Three Essays on the Economics of Religion

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Abstract

The economics of religion comprises two concepts. The first is commonly referred to as religiosity which, in this study, is defined as the importance of religious beliefs in people's everyday decision making processes. Second, religious diversity is an important component of the economics of religion. The first chapter of this thesis examines the relationship between religiosity and religious diversity and finds that higher religious diversity leads to lower levels of religiosity which supports the so-called Secularization Hypothesis. Furthermore, religiosity and national identity appear to be substitutes. A new measure for national identity supports this idea. Democratic institutions and mobility throughout the country seem to be other important determinants for the formation of a national identity. Finally, this thesis analyzes the relationship between religiosity and happiness. Religiosity can be considered a substitute in the happiness function so that the same level of happiness can be maintained with different levels of religiosity.

Zusammenfassung

Die Ökonomik der Religion umfasst zwei Konzepte. Das erste wird gemeinhin Religiosität genannt, welche in dieser Studie als die Wichtigkeit religiösen Glaubens in alltäglichen Entscheidungsprozessen definiert ist. Desweiteren ist religiöse Diversifikation ein wichtiger Bestandteil der Religionsökonomik. Das erste Kapitel dieser Arbeit untersucht die Beziehung von Religiosität und religiöser Diversifikation und zeigt, dass höhere Diversifikation zu geringerer Religiosität führt, welches die Sekularisierungshypothese unterstützt. Desweiteren scheinen Religiosität und nationale Identität Substitute zu sein. Eine neue Maßzahl für nationale Identität unterstützt diese Idee. Demokratische Institutionen und Mobilität scheinen weitere wichtige Einflussgrößen für das Entstehen einer nationalen Identität zu sein. Schließlich analysiert diese Arbeit die Beziehung zwischen Religiosität und Glücksbefinden. Religiosität kann als Substitut in der Glücksfunktion angesehen werden, sodass das gleiche Glücksniveau mit verschiedenen Religiositätsniveaus erreicht werden kann.

Keywords: Religiosity, Religious Diversity, Identity Formation
Schlagwörter: Religiosität, religiöse Diversifikation, Identitäsbildung

Contents

List of Tables

List of Figures

Chapter 1

Introduction

> "Man is a religious animal. He is the only religious animal. He is the only animal that has the True Religion - several of them. He is the only animal that loves his neighbor as himself and cuts his throat if his theology isn't straight." (Mark Twain)

1.1 Religion and Economics

Religion is often considered to be something irrational. It is not possible to actually prove the existence of something divine. Though, there is no proof neither that God does not exist. Thus, it is not irrational to be religious, it is only intractable if faith and a religious lifestyle do affect outcomes after the end of life on earth.

The science of economics is considered to be rational. Economists build models which assume that subjects always maximize their utility, are forward-looking, and form rational expectations. The two worlds of economics and religion seem to collide frontally. However, the first and maybe most influential classical economic writer, Adam Smith (1776 [1976]), devotes a whole chapter to the institutions of religion. He lays the foundation for the economics of religion as he describes the market structure for religion and the consequences for monopolistic and competitive churches. It is therefore not surprising that in the following decades and centuries religion has always stayed in the interest of economic research, such as in the works of Karl Marx (1844) or Max Weber (1904/05), just to mention two of them. Marx (1844) declares religion "the people's opium." He argues that man creates religion and that religion can be used as a means to exploit the population. Weber (1904/05) compares ethical attitudes across denominations and finds, amongst other things, that the Protestant work ethic explains higher prosperity in Protestant

compared to Catholic regions.

Nevertheless, after the work of Max Weber it took another 70 years until religion finally found its way into modern economic modeling. Azzi and Ehrenberg (1975) develop a model in which rational households allocate their time to religious matters as a consequence of utility maximization. This was the starting point for many scholars to analyze people's decisions concerning religiosity and the consequences for economic outcomes[1].

This work aims to contribute to the growing literature on the economics of religion. However, religion is a very abstract concept and different people might have different perceptions and definitions of what religion, or religiosity, actually is. The theological and social science literature offers many definitions of religion, however, remarkably fewer of religiosity. As Bréchon (2007) points out, religiosity refers more to the individual level. Glock and Stark (1965) define religiosity as a combination of five different dimensions. The ideological dimension refers to beliefs and ideas about the divine, whereas the intellectual dimension takes account of the knowledge of the doctrines and origins of the respective religion. The ritual dimension refers to the religious acts carried out and the experiential dimension to feelings and beliefs an individual has made concerning his religion. The consequential dimension measures attitudes and conduct in all aspects of life and the relationship to religious beliefs. All these categories, especially the consequential dimension, have in common that they refer to people's attitudes concerning their religion, independent of the denomination, and the influence on their lives. Implicitly Glock and Stark (1965) define religiosity as the "intrinsic importance of religion in the life of man" (p.19). Hence, in the remainder of this work religiosity is defined as the importance of religious beliefs in people's everyday decision making processes.

Following Clayton (1971) there seems to be one common underlying factor to the five dimensions of religiosity so that it becomes measurable unidimensionally. Paldam and Gundlach (2012) use the World Values Survey in order to calculate the so-called religiosity score which is a measure for the importance of religion. They consider all questions from the World Values Survey relating to religiosity and by conducting principal component analysis construct one comprehensive index.

The religiosity score ranges theoretically from zero to 100 percent, where higher values imply that religiosity is of higher importance in everyday decisions. The highest scores of approximately 90 percentage points are observed in some developing countries whereas the scores for the industrialized countries are mostly distributed between 20 and 40 percentage points. Important outliers are, not surprisingly, the United States which reveal religiosity rates which are far higher compared to the other industrialized nations, and China whose religiosity score, at least in the early observations is extraordinarily low.

[1] Iannaccone (1998) offers an overview of the economics of religion.

Figure 1.1: Relationship between (log) income and the religiosity score

Source: Paldam and Gundlach (2012); own calculations.

Paldam and Gundlach (2012) use a panel of over 90 countries observed over five waves of the World Values Survey to show that decreasing rates of religiosity are a consequence of economic development, a fact which social scientists call "Secularization". This relationship is depicted in Figure 1.1. It shows the relationship between income and the religiosity score for all countries for which it could be calculated.

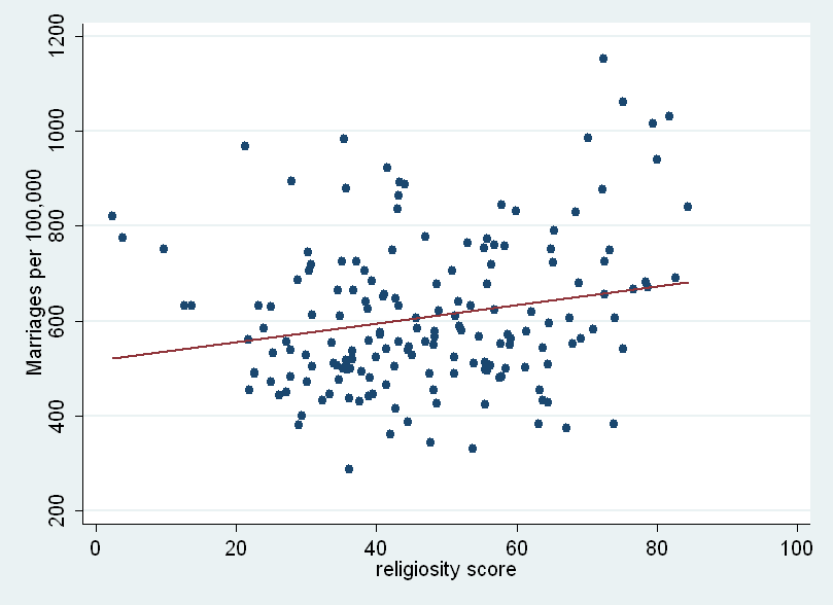
We expect this measure of religiosity to be related to measures of social norms which are proposed to be influenced by religious behavior. All religions endorse the role of marriage. As a consequence, if the religiosity score is indeed a good measure for the importance of religion in everyday life, one would expect to find a positive relationship between the religiosity score and the marriage rate. Figure 1.2 presents the correlation between these two variables.

Apparently there is a positive relationship between religiosity and the marriage rate. The marriage rate is higher in countries which reveal a higher level of religiosity, i.e. in countries in which religion plays a more prominent role in everyday decision making. As can be shown by simple regression analysis this relationship also holds when income is controlled for.

Another common norm throughout all major religions is that suicide is regarded a sin. Consequently, one expects to find a negative relationship between religiosity and the suicide rate. A confirmation would be another piece of evidence supporting the idea that the religiosity score is indeed a good proxy variable for the importance of religion. Figure 1.3 shows the relationship between the religiosity score and the

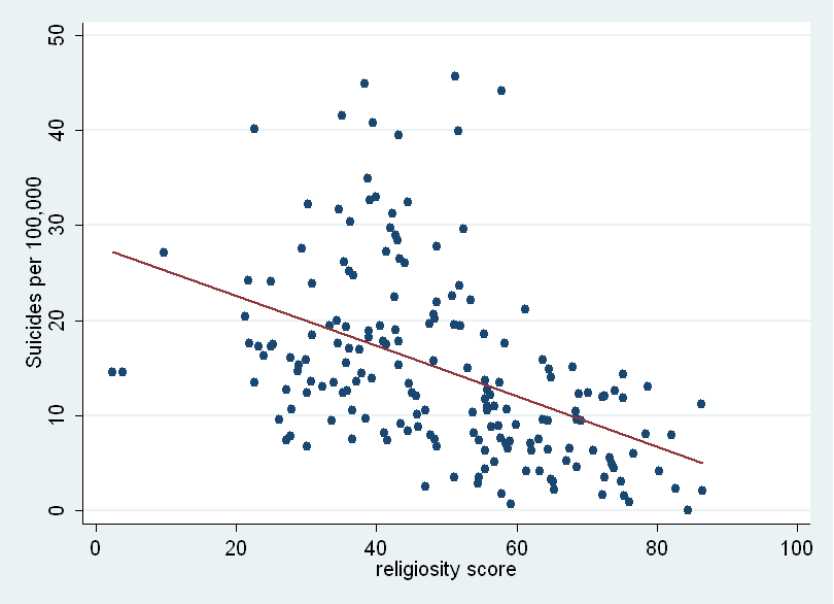
suicide rate.

Figure 1.2: Relationship between the religiosity score and the marriage rate



Source: Paldam and Gundlach (2012) and UN Statistics division; own calculations.

Figure 1.3: Relationship between the religiosity score and the suicide rate

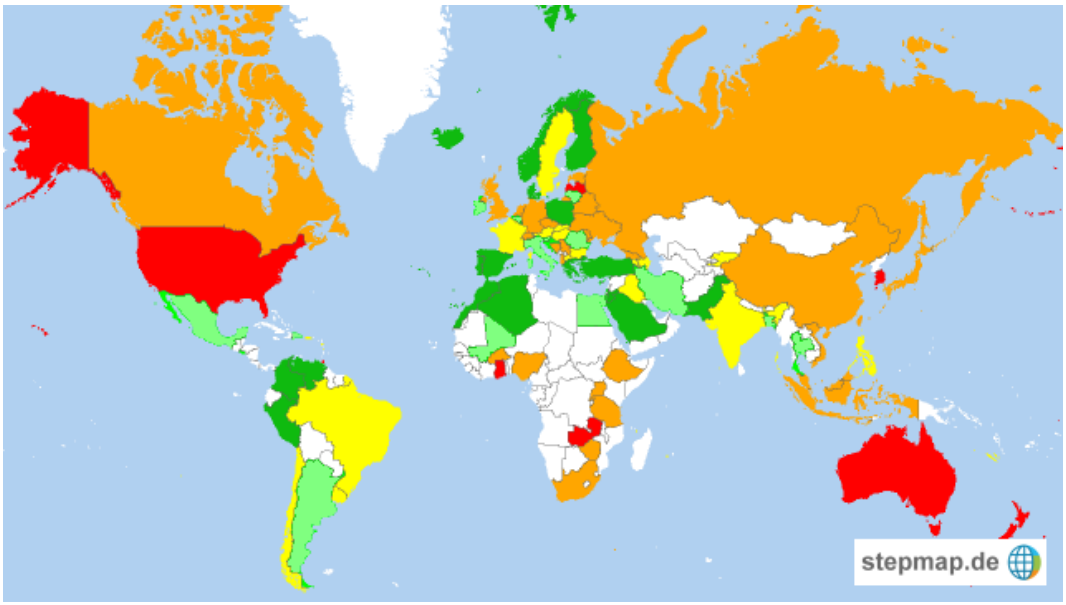


Source: Paldam and Gundalach (2012) and World Health Organization; own calculations.

The proposition that religiosity correlates with social norms is again supported. We find that the suicide rate is significantly lower in countries which reveal higher levels of religiosity. Once more, this relationship still holds if the level of income is controlled for. It appears that the religiosity score is a reasonable variable to measure the importance of religion in everyday decision making.

The line of reasoning up to this point suggests that the level of religiosity is the only important factor in the research on the economics of religion. But there is another important variable concerning religion which is worth being studied. Not only the level of religiosity might vary across countries but also the number of different religious denominations might differ substantially. An index of religious diversity can measure the probability that two randomly drawn persons from one group belong to the same church. Higher index values imply more religious fragmentation in the society. Figure 1.4 presents the distribution of religious diversity over the world. The map shows the values for those countries which are used later in the empirical estimations.

Figure 1.4: Religious Diversity around the World



Source: World Christian Encyclopedia; own calculations, created with stepmap

The lowest values of religious diversity are symbolized by dark green color. Higher levels of religious diversity are revealed by light green, yellow, orange, and red color in ascending order. The United States, Australia, and New Zealand reveal high rates of religious diversity, along with the Sub-Saharan African countries. Religious diversity appears to be lower in countries that had or still have a state religion, such as, e.g. Spain, Turkey, Saudi-Arabia, or some Latin-American countries. Income does not seem to be the

driving force behind these results as rich and poor countries have the highest rates of religious diversity and comparably prosperous countries, such as Norway and Sweden differ markedly.

The role of social fragmentation for economics has been studied by several authors (Alesina et al., 1999; Easterly and Levine, 1997; La Porta et al., 1999; Montalvo and Reynal-Querol, 2005). The majority states that higher fragmentation leads to worse economic outcomes. This effect could be either direct or indirect through worse government performance, a smaller amount of publicly provided goods, or a higher probability of civil conflict.

This work contributes to the empirical research on the economics of religion as it combines the importance of religiosity and religious diversity instead of focusing on one of the two dimensions. The concept of religiosity is an individual attitude whereas religious diversity is influenced by surrounding societal factors. It is an important question how these concepts are interrelated. Furthermore, this study generates links to other social phenomena, such as national identity and happiness and thereby offers interesting insights into the relationship of economic and social factors as well as it helps understand the formation of different identities. As such, it can contribute to a better understanding of the relationship between economic outcomes and matters of culture and personal identity.

1.2 Summary

Chapter 2 examines the relationship between the two variables on religion, religiosity and religious diversity. The literature offers two conflicting theories on this relationship. The Religious Market Theory which describes a supply side model of the market for religion proposes that rising levels of religious diversity should lead to increasing religiosity (Iannaccone, 1991). Following the Religious Market Theory which is based on microeconomic foundations, a monopoly church does not exert optimal effort if its servants are paid a fixed income by the government. A suboptimal effort level creates a lower quality good, in this case religion, which induces people to reduce their demand for this sub-optimal good. High competition on the market for religion should increase the quality of the produced good which raises the demand for religion. The contrasting demand side model of the market for religion suggests that religiosity decreases with rising levels of religious diversity. According to Bar-El et al. (2012) this is also called the "Secularization Hypothesis". This might appear confusing since secularization also describes the decreasing importance of religion with rising incomes. Since the demand side model builds on this idea I will stick to the term "Secularization Hypothesis" and refer to the income channel as the "secularist view". Whenever necessary in this work, I will clarify the terms. The main argument of the Secularization Hypothesis is that increasing the level of religious diversity raises people's doubt in the uniqueness and correctness of their respective

beliefs. Instead of switching beliefs to a denomination which might fit their preferences best people drop out of religion altogether. As a consequence, the Secularization Hypothesis proposes that higher levels of religious diversity lead to lower levels of religious involvement.

The religiosity score from Paldam and Gundlach (2012) is used as a comprehensive proxy variable for the importance of religion in people's lives. The World Christian Encyclopedia (Barrett, Kurian, Johnson, 2002) is used to estimate an index of religious diversity which also considers atheistic and non-religious as separate denominations. We run several cross-country OLS regressions with different control variables to investigate the relationship between religious diversity and religiosity. The findings suggest that there is a negative relationship which supports the demand side model. Apparently, the Secularization effect of people dropping out of religion is stronger than the Market effect of people switching their denominations to a faith which might better fit their preferences. This finding still holds when conducting different robustness tests.

Furthermore, ethnic diversity seems to be positively related to the level of religiosity. It appears that if the country is religiously diverse so that people might not identify with their religious group, they choose to identify on another level. Following the work of Bruce (2000) it is argued that a national identity might be a substitute for identification with the religious community.

This line of thought is developed further in Chapter 3. Similarly to the religiosity score proposed by Paldam and Gundlach (2012) we construct a composite measure which is supposed to capture the national identity of a person. We also rely on the World Values Survey and extract those questions which relate to the respondents' attitudes towards politics and their respective home countries. We come up with eight different indicators with which we are able to calculate national identity for 62 countries.

Following the argument which was developed in Chapter 2 we analyze the relationship between our new measure of national identity and ethnic and religious heterogeneity. We would expect to find a positive relationship between religious diversity and national identity and/or a negative relationship between ethnic diversity and national identity. In fact our results reveal that religious diversity is positively correlated with our measure of national identity, whereas other measures of social heterogeneity do not reveal a significant relationship.

We interpret our finding in the way that people choose to identify with the group which offers the narrowest set of common values and norms which is probably the religious community[2]. As a consequence, people identify with their church. If the society is religiously very diverse so that people from the same neighborhood adhere to different religious denominations they cannot identify with the same religious

[2]The role of norms and identification in the social psychology literature is discussed in e.g. Jetten et al., 2002; Terry et al., 1999; Turner, 1975.

values and norms. But still, they feel some closeness to the people in their society. It follows that they search for other common values and norms. These might be based on the cultural or historical heritage of a country which entices people to identify with their nation. This community offers a broader set of common values and norms so that it becomes possible for people of different religious faiths to identify with the same norms which are based on the nationality. It appears that religiosity and national identity are indeed substitutes.

In addition we are able to test other predictions concerning the formation of a national identity which could not be validated earlier due to a missing numerical measure for national identity. We find that democratic institutions and mobility throughout the country are possible determinants for the formation of a national identity. Both variables are positively related to our measure of national identity. Non-physical mobility which we measure by the number of phone lines seems to be more important than physical mobility as measured by the number of kilometers of paved roads. A communist past seems to have a detrimental effect on national identity. Concerning the role of income we do not find a clear pattern. Our baseline regressions do not reveal a significant relationship between national identity and income whereas the robustness tests hint in a direction that there might exist a negative relationship. Probably the concept of a national identity is beyond the dimension of income as it might be possible to identify with values and norms the nationality proposes independent of the economic circumstances. However, the negative relationship that appears in the robustness section might also indicate that with rising levels of economic development the ties to the social community become weaker, which might be a sign for growing individualism in the richest societies (compare, e.g. Beck and Beck-Gernsheim, 2005; Bellah et al., 2008; Lukes, 2006; Oyserman et al., 2002; Schwartz, 1994; Triandis et al., 1990).

In Chapter 4 we develop a theoretical framework which delivers hypotheses on the relationships between income, religiosity, and happiness which are estimated empirically. The empirical happiness literature has long been influenced by the Easterlin paradox which states that rising levels of income do not increase the level of happiness of societies (Easterlin, 1973, 1974). This finding has led to two theoretical explanations. First, people might make mistakes when maximizing their utility in cases where happiness maximization does not correspond to utility maximization. A better paid job, for example, might lead to lower levels of happiness if it comes along with higher commuting costs (Frey and Stutzer, 2006). The other possible rationalization for the Easterlin paradox proposes that happiness itself is not a suitable proxy variable for utility (Becker and Rayo, 2008). Rather, happiness is an argument of the utility function. Thereby, lower levels of happiness can correspond to higher utility if other arguments of the utility function rise.

