,000 Euros)	6,591	0.1268	0.1302	0	1.5	3,085	0.0847	0.1103	0	0.74
Unemployment rate in Bundesland	6,591	8.9145	2.9341	4.3	22.1	3,085	8.7145	2.9308	4.3	21.5
16 German Federal states	6,591			1	16	3,085			1	16
German Citizenship (d)	6,591	0.4673		0	1	3,085	0.4506		0	1
Alterative measures for culture										
Country of origin	6,591			1	20	3,085			1	20
% Females in country of origin agreeing housework is fulfilling	5,073	0.6101	0.1123	0.335	0.794	2,722	0.6054	0.1346	0.335	0.794

Table 5.A.1 (continued)

Variable	1st generation					2nd generation				
	Obs	Mean	Std. Dev.	Minimum	Maximum	Obs	Mean	Std. Dev.	Minimum	Maximum
Alterative specifications										
Feel German (reference: completely):										
Mostly (d)	1,694	0.2196		0	1	638	0.2837		0	1
In some respects (d)	1,694	0.2769		0	1	638	0.3166		0	1
Hardly (d)	1,694	0.1800		0	1	638	0.1332		0	1
Not at all (d)	1,694	0.1358		0	1	638	0.0940		0	1
Connected to country of origin (reference: completely):										
Mostly (d)	1,697	0.2952		0	1	638	0.2680		0	1
In some respects (d)	1,697	0.3335		0	1	638	0.3746		0	1
Hardly (d)	1,697	0.1355		0	1	638	0.1599		0	1
Not at all (d)	1,697	0.0689		0	1	638	0.0721		0	1
Religious affiliation (reference: not-affiliated):										
Catholic (d)	1,721	0.3603		0	1	819	0.3675		0	1
Protestant (d)	1,721	0.1865		0	1	819	0.1282		0	1
Other Christian religion (d)	1,721	0.1156		0	1	819	0.1343		0	1
Muslim (d)	1,721	0.2167		0	1	819	0.2894		0	1
School leaving degree mother (reference: low school degree):										
Medium school degree (d)	5,802	0.0789		0	1	2,883	0.0898		0	1
High school degree (d)	5,802	0.0602		0	1	2,883	0.0323		0	1
Other school degree mother (d)	5,802	0.0827		0	1	2,883	0.2778		0	1
Father-Medium school degree (d)	5,613	0.0921		0	1	2,823	0.0631		0	1
Father-High school degree (d)	5,613	0.0695		0	1	2,823	0.0414		0	1
Father-Other school degree father (d)	5,613	0.0958		0	1	2,823	0.3383		0	1

Notes: (d) denotes dummy variables. Female immigrants in Germany. GSOEP, 2001 - 2011.

Table 5.A.2: Description of country of origin characteristics

Variable	Description
Secondary school enrollment	Female or male secondary school enrollment rate: Gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. Secondary education completes the provision of basic education that began at the primary level, and aims at laying the foundations for lifelong learning and human development, by offering more subject- or skill-oriented instruction using more specialized teachers.
GDP per capita, PPP	GDP per capita based on purchasing power parity (PPP). PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2005 international dollars.
Fertility rate (births per woman)	Total fertility rate represents the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with current age-specific fertility rates.
Life expectancy	Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.
LFPR	Labor force participation rate is the proportion of the population ages 15 and older that is economically active: all people who supply labor for the production of goods and services during a specified period.

Source: World Development Indicators, The World Bank

6 Concluding remarks

Although classical economists like Adam Smith and John Stuart Mill did not separate culture from economic questions, neoclassical economists widely ignore cultural conditions as determinants of economic inequalities across nations (Guiso et al., 2006). Recently, most macroeconomists would not deny that cultural norms are relevant factors for economic development, since an appropriate cultural heritage, as a fundamental growth determinant, is seen to enhance a country's ability to use the factors of production efficiently, as Acemoglu et al. (2005) argued. The line of macroeconomic interest dealing with the consequences of culture for economic outcomes runs from cultural values to macroeconomic outcomes: cultural norms and values determine the significance individuals attach to certain individual economic behavior, such as attitudes towards work and thrift. At the aggregate level, individual economic choices are supposed to influence societal institutions, such as the welfare state, the political system or usury laws, and, thus, economic development. However, whether this relationship is of quantitative economic importance is disputable.

Against the background of recent economic attempts to explain individual economic decisions by structural and institutional factors, this thesis examined to what extent cultural norms exhibit quantitatively important explanatory power for individual economic outcomes, namely individual's savings and working choices. While an extensive literature deals with the relation between culture and aggregate economic outcomes, those results obtained may reveal distorted cultural effects due to unobserved omitted variables at the country level. Thus, for the purpose of this thesis, four empirical studies were conducted based on individual and household level data for the USA and Germany, respectively.

