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For the Grace of God

- A study of religions' effect on economic behavior

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Abstract

There has been a longstanding debate within the discourse of economics concerning the role of cultural aspects in determining economic behavior. In this thesis we examine the effect of religion on saving behavior performing a within country analysis in Germany. By controlling for factors that previous research suggest has an effect on savings in a setting where formal and other informal institutions are homogenous we can single out the effect of religion.
Comparing religiosity in the form of Catholicism and Protestantism to non-believers the results show that Catholics and Protestants are more probable to and save more than non-believers. In addition Catholics save more than Protestants. We also test if religion has an effect on saving behavior transcending those that self-identify as religious, i.e. if norms and values that come from religion can influence norms, values and beliefs even in non-believers if associated with a certain religion. We find no support for such an effect.

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1. Introduction

1.1 Background

Why do we see differences in economic behavior between individuals within a society and aggregate differences in economic behavior across societies? There are many plausible explanations for these very broad questions. However amongst economists there has developed a consensus that institutions matter for economic performance.

The doyen on the field Douglass C. North defined institutions such as: "the humanly devised constraints that structure political, economic and social interaction" (North 1991 p.97) and that "[i]nstitutions provide the incentive structure of an economy; as that structure evolves, it shapes the direction of economic change towards growth, stagnation, or decline" (North 1991 p.97).

The importance of institutions raises additional questions: how come economic performance differs between countries with similar institutions and why do these differences persist for generations? Some argue that culture can be seen as bridging the gap between the differences in outcome across countries and regions with similar institutional settings. However the relative weight and importance of the formal vs. informal constraints,[1] or if you will law vs. culture, is an ongoing debate between economists, (Putnam 1993, Landes 1998, Acemoglu, Johnson and Robinson 2001, Glaeser, La Porta, Lopez-de-Silanes and Shleifer 2004, Rodrik, Subramanian and Trebbi 2004, Tabellini 2005).

Acemoglu, Johnson and Robinson (2001) make a landmark contribution to institutional economics and tipped the scale in favor of formal institutions. According to them culture is endogenous to economic development (Acemoglu, Johnson and Robinson 2005) and after formal institutions are controlled for culture has a limited effect on economic performance. This notion is in line with other classical schools of thought such as historical materialism and modernization theory. According to Marx (1859) all human institutions, including religion and culture, were based on economic foundations. Individual world views and ideas are therefore treated as endogenous to economic realities.

[1] North separates his analysis between informal constraints and formal constraints. Formal constraints include political and judicial rules, economic rules and contracts whereas informal constraints are socially transmitted information and are commonly referred to as parts of culture (North 1990).

Possibly the most famous argument for culture as a causal factor of economic growth, *The Protestant Ethic and the Spirit of Capitalism* (1904), was written as a response to the deterministic view of Marxists. In the book Weber argues for the specific hypothesis that capitalism was born out of the work ethic and thrift of Protestants. But in general it was an argument for how shifts in an individual's world view can have a causal effect on his economic behavior and on an aggregate level change the economic system entirely, i.e. how culture can shape institutions instead of the other way around. This is not to say that culture is the only factor explaining institutional change but that it is very important and cannot be neglected. Other more recent scholars (Putnam 1993, Fukuyama 1995, Huntington 1996, Landes 1998) also argue for the importance of culture in explaining economic performance.

The academic discussion can be related to the discussions concerning the ongoing debt crisis shaking the very foundation of the European Union. Is it perhaps something deeply embedded in the culture of the debt stricken countries in the south of the European Union that is detrimental do their economic performance? Leaving Greece out of the picture the countries that are the most affected, namely Italy, Spain and Portugal are also all Catholic countries. In the predominantly historically Protestant northern part of the union the economies are comparatively better off. Not surprisingly the discussion about what role religion plays in economic performance has once again resurfaced (Brooks 2011, Fleischhauer 2011, Johansen 2011). Is it simply coincidence or does religion have a role to play in understanding differences in economic behavior across countries? Furthermore does historic religion have an effect on economic behavior even in current secular societies such as Sweden (Arnot 2011, Sanandajii and Sanandajii 2011)?

1.2 Aim

The aim of this thesis is to investigate if religion has an effect on saving behavior holding other factors affecting saving behavior fixed. The aim is further to test if religion has an effect on saving behavior transcending those that self-identify as religious, i.e. if norms and values that come from religion can influence norms, values and beliefs even in non-believers if associated with a certain religion. Hopefully our results will shed some light on the relative importance of culture in the field of economics.

1.3 Limitations of scope

There are many aspects of culture that are worthy of attention however it is often difficult to identify different cultural groups. For this reason we use religion as a cultural identifier and examine religions' effect as it is easily identifiable and the groups hold shared values (Guiso, Sapienza and Zingales 2006).

As our main dependent variable in this experiment we use savings on a household level. The choice of savings as dependent variable is based on the fact that the saving behavior chosen in a household is suggested to be highly influenced by values, norms and beliefs and therefore can be suspected to differ between different cultural groups (Weber 1904, Kotlikoff 1993, Guiso, Sapienza and Zingales 2003).

When discussing religion we refer to those norms, values and beliefs that are shared amongst self-identified believers. Religious culture is a broader concept that encompasses the norms, beliefs and values that come from religion and are shared amongst believers and non-believers associated with the same religion. Both religion and religious culture are part of culture which we define as the "customary beliefs and values that ethnic, religious and social groups transmit fairly unchanged from generation to generation" (Guiso, Sapienza, and Zingales 2006 p.1). Religion, religious culture and culture are all informal constraints in that they are socially transmitted information (North 1990) and for the benefit of our analysis we make no distinction between culture and informal institutions.

A common method when assessing the role of a cultural phenomenon for economic performance is to do cross-country comparisons of values or cultural traits and economic outcomes **(**Guiso, Sapienza and Zingales 2003**).** When performing a cross-country study it is difficult to entangle the effect of religion from other cultural factors, such as history, that might correlate with religion and if not properly controlled for would cause bias in the estimated effect of religion. We therefore choose to perform a within country study.

The ideal testing ground for the effect of religion would be a country with completely homogenous formal and informal institutions except for values, norms and beliefs that are affected by religion. This would allow us to pinpoint the effect of religion and minimize the risk of bias. We test the effect of religion using current day Germany as it is well suited for this type of study. In Germany there are two major religious blocks of similar size, Protestants and Catholics. Each block holds 34-37 percent of the population and non-denominationals make up 19 percent (Spenkuch 2011). As the groups are of similar size we assume that the formal institutions are not likely to be biasedly shaped by any denomination. We would also argue that Germans share similar institutions and that the culture of the country is relatively homogenous. An apparent differentiator would be the time in the 20th Century when the country was divided in two very different parts. This variation is however easily identifiable and will be controlled for in our analysis. Within-country variations will also be controlled for by adding control variables for county (*Kriese)* characteristics.

We also test if religion has an effect on economic behavior beyond those that self-identify as religious, through what we call religious culture. We will use information on parent's religion as well as historically dominating religion in the region where the individuals currently reside to create proxies for exposure to a specific religion.

2. Theoretical background

The theoretical background is divided into six parts. First we provide a short summary of the institutions' view as it is very influential and much of the current literature on culture and economics is written partly in response to this dominating view. The second part will focus on the theoretical literature on culture and economic behavior in general. The third part is a short introduction of the empirical studies that have been done on the effect of culture on economic behavior. The fourth part explains the religious situation in Germany. The fifth serves as a brief introduction to the literature on savings, as well as an introduction to the literature on religion and savings in particular. Finally we will make some specific remarks on savings in Germany

2.1 The Institutions' view

Amongst economists there is a consensus on the importance of path dependence, i.e. history as one of the main determinants for current economic performance. Traditional explanations of growth such as capital, labor, or human capital has been put forth and was discarded as engines of growth because, they are not factors for growth, they are growth (North and Thomas 1973).

Following the influential paper written by Acemoglu, Johnson and Robinson (2001) there is a widespread interpretation that history affects economic performance through the effect of current institutions (Rodrik, Subramanian and Trebbi 2004). In Acemoglu, Johnson and Robinson (2001) colonialization is used as a natural experiment testing the effect of institutions on the current economic performance of former colonies. As an instrumental variable for current day institutions in previously colonized countries settler mortality is used. Arguably the mortality rates amongst settlers affected what type of institutions that were installed.[2] Those settler institutions did not only affect the

[2] The argument goes that Europeans were more likely to develop institutions protecting property rights and basic political rights to the majority of the population if they themselves would settle and become the majority. Europeans tended to settle where the settler mortality rate was low which it was in scarcely populated areas such as current day USA and Australia. Settler mortality was higher in more densely populated areas such as the Caribbean and Latin America which caused colonizers to install institutions suited for a small group of settlers to extract profit from natural resources and exploiting the native inhabitants (Acemoglu, Johnson and Robinson 2001).

economic incentives of the society of its days but also had a lasting effect and to a large extent predetermines the institutions of our time. Hence historic settler mortality, as is to be seen as exogenous to current day economic performance, induces an exogenous variation in the endogenous explanatory variable, current institutions, and therefore the writers claim that institutions have a causal interpretation on current economic performance. The results suggest that as much as 75 percent of the income gap between relatively rich and relatively poor countries we see today can be explained by differences in economic institutions.

Acemoglu (2009) criticizes the literature on cultures' effect on economic performance, such as social capital arguments by Putnam (1993) and religious beliefs by Barro and McCleary (2003), to be merely correlational and not take into account that causality can go both ways. The second argument is that a cultural explanation has difficulties in explaining the divergent growth performance of countries with homogenous culture such as North and South Korea or sudden rapid growth in China post-Mao. Proponents of a cultural explanation for economic performance have to develop models to assert causality and explain how culture can change rapidly to challenge the institutions' view. For Acemoglu (2009) the role of culture is limited to a complementary role of institutions, acting as one of the forces responsible for institutional persistence.

But if institutions, or rather property rights enforcing institutions, hold such explanatory value then how come economic performance differs between countries and regions that have had similar institutions for a long period of time?[3]

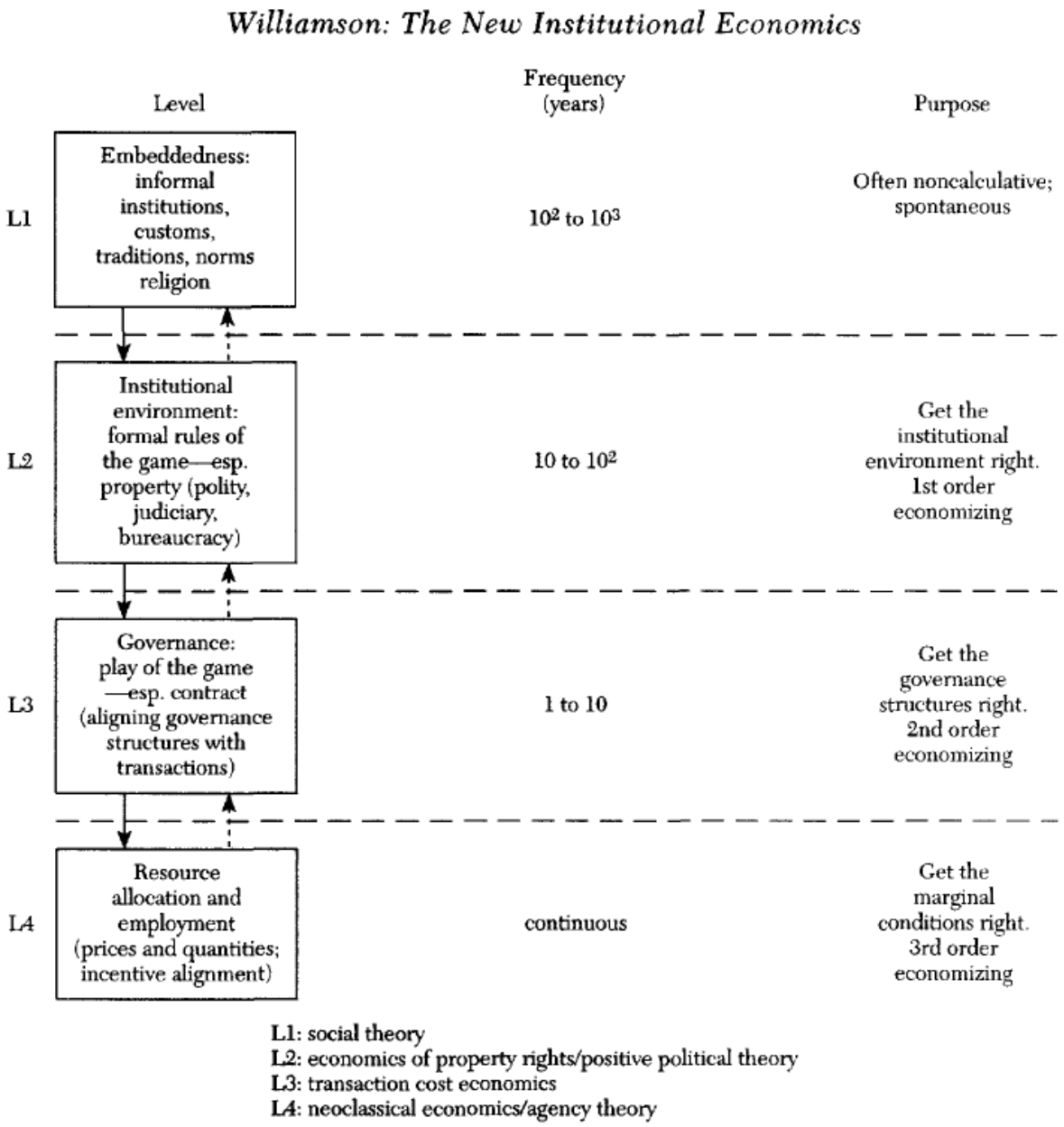
2.2 Culture, institutions and economic behavior

To understand how formal and informal institutional constraints are separated from each other and interact, Williamson (2000) provides a useful framework (see Figure 1). He separates institutions into a hierarchy consisting of four levels, ranked on the basis of how slowly they change over time. The solid arrows in the model that connect a higher level with a lower signify that the higher level imposes constraints on the level below. The dashed arrows that go upstream indicate the feedback mechanism. The highest level of the hierarchy, *Embeddedness or Social/Cultural Foundations* contains informal constraints and consists of such slow changing variables as customs, traditions, ethics, social norms and religion and on some level language and cognition. The second level is the *Basic Institutional Environment,* called *the rules of the game,* consisting of formal rules that are defined by the political system, such as laws, judicial and financial institutions. The other two levels are *the play of the game* which is various contractual and governance agreements that prevail in certain institutional

[3] The typical example for this is the difference in economic performance between the northern and southern Italy (Banfield 1958, Putnam 1993).

arrangements and the final hierarchy is the *day-to-day*[4] operation of the economy given the institutions defined at the other three levels.

Figure 1. Williamson's Four levels of institutions. Source: Williamson 2000 p.597



Williamson argues that changes in the faster changing levels (L3, L4) can cause changes in the slower changing levels of the hierarchy (L1, L2). A good example (Joskow 2004) of how the levels can interact is Greif's (1993) work on Mediterranean trade where differences in culture, Genovesean individualism or Maghribi collectivism, led to different solutions to handle the contractual problem

[4] On the final level prices and quantities bought and sold are determined as a consequences of monopoly, oligopoly and other neoclassical market imperfections.

associated with long distance trade. In Greif's framework the role of culture is that of a coordinating device in a multiple equilibrium game. Societies with different cultures play the exact same game but choose different equilibriums based on their expectations of opponents actions. This approach allows for an equilibrium solution that might persist even though it might not be efficient. In the case of the Maghribi and the Genovese traders, the collectivistic Maghribi traders needed not to formalize the basic institutions governing enforcement of private property rights and contractual performance as "In a collectivist society, individuals can be induced to forgo 'improper' behavior through a credible threat of informal collective economic punishment" (Greif 1994 p.26). In individualistic Genova on the other hand no such collective punishment mechanism existed and "to support collective actions and to facilitate exchange, an individualist society needs to develop formal legal and political enforcement organizations. Further, a formal legal code is likely to be required to facilitate exchange by coordinating expectations and enhancing the deterrence effect of formal organizations" (Greif 1994 p.26). Because of the differences in their respective culture (L1) they solved the same contractual problem (L3) in two different ways, where the Genovese solution fostered changes in the formal institutions (L2) that in the long run provided for a more effective division of work and economic growth.