However, new empirical results seem to disprove the Easterlin paradox. If income is measured in

logarithmic terms there seems to be a robust positive relationship between income and happiness across countries and over time (Deaton, 2008; Stevenson and Wolfers, 2008; Sacks et al., 2010). This finding suggests that happiness might be a suitable proxy variable for utility. In a comment to the paper by Stevenson and Wolfers (2008), Becker and Rayo (2008) propose a framework which rationalizes that happiness is only a part of the utility function. We extend this approach by considering happiness as a direct proxy for utility, similar to Frey and Stutzer (2002). We develop a theoretical framework which can explain three stylized facts from the empirical literature. First, there is a positive correlation between happiness and religiosity, second, a positive correlation between happiness and income, and third, a negative relationship between income and religiosity.

We use an unbalanced panel data set in order to estimate the different relationships. The happiness data is taken from the study be Stevenson and Wolfers (2008) who calculate a measure of national happiness based on the World Values Survey. Paldam and Gundlach (2012) also use the World Values Survey in order to calculate a composite measure of religiosity. These two measures are used to analyze the relationship between religiosity and happiness.

In our empirical estimations we find that the same level of happiness can be maintained with different levels of religiosity. We argue that religiosity is an element of the happiness function, which is a proxy for the utility function. We find that political participation and the absence of misery, which is a weighted average of inflation and unemployment, are further elements of the happiness function. Our results indicate that decreasing levels of religiosity can be substituted for higher levels of political participation or for lower levels of the misery index. Our empirical results support the three hypotheses gained in the theoretical section.

Chapter 2

Religious Market Theory vs. Secularization Hypothesis: The Role of Religious Diversity Revisited

2.1 Introduction

Freedom of religion is one of the basic human rights in most countries, especially in the Western democracies. What is the consequence of this freedom of choice and the resulting variety of different religions, does it increase religious involvement? Or does it undermine people's closeness to their church and therefore reduce religiosity? It seems that there are plausible arguments to answer both questions with 'yes'. In fact, in the literature on economics of religion both questions have actually be answered with 'yes'. The present paper reinvestigates the relationship between religious diversity and religiosity. It analyzes empirically which of the two opinions should be supported.

The part of the literature that adheres to the Religious Market Theory has mainly been influenced by Iannaccone's (1991) article in which he tries to apply microeconomic market theory to the market for religion. Iannaccone (1991) argues that a monopolistic church, as any other monopolistic firm, earns positive profits and output is smaller than under full competition. In many countries the employees of the church are paid by the government. If their salary is fixed, the church can only raise profits by reducing effort. Hence, the quality of the produced religious good declines which entices consumers to demand less religion goods. It follows that religiosity should be lower in countries where there is a monopolistic church

or if one religion is highly favored by the government and protected through legislation or subsidies.

Another negative effect of monopolistic churches on people's attitude towards religion is that a single church can only serve a fraction of their beliefs. As Iannaccone (1991) puts it "[a single church] cannot be monotheistic and polytheistic; it cannot proclaim both that Jesus is the Christ and that the messiah is yet to come"(p.163). On a competitive religious market there is a higher probability that everyone finds a faith that fits his beliefs which increases the demand for religious goods. The quality of the produced religious good should also be higher on a competitive market because a single church cannot earn positive profits by reducing effort. Hence, on a competitive market, i.e. with greater religious diversity, the overall level of religiosity should increase. In his empirical validation of the theory Iannaccone (1991) finds that this is especially true for predominantly Protestant countries.

In a study of the 1906 US Census of Religious Bodies Finke and Stark (1988) analyze the impact of urbanization and religious pluralism on religious mobilization. They find that religious adherence is higher in cities compared to rural areas and argue that religious diversity explains the higher levels of religiosity in urban areas. Gruber (2005) also finds that religious participation increases with market density. In a study on church attendance rates in ten Western economies from the 1920's to the 1990's Franck and Iannaccone (2009) compare the market model of religion to the secularist view which proposes that higher levels of development reduce religious participation. They find that income, education, or urbanization do not affect the level of religiosity. However, as the results and discussion in the remainder of this paper will show, these findings might be due to the fact that church attendance is probably not a suitable proxy for religiosity. But Franck and Iannaccone (2009) argue that the formation of welfare states reduces church participation rates. People do not have to rely on churches any longer because social benefits are granted by the government. This effect is stronger in countries with a monopolistic church because in a competitive market churches offer social benefits of higher quality which can compete with government welfare and attract more people.

The Religious Market Theory is build on three pillars. First, a monopolistic church has less incentive to exert effort to produce high quality religious goods than churches in a fully competitive market. Second, a monopolistic church can satisfy only a smaller fraction of beliefs than many competing churches. Hence, religious diversity should increase religious participation. Third, market forces have crowded out religion. Government welfare services reduce the church's importance which primarily affects monopolistic churches. Barro and McCleary (2002) investigate the correlation between religion and economic development in both directions of causation. In their comprehensive study they find, amongst other things, that religious pluralism has a positive effect on religious inputs, such as church attendance, and religious outcomes, such

as belief in heaven and hell which supports the Religious Market Theory.

However, in a follow-up paper (McCleary and Barro, 2006) the authors do not find a significant impact of religious diversity on religiosity. But McCleary and Barro (2006) show that GDP has a negative effect on religiosity. The authors state that "this finding supports the secularization view...[although] the proponents of secularization have been in retreat over the last couple of decades." The secularist view has been established by social scientists (e.g. Martin, 1979; Stark and Bainbridge, 1986). The Secularization Hypothesis, i.e. the demand side model, which builds on the foundations of the secularist view, is also composed of three arguments. First, and probably most intuitively, the establishment of different churches casts doubt on the correctness of one's own belief. This does not induce people to switch religions but to reduce their overall religiosity. Second, it might be behaviorally optimal to reduce revealed religiosity in a non-religious society. Finally, ethnicity and national identity seem to be more important for the consumption of religious goods than market structure.

The secularist view proposes that the importance of and also the interest in religion decrease as countries develop economically. In early times life on earth was meant to be led religiously in order to appease the gods and to make sure that an afterlife in heaven will be allowed. Since the late Middle Ages humans seem to focus on worldly matters, such as higher income and wealth (compare Inglehart and Baker, 2000). Today we also see that religion plays a more prominent role in less developed countries than in the industrialized world (see Paldam and Gundlach, 2012 or Gundlach and Opfinger, 2011). Whether the causation runs from religiosity to economic development or from higher income to lower religiosity is not definitively resolved. Paldam and Gundlach (2012) present causality tests which show that in the long run causality goes from income to religiosity. The implication over a shorter period is less clear, but the fact that higher levels of economic development correlate with lower levels of religiosity seems unquestionable. The secularist view also states that higher education would lead to lower levels of religiosity because better education renders mystic or miraculous explanations insufficient. Natural disasters in early times have been deemed a punishment of the gods. Today, in the developed world people know that disasters are due to extraordinary weather conditions, the shifting of tectonic plates, or greenhouse gas emissions.

Founded on this basic idea and regarding the relationship between religious diversity and religiosity, the Secularization Hypothesis, i.e. the demand side model, proposes that as long as there is only one religion this religion and its beliefs are undoubtedly correct. If adherents to this monopoly religion become aware of the existence of other churches and faiths the belief in the own religion's correctness might vanish. A higher supply of different beliefs might destroy the trust in the uniqueness of the own church. Consequently, people reduce their overall religious involvement instead of switching denominations because they are not

sure in which religion to trust. Hence, higher religious diversity should lead to lower levels of religious participation.

In order to show that a higher supply of religious goods tends to decrease the ties to one's own religion Sherkat (1991) uses survival models. Olson (1999) finds that the rising doubt in the own religion might entice people to reduce their overall religiosity. But he also offers another explanation in favor of Secularization arguing that the reduction in religiosity could as well be explained by behavioral motives. In order to signal conformity it can be socially optimal for a religious person to reduce her revealed religious involvement if the surrounding society discloses low religious participation. Furthermore, Olson (1999) criticizes Finke and Stark's (1988) findings on methodological grounds. The positive relationship found in this paper is said to be due to multicollinearity issues which turns the coefficient from negative to positive.

A final argument proposed by the Secularization Hypothesis is brought forward in Bruce (2000) who shows that religious participation in the Nordic states declined continuously although the level of religious diversification has remained stable. He argues that ethnicity and a national identity are more important in explaining religiosity than the structure of the market for religious goods. Breault (1989) and Blau et al. (1993) also support the Secularization Hypothesis, whereas Bar-El et al. (2012) find that the relationship between religious diversity and religiosity follows an inverted U. At low levels increasing religious pluralism raises religiosity. When the maximum point is reached further increases in religious diversity reduce the level of religious involvement. Chaves and Gorski (2001) come to a similar conclusion. In a summary of the literature they do not find a clear pattern between religious diversity and religiosity.

The aim of this paper is to contribute to the discussion on the relationship between religious diversity and the overall level of religiosity across countries. I try to find out whether the Market effect or the Secularization effect dominates in the relationship between diversity and religiosity. This appears to be a microeconomic question. Hanson and Xiang (2011) present a model to determine the market power of a religion. The present paper focuses on the comparison of different markets for religion, monopolistic and competitive. That is why a cross-country analysis on the macroeconomic level is applied. It would be desirable to examine the development of religiosity within one country when diversity changes. But the religiosity score from Paldam and Gundlach (2012) is only available at the country level and the time horizon of 25 years that is covered here is not enough to perform within-country analyses.

I use a broad data-set and religiosity is measured differently compared to earlier studies. Instead of relying on church attendance rates as a proxy for religious involvement I use a more comprehensive measure of religiosity which has been proposed by Paldam and Gundlach (2012). Since it is plausible to assume that religiosity is a more complex phenomenon than the desire to visit a church this approach should produce

more reliable results concerning its actual relationship to diversity. In fact, McCleary and Barro (2006) find a positive effect of religious diversity on religiosity only when church attendance is the dependent variable. Otherwise, they do not find a significant relationship between diversity and religiosity. Furthermore, Glock and Stark (1965) state that "[i]t is evident that to equate the two [churchgoers] on the grounds of their equal participation in worship services is to obscure a major difference in their involvement in ritualistic activity. This illustrates the inherent weakness of relying on a single indicator to distinguish individuals on this, as well as other dimensions of religiosity."(p.29).

Religious diversity arises as a consequence of the opening of religious markets. As already described, monopoly religions have the possibility to earn positive profits as long as the position of the monopolistic church is protected through legislation. Once the market for religion is liberalized new denominations will enter the market to earn part of the profits. This will entice part of the consumers to switch their denomination from the monopoly religion to the new church. Besides, the Secularization effect might lead others to doubt their faith and drop out of religion altogether. If this Secularization effect is strong enough, that means more people drop out of religion than switch to a new denomination, this could explain how rising levels of religious diversity could lead to lower levels of religiosity. The hypotheses that are to be evaluated empirically are:

1. Rising religious diversity reduces religiosity (Secularization Hypothesis) and

2. Rising income reduces religiosity (secularist view).

Rejection of hypothesis 1 would support the Religious Market Theory, and a rejection of hypothesis 2 would question the secularist view which is prominent in social sciences.

As I will discuss more extensively in the section on data, several earlier studies suffer from problems in the calculation of the index of religious diversity. The second contribution of this paper is that this problem is resolved by relying on data on religious adherence of the whole population within the countries under consideration. Since the religiosity data set is based on the World Values Survey it contains information on industrialized and developing nations. These facts should increase the accuracy of the results and should shed new light on the discussion whether the Religious Market Theory or the Secularization Hypothesis better describes people's attitudes concerning religious behavior.

The paper is organized as follows. In Section 2 I describe the data and methodology, especially the construction of the measure of religiosity and the index of religious diversity. The results are presented in Section 3, followed by some robustness tests. In Section 4 I discuss the results with regards to the underlying theories. Section 5 concludes.

2.2 Data and Methodology

2.2.1 Data

In most existing papers church attendance rates are used as a proxy for religiosity. But it is plausible to assume that religiosity is a broader construct than just visiting a church. Religiosity is reflected in people's beliefs in God and the church and religious practices, such as praying. For this reason Paldam and Gundlach (2012) construct a comprehensive measure of religiosity. They analyze answers to questions concerning religion from the World Values Survey and calculate a religiosity score by using factor analysis. On the whole there are 14 questions on religion which Paldam and Gundlach (2012) use to create the religiosity score. These ask, for example, about subjective attitudes to religion, such as if the individual believes in God, thinks that religion is important in life, considers himself a religious person, and about revealed religious behavior, such as how often the individual goes to church or if he adheres to a specific denomination. The whole set of questions can be found in Table 2.4. The religiosity score ranges from 0 to 100 percentage points and will be the dependent variable throughout the whole analysis.

The World Values Survey is based on national surveys conducted in industrialized as well as developing nations in five waves in 1982, 1990, 1995, 2000, and 2005. The questionnaire includes information on the respondents' demographics, such as age and gender as well as information on the economic conditions of the household. Furthermore, it contains questions about people's attitudes concerning politics, religion, life satisfaction, and related topics. The average religiosity score over the five waves can be calculated for 93 countries.[1]. The religiosity score can be interpreted as a measure for the importance of religion in people's lives. The interpretation is similar to what other authors have called "neo-secularization"(Yamane 1997, Tschannen 1994, Casanova 1994, Chaves 1994). However, I will stick to the term religiosity throughout this analysis.

The explanatory variables of main interest are religious diversity and income in each country. Commonly, religious diversity is measured by a concentration index, called the Herfindahl-Index, which is gained by $H = \sum_{i=1}^{n} s_i^2$ where s is the share of adherents to each religious denomination i and n is the number of denominations. This is transformed to the index of religious diversity by $1 - H$. This index for religious diversity will equal 0 if every person in a country belongs to the same religious denomination and will equal 1 if everyone belongs to a different denomination.

Voas et al. (2002) show that the calculation of the index of religious diversity can be problematic. It can cause a positive (Religious Market Theory) or negative relationship (Secularization Hypothesis) between

[1] For further detail on the religiosity score, see the original paper by Paldam and Gundlach (2012)

religious diversity and religiosity. The variability of the number of adherents to each denomination is crucial. If religious diversity grows because of higher variability in denominations with a small number of adherents, a positive relationship emerges. By the same token a change in diversity due to variation in larger religious denominations generates a negative relationship. The authors propose that this mathematical fallacy can be resolved if, and only if, every person in a country belongs to a religious denomination. Hence, I include atheistic and non-religious as single denominations. In most cases this is a free decision so that there is no reason to exclude this part of the population from the calculation of the index of religious diversity.

I use data from the World Christian Encyclopedia (Barrett, Kurian, Johnson, 2002). This encyclopedia reveals in detail for every country the fraction of the population that belongs to each denomination. The World Christian Encyclopedia distinguishes many Christian denominations, such as Roman Catholic, Protestant, Anglican, Baptist etc. Other denominations are Islam, Judaism, Buddhism, Hinduism, Taoism, Shintoism, and indigenous religions. When there is a considerable Shiite population I separate Islam into Sunni and Shiite Islam. In this sample this applies to Azerbaijan, Iran, Iraq, Pakistan, Saudi Arabia, and Turkey. Information on the Shiite population is taken from Riggs (2006). With atheists and non-religious included, I am able to calculate the index of religious diversity for the whole population which should make the results robust to the mathematical problem discussed by Voas et al. (2002). Table A.1 in Appendix A shows the index of religious diversity for the countries used in this analysis.

In order to reduce the risk of reverse causation I use income from a year before the first observation of religiosity. Only the Maddison (2010) online database offers income information on the single former Soviet nations before the dissolution of the USSR. This data is available only for the year 1973. In one of the robustness tests I use income data from the Penn World Tables and exclude the former Soviet nations. Furthermore, I test the robustness with the Penn World Tables data for the year 1993 and include the single former Soviet nations. I control for income to take into account that religiosity is lower in richer countries. Income is used in logarithmic terms because Paldam and Gundlach (2012) propose that secularization is a non-linear process. In order to control for other variables suggested by the secularist view I include the population growth rate, the total fertility rate, and the urbanization rate, all in 1973. Data on population growth comes from the United Nations Population Division, on the total fertility rate from the United Nations Children's Fund, on urbanization rates from the World Development Indicators.

Furthermore, I control for ethnic and linguistic diversity to take into account that there might be cultural differences aside from religious diversity. Data is taken from Alesina et al. (2003) and is constructed equivalently to the index of religious diversification. To check the robustness concerning the results on

ethnic diversity I also use the measure of ethnic diversity from Fearon and Laitin (2003). Population is also included in the regressions to test whether the size of the country influences religiosity. Data comes from the World Development Indicators. Furthermore, I added different measures of democracy to the equations in order to estimate the effect the political circumstances have on religiosity. The polity score is taken from the Polity IV database and information on political rights and civil liberties from the freedomhouse.org web page. I use the polity score and the information on political rights and civil liberties from the year 1973 because it might take time until changes in political regimes might influence religiosity. Also the year 1973 is chosen to make the control variables fit in the time horizon. I control for education, based on information from the Barro and Lee (2010) dataset. The variable chosen is the percentage of the population aged 25 years or older that completed secondary education. Higher education should be correlated with lower religiosity since it makes mystic or miraculous explanations of certain phenomena insufficient. As Franck and Iannaccone (2009) propose, spending on education affects religiosity. I test this assumption by using their data to control for government spending on education.

Fincher and Thornhill (2008) propose that the disease environment influences religious diversity, however, this does not work as an instrument for religious diversity in the present setting. As I will show later, French legal origin is a suitable instrument. Data on this comes from La Porta et al. (1998, 2008).

2.2.2 Methodology

The empirical methodology is straight-forward. I run cross-country OLS regressions of the level of religiosity on the index of religious diversity and other control variables. Since religious diversity does merely change over the 25 years covered here and several other variables are observed only once it is not possible to use panel data methods. Instead I take the average values of religiosity and religious diversity over the period from 1982 to 2005. The estimated model is:

$$religiosity_i = \alpha + \beta \cdot diversity_i + \gamma \cdot income_i + \delta \cdot X_i + \varepsilon_i \tag{2.1}$$

where X_i is a vector of control variables. I use clustered standard errors because of the stability over time in the diversity variable. This method avoids to underestimate the standard errors which would result in too large t-statistics. The maximum number of observations for religious diversity is 92. Since there are missing values for some countries in different variables the number of observations is reduced to 74 when all control variables are included, as is done in Table 2.3. Still, this should be sufficient to give a good indication whether to support the Religious Market Theory or the Secularization Hypothesis.

The coefficients of main interest are β and γ. A positive β would support the Religious Market Theory because this implies that religious diversity is positively correlated with religiosity. In contrast, a negative β would support the Secularization Hypothesis. γ describes whether the underlying secularist view can be supported, for this the coefficient should be negative. It might be objected that the variable for religious diversity could suffer from endogeneity due to omitted variable bias or simultaneity issues.

However, in the previous literature on this topic simultaneity has not been considered a problem (e.g. Iannaccone, 1991) and it is not obvious how religiosity should influence religious diversity. If there was a relationship between the two variables high levels of religious diversity would have to be caused either by high or low religiosity. Several decades or centuries ago average religiosity was higher than today. If the first hypothesis was true, this should lead to high levels of religious diversity. But religious diversity was significantly lower in 1900 than today[2]. The other possibility is that low levels of religiosity lead to high religious diversity. Then, one should ask why anybody should take the effort to found a new denomination if the population is not religious at all. If low levels of religiosity led to high diversity new churches should emerge in high number in developed countries, which in fact does not seem to happen. Thus, as in the previous literature, I assume that religiosity does not affect diversity so that simultaneity should not have a negative effect on the estimates. As Weber (1904/05) argues, the causation might run from religiosity to income. However Paldam and Gundlach (2012) present causality tests which imply that causation goes from income to religiosity so that the estimates on income should also not be affected by simultaneity.

Unfortunately the time period that is covered here is too short to analyze the impact of changing religious diversity on religiosity within one single country. Furthermore, there is probably too little variation in religious diversity in one country across its jurisdictions. That is why I use a data set that covers many countries at different stages of development and with very different levels of religious diversification. Nevertheless, I also use instrumental variable estimations in the subsection on robustness to assure that my estimations are indeed correctly specified. The instrumental variable regressions help overcome the possible bias introduced by omitted variables as well as by, unlikely, simultaneity. Fincher and Thornhill (2008) propose that the disease environment could explain religious diversity. I tried to use their data on diseases and pathogens in each country as instruments. However, the first stage results show that the instruments are too weak (first stage F-statistic: 2.3).