Due to difficulties in defining a coherent concept of culture, *Chapters 2* to *4* use individual religiosity, as measured by one's religious affiliation and religious involvement, as a proxy for culture. Using individual survey data for the USA, namely the PSID, for the years 2003 to 2009, the aim of *Chapter 2* was, firstly, to analyze the extent to which religious beliefs and religious commitment are associated with distinct individual savings behavior as a basis for culture-induced heterogeneity in aggregate economic outcomes. One's religiosity was found in the cross-sectional analysis to be a robust determinant of individual savings choices, even once I control for differences in individual characteristics. To identify the causal effect of

religion on individual savings choices, secondly, the results from the multivariate analysis were verified by using the longitudinal structure of the PSID and by an instrumental variable approach, where own individual religious belief were instrumented with the share of one's religious tradition in the region of ancestry. Neither of these approaches was able to replicate the positive relation between religious affiliation and savings behavior found in the cross-sectional analysis Although the estimates are subject to inefficiencies due to data limitations, this paper mainly sheds light on the endogeneity bias inherent in the relation between cultural factors and economic outcomes. However, taking actively part in religious activities was found to affect the amount saved positively. Thus, one may argue that religious traditions impose religious rules and establish social networks that enhance an individual's ability and willingness to save money.

As opposed to the vital religious market in the USA, *Chapters 3* and *4* analyzed the relationship between individual religiosity and risk-taking preferences as well as individual financial behavior within Germany. Using German micro-data, namely the GSOEP, for the years 2003 and 2004, while controlling for the overall level of general risk assessment, evidence is provided that different religious affiliations are associated with distinct financial risk taking attitudes as well as with distinct individual propensities to trust strangers, another central determinant of a household's financial choices. Further, the extent to which religion-induced heterogeneity in risk-taking preferences actually influences investment and trusting decisions of households in Germany was examined. As compared to the results obtained for the relation between religiosity and savings behavior in the USA, the main differences in economic attitudes and behavior in Germany occur between Christian and Non-Christian religions. However, religious networks were found in both countries to be more important for economic outcomes than religious belief.

Chapter 5 purposed to replicate epidemiological studies conducted for North America (Fernández, 2007; Fernández and Fogli, 2009; Gevrek et al., 2011) in Germany using a quite smaller sample which were drawn from data provided by the GSOEP for the years 2001 to 2011. Applying probit and Tobit estimation techniques the results contradict the findings obtained by these previous contributions. While cultural norms towards labor market behavior of women, as measured by past female LFP rates in the country of own or parental origin, were found to be negatively associated with labor market outcomes for first-generation immigrant women in Germany, no statistically significant relation was revealed for the second

generation. However, in accordance with the findings from *Chapters 2* to *4*, religiosity, and especially the Islamic belief, was showed to be negatively related to labor market outcomes of both generations.

It was by far not the scope of this thesis to proclaim that one culture is superior to another. It is rather the case that especially all major religious traditions highlight virtues such as thriftiness, diligence, and honesty. Consequently, one has to keep in mind that "every […] sacred literature contains enough ambiguity to justify any number of economic positions" (Iannaccone, 1998, p. 1478). Exemplarily, the Bible, on the one hand, states that "it is easier for a camel to go through the eye of a needle than for someone who is rich to enter the kingdom of God" (Mathew 19:24). However, on the other hand, getting high returns on capital, including human capital, is praised (Mathew 25:14-30). Further, finding quantitatively relevant effects for cultural background, as proxied by individual religiosity and cultural heritage, on savings and labor market decisions does not mean that culture is the strongest factor affecting economic outcomes. Differences in individual economic outcomes cannot be solely traced back to distinct cultural values, since these are just one among many factors. Finally one has to note, that although some specifications did not find cultural effects on savings or working behavior, this does not mean that there is no relationship. It is more plausible to assume that cultural values rather are indirectly associated to individual economic outcomes via other channels, such as fertility or education (Inglehart and Baker, 2000).

Combing the obtained results, this thesis provided empirical evidence that, first, cultural values and norms help to explain individual heterogeneity in economic attitudes. Second, individual economic behavior was found not only to be indirectly related to cultural norms via their impact on economic attitudes, but cultural values were also showed to be directly associated with economic outcomes. Showing that cultural background can help to explain individual economic differences raises the question of what one should do with that knowledge. First, knowing how cultural values are related to economics may partly help to gain a more realistic picture of "homo oeconomicus" and it may partly enhance looking beyond purely structural and institutional explanations for heterogeneous individual economic developments. Furthermore, lessons from these results cannot be that national governments try to enhance religious beliefs, but rather that they take account of culture-induced heterogeneity in individual characteristics to provide better policies.