The slow changing of the first level institutions is reflected in the concept of path dependence. That means that the prevailing institutions in a society depend on the historical experiences embedded in that society (North 1991). Denzau and North (1994) provide one fruitful hypothesis for how path dependence affect individual decision making. They claim that it is not possible to explain the diverse performance of economies and polities both historically and today if individuals really knew their self-interest and acted accordingly. Instead we live in a world of uncertainty and therefore act partly on the basis of culturally rooted myths, traditions, ideologies and 'half-baked' theories of cause and effect. They argue that to understand decision making under uncertainty we must understand the mental models, the "internal representation that individual cognitive systems create to interpret the environment" (Denzau and North 1994 p.2) and the ideologies that results from these mental models and the institutions, "external […] mechanisms that individuals create to structure and order the environment" (Denzau and North 1994 p.2).

The mental models that the mind creates and the institutions that individuals create are both an essential part of the way human beings structure their environment in their interactions with it. These mental models are not a *tabula rasa* but individuals are socialized with a set of categories and priors rooted in culture and are constantly affected by social interaction. Therefore individuals sharing common cultural backgrounds and experiences also share relatively coherent mental models. When interpreting the world an individual is highly influenced by the concepts he has about the world and will act in accordance with these perceptions. Consequently individuals from different cultures have

different mental models and interpret the environment differently and act accordingly. As Greif (1994) they also claim that culture can have a causal impact on economic performance: "[t]he performance of economies is a consequence of the incentive structures put into place; that is, the institutional framework of the polity and economy. These are in turn a function of the shared mental models and ideologies of the actors" (Denzau and North 1994 p.15). Similarly Guiso, Sapienza, and Zingales (2006) point out that the culture has a particularly important role to play in situations where the individual lacks prior experience. In these situations choices must to some extent be based on beliefs. Moreover the information feedback from their choices is not sufficient to lead to convergence of competing interpretations of reality that explains why these beliefs persist.

Similarly there are several cultural relics that when introduced might have been efficient but now have played out their role and are still kept and passed down to new generations. Guiso, Sapienza, and Zingales (2006) mention the Mursi people of Ethiopia who force their women to wear large clay ornaments that greatly disfigure their mouths. This tradition is said to have originated to make these women less attractive to slave hunters but even though this threat is not current the tradition is kept. In many instances this might be because the organizations that uphold the traditions, like churches or governments, have greatly invested in this structure and therefore gain from upholding it. In the Mursi case it is possible that the men promote this ritual so as to limit their women's opportunities in the outside world. Another example is that according to Guiso, Sapienza, and Zingales (2003) religious people in general have more conservative views on the role of women in society that would not appear to be economically efficient.

The conservatism of culture is reflected in the socialization and partner selection process. Parents are very influential in the children's socialization process allowing indoctrination in accordance with their own beliefs and preferences (Bisin and Verdier 2000, Guiso, Sapienza, and Zingales 2006). This is reflected in that individuals belonging to minorities tend to marry homogamously as a heterogamous (out of group) marriage would diminish the individual's opportunity to transfer his traits, as the offspring is not just influenced by the other spouse but by the whole majority culture. As children of interreligious marriages are less likely to adopt either of their parent's religion and uphold religious traits those individuals who are highly socialized in a religion tend to choose their spouse with this in mind. This idea of partner selection can be included in the socialization process of children as a norm by parents as they wish to transfer their cultural traits also to their grandchildren (Bisin and Verdier 2000).

Culture and differences between group's preferences has been described as just being diverse choices of equilibrium strategies in a multi equilibrium repeated game. In this theory, used by among others Mailath and Postlewaite (2003), the differences lie in the variation of expectations on the strategies

that will be played in equilibrium. If a group has shared values, notions and mechanisms to encourage desirable behavior and individuals in the group act in accordance with these principles the group has a social institution that is an equilibrium. As there is a social cost of deviating from equilibrium strategies it is for most people beneficial to act in accordance with the social institution as long as they expect other people to do the same. Changes in social institutions come as effects of extrinsic shocks changing the benefits for people of sticking to the social institutions.

As mentioned when measuring culture there is always the problem that the causality between culture and economic performance can work both ways. To break this Guiso, Sapienza, and Zingales (2006) suggest focusing only on those portions of culture that are inherited rather than voluntary accumulated. Becker (1996) states that an individual has less control over his culture than over other traits and it is vertically impossible to change once race, ethnicity and family history. Only with difficulty can one alter ones country and religion. In view of this together with its low depreciation rate culture can be seen as being largely given throughout an individual's lifetime (Becker 1996).

The scholars cited above all highlight the conservative force of culture and as Acemoglu (2009) points out it is difficult to explain rapid economic change with a variable that is largely given and unchanged through out an individual's lifetime (Becker 1996). The following two academics argue that culture can change rapidly and have a profound effect on economic behavior.

Mokyr (2010) argues that there is a role for cultural entrepreneurs in understanding cultural change. He defines culture as "a set of beliefs, values, and preferences, capable of affecting behavior, that are socially (not genetically) transmitted and that are shared by some subset of society" (p.3). In his framework a cultural entrepreneurs is one "that is successful in persuading large number of people to accept a set of beliefs different from their parents" (p.41). He claims that every society has men and women with ideas that are radically novel and if accepted by a large number of individuals would create a change in the culture of that society. Two cultural entrepreneurs that he mentions are Martin Luther and John Calvin.

One of the most famous arguments for the role of culture in economic behavior and the inspiration for this thesis is made by the famous sociologist Max Weber in his controversial essay *The Protestant Ethic and the Spirit of Capitalism* (1904). Weber noticed that Protestants and Protestant countries tended to be more capitalistic than others in the late 19th century. According to Weber this could be explained by a distinct *Protestant ethic*. The traditional view was that work was instrumental to survival and not an end in its own right. In pre-capitalistic societies entrepreneurial agriculturalists noticed this when they tried to raise workers' wages so as to incentivize them to work harder the effect was the opposite, namely that the workers substituted increased wages to more leisure. "The

opportunity of earning more was less attractive than that of working less" (Weber1904 p.60). In such a society the accumulation of wealth is limited to capitalistic individuals and not grasping the entire society as of today. For capitalism to penetrate all levels of society "[l]abour must, on the contrary be performed as if it were an absolute end in itself, a calling" (Weber 1904 p.62).

According to Weber Protestantism, and most notably Protestant sects such as Puritans and Calvinists, promoted hard work and thriftiness. These social norms were socialized through upbringing and altered individuals incentives such as they no longer lived *hand-to-mouth* in the sense that they worked harder and did not consume their surplus. *The protestant ethic*, of hard work and thrift, gave birth to capital accumulation and hence capitalism.

Nevertheless Weber also expected that after the capitalistic modes of labor and production were decisively established, the religiously inspired ethic would lose its religious roots as the rationality of capitalism would not conform to religiosity. He argued that the Protestant ethic would become embodied in a more general ethical code, which he coins as *the spirit of capitalism*, and that social and legal institutions would therefore no longer depend on specific forms of religious practices and beliefs. Thus Weber would not predict a close association between religious affiliations or practices and economic outcomes of today.

2.3 Empirical studies of culture and economic performance

There seems to be little empirical support of Weber's argument that capitalism was born out of the protestant ethic. Delacroix (2001) investigated if Protestantism contributed to the rise of early capitalism by estimating the association between the percentage of Protestants and the development of industrial capitalism. According to the author his results "certainly do not constitute a strong, or even mildly plausible, case in favor of the idea that Protestantism caused, facilitated, or was in any way instrumental to in the development of industrial capitalism" (Delacroix 2001 p.543). Sanderson, Abrutyn and Proctor (2011) also conclude that there is no support for the theory that the Protestant ethic has been an important factor in the growth of modern capitalism. Cantoni (2010) studies Germany in particular and like Delacroix (2001) finds nothing that suggests that Protestantism favored capitalistic development.

Becker and Woessman (2009) looked mainly at Prussian county data from the late 19th century and found descriptive evidence that Protestant counties in late 19th century were on average economically more advanced. They however found a different mechanism to be the explanation of this income gap, namely the higher literacy rate amongst Protestants that came as a result of their religious practice.

This increased their human capital accounting for major parts in their edge in the economic development relative Catholic regions. Furthermore they examined economic outcome of current day Germans and found that Protestants current higher earnings relative to Catholics also can be explained by higher human capital amongst Protestants.

Spenkuch (2011) in his study on the relationship between Protestantism, Catholicism and non-belief in Germany using the same database as is used in this thesis, the SOEP data, found that self-identified non-denominational individuals work longer hours, enjoy higher wages and much higher earnings than their self-identified religious counterparts. He also identifies a small difference between Catholics and Protestants where the later seem to work more but these results show too high a standard error to be entirely trustworthy. Spenkuch goes on to use an instrument that is based on the historical distributions of religious denominations in 17th Century Germany to break the endogeneity in religious affiliation.[5] The findings when using this instrument are that on average Protestants work 3.5-4.5 hours more per week and earn about 12 percent more with only the first result being statistically significant. According to Spenkuch his results show that the current difference in earnings that are observed between Protestant and Catholics, as brought forward by Becker Woessman (2009), cannot be explained by higher human capital. If so then the hourly wage would be higher which Spenkuch finds no support for. Spenkuch conclude that Becker and Woessman (2009) were wrong in their human capital explanation of the earnings gap and instead proposes a value based explanation more in line with Weber's Protestant ethic.

Although Weber emphasized hard work and thrift as the key mechanisms in the Protestant ethic that gave birth to capitalism another potential mechanism for the relative affluence of Protestants in the late 19th century might be that of trust. Because Protestants reject the idea of penance and consequently cannot obtain pardon for their sins through acts of reparation, they are less likely to break promises and contracts. This shift from a Catholic 'cycle of sin' consisting of sin followed by pardon through an intervention of a priest, towards an accumulative moral responsibility could have created a lower level of defection (Weber 1904). Using modern economic terminology not available to Weber: If the risk of defection is expected to be lower, transaction costs decreases, hence the number of transactions increases because an increased number of transactions are expected to be profitable. Blum and Dudley (2001) tested this very mechanism as well as other more mainstream growth models such as endogenous growth theory and neo-classical models to explain why wages were falling in Catholic cities whereas wages were rising in Protestant cities between 1500 and 1750. They found that these models could not explain the divergence whereas a cultural shift in the perceived cost of cooperation could: "Simply put, greater human capital, other things being equal, is not a sufficient condition for higher incomes or more rapid growth in low-income economies. Unless

[5] We in this thesis use Spenkuch's distribution when specifying historical religion in different areas.

there is a concomitant change in the behavior of individuals in their contractual relations with one another, both within and beyond national borders, the economies will remain mired in their previous underdeveloped state" (Blum and Dudley 2001 p.228). They argued that this shift in view of sin altered the subjective cost of cooperating with strangers and generated profound transformation and expansion in trading networks. The relatively higher propensity of Protestants to honor contracts with individuals they interacted with infrequently especially enabled for the Protestant cities with access to the Atlantic to realize profits from the advances in transportation technology and reduced cost of ocean shipping.

Similarly social capital theorists argue for different mechanism for religions' effect on economic behavior. Putnam (1993) studies economic development across Italy partly attributing the current lack of trust towards others in the South of Italy to the strong Catholic tradition, which underlines the vertical bond with the Church and tends to undermine the horizontal bond with fellow citizens. Putnam was not the first to stress the detrimental effect of Catholicism on trust. Banfield (1958) claims that the strong sense of family in the Catholic tradition was associated with *amoral familiarism*, an inability of individuals on a societal level "to act together for their commorn good or, indeed, for any end transcending the immediate, material interest of the nuclear family"(Banfield 1958 p.8). Similar to that notion Fukuyama (1995) stresses the importance of trust in strangers for the expansion of large corporation, and argues that strong family ties are detrimental to the growth of large organizations. These theories find support in cross-country studies made by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997). Trust in strangers increases the share of large corporation and trust in family has the reverse effect on the same. Furthermore they also find that the percentage of the population belonging to hierarchical religions; Eastern Orthodox, Roman Catholic, and Islam, has a significant and remarkable negative effect on trust. Nonetheless trust as an explanatory variables has serious limitations as it is not just a given trait but can be developed as a result of a good legal system or strategic social interactions (Axelrod 1984).

Guiso, Sapienza and Zingales (2003) uses the World Value Surveys to compare religious beliefs and economic attitudes in the world and finds that religious beliefs are on average associated with conductive economic attitudes where Christianity seems to be somewhat more positive. Protestants appear to both be more trusting in others and the legal system but less supportive of private ownership than Catholics who on their part are more willing to cheat on taxes and accept bribes. Catholics also believe that it is more important to teach their children the value of thrift than Protestants.

2.4 Religion in Germany

Today Germany is dominated by two religious blocks formed in two churches: the Evangelical Church and the Roman Catholic Church.[6] Each block holds 34-37 percent of the population with the third largest group being Muslims at 4 percent. Non-denominationals make up 19 percent and are mainly living in the former German Democratic Republik (DDR). The Evangelical Church in Germany (*Evangelische Kirche*) is a federation consisting of 22 Lutheran, Unified and Reformed churches and has continuously lost members during the last decades. In Germany members of religious communions are obliged to pay a Church tax (*Kirchensteuer*) of up to 3.5 percent of one's taxable income (Spenkuch 2011).

To this day the geographic distribution of Protestants and Catholics is to a large extent explained by prince's religious affiliation following the Peace of Augsburg 1555. According to the 'Cuius regio, eius religio' (whose realm, his religion) principle agreed on at the Peace of Augsburg in 1555 the religion of the prince in a region became the religion of that state and its inhabitants. Catholicism and Protestantism were the only two religions allowed and inhabitants who could not conform to their ruler's choice were allowed to leave or be punished, sometimes even executed. The act was very controversial as it went against the earlier Catholic law that a ruler should service the people and share their religion. At the time Germany was divided into over a thousand states and although the principle ended a long stretch of religious conflict it led to an extensive religious fragmentation. Until the Peace of Westphalia in 1648 many regions ended up switching religious denomination several times due to new prince's idiosyncratic choices but with the peace came a form of freedom of religion where the population was no longer forced to convert according to their sovereign's choice.[7] With the Peace the pope abandoned his claims on the Protestant population and religious matters stabilized. This religious relief was of course limited to the two religions for which the Thirty year's war was fought, Catholicism and Protestantism (Harrington and Walser Smith 1997, Spenkuch 2011).

Historians have analyzed princes' decisions and isolated the key factors, all of which are reasonably uncorrelated with the determinants of economic success today (see, for instance, Lutz 1997, and Dixon 2002 through Spenkuch 2011). According to Spenkuch's (2011) research the prince's made idiosyncratic decisions after considering several options where the most crucial where; risking hostility and loss of support from neighbors and/or the pope, possibility to confiscate the church's possessions and own actual beliefs about their own salvation and that of their people. The fact that the regions official religion often changed with its rulers points to the importance of idiosyncratic factors affecting prince's religious denomination.

[6] See Figure 4 for a mapping of the religious distribution of current day Germany

[7] At the Peace at Westphalia in 1648 the religious distribution of the year 1624 was set as the 'normal year', the distribution that would be the official from then on.

Today individuals living in traditionally Protestant regions are still more likely to identify as Protestant than Catholic (see Table 1). During the 19th century many of the religiously heterogenic states where united into bigger states creating religiously mixed entities. On a local level however the denominations where changed only to a low extent and up until the migrations brought on by World War II to over 90 percent either Catholicism or Protestantism dominated the population in 247 of the then 900 counties. Immediately after the war this was true to 82 percent. Before the war Germany to two thirds consisted of Protestants and to one third of Catholics. Forty-one years of communist rule in the former DDR had a strong negative effect on religiousness and religious participation in the eastern parts of the country.

Even though different institutions might have developed in different states as a result of their religious choice these differences most likely disappeared after the German Mediatization (*Reichsdeputationshauptschluss*) in 1803 that radically decreased the number of states in Germany and the following decades that standardized native institutions. Today the German states share almost identical formal institutions such as legal and tax system etc. There is however some differences in the educational and health care systems between states why it is important to control for county fixed effects in our estimations. All in all this suggests that historical religious distribution was largely exogenous to economic conditions and have persisted up until our time (Spenkuch 2011).

2.5 Savings

Laurence J. Kotlikoff (1993) humbly states that economists do not know all the answers to why saving rates differ between countries. But some factors that "undoubtedly affect the amount people save are culture, differences in saving motives, economic growth, demographics, how many people in the economy are in the labor force, the insurability of risks and economic policy" (Kotlikoff 1993).