La Porta et al. (1997, 2008) analyze how the origin of the legal codes in each country affects economic variables. They explain the underlying paradigms of the different legal rules. It appears that following their classification French legal origin is a suitable instrumental variable for religious diversity. The French

[2]In the US, for example, religious diversity was 0.7 in 1900 and 0.83 today, in Germany 0.5 and 0.7, in Denmark 0.02 and 0.2, or in Argentina 0.07 and 0.35.

Legal Code was written under Napoleon and was heavily influenced by the French Revolution. It emerged "to use state power to alter property rights and attempted to insure that judges did not interfere. [It is] more comfortable with the centralized and activist government" (Mahoney, 2001). A strong role of the government supports the traditional monopolistic position of the prevalent church, in France the Catholic church. Since religion was used as a means to please the people, legislation prohibited the introduction of new denominations. As a consequence, the presence of French legal origin should have a negative effect on religious diversity. In fact, it always enters negatively and highly significantly in the first stage regressions. The F-statistic of the first stage is greater than 7 and the Cragg-Donald test statistics also imply that French legal origin is not a weak instrument. The exclusion restriction also seems to hold. A French legal origin should not have a direct effect on the level of the religiosity score which is used to proxy religiosity in this analysis. Hence, French legal origin appears to be a suitable instrumental variable. However, a Durbin-Wu-Hausman test for column 10 of Table A.2 which is the preferred specification does not reject the hypothesis that religious diversity is exogenous (p-value: 0.21). In this case OLS is the best estimator for the relationship between religious diversity and religiosity. Nevertheless I report the results of the IV estimation in the robustness section.

2.2.3 Summary Statistics

Table 2.1 gives an overview of the summary statistics of the variables used in this analysis. The values are the averages over the investigation period. The religiosity score is calculated in percentage points. The mean is about 58 percentage points. The lowest religiosity is measured in Hong Kong with 12.7 percentage points. The country in this sample with the highest religiosity is Nigeria at 88.3 percentage points. The United States' religiosity score is 68.5 percentage points which is relatively high compared to other industrialized countries, such as France, Germany, the Netherlands, and the UK where the religiosity score lies between 32 and 37 percentage points. This fact has also been revealed by Paldam (2009). Poutvaara and Wagener (2010) propose a model with endogenous demand and supply for religious goods to analyze this relationship and show that such a model has multiple equilibria which might explain the differences between the US and other industrialized nations.

As mentioned above, a value of close to 1 in the religious diversity index means that the country is highly diversified. The country with the highest religious diversity is the Republic of Korea with an index value of 0.85, followed by Australia (0.84) and the United States, Ghana, and New Zealand (0.83). The country with the lowest value of religious diversity is Morocco with an index score of 0.03. Other countries with very low levels of religious diversity are Algeria (0.06), Malta (0.10), Colombia (0.12), and Jordan

(0.12). These low levels of religious diversity imply that almost the whole population belongs to the same religious denomination.

Table 2.1: Summary Statistics

Variable	*Number of observations*	*Mean*	*Median*	*Standard Deviation*	*Minimum*	*Maximum*
Religiosity	93	58.19	59.16	19.43	12.70	88.31
Religious Diversity	92	0.48	0.51	0.24	0.03	0.85
Log of income '73	92	8.35	8.52	0.94	6.21	9.81
Secondary Education	83	19.55	18.67	11.88	0.58	56.47
Ethnic Diversity	92	0.38	0.36	0.24	0.00	0.93
Linguistic Diversity	90	0.34	0.26	0.28	0.00	0.92
Population Growth '73	93	1.71	1.61	1.09	-0.19	4.80
Total Fertility Rate '73	83	4.05	3.18	2.07	1.50	8.21
Urbanization '73	92	51.12	54.10	23.82	3.68	100.00
Education Spending	89	4.34	4.30	1.47	1.00	7.90
Polity Score '73	86	-1.37	-7	7.82	-10	10
Political Rights '73	91	4.21	5	2.25	1	7
Civil Liberties '73	91	4.22	5	2.09	1	7
Population (million)	93	53.58	10.30	156.48	0.08	1182.88

Income in the Maddison (2010) database is measured in 1990 Geary-Khamis dollars. After taking logarithms the mean income in 1973 is 8.35 which corresponds to 4,230 dollars. Switzerland had the highest income in 1973 with 9.81 logarithmic points which equals 18,215 dollars, whereas the lowest income of 6.21 corresponds to only 498 dollars (Bangladesh). The variable secondary education measures the percentage of the population aged 25 years or older that completed secondary education. The mean is slightly below 20 percent. But across countries there is substantial variation. In India only 0.58 percent of the population finished secondary education whereas in Armenia more than half the population (56.5%) completed secondary education.

The variables ethnic and linguistic diversity are constructed equivalently to the measure of religious diversity. The results are very similar for most of the countries. Uganda is the most ethnically as well as linguistically diverse country, 0.93 and 0.92, respectively. The Republic of Korea is in both regards the most homogeneous country, the values differ from zero only in the third decimal. Countries in which these two indices differ substantially are, for example, Jordan where ethnic diversity is high (0.59) but linguistic diversity is low (0.04) or Colombia (0.60 and 0.02, respectively). In both these countries people of different ethnicities live together, but share the same language, Arabic and Spanish, respectively. Contrary, Cyprus and the Netherlands are ethnically homogeneous (0.09 and 0.11, respectively), but the linguistic fractionalization is fairly high, 0.40 in Cyprus and 0.51 in the Netherlands.

Population growth in 1973 is measured in percent and ranges from -0.19 percent in Cyprus to 4.8

percent in Andorra. The total fertility rate amounted to 1.5 children per woman in 1973 in Finland and to 8.2 children per woman in Rwanda. The urbanization rate in 1973 is also measured in percent and was highest in Singapore with everybody living in the city and lowest with 3.68 percent in Rwanda. Education spending measures the percentage of GDP spent on education. Nigeria spent only one percent of its GDP on education compared to 7.9 percent in Denmark. The smallest country in the sample is Andorra with less than 80,000 inhabitants, the largest is China with 1.1 billion inhabitants. The Polity IV score ranges by definition from -10 for total autocracies to +10 for full democracies. The index of political rights assigns a value of 1 to countries with full political rights and 7 for no political rights at all, accordingly, the index of civil liberties. In all these three indices there are a lot of countries with a polity score of 10 and political rights and civil liberties of 1. These are mostly Western democracies. On the other end there are mainly developing countries for which the polity score is negative and the indices of political rights and civil liberties are fairly high.

2.3 Empirical Results

The results presented in this section support the Religious Market Theory if the coefficient β is positive, whereas a negative sign supports the Secularization Hypothesis. A negative γ would also give support to the underlying secularist view.

2.3.1 Main Findings

Table 2.2 shows the results from regressions of the religiosity score on religious diversity, the log of income and other control variables. Underneath the coefficients the t-statistics can be found in parentheses. In column 1 religious diversity is negatively related to religiosity, as measured by the religiosity score.

An increase in the index of religious diversity of 0.1 coincides with a reduction in the level of religiosity by almost two percentage points. This finding is statistically significant at the two percent level. In this first approach the log of income in 1973 is the only other control variable to test the secularist view. In fact, an increase in income of one logarithmic point reduces the religiosity score by 11 percentage points. The difference in incomes between the richest and poorest countries amounts to 3.6 logarithmic points. This difference explains a variation in the religiosity score of approximately 40 percentage points. The index of religious diversity is by 0.82 index points higher in the most diverse country compared to the religiously most homogeneous country. This coincides with a difference in the level of religiosity of 15 percentage points. Although the impact of income is higher the variation in religiosity due to differences in religious diversity is substantial. The negative coefficient gives first support to the Secularization Hypothesis.

Table 2.2: OLS Regression Results, dependent variable: religiosity score

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Rel. Diversity	-18.28	-14.30	-24.99	-23.08	-23.42	-18.88	-17.97	-17.65	-16.92	-16.25
	(-2.58)**	(-2.06)**	(-3.51)***	(-2.59)**	(-2.90)***	(-2.57)**	(-2.50)**	(-2.45)**	(-2.32)**	(-2.35)**
Income '73	-11.12	-7.58	-8.62	-9.33	-8.54	-11.14	-11.47	-11.80	-11.02	-12.68
	(-5.96)***	(-2.80)***	(-4.23)***	(-3.84)***	(-3.65)***	(-5.32)***	(-5.74)***	(-5.93)***	(-6.20)***	(-8.06)***
Sec. Educ.		-0.45								
		(-2.79)***								
Ethnic Div.			31.23		35.54					
			(4.13)***		(4.27)***					
Ling. Div.				16.22	-3.75					
				(2.06)**	(-0.46)					
Polity sc.						0.04				
						(0.18)				
Pol. Rights							-0.16			
							(-0.23)			
Civic Lib.								-0.47		
								(-0.59)		
Educ. Spen.									-0.20	
									(-0.16)	
Population										-0.03
										(-2.66)**
cons	160.65	137.42	130.91	142.36	129.07	161.02	163.76	167.68	159.70	174.58
	(10.46)***	(6.67)***	(7.00)***	(6.79)***	(6.14)***	(9.33)***	(9.38)***	(9.72)***	(10.83)***	(12.81)***
N	91	82	90	88	87	86	90	90	87	91
adj. R^2	0.34	0.38	0.48	0.38	0.49	0.33	0.35	0.35	0.34	0.42

Note: t-statistics in parentheses, *,**,*** denotes statistical significance at the ten, five, and one percent levels.

The following regressions include other covariates to test the robustness of this link and to investigate what else might affect religiosity. Religious diversity and the log of income in 1973, as the main arguments of the Secularization Hypothesis and the underlying secularist view, are kept throughout all estimations. The main insights from column 1 are obviously preserved. The coefficient on religious diversity is negative in every specification. It is always significant at least at the five percent level.

The magnitude of the coefficient ranges from 14.30 percentage points in column 2 to 24.99 percentage points in column 3. Hence, the difference in diversity between the most diverse and the most homogeneous countries decreases religiosity by 11.73 to 20.49 percentage points. The log of income in 1973 also has a significantly negative impact on the level of religiosity in all estimations. Increasing income by one logarithmic point reduces religiosity by 7.58 percentage points in column 2 and up to 12.68 percentage points in column 10.

Since education is commonly positively related to human development a higher share of people that completed secondary education should coincide with lower levels of religiosity. In column 2 education does indeed have a negative impact on the level of religiosity which is statistically significant. An increase in the share of the population that completed secondary education by one percentage point is associated with a reduction of religiosity by 0.45 percentage points.

In columns 3 through 5 other measures of diversity are included to ensure that religious diversity does not capture the effect of general cultural differences. Ethnic diversity is added in column 3. The results indicate that ethnic diversity is strongly positively related to the level of religiosity which implies that religiosity is significantly lower in ethnically more homogeneous countries. I will come back to this point in more detail in the discussion of the results. Increasing ethnic diversity by 0.1 index points coincides with a rise in the level of religiosity of more than 3 percentage points. This effect more than offsets the reduction in religiosity that is due to raising religious diversity by the same amount. Comparing the ethnically most homogeneous country where the index is virtually zero to the most diverse displays a difference in the religiosity score of 29 percentage points.

In column 4 I control for linguistic diversity. Similar to column 3, higher diversity correlates with increasing levels of religiosity, although the coefficient is comparatively smaller. Column 5 includes all measures of diversity. Linguistic diversity loses statistical significance, the sign even becomes negative. The coefficient on ethnic diversity remains similar to that from column 3, the magnitude is even slightly larger. The difference in religiosity between the countries with the lowest and the highest level of ethnic diversity now adds up to more than 33 percentage points. Replacing the index of ethnic diversity from Alesina et al. (2003) with Fearon and Laitin's (2003) leaves the results unchanged.

The coefficient on religious diversity is larger in these three specifications than in the other models. Rises in religious diversity by 0.1 index points relate to religiosity scores lower by 2.31 percentage points in column 4, 2.34 percentage points in column 5 and 2.5 percentage points in column 3. These results imply that ethnic and religious diversity both heavily affect the level of religiosity. High levels of religiosity are correlated with low levels of religious diversity and with high levels of ethnic diversity. Apparently, linguistic diversity does not affect religiosity.

I include different variables to measure the effect of democratic institutions in the next three columns. In column 6 the polity score from the Polity IV dataset is included, in columns 7 and 8 two variables that measure political rights and civil liberties, respectively. A higher polity score and lower political rights and civil liberties scores suggest that a country is more democratic. Although the coefficients hint in the direction that higher levels of democracy might be correlated with higher religiosity this finding is not statistically significant and the coefficients are only marginally different from zero. The magnitude of the coefficient on religious diversity is slightly smaller than before, especially when political rights and civil liberties are included. In these specifications an increase in the index of religious diversity by 0.1 coincides with a reduction of the religiosity score by approximately 1.8 percentage points. The coefficient on income is slightly larger than before, around 11 percentage points per one logarithmic point.

Franck and Iannaccone (2009) propose that government welfare reduces religiosity which they use as support for the Religious Market Theory. However, in column 9 government spending on education, which is one of the variables Frank and Iannaccone (2009) propose, does not have any effect on the level of religiosity, the coefficient is basically zero. The estimates for religious diversity and income change only very little and remain highly statistically significant. Column 10 controls for population size which is negatively related to religiosity which means that the level of religiosity is lower in larger countries. The negative relation between religious diversity and religiosity still holds although the coefficient on diversity is slightly smaller. Apparently, population size reduces the impact of religious diversity, probably because population and diversity are correlated with diversity being higher in larger countries.

In a following step I include all control variables of importance at the same time. The results are presented in Table 2.3. The main finding of religious diversity's negative relationship with religiosity holds unchanged in the five different estimations. The magnitude of the coefficient varies between 14.96 and 19.84 and it is statistically significant at the one percent level in three models and at the two and three percent levels in one case each. Comparing the most homogeneous to the most diverse country reveals a difference in the religiosity score of 12.27 percentage points in column 12 and 16.27 percentage points in column 13. Again, these findings support the Secularization Hypothesis.

Secondary education, ethnic diversity, linguistic diversity, the polity score, and population size are included as control variables. In column 11 the log of income in 1973 is also controlled for. To test other suggestions derived from the secularist view I substituted income for total fertility in column 12, for the urbanization rate in column 13, and for the growth rate of the population in column 14. All these variables enter together in column 15. The secularist view suggests that higher levels of development should correlate with lower levels of religiosity. Since fertility rates decrease as a result of economic development total fertility should be positively correlated with religiosity. By the same token a higher rate of population growth should also coincide with higher religiosity. Urbanization rates increase with economic development which implies that the relationship between urbanization and religiosity should be negative. All these propositions are supported by the results in columns 12 through 14.

Table 2.3: OLS Regression Results (with all significant explanatory variables), dependent variable: religiosity score

	(11)	(12)	(13)	(14)	(15)
Religious Diversity	-19.82	-14.96	-19.84	-17.42	-19.59
	(-2.87)***	(-2.24)**	(-2.85)***	(-3.18)***	(-2.63)**
Log of income 1973	-7.98				-4.08
	(-2.69)***				(-1.28)
Secondary Education	-0.29	-0.15	-0.44	-0.31	-0.19
	(-1.71)*	(-0.91)	(-2.68)***	(-2.48)**	(-1.07)
Ethnic Diversity	28.69	19.73	26.54	16.39	20.01
	(3.05)***	(2.19)**	(2.77)***	(1.97)*	(2.32)**
Linguistic Diversity	2.97	4.33	7.09	9.48	5.25
	(0.41)	(0.81)	(1.13)	(2.01)**	(0.77)
Polity score 1973	0.14	0.08	-0.06	0.01	0.22
	(0.60)	(0.42)	(-0.33)	(0.03)	(1.31)
Population	-0.03	-0.02	-0.02	-0.02	-0.03
	(-2.99)***	(-2.36)**	(-2.70)***	(-2.51)**	(-2.79)***
Total Fertility Rate 1973		5.26			-1.24
		(4.82)***			(-0.35)
Urbanization 1973			-0.20		-0.06
			(-2.36)**		(-0.70)
Population Growth 1973				8.21	9.48
				(6.31)***	(1.98)*
cons	131.16	40.68	76.43	51.46	91.52
	(5.45)***	(5.01)***	(9.49)***	(9.46)***	(2.75)***
N	75	68	75	75	68
adj. R^2	0.55	0.65	0.52	0.64	0.71

Note: t-statistics in parentheses, *,**,*** denotes statistical significance at the ten, five, and one percent levels.

Total fertility in 1973 and population growth are both positively and significantly related to the level of religiosity. An increase in the total fertility rate by one child per mother coincides with a 5.3 percentage

points higher level of religiosity. A one percentage point higher population growth rate is correlated with a rise in religiosity of 8.2 percentage points. Both findings are significant at the one percent level. The urbanization rate enters negatively and significantly at the three percent level. An increase in the urbanization rate by one percentage point correlates to a decrease in religiosity by 0.2 percentage points. The propositions from the secularist view of higher levels of development tending to decrease religiosity seem to be endorsed by these findings. In column 15 population growth has the strongest effect of the four secularist variables. Income, fertility, and urbanization are not significant in this setting.

With regards to the other control variables, one observation remains remarkable. Ethnic diversity is statistically significant in all five regressions and the impact is much stronger than that of income, education, or democracy. An increase in the index of ethnic diversity of 0.1 index points, i.e. higher heterogeneity, raises religiosity by 16.39 percentage points in column 14 and 28.69 percentage points in column 11. Hence, religiosity is by 15.24 to 26.68 percentage points higher in the most diverse country compared to the ethnically most homogeneous country. Secondary education enters negatively in all five estimations. However, this finding is statistically significant in only one case and the coefficient itself is fairly small. Neither linguistic diversity nor the democracy variable come close to statistical significance. Population size also relates negatively and significantly to the level of religiosity. But the coefficient is very small, a population that is larger by 1 million inhabitants is correlated with lower levels of religiosity by only 0.02 percentage points.

In a nutshell, the results provide support for the Secularization Hypothesis. Religious diversity and the level of religiosity are strongly negatively related. The magnitude of this effect amounts to approximately two percentage points in the religiosity score when diversity changes by 0.1 index points. This finding is statistically significant throughout all estimations. Furthermore, income has a negative impact on religiosity as proposed by the underlying secularist view. The total fertility rate and the growth rate of the population are positively and the rate of urbanization negatively correlated with religiosity which supports further propositions from the secularist view. Education, linguistic diversity, and democracy do not seem to affect religiosity. Interestingly, ethnic diversity is strongly positively related to religiosity. It enters highly statistically significantly in all regressions and the coefficient is even slightly larger in absolute terms than the coefficient on religious diversity.

2.3.2 Robustness

I ran several robustness checks to minimize the risk that the results suffer from flaws in the data or the empirical methodology. The results are presented in the tables A.2 through A.8 in Appendix A. They

confirm the main finding from the OLS regressions which was the negative relationship between religious diversity and religiosity.

As argued in the section on data and methodology, an objection against the analysis might be the possible endogeneity of religious diversity. Although the Durbin-Wu-Hausman test did not reject the hypothesis that religious diversity is exogenous I ran instrumental variable regressions with a dummy for French legal origin as instrument for religious diversity. The results of these regressions can be found in Table A.2 in the appendix. The models reestimate the regressions from Tables 2.2 and 2.3.

The relationship between religious diversity and religiosity remains negative which confirms the finding from the OLS regressions. The result is statistically significant in all models but two and the coefficient is even larger in absolute size than the OLS estimates. In the OLS regressions the coefficient ranged from -14 to -25, whereas in most instrumental variable regressions it lies between -31 and -47. The religiosity score is by 25.4 to 38.5 percentage points higher in the religiously most homogeneous country compared to the most diverse.

The instrumental variable estimation also confirm the other findings from the OLS regressions. The coefficient on the log of income in 1973 is negative and significant. The size of the coefficient and the significance levels are very similar to the OLS estimates. The same holds true for population size and for the coefficient on ethnic diversity which is positive, significant and of the same size as the OLS result. All the other variables are not statistically significant.