Second, individual values and morals, which were found in this contribution to be associated with individual economic attitudes and outcomes, shape societal institutions at the aggregate level. Thus, government policies aiming to foster economic development may be successful in one institutional framework, but may failure in another, since cultural values may be associated with the acceptance of certain institutionalized rules by the society. In this context, knowing how exactly norms and values are associated with economic measures could help to get further insights into how to establish a more responsible and sustainable economic order.

Drawing on the limitations of the presented contributions, several directions for further research are conceivable. Since country case studies, as presented here, depend strongly on the temporal and regional framework, further empirical country studies should be conducted to assess the role cultural factors may play on a more aggregated level. Further attempts are also needed to establish more quantitative measures for culture to provide specific channel through which culture is associated with economic outcomes such as savings and investment behavior, entrepreneurial decisions, or educational attainment. The role cultural norms play in shaping individual economic attitudes should gain an increased attention in the empirical study of cultural economics, since attitudes are a crucial part in the link running from culture to economic outcomes. Finally, richer datasets including not only several time periods but also different dimensions of religion are needed to be able to establish a more reliable causal relation between cultural and economic outcomes. Differentiating between intrinsic and extrinsic religiousness is of exceptional importance in times of a growing privatization of religion.

Bibliography

Abramovitz, M. (1994), Catch up and Convergence in the Postwar Growth Boom and After, *in* Baumol, W.J., Nelson, R.R. and Wolff, E.N., eds., "Convergence of Productivity", Oxford University Press, Oxford, pp. 83–123.

Acemoglu, D., Johnson, S. and Robinson, J. (2005), Institutions as a Fundamental Cause of long-run growth, *in* Aghion, P. and Durlauf, S., eds., "Handbook of Economic Growth", Vol. 1A, Elsevier Books, Amsterdam, pp. 386–464.

Ahern, K., Duchin, R. and Shumway, T. (2012), Peer Effects in Economic Attitudes, http://bus.miami.edu/umbfc/_common/files/papers/Ahern.pdf (date last accessed December 12, 2012).

Albrecht, J.W., Edin, P.-A. and Vroman, S.B. (2000), "Across-country comparison of attitudes towards mothers working and their actual labor market experience", *Labor* **14**(4), 591–607.

Aldashev, A. Gernandt, J. and Thomsen, S.L. (2009), "Language usage, participation, employment and earnings: Evidence for foreigners in West Germany with multiple sources of selection", *Labor Economics* **16**(3), 330–341.

Alesina, A. and Fuchs-Schündeln, N. (2007), "Good Bye Lenin (Or Not?): The Effect of Communism on People's Preferences", *The American Economic Review* **97**(4), 1507–1528.

Alesina, A. and Giuliano, P. (2010), "The power of the family", *Journal of Economic Growth* **15**(2), 93–125.

Alesina, A., Devleeschauwer, A., Easterly, W., Kurlat, S. and Wacziarg, R. (2003), "Fractionalization", *Journal of Economic Growth* **8**, 155–194.

Algan, Y., Dustmann, C., Glitz, A. and Manning, A. (2010), "The economic situation of first- and second-generation immigrants in France, Germany, and the UK", *Economic Journal* **120**, 4–30.

Allison, P.D. (2009), *Fixed Effects Regression Models*, Sage Publications, Thousand Oaks, California.

Akerlof, G. (2007), "The Missing Motivation in Macroeconomics", *The American Economic Review* **97**(1), 5–36.

Bibliography

Angrist, J.D. and Pischke, J.-S. (2008), *Mostly Harmless Econometrics: An Empiricist's Companion*, Princeton University Press, Princeton.

Antecol, H. (2000), "An Examination of Cross-Country Differences in the Gender Gap in Labor Force Participation Rates", *Labor Economics* **7**(4), 409–426.

Arruñada, B. (2010), "Protestants and Catholics: Similar work ethic, different social ethic", *Economic Journal* **120**(547), 890–918.

Audretsch, D., Boente, W. and Pawan Tamvada, J. (2007), Religion and Entrepreneurship, Jena Economic Research Papers No. 2007-075, Max-Planck-Institute of Economics, Friedrich-Schiller-University Jena, Jena, Germany.

Avery, R.B. and Kennickell, A.B. (1991), "Household Saving in the U.S.", *Review of Income and Wealth* **37**(4), 409–432.

Azzi, C. and Ehrenberg, R. (1975), "Household Allocation of Time and Church Attendance", *Journal of Political Economy* **83**(1), 27–56.

Baele, L., Farooq, M. and Ongena, S. (2012), Of Religion and Redemption: Evidence from Default on Islamic Loans, CentER Discussion Paper No. 2012-014, Center for Economic Research of the Tilburg University, Tilburg, Netherlands.