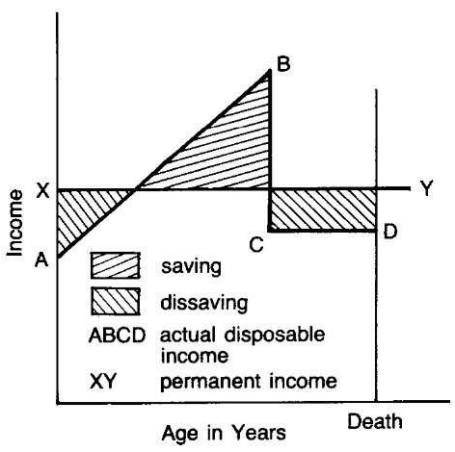
In economics the individual agent faces the decision to consume or to save in order to have the opportunity to consume what is saved in a later time period. Consumer choices that involves more than one period, i.e. intertemporal choices, are no different from any other economic decision, since it involves a budget constraint and a utility function. The consumer decision on whether to save or consume hence depends ultimately on what utility the individual agent expects to get from future vs. current consumption. All economic theories on savings are based on some form of discounted utility model, where future consumption is discounted to a lower value than current consumption (Wärneryd 1999).

The idea of the permanent income hypothesis (PIH) developed by Milton Friedman (1957) has long dominated the view on consumption. The theory states that a consumer's consumption pattern is determined not by current income but by the individuals long-term income expectations. The theory implicates that short-term transitory changes in income has a small effect on a individuals spending behavior and also states that the key determinant of consumption is an individual's wealth rather than his current disposable income.

In recent years the PIH-hypothesis have become more and more criticized for the benefit of a adjusted model with overlapping generations with heterogeneous wealth levels, including bequests, as originally developed by Duesenberry (1949) – the relative income hypothesis (RIH). Here individual's attitudes to consumption and savings are driven by the comparison of his lifetime income and the lifetime income of his reference group in society rather than as in the PIH his abstract standard of living. The consumption is not only limited to the influence of present relative income but also to the level of consumption in previous periods making it difficult for a household to reduce the level of consumption once attained (Alvarez-Cuadrado and Van Long 2011).

Another related and contemporary theory seen as the pillar of research on savings for the past five decades is the life cycle hypothesis (LCH) that has proven useful for examining a variety of questions. In essence the theory explains that individuals restrain their consumption in certain stages of life when income is higher in order to afford approximately the same level of consumption in times were income is lower. According to the model young people may borrow to get the level of consumption they want, middle-aged people save money for old age and old people dissave, i.e. live out of the savings they accumulated throughout their work life (Wärneryd 1999). As in the PIH people smooth out fluctuations in income so that they save during periods of unusually high income and dissave during periods of unusually low income.

Figure 2. Life Cycle Hypothesis Source: Wärneryd 1999 p.47



In a classical paper from the creators of LCH, Albert Ando and Franco Modigliani stated a key assumption of the model: "[t]he individual neither expects to receive nor desires to leave any inheritance" (1963 p.56). This bold statement set of a debate on the importance of bequests and most famously Laurence Kotlikoff and Laurence Summers (1981) estimated that out of the accumulated wealth in the U.S. only a fifth was savings for retirement, or 'hump-savings' as suggested by the LCH, the rest was bequeathed.

Modigliani (1985) disagreed and estimated the size of bequests to 20 percent and claimed that life-cycle saving was the primary source of capital accumulation. This can either be explained as enabling time of death to be a stochastic variable and precautionary savings reflecting risk aversion from running out of saving. The relative importance of these saving motives is difficult to assess empirically, due to contradictory survey data (Dynan, Skinner and Zeldes 2002). [8] Modigliani (1985) believes that a large fraction of bequests can be understood as precautionary savings but admits that the size of the bequests suggests that a substantial part is intentional. Subsequent work has failed to reach a consensus but Dynan, Skinner and Zeldes (2002) proposes a model where saving simultaneously serves two purposes. The first purpose is as a precautionary measure as supposed by LCH. The second purpose, to bequeath wealth to future generations, becomes effective in the likely event that future developments are not as bad as they could be and the individual has over saved.

This is relevant to our thesis since both risk aversion and the desire to leave bequest might to some degree be explained by culture or religion. Miller (2000) proposes religious belief to be a rationally chosen risk-averse behavior motivated by a society's belief that a specific religious faith and associated behavior are necessary to ensure a satisfying afterlife. Since atheists depart from this behavior in favor of profits in this world they are said to be risk-prone. According to Halek and Eisenhauser (2001) as well as Renneboog and Spaenjers (2009) there is also a difference in risk-aversion between denominations where Catholics are less risk prone than Protestants. Miller (2000) makes an international comparison and finds a relation between active participation in religious faith and risk aversion in monotheistic societies, but cannot identify such a relation among Buddhists or Hinduists.

Bartke and Schwarze (2008) proposed a different mechanism where religion functions as a "superior monitoring device", where the religion contains specific rules and behavior that typically places some

[8] In Survey of Consumer Finance done 1998 in the U.S. nearly half of households said "yes" or "possibly" when asked whether they expected to leave a sizable estate to others. Roughly half of the respondents also claimed that leaving an inheritance to their heirs is important or very important to them. This suggests that individual's value to bequeath wealth to their offspring and one could expect that it therefore would be an important saving motive. However in the same survey only 8percent of the full sample and 12 percent of the retired sample even mentioned it as one motive for saving. Saving for retirement and precautionary savings clearly dominated as saving motive in the survey (Dynan, Skinner and Zeldes 2002).

limit to risk-taking. As Atheists are not concerned with the afterlife they tend to dare more to exhaust the possibilities of their restricted lifetime. Using SOEP-data on how self-assessed risk tolerance was correlated with religion they found that individuals with a religious affiliation are significantly less risk-tolerant than those who do not belong to any denomination. Those that belong to religions with stricter behavioral rules such as Islam are more risk averse than those belonging to less strict religions such as Protestantism.

Renneboog and Spaenjers (2009) conduct a study using a Dutch equivalent of the SOEP-data and find a clear difference between Christians and non-religious people with regards to savings where the first group is less risk-prone, more positive to bequeathing and appear to have a longer planning horizon. Catholics invest in less risky assets than Protestants and appear to value bequests more. The authors comment that these values are reflected in that those countries in Europe with the traditionally lower stock market participation are all Catholic.

2.6 Savings in Germany

Germans have by tradition valued savings and saved at a relatively high level. Boersch-Supan (1994a) attributes this partly to the Second World War where many Germans were negatively affected and could often not satisfy their basic needs of food and utilities. As soon as relative economic abundance was reached in the 1960's Germany landed at a high aggregate savings rate.

During the last ten years consumption in Germany has stabilized whilst savings rates have gone up. This unexpected trend is explained as being an effect of changes in income distribution, pension systems and labor market reforms. An additional reason given is that the increase is due to declining prices on the stock market (Hüfner and Koske 2010).

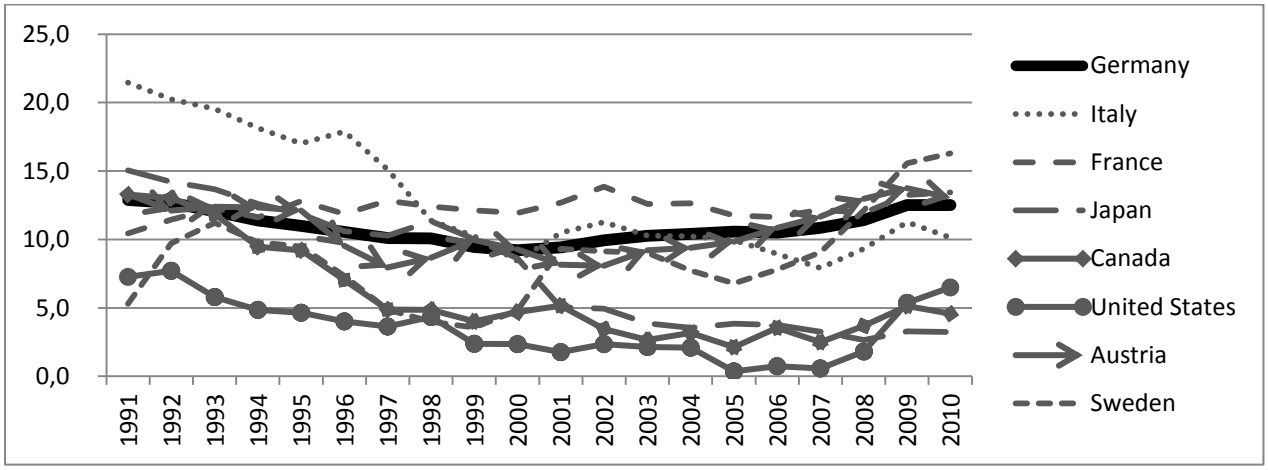
The German government has supported several incentive plans to encourage savings, for example a general program designed to increase wealth accumulations among lower income groups as a means for wealth distribution and to provide sufficient funding for economic growth (*Vermögensbildungsgesetz*). Also tax subventions for down payments on house loans are in place (Boersch-Supan 1994a) as well as subsidized private pensions (Hüfner and Koske 2010). The increase in saving ratios might therefore also be explained as an effect of increased opportunity cost of consumption today.

The German pension system is divided into three parts; mandatory State Pension Insurance (*Gesetzliche Rentenversicherung*), Voluntary Occupational Pension Insurance (*Betriebliche*

Altersvorsorge) and Private Pension. In 2007 a decision to increase the pension age from 65 to 67 was made and will gradually be introduced to reach full effect in 2029. The mandatory pension follows the *pay as you go*-system where pensions are not saved by the state but used to pay current pension commitments. This system creates a certain amount of uncertainty as individuals will have to rely on other people and the economic situation when it is their time to get paid. The Voluntary Occupational Pension System is a form of employment benefit that employers can choose to introduce. The private pension funds have been heavily encouraged by the government; these are not inheritable and are protected against creditors by law (Guardiancich 2010). Germany underwent a great alteration in the retirement saving behavior after the pension reform of 2001. The reform resulted in an decrease in public pension level from seventy percent of pre-retirement income to about forty percent in 2004 (Boersch-Supan and Wilke 2006). To avoid poverty in old age additional private savings have become almost unavoidable. This thesis will not cover retirement payments but uncertainty about future conditions is an important factor considered when individuals make decisions about savings.

In contrast to what the LCH suggests there is no clearly identified dissaving in retirement but historically rather an increase in saving rates in old age a few years after retirement. The highest lifetime saving peak is when the individual reaches the age of 45 to 49 years. Until the age of 35, saving is mainly invested in owner-occupied housing, while it is mainly financial saving at older ages (Boersch-Supan 1994b). An investigation into German saving behavior made by Boersch-Supan and Essig in 2005 found that in general Germans save regularly, planned and often with a clearly defined purpose. Saving to even out income fluctuations was not found to be an important motive but rather saving for old age and precautionary savings dominated.

Figure 3. Net Household Saving Rates 1991-2010 Source: OECD 2011



3. Method

3.1 Structure

To answer the question if and if so how religion effect savings we will use econometric analysis using cross sectional data from SOEP with 2007 as our base year. We will control for factors that according to the literature affects savings to achieve a ceteris paribus setting. We will test five different settings (A,B,C,D and E) as described in the table below. For each setting will use both the Probit and the Weighted Least Squares (WLS) models.

We choose to refer to those observations that are self-identified as having no denomination as non-believers. Although we are aware that this group contains both atheists, agnostics and non-organized believers we chose this term for simplicity reasons and define non-believers as observations who are not part of a religious community.

	A	**B**	**C**	**D**	**E**
Religious variables	Protestant and Catholics against non-believers	Protestant against Catholics	Raised in religious home against raised in non-religious home	Protestant culture against Catholic culture	Non-believers in Protestant culture against non-believers in Catholic culture
Sample selection	Full sample	Non-believers excluded	Individuals with parents who are not Catholic, Protestant or non-believers excluded	Non-believers living in counties with historically mixed dominant religious denomination excluded	Non-believers in historically mixed regions and all Protestants and Catholics excluded

The purpose of setting A is to test if self-identified Protestants and self-identified Catholics differ significantly in their saving behavior from non-believers, basically to see if there is a difference between being religious and not being religious. Setting B serves the purpose to answer if there is a significant difference between the denominations, hence non-believers are excluded. Setting C tests if there is a significant difference between growing up in a homogenous or heterogeneous religious home to a non-religious home. We test three variables; if both parents share the same religious denomination (Catholicism or Protestantism) or if parents have different religious affiliations where at least one parent is religious against the variable if both parents are non-believers. Setting D is designed to capture a cultural effect of religion that goes beyond being religious. This will be done by grouping all self-identified Protestants together with non-believers living in historically dominated Protestant counties and vice versa for Catholics. This crude measure is designed to capture the

Protestant and Catholic culture spheres and will be used to test the intrinsic traits of these groups on saving behavior. To test if the results from setting D are driven by those who self-identify as religious we will remove all self-identified Catholics and Protestants in setting E and only compare non-believers currently living in a county that is historically dominated by either religious denomination.[9]

The Probit model is used to answer how the groups differ in terms of whether or not households save money on a monthly basis. The WLS model is used to answer if and if so how much religion or religious culture affects savings amongst savers.

3.2 Data

The data used for this study is *The German Socio-Economic Panel Study* (SOEP) produced by *The German Institute for Economic Research* (DIW). The SOEP is a restricted-use longitudinal panel data set based on German households. Since 1984 adults in households have been reinterviewed annually. Today the sample consists of nearly 11 000 households and more than 20 000 adult persons and covers topics like among many employment, earnings, household composition and health. We will use cross-sectional data from year 2007 in this analysis, as religious beliefs are thought to be invariant over time (Guiso 2006) there are small potential gains from using panel data. As with most longitudinal data, some respondents cannot be located, refuses or are unable to participate. To maintain or expand the survey size additional samples were taken of East Germans after the unification and immigrant samples have been added in the late 90's early 00's. Sample weights, which are supplied with all waves, attempt to correct for sample biases caused by unequal sampling probabilities and observed patterns of nonresponse and are used throughout the analysis. In this analysis we have used the SOEPremote service for remote access to be able to access the county codes which are considered highly sensitive data under data protection regulations.

We exclude all observations that self-identify as anything but Catholic, Protestant or non-denominational[10] and observations that are born outside of Germany.[11] As our data contains very few observations of other religious affiliations than those stated above including these observations and

[9] Information about the historical religious distribution can be found in Table 10

[10] The question of religious belonging is in the 2007 SOEP survey stated as "are you a member of a church or religious community? If so, are you…". The possible answers to check are thereafter "Catholic", "Protestant", "a member of a different Christian denomination or religious community", "a member of an Islamic religious community", "a member of another religious community" and "No, I am not a member of a religious community". We will for simplicity reasons call the last group non-believers and exclude those participants claiming to belong to a different Christian denomination than Protestantism and Catholicism. In the German language survey the Protestant variable is named *Evangelisch* which in Germany means part of the *Evangelische Kirche* in Deutschland.

[11] The SOEP counts everyone born outside of Germany but who immigrated before 1949 as born in Germany, these observations are therefore included.

controlling for effects of these religions would have a very small explanatory value. Also as other religious denominations are minorities and the behavior of minorities is different from the majority population including religious minorities might capture different economic behavior that is not caused by religion, but rather from being part of a minority (Bisin and Verdier 2000). Historically dominating religions have had part in forming formal institutions whilst minorities have not and there is therefore also a risk of omitted variable bias. We restrict the sample to native Germans as much as possible as we want to inhibit the cultural variation that is not explained by variation in religion, for example cultural variation that comes from national heritage. Excluding non-born Germans eliminates any bias that might come with immigrants and would make the analysis less clear cut.

In order to control for variances in institutional factors on county and state level we complement the SOEP data with data on county fixed effects taken from the Regionaldatenbank Deutschland created by the Statistical Offices of the Länder and the Federal Statistical Office in Germany. For all observations we have used the sheet date 31th of December 2006. Information on how these variables were created is found in the appendix. The Regionaldatenbank is a common statistics portal that compiles data reported by all sixteen states and the Federal Statistical Office. It holds information on several levels on which the lowest is county level covering subjects such as unemployment, school density and population among others. There are 413 counties or county equivalents in our set.