The results on total fertility, urbanization and population growth also confirm the findings from the OLS estimations. The fertility rate and the population growth rate are positively correlated with religiosity, the urbanization rate negatively. However, it has to be noted that religious diversity is not significant at the ten percent level if fertility or population growth are included. But still the coefficient is negative as in all the other models.

As a second robustness check I changed the calculation of the index of religious diversity basing it on the three largest denominations in each country to check whether very small religious groups might have driven the results in the previous section. The results, shown in Table A.3 in Appendix A, reveal that the magnitude and the significance level of the coefficient on religious diversity is reduced in several estimations. The importance of an accurate calculation of the index of religious diversity becomes obvious. With an imprecisely calculated index of religious diversity the results could suffer from extensive bias. The negative relationship with the log of income and population size and the positive relation to ethnic diversity are confirmed in this setting. The results on fertility and population growth support again the additional propositions from the secularist view. The other control variables are again not statistically

significant.

A third reestimation should check whether the results could be driven by different levels of income. The favored models are those in which all control variables are included (Table 2.3). I reran these models twice, the results are shown in Table A.4 in Appendix A. In the first four columns the data set comprises only those countries whose log of income in 1973 was above 8.52, i.e. 5,000 dollars. Obviously this value can be chosen arbitrarily, but the value of 8.52 leaves me with approximately the richer half of the countries. In the second set of estimations only OECD member countries are included. The negative relationship between religious diversity and religiosity is again confirmed. Only in columns 2 and 4 the coefficient is not significant, but the sign is still negative. The t-statistics on income might suffer from the fact that the sample size is heavily reduced. Nevertheless the coefficient is still negative and of a similar magnitude as in the baseline regressions. Ethnic diversity is still strongly positively related to religiosity although the significance level is lower in the OECD estimations. The result on population growth does not change. However, fertility is not related to religiosity in the OECD sample, whereas urbanization is strongly negatively related to religiosity. Urbanization is not significant in the rich country sample , but the coefficient on fertility is almost twice as large as in the OECD sample.

Table A.5 in Appendix A presents the results for the sample of remaining countries, i.e the first five columns for countries with an income in 1973 below 5,000 dollars and the last five columns for non-OECD member countries. The results concerning religious diversity remain intact. The negative relationship is always significant and the coefficient is even slightly larger than for the rich countries. Interestingly, income is not significant in this setting which is not surprising as secularization has probably not yet set in in the poor countries. Similar to the rich countries, education does not enter significantly in the first five columns. However, education has a significant negative relationship to religiosity in non-OECD countries. Another remarkable finding is that ethnic diversity does not enter significantly. Somehow, this role seems to be taken by linguistic diversity for the poorer and non-OECD countries. Regarding the other variables proposed by the secularist view, only population growth enters significantly which supports the idea that secularization has not yet occurred in the poorer countries of this sample.

The next robustness test splits the sample again into two parts. In the first five columns of Table A.6 I use information on religiosity from the waves 1982, 1990, and 1995, and in the last five columns from the waves 2000 and 2005. As is easy to see the results on religious diversity are not affected by this. The coefficient is still negative and of a similar magnitude as in the baseline regression. However, the other implications from the secularist view seem to lose some part of their explanatory importance. The coefficients on income, fertility, urbanization, and population growth are smaller in columns 6 through 10.

In contrast, the coefficient on ethnic diversity is larger. It seems that ethnicity becomes more important over time.

Since the Maddison data set is not free of criticism I use the Penn World Tables to perform the last two robustness tests. In the Penn World Tables there is no information on income for countries which were part of the Soviet Union prior to its dissolution. Consequently, these countries are excluded if income from 1973, for comparability with the baseline results, is used. The results are shown in Table A.7. In order to include all countries income can only be used from 1993 on. This exercise is presented in Table A.8. Again the main results hold unchanged. The effect of religious diversity is still negative and of a similar magnitude as before. The results on income, ethnic diversity, fertility, urbanization, and population growth are also unaffected by this action.

Taken together the robustness checks do not give reason to doubt the results from the previous subsection. Apparently the Secularization Hypothesis is supported by these findings, i.e. higher religious diversity is correlated with lower levels of religious involvement.

2.4 Discussion

The aim of this paper is to investigate whether the Religious Market Theory or the Secularization Hypothesis better describe the relationship between religious diversity and religious involvement. The results suggest that the Secularization Hypothesis seems to dominate the Religious Market Theory. As the theory of a religious market structure is without doubt plausible the question remains why the market for religion goods does not seem to follow the same rules as other markets. There is a greater variety of goods on a competitive market which are produced with higher effort and should therefore be of better quality than goods produced in a monopoly. Nevertheless, religiosity is apparently lower in countries in which there exist more religious denominations.

Religious Market Theory argues that higher religious diversity offers more than one set of beliefs and that for this reason more people are attracted to faith itself. The counterargument from the Secularization Hypothesis is that the existence of many denominations casts doubt on the correctness of one's own religion. The appeal of each religion, its market power, decreases and consequently, people reduce their religious involvement. If this Secularization effect is stronger or affects more people than the Market effect overall religiosity may be lower when religious diversity is high.

The way of measuring religiosity might also explain part of this finding. Church attendance rates were used to proxy religiosity in most of the earlier studies, which, as mentioned in the introduction, might bias the results. In this analysis I use a comprehensive measure of religiosity, constructed from 14 answers to

different questions related to religiosity. It is feasible to assume that this measure of religiosity is a better proxy variable for religiosity than church attendance rates.

Nevertheless, to explore this argument further I split the comprehensive religiosity score in its single items[3]. These can be interpreted in the same way as the religiosity score and were used as dependent variables in regressions which reestimate column 11 of Table 2.3. Religious diversity, the log of income in 1973 and ethnic diversity are the explanatory variables of main interest. Table 2.4 presents the coefficients and t-statistics for these variables. Secondary education, linguistic diversity, the level of democracy, and population size are also controlled for. The results are not shown, but are available upon request.

Table 2.4: OLS Regression Results (single items of the religiosity score)

	Religious Diversity		Log of income '73		Ethnic Diversity	
Dependent variable:	Coefficient	t-statistic	coefficient	t-statistic	coefficient	t-statistic
Importance of religion	-25,12	-2,16**	-10,21	-2,03**	34,70	2,18**
Important child quality	-20,93	-2,10**	-8,90	-2,04**	37,00	2,99***
Affiliation to denomination	-37,69	-4,13***	-1,76	-0,54	6,35	0,69
Attending religious service	-15,74	-1,71*	-10,56	-3,17***	33,89	2,65**
Self-assessment religious	-27,83	-3,79***	-3,47	-1,15	35,85	4,48***
Belief in God	-30,44	-2,84***	1,42	0,31	29,82	3,33***
Importance of God	-29,79	-2,96***	-7,58	-1,77*	49,87	3,69***
Private moments of prayer	-24,85	-1,93*	-8,73	-1,08	68,16	3,88***
Unbelieving politician unfit	-3,23	-0,35	14,81	-4,44***	35,72	2,22**
Appreciation of more believers	-6,41	-0,80	-10,72	-2,04**	85,14	6,48***
Church answers:						
moral problems	-7,13	-1,02	-5,98	-2,45**	21,58	2,79***
family life problems	-2,42	-0,28	-5,82	-1,93*	32,56	3,46***
spiritual needs	-7,11	-0,83	-0,31	-0,07	19,94	2,14**
social problems	-15,40	-1,84*	-4,04	-1,10	24,98	2,32**

Note: *,**,*** denotes statistical significance at the ten, five, and one percent levels.

The results can give interesting answers to the question which parts of the religiosity score are influenced by religious diversity, income, or ethnic diversity. The importance of religion, the affiliation to a denomination, the self-assessment of being religious, the belief in and importance of God, and private prayer are the variables that are most negatively related to religious diversity. Their index values are by

[3]The single questions from the WVS are: importance of religion: the question is whether people think that religion is important, people are considered religious if the answer is yes; important child quality: the respondents are asked to list important child qualities, they are considered religious if they mention religion; affiliation to denomination: asks whether people belong to a denomination, answer yes; attending religious service: asks how often people go to church, answer once a month or more; self-assessment religious: asks whether people regard themselves religious, answer yes; belief in God: asks whether people believe in God, answer yes; importance of God: asks whether God is important in life, answer yes; private moments of prayer: asks whether people pray in private, answer yes; unbelieving politicians unfit: asks whether people think that unbelieving politicians are unfit for their job, answer yes; appreciation of believers: asks whether people think that a high number of true believers in a society is good, answer yes; moral problems: asks whether the church can give answers to moral problems, answer yes; family life problems: asks whether the church can give answers to family life problems, answer yes; spiritual needs; asks whether the church fulfills spiritual needs, answer yes; social problems: asks whether the church can give answers to social problems, answer yes.

2.5 to 3.8 percentage points lower when diversity is increased by 0.1 index points. This finding is also statistically significant. Apart from the affiliation to denomination the affected variables are all intrinsic, or subjective, perceptions of religion. Apparently, the effect of religious diversity is strongest on these subjective values, which fits the idea of Bréchon (2007) that religiosity refers to the individual level. The finding on the affiliation to a denomination endorses the idea that people do not switch to another religion which might fit their preferences if diversity is high but that they drop out of religion altogether. But since some people switch faith the suppliers have an incentive to create a new denomination. These findings support the main argument of the Secularization Hypothesis which suggests that doubting the correctness of the own faith is the main consequence of high diversity. Although the coefficient on the attention of religious services is still negative, it is comparatively small. Income seems to be a more important predictor for the frequency of church attendance. Since income is negatively related to church attendance it appears that the importance of going to mass decreases with economic development. This might help explain why studies that use church attendance as a proxy for religiosity might come to other conclusions.

The results on income also support the secularist views' argument of religion's declining importance when countries develop economically. The importance of religion, the importance of God, and the attention of religious services are significantly and negatively related to income. Apparently religion is less important in everyday decision making in rich societies than in developing nations. Hirschle (2011) argues that religious activities are substituted for consumption-related actions when income rises.

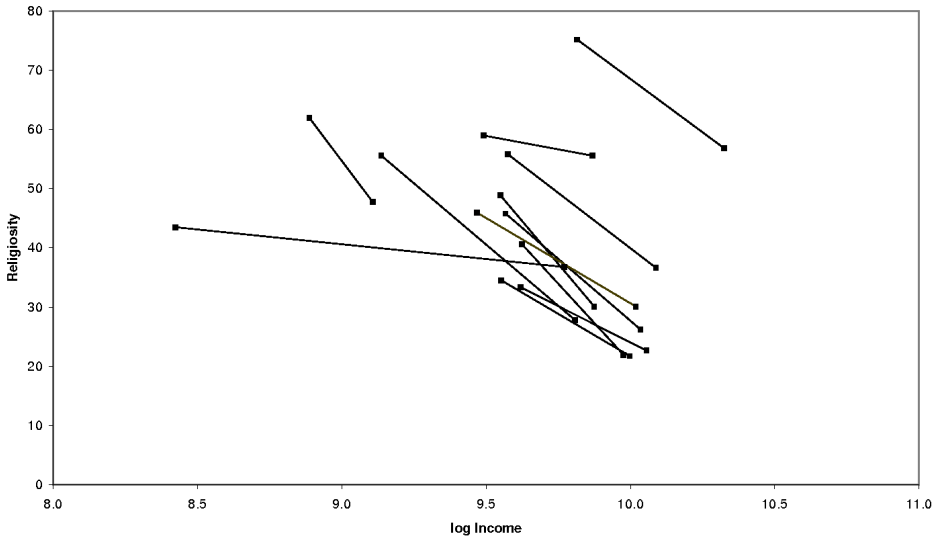
Ethnic diversity is related to religiosity inversely to religious diversity. It is positively related to every single item of the religiosity score. Only the affiliation to a denomination is not significantly related to ethnic diversity. The effect of ethnic diversity is extraordinarily strong for the appreciation of more believers, private moments of prayer, and the importance of God. As the only explanatory variable it is also significantly related to the question if the church can give answers to specific problems. The share of affirmative answers rises with ethnic diversity which means that in ethnically heterogeneous societies more people actually believe in the church's ability to help those in need.

Another argument against the use of church attendance rates is that people might go to church for other reasons than only indulging in their faith. It is possible that people go to church because of network effects or conformism which would make it socially advantageous to go to church although oneself might not be a believing person. There is a chance of meeting important people of the local community, such as possible business partners, in church. Hence, going to church can have an important signaling effect which results in improved connections to the social network. Church attendance rates might overestimate religiosity because they do not capture the effect of actually believing in God, the importance of religion in child

education, or private prayer. But all this is included in the religiosity score used in this analysis. Since these characteristics reduce religiosity compared to the rate of church attendance the true relationship between religious diversity and religiosity may be negative even if church attendance rates might propose something different.

Furthermore, the results on the other variables also support the propositions from the secularist view. The log of income in 1973 has a significant and economically relevant negative impact on the level of religiosity which backs up the idea that religiosity behaves inversely to the process of economic development. Religion's role in people's lives decreases as they become richer. Figure 2.1 compares religiosity and income for the years 1982 and 2005 for those countries where data is available for those years. It is easy to see that in each country religiosity decreases as income grows. This visualization supports the findings from the empirical section.

Figure 2.1: Relationship between log income and religiosity, 1982-2005



The findings on the total fertility rate, urbanization, and the population growth rate also hint in the direction that higher economic development coincides with lower levels of religiosity. Eduction does not show the results that are proposed by Secularization theorists since this variable did not enter significantly.

The question that remains is why other authors find a positive relationship between religious diversity and the level of religiosity. The first argument has already been mentioned: using church attendance rates

to proxy religiosity might not be the best method. Table 2.4 shows that it is, compared to other components of the religiosity score, only weakly correlated with religious diversity and that income appeared to be a better predictor of church attendance. The robustness tests show that the composition of the data sample might also influence the results. If the index of religious diversity is only based on the three largest denominations or the sample limited to the richer or OECD member countries, the impact of religious diversity is decreased, in some cases even far enough to render it statistically insignificant. In fact, the impact of diversity on religiosity is virtually equal to zero if the diversity index is based on only the three largest denominations and the data set consists only of OECD member countries with an income in 1973 of more than 5,000 dollars. Inserting church attendance as the dependent variable gives a positive coefficient on religious diversity, although not statistically significant.

The dataset I use is fairly large and covers industrialized as well as developing nations. In addition I employ a comprehensive measure of religiosity. Hence, it is feasible to assume that the relationship between religious diversity and the level of religiosity is indeed negative. This favors the Secularization Hypothesis over the Religious Market Theory.

The robust positive relationship between ethnic diversity and religiosity is another remarkable finding of this study, although not directly inferred from the Secularization Hypothesis. It is highly statistically significant in all estimated equations and the size of the coefficient is economically meaningful. Raising ethnic diversity by 0.1 index points corresponds to a higher religiosity score by 2.2 to 3.5 percentage points. Thus, the level of religiosity is by 20.5 to 32.5 percentage points higher in the country with the highest ethnic diversity compared to the ethnically most homogeneous country if all else is equal. If ethnic diversity is increased by one standard deviation the level of religiosity is higher by 5.3 to 8.4 percentage points.

What might be the explanation for this strong positive relationship? Probably the formation of a national identity can explain this finding. In ethnically homogeneous countries (low diversity), identification on a national level can replace the role of religion. People look for large social networks with which they can identify and be part of. The object of identification for the parties involved in this network are shared interests and values. In ethnically homogeneous countries people can more easily form a national identity. In ethnically diverse countries identification on a national level might not be as easily possible due to a lack of commonness. Consequently, people search for other networks with which they can identify, such as a religious community. High ethnic diversity leads to high religiosity because it prevents people from forming a national identity. Bruce (2000) also emphasizes the importance of national identity for religiosity.

The results from Table 2.4 also support this proposition. Appreciation of more true believers, private moments of prayer, and the importance of God reveal the strongest positive relationship to ethnic diversity.

The closeness of a small religious community appears to be especially important in ethnically diverse countries. Sharing the same values is essential for the formation of a common identity which is why the effect on the appreciation of true believers is very pronounced in ethnically diverse countries. People feel comfortable in their religious community if the company is strong enough and thus, praying and the importance of God are also heavily influenced by ethnic diversity. This behavioral approach and the missing opportunity to form a national identity raise the overall level of religiosity in ethnically diverse countries. Religious involvement can therefore in some respect be seen as a substitute for a national identity.

2.5 Conclusion

According to Iannaccone's (1991) Religious Market Theory religious diversity should increase religious involvement. Basic microeconomic market theory suggests that a monopolistic church earns positive profits by reducing effort and as a consequence competitive churches should attract more believers. The Secularization Hypothesis predicts the contrary, higher religious diversity should decrease religiosity. People will believe that their faith is the only and the right one if there exists only a monopolistic church. They will start to doubt their faith if they become aware of the existence of different churches. In order to maximize their personal utility people do not respond with switching the denomination but instead reduce their overall religious involvement.

Earlier studies found support for the Religious Market Theory as well as for the Secularization Hypothesis. But as Voas et al. (2002) show, many of them suffer from a common weakness that arises if the index of religious diversity is not calculated accurately. Moreover, in almost all of the studies religious involvement is measured by church attendance rates. In this paper I overcome both weaknesses by using detailed data on the whole population to calculate the index of religious diversity and employing a comprehensive measure of religiosity taken from Paldam and Gundlach (2012).

Cross-country regressions of religiosity on religious diversity and a set of control variables find that religious diversity is negatively related to religiosity which supports the Secularization Hypothesis. The result is stable throughout all estimations and is also robust to the alterations described before. An increase of religious diversity by 0.1 index points coincides with a reduction of the religiosity score by approximately two percentage points. Income also has a negative effect on the level of religiosity as suggested by the underlying secularist view.

Every church attracts less people when it competes with other churches which explains the negative relationship between religious diversity and religiosity. It loses market power if people start to doubt their faith. This effect appears to be stronger than the Market effect of people finding their utility maximizing

denomination.

Besides, ethnic diversity is strongly and significantly positively related to the level of religiosity. National identity and religiosity appear to be substitutes. In ethnically homogeneous countries people identify with their nationality whereas in diverse countries people choose other networks to identify with, such as a religious community.

To conclude, the results imply that basic market theory might not be easily applied to the market for religion. Instead, I find support for the Secularization Hypothesis. Religious diversity as well as income are negatively related to religiosity. Religiosity seems to be lower if more churches compete for people's affection. The roles of ethnic diversity and national identity are left for future research.

Chapter 3

In the Nation We Trust: National Identity as a Substitute for Religion

3.1 Introduction

> "[National identity] provides the sole vision and rationale of political solidarity today, one that commands popular assent and elicits popular enthusiasm. All other visions, all other rationales, appear wan and shadowy by comparison. They offer no sense of election, no unique history, no special destiny. These are the promises which nationalism for the most part fulfills, and the real reasons why so many people continue to identify with the nation." Anthony D. Smith (1991), National Identity.

Large empires have disintegrated into smaller units over the last centuries or in some cases even only in the last decades. New entities have been formed along specific lines which are today known as nation states. But how did these states evolve? What do the inhabitants have in common? The analysis of nations is popular in political and social sciences. It is investigated by, e.g. Anderson (2006), Alesina and Spolaore (2005), Bloom (1990), Gillis (1996), Miller (2000), Triandafyllidou (1998), Wodak et al. (1998), or concerning the role for specific nations or Europe by, e.g. Checkel (1999), Maier (1997), Noiriel (1996), or Smith (1992). Smith (1991) devotes a book to the question of national identity. As the reader proceeds throughout the book he comes across interesting hypotheses on the determinants of national identity. However, these can unfortunately not be tested empirically due to a missing measure of national identity. The present paper contributes to this literature by making national identity numerically measurable and

comparable across countries. In a later stage of this study we use our newly constructed index to evaluate the impact of ethnic and religious heterogeneity on national identity and in order to identify other possibly important covariates.

The concept of identity has been introduced into the economics literature by Akerlof and Kranton's (2000) influential article. They add identity to the utility function and can thereby explain why some outcomes are optimal for a group of people while they might be detrimental to others. Identity can affect economic outcomes through changes in the payoffs from own actions or from the actions of others. Furthermore, the choice of an identity can affect economic behavior or changing social norms might alter identity-based preferences.