Barasinska, N., Schäfer, D. and Stephan, A. (2012), "Individual risk attitudes and the composition of financial portfolios: Evidence from German household portfolios", *The Quarterly Review of Economics and Finance* **52**, 1–14.

Barnett, D.B. (1982), *World Christian Encyclopedia: A Comparative Survey of Churches and Religions in the Modern World A.D. 1900-2000*, Vol. 1, Oxford University Press, Oxford.

Barro, R.J. and McCleary, R.M. (2003), "Religion and Economic Growth", *American Sociological Review* **68**(5), 760–781.

Barsky, R., Juster, T., Kimball, M. and Shapiro, M. (1997), "Preference Parameters and Behavioral Heterogeneity: An Experimental Approach in the Health and Retirement Study", *The Quarterly Journal of Economics* **112**(2), 537–579.

Bartke, S. and Schwarze, R. (2008), Risk-Averse by Nation or by Religion? Some Insights on the Determinants of Individual Risk Attitudes, SOEPapers on Multidisciplinary Panel Data Research No. 131, DIW, Berlin.

Bibliography

Bauer, T., Dietz, B. and Zimmermann, K.F. (2005), German migration: Development, assimilation, and labor market effects, *in* Zimmermann, K. F., ed., "European Migration: What Do We Know?" Oxford University Press, Oxford, pp. 197–261.

Becker, G.S. (1996), Preferences and Values, *in* Becker, G.S., ed., "Accounting for Taste", Harvard University Press, Cambridge, pp. 3–23.

Becker, G.S. and Tomes, N. (1994), Human Capital and the Rise and Fall of Families, *in* Becker, G.S., ed., "Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education", 3rd edition, The University of Chicago Press, Chicago, pp. 257–298.

Becker, S.O. and Woessmann, L. (2009), "Was Weber Wrong? A Human Capital Theory of Protestant Economic History", *The Quarterly Journal of Economics* **24**(2), 531–596.

Benjamin, D., Choi, J. and Fisher, G. (2012), Religious Identity and Economic Behavior, NBER Working Papers No. 15925, National Bureau of Economic Research, Inc., Cambridge, Massachusetts, USA.

Bernheim, D. Maki, D. and Garret, D. (1997), Education and Saving: The Long-Term Effects of High School Financial Curriculum Mandates, Working Paper Series No. 6085, National Bureau of Economic Research, Inc., Cambridge, Massachusetts, USA.

Bertelsmann Stiftung (2008), *Religionsmonitor,* Verlag Bertelsmann Stiftung, Gütersloh.

Bisin, A. and Verdier, T. (2011), The Economics of Cultural Transmission and Socialization, *in* Benhabib, J., Bisin, A. and Jackson, M.O., eds., "Handbook of Social Economics", Vol. 1.A, Elsevier Science, Amsterdam, pp. 339–416.

Bisin, A., Patacchini, E., Verdier, T. and Zenou, Y. (2011), "Ethnic identity and labour market outcomes of immigrants in Europe", *Economic Policy* **26**(65), 57–92.

Blau, F.D., Kahn, L.M. and Papps, K.L. (2011), "Gender, source country characteristics, and labor market assimilation among immigrants", *Review of Economics and Statistics* **93**(1), 43–58.

Bohnet, I., Herrmann, B. and Zeckhauser, R. (2010), "Trust and the Reference Points for Trustworthiness in Gulf and Western countries", *The Quarterly Journal of Economics* **125**(2), 811–828.

Bibliography

Borjas, G.J., (1992), "Ethnic Capital and Intergenerational Mobility", *The Quarterly Journal of Economics* **107**(1), 123–150.

Bourkhis, K. and Sami Nabi, M. (2011), Have Islamic Banks been more resistant than Conventional Banks to the 2007-2008 Financial Crisis?, University of Sousse-IHEC, Working Paper No. 616, Sousse, Tunisia.

Browning, M. and Lusardi, A. (1996), "Household saving: Micro theories and micro facts", *Journal of Economic Literature* **34**, 1797–1855.

Burkert, C. and Seibert, H. (2007), Labor market outcomes after vocational training in Germany – equal opportunities for migrants and natives?, IAB Discussion Paper (31/2007), Institut für Arbeitsmarkt- und Berufsforschung (IAB), Nuernberg, Germany.

Carroll, C., Rhee, B. and Rhee, C. (1994), "Are there cultural effects on saving? Some cross-sectional evidence", *The Quarterly Journal of Economics* **109**(3), 685–699.

Carroll, C., Rhee, B. and Rhee, C. (1999), "Does Cultural Origin Affect Saving Behavior? Evidence from Immigrants", *Economic Development and Cultural Change* **48**(1), 33–50.