3.3 Variables

3.3.1 Religion as cultural identifier

To use religion as our culture identifier has its pros and cons. The pros are that the groups are easy identifiable and that there are some shared values within a group. It is also relevant because religious norms tend to stick more than other cultural traits and religious belonging is highly invariant over a person's lifetime (Guiso 2006).

The cons are that the cultural values intertwined in the religious gospel can be separated from its religious roots. That is that atheists and agnostics can share cultural values rooted in religion without self-identifying as religious. Therefore the cultural impacts of values steaming from religion are likely to be biased if that group is not taken into account. Therefore we will construct two measures to take this into account. As the literature suggests that individual that are raised in a religious environment show common preferences even if they reject religion in their adult life (Guiso, Sapienza and Zingales 2006, Mailath and Postlewaite 2003) we will construct dummy variables for if either both parents of the observation share the same religion, one for Protestants and one for Catholics, if the observation comes from a mixed home where than at least one parent is religious or if neither of the

parents are believers. We will also create a path dependent variable that will directly measure the effect from being part of a religious cultural sphere. If an individual self-identifies as affiliating with a certain religious denomination or if they live in a county that has been historically dominated by that religion we will define those observations as part of that religions' cultural sphere. This crude measure studies culture as a channel of historical influence and tests if there is a path dependent effect on saving behavior from the historically dominating religion. As described in section 2.4 historical religious distribution appears to be exogenous to passed time economic conditions. Had it been the opposite any potential results of this analysis could be explained as path dependence of economic success rather than religion.

3.3.2 Savings as a dependent variable

To construct an ideal saving rate you would need detailed information on consumption and disposable income such that savings can be calculated as everything you do not consume per a given time period. Unfortunately the extensive SOEP data does not contain such information. Another method suggested by Freyland (2005) would be to use change in wealth from one time period to another as a measure of savings. That method is not applicable in our study as we want to measure saving behavior and that measure would not only take into account how much you save but also how you choose to invest your savings.

Ideally we would have wanted to examine save ratios in order to capture savings in relative terms.[12] However when testing the different savings measurements using the Ordinary Least Squares model the coefficient of determination, R^2, on models using save ratio showed a far lower value than those that used monthly household savings as dependent variable. In addition the distribution of the error term show signs of non-normality for models with save ratio as dependent variable. As WLS relies on the normality assumption we proceed with monthly household savings[13] as dependent variable. The potential problem in that we estimate absolute savings and not relative savings is mitigated as we hold other factors that the literature suggests affects savings fixed.

This measure of household monthly savings comes with several problems. The variable is self-reported and the accuracy of respondent's estimations is likely to be flawed, in addition it is possible that respondents do not have the same idea of what constitutes savings. One such problem of interpretation is that of repayment of housing loans. If respondents confuse interest payments, which are the cost you pay to 'consume' your house during that period and the repayment which increases

[12] The save ratio as defined by dividing reported monthly household savings by the monthly household income.
[13] In the questionnaire the respondents answer the question: "Do you usually have an amount of money left over at the end of the month that you can save for larger purchases, emergency expenses or to acquire wealth? If yes, how much?"

the households stock of real wealth and therefore is to be considered as savings, there would be an underestimation of the household's savings.

Ideally respondents would provide answers as close to their average monthly savings as possible. Unfortunately it is likely to fluctuate between months and therefore observations might deviate from their average monthly saving if respondents are planning a large purchase in the near future (Freyland 2005). Another problem with this measurement is that savings cannot take negative values and therefore overestimates household's savings. To account for this the variable household wealth can take on negative values that would in some cases balance this problem limiting the bias.

The question we need to ask ourselves is whether or not the measurement errors in the dependent variable are likely to be correlated with the error term or with any of the variables we control for. Are there any reasons to assume that the measurement errors in savings are systematic and therefore would cause a bias? It is plausible that measurement errors in savings are correlated with education level, in the sense that more educated people make more accurate prediction. On the other hand there are so many random factors as the case with above average savings due to planned large purchase, that there is enough noise not to create a bias. We cannot with our existing data and within the scope of this thesis rule out there is a systematic measurement error causing a bias. However we find no strong argument for this either and therefore assume that there is no significant bias.

The dummy variable on savings for the probit regression is derived from the question in the SOEP "Do you usually have an amount of money left over at the end of the month that you can save for larger purchases, emergency expenses or to acquire wealth" (SOEP 2007a)? For the same reasons as above it is likely that there are some measurement error in this variable, however there are no reasons to assume that this will cause a severe bias in our estimates for the effect of religious denomination

3.3.3 Control variables

HOUSEHOLD NET INCOME is the summed monthly income of all members of the household after deductions for taxes and social security and is self-reported by the household. Since a household's decision to save money is influenced not only by the income but also by the endowment in other assets the variable WEALTH is considered (Duesenberry 1949). This variable is generated by SOEP from the answers about holdings of owner-occupied housing (including mortgage debt), other property (including mortgage debt), financial assets, business assets, tangible assets, private pensions (including life insurance) and consumer credits on the household level (Frick, Grabka and Marcus

2007). There are five wealth variables on the household level weighted in different ways of which we use the mean as recommended to us by SOEP personnel.

GENDER of an individual is assigned the binary number one if the individual is male and zero if it is a woman. AGE is included as research claims that these variables are significant in forming saving behavior (Modigliani 1985, Sundén and Surette 1998). The SOEP-data is restricted to people from 18 years of age but we chose to exclude observations where the respondents have not yet reached the age of 25 as individuals under 25 are more likely to still live in their parent's household and would therefore have the same reported household income, wealth and savings as their parents. As the age data is non-parametric we divide the variable age into age intervals.

A persons HEALTH is controlled for as households with poor health are less likely to save at the expected level (Rosen and Wu 2007). The information is self-identified and given on a five point scale from very good to bad.

With East Germanys history during the 20th century the fact that these inhabitants to a very large degree self-identify as atheists and that it most probably has affected economic behavior there is a risk of a confounding variable, to avoid this we include a dummy variable for whether or not a person lived in the DDR in 1989 (Spenkuch 2011).

Level of EDUCATION is included as it has a strong correlation with the income level. Bernheim, Maki and Garret **(**1997) found that students who are exposed to financial curricula and learn about budgeting and savings in school grow up to save more. As there is no information on this available we have to satisfy with the degree of education attained. In the SOEP this is given in five categories for different levels and an additional two for dropouts and those who haven't yet gotten their degree with the highest level being a secondary school degree.[14]

HOUSEHOLD COMPOSITION is important to look at as several individuals living together in a household might enjoy economies of scale. The variable holds the values one person household, couples without children, single parent, couples with children under 16, couples with children over 16, couples with children both under and over 16, multi-generational household and other type of household. Germany is one of the EU states with the highest share of people living alone and the lowest proportion of households with children. In 2000 only one third of all household where multigenerational and only 0,8 percent contained more than two generations (parents/children). One third is single households where those inhabited by females are more common than those with males

[14] When excluding observations where the respondent is below 25 years of age the variable "have not yet gotten a degree" lost all of its observations why we exclude this category from our regressions.

(Engstler and Menning 2004). Family characteristics such as NUMBER OF CHILDREN are also relevant to check for as it is reasonable to believe that it has an effect to have children and especially to have children living at home. It can be assumed that savings are smaller the larger the number of children in a household (Freyland 2005).

A households type of DWELLING has an effect on household expenditure (mortgage repayments etc.) and is therefore included (Lindqvist 1981). The variable displays if an individual is living in an owned dwelling, is a main tenant, sub-tenant or lives in a home.

We include COUNTY FIXED EFFECTS to attain a sort of ceteris paribus setting over the different areas. As some decisions about common goods are made not on country but on state and county level it is important to break potential systematic patterns in the data so as not to get geographically biased results. The variables included in this group are the density of firms, hospital beds, welfare recipients, schools on three levels as well as population per square kilometer. More detailed accounts on how these variable where created can be found in the appendix.

As mentioned in the theoretical background the amount of TRUST you feel for other people and the society influences your decision whether or not to save and at what level. The variable takes on four values from totally disagree to totally agree answering the question if on the whole people are perceived to be trustworthy. As precautionary savings is suggested (Modigliani 1985) to be positively correlated with risk aversion and that risk aversion is correlated with religious beliefs (Halek and Eisenhauser 2001, Renneboog and Spaenjers 2009) the level of RISK aversion will be included in our regressions. It is given on a ten grade scale where 10 is very willing to take risks and 0 is very unwilling. The trust variable is collected from the Y-from 2008 and the risk variable from the W-wave in 2006. These variables are not derived by the SOEP every year and we choose those collections that were closest in time.

The variable CHURCH ATTENDANCE depicts the frequency with which an individual attends church events and ranges from weekly to never. By using this variable we detach the private individual practice from the possible network effect intertwined with shared public practice. As there is a suspicion of multicollinearity when adding this variable we will add this as an extra variable after all others.

After all variables are included in the regressions we restrict the sample in three ways; a sample with only individuals over the age of 65, a sample with individuals under the age of 65 and a sample where outliers are removed. This is to estimate the effect of these specific groups on our estimations as we believe that these observations might drive our results. The outliers we exclude in the restricted

sample are the top and bottom one percent of the variable wealth and the top one percent for household net income

3.4 Regressions

3.4.1 Tests on the data

Testing the data for outliers using the Cook's distance test does not indicate that outliers are severely influencing our results[15] (see Table 9). Using the Breusch-Pagan test for heteroskedasticity we find that our models are hetereoskedastic.[16] To correct for the heteroskedasticity we use robust standard errors in all our regressions.

There is suspicion of an endogeneity problem in religious affiliation as those individuals who become the most economically successful tend to opt out of religion once the opportunity cost of religious activity becomes too high (Iannaconne 1992). Spenkuch (2011) solved this problem by using historical religious distribution as an instrument for religiosity today. When performing a Hausman test for endogeneity on our models with this instrument we found no support for endogeneity why we choose not to use the instrumental variable technique.

3.4.2 Probit regression

For each of the five settings we will initiate by running a probit regression, testing the probability for whether or not our observations save money on a monthly basis.

We use the probit model as it predicts probabilities for binary dependent variables. In the choice between the logic or probit models we found no significant difference in our results and therefore selected the probit model. The probit uses the Cumulative distributions function whilst the logit uses the Cumulative logistic function. The chief difference between the models is that the logit has slightly flatter tails i.e. the normal or probit curve approaches the axes more quickly than the logistic curve.

[15] Usually values near 1 are perceived as indicative of excessive influence, our regressions only approaches 1 in setting E which we only use for comparison with setting D. We therefore see no reason for excluding outliers in our full regressions but test excluding the top and bottom one percent of the wealth variable and the top one percent of the household net income variable in every setting to examine the potential influence. The Cook's distance test is a common statistical test which provides an overall measure of the impact of an observation on the estimated regression coefficient. It measures influence based on the extent to which parameter estimates would change if one omitted the i-th observation (Rodríguez 2007).

[16] The Breusch-Pagan test tests for heteroskedasticity by regressing the squared Ordinary Least Squares residuals on the explanatory variables. By estimating the p-values the hypothesis of homoscedasticity can, as in our case, be rejected if the values are sufficiently small (Wooldridge 2009).

The two models give similar results and the choice of one model over the other is mainly based on individual preferences (Hahn and Soyer 2005).

We define the probit model as

$$y^* = \alpha + X\beta + \varepsilon, \qquad \varepsilon \sim N(0,1)$$

where

$$\text{If } y^* > 0 \quad y = 1$$
$$\text{If } y^* \leq 0 \quad y = 0$$

where y is a binary number (either 0 or 1), X the explanatory variables on both individual and county level, ß the calculated estimates of the explanatory variables and ε the error term. All this under normal distribution.

3.4.3 Weighted Least Squares regression

For our estimation we have examined the power, logarithmic, exponential, reciprocal and quadratic models of defining variables, however the model with the highest goodness-of-fit was the standard linear regression model which we use. As described above weights are used throughout the analysis.

Our multivariable basic WLS estimation for settings A, B, C, D and E is given by

$$Y = \beta R_i + D_i'\gamma + Q_c'\lambda + \varepsilon_i$$

where R, D and Q represent vectors of different sets of independent variables and ε is the stochastic error. R is a dummy variable representing the religious denomination and D represents the explanatory variables on the person level whereas Q covers the explanatory variables on the county level. The i represents the different observations in our set and c the 413 different counties.

4. Results

4.1 Setting A: Do self-identified Protestants and Catholics differ in saving behavior from non-believers?

The results from the probit regression show that the predicted probability of saving money on a monthly basis is slightly higher for Catholics than for non-believers. Even though the difference is significant the effect is marginal. No significant difference between Protestant and non-believers is found (see Table 3).

Without control variables in the WLS regression the estimates on religion are significant and have a big impact on estimated savings (see Table 4). Protestants save 48.60 euros more a month, whereas Catholics save 104.6 euros more on a monthly basis compared to non-believers. When adding controls for wealth, income, gender and age we find that the estimate for Protestants suggests that Protestant save less than non-believers. However that effect ceases to be significant when adding controls for if the individuals used to live in the DDR. Education has a very limited effect on the estimates. When controls for number of children and household composition are added the results are highly significant and positive for both religions where the largest effect is from being Catholic. After also controlling for type of dwelling and county fixed effects our results show that Catholics save approximately 60 euros more than non-believers and Protestants 30 euros more than non-believers. Comparing these values to the mean of monthly household savings for non-believers we see an addition of 18 percent versus 9 percent being added from being Catholic or Protestant.

Finally we add two controls that the literature suggests are closely associated with religion; trust and risk preferences. Controlling for trust decreases the estimates for Protestants more than it affects Catholics and adding a control variable for risk preferences increases the estimates for Catholics but decreases the results for Protestants.

We also test if the estimates on religion are driven by higher savings amongst senior citizens; however that is not the case. We run the full regression without outliers and find that our estimates are almost halved, and only the estimate for Catholics is significant on a 5 percent level suggesting a strong effect of extreme values in this set.

Our results show that only self-identifying Catholics seem to have a positive effect on the probability of saving money on a monthly basis. Provided that individuals do save on a monthly basis, both denominations have a positive effect on the amount saved, the effect most notable for Catholics.

4.2 Setting B: Is there a difference in saving behavior between Protestants and Catholics?

The predicted probability of saving money on a monthly basis shows that Catholics are 2.57 percent more likely to have regular savings compared to Protestants (see Table 3).

The results from the WLS shows that Protestants save less than Catholics ranging from between 25 to 38 euros less per month for significant values and is mostly significant (see Table 5). When adding the trust and risk variables the difference increases. Before adding controls for risk and trust we see a 6 percent difference between the denominations however the difference increases when adding controls for risk and trust.

There is strong support for the result that Catholics are more likely to save and save more than Protestants in a ceteris paribus comparison.

4.3 Setting C: Does parents' religion affect an individual's saving behavior?

The predicted probabilities of saving on a monthly basis show that growing up in a home where none of your parents were religious reduces your probability of saving on a regular basis by 14 to 19 percent relative to those who grow up in religious homes (see Table 3) The predicted probability of saving is highest for individuals growing up in homes where both parents were Catholics. The large difference probably has its explanation in the fact that 82 percent of the individuals from non-religious homes also used to live in the DDR (see Table 2).

The first WLS regression on parents religious affiliation, without any controls show what the descriptive statistics indicates (see Table 2), namely that there is a positive correlation between having grown up in a religious home and having higher savings (see Table 6). However all the results from the WLS are negative after controlling for wealth and income. The only exception in this setting, where we actually get very significant results, is when we restrict the set to only individuals over 65 years of age. Here we find that coming from a religious home has a very strong positive effect on your savings. The range goes from being raised in a mixed home (where then at least one parents is religious) with almost 105 euros to being raised in a Protestant home with 23 euros more saved per month. These results can be explained by the fact that the number of individuals over 65 years of age brought up by two non-believing parents is limited to only 22 in the set and is too small a number to base any conclusions on.

Having been raised in a religious home has a strong and clear effect on the probability of saving regularly. However when it comes to the amount saved, amongst the savers, the effect seems to be the

reverse. After controlling for other factors, being raised in a religious home seems to have a negative effect on savings and individuals from non-religious homes save more. However the results from the WLS cease to be significant as vital controls are added.

4.4 Setting D and E: Does religious culture affect saving behavior?

The predicted probabilities for having monthly savings is 3.88 percent lower for those that we defined as a part of the Protestant cultural sphere relative to the Catholic cultural sphere (see Table 3).