In the following years several studies have been conducted which further investigate the role identity might play for economic outcomes. Bisin et al. (2010), for example, disentangle the identity formation process and propose two mechanisms. Cultural conformity claims that minority groups adopt inclusive identities and that they integrate into their social surroundings. Contrary, cultural distinctiveness proposes that minorities keep their identities and reduce interactions with individuals from other ethnic groups. The authors find empirical evidence supporting the idea of cultural distinctiveness. Darity et al. (2006) provide an evolutionary model that discusses inter- and intraracial interactions based on identities and explains under which circumstances racialist or individualistic identities are formed.

Bodenhorn and Ruebeck (2003) analyze the identity formation process of African Americans in the Antebellum South and find that the size of the community determines the probability of choosing a mixed-race identity. Similarly, Austin-Smith and Fryer (2005) find that the cost of leaving the peer group explains the education decisions of African Americans. By "acting white", i.e. becoming better educated, African Americans lose their former identity and choose to integrate into the white, presumably rich, network. Battu et al. (2007) come to a very similar conclusion when they investigate job market decisions of non-whites. Peer pressure and the possible gains of adopting a white identity heavily influence the job market decisions. Constant and Zimmerman (2008) and Constant et al. (2009) develop a measure of ethnic identity and investigate why migrants might choose an identity that favors the country of origin over their host country.

In this study we try to shed light on the relationship between national identity and ethnic and religious heterogeneity. Earlier studies followed similar approaches, however, they lack a clear concept of national identity, a problem which we try to solve with our index of national identity. Miles and Rochefort (1991), Calhoun (1993), Jones (1997), and Bond (2006) analyze the relationship between ethnic diversity and national identity and suggest that ethnic diversity and national identity influence each other. However,

Masella (2012) finds that ethnic heterogeneity does not have a significant effect on national identity. Smith (1991) proposes that a nation needs a single political culture, a unified economy, and a unified legal code (p.69) all of which should be more easily obtainable in more homogeneous societies, as this facilitates the finding of compromises on the policies or legal codes. Hence, it is feasible to assume that social heterogeneity has a detrimental effect on the formation process of a national identity. This is the main hypothesis which we want to test. We employ measures of ethnic and religious diversity as well as polarization in order to investigate their impact on national identity.

Ethnic or ethnolinguistic fractionalization has been used as an explanatory variable in many different settings. Easterly and Levine (1997) find that ethnolinguistic fractionalization helps explain Africa's unfavorable growth experience because ethnic diversity complicates public policies and leads to worse institutions. La Porta et al. (1999) argue that ethnic fractionalization reduces government performance and Alesina et al. (1999) show that higher ethnic diversity leads to a smaller amount of public goods provided. Ashraf and Galor (2007) claim that it is not cultural traits but the variation in cultural assimilation that affects economic development. In another paper, Ashraf and Galor (2011) suggest that genetic distance, as a consequence of human migration out of Africa, affects economic development.

Collier and Hoeffler (1998), Vanhanen (1999), and Fearon and Laitin (2003) investigate the economic determinants of civil wars. Vanhanen (1999) finds that higher heterogeneity increases the probability of the occurrence of civil wars. Collier and Hoeffler (1998) argue that the effect is not linear. First, the probability of a civil war rises with higher levels of ethnic diversity but after a maximum is reached further increases in ethnic diversity reduce the probability. Thus, Montalvo and Reynal-Querol (2005, 2005a) calculate a measure of ethnic polarization. They follow an idea of Esteban and Ray (1994). This index reaches its maximum if the society consists of two large rivaling ethnic groups. Montalvo and Reynal-Querol (2005) show that ethnic diversity has a direct negative impact on the GDP growth rate, whereas the impact of ethnic polarization and religious polarization is indirect through reduced investment, increased government consumption, or a higher probability of civil wars. In a following paper (2005a) they analyze the direct impact on civil wars and find that increasing ethnic polarization has a significant positive impact on the occurrence of civil wars.

We will use measures of ethnic and religious diversity, as well as polarization to investigate the impact of social heterogeneity on national identity. Using data from the World Values Survey (WVS), we suppose to find that ethnic and religious heterogeneity have a detrimental effect on national identity because a highly fragmented society will find it harder to identify with the same values and norms. If the society consists of different social groups they will be distinct from another. Hence, the members of the separate groups

will prefer to identify with their group instead of identifying with their nation. Furthermore, we will test more suggestions from Smith (1991) and try to find other possible correlates of national identity. Testable hypotheses are that democratic institutions and mobility throughout the country have a positive impact on national identity and that geographical factors also influence the formation of a national identity.

The paper is organized as follows. Section 2 describes our index of national identity. We will explain the calculation of the index and present the results for those countries used in our analysis. The data and methodology we use to analyze the relationship between our index of national identity and social heterogeneity are presented in Section 3. Section 4 shows the empirical results, followed by some robustness tests in Section 5. The results are discussed in Section 6. Section 7 briefly concludes.

3.2 National Identity Index

This section describes the construction of the index of national identity. The motivation behind constructing an index of national identity is twofold. First, the reason for constructing an index rather than analyzing several potential indicators of national identity separately is that we aim to identify a common underlying factor captured by a set of indicators of political and national interests and orientations, namely the national identity of a person. Table 3.1 suggests that using only one indicator might generate biased results. The proportion of the people who declare to be very proud of their country, for example, appears rather small. It might be that in an interview the respondents might hesitate to express overtly nationalistic attitudes. By combining a set of indicators we might be better able to actually capture the underlying factor of national identity. Second, within a unidimensional index, we are directly able to analyze the determinants of national identity.

To derive the national identity index, we apply a principal component analysis. The main idea of this approach is to construct an aggregated unidimensional index over the range of different dichotomous indicators of political and national interests and orientations capturing the national identity of a person.

The approach of aggregating different variables to a unidimensional index is widely used in the economic and social literature. We closely follow the approach of Filmer and Pritchett (2001) and Sahn and Stifel (2000, 2003) to construct an asset index of material welfare based on the possession of housing durables. The authors propose an asset index based on the possession of household assets and dwelling characteristics as a proxy of material welfare of households in cases where no information on household income or expenditure are at hand. Paldam and Gundlach (2012) use an index approach do derive a measure of religiosity to analyze the religious transition over time.

Principal component analysis is an aggregation technique to identify from a set of variables those linear

combinations that best captures the common information behind the variables (Filmer and Scott, 2008). This means that we assume that specific variables on social and political participation and political interest can explain the long-term national identity of a person measured by an aggregated index:

$$NI_j = b_1 a_{j1} + b_2 a_{j2} + ... + b_k a_{jk} \tag{3.1}$$

where NI_j is the national identity index, the a_j's refer to the respective variable of the person j recorded as dichotomous variables in the data and the b's are the respective weights for each variable used to aggregate the indicators to a unidimensional index and that are to be estimated. In our model this means that the k^{th} identity variable, identified by a_{jk} is a linear function of a common factor, which in our case is "national identity".

For the estimation of the weights in equation (3.1) we use principal component analysis, which, has been used often in the recent empirical literature.[1] In particular, we rely on the first principal component as our national identity index.[2]

Since we are not interested in the analysis of changes in national identity over time, we pool all survey years of the World Values Survey and calculate the national identity index for the whole sample. Table B.1 in Appendix B shows the results by country for those countries where information on all variables that enter the index are available.

We include 8 dichotomous variables as components for the national identity index which are presented in Table 3.1. These are assumed to capture the national identity of a person. Our choice of variables entering the index depends on two factors: First, we use variables that define national identity capturing available information in the World Values Survey on political interest and participation and on national interest and orientations. The second reason is mainly due to data constraints. This means that we rely on this specific set of variables because it is identified as the set which suffers least from missing information.[3] Table 3.1 shows the mean values of the indicators, the standard deviation, the number of observations, and the scoring factors of the principal component analysis. For example, 43.3% of respondents answered to

[1] For example, a large body of literature exists using an asset index to explain inequalities in educational outcomes (e.g. Ainsworth and Filmer 2006), health outcomes (e.g. Bollen et al. 2002), child mortality (e.g. Sastry 2004) when data on income or expenditure is missing. In addition, asset indexes are used to analyze changes and determinants of poverty (e.g. Stifel and Christiaensen 2007).

[2] An alternative way to estimate the weights to derive the aggregated index is a factor analysis employed, for example, by Sahn and Stifel (2001) and Paldam and Gundlach (2012). However, the two estimation methods show very similar results. For a systematic overview of different aggregation techniques, see Filmer and Scott (2008).

[3] We also tried to derive the index based on more variables. But since the sample size is then reduced a lot and since the results differ not very much, we decide to derive the index for as many countries as possible. With the underlying indicators, we are able to calculate the index for 62 countries in the sample, for almost 100,000 persons. The country specific mean values of the identity index as well as the standard deviation, and the number of observations are presented in Table B.1.

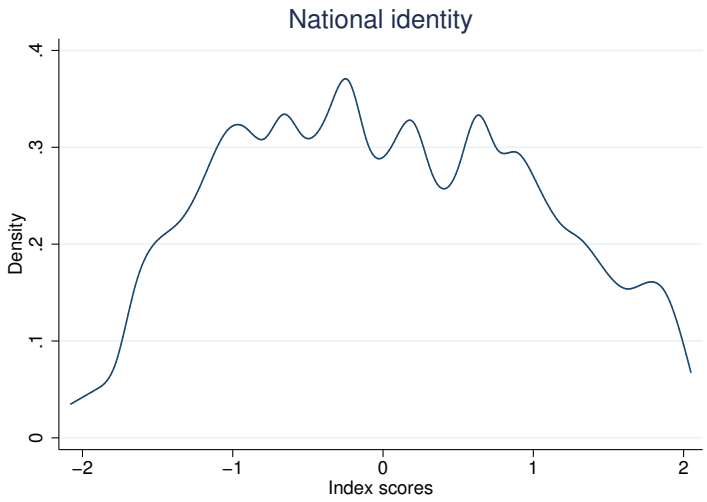
be very interested in politics and 16.6% of the respondents have stated their willingness to fight for their country. The mean value of the identity index is close to zero with a range of around -2 to 2. The distribution of the index is presented in Figure 3.1. In total, the first component explains 21% of the variance.

Table 3.1: Summary statistics for single items

		Index		
Indicators	Index value	Mean	SD	Obs
Politics very important in life (=1)	0.424	0.405	0.491	308,225
Willingness to fight for the country:yes (=1)	0.166	0.732	0.443	256,999
Interest in politics: very or somewhat interested (=1)	0.433	0.467	0.499	309,409
Signing a petition: have done or might do (=1)	0.200	0.663	0.473	310,689
Confidence: parliament: a great deal and quite a lot (=1)	0.290	0.414	0.493	312,863
Confidence: justice system: a great deal and quite a lot (=1)	0.237	0.516	0.500	269,203
Geographical groups belonging to first: country (=1)	0.092	0.337	0.473	254,120
Very proud of nationality (=1)	0.104	0.562	0.496	332,747
Index value (mean)	0.006			95,277
Index value (sd)	1.008			
Index value (min)	-2.030			
Index value (max)	2.000			
% of the covariance explained by the first principal component	0.210			
Eigenvalue of first principal component	1.683			

Source: WVS; calculations by the authors.
Note: Indicators of national identity and index statistics.

Figure 3.1: Density of National Identity Index



Source: World Value Survey; calculations by the authors.

3.3 Data and Methodology

3.3.1 Data

In the previous section we described the construction of our measure of national identity. This index will be the dependent variable throughout the whole analysis.

The aim of the present study is to analyze the relationship between national identity and diversity within the population. For this purpose we employ four different measures of social heterogeneity, ethnic diversity, ethnic polarization, religious diversity, and religious polarization. These four variables are the regressors of main interest. The indexes of ethnic and religious diversity measure the probability that two randomly drawn people belong to the same ethnic or religious group. It is calculated as $1 - H$, where H is a Herfindahl-Index which is gained by $\sum_i^N s_i^2$, where s_i is there share of people belonging to each ethnic or religious group i and N is the number of groups. Information on ethnic diversity comes from Alesina et al. (2003). Data on religious diversity is taken from Opfinger (2011) who relies on data from the World Christian Encyclopedia (Barrett, Kurian, Johnson, 2002) and also includes non-religious and atheistic as separate denominations. This method guarantees that the whole population is assigned a denomination which overcomes the weaknesses of previous studies using religious diversity as described in Voas et al. (2002). If everybody belongs to the same ethnic or religious group the index takes on the value zero and it equals one if everybody belongs to a different group.

Montalvo and Reynal-Querol (2005) calculate measures for ethnic and religious polarization. They use these measures to analyze their respective effects on economic development. The indexes of ethnic and religious polarization are gained by $Pol = 1 - \sum_i^N \left(\frac{1/2 - s_i}{1/2}\right)^2 s_i$. Diversity and polarization behave similarly in homogeneous societies. Polarization reaches its maximum if the society consists of two equally sized groups, i.e. diversity equals 0.5. The term in parentheses then becomes zero and polarization reaches its maximum. Further increases in diversity reduce the index of polarization. If s_i is very small the term in brackets is close to one. It is then multiplied by the small s_i and summed over all i. Subtracting this term from one yields a small value for the polarization index.

In order to reduce the risk of reverse causality we want to use income from a year before the observation period on national identity begins. The Maddison (2010) online database offers information on income, also for the single former Soviet nations, for the year 1973. We include income to control for the possibility that economic development might have an impact on the formation of a national identity. Furthermore, it serves as a kind of broad catch-all control variable so that it possibly reduces the negative consequences of omitted variables. Hence, income is included in all regressions.

The second aim of this study is to find other variables that might affect the formation of a national

identity and thereby test the arguments brought forward by Smith (1991). The political environment might be one, which we control for with the Polity score from the Polity IV database and with measures of political rights and civil liberties from the freedomhouse.org webpage. We rescale these two measures so that higher values signify more democratic institutions. We also use education as a control variable, information is taken from the Barro and Lee (2010) dataset. The variable we use is the percentage of the population aged 25 years and older that completed secondary education.

Geography is also supposed to influence the formation of a national identity. Consequently, we include a set of geographic variables in the regressions. Data on area size, if the country is landlocked, and the number of neighboring countries is taken from the CIA World Factbook. Information on the population size comes from the UN statistics division. Population density is calculated by dividing population through area. In order to evaluate if the countries under investigation have been a colony or under communist rule we rely on the country information from the CIA World Factbook. Data on soil quality is taken from Nunn and Puga (2009).

It is reasonable to assume that openness might affect national identity as it can be seen as a proxy for tolerance towards others or the unknown. We use the trade share and constructed trade share from 1985 (Frankel and Romer, 1999) to control for it. Smith (1991) argues further that mobility throughout the country is an important factor for the formation of a national identity. We use kilometers of paved roads as a proxy for physical mobility. Information is once more taken from the CIA World Factbook. We calculate kilometers of paved roads per inhabitant, per square kilometer, and per inhabitant per square kilometer. As a proxy for nonphysical mobility we use the number of phone lines per 100 inhabitants. Information is taken from the World Bank's World Development Indicators.

For the instrumental variable estimations we rely on data on the disease environment from Fincher and Thornhill (2008) and on climatic conditions which is taken from Sachs (2001). Fincher and Thornhill (2008) provide data on diseases and pathogen exposure in each country. From Sachs (2001) we take the data on the percentage of the population in each country living in temperate climatic areas.

3.3.2 Methodology

The present study is the first attempt to assign a numeric value to the concept of national identity. In order to discover possible correlates we run regressions with a whole set of control variables. Opfinger (2011) finds that religiosity decreases with rising levels of religious diversity but is positively related to ethnic diversity. He argues that religiosity and national identity might be substitutes. As a consequence, ethnic diversity should have a negative impact on national identity. We also use other measures of social diversity to reveal national identity's main explanatory factors.

We cannot use panel data methods since our main explanatory variables, ethnic and religious heterogeneity, are observed at only one point in time. Thus, we average our national identity index over the five WVS waves and run cross-country regressions. We use data at the country level because we want to analyze the impact of ethnic and religious heterogeneity. This a societal phenomenon and we want to compare different societies and measure the impact of social heterogeneity on identity formation at the national level.

In order to reduce the risk of reverse causality, most explanatory variables are used from 1973, the year for which we have income data for all countries. Other control variables, such as the dummy variables for former communist rule, landlocked countries, and former colonial rule, do not change at all over time. The estimated regressions are of the form:

$$NI_i = \alpha + \beta \cdot ethdiv_i + \gamma \cdot y_i + \delta X_i + \varepsilon_i \tag{3.2}$$

$$NI_i = \alpha + \beta \cdot ethpol_i + \gamma \cdot y_i + \delta X_i + \varepsilon_i \tag{3.3}$$

$$NI_i = \alpha + \beta \cdot reldiv_i + \gamma \cdot y_i + \delta X_i + \varepsilon_i \tag{3.4}$$

$$NI_i = \alpha + \beta \cdot relpol_i + \gamma \cdot y_i + \delta X_i + \varepsilon_i, \tag{3.5}$$

where NI_i is the index of national identity in country i, $ethdiv_i$ is ethnic diversity in country i, $ethpol_i$ is ethnic polarization in country i, $reldiv_i$ is religious diversity in country i, and $relpol_i$ is religious polarization in country i. y_i is income in country i, X_i is a vector of the other control variables and ε_i is the error term.

The coefficient of main interest in each case is β. A positive coefficient means that heterogeneity has a positive effect on national identity, whereas a negative β would imply that national identity decreases if heterogeneity rises.

The explanatory variables of main interest could all be subject to endogeneity bias. Due to the missing time dimension we are not able to use fixed effects models, which would decrease the importance of omitted variable bias. Consequently, we have to rely on two stage least squares estimation with instruments for the variables that we use to measure social heterogeneity. Fincher and Thornhill (2008) propose that the disease environment in a country could explain religious diversity. However, their argumentation seems to fit better to ethnic diversity. Groups that share the same immunity pattern to specific diseases should come together and separate themselves from other groups. This should be more true for ethnic groups than for religious groups. In fact, a common factor of Fincher and Thornhill's (2008) disease and pathogen variables is a suitable instrument for ethnic diversity. The first stage F-statistic is 4.7 on average. The null hypothesis of underidentification can be rejected at the one percent level. The Cragg-Donald Wald statistic that is used to test for weak instruments is on average 11.1. The comparison with the Stock and

Yogo (2005) critical values reveal that the disease environment is not a weak instrument. The exclusion restriction should hold because it is not obvious how the disease environment should affect the formation of a national identity if not through ethnic diversity. Cervelatti et al. (2011) find that the disease environment influences the possibility of civil conflicts. Following the argument of Montalvo and Reynal-Querol (2005a) and Fincher and Thornhill (2008), the disease environment leads to ethnic diversity which then results in a higher probability for civil conflict.

Ethnic polarization can be instrumented by the percentage of the population living in temperate climatic zones. The relationship is negative, which means that a larger share of people living in temperate climatic zones reduces ethnic polarization. Migration routes of the human population since its beginning in East Africa might explain this pattern. The further ethnic groups moved away from the cradle of mankind the further the different groups drifted apart. As a consequence, areas in temperate climatic zones are typically inhabited by one large ethnic group and some smaller groups, as a consequence of modern migration, which leads to low levels of ethnic polarization. The first stage statistics imply that the instrument is valid, as the F-statistic is on average 7.1, the underidentification hypothesis can be rejected at the one percent level and the Cragg-Donald statistic is on average 18.4. The exclusion restriction should hold in this case as well, as it is plausible to assume that the climatic conditions do not directly affect national identity.

We instrument religious diversity today with past religious diversity. Barrett, Kurian, and Johnson (2002) provide data on religious diversity for the year 1900. It is feasible to assume that past religious diversity influences diversity today and in fact the first stage regressions reveal that past rates of religious diversity are a strong instrument for religious diversity today (F-statistic over 20 and Cragg-Donald statistic over 50). The exclusion restriction demands that past rates of religious diversity do not affect national identity today but through present religious diversity. Since many countries of our sample did not exist in their present form in 1900 it is highly unlikely that past rates of religious diversity have a direct impact on national identity. In addition, historic events in the course of the twentieth century might have changed the perception of nationality so that variables that go back further in time should not influence national identity today. But religious diversity in 1900 must also not have influenced the formation of nations. In Europe, the present nations have not been formed along religious borders. In Germany, for example, there are Catholics as well as Protestants and if diversity in 1900 would have played an important role in the formation of nations, there should have been a Protestant and a Catholic Germany. Although there certainly exist exceptions, such as former Yugoslavia, this should nevertheless be true for most countries. Furthermore, countries that were under colonial rule have not been shaped by religious borders but by the

wishes of the ruling colonizers. As a consequence, religious diversity from the year 1900 appears to be a valid instrument for religious diversity nowadays.