Casey, T. and Dustmann, C. (2010), "Immigrants' Identity, Economic Outcomes and the Transmission of Identity Across Generations", *The Economic Journal* **120**, 31–51.

Cavalcanti, T^V., Parente, S.L. and Zhao, R. (2007), "Religion in macroeconomics: a quantitative analysis of Weber's thesis", *Economic Theory* **32**, 105–123.

Chamberlain, G. (1984) Panel data, *in* Griliches, Z. and Intriligator, M.D., eds., "Handbook of Econometrics," edition 1, volume 2, Elsevier Science, Amsterdam, pp. 1247-1318.

Charles, K. and Hurst, E. (2003), "The Correlation of Wealth across Generations", *Journal of Political Economy* **111**(6), 1155–1182.

Chiswick, B.R. (1983), "The Earnings and Human Capital of American Jews", *The Journal of Human Resources* **18**(3), 313–336.

Constant, A.F. and Zimmermann, K.F. (2008), "Measuring Ethnic Identity and Its Impact on Economic Behavior", *Journal of the European Economic Association* **6**, 424–433.

Constant, A.F., Gataullina, L., and Zimmermann, K.F. (2007), Gender, ethnic identity and work, IZA Discussion Paper No. 2420, IZA, Bonn, Germany.

Bibliography

Crain, M. and Lee, K. (1999), "Economic growth regressions for the American states: a sensitivity analysis", *Economic Inquiry* **37**, 242–257.

Diaz, J. (2000), "Religion and Gambling in Sin-City: A Statistical Analysis of the Relationship between Religion and Gambling Patterns in Las Vegas residents", *Social Science Journal* **97**(3), 453–458.

Dohmen, T., Falk, A., Huffman, D. and Sunde, U. (2012), "The Intergenerational Transmission of Risk and Trust Attitudes", *Review of Economic Studies* **79**(2), 645–677.

Dohmen, T., Falk, A., Huffman, D. and Sunde, U. (2011), "Individual Risk Attitudes: Measurement, Determinants and Behavioural Consequences", *Journal of the European Economic Association* **9**(3), 522–550.

Dorn, D. and Huberman, G. (2010), "Preferred Risk Habitat of Individual Investors", *Journal of Financial Economics* **97**(1), 155–173.

Durlauf, S., Kourtellos, A. and Ming Tan, C., (2008), "Are any growth theories robust?" *Economic Journal* **118**(527), 329–346.

Euwals, R., Dagevos, J., Gijsberts, M. and Roodenburg, H. (2010), "Citizenship and labour market position: Turkish immigrants in Germany and the Netherlands", *International Migration Review* **44**(3), 513–553.

Ewing, B. (2000), "The Wage Effects of Being Raised in the Catholic Religion", *American Journal of Economics and Sociology* **50**(3), 419–432.

Farré, L. and Vella, F. (2012), "The Intergenerational Transmission of Gender Role Attitudes and its Implications for Female Labour Force Participation", *Economica* **80**(318), 219–247.

Feldmann, H. (2007), "Protestantism, Labor Force Participation, and Employment Across Countries", *American Journal of Economics and Sociology* **66**(4), 795–816.

Fernández, R. (2007), "Women, Work, and Culture", *Journal of the European Economic Association* **5**, 305–332.

Fernández, R. (2010), Does Culture Matter?, *in*: Benhabib, J., Bisin, A. and Jackson, M., eds., "Handbook of Social Economics", Vol. 1.A, Elsevier Science, Amsterdam, pp. 481–510.

Bibliography

Fernández, R. and Fogli, A. (2009), "Culture: An Empirical Investigation of Beliefs, Work and Fertility", *American Economic Journal: Macroeconomics* **1**(1), 146–177.

Fertig, M. and Schurer, S. (2007), Earnings assimilation of immigrants in Germany: the importance of heterogeneity and attrition bias, SOEPpapers on Multidisciplinary Panel Research 30, DIW, Berlin, Germany.

Fuchs-Schündeln, N. and Schündeln, M. (2005), "Precautionary Savings and Self-Selection: Evidence from the German Reunification Experiment", *The Quarterly Journal of Economics* **120**(3), 1085–1120.

General Social Survey, (2008), Cross-Section and Panel Combined, James, D., Smith, T. and Marsden, P., Chicago: National Opinion Research Center, retrieved August 12, 2012, from http://www.thearda.com.

Gevrek, Z.E., Gevrek, D. and Gupta, S. (2011), Culture, Intermarriage, and Differentials in Second-Generation Immigrant Women's Labor Supply. IZA Discussion Paper No. 6043, IZA, Bonn, Germany.

Giavazzi, F., Schiantarelli, F. and Serafinelli, M. (2009), Culture, Policies, and Labor Market Outcomes," IZA Discussion Paper No. 455, IZA, Bonn, Germany.