Throughout the setting D the WLS estimates indicate that those that are part of the Protestant Culture save less but the result are non-significant until we add controls for county fixed effects (see Table 7). Adding controls for trust and risk increases the significance as well as the difference between the cultural spheres. The peak difference at 31 euros occurs with the full set of control variables and the results are significant on a 1 percent level.

When viewing setting E, where all Christians are removed leaving only non-believers in historically Catholic or Protestant areas, we find that the estimates suggest that non-believers from Protestant areas save more than their counterpart indicating that our results in D are driven by the self-identified Protestants in the variable (see Table 8). These results are however also mostly insignificant.

Religious culture seems to have an effect on saving behavior where those that are part of the Catholic culture sphere save more in comparison to the Protestant counterpart. However we suspect that the religious individuals drive the results and when removing these observations we get the opposite results. All these results show to low significance to be entirely trustworthy.

5. Analysis

Limiting our study to a within-country comparison and only comparing individuals that are born in Germany allows us to assume that other cultural factors that could possibly affect savings have a homogenous effect on the population. The formal institutional differences are small between counties, but to be cautious we have also added controls for county fixed effects. Our aim has been to test the effect of religion and religious culture holding other factors in the first as well as the second level in Williamson's (2000) hierarchy fixed. Using econometric analyses in this setting allows us to do a ceteris paribus comparison and control for other variables that the literature suggests affect savings. That is, by holding informal institutional factors such as culture, with the exception of religion, and formal institutions fixed as well as factors affecting savings, we see that the type of self-identified religious affiliation has a significant and large impact on saving behavior. However we cannot find

support for an effect of religious culture, neither when defined as living in a historically dominated area, nor as being raised in a religious household.

The results from settings A and B show that it appears as if Protestants, Catholics and non-believers make up three distinct different groups when it comes to saving. Catholics save more and are more likely to save than Protestants and Protestants save more and are more likely to save than non-believers. Especially Catholics stand out as they are estimated to save approximately 60 euros more on a monthly basis than non-believers, which is a full 17 percent of what the non-believer on average save on a monthly basis (see Table 2). Our results are consistent with what Guiso, Sapienza and Zingales (2003) found in their cross-country comparison of religion and values, namely that *thrift* is perceived as particularly important by Catholics. As our results come from a within country analysis this gives even stronger support for the thriftiness of Catholics as any cross-country study runs the risk of capturing some other factors rooted in national culture or institutions. This speaks in favor of a value based explanation for the diverging saving patterns.

If we assume that self-identified Protestants, Catholics and non-believers are more likely to have other religious individuals of the same denomination in their reference group the *Relative Income Hypothesis* (RIH) suggests that differences between groups would be amplified (Alvarez-Cuadrado and Van Long 2011). If there is a value-based explanation for the observed differences in saving behavior the peer-effect suggested by RIH is likely to amplify this effect.

Our results also show that not only being religious has an effect but also the form the religiosity takes. A groups actions can be seen as an equilibrium resulting from decisions made under consideration of the shared beliefs and norms of this group (Mailath and Postlewaite 2003). Our results show different equilibriums for Protestants and Catholics suggesting different cognitive constraints, partly value-based and plausibly amplified by peer-effect, in the decision making regarding savings. Our findings speak in favor of the shared mental model's theory by North and Denzau (1994) in that religious groups that self-identify to a number of norms, values and beliefs share observable similarities, which is arguably an outcome of coherent mental models.

The research on risk tolerance and religion has proposed that religious affiliation is associated with lower risk tolerance (Bartke and Schwarze 2008, Guiso, Sapienza and Zingales 2003) and that religion is a rationally chosen risk averse behavior if one believes that it ensures a better afterlife (Miller 2000). If so then our results could plausibly be explained by higher pre-cautionary savings (Modgliani 1985) amongst believers and what appeared to be an effect of different values could instead by understood as an effect of risk aversion. However when adding controls for risk preferences the estimates on religion remain significant and substantial. It is interesting to note that

the gap between the religious groups widens after controlling for risk preferences (see Table 4). This suggests that both religions are correlated with risk but that correlation is positive for Protestants and negative for Catholics. This is in line with Renneboog and Spaenjers (2009) research on religion in The Netherlands, where Catholics were found to be more risk averse.

As pointed out by Axelrod (1984) using trust as an explanatory variable for economic performance as Putnam (1993), La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997) and Fukuyama (1995) does come with severe limitations as trust is not just a given trait but also a result of experience and previous social interactions. A quick glance at the summary statistics reveals no difference between Protestants and Catholics whereas non-believers have a lower level of trust (see Table 2). In Setting A and B we see that when adding trust as control variable the estimates for Catholics remain unaffected but the estimates for Protestants decreases. This indicates a slightly stronger positive correlation between Protestants and trust than for Catholics. The fact that we only see a very small effect in a within country analysis on the difference of trust between the denominations speaks for that the detrimental effect captured in cross-country studies performed by amongst others La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997) does not have its explanation in Catholicism. Rather there is some unknown factor correlated with Catholicism of which effect is captured. Our findings therefore support Axelrod in his critique of using trust as an explanatory variable as it does not successfully capture a certain trait but rather is an outcome variable of previous social interactions.

To test if the differences we see between non-believers and religiously affiliated and the differences between denominations are driven by a social mechanism of actually practicing religion, and not values from religion, we add a control for the frequency of church attendance. This of course includes a big risk of multicollinearity and the estimates are not to be taken at face value. However it shows that being religious has an effect on savings that goes beyond practicing religion in a social environment, speaking in favor of a value based explanation for the higher estimated savings especially amongst Catholics.

We also find that the estimates tend to be higher for those over the classical age of retirement than the LCH would predict, that is we see no real decline in savings in this group. These findings are in line with Boersch-Supan's (1994b) results that Germans do not dissave in old age. If the bequest motive would be stronger amongst the religious we would see a larger significant increase in the difference between the religious groups and the non-believing in setting A, something we do not see implying that religious people in fact do not value bequeathing more than non-believers.

In setting C, D and E we find no support for a significant effect of religious culture. At first look our results in setting D appear to be somewhat significant but when examining the effect on those non-

believers that live in historically religiously dominated areas in E we find that our results in the previous setting most likely are driven by the self-identified religious individual's behavior. We conclude that a historically dominated religion in an area does not affect the inhabitants saving behavior with the reservation for self-identified religious belonging to the historic religion. Viewing these results in a broader perspective we see no support for historical culture as a determinant of current norms, values and beliefs affecting saving behavior, i.e. there is no support for a path dependent effect of historically dominated religion on current saving behavior.

The literature has suggested that growing up in a religious home would have an effect on behavior in adult life even when the individual chooses to leave the religion (Guiso, Sapienza, and Zingales 2006). In our thesis we find no support for this indicating that religious traits concerning saving behavior do not stick. This is under the assumption that religious affiliation affected saving behavior in previous generations similarly to the effect we see today in setting A and B. Contradictory to Bisin and Verdier (2000) growing up in a religiously homogenous home does not significantly increase the probability of adhering to the traits specific to that religion any more than coming from a religiously mixed home.

There is indication that the circumstances surrounding the division of Germany into two countries and their relative economic development during the 20th century still has an effect on individual's economic realities. The control variable for if an individual lived in the DDR in 1989 has a strong effect on our estimates in every regression and is in itself highly significant almost whenever added. From our summary statistics we see that non-believers are clearly over represented in this group with the biggest group of all being those raised by non-believers (see Table 2).

All in all we find that religion, but not religious culture, matter a lot for saving behavior. Not only the fact that an individual self-identifies as religious but also to what denomination the individual adheres has a strong effect. Like Spenkuch (2011) we land in a value based explanation of these differences where in our study Catholics appear to be more thrifty. Where Spenkuch's results support Weber's theory about a stronger work ethic amongst Protestants our results contradict Weber's theory of a Protestant thrift. The fact that religious culture seems to have no effect contradicts Weber's theories about a capitalist spirit in non-believers sprung from religion. However Weber predicted an effect of these theories that would overturn the entire society and promote capitalism on a society level. In the event that Germany has already passed this stage it would not be surprising that we see no results separating secular cultural groups.

Acemoglu (2009) criticizes cultural factors, such as religions', effect on the basis that nothing can be said about the causality. In effect there is no way of telling whether being religious affects your

economic behavior or if you become religious on the basis of your economic preferences. This has been supported also by Iannaconne (1992) as well as Spenkuch (2011) and we therefore performed an endogeneity test of religious affiliation and our dependent variable monthly household savings using historic religious distribution (Spenkuch 2011) as an instrumental variable but found no support for endogeneity in religious affiliation. Our results suggest that the proposed endogenous relationship between religious affiliation and economic behavior might be exaggerated, at least when it comes to household savings. If there is no endogeneity our results have a causal interpretation, however we remain very humble in the light of the great scholars that have supposed otherwise. Leaving the question of causality aside the mere size of the effect of religion in this ceteris paribus comparison suggests that religion is a factor that needs to be taken into consideration.

6. Discussion

If formal institutions are so important then how come countries with similar institutions differ in economic performance? Our within country study shows that in a setting where formal and informal institutions are relatively homogenous, except for religion, we see sizable differences in economic behavior across groups defined on the basis of their religiosity.

That is, the humanely devised constraints that structure political, economic and social interaction and provide the incentive structure of the economy are to a large extent shared but differ between groups on the basis of their religious beliefs. Our analysis of the question finds no other answer than a value driven explanation that lies outside of the mechanisms of trust and risk aversion. In the broad debate on how economic performances differ we find that the religious affiliation to some extent forms a distinct behavior that separates groups. Our results suggests that differences between countries with similar institutions can partly be explained by different groups´ shared mental models and their interpretations of the world.

It is difficult to speculate on how generalizable our results are in the debate on whether or not culture matters. We chose Germany as our research object since the country has a clear division of affiliations and non-believers with no group in great majority which would support our theory that no group has had a substantially greater benefit when formal institutions where formed. In countries where one affiliation dominates and has done so historically it is reasonable to believe that the formal institutions reflect the intrinsic traits of society and that these traits are highly influenced by the dominating religion. Testing for culture through religion in that setting would therefore most likely yield less significant results as these cultural traits and specificities would be shrouded in the formal institutions.

We believe that our results, mainly that Protestants and Catholics save more than non-believers and that Catholics save more than Protestants partly has a value driven explanation. Assuming that these values are the same and work in the same way in all Catholic countries inhabitants in these countries would ceteris paribus save more than inhabitants in countries where people are self-confessed Protestants. In the comparison however there is an obstacle of how people self-identify in different countries. For example Sweden, seen as one of the world's most secular countries, still has a large portion of the population confessing to Protestantism without actually taking part in a religious life whereas in some countries only real believers would self-identify as religious. History probably holds a strong effect in this where one explanatory variable might be the religious historical heterogeneity in a country and the historical possibility of leaving religion. As our results show that religious culture in fact does not have an effect on an individual's saving behavior, results deriving from such comparisons risk being distorted.

We have performed a limited study within a European country to discern if religious affiliation, or contact with a religion, in any way affects an individual's saving behavior. Our results cannot answer all the questions raised in light of the current European crisis about the importance of religion and religious culture on a macro level. However our results contradict those who claim that Catholicism is detrimental for thrift. We further claim that there is no definite proof of a Protestant ethic that would transcend those who actually adhere to the Protestant faith and induce additional thrift. The differences in economic policies that have created the current crisis do not have their roots in household savings but rather in some other mechanisms that might very well have its roots in culture. As religion is just one part of culture and saving behavior is just one part of economic behavior there are multiple opportunities for further research open to continue the search of an answer for these important questions.

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8. Appendix

8.1 Modifications of the data

For the variable Monthly household savings in the SOEP we dropped observations with values -1 (no answer) and -3 (answer improbable). Observations with value -2 (does not apply i.e. those who had in the previous question stated that they did not have a savings account) are excluded.

We also modified the trust variable from SOEP as it was graded from 1 being the highest level of trust and 4 being the lowest. In order to make the interpretation of the trust variable more intuitive we reversed it so that a higher value on trust indicates that an observation is more trusting.

8.2 Details on county fixed effects

German names of variables in the Regionaldatenbank in parentheses.

Firm density is calculated as number of firms per county divided by the population in the same county. (*Unternehmensregister-System 95 (URS 95) aktive Betriebe nach Beschäftigtengrößenklassen)*

Hospital bed density is the number of hospital beds in a county divided by the population in the same county. (*Grunddaten der Krankenhäuser: aufgestellte Betten in Krankenhäusern)*

Welfare recipients is defined as the number of welfare recipients per county divided by the population in the county. (*Hilfe zum Lebensunterhalt)*

For Educational organization we divided the different kinds of schools and created variables for three sorts of institutions namely **pre-schools** (*Vorschule*), **primary schools** (*Grundschule*) and **high schools** (*Gymnasie*). We divide every school form per county on the county population. (*Allgemeinbildende Schulen: Schulen)*

The variable **average population per square kilometer** is created dividing population with the SOEP variable for county size. (*Bevölkerungsstand)*

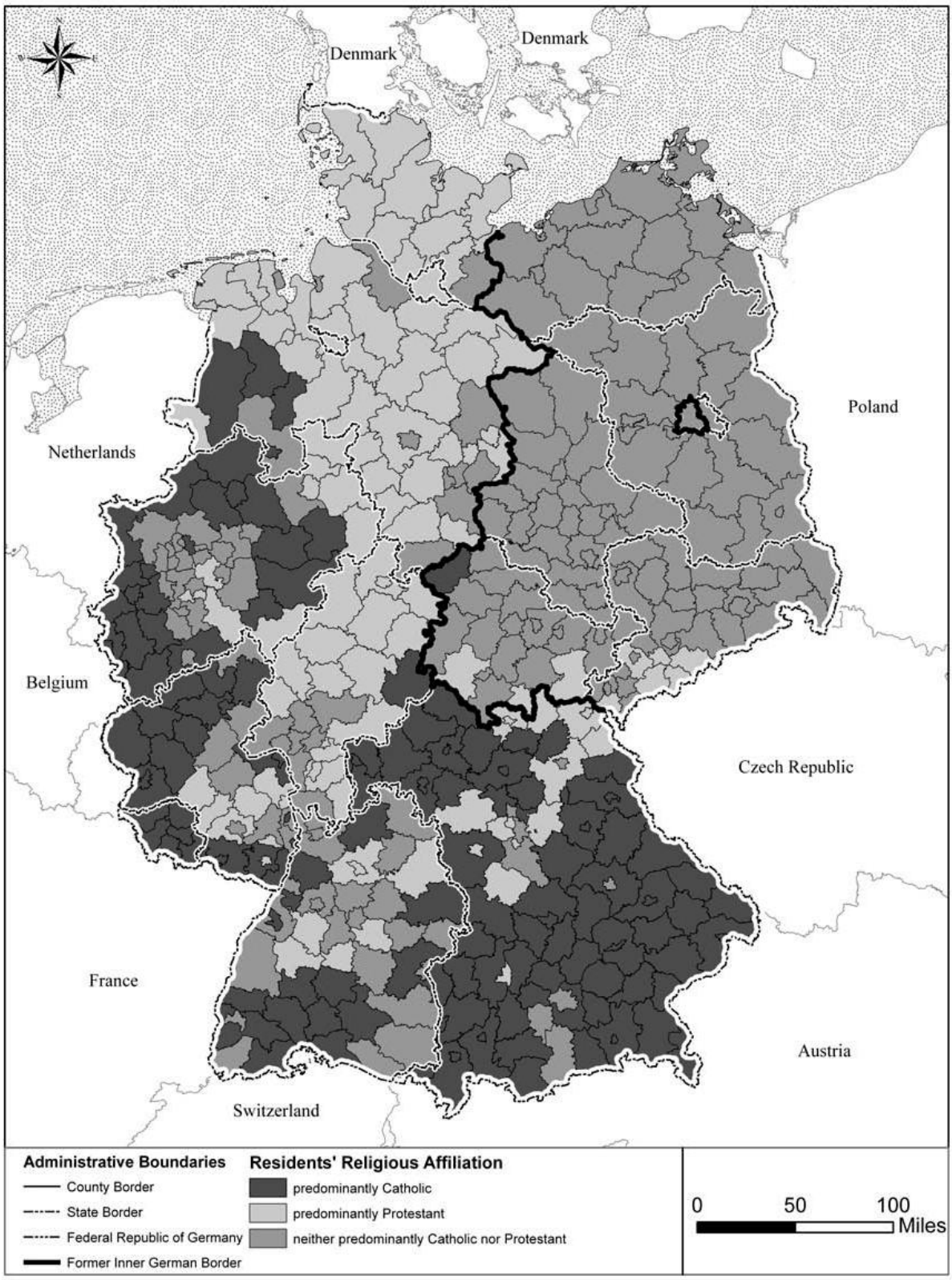
8.3 Test for historical accuracy

When testing set D and E we use Spenkuch's estimated distribution of religious affiliation in Germany in 1624 to determine what counties are to be counted as having been dominated by what denomination. To measure the relevance of this mapping we have to investigate to what extent Protestantism today is explained by Protestantism in 1624 by running a regression testing the relationship.

$$Protestantism_i = \delta_P Protestant_1624_c + \delta_M Mixed_1624_c + D_i'\varphi + Q_c'\omega + {}_i$$

Our results show that living in an area that was Protestant in 1624 has a higher explanatory value for if you are Protestant today than if you live in a historically mixed area. We run the same regression for Catholics and get similar results. For results see Table 1 below reporting the results of the regressions.