The common factor of diseases and pathogens is also a suitable instrument for religious polarization as it enters very significantly in the first stage regressions (F-statistic over 15 and Cragg-Donald statistic over 20). We can assume that the disease environment affects national identity only through religious and ethnic heterogeneity so that the exclusion restriction should not be violated.

3.3.3 Summary Statistics

Table 3.2 presents summary statistics for the variables used in this study. We are able to calculate national identity for 62 countries. At the country level, our index ranges from -0.515 to 0.709 index points.[4] Mean and median are both slightly negative. The lowest value of national identity is observed in Argentina. Bangladesh reveals the highest value of national identity. Taiwan's level comes closest to the mean and the median lies between the observations for Georgia and Croatia.

Table 3.2: Summary Statistics on the country level

Variable	*Number of obs.*	*Mean*	*Median*	*Standard Deviation*	*Minimum*	*Maximum*
National Identity	62	-0.005	-0.063	0.296	-0.515	0.709
Ethnic Diversity	61	0.315	0.274	0.213	0.002	0.851
Ethnic Polarization	42	0.421	0.385	0.261	0.020	0.871
Religious Diversity	62	0.475	0.496	0.236	0.055	0.848
Religious Polarization	62	0.175	0.024	0.284	0.000	0.999
Log of Income '73	62	8.702	8.755	0.731	6.210	9.810
Polity score '73	56	-0.393	-7	8.263	-9	10
Political Rights '73	59	4.136	4	2.381	1	7
Civic Liberties '73	59	4.136	3	2.278	1	7
Secondary Education	54	23.439	23.485	11.991	0.580	56.470
Area in square km	62	1,186,486	127,438	3,029,922	316	17,098,242
Population in million	61	47.289	10.137	123.078	0.267	915.992
Population Density	61	135.749	86.970	190.013	2.322	1,176.827
Landlocked	62	0.178	0	0.385	0	1
# Neighboring Countries	62	3.790	4	2.847	0	14
% Fertile Soil	62	47.504	49.789	22.383	0.073	100.000
Former Colony	62	0.258	0	0.441	0	1
Former Communist Country	62	0.371	0	0.487	0	1
Trade Share '85	48	64.631	57.185	40.150	15.040	211.940
Constructed Trade Share '85	48	24.171	16.165	41.170	2.560	281.290
Roads per 1000 inh	55	8.027	6.859	6.670	0.193	25.945
Roads per sq km	56	0.871	0.378	1.146	0.011	6.373
Roads per inh per sq km	55	11,227.75	894.334	36,024.88	1.711	162,287.9
Phone Lines per 100 inh	56	16.786	10.000	14.621	0.000	58.000

The index of ethnic diversity is by construction distributed between zero and one, and measures the probability that two randomly drawn persons belong to the same ethnic group. The most homogeneous country in our sample is South Korea with an index value of 0.002. Nigeria is the most ethnically diverse country, 0.851. The index of religious diversity can be interpreted in the same way. Turkey is the most

[4]The mean of the national identity index differs to the mean in Table 3.1 because, it refers to the country mean and not to the whole micro data sample.

homogeneous country (0.055) whereas South Korea is the most diverse in this case with an index value of 0.848. Ethnic and religious polarization are at their maximum if the society is made up of two large rivaling groups. The indexes reveal low levels if diversity is very low or very high. The country with the lowest value of ethnic polarization in our sample is Portugal (0.02). Belgium is the ethnically most polarized country with an index value of 0.871. There are 20 countries in our sample where religious polarization is zero. Religious polarization in the Dominican Republic reaches an index value of 0.999.

Income in 1973 is measured in logarithmic terms. It ranges from 6.21 which equals 497.7 1990 US-Dollars in Bangladesh to 9.81 which equals 18,215 1990 US-Dollars in Switzerland. The polity score, by construction, lies between -10 for total autocracies to +10 for full democracies. There are four countries where the polity score in 1973 is -9. These are Albania, Brazil, the Philippines, and Portugal. There are 17 countries with a polity score of +10. These are the Western European countries, the Western off-shoots, and Japan. The indexes of political rights and civil liberties are rescaled so that a higher score correlates to higher political rights and civil liberties, respectively. The distribution over the countries is similar to that of the polity score.

Secondary education measures the percentage of the population aged 25 years and older that completed secondary education. In India only 0.58 % of the population completed secondary education. The highest value is observed in Armenia with 56.47 %. The smallest country in our sample is Malta with an area of 316 square kilometers compared to the largest country Russia, more than 17 million square kilometers. Concerning the population the smallest country is Iceland with 267,000 inhabitants, India is the largest country with slightly less than 916 million inhabitants. Population density is lowest in Australia with 2.32 inhabitants per square kilometer and reaches 1176.83 in Malta. There are eight islands without land boundaries in our sample. The Russian Federation has the highest number of neighboring countries (14). In Norway only 0.07 % of the soil is fertile whereas the value for Malta is 100 %. Landlocked, former colony, and former Communist country are dummy variables.

Trade share and the constructed trade share measure the openness of a country and are reported in Frankel and Romer (1999). The actual trade share is lowest in India, whereas for the constructed trade share the value for the United States is smallest. For both measures the highest value is reported for Luxembourg.

Bangladesh has only 0.19 kilometers of paved roads per 1,000 inhabitants. The highest value in this category is reported in Ireland with 25.95 kilometers per 1,000 inhabitants. In Brazil there are only 0.01 kilometers of paved roads per square kilometer compared to 6.34 kilometers in Malta. The lowest value of paved roads per inhabitant per square kilometer comes from Malta with 1.71 compared to the highest

value of more than 162,287 kilometers per inhabitant per square kilometer in the United States. The number of phone lines per 100 inhabitants ranges from 0 in Bangladesh and India to 58 in Sweden.

Our main goal is to study the relationship between national identity and ethnic and religious heterogeneity. Correlations of these raw data propose that ethnic diversity and ethnic polarization are negatively related to national identity (-0.27 and -0.34) whereas religious diversity and polarization are slightly positively related to national identity (0.19 and 0.12). In order to find out if this pattern holds when we introduce more explanatory variables we rely on regression analysis. The results will be presented in the next section.

3.4 Regression Results

In this section, we present the results of various regressions with which we want to analyze the effect of ethnic and religious heterogeneity on national identity. The explanatory variables of main interest are ethnic and religious diversity and polarization. Furthermore, we add a large set of control variables in order to investigate what else might influence the formation of a national identity.

3.4.1 Ethnic Diversity

First, we analyze the effect of ethnic diversity on national identity. As described before, a larger value of ethnic diversity represents higher heterogeneity. A positive β implies that higher ethnic diversity leads to higher levels of national identity. In the next subsection we present the results of cross-country OLS regressions before we turn to instrumental variable estimations in section 4.1.2.

OLS Results

Table 3.3 shows the results of the OLS regressions. Ethnic diversity and income are kept in all estimations. With regards to ethnic diversity the main result is easily observed at first sight. The coefficient on ethnic diversity fails to reach statistical significance in more than half of the estimations. However, the sign is negative, which hints in the direction that higher levels of ethnic diversity lead to lower values in our index of national identity. The size of the coefficient is, except for column 19, always between -0.2 and -0.35 which implies that an increase in the index of ethnic diversity by 0.1 reduces our measure of national identity by only 0.02 to 0.035 index points.

Income does also not enter statistically significantly in 17 out of the 19 regressions. Only in columns 2 and 19 does income have a significant negative effect on national identity. In columns 2 through 4 we control for different variables that proxy democratic institutions. All these variables have a positive and significant relation to national identity at the 5% level. The polity score from the Polity IV database

reaches the highest level of statistical significance. In column 5 we control for education and find that this variable does not seem to affect national identity.

Table 3.3: OLS regression results, dependent variable: national identity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ethnic Diversity	-0.32*	-0.22	-0.17	-0.23	-0.33	-0.35*	-0.34*	-0.25	-0.32*	-0.28
	(-1.80)	(-1.26)	(-0.95)	(-1.27)	(-1.60)	(-1.89)	(-1.92)	(-1.25)	(-1.73)	(-1.53)
Log of Income '73	-0.03	-0.14**	-0.08	-0.07	-0.05	-0.03	0.01	0.00	-0.03	-0.03
	(-0.54)	(-2.44)	(-1.50)	(-1.27)	(-0.83)	(-0.63)	(0.11)	(0.00)	(-0.50)	(-0.60)
Polity score '73		0.02***								
		(3.72)								
Pol. Rights '73			0.05**							
			(2.56)							
Civ. Liberties '73				0.04**						
				(2.03)						
Secondary Educ.					0.00					
					(0.69)					
Area in square km						0.00				
						(0.72)				
Population in mill							0.00*			
							(1.81)			
Pop. Density								0.00		
								(0.95)		
Landlocked									-0.04	
									(-0.38)	
# neighboring coun.										-0.02
										(-1.44)
cons	0.35	1.25**	0.60	0.55	0.49	0.38	0.02	0.05	0.33	0.43
	(0.75)	(2.56)	(1.29)	(1.16)	(0.95)	(0.82)	(0.05)	(0.08)	(0.71)	(0.93)
N	61	56	59	59	54	61	60	60	61	61
R^2 adj.	0.02	0.22	0.10	0.06	0.01	0.01	0.06	0.02	0.01	0.04

	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
Ethnic Diversity	-0.32*	-0.32*	-0.28	-0.32	-0.33	-0.25	-0.31	-0.31	-0.10
	(-1.78)	(-1.76)	(-1.58)	(-1.48)	(-1.55)	(-1.25)	(-1.54)	(-1.61)	(-0.55)
Log of Income '73	-0.05	-0.03	-0.04	-0.04	-0.04	-0.04	-0.01	-0.04	-0.30***
	(-0.90)	(-0.44)	(-0.80)	(-0.60)	(-0.66)	(-0.54)	(-0.14)	(-0.73)	(-4.00)
% fertile soil	0.00								
	(-1.27)								
Former Colony		0.00							
		(-0.01)							
Former Communist coun.			-0.13*						
			(-1.72)						
Trade Share '85				0.00					
				(0.24)					
Constr. Trade Share '85					0.00				
					(0.61)				
Roads per 1000 inh.						0.00			
						(0.59)			
Roads per sq km							-0.03		
							(-0.74)		
Roads per inh. per sq km								0.00	
								(1.65)	
Phone Lines per 100									0.02***
									(4.48)
cons	0.63	0.34	0.49	0.42	0.45	0.38	0.19	0.46	2.39***
	(1.23)	(0.59)	(1.07)	(0.80)	(0.85)	(0.64)	(0.38)	(0.87)	(3.97)
N	61	61	61	47	47	54	55	54	55
R^2 adj.	0.03	0.00	0.05	-0.01	0.00	-0.01	-0.01	0.03	0.28

Note: t-statistics in parentheses; *,**,*** denotes statistical significance at the ten, five, and one percent levels.

Geographical factors that might influence the formation of a national identity are introduced in columns 6 through 11 which reveals that only population size has a positively significant impact at the 10% level. Thus, countries with a larger population reveal higher levels of national identity, the impact is very small as it differs from zero only in the fourth decimal. If the population is larger by 1 million inhabitants

national identity is increased by only 0.0006 index points. In columns 12 and 13 we test whether the history of the country matters for national identity. In column 12 we find, that the colonial past does not affect national identity. In contrast, countries that have been under communist rule exhibit lower levels of national identity which is statistically significant at the 10% level.

We control for the openness of the economy in columns 14 and 15 with the trade shares calculated by Frankel and Romer (1999). Neither variable comes close to statistical significance at conventional levels. We include different measures of mobility in columns 16 through 19 to test Smith's (1991) proposition that mobility throughout the country is important for the formation of a national identity. We account for physical mobility in columns 16 through 18 in which we add different measures of the amount of paved roads within a country. Paved roads per inhabitant per square kilometer is the only variable that comes close to statistical significance as it falls short of the 10% significance level only very slightly. The effect is positive. In column 19 we control for the number of phone lines per 100 inhabitants as a proxy for non-physical mobility which turns out to be highly statistically significant. The estimated effect is positive, an increase by ten phone lines per 100 inhabitants raises national identity by 0.2 index points.

At first sight we do not find evidence for the hypothesis that ethnic diversity is an important factor in explaining national identity. With regards to the other control variables, democratic institutions and mobility across the country had the strongest positive correlation with national identity. The impact of population size is also slightly positive whereas a communist past is negatively related to national identity.

Instrumental Variable Results

Since the OLS regressions might suffer from endogeneity issues we rely on instrumental variable regression in order to gain more robust results on the effects of ethnic diversity on national identity.

Ethnic diversity is instrumented by a common factor of the disease and pathogen variables proposed by Fincher and Thornhill (2008). The results of the instrumental variable regressions are presented in Table 3.4. The control variables remain in the same order as in Table 3.3.

The results from the instrumental variable estimations support the main insights from the OLS regressions. The significance level on the coefficients on ethnic diversity are reduced further. Obviously, ethnic diversity is no important predictor of national identity. Income is again only significant in columns 2 and 19. The presence of democratic institutions, however, seems to be an important factor for the formation of a national identity. The polity score and the indexes of political rights and civil liberties remain positive and statistically significant. The polity score is significant at the 1% level, the other two variables at the 5% level.

Population size and roads per inhabitant per square kilometer also stay positive and significant at

the 10% level. Compared to Table 3.3 communist past loses statistical significance at the 10% level, but the sign is still negative and the coefficient of a similar magnitude. The number of phone lines per 100 inhabitants maintains its positive and significant impact on national identity. Raising the number of phone lines by 10 per 100 inhabitants results in an increase in national identity by 0.2 index points.

Table 3.4: Instrumental Variable regression results, dependent variable: national identity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ethnic Diversity	-0.28	-0.19	-0.11	-0.12	-0.06	-0.48	-0.66	-0.04	-0.31	-0.04
	(-0.61)	(-0.42)	(-0.25)	(-0.27)	(-0.10)	(-0.95)	(-1.51)	(-0.07)	(-0.73)	(-0.09)
Log of Income '73	-0.03	-0.13**	-0.08	-0.07	-0.06	-0.04	0.00	0.02	-0.03	-0.03
	(-0.51)	(-2.49)	(-1.56)	(-1.29)	(-0.90)	(-0.71)	(-0.04)	(0.22)	(-0.50)	(-0.50)
Polity Score '73		0.02***								
		(3.43)								
Pol. Rights '73			0.05**							
			(2.35)							
Civ. Liberties '73				0.04**						
				(2.04)						
Secondary Educ.					0.00					
					(0.82)					
Area in square km						0.00				
						(0.78)				
Population in mill							0.00*			
							(1.91)			
Pop. Density								0.00		
								(0.85)		
Landlocked									-0.04	
									(-0.39)	
# neighboring coun.										-0.02
										(-1.58)
cons	0.32	1.24**	0.57	0.50	0.43	0.47	0.19	-0.19	0.33	0.33
	(0.62)	(2.40)	(1.21)	(1.00)	(0.82)	(0.86)	(0.36)	(-0.21)	(0.65)	(0.64)
N	60	56	59	59	54	60	60	60	60	60

	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
Ethnic Diversity	-0.49	-0.26	-0.51	-0.39	-0.36	-0.18	-0.45	-0.58	0.56
	(-1.19)	(-0.56)	(-1.34)	(-1.13)	(-1.03)	(-0.33)	(-0.78)	(-1.15)	(0.93)
Log of Income '73	-0.06	-0.03	-0.05	-0.04	-0.04	-0.04	-0.01	-0.05	-0.36***
	(-1.06)	(-0.45)	(-0.89)	(-0.68)	(-0.70)	(-0.58)	(-0.15)	(-0.83)	(-3.72)
% fertile soil	0.00								
	(-1.36)								
Former Colony		-0.01							
		(-0.05)							
Former Communist coun.			-0.12						
			(-1.51)						
Trade Share '85				0.00					
				(0.26)					
Constr. Trade Share '85					0.00				
					(0.64)				
Roads per 1000 inh.						0.01			
						(0.62)			
Roads per sq km							-0.03		
							(-0.76)		
Roads per inh. per sq km								0.00*	
								(1.78)	
Phone Lines per 100									0.02***
									(3.93)
cons	0.78	0.33	0.61	0.47	0.47	0.37	0.25	0.59	2.68***
	(1.39)	(0.56)	(1.24)	(0.88)	(0.88)	(0.65)	(0.46)	(1.04)	(3.84)
N	60	60	60	46	46	54	54	54	55

Note: t-statistics in parentheses; *,**,*** denotes statistical significance at the ten, five, and one percent levels.

We can conclude that ethnic diversity does not seem to have an important impact on the level of national identity. It fails to gain statistical significance in the instrumental variable regressions. The presence of democratic institutions and mobility throughout the country seem to be important factors for

the formation of a national identity. In the next subsections we will explore if these relationships hold when we substitute ethnic diversity for other variables of social heterogeneity.

3.4.2 Ethnic Polarization

In this subsection we investigate the relationship between ethnic polarization and national identity. As described before, ethnic polarization reaches its maximum if a majority faces a large minority group. If the society is ethnically very homogeneous or very heterogeneous ethnic polarization is small. Similar to the subsection on ethnic diversity we will present OLS results first which will be followed by instrumental variable estimations. The control variables remain the same as in Tables 3.3 and 3.4.

OLS Results

Table 3.5 shows the results of OLS regressions in which ethnic polarization is the variable of main interest. A positive coefficient implies that rising levels of ethnic polarization increase national identity.

In contrast to ethnic diversity, the OLS results suggest that ethnic polarization might have a significant impact on national identity. The coefficient is negative and statistically significant at least at the 10% level in 18 out of 19 regressions, in 16 cases at the 5% level. The size of the coefficient varies between -0.36 and -0.63 in the regressions in which ethnic polarization is significant. Raising ethnic polarization by 0.1 index points then implies a reduction in our measure of national identity by 0.036 to 0.063 index points. This amounts to the difference in national identity for example between the United States and Bosnia and Herzegovina or between Germany and Iceland.

Table 3.5: OLS regression results, dependent variable: national identity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ethnic Polarization	-0.47**	-0.38*	-0.36*	-0.42**	-0.40**	-0.61***	-0.48**	-0.46**	-0.47**	-0.45**
	(-2.51)	(-1.94)	(-1.79)	(-2.12)	(-2.20)	(-3.22)	(-2.56)	(-2.24)	(-2.49)	(-2.36)
Log of Income '73	-0.02	-0.13*	-0.07	-0.06	-0.14**	-0.04	0.02	-0.01	-0.02	-0.02
	(-0.40)	(-1.93)	(-1.06)	(-0.84)	(-2.04)	(-0.65)	(0.26)	(-0.21)	(-0.42)	(-0.43)
Polity score '73		0.02**								
		(2.66)								
Pol. Rights '73			0.04							
			(1.48)							
Civ. Liberties '73				0.03						
				(1.09)						
Secondary Educ.					0.01**					
					(2.43)					
Area in square km						0.00**				
						(2.16)				
Population in mill							0.00			
							(1.46)			
Pop. Density								0.00		
								(0.22)		
Landlocked									0.03	
									(0.20)	
# neighboring coun.										-0.01
										(-0.70)
cons	0.44	1.25**	0.60	0.56	1.22**	0.56	0.07	0.35	0.45	0.49
	(0.87)	(2.25)	(1.14)	(1.04)	(2.17)	(1.16)	(0.12)	(0.55)	(0.88)	(0.95)
N	42	37	40	40	40	42	41	41	42	42
R^2 adj.	0.10	0.24	0.10	0.08	0.21	0.18	0.13	0.08	0.08	0.09

	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
Ethnic Polarization	-0.53***	-0.43**	-0.47**	-0.47**	-0.47**	-0.40*	-0.47**	-0.54**	-0.28
	(-2.86)	(-2.08)	(-2.49)	(-2.48)	(-2.48)	(-1.80)	(-2.35)	(-2.72)	(-1.58)
Log of Income '73	-0.05	-0.05	-0.03	-0.02	-0.03	-0.05	0.00	-0.05	-0.28***
	(-0.93)	(-0.57)	(-0.47)	(-0.35)	(-0.46)	(-0.51)	(-0.03)	(-0.75)	(-3.08)
% fertile soil	0.00*								
	(-1.74)								
Former Colony		-0.07							
		(-0.42)							
Former Communist coun.			-0.10						
			(-0.62)						
Trade Share '85				0.00					
				(-0.15)					
Constr. Trade Share '85					0.00				
					(0.41)				
Roads per 1000 inh.						0.01			
						(0.62)			
Roads per sq km							-0.04		
							(-1.04)		
Roads per inh. per sq km								0.00**	
								(2.21)	
Phone Lines per 100									0.02***
									(3.22)
cons	0.91	0.68	0.49	0.43	0.46	0.55	0.30	0.66	2.32***
	(1.62)	(0.89)	(0.95)	(0.85)	(0.90)	(0.77)	(0.53)	(1.14)	(3.28)
N	42	42	42	42	42	37	38	37	39
R^2 adj.	0.14	0.08	0.09	0.08	0.08	0.05	0.07	0.17	0.29

Note: t-statistics in parentheses; *,**,*** denotes statistical significance at the ten, five, and one percent levels.