Glaeser, E.L., Laibson, D., Scheinkman, J. and Soutter, C. (2000), "Measuring trust" *The Quarterly Journal of Economics* **115**(3), 811–846.

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

Grilo, I. and Thurik, R. (2008), "Determinants of entrepreneurial engagement levels in Europe and the US", *Industrial and Corporate Change* **17**(6), 1113–1145.

Grossbard, S.A. and Marvão Pereira, A. (2010), Will Women Save More Than Men? A Theoretical Model of Savings and Marriage, Working Papers 95, Department of Economics, College of William and Mary, Williamsburg, USA.

Gruber, J. (2005), "Religious Market Structure, Religious Participation, and Outcomes: Is Religion Good for You?", *Advances in Economic Analysis & Policy* **5**(1), 1–30.

Guidolin, M. and La Jeunesse, E.A. (2007), "The decline in the U.S. personal saving rate: Is it real and is it a puzzle?", *Federal Reserve Bank of St. Louis Review* **86**,491–514.

Guiso, L., Sapienza, P. and Zingales, L. (2003), "People's opium? Religion and economic attitudes", *Journal of Monetary Economics* **50**(1), 225–282.

Guiso, L., Sapienza, P. and Zingales, L. (2004), "The Role of Social Capital in Financial Development", *The American Economic Review* **94**(3), 526–556.

Guiso, L., Sapienza, P. and Zingales, L. (2006), "Does Culture Affect Economic Outcomes?", *Journal of Economic Perspectives* **20**(2), 23–48.

Guiso, L., Sapienza, P. and Zingales, L (2008), "Trusting the Stock Market", *The Journal of Finance* **63**(6), 2557–2600.

Guiso, L., Sapienza, P. and Zingales, L. (2009), "Cultural biases in economic exchange." *The Quarterly Journal of Econ*omics **124** (3), 1095–1131.

Haisken-DeNew, J.P. and Hahn, M.P. (2010), "PanelWhiz: Efficient Data Extraction of Complex Panel Data Sets – An Example Using the German SOEP", *Journal of Applied Social Science Studies* **130**(4), 643–654.

Halek, M. and Eisenhauer, J. (2001), "Demography of Risk Aversion", *The Journal of Risk and Insurance* **68**(1), 1–24.

Hartog, J., Ferrer-i-Carbonell, A. and Jonker, N. (2002), "Linking Measured Risk Aversion to individual Characteristics", *Kyklos* **55**(1), 3–26.

Hasan, M. and Dridi, J. (2010), The Effects of the Global Crisis on Islamic and Conventional Banks: A Comparative Study, IMF Working Paper No. 10/201, International Monetary Fund, Washington DC, USA.

Hassan, A. (2009), The Global Financial Crisis and Islamic Banking, unpublished manuscript, http://www.islamic-foundation.org.uk/IslamicEconomicsPDF/Hassan-financialcrisis-if.pdf (date last accessed February 8, 2012).

Heath, W., Waters, M. and Watson, J. (1995), "Religion and economic welfare: An empirical analysis of state per capita income", *Journal of Economic Behavior and Organization* **27**, 129–142.

Heineck, G. (2004), "Does religion influence the labor supply of married women in Germany?", *Journal of Socio-Economics* **33**(3), 307–328.

Hilary, G. and Hui, K.W. (2009), "Does religion matter in corporate decision making in America?", *Journal of Financial Economics* **93**(3), 455–473.

H'madoun, M. (2010), Religion and labor force participation of women, Working Papers No. 2010007, Faculty of Applied Economics, University of Antwerp, Belgium.

Hoffmann, R. (2012), "The Experimental Economics of Religion", *Journal of Economic Surveys*, Article first published online: DOI: 10.1111/j.1467-6419.2011.00716.x.

Höhne, J. and Koopmans, R. (2010), Host-country cultural capital and labor market trajectories of migrants in Germany: The impact of host-country orientation and migrant-specific human and social capital on labor market transitions, WZB Discussion papers No. SP IV 2010, WZB, Berlin, Germany.

Hong, H., Kubik, J. and Stein, J. (2004), "Social Interaction and Stock Market Participation", *The Journal of Finance* **59**(1), 137–163.

Horioka, C. (2007), A Survey of Household Saving Behavior in Japan. ISER Discussion Paper no. 0684, Institute of Social and Economic Research, Osaka University, Osaka, Japan.

Hunkler, C. (2009), Human capital or discrimination? Labor market entry disadvantages of second-generation Turkish migrants in Germany, Unpublished manuscript, University of Mannheim. http://www.equalsoc.org/uploaded_files/publications/Hunkler_HKD.pdf.

Iannaccone, L.R. (1998), "Introduction to the Economics of Religion", Jo*urnal of Economic Literature* **36**(3), 1465–1495.