Figure 4. - The Religious distribution of current day Germany Source: Spenkuch 2011



8.4 Regressions and tables

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Table 1: Test of historical accuracy

	Protestant	**Catholic**
Living in a:		
Historically Protestant area	0.178*** (21.10)	.
Historically Catholic area	.	0.428*** (57.98)
Historically mixed area	0.0825*** (7.05)	0.304*** (33.59)
Constant	0.252*** (35.31)	0.152*** (38.53)
Number of observations	18268	18268

Table 2: Summary descriptive statistics
Means in bold, standard deviations in italics

	Household Net Savings	*Save Dummy*	*Household Net Income*	*Household Net Wealth*	*Age*	*Health Level*	*Used to live in DDR*	*Years in School*	*Number of children*	*Single*	*Household owner*	*Risk Preferences*	*Trust*
Catholic	**446.7366**	**.6347286**	**2430.926**	**112291.8**	**51.01431**	**2.706497**	**.0305226**	**11.34223**	**1.302035**	**.3195858**	**.5335865**	**4.500181**	**2.646272**
	819.3823	*.4815495*	*1694.269*	*304352*	*18.6242*	*.9863811*	*.1720358*	*3.674846*	*1.308813*	*.4663581*	*.4989156*	*2.333795*	*.6652054*
Protestant	**390.6907**	**.6101875**	**2268.967**	**91526.25**	**53.24323**	**2.77781**	**.1508598**	**11.33184**	**1.321237**	**.3422906**	**.4799376**	**4.465417**	**2.642506**
	589.926	*.4877417*	*1503.646*	*330844.9*	*19.49944*	*.9910518*	*.3579371*	*3.816787*	*1.286674*	*.4745095*	*.4996323*	*2.414389*	*.6634218*
Non-Believers	**342.087**	**.5938642**	**2151.192**	**55864.07**	**48.13325**	**2.659714**	**.5634806**	**11.68311**	**1.070383**	**.3666248**	**.3237802**	**4.971392**	**2.530384**
	446.6676	*.4911483*	*1392.671*	*249666.7*	*16.22381*	*.9886007*	*.495992*	*3.751188*	*1.162842*	*.4819199*	*.4679533*	*2.211943*	*.6764879*
Catholic Culture	**431.8665**	**.6176924**	**2418.962**	**99176.62**	**50.03896**	**2.692463**	**.1030084**	**11.44349**	**1.210305**	**.3418961**	**.4567839**	**4.650009**	**2.622758**
	744.9577	*.4859838*	*1670.62*	*280682.3*	*17.85233*	*.9906257*	*.3039903*	*3.813822*	*1.257701*	*.4743769*	*.4981623*	*2.315645*	*.6724407*
Protestant Culture	**365.4697**	**.6085981**	**2182.401**	**77463.26**	**51.60009**	**2.737686**	**.3460907**	**11.44838**	**1.253942**	**.3441435**	**.4391994**	**4.626249**	**2.597123**
	543.0625	*.4880847*	*1422.184*	*312499.5*	*18.70726*	*.9893225*	*.4757428*	*3.717103*	*1.262399*	*.4751083*	*.4963106*	*2.354826*	*.6685421*
Catholic Home	**449.1459**	**.6620281**	**2530.414**	**120928.4**	**51.98141**	**2.685749**	**.0303763**	**11.90143**	**1.499707**	**.3098434**	**.5426778**	**4.540967**	**2.676029**
	876.1362	*.4730887*	*1777.422*	*339339*	*17.0614*	*.985932*	*.1716459*	*3.0779*	*1.362936*	*.4624971*	*.4982488*	*2.292546*	*.6515272*
Protestant Home	**393.2088**	**.6490616**	**2338.14**	**103805.6**	**55.3429**	**2.768326**	**.2008781**	**11.99**	**1.456905**	**.3449378**	**.4798351**	**4.546851**	**2.615003**
	586.9157	*.4773144*	*1509.269*	*353562.9*	*17.31962*	*.956393*	*.4006997*	*3.158108*	*1.259819*	*.4753985*	*.4996463*	*2.33267*	*.6842337*
Mixed home	**466.0462**	**.5968784**	**2450.77**	**81292.73**	**45.40306**	**2.596913**	**.1564389**	**12.14811**	**1.113341**	**.3518525**	**.3646129**	**4.854002**	**2.614746**
	841.5425	*.4906763*	*1821.81*	*398659.3*	*15.30558*	*.9789495*	*.3633832*	*3.739966*	*1.149559*	*.4776958*	*.4814702*	*2.371892*	*.661762*
Non-Religious Home	**331.5501**	**.5114792**	**1973.606**	**29552.26**	**41.61507**	**2.44549**	**.827288**	**11.93893**	**1.155465**	**.3181849**	**.2320271**	**5.164032**	**2.553471**
	468.4679	*.5000293*	*1229.264*	*113667.6*	*14.14172*	*.9692537*	*.37812*	*3.45958*	*1.070343*	*.4659218*	*.4222622*	*2.077366*	*.6463817*
Non-Believers Cath. County	**357.8418**	**.5862405**	**2302.191**	**60568.4**	**47.29774**	**2.643484**	**.341544**	**11.48318**	**.9584337**	**.4142617**	**.2585581**	**5.064528**	**2.607652**
	437.5263	*.492691*	*1392.152*	*174680.9*	*15.33438*	*1.004209*	*.4744052*	*4.451677*	*1.07713*	*.4927787*	*.4380063*	*2.237637*	*.6888154*
Non-Believers Prot. County	**317.5691**	**.605602**	**2019.228**	**50955.09**	**48.50283**	**2.662055**	**.7140931**	**11.66806**	**1.127094**	**.347636**	**.3624096**	**4.928732**	**2.51307**
	436.6545	*.488774*	*1238.154*	*272679.9*	*16.6824*	*.9817213*	*.4518943*	*3.511482*	*1.205299*	*.4762714*	*.4807484*	*2.20728*	*.6699347*
Total	**393.1219**	**.6123529**	**2280.07**	**86428.02**	**50.95555**	**2.719015**	**.2457296**	**11.44637**	**1.235926**	**.3432156**	**.4464595**	**4.636101**	**2.607621**
	635.8078	*.487226*	*1534.038*	*299955.7*	*18.37472*	*.9900847*	*.4305302*	*3.757237*	*1.260611*	*.4747951*	*.4971381*	*2.338625*	*.6702402*

Table 3: Probit regression results for settings A, B, C, D and E
Full set of controls (Church attendance, risk and trust not used)
*t statistics in parentheses, * p<0.05, ** p<0.01, *** p<0.001*

Probit: Predicted Probabilities of having monthly household savings setting A and B

Setting	(**A**)		(**B**)	
	Pred.Prob	Diff	Pred.Prob	Diff
Protestant	0.6516	2.74%	0.6529**	2.57%
Catholic	0.6689***	5.47%	0.6701	
Non-believers	0.6342			

The bottom variable is omitted in the probit regression and therefore not t-tested. Diff is the relative difference between the indicated variable and the omitted.

Probit: Predicted Probabilities of having monthly household savings setting C

Setting	(**C**)	
	Pred.Prob	Diff
Both Parents Protestant	0.6806***	17.79%
Both Parents Catholic	0.6872***	18.93%
Mixed religious	0.6592**	14.09%
Both Parents non-believers	0.5778	

The bottom variable is omitted in the probit regression and therefore not t-tested. Diff is the relative difference between the indicated variable and the omitted.

Probit: Predicted Probabilities of having monthly household savings setting D

Setting	(**D**)	
	Pred.Prob	Diff
Protestant Culture	0.6444*	-3.88%
Catholic Culture	0.6668	

The bottom variable is omitted in the probit regression and therefore not t-tested. Diff is the relative difference between the indicated variable and the omitted.

Probit: Predicted Probabilities of havings monthly household savings setting (E)

Setting	(**E**)	
	Pred. Prob	Diff
Protestant Culture	0.6315271**	-2.11%
Catholic Culture	0.6451204	

Diff is the relative difference between the indicated variable and the omitted

Table 4: Setting A – WLS (Catholics and Protestants, Non-believers omitted)
*t statistics in parentheses, * p<0.05, ** p<0.01, *** p<0.001*

											Restricted to age >65	Restricted to age <65	Outliers removed	
Protestant	**48.60*** **	**2.390**	**-22.25***	**-3.077**	**-3.793**	**37.28*** **	**37.52*** **	**29.71** **	**27.39***	**23.87***	**31.23**	**20.70**	**10.37**	**11.98**
	(4.01)	(0.25)	(-2.09)	(-0.30)	(-0.37)	(3.62)	(3.57)	(2.68)	(2.35)	(2.01)	(1.79)	(1.39)	(0.98)	(0.90)
Catholic	**104.6*** **	**12.92**	**-1.356**	**23.56**	**23.00**	**66.39*** **	**66.75*** **	**59.88*** **	**59.68*** **	**62.06*** **	**65.21** **	**62.39*** **	**29.15***	**48.94** **
	(6.35)	(1.12)	(-0.12)	(1.78)	(1.74)	(4.86)	(4.81)	(4.23)	(4.01)	(4.12)	(3.13)	(3.36)	(2.48)	(3.00)
Household wealth		0.000238***	0.000222***	0.000223***	0.000223***	0.000210***	0.000210***	0.000217***	0.000209***	0.000208***	0.000260**	0.000182***	0.000335***	0.000208***
		(5.84)	(5.65)	(5.67)	(5.68)	(5.57)	(5.41)	(5.39)	(5.22)	(5.16)	(3.26)	(4.82)	(10.35)	(5.16)
Household Net Income		0.232***	0.246***	0.247***	0.247***	0.281***	0.281***	0.278***	0.296***	0.297***	0.308***	0.298***	0.222***	0.297***
		(14.86)	(14.89)	(14.81)	(14.08)	(14.42)	(14.42)	(13.89)	(15.44)	(15.03)	(11.00)	(12.73)	(24.37)	(15.06)
Age			X	X	X	X	X	X	X	X	X	X	X	X
Gender			X	X	X	X	X	X	X	X	X	X	X	X
Health level			X	X	X	X	X	X	X	X	X	X	X	X
Used to live in DDR				X	X	X	X	X	X	X	X	X	X	X
Level of education					X	X	X	X	X	X	X	X	X	X
Household composition						X	X	X	X	X	X	X	X	X
Number of children						X	X	X	X	X	X	X	X	X
Type of dwelling							X	X	X	X	X	X	X	X
County fixed effects								X	X	X	X	X	X	X
Trust									-5.671	-5.468	-20.50*	0.531	1.979	-6.165
									(-0.84)	(-0.80)	(-2.26)	(0.06)	(0.33)	(-0.90)
Risk										-5.253*	0.648	-8.177**	-2.893	-5.309*
										(-2.45)	(0.24)	(-2.84)	(-1.65)	(-2.48)
Church attendance														X
Constant	342.1***	-270.2***	-297.1***	-331.4***	-387.4***	-285.2***	-289.2***	-236.1***	-250.2***	-254.3***	-309.6***	-211.5**	-170.9***	-251.0***
	(46.75)	(-6.92)	(-6.20)	(-6.05)	(-6.30)	(-5.92)	(-5.50)	(-3.77)	(-3.98)	(-3.95)	(-3.49)	(-2.60)	(-3.46)	(-3.90)
Number of observations	12499	12499	12499	12499	12499	12499	12499	11770	10786	10412	2748	7664	10127	10412

Table 5: Setting B – WLS (Protestants, Catholics omitted)
*t statistics in parentheses, * p<0.05, ** p<0.01, *** p<0.001*

										Restricted to age >65	Restricted to age <65	Outliers removed	
Protestant	**-56.05****	**-6.698**	**-18.97**	**-26.31***	**-25.79***	**-25.30***	**-25.48***	**-28.26***	**-31.77***	**-37.53****	**-36.29***	**-40.53***	**-20.52**	**-36.17****
	(-3.18)	(-0.57)	(-1.61)	(-2.13)	(-2.10)	(-2.14)	(-2.16)	(-2.29)	(-2.45)	(-2.90)	(-2.35)	(-2.34)	(-1.83)	(-2.70)
Household wealth		0.000240***	0.000219***	0.000220***	0.000220***	0.000206***	0.000207***	0.000216***	0.000214***	0.000215***	0.000309***	0.000169***	0.000334***	0.000214***
		(5.08)	(4.97)	(4.98)	(4.99)	(5.02)	(4.87)	(4.86)	(4.69)	(4.65)	(5.01)	(4.30)	(9.16)	(4.65)
Household Net Income		0.255***	0.272***	0.273***	0.274***	0.311***	0.311***	0.306***	0.312***	0.314***	0.315***	0.316***	0.229***	0.314***
		(14.17)	(14.67)	(14.66)	(14.01)	(15.45)	(15.46)	(15.27)	(14.69)	(14.25)	(11.30)	(12.02)	(20.17)	(14.28)
Age			X	X	X	X	X	X	X	X	X	X	X	X
Gender			X	X	X	X	X	X	X	X	X	X	X	X
Health level			X	X	X	X	X	X	X	X	X	X	X	X
Used to live in DDR				X	X	X	X	X	X	X	X	X	X	X
Level of education					X	X	X	X	X	X	X	X	X	X
Household composition						X	X	X	X	X	X	X	X	X
Number of children						X	X	X	X	X	X	X	X	X
Type of dwelling							X	X	X	X	X	X	X	X
County fixed effects								X	X	X	X	X	X	X
Trust									-8.325	-7.921	-22.10*	-2.031	2.186	-8.577
									(-0.96)	(-0.90)	(-2.06)	(-0.17)	(0.29)	(-0.98)
Risk										-5.502*	0.987	-8.558*	-2.687	-5.612*
										(-2.04)	(0.30)	(-2.29)	(-1.22)	(-2.08)
Church attendance														X
Constant	446.7***	-320.2***	-381.1***	-384.8***	-438.7***	-246.7***	-252.2***	-213.7**	-195.5**	-206.1**	-314.6***	-120.6	-148.2*	-217.2**
	(30.27)	(-6.87)	(-6.35)	(-6.38)	(-6.16)	(-4.78)	(-4.53)	(-3.08)	(-2.71)	(-2.79)	(-3.46)	(-1.25)	(-2.48)	(-2.93)
Number of observations	8412	8412	8412	8412	8412	8412	8412	8083	7381	7137	2078	5059	6938	7137

Table 6: Setting C – WLS (Both parents Protestant, both parents Catholic and parents mixed, both parents Non-believers omitted)