Similar to the results of the previous subsection, income does not appear to be an important factor for national identity. It reaches statistical significance in only three regressions. The polity score remains statistically significant at the 2% level. The relationship between democratic institutions and national identity is still positive. However, the coefficients on political rights and civil liberties are no longer significant.

In column 5 we control again for secondary education. In this setting it has a positive and significant relationship to national identity. An increase in the secondary education completion rate by ten percentage points implies that our measure of national identity rises by 0.1 index points. In columns 6 through 11 we add again the geographical variables and find that population size is no longer significant, but instead, area size becomes significant. The coefficient is positive which implies that national identity is higher in larger countries. Concerning mobility we find, once more, that physical mobility, proxied by kilometers of paved roads per inhabitant per square kilometer, as well as non-physical mobility, proxied by the number of phone lines, to positively affect the level of national identity. The other control variables do not enter significantly.

Instrumental Variable Results

Again, we have to take into account that ethnic polarization might suffer from endogeneity bias. We use the percentage of the population in each country living in temperate climatic areas as an instrument for ethnic polarization. The results are presented in Table 3.6.

The instrumental variable regressions show important differences to the OLS results. When ethnic polarization is instrumented by the percentage of the population in each country living in temperate climatic

areas, it no longer reveals significant effects. It fails to reach significance at the 10% level in all regressions.

Table 3.6: Instrumental Variable regression results, dependent variable: national identity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ethnic Polarization	-0.33	-0.13	-0.13	-0.28	-0.24	-0.63*	-0.32	-0.08	-0.32	-0.33
	(-1.01)	(-0.43)	(-0.41)	(-0.94)	(-0.85)	(-1.72)	(-1.07)	(-0.23)	(-1.02)	(-1.03)
Log of Income '73	-0.04	-0.13**	-0.13*	-0.11	-0.17**	-0.05	0.00	0.02	-0.04	-0.04
	(-0.68)	(-2.13)	(-1.84)	(-1.51)	(-2.51)	(-0.98)	(-0.03)	(0.36)	(-0.69)	(-0.79)
Polity score '73		0.02***								
		(2.94)								
Pol. Rights '73			0.07**							
			(2.23)							
Civ. Liberties '73				0.05*						
				(1.71)						
Secondary Educ.					0.01***					
					(2.70)					
Area in square km						0.00*				
						(1.93)				
Population in mill							0.00			
							(1.31)			
Pop. Density								0.00*		
								(1.85)		
Landlocked									0.02	
									(0.10)	
# neighboring coun										-0.02
										(-1.06)
cons	0.53	1.23**	0.90*	0.84	1.41**	0.72	0.17	-0.23	0.53	0.64
	(1.01)	(2.28)	(1.67)	(1.52)	(2.53)	(1.44)	(0.29)	(-0.34)	(1.01)	(1.23)
N	41	37	39	39	39	41	40	40	41	41

	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
Ethnic Polarization	-0.47	-0.08	-0.42	-0.27	-0.28	-0.13	-0.28	-0.49	-0.11
	(-1.47)	(-0.15)	(-1.44)	(-0.88)	(-0.90)	(-0.34)	(-0.78)	(-1.44)	(-0.42)
Log of Income '73	-0.06	-0.11	-0.04	-0.05	-0.05	-0.10	-0.02	-0.07	-0.37***
	(-1.03)	(-1.04)	(-0.80)	(-0.80)	(-0.85)	(-1.08)	(-0.30)	(-1.12)	(-4.15)
% fertile soil	0.00								
	(-1.39)								
Former Colony		-0.17							
		(-0.80)							
Former Communist coun			-0.12						
			(-0.76)						
Trade Share '85				0.00					
				(0.46)					
Constr. Trade Share '85					0.00				
					(0.79)				
Roads per 1000 inh						0.01			
						(1.08)			
Roads per sq km							-0.02		
							(-0.28)		
Roads per inh. per sq km								0.00**	
								(2.19)	
Phone Lines per 100									0.02***
									(4.12)
cons	0.89	1.06	0.63	0.55	0.58	0.91	0.37	0.84	3.02***
	(1.59)	(1.27)	(1.23)	(1.04)	(1.10)	(1.24)	(0.60)	(1.44)	(4.35)
N	41	41	41	41	41	36	37	36	38

Note: t-statistics in parentheses; *,**,*** denotes statistical significance at the ten, five, and one percent levels.

Once more, income enters significantly in four out of 19 regressions. The results on democratic institutions hold. In column 2 the polity score enters significantly at the 1% level. In columns 3 and 4 the indexes of political rights and civil liberties are significant at the 5 and 10% levels, respectively. The findings on secondary education are also supported by the instrumental variable results. Secondary education has a positive and significant impact on the level of national identity. An increase in the secondary education completion rate by 10 percentage points correlates with a rise in national identity by 0.14 index points.

Concerning the geographical variables we find area size to be significantly related to our measure of national identity. In contrast to the OLS regressions population density now also has a positive and significant effect on national identity. National identity rises by 0.14 points if population density increases by one standard deviation. Once more, we find support for the idea that mobility throughout the country is an important factor. In columns 18 and 19 kilometers of paved roads per inhabitant per square kilometer and the number of phone lines per 100 inhabitants have a positive and significant effect on national identity. Increasing kilometers of paved roads per inhabitant per square kilometer by one standard deviation raises national identity by 0.1 index points, or a third of a standard deviation. 10 phone lines more per 100 inhabitants raise national identity by 0.19 index points, almost two-thirds of a standard deviation.

The OLS results suggest that ethnic polarization might have an important effect on the formation of a national identity. The instrumental variable regressions reveal that the results were probably due to endogeneity, which might have been caused by omitted variables, and that ethnic polarization is not significantly related to national identity. The results of this subsection imply that democratic institutions, mobility throughout the country, education, and country size appear to be important correlates of national identity.

3.4.3 Religious Diversity

In the previous two subsections, we analyzed the impact of ethnicity on national identity. It appears that ethnic heterogeneity does not affect the formation of a national identity. But other levels of social differences might cause variation in national identity across countries. Opfinger (2011) proposes that religious diversity affects levels of religiosity negatively. We follow the argumentation of Bruce (2000) who suggests that religiosity and national identity might be substitutes. Therefore, we explore the effect of religious diversity on national identity in this subsection. We expect to find a positive relationship between religious diversity and national identity, as religious diversity decreases religiosity and religiosity and national identity are supposed to be substitutes.

OLS Results

We repeat the estimations of the previous subsections, but replace the variables measuring ethnic heterogeneity by religious diversity. A positive sign on the coefficient implies that higher levels of religious diversity increase national identity. The results are presented in Table 3.7.

With regards to the role of religious diversity the regressions do not deliver a clear result. The coefficient is positive as we would expect if national identity and religiosity were indeed substitutes. Hence, higher levels of religious diversity appear to be correlated with higher levels of national identity. But this finding

is statistically significant at least at the 10% level in only 9 out of 19 estimations. In those regressions in which religious diversity enters significantly the size of the coefficient varies between 0.27 and 0.44. An increase in religious diversity by 0.1 index points therefore correlates with a rise in national identity by 0.027 to 0.044 index points.

Table 3.7: OLS regression results, dependent variable: national identity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Religious Diversity	0.24	0.33**	0.32**	0.30*	0.29	0.24	0.22	0.27*	0.25	0.24
	(1.50)	(2.16)	(2.06)	(1.88)	(1.53)	(1.43)	(1.34)	(1.68)	(1.56)	(1.51)
Log of Income '73	-0.03	-0.15***	-0.11*	-0.10	-0.06	-0.03	0.00	0.01	-0.03	-0.03
	(-0.55)	(-2.80)	(-1.99)	(-1.66)	(-0.92)	(-0.54)	(0.04)	(0.19)	(-0.49)	(-0.65)
Polity score '73		0.02***								
		(4.41)								
Pol. Rights '73			0.06***							
			(3.38)							
Civ. Liberties '73				0.05***						
				(2.69)						
Secondary Educ.					0.00					
					(0.24)					
Area in square km						0.00				
						(0.04)				
Population in mill							0.00			
							(1.55)			
Pop. Density								0.00*		
								(1.68)		
Landlocked									-0.07	
									(-0.68)	
# neighboring coun.										-0.02
										(-1.61)
cons	0.13	1.18**	0.58	0.49	0.36	0.13	-0.15	-0.28	0.11	0.25
	(0.28)	(2.51)	(1.29)	(1.06)	(0.68)	(0.28)	(-0.31)	(-0.54)	(0.24)	(0.55)
N	62	56	59	59	54	62	61	61	62	62
R^2 adj.	0.01	0.26	0.15	0.09	0.01	-0.01	0.03	0.04	0.00	0.03

	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
Religious Diversity	0.27	0.24	0.33**	0.40**	0.44**	0.25	0.22	0.17	0.29**
	(1.67)	(1.47)	(2.05)	(2.07)	(2.25)	(1.49)	(1.28)	(0.92)	(2.06)
Log of Income '73	-0.05	-0.04	-0.05	-0.05	-0.05	-0.07	-0.02	-0.04	-0.33***
	(-0.99)	(-0.61)	(-1.00)	(-0.85)	(-0.94)	(-0.92)	(-0.35)	(-0.66)	(-4.68)
% fertile soil	0.00								
	(-1.53)								
Former Colony		-0.03							
		(-0.29)							
Former Communist coun.			-0.18**						
			(-2.33)						
Trade Share '85				0.00					
				(0.64)					
Constr. Trade Share '85					0.00				
					(1.17)				
Roads per 1000 inh.						0.01			
						(1.06)			
Roads per sq km							0.00		
							(-0.12)		
Roads per inh. per sq km								0.00	
								(1.09)	
Phone Lines per 100									0.02***
									(5.07)
cons	0.46	0.23	0.35	0.23	0.26	0.39	0.08	0.25	2.46***
	(0.93)	(0.40)	(0.79)	(0.47)	(0.53)	(0.67)	(0.15)	(0.48)	(4.32)
N	62	62	62	48	48	55	55	55	56
R^2 adj.	0.03	-0.01	0.08	0.03	0.05	0.00	-0.02	0.00	0.34

Note: t-statistics in parentheses; *,**,*** denotes statistical significance at the ten, five, and one percent levels.

As before, income does not seem to have an important effect on national identity. It enters significantly only in four regressions. In columns 2 through 4 we control again for democratic institutions. All three

variables reveal a positive coefficient which is statistically significant at the 1% level. In contrast to the findings from the previous subsection secondary education and the geographical variables do not enter significantly. But instead, countries that have formerly been under communist rule reveal lower levels of national identity. This finding is significant at the 5% level.

Openness, proxied by the trade share, is again insignificant. Concerning the hypothesis of the importance of mobility we find in this setting that only the number of phone lines per 100 inhabitants is significant. The variables on paved roads do not enter significantly.

Instrumental Variable Results

As before, we have to account for possible endogeneity, which might arise due to omitted variables. If a variable is omitted that affects religious diversity as well as national identity, this might cause bias in the OLS estimates. We use rates of religious diversity in 1900 as instrument for religious diversity today. The results of these estimations are shown in Table 3.8.

The instrumental variable regression results show very important and remarkable differences to the OLS findings. If religious diversity is instrumented by past rates of religious diversity it is significant in all of the 19 estimations. It is significant at the 1% level in 17 regressions and at the 5% level in two more.

The coefficient is larger compared to the OLS results as it varies between 0.58 and 0.83. The average value of the coefficient is 0.7. Hence, an increase in religious diversity by 0.1 index points raises national identity on average by 0.07 index points. If religious diversity changes by one standard deviation, national identity reacts with a change by 0.165 index points in the same direction which is more than half of a standard deviation. The difference in religious diversity between the most homogeneous and most diverse countries amounts to 0.793 index points. This value implies a difference in national identity of more than half an index point which is the difference between Argentina, the country with the lowest value of national identity, and Switzerland which is in the upper half of countries in ascending order of national identity. It also amounts to the difference in national identity between, for example, the United States and France. Apparently, religious diversity has a strong impact on the formation of a national identity. Countries that are religiously very homogeneous reveal low levels of national identity whereas national identity is high if the population is religiously diverse.

Once again, income is only significant in four out of 19 regressions. Columns 2 through 4 show the by now well-known pattern. Democratic institutions have a positive and significant relation to the level of national identity. All three variables are significant at the 1% level.

In this setting secondary education does not have a significant effect on national identity. In column 5 the sign of the coefficient even becomes negative. Concerning the geographical variables in columns 6

through 11 we find that only two of them are statistically significant. Population density seems to increase national identity whereas the percentage of fertile soil has a significant negative relationship to national identity. The size of the coefficient is fairly small. Ten percentage points more fertile soil reduce national identity by only 0.03 index points.

Table 3.8: Instrumental Variable regression results, dependent variable: national identity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Religious Diversity	0.65***	0.72***	0.72***	0.72***	0.64**	0.69***	0.65***	0.69***	0.67***	0.65***
	(2.83)	(3.25)	(3.23)	(3.13)	(2.53)	(2.80)	(2.76)	(2.97)	(2.88)	(2.87)
Log of Income '73	-0.04	-0.18***	-0.14**	-0.13**	-0.06	-0.04	-0.02	0.00	-0.04	-0.05
	(-0.82)	(-3.17)	(-2.47)	(-2.17)	(-0.96)	(-0.77)	(-0.37)	(-0.01)	(-0.75)	(-0.93)
Polity score '73		0.02***								
		(4.54)								
Pol. Rights '73			0.07***							
			(3.77)							
Civ. Liberties '73				0.06***						
				(3.12)						
Secondary Educ.					-0.00					
					(-0.42)					
Area in square km						-0.00				
						(-0.62)				
Population in mill							0.00			
							(1.22)			
Pop. Density								0.00*		
								(1.88)		
Landlocked									-0.09	
									(-0.90)	
# neighboring coun.										-0.02
										(-1.56)
cons	0.07	1.22**	0.64	0.55	0.28	0.04	-0.14	-0.38	0.05	0.19
	(0.15)	(2.55)	(1.39)	(1.17)	(0.54)	(0.09)	(-0.28)	(-0.72)	(0.10)	(0.41)
N	62	56	59	59	54	62	61	61	62	62

	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
Religious Diversity	0.73***	0.65***	0.82***	0.80***	0.83***	0.68***	0.68***	0.65**	0.58***
	(3.14)	(2.82)	(3.44)	(2.95)	(3.05)	(2.87)	(2.78)	(2.44)	(3.01)
Log of Income '73	-0.08	-0.05	-0.08	-0.07	-0.08	-0.10	-0.04	-0.04	-0.35***
	(-1.35)	(-0.74)	(-1.40)	(-1.24)	(-1.31)	(-1.32)	(-0.66)	(-0.69)	(-4.87)
% fertile soil	-0.00*								
	(-1.76)								
Former Colony		-0.01							
		(-0.10)							
Former Communist coun.			-0.24***						
			(-2.83)						
Trade share '85				0.00					
				(1.08)					
Constr. Trade Share '85					0.00*				
					(1.69)				
Roads per 1000 inh.						0.01			
						(1.36)			
Roads per sq km							0.02		
							(0.39)		
Roads per inh per sq km								0.00	
								(0.19)	
Phone lines per 100									0.02***
									(5.01)
cons	0.46	0.11	0.36	0.23	0.27	0.44	0.01	0.06	2.48***
	(0.90)	(0.18)	(0.76)	(0.46)	(0.55)	(0.73)	(0.01)	(0.11)	(4.33)
N	62	62	62	48	48	55	56	55	56

Note: t-statistics in parentheses; *,**,*** denotes statistical significance at the ten, five, and one percent levels.

Again, a communist past has a strong and negative effect on national identity, as shown in column 13. For the first time, openness has a significant effect on our measure of national identity. In column 15 the constructed trade share of Frankel and Romer (1999) enters positively. Increasing trade openness

by ten percentage points raises national identity by 0.02 index points, a rather small effect. Supporting the findings from Table 3.7 only non-physical mobility appears to have an important effect on national identity, as becomes apparent in column 19. Kilometers of paved roads fall short of statistical significance at conventional levels.

The findings of this subsection, especially the instrumental variable results, support the idea that social heterogeneity is related to the formation of a national identity. Religious diversity enters significantly and the size of the effect is also remarkable. Apparently, national identity is higher if the society is religiously highly fragmented. People seem to choose to identify on a national level only if this is not possible through religion. We will come back to this point in the discussion of the results. Furthermore, democratic institutions and non-physical mobility reveal a robust positive relationship to national identity. A communist past appears to have a detrimental effect on our measure of national identity.

3.4.4 Religious Polarization

We use religious polarization as a last possible measure of social heterogeneity. This concept is comparable to ethnic polarization. It reaches its maximum if the society consists of only two large religious groups. Religious polarization is small if a large majority faces a number of small minorities or if a large number of equally sized groups coexist. As before, a positive sign on the coefficient implies that higher levels of religious polarization increase national identity.

OLS Results

Table 3.9: OLS regression results, dependent variable: national identity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Religious Polarization	0.13	-0.02	0.06	0.04	0.22	0.12	0.08	0.16	0.12	0.10
	(0.84)	(-0.14)	(0.36)	(0.25)	(1.28)	(0.78)	(0.51)	(0.99)	(0.76)	(0.67)
Log of Income '73	0.00	-0.14**	-0.07	-0.06	-0.03	0.00	0.02	0.04	0.00	-0.01
	(0.02)	(-2.09)	(-1.16)	(-0.92)	(-0.49)	(-0.03)	(0.41)	(0.68)	(0.02)	(-0.14)
Polity score '73		0.02***								
		(3.92)								
Pol. Rights '73			0.05***							
			(2.73)							
Civ. Liberties '73				0.04**						
				(2.04)						
Secondary Educ.					0.00					
					(1.06)					
Area in square km						0.00				
						(0.28)				
Population in mill							0.00			
							(1.51)			
Pop. Density								0.00		
								(1.56)		
Landlocked									-0.04	
									(-0.37)	
# neighboring coun.										-0.02
										(-1.51)
cons	-0.04	1.19**	0.44	0.37	0.15	-0.01	-0.26	-0.45	-0.03	0.12
	(-0.07)	(2.06)	(0.82)	(0.66)	(0.27)	(-0.03)	(-0.48)	(-0.79)	(-0.06)	(0.24)
N	62	56	59	59	54	62	61	61	62	62
R^2 adj.	-0.02	0.20	0.09	0.04	-0.01	-0.04	0.00	0.01	-0.03	0.00

	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
Religious Polarization	0.05	0.19	0.01	0.06	0.06	0.26	0.21	0.18	0.13
	(0.28)	(1.13)	(0.09)	(0.32)	(0.36)	(1.45)	(1.20)	(1.00)	(0.90)
Log of Income '73	-0.03	-0.02	-0.03	-0.02	-0.02	-0.02	0.02	-0.01	-0.29***
	(-0.48)	(-0.35)	(-0.53)	(-0.22)	(-0.24)	(-0.34)	(0.29)	(-0.17)	(-3.78)
% fertile soil	0.00								
	(-1.06)								
Former Colony		-0.10							
		(-0.84)							
Former Communist coun.			-0.14						
			(-1.64)						
Trade Share '85				0.00					
				(0.23)					
Constr. Trade Share '85					0.00				
					(0.55)				
Roads per 1000 inh.						0.01			
						(1.13)			
Roads per sq km							-0.01		
							(-0.27)		
Roads per inh. per sq km								0.00	
								(1.28)	
Phone Lines per 100									0.02***
									(4.79)
cons	0.36	0.18	0.32	0.13	0.13	0.10	-0.19	0.06	2.23***
	(0.57)	(0.32)	(0.59)	(0.20)	(0.22)	(0.17)	(-0.33)	(0.09)	(3.52)
N	62	62	62	48	48	55	55	55	56
R^2 adj.	-0.02	-0.02	0.01	-0.06	-0.06	0.00	-0.03	0.00	0.29

Note: t-statistics in parentheses; *,**,*** denotes statistical significance at the ten, five, and one percent levels.