Inglehart, R. and Baker, W.E. (2000), "Modernization, Cultural Change, and the Persistence of Traditional Values", *American Sociological Review* **65**, 19–51.

Inglehart, R. and Welzel, C. (2010), "Changing mass priorities: The link between modernization and democracy", *Perspectives on Politics* **8**, 551–567.

Kaas, L. and Manger, C. (2012), "Ethnic Discrimination in Germany's Labour Market: A Field Experiment", *German Economic Review* **13**(1), 1–20.

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

Bibliography

Khaled, H. and Thirlwall, A.P. (1999), "Explaining differences in the domestic savings ratio across countries: A panel data study", *The Journal of Development Studies* **36**(1), 31–52.

Knack, S. and Keefer, P. (1997), "Does social capital have an economic payoff? A cross-country investigation", *The Quarterly Journal of Economics* **112** (4), 1251–1288.

Kristen, C. and Granato, N. (2007), "The educational attainment of the second generation in Germany - Social origins and ethnic inequality", *Ethnicities* **7**, 343–366.

Kumar, A., Page, J.K. and Spalt, O.G. (2011), "Religious Beliefs, Gambling Attitudes, and Financial Market Outcomes", *Journal of Financial Economics* **102**(3), 671–708.

Kurthen, H. and Heisler, B.S. (2009), "Immigrant integration: comparative evidence from the United States and Germany", *Ethnic and Racial Studies* **32**, 139–170.

La Porta, R., Lopez-De-Silanes, F., Shleifer, A. and Vishny, R. (1997), "Trust in large organizations", *The American Economic Review* **87**(2), 333–338.

La Porta, R., Lopez-De-Silanes, F., Shleifer, A. and Vishny, R. (1999), "The quality of government", *Journal of Law, Economics and Organization* **15**(1), 222–279.

Lehrer, E.L. (1995), "The Effects of Religion on the Labor Supply of Married Women", *Social Science Research* **24**(3), 281–301.

Lehrer, E.L. (2008), "The Role of Religion in Economic and Demographic Behaviour in the United States: A Review of the Recent Literature", IZA Discussion Papers No. 3541, IZA, Bonn, Germany.

Liebig, T. (2007), The Labour Market Integration of Immigrants in Germany, OECD Social, Employment and Migration Working Papers No. 47, OECD, Paris, France.

Liebig, T. Steinhardt, M. and Von Haaren, F. (2010), Naturalisation and the Labour Market Integration of Immigrants", *in* "International Migration Outlook, SOPEMI 2010", OECD, Paris, France.

Lipford, J. and Tollison. R. (2003), "Religious participation and income", *Journal of Economic Behavior and Organization* **51**(2), 249–260.

Maneschiold, P. and Haraldsonn, B. (2007), "Religious Norms and Labour Supply of Married. Women in Sweden", *Finnish Economic Papers* **20**(1), 41–56.

Bibliography

Mangeloja, E. (2005), "Economic growth and religious production efficiency", *Applied Economics* **20**(37), 2349–2359.

McCleary, R.M. and Barro, R.J. (2006), "Religion and Economy", *Journal of Economic Perspectives* **20**(2), 49–72.

McCleary, R.M. (2007), "Salvation, Damnation, and Economic Incentives", *Journal of Contemporary Religion* **22**(1), 49–74.

Murray, M.P. (2006), "Avoiding Invalid Instruments and Coping with Weak Instruments", *The Journal of Economic Perspectives* **20**(4), 111–132.

Newsweek (2007), Last Word: Edmund Phelps. It's all about Attitude, Interview by Stefan Theil, from http://www.columbia.edu/~esp2/Newsweekpercent20Itpercent27spercent2 Allpercent20Aboutpercent20Attitude.pdf (date last accessed February 20, 2012).

Nichols, A. and Schaffer, M.E. (2007), "Clustered standard errors in Stata", United Kingdom Stata Users' Group Meetings 2007 07, Stata Users Group.

Noussair, C., Trautmann, S.T., van de Kuilen, G. and Vellekoop, N. (2012), Risk Aversion and Religion, CentER Discussion Paper No. 2012-073, Center for Economic Research of the Tilburg University, Tilburg, Netherlands.

Papps, K.L. (2010), Female Labour Supply and Spousal Education, IZA Discussion Paper No. 5348, IZA, Bonn, Germany.

Putnam, R. (1993), *Making democracy work: Civic traditions in modern Italy*, Princeton University Press, Princeton.

Putnam, R. (2000), *Bowling Alone: The collapse and revival of American community*, Simon and Schuster, New York.

Renneboog, L. and Spaenjers, C. (2012), "Religion, economic attitudes, and household finance", *Oxford Economic Papers* **64**(1), 103–124.