*t statistics in parentheses, * p<0.05, ** p<0.01, *** p<0.001*

										Restricted to age >65	Restricted to age <65	Outliers removed	
Both parents Protestant	**55.99****	**-22.43**	**-62.49*****	**-36.71**	**-37.48***	**-20.39**	**-20.85**	**-27.92**	**-25.37**	**-36.12**	**22.86**	**-29.85**	**-34.08**	**-45.35***
	(2.91)	(-1.35)	(-3.43)	(-1.94)	(-1.98)	(-1.14)	(-1.16)	(-1.47)	(-1.24)	(-1.76)	(0.81)	(-1.21)	(-1.80)	(-2.19)
Both parents Catholic	**111.9*****	**-26.52**	**-50.90****	**-17.34**	**-20.32**	**2.566**	**1.865**	**-0.340**	**7.835**	**-3.582**	**77.89***	**-5.950**	**-26.07**	**-19.60**
	(4.41)	(-1.43)	(-2.67)	(-0.79)	(-0.92)	(0.12)	(0.09)	(-0.02)	(0.33)	(-0.15)	(2.30)	(-0.20)	(-1.22)	(-0.81)
Mixed Parents	**128.8*****	**-37.25**	**-46.42**	**-19.65**	**-19.95**	**-17.55**	**-17.75**	**-10.75**	**-15.59**	**-26.96**	**105.0**	**-34.95**	**-12.68**	**-32.33**
	(4.12)	(-1.46)	(-1.82)	(-0.76)	(-0.77)	(-0.71)	(-0.72)	(-0.41)	(-0.58)	(-0.99)	(1.69)	(-1.14)	(-0.53)	(-1.20)
Household wealth		0.000206***	0.000190***	0.000191***	0.000189***	0.000172***	0.000172***	0.000178***	0.000185***	0.000185***	0.000231***	0.000161***	0.000343***	0.000184***
		(5.16)	(4.97)	(4.98)	(4.97)	(4.76)	(4.65)	(4.69)	(4.58)	(4.57)	(2.69)	(4.37)	(8.88)	(4.56)
Household Net Income		0.268***	0.283***	0.284***	0.287***	0.325***	0.325***	0.321***	0.323***	0.324***	0.332***	0.325***	0.223***	0.325***
		(14.68)	(15.13)	(15.06)	(14.46)	(16.15)	(16.12)	(15.87)	(15.17)	(14.87)	(11.14)	(12.60)	(20.77)	(14.93)
Age			X	X	X	X	X	X	X	X	X	X	X	X
Gender			X	X	X	X	X	X	X	X	X	X	X	X
Health level			X	X	X	X	X	X	X	X	X	X	X	X
Used to live in DDR				X	X	X	X	X	X	X	X	X	X	X
Level of education					X	X	X	X	X	X	X	X	X	X
Household composition						X	X	X	X	X	X	X	X	X
Number of children						X	X	X	X	X	X	X	X	X
Type of dwelling							X	X	X	X	X	X	X	X
County fixed effects								X	X	X	X	X	X	X
Trust									-2.182	-4.827	-30.84**	7.563	5.205	-6.650
									(-0.25)	(-0.54)	(-2.68)	(0.65)	(0.72)	(-0.74)
Risk										-2.667	2.747	-5.104	-0.247	-2.666
										(-0.99)	(0.75)	(-1.47)	(-0.11)	(-0.99)
Church attendance														X
Constant	337.2***	-336.4***	-294.4***	-332.9***	-402.5***	-280.4***	-277.4***	-201.3**	-187.9*	-155.6	-300.5*	-112.4	-126.0*	-162.4
	(21.16)	(-7.26)	(-5.62)	(-5.38)	(-5.60)	(-5.01)	(-4.60)	(-2.76)	(-2.32)	(-1.88)	(-2.57)	(-1.08)	(-2.02)	(-1.96)
Number of observations	7525	7525	7525	7525	7525	7525	7525	7525	7105	6514	6332	1561	4771	6139	6332

Table 7: Setting D – WLS (Culturally Protestant, culturally Catholic omitted)
*t statistics in parentheses, * p<0.05, ** p<0.01, *** p<0.001*

										Restricted to age >65	Restricted to age <65	Outliers removed	
Culturally Protestant	**-63.73*** **	**4.674**	**-3.305**	**-15.02**	**-15.54**	**-13.29**	**-13.51**	**-26.19***	**-27.14***	**-30.90** **	**-39.18** **	**-28.65**	**-14.77**	**-26.58***
	(-4.54)	(0.49)	(-0.35)	(-1.48)	(-1.54)	(-1.38)	(-1.40)	(-2.39)	(-2.35)	(-2.68)	(-2.64)	(-1.92)	(-1.51)	(-2.24)
Household wealth		0.000230***	0.000211***	0.000213***	0.000212***	0.000198***	0.000197***	0.000203***	0.000207***	0.000207***	0.000259***	0.000181***	0.000333***	0.000206***
		(5.75)	(5.53)	(5.55)	(5.56)	(5.46)	(5.28)	(5.27)	(5.11)	(5.06)	(3.24)	(4.70)	(10.14)	(5.05)
Household Net Income		0.241***	0.255***	0.257***	0.258***	0.295***	0.295***	0.293***	0.297***	0.299***	0.309***	0.299***	0.220***	0.299***
		(15.55)	(15.87)	(15.79)	(15.08)	(16.26)	(16.25)	(15.85)	(15.16)	(14.74)	(11.04)	(12.46)	(23.67)	(14.81)
Age			X	X	X	X	X	X	X	X	X	X	X	X
Gender			X	X	X	X	X	X	X	X	X	X	X	X
Health level			X	X	X	X	X	X	X	X	X	X	X	X
Used to live in DDR				X	X	X	X	X	X	X	X	X	X	X
Level of education					X	X	X	X	X	X	X	X	X	X
Household composition						X	X	X	X	X	X	X	X	X
Number of children						X	X	X	X	X	X	X	X	X
Type of dwelling							X	X	X	X	X	X	X	X
County fixed effects								X	X	X	X	X	X	X
Trust									-3.597	-3.342	-19.80*	2.631	4.016	-4.818
									(-0.53)	(-0.49)	(-2.18)	(0.29)	(0.67)	(-0.70)
Risk										-5.381*	0.273	-8.355**	-3.020	-5.357*
										(-2.46)	(0.10)	(-2.82)	(-1.71)	(-2.46)
Church attendance														X
Constant	429.2***	-288.9***	-330.4***	-342.6***	-401.6***	-260.8***	-256.2***	-200.1***	-191.4**	-198.2**	-258.8**	-150.3	-140.7**	-210.8***
	(35.04)	(-7.20)	(-6.70)	(-6.69)	(-6.83)	(-6.06)	(-5.45)	(-3.43)	(-3.13)	(-3.14)	(-2.79)	(-1.88)	(-2.89)	(-3.32)
Number of observations	12157	12157	12157	12157	12157	12157	12157	11428	10476	10114	2704	7410	9837	10114

Table 8: Setting E – WLS (Non-believer in Protestant areas, non-believers in Catholic areas omitted)
*t statistics in parentheses, * p<0.05, ** p<0.01, *** p<0.001*

											Restricted to age >65	Restricted to age <65	Outliers removed	
Protestant non-believers	**-40.27***	**30.47***	**23.44**	**20.14**	**18.07**	**29.23***	**25.44**	**33.52**	**33.88**	**36.28**	**-30.28**	**48.25***	**29.80**	**37.67**
	(-2.37)	(2.17)	(1.67)	(1.42)	(1.30)	(2.19)	(1.85)	(1.68)	(1.65)	(1.71)	(-0.76)	(2.01)	(1.54)	(1.76)
Household wealth		0.000185***	0.000175**	0.000176**	0.000175**	0.000160**	0.000157**	0.000161**	0.000184**	0.000178**	-0.0000429	0.000214**	0.000345***	0.000178**
		(3.35)	(3.16)	(3.16)	(3.14)	(2.73)	(2.67)	(2.70)	(2.82)	(2.69)	(-0.83)	(2.77)	(4.64)	(2.69)
Household Net Income		0.187***	0.192***	0.193***	0.192***	0.227***	0.226***	0.224***	0.220***	0.225***	0.303***	0.223***	0.189***	0.225***
		(12.62)	(12.30)	(12.14)	(11.82)	(10.42)	(10.35)	(9.02)	(8.50)	(8.32)	(7.19)	(7.72)	(15.60)	(8.33)
Age			X	X	X	X	X	X	X	X	X	X	X	X
Gender			X	X	X	X	X	X	X	X	X	X	X	X
Health level			X	X	X	X	X	X	X	X	X	X	X	X
Used to live in DDR				X	X	X	X	X	X	X	X	X	X	X
Level of education					X	X	X	X	X	X	X	X	X	X
Household composition						X	X	X	X	X	X	X	X	X
Number of children						X	X	X	X	X	X	X	X	X
Type of dwelling							X	X	X	X	X	X	X	X
County fixed effects								X	X	X	X	X	X	X
Trust									8.444	6.397	-17.28	14.47	4.957	5.911
									(0.98)	(0.74)	(-1.26)	(1.36)	(0.59)	(0.68)
Risk										-1.801	-0.635	-2.919	-2.339	-2.052
										(-0.62)	(-0.18)	(-0.78)	(-0.91)	(-0.71)
Church attendance														X
Constant	357.8***	-172.6***	-177.6***	-185.8***	-245.7***	-231.7***	-202.4***	-229.8*	-229.5*	-232.0*	-129.0	-278.0*	-165.7*	-230.5*
	(23.65)	(-4.71)	(-4.26)	(-4.07)	(-5.13)	(-5.04)	(-4.03)	(-2.48)	(-2.28)	(-2.13)	(-0.91)	(-2.09)	(-2.07)	(-2.12)
Number of observations	3745	3745	3745	3745	3745	3745	3745	3345	3095	2977	626	2351	2899	2977

Table 9: Cook's distance test for outliers
Bold values close to 1 indicate distortive outliers

(**A**)

	Percentiles	Smallest
1%	1.41e-09	9.48e-14
5%	5.39e-08	1.90e-13
10%	2.41e-07	5.83e-13
25%	1.63e-06	7.78e-13
50%	8.56e-06	
		Largest
75%	.0000391	.1364698
90%	.0001387	.1633494
95%	.0003077	.1761107
99%	.0018509	**.6400965**

(**B**)

	Percentiles	Smallest
1%	2.74e-09	2.60e-13
5%	8.65e-08	6.40e-13
10%	3.47e-07	1.04e-11
25%	2.47e-06	2.21e-11
50%	.0000131	
		Largest
75%	.0000586	.1580869
90%	.000197	.15993
95%	.0004475	.1714638
99%	.002452	**.1893938**

(**C**)

	Percentiles	Smallest
1%	2.74e-09	2.60e-13
5%	8.65e-08	6.40e-13
10%	3.47e-07	1.04e-11
25%	2.47e-06	2.21e-11
50%	.0000131	
		Largest
75%	.0000586	.1580869
90%	.000197	.15993
95%	.0004475	.1714638
99%	.002452	**.1893938**

(**D**)

	Percentiles	Smallest
1%	1.39e-09	1.41e-13
5%	5.55e-08	2.58e-13
10%	2.42e-07	1.65e-12
25%	1.64e-06	2.81e-12
50%	8.71e-06	
		Largest
75%	.0000398	.1406252
90%	.0001384	.1679749
95%	.0003136	.1828255
99%	.0019313	**.5946065**

(**E**)

	Percentiles	Smallest
1%	7.13e-09	1.74e-11
5%	1.78e-07	3.43e-11
10%	6.59e-07	9.83e-11
25%	5.26e-06	1.33e-10
50%	.0000302	
		Largest
75%	.0001415	.1255322
90%	.0005101	.1701739
95%	.0011027	.1907694
99%	.0087199	**.9300899**

8.5 Spenkuch's mapping of historical religious distribution

Using Spenkuch's mapping of religious belonging we ran into two problems. When mapping the counties we realized that out of 96 counties in Bavaria there was six counties missing and with them their dominating denominations in 1624. By comparing with surrounding counties we found that they were all surrounded by Catholic counties why we choose to count these six as also being Catholic. The close proximity to the border of the highly Catholic Austria for all these counties also supported this choice. These counties together inhabited just under 800 000 people in 2007 compared to the over 82 million in the country why we do not believe this might create any significant bias (Regionaldatenbank 2007).

Also, during 2007 and 2008 the two states Saxony and Saxony-Anhalt each underwent county reforms (Kreisreform). The county reforms changed the number of counties in the states by mostly merging several counties into one. Sachsen-Anhalt went from 24 counties to 14 in 2007 and Sachsen went from 29 to 13 in 2008. The reason for these reforms is an expected population decline in these areas in the coming years. Even during the transition stage official data started being reported from the states and presented in the form of the new counties making data difficult to find on the old county level. For the reason of getting better quality data we chose to go with the new county codes even though some of them where not official in 2007, the year we get most of our SOEP data from. This of course created a problem with the religious distribution as Spenkuch created his mapping before the transitions. Fortunately we found that with one exception all former counties in Sachsen and Sachsen-Anhalt were historically Protestant and as almost all new counties had been created by merging old we see no problem in also making all the new counties Protestant. The only exception, Bautzen, was merged with larger Protestant dominated areas.

Table 10 - Spenkuch's (2011) mapping of Religious affiliation in Germany in 1624 (writer's modifications with asterisk)

County	*Denomination 1634*
Schleswig-Holstein (Schleswig-Holstein)	
Flensburg, Kreisfreie Stadt	Protestant
Kiel, Landeshauptstadt, Kreisfreie Stadt	Protestant
Lübeck, Hansestadt, Kreisfreie Stadt	Protestant
Neumünster, Kreisfreie Stadt	Protestant
Dithmarschen, Landkreis	Protestant
Herzogtum Lauenburg, Landkreis	Protestant
Nordfriesland, Landkreis	Protestant
Ostholstein, Landkreis	Protestant
Pinneberg, Landkreis	Protestant
Plön, Landkreis	Protestant
Rendsburg-Eckernförde, Landkreis	Protestant
Schleswig-Flensburg, Landkreis	Protestant
Segeberg, Landkreis	Protestant
Steinburg, Landkreis	Protestant
Stormarn, Landkreis	Protestant
Hamburg (Hamburg)	
Hamburg	Protestant
Lower Saxony (Niedersachsen)	
Braunschweig, Kreisfreie Stadt	Protestant
Salzgitter, Kreisfreie Stadt	Protestant
Wolfsburg, Kreisfreie Stadt	Protestant
Gifhorn, Landkreis	Protestant
Göttingen, Landkreis	Protestant
Goslar, Landkreis	Protestant
Helmstedt, Landkreis	Protestant
Northeim, Landkreis	Protestant
Osterode am Harz, Landkreis	Protestant
Peine, Landkreis	Protestant
Wolfenbüttel, Landkreis	Protestant
Region Hannover, Landkreis	Protestant
Diepholz, Landkreis	Protestant
Hameln-Pyrmont, Landkreis	Protestant
Hildesheim, Landkreis	Catholic
Holzminden, Landkreis	Protestant
Nienburg (Weser), Landkreis	Protestant
Schaumburg, Landkreis	Protestant
Celle, Landkreis	Protestant
Cuxhaven, Landkreis	Protestant
Harburg, Landkreis	Protestant
Lüchow-Dannenberg, Landkreis	Protestant
Lüneburg, Landkreis	Protestant
Osterholz, Landkreis	Protestant
Rotenburg (Wümme), Landkreis	Protestant
Soltau-Fallingbostel, Landkreis	Protestant
Stade, Landkreis	Protestant
Uelzen, Landkreis	Protestant
Verden, Landkreis	Protestant
Delmenhorst, Kreisfreie Stadt	Protestant
Emden, Kreisfreie Stadt	Protestant
Oldenburg (Oldenburg), Kreisfreie Stadt	Protestant
Osnabrück, Kreisfreie Stadt	Catholic
Wilhelmshaven, Kreisfreie Stadt	Protestant
Ammerland, Landkreis	Protestant
Aurich, Landkreis	Protestant
Cloppenburg, Landkreis	Protestant
Emsland, Landkreis	Protestant
Friesland, Landkreis	Protestant
Grafschaft Bentheim, Landkreis	Protestant
Leer, Landkreis	Protestant
Oldenburg, Landkreis	Protestant
Osnabrück, Landkreis	Catholic
Vechta, Landkreis	Protestant
Wesermarsch, Landkreis	Protestant
Wittmund, Landkreis	Protestant
Bremen (Bremen)	
Bremen, Kreisfreie Stadt	Protestant
Bremerhaven, Kreisfreie Stadt	Protestant
North Rhine-Westphalia (Nordrhein-Westfalen)	
Düsseldorf, Kreisfreie Stadt	Mixed
Duisburg, Kreisfreie Stadt	Mixed
Essen, Kreisfreie Stadt	Mixed
Krefeld, Kreisfreie Stadt	Catholic
Mönchengladbach, Kreisfreie Stadt	Catholic
Mülheim an der Ruhr, Kreisfreie Stadt	Mixed
Oberhausen, Kreisfreie Stadt	Mixed
Remscheid, Kreisfreie Stadt	Mixed
Solingen, Kreisfreie Stadt	Mixed
Wuppertal, Kreisfreie Stadt	Mixed
Kleve, Kreis	Mixed
Mettmann, Kreis	Mixed
Rhein-Kreis Neuss	Catholic
Viersen, Kreis	Mixed
Wesel, Kreis	Mixed
Bonn, Kreisfreie Stadt	Catholic
Köln, Kreisfreie Stadt	Catholic

Leverkusen, Kreisfreie Stadt	Catholic
Aachen, Stadt	Catholic
Aachen, Kreis	Catholic
Düren, Kreis	Mixed
Rhein-Erft-Kreis	Catholic
Euskirchen, Kreis	Mixed
Heinsberg, Kreis	Mixed
Oberbergischer Kreis	Mixed
Rheinisch-Bergischer Kreis	Mixed
Rhein-Sieg-Kreis	Mixed
Bottrop, Kreisfreie Stadt	Mixed
Gelsenkirchen, Kreisfreie Stadt	Mixed
Münster, Kreisfreie Stadt	Catholic
Borken, Kreis	Catholic
Coesfeld, Kreis	Catholic
Recklinghausen, Kreis	Catholic
Steinfurt, Kreis	Catholic
Warendorf, Kreis	Catholic
Bielefeld, Kreisfreie Stadt	Protestant
Gütersloh, Kreis	Catholic
Herford, Kreis	Protestant
Höxter, Kreis	Catholic
Lippe, Kreis	Protestant
Minden-Lübbecke, Kreis	Protestant
Paderborn, Kreis	Catholic
Bochum, Kreisfreie Stadt	Mixed
Dortmund, Kreisfreie Stadt	Mixed
Hagen, Kreisfreie Stadt	Mixed
Hamm, Kreisfreie Stadt	Mixed
Herne, Kreisfreie Stadt	Mixed
Ennepe-Ruhr-Kreis	Mixed
Hochsauerlandkreis	Catholic
Märkischer Kreis	Mixed
Olpe, Kreis	Mixed
Siegen-Wittgenstein, Kreis	Protestant
Soest, Kreis	Mixed
Unna, Kreis	Mixed

Hesse (Hessen)

Darmstadt, Kreisfreie Stadt	Protestant
Frankfurt am Main, Kreisfreie Stadt	Protestant
Offenbach am Main, Kreisfreie Stadt	Protestant
Wiesbaden, Landeshauptstadt, Kreisfreie Stadt	Protestant
Bergstraße, Landkreis	Catholic
Darmstadt-Dieburg, Landkreis	Protestant
Groß-Gerau, Landkreis	Protestant
Hochtaunuskreis	Protestant
Main-Kinzig-Kreis	Protestant
Main-Taunus-Kreis	Mixed
Odenwaldkreis	Protestant
Offenbach, Landkreis	Protestant
Rheingau-Taunus-Kreis	Mixed
Wetteraukreis	Protestant
Gießen, Landkreis	Protestant
Lahn-Dill-Kreis	Protestant
Limburg-Weilburg, Landkreis	Protestant
Marburg-Biedenkopf, Landkreis	Protestant
Vogelsbergkreis	Protestant
Kassel, Kreisfreie Stadt	Protestant
Fulda, Landkreis	Catholic
Hersfeld-Rotenburg, Landkreis	Catholic
Kassel, Landkreis	Protestant
Schwalm-Eder-Kreis	Protestant
Waldeck-Frankenberg, Landkreis	Protestant
Werra-Meißner-Kreis	Protestant

Rhineland-Palatinate (Rheinland-Pfalz)

Koblenz, Kreisfreie Stadt	Catholic
Ahrweiler, Landkreis	Catholic
Altenkirchen (Westerwald), Landkreis	Catholic
Bad Kreuznach, Landkreis	Protestant
Birkenfeld, Landkreis	Protestant
Cochem-Zell, Landkreis	Catholic
Mayen-Koblenz, Landkreis	Catholic
Neuwied, Landkreis	Catholic
Rhein-Hunsrück-Kreis	Protestant
Rhein-Lahn-Kreis	Catholic
Westerwaldkreis	Catholic
Trier, Kreisfreie Stadt	Catholic
Bernkastel-Wittlich, Landkreis	Catholic
Eifelkreis Bitburg-Prüm	Catholic
Vulkaneifel, Landkreis	Catholic
Trier-Saarburg, Landkreis	Catholic
Frankenthal (Pfalz), Kreisfreie Stadt	Protestant
Kaiserslautern, Kreisfreie Stadt	Protestant
Landau in der Pfalz, Kreisfreie Stadt	Protestant
Ludwigshafen am Rhein, Kreisfreie Stadt	Protestant
Mainz, Kreisfreie Stadt	Catholic
Neustadt an der Weinstraße, Kreisfreie Stadt	Protestant
Pirmasens, Kreisfreie Stadt	Protestant
Speyer, Kreisfreie Stadt	Protestant
Worms, Kreisfreie Stadt	Protestant
Zweibrücken, Kreisfreie Stadt	Protestant
Alzey-Worms, Landkreis	Protestant

Bad Dürkheim, Landkreis	Protestant
Donnersbergkreis	Protestant
Germersheim, Landkreis	Protestant
Kaiserslautern, Landkreis	Protestant
Kusel, Landkreis	Protestant
Südliche Weinstraße, Landkreis	Protestant
Rhein-Pfalz-Kreis	Protestant
Mainz-Bingen, Landkreis	Catholic
Südwestpfalz, Landkreis	Protestant

Baden-Württemberg (Baden-Württemberg)

Stuttgart, Landeshauptstadt, Kreisfreie Stadt	Protestant
Böblingen, Landkreis	Protestant
Esslingen, Landkreis	Protestant
Göppingen, Landkreis	Protestant
Ludwigsburg, Landkreis	Protestant
Rems-Murr-Kreis	Protestant
Heilbronn, Kreisfreie Stadt	Protestant
Heilbronn, Landkreis	Protestant
Hohenlohekreis	Protestant
Schwäbisch Hall, Landkreis	Protestant
Main-Tauber-Kreis	Mixed
Heidenheim, Landkreis	Protestant
Ostalbkreis	Mixed
Baden-Baden, Kreisfreie Stadt	Catholic
Karlsruhe, Kreisfreie Stadt	Protestant
Karlsruhe, Landkreis	Protestant
Rastatt, Landkreis	Mixed
Heidelberg, Kreisfreie Stadt	Protestant
Mannheim, Universitätsstadt, Kreisfreie Stadt	Protestant
Neckar-Odenwald-Kreis	Protestant
Rhein-Neckar-Kreis	Protestant
Pforzheim, Kreisfreie Stadt	Protestant
Calw, Landkreis	Protestant
Enzkreis	Protestant
Freudenstadt, Landkreis	Protestant
Freiburg im Breisgau, Kreisfreie Stadt	Catholic
Breisgau-Hochschwarzwald, Landkreis	Catholic
Emmendingen, Landkreis	Protestant
Ortenaukreis	Catholic
Rottweil, Landkreis	Catholic
Schwarzwald-Baar-Kreis	Mixed
Tuttlingen, Landkreis	Catholic
Konstanz, Landkreis	Catholic
Lörrach, Landkreis	Catholic
Waldshut, Landkreis	Catholic
Reutlingen, Landkreis	Protestant
Tübingen, Landkreis	Protestant
Zollernalbkreis	Catholic
Ulm, Universitätsstadt, Kreisfreie Stadt	Protestant
Alb-Donau-Kreis	Protestant
Biberach, Landkreis	Mixed
Bodenseekreis	Catholic
Ravensburg, Landkreis	Catholic
Sigmaringen, Landkreis	Catholic

Bavaria (Bayern)

Ingolstadt	Catholic
München, Landeshauptstadt	Catholic
Rosenheim	Catholic
Altötting, Landkreis	Catholic
Berchtesgadener Land, Landkreis	Catholic
Bad Tölz-Wolfratshausen, Landkreis	Catholic
Dachau, Landkreis	Catholic
Ebersberg, Landkreis	Catholic
Eichstätt, Landkreis	Catholic
Erding, Landkreis	Catholic
Freising, Landkreis	Catholic
Fürstenfeldbruck, Landkreis	Catholic
Garmisch-Partenkirchen, Landkreis	Catholic
Landsberg am Lech, Landkreis	Catholic
Miesbach, Landkreis	Catholic
Mühldorf a.Inn, Landkreis	Catholic
München, Landkreis	Catholic
Neuburg-Schrobenhausen, Landkreis	Mixed
Pfaffenhofen a.d.Ilm, Landkreis	Catholic
Rosenheim, Landkreis	Catholic
Starnberg, Landkreis	Catholic
Traunstein, Landkreis	Catholic
Weilheim-Schongau, Landkreis	Catholic
Landshut	Catholic
Passau	Catholic
Straubing	Catholic
Deggendorf, Landkreis	Catholic
Freyung-Grafenau, Landkreis	Catholic
Kelheim, Landkreis	Catholic
Landshut, Landkreis	Catholic
Passau, Landkreis	Catholic
Regen, Landkreis	Catholic
Rottal-Inn, Landkreis	Catholic
Straubing-Bogen, Landkreis	Catholic
Dingolfing-Landau, Landkreis	Catholic
Amberg	Mixed

Regensburg	Protestant
Weiden i.d.OPf.	Mixed
Amberg-Sulzbach, Landkreis	Mixed
Cham, Landkreis	Mixed
Neumarkt i.d.OPf., Landkreis	Mixed
Neustadt a.d.Waldnaab, Landkreis	Mixed
Regensburg, Landkreis	Mixed
Schwandorf, Landkreis	Mixed
Tirschenreuth, Landkreis	Mixed
Bamberg	Catholic
Bayreuth	Protestant
Coburg	Protestant
Hof	Protestant
Bamberg, Landkreis	Catholic
Bayreuth, Landkreis	Protestant
Coburg, Landkreis	Protestant
Forchheim, Landkreis	Catholic
Hof, Landkreis	Protestant
Kronach, Landkreis	Protestant
Kulmbach, Landkreis	Protestant
Lichtenfels, Landkreis	Catholic
Wunsiedel i.Fichtelgebirge, Landkreis	Protestant
Ansbach	Protestant
Erlangen	Protestant
Fürth	Protestant
Nürnberg	Protestant
Schwabach	Protestant
Ansbach, Landkreis	Protestant
Erlangen-Höchstadt, Landkreis	Protestant
Fürth, Landkreis	Protestant
Nürnberger Land, Landkreis	Protestant
Neustadt a.d.Aisch-Bad Windsheim, Landkreis	Protestant
Roth, Landkreis	Protestant
Weißenburg-Gunzenhausen, Landkreis	Protestant
Aschaffenburg	Catholic
Schweinfurt	Protestant
Würzburg	Catholic
Aschaffenburg, Landkreis	Catholic
Bad Kissingen, Landkreis	Catholic
Rhön-Grabfeld, Landkreis	Catholic
Haßberge, Landkreis	Catholic
Kitzingen, Landkreis	Catholic
Miltenberg, Landkreis	Catholic
Main-Spessart, Landkreis	Catholic
Schweinfurt, Landkreis	Catholic
Würzburg, Landkreis	Catholic
Augsburg	Mixed
Kaufbeuren	Mixed
Kempten (Allgäu)	Protestant
Memmingen	Protestant
Aichach-Friedberg, Landkreis	Catholic
Augsburg, Landkreis	Catholic
Dillingen a.d.Donau, Landkreis	Catholic
Günzburg, Landkreis	Catholic
Neu-Ulm, Landkreis	Catholic*
Lindau (Bodensee), Landkreis	Catholic*
Ostallgäu, Landkreis	Catholic*
Unterallgäu, Landkreis	Catholic*
Donau-Ries, Landkreis	Catholic*
Oberallgäu, Landkreis	Catholic*
Saarland (Saarland)	
Saarbrücken, Regionalverband	Protestant
Merzig-Wadern, Landkreis	Catholic
Neunkirchen, Landkreis	Protestant
Saarlouis, Landkreis	Protestant
Saarpfalz-Kreis	Protestant
St. Wendel, Landkreis	Catholic
Counties in the former German Democratic Republic:	
Berlin (Berlin)	
Berlin	Protestant
Brandenburg (Brandenburg)	
Brandenburg an der Havel, Kreisfreie Stadt	Protestant
Cottbus, Kreisfreie Stadt	Protestant
Frankfurt (Oder), Kreisfreie Stadt	Protestant
Potsdam, Kreisfreie Stadt	Protestant
Barnim, Landkreis	Protestant
Dahme-Spreewald, Landkreis	Protestant
Elbe-Elster, Landkreis	Protestant
Havelland, Landkreis	Protestant
Märkisch-Oderland, Landkreis	Protestant
Oberhavel, Landkreis	Protestant
Oberspreewald-Lausitz, Landkreis	Protestant
Oder-Spree, Landkreis	Protestant
Ostprignitz-Ruppin, Landkreis	Protestant
Potsdam-Mittelmark, Landkreis	Protestant
Prignitz, Landkreis	Protestant
Spree-Neiße, Landkreis	Protestant
Teltow-Fläming, Landkreis	Protestant
Uckermark, Landkreis	Protestant
Mecklenburg-Vorpommern (Mecklenburg-Vorpommern)	
Greifswald, Kreisfreie Stadt	Protestant

Neubrandenburg, Kreisfreie Stadt	Protestant
Rostock, Kreisfreie Stadt	Protestant
Schwerin, Kreisfreie Stadt	Protestant
Stralsund, Kreisfreie Stadt	Protestant
Wismar, Kreisfreie Stadt	Protestant
Bad Doberan, Kreis	Protestant
Demmin, Kreis	Protestant
Güstrow, Kreis	Protestant
Ludwigslust, Kreis	Protestant
Mecklenburg-Strelitz, Kreis	Protestant
Müritz, Kreis	Protestant
Nordvorpommern, Kreis	Protestant
Nordwestmecklenburg, Kreis	Protestant
Ostvorpommern, Kreis	Protestant
Parchim, Kreis	Protestant
Rügen, Kreis	Protestant
Uecker-Randow, Kreis	Protestant
Saxony (Freistaat Sachsen)	
Chemnitz, Stadt	Protestant*
Erzgebirgskreis	Protestant*
Landkreis Mittelsachsen	Protestant*
Vogtlandkreis	Protestant*
Landkreis Zwickau	Protestant*
Dresden, Stadt	Protestant*
Landkreis Bautzen	Protestant*
Landkreis Görlitz	Protestant*
Landkreis Meißen	Protestant*
Landkreis Sächsische Schweiz-Osterzgebirge	Protestant*
Leipzig, Stadt	Protestant*
Landkreis Leipzig	Protestant*
Landkreis Nordsachsen	Protestant*
Saxony-Anhalt (Sachsen-Anhalt)	
Dessau-Roßlau, Kreisfreie Stadt	Protestant*
Halle (Saale), Kreisfreie Stadt	Protestant*
Magdeburg, Kreisfreie Stadt	Protestant*
Altmarkkreis Salzwedel	Protestant*
Anhalt-Bitterfeld, Landkreis	Protestant*
Börde, Landkreis	Protestant*
Burgenlandkreis	Protestant*
Harz, Landkreis	Protestant*
Jerichower Land, Landkreis	Protestant*
Mansfeld-Südharz, Landkreis	Protestant*
Saalekreis	Protestant*
Salzlandkreis	Protestant*
Stendal, Landkreis	Protestant*
Wittenberg, Landkreis	Protestant*
Thuringia (Thüringen)	
Erfurt, krsfr. Stadt	Mixed
Gera, krsfr. Stadt	Protestant
Jena, krsfr. Stadt	Protestant
Suhl, krsfr. Stadt	Protestant
Weimar, krsfr. Stadt	Protestant
Eisenach, krsfr. Stadt	Protestant
Eichsfeld, Kreis	Catholic
Nordhausen, Kreis	Protestant
Wartburgkreis	Protestant
Unstrut-Hainich-Kreis	Protestant
Kyffhäuserkreis	Protestant
Schmalkalden-Meiningen, Kreis	Protestant
Gotha, Kreis	Protestant
Sömmerda, Kreis	Protestant
Hildburghausen, Kreis	Protestant
Ilm-Kreis	Protestant
Weimarer Land, Kreis	Protestant
Sonneberg, Kreis	Protestant
Saalfeld-Rudolstadt, Kreis	Protestant
Saale-Holzland-Kreis	Protestant
Saale-Orla-Kreis	Protestant
Greiz, Kreis	Protestant
Altenburger Land, Kreis	Protestant