Riphahn, R.T., Sander, M. and Wunder, C. (2010), The Welfare Use of Immigrants and Natives in Germany: The Case of Turkish Immigrants, LASER Discussion Papers No. 44, Labor and Socio-Economic Research Center, University of Erlangen-Nuernberg, Nuernberg, Germany.

Ruffle, B. and Sosis, R. (2007), "Does it pay to pray? Costly ritual and cooperation", *B.E. Journal of Economic Analysis and Policy* **7**(1), Article 18.

Ruffle, B. and Sosis, R. (2010), Do religious contexts elicit more trust and altruism? An experiment on Facebook, from http://ssrn.com/abstract=1566123 (date last accessed March 25, 2012).

Saleh Ambah, F. (2008), Islamic Banking: Steady in Shaky Times, Washington Post, from http://www.washingtonpost.com/wp-dyn/content/article/2008/10/30/ AR2008103004434.html (date last accessed February 21, 2013).

Scheller, F. (2011), Bestimmung der Herkunftsnationen von Teilnehmern des Soziooekonomischen Panels (SOEP) mit Migrationshintergrund. SOEPpapers on Multidisciplinary Panel Data Research, No. 407/2011, DIW, Berlin, Germany.

Shu, T., Sulaeman, J. and Yeung, P.E. (2012), "Local Religious Beliefs and Mutual Fund Risk-Taking Behaviours", *Management Science* **58**(10), 1779–1796.

Spenkuch, J.L. (2010), The Protestant Ethic and Work: Micro Evidence from Contemporary Germany, MPRA Paper 26444, University Library of Munich, Germany.

Stafford, F., Chen, B. and Schoeni, R. (2012), Mortgage Distress and Financial Liquidity: How U.S. Families are Handling Savings, Mortgages and Other Debts, PSID Technical Series Paper #12-02, Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor, Michigan, USA.

Statistisches Bundesamt (2012a), Familien mit Migrationshintergrund: Traditionelle Werte zählen, Wiesbaden, https://www.destatis.de/DE/Publikationen/STATmagazin/ Bevoelkerung/2012_03/Bevoelkerung2012_03.html (date last accessed January 15, 2013).

Statistisches Bundesamt (2012b), Bevölkerung und Erwerbstätigkeit: Bevölkerung mit Migrationshintergrund – Ergebnisse des Mikrozensus 2011, Fachserie 1, Reihe 2.2,, Wiesbaden.

Stets, J. and Burke, P. (2000), "Identity Theory and Social Identity Theory", *Social Psychology Quarterly* **63**(3), 224–237.

Stock, J. and Yogo, M. (2005), Testing for Weak Instruments in Linear IV Regression, NBER Working Papers No. 0284, National Bureau of Economic Research, Inc., Cambridge, Massachusetts, USA.

Stulz, R.M. and Williamson, R. (2003), "Culture, openness, and finance", *Journal of Financial Economics* **70**(3), 313-349.

Tabellini, G. (2010), "Culture and Institutions: Economic Development in the Regions of Europe", *Journal of the European Economic Association* **8**(4), 677–716.

The Pew Forum on Religion & Public Life, (2008), U.S. Religious Landscape Survey. Religious Affiliation: Diverse and Dynamic, Report 2008, Washington, DC, USA.

Tolciu, A. and Zierahn, U. (2012), "Women and work: what role do social norms play?", *International Review of Applied Economics* **26**(6), 711–733.

Tomes, N. (1985), "Religion and the Earnings Function", *The American Economic Review* **75**(2), 245–250.

Traunmüller, R. (2009), "Individual religiosity, religious context, and the creation of social trust in Germany", *Schmollers Jahrbuch (Journal of Applied Social Science Studies)* **129**(2), 357–365.

Traunmüller, R. (2011), "Moral communities? Religion as a source of social trust in a multilevel analysis of 97 German regions", *European Sociological Review* **27**(3), 346–363.

Uhlendorff, A. and Zimmermann, K.F. (2006), Unemployment Dynamics among Migrants and Natives, IZA Discussion Paper No. 5872, IZA, Bonn, Germany.

Weber, M., (1904/05), *Die protestantische Ethik und der Geist des Kapitalismus*, AREA Verlag, 2005, Erftstadt.

Welch, M.R., Sikkink, D., Sartain, E. and Bond, C. (2004), "Trust in God and trust in man: the ambivalent role of religion in shaping dimensions of social trust." *Journal for the Scientific Study of Religion* **43**(3), 317–343.

Wooldridge, J.M. (2002), "*Econometric Analysis of Cross Section and Panel Data*", The MIT Press, Cambridge, Massachusetts.

World Bank, (2013), World Development Indicators Online (WDI) database, (date last accessed March 2, 2013).