We follow the same procedure as before. First, we show the results of OLS regressions of national identity on religious polarization and the remaining control variables. The results are presented in Table 3.9.

Apparently, religious polarization does not affect the level of national identity. Since, we found religious diversity to have a significant impact on national identity this result is not surprising. Religious polarization does not reach statistical significance in any of the 19 regressions. Income is also statistically significant in only two estimations.

Concerning the remaining covariates, we find again that democratic institutions have a positive and significant impact on national identity. The polity score and the index of political rights are significant at the 1% level, while the index of civil liberties is significant at the 5% level. The number of phone lines, our proxy variable for non-physical mobility, is also positively and significantly related to national identity. The other control variables do not reach significance at conventional levels.

Instrumental Variables Results

Also in this last case we have to deal with possible endogeneity issues concerning religious polarization. Again, the common factor of the disease and pathogen variables from Fincher and Thornhill (2008) might be used as an instrument. The results of the instrumental variable regressions are presented in Table 3.10.

Our main insight on religious polarization is preserved in the instrumental variable regressions. It does not have a significant impact on the level of national identity. Income is again significant in only two out of 19 regressions.

Table 3.10: Instrumental Variable regression results, dependent variable: national identity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Religious Polarization	-0.15	-0.11	-0.06	-0.07	-0.03	-0.26	-0.44	-0.01	-0.19	-0.02
	(-0.55)	(-0.41)	(-0.25)	(-0.27)	(-0.10)	(-0.88)	(-1.37)	(-0.05)	(-0.65)	(-0.08)
Log of Income '73	-0.04	-0.15**	-0.10	-0.09	-0.06	-0.06	-0.04	0.02	-0.04	-0.03
	(-0.62)	(-1.98)	(-1.31)	(-1.07)	(-0.83)	(-0.87)	(-0.53)	(0.24)	(-0.65)	(-0.46)
Polity Score '73		0.02***								
		(3.90)								
Pol. Rights '73			0.05***							
			(2.85)							
Civ. Liberties '73				0.05**						
				(2.12)						
Secondary Educ.					0.00					
					(0.79)					
Area in square km						0.00				
						(0.67)				
Population in mill							0.00**			
							(2.04)			
Pop. Density								0.00		
								(1.53)		
Landlocked									-0.07	
									(-0.69)	
# neighboring coun.										-0.02*
										(-1.66)
cons	0.39	1.36*	0.64	0.58	0.46	0.57	0.35	-0.19	0.43	0.34
	(0.62)	(1.92)	(1.02)	(0.85)	(0.70)	(0.87)	(0.55)	(-0.30)	(0.68)	(0.57)
N	61	56	59	59	54	61	61	61	61	61

	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
Religious Polarization	-0.39	-0.18	-0.44	-0.54	-0.36	-0.10	-0.24	-0.37	0.25
	(-1.09)	(-0.40)	(-1.20)	(-1.07)	(-0.89)	(-0.28)	(-0.72)	(-1.04)	(1.08)
Log of Income '73	-0.12	-0.04	-0.11	-0.11	-0.09	-0.06	-0.04	-0.10	-0.27***
	(-1.33)	(-0.59)	(-1.32)	(-1.07)	(-0.97)	(-0.73)	(-0.56)	(-1.15)	(-3.30)
% fertile soil	0.00*								
	(-1.73)								
Former Colony		0.02							
		(0.11)							
Former Communist coun.			-0.26**						
			(-2.09)						
Trade Share '85				0.00					
				(-0.51)					
Constr. Trade Share '85					0.00				
					(0.17)				
Roads per 1000 inh.						0.01			
						(0.69)			
Roads per sq km							-0.02		
							(-0.53)		
Roads per inh. per sq km								0.00*	
								(1.67)	
Phone Lines per 100									0.02***
									(4.75)
cons	1.32	0.36	1.13	1.14	0.87	0.46	0.42	0.88	2.03***
	(1.43)	(0.59)	(1.39)	(1.13)	(1.00)	(0.67)	(0.61)	(1.14)	(2.95)
N	61	61	61	47	47	55	55	55	56

Note: t-statistics in parentheses; *,**,*** denotes statistical significance at the ten, five, and one percent levels.

Once more, we find democratic institutions to have a significant effect on national identity. The coefficient is positive and significant at the 1% level for the polity score and political rights and at the 5% level for civil liberties. The instrumental variable estimations reveal significance of some of the geographical variables. In column 7 population size is positively correlated with national identity which is significant at the 5% level. Also, the number of neighboring countries and the percentage of land that is fertile are significant at the 10% level. Both variables relate negatively to the level of national identity.

In column 13 we find, as already mentioned before, that a communist past decreases national identity,

which is significant at the 5% level. With regards to mobility throughout the country, column 18 shows that kilometers of paved roads per inhabitant per square kilometer, as a proxy for physical mobility positively affects national identity. Column 19 supports our result that non-physical mobility, as measured by phone lines, significantly increases the level of national identity. The other covariates again do not enter significantly.

Obviously, religious polarization does not determine national identity. This result is not surprising, as we found before that religious diversity is significantly correlated with national identity. The other results are in line with our previous findings. Democratic institutions, mobility throughout the country, and size are positively related to national identity. A communist past reduces national identity.

To sum up, we find that social heterogeneity is one important factor in explaining different levels of national identity. Religious diversity is the force driving these results. It is positively and significantly related to national identity. The implication of this finding will be discussed in Section 6. In addition, we found that democratic institutions and mobility throughout the country have positive and significant effects on the formation of a national identity. The country size also seems to have an impact on national identity, as in several regressions either country size or population size entered significantly. A communist past appears to decrease national identity. Income, education, openness, colonial past, and other geographical variables seem to play, if at all, only a very minor role.

3.5 Robustness

In this section we show the results of some simple robustness tests. First, we will present regressions in which we included more than only one additional explanatory variable. Since some of our control variables measure basically the same we do not include all variables. The polity score and the index of political rights are very similar so that including both in the same regression might introduce multicollinearity problems. Second, we present the results of stepwise regressions in order to find out which explanatory variables are indeed important for the formation of a national identity.

Table B.2 shows the results of the regressions with multiple explanatory variables. The variables that are included in the regressions are listed on the left side. This exercise supports the main result concerning the relationship between national identity and ethnic and religious heterogeneity. Of all the variables we use as proxy variables for social heterogeneity only religious diversity has a significant impact on the formation of a national identity.

We also find phone lines to be significant in most estimations. This confirms the insight that nonphysical mobility seems to be an important determinant of national identity. Interestingly, income enters negatively

and significantly in all estimations. Apparently higher income has a detrimental effect on national identity. In contrast, democratic institutions, as proxied by the polity score, fails to reach statistical significance in these regressions. Since we also included colonial and communist past as explanatory variable, this result might possibly be due to correlation of the explanatory variables.

Table B.3 in Appendix B shows the results of stepwise regressions. The explanatory variables included at the beginning are the same we used for Table B.2. All variables of which the p-value lies above 0.15 are dropped from the model. We can see that our main result is again confirmed. Religious diversity has a positive impact on national identity. We also find that ethnic polarization has a negative effect as we expected. But our results section shows that this finding disappears once one relies on instrumental variable estimation which is not possible to apply in stepwise regressions.

Again, phone lines have a positive effect in all estimations and income enters negatively and significantly. Democratic institutions once more appear not to have a significant impact on national identity in this setting. When we use ethnic polarization as measure for social heterogeneity openness enters negatively, which is surprising and secondary education has a positive effect. All the other control variables are dropped.

3.6 Discussion

The present study pursues two objectives. It is a first attempt to assign numeric values to the idea of national identity. Second, we try to reveal, which factors might drive the formation of a national identity. To achieve our first goal we use data from the World Values Survey from which we extract questions that refer to national identity. Due to data scarcity on several variables we are restricted to those eight items presented in Table 3.1 which relate to the respondents' attitudes towards politics and the state itself. On the whole we have more than 95,000 observations included in our index, that is an average of 1,500 respondents per country.

In the empirical section, we investigate the relationship between national identity and ethnic and religious heterogeneity. In addition, we try to reveal other important determinants of national identity. Bruce (2000) argues that religiosity and national identity might be substitutes and Opfinger (2011) finds that ethnic diversity has a large positive impact on religiosity. He concludes that people identify with their religious group if they cannot identify at the national level when the society is ethnically too fragmented.

We find that religious diversity has a strong positive relationship to national identity, whereas ethnic diversity does not enter significantly. It appears that religiosity and national identity are in fact substitutes. Religion seems to be the most favorite object of identification in a society. Opfinger's (2011) finding of

ethnic diversity's impact on religiosity appears after controlling for the level of religious diversity. This means that when holding the level of religious diversity constant, increasing levels of ethnic diversity raise the level of religiosity.

We interpret our findings on social heterogeneity in the following way. If the society is religiously homogeneous people choose to identify with their religious group. By sharing the same belief people send out signals that they also share a set of common values. Forming a common identity builds on this set of common values. Only if the society is religiously highly fragmented people do not identify with their religion. They start to doubt that their neighbors share the same set of common religious values and norms and hence, decrease their religious involvement. On a second level, people still feel some kind of closeness to the people in their environment. Since they cannot identify with common religious norms when people adhere to different denominations they choose to identify on another level with broader common values. This is the level of national identity. People of the same nationality can identify with their country which might be due to political, social, or cultural factors. Consequently, religious diversity has a direct impact on national identity, whereas ethnic diversity does not.

Two simple examples can make this more easily understandable. First, take two persons of the same nationality. These persons will identify with their religious group as long as they adhere to the same denomination. They share a set of common values, which is based on their religious beliefs. These two persons might not be able to identify with their religion if they adhere to two different denominations, say Protestant and Catholic. Hence, higher religious diversity decreases the importance of religion. But still, these people share a broader set of values or cultural beliefs which are based on their national heritage and lets them form a national identity. As a consequence, higher religious diversity, which leads to less importance of religion, increases national identity.

As a second example, consider two US American citizens where one is Caucasian and the other is African American. No matter what their religion is these persons can at least identify on a national level. They share a set of common values which is based on being a US national. This example can help understand why ethnic differences might not affect the formation of a national identity.

Masella (2012) does not find a significant effect of ethnic diversity either. However, he does not offer other explanatory factors for national identity. We propose that religious diversity can explain that social heterogeneity does indeed affect the formation of a national identity. Miles and Rochefort (1991) also find in their survey study that religion is the most important factor of social identification. If the society is religiously sufficiently homogeneous people choose to identify with their religion because religiosity offers the narrowest set of common values and norms. Only if religious fragmentation is too strong the society

looks for other objects of identification, which offers common values on a broader level. In this case people identify with their nationality. Apparently, national identity is a substitute for religion if identification on a religious level is not possible due to social heterogeneity.

Concerning the other possible determinants of national identity, we reveal further interesting insights. In our baseline regressions the most robust and probably most important finding is that democratic institutions have a positive impact on national identity. Democracy does not appear as significant explanatory variable in the robustness section. As this might be due to multicollinearity we still think that democratic institutions should be an important correlate of national identity. However, the way of causation is less clear. It could be that democracy offers people freedom they need in order to find their favored identity. A limitation to the liberal rights of the population reduces people's closeness to their country. If they are granted political rights and civil liberties the population feels comfortable in its country and can identify with the values that are established by the society. On the other hand, national identity could increase democracy. Only if people trust in the same norms based on their national identity they might be willing to engage in collective actions which make democracy work properly.

We also find support for the proposition that mobility throughout the country has an important influence on national identity. We estimate the separate impacts of physical and non-physical mobility and find that both are significantly related to national identity. However, non-physical mobility, which we proxied by the number of phone lines per 100 inhabitants, seems to be more important than physical mobility as it always enters highly significantly. Apparently the contact between individuals is important to form a common national identity. This contact can be established through personal interaction for which physical mobility is needed. But it can also be established through non-physical mobility. Longer distances can be more easily covered by a phone call or an e-mail than by physical travel. Non-physical mobility saves time and enables people to be in contact with a lot of persons at very low costs.

Furthermore, country size and secondary education revealed significant results in part of the regressions. Secondary education might have a positive impact when the students are taught that they have a good government and should be proud of their country. Better educated societies might possibly find more compromises on which similar values to identify. In poorly educated societies fanaticism might spread more easily which could reduce the set of common beliefs. It has also been found before that the importance of religion decreases as people become better educated. Since national identity is a substitute for religion the decreasing role of religiosity could foster the importance of national identity. Country size might have a positive impact because a larger population might increase the probability that people discover a commonness to their neighbors with which they can identify.

A past under communist rule has a detrimental effect on national identity. Probably, the disappointment about the negative consequences communism had for the population reduces people's bonds towards their nation.

Surprisingly, we did not find a significant impact of income on national identity in many cases when we entered the explanatory variables separately. However, income is significantly and negatively related to national identity when we control for non-physical mobility and in the robustness section. These partially ambiguous results hint in a direction that the concept of national identity might be above the level of material wealth. People can identify with the rest of the society due to shared values and beliefs, independent of their economic situation. However, the negative effect might also be a sign for the decreasing importance of social networks to identify with in the most developed countries. Paldam and Gundlach (2012) show that religiosity loses importance as countries develop. Potentially the ties to the nation also vanish as societies become richer. The importance for networks with which people identify might decrease with growing prosperity, a fact which might be termed "rising individualism". This could explain why trade openness did not show significant results. If this is actually true has to be clarified by future research, as has to be the role that income inequality or income growth might play.

3.7 Conclusion

The present paper is a first attempt to make the concept of national identity measurable numerically. For this purpose we use information from the World Values Survey. The survey delivers information on peoples' attitudes concerning politics and the state itself. We use common factor analysis in order to receive one index of national identity. Our index consists of eight single indicators. In the combination we have more than 95,000 respondents to the different questions. We calculate our index on the country level which lets us work with 62 country observations for national identity.

The second main contribution of this study is to analyze the relationship between our new measure of national identity and variables measuring social heterogeneity. We use ethnic diversity, ethnic polarization, religious diversity, and religious polarization as proxy variables. Furthermore, we control for income, democratic institutions, geographical factors, education, openness, and mobility throughout the country. We conduct a cross country analysis. First, we use OLS estimation and due to endogeneity issues test the robustness of the results by using instrumental variables.

We find that only religious diversity has a direct significant effect on the level of national identity. Raising religious diversity by one standard deviation increases our index of national identity by more than half a standard deviation. Democratic institutions and mobility throughout the country are positively

related to national identity, a past under communist rule has a negative impact. Income might be negatively related to national identity which might possibly be a result of rising individualism. The other variables showed no clear pattern of significant effects.

We argue that people identify with the group that shares the narrowest set of common values and norms which is, in general, probably the religious community. If people cannot identify with their religious group because religious diversity is too high they choose another object of identification that offers common values on a broader level. Consequently, people identify with their nationality.

We can conclude that religiosity and national identity indeed appear to be substitutes. If religious diversity is too high the importance of religion decreases. As a consequence, people look for another object of identification which offers a set of common values and norms which can be found in a national identity.

Chapter 4

Religiosity as a Determinant of Happiness

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4.1 Religiosity, happiness, and utility theory

Religious behavior does not generate a direct financial reward to believers, but religious activities obviously generate subjective well-being, either through reduced fear (Ardelt, 2003) or through an increase in personal happiness. Hence, religiosity appears to be a plausible determinant of happiness. Since happiness is often considered to be a plausible proxy for utility it is almost self-evident to address any presumed link between religiosity and happiness from the perspective of basic utility theory. However, the theoretical link between happiness and religiosity has not been clearly established in the literature. The present study aims to fill this gap. We develop a simple theoretical framework that can be used as a point of reference when assessing the empirical evidence on the various links between religiosity and happiness.

Empirical research on happiness has been influenced by the Easterlin paradox, which has long been held to be at odds with the idea that happiness is a good proxy for utility. The Easterlin paradox states that rich people generally report higher levels of happiness than poor people, but rising average incomes do not increase happiness beyond a satiation point (Easterlin, 1973, 1974, 1995). Accordingly, an increase in income beyond the satiation point only seems to shift the reference point within a society, without affecting utility as proxied by a measure of happiness. This conclusion contradicts textbook utility theory, where changes in income always shift the indifference curve to a higher level of utility.

Taken at face value, the Easterlin paradox has far-reaching policy implications beyond any link between

religiosity and happiness. If rising incomes only shift the reference point instead of improving utility, a primary goal of government policy should be higher taxes on income or consumption rather than a focus on economic growth (Layard, 2003). This conjecture has led to two related theoretical reactions in the happiness literature.

Frey and Stutzer (2006) appeal to mistakes in rational decision making in cases where reported levels of happiness do not correspond with utility maximization. For instance, accepting a better paid job with higher commuting cost should not result in less happiness, but there appears to be some evidence that it does. Criticizing the assumption that individuals systematically fail to maximize their utility, Becker and Rayo (2008) argue that measures of happiness and the reported Easterlin paradox might not be founded on utility theory at all. They consider subjective happiness to be an argument of the utility function rather than a direct proxy for utility itself. According to their approach, utility would remain in the realm of the empirically unknown and a decline of happiness with rising income could be interpreted as a simple substitution effect.

It is not without irony that the rationalization of the Easterlin paradox by Becker and Rayo (2008) has been published as a comment to an empirical study that rejects the Easterlin paradox (Stevenson and Wolfers, 2008). Deaton (2008) and Sacks et al. (2010) also provide strong evidence for a robust positive link between aggregate indicators of happiness and (log) per capita income across countries and over time. Moreover, the estimated effects of income on happiness closely resemble the well-known within-country correlation between individual levels of happiness and individual income.

The new empirical evidence allows for a fresh start of empirical research on happiness and religiosity that is based on a standard model of utility maximization. We revise the model proposed by Becker and Rayo (2008) by treating happiness as a direct proxy for utility, which has also been the starting point of the older empirical happiness literature (Frey and Stutzer, 2002). Accordingly, a higher level of income should be reflected by a higher-level indifference curve for happiness. Religiosity enters as one of the commodities of the happiness function. We show that our theoretical framework can account for three stylized facts of the empirical literature, namely a positive correlation between happiness and income, a positive correlation between happiness and religiosity, and a negative correlation between religiosity and income.

Section 2 briefly reviews empirical studies on religiosity and happiness. Section 3 introduces the theoretical framework. Section 4 discusses data and samples that we use for our empirical estimates in Section 5. Section 6 discusses the empirical results and Section 7 concludes.

4.2 Basic results of the empirical literature on happiness and religiosity

Empirical research on the link between religious activities and alternative measures of well-being starts with Ellison (1991), who divides religious involvement into denominational ties, divine relations, existential certainty, and social integration, which is considered to be influenced by church membership and attendance. Religious involvement is reported to be positively correlated with subjective well-being. Along these lines, Greene and Yoon (2004) assert that subjective well-being rises with religious attachment as measured by the willingness to attend religious services regularly. Ferriss (2002) confirms a positive correlation between happiness and the frequency of church attendance but points to denominational and doctrinal differences across churches.

One strand of the literature discusses the effects of religious activities on well-being over the life cycle. Peacock and Poloma (1999) define religiosity by the four categories personal devotion, participation in public ritual, divine interaction, and the preference for public or private religiosity. They suggest that religiosity increases with age and as such tends to increase reported well-being. Various other studies report positive effects of different measures of religious involvement on general well-being over the life cycle (Beit-Hallahmi, Argyle, 1997; Chamberlain, Zika, 1988; Ellison et al., 2001; Willits, Crider, 1988; Witter et al., 1985). However, there are also studies that do not find a statistically significant effect of religious activities on the well-being of selected age groups (Koenig et al., 2001, Walls, Zarit, 1991). Ardelt (2003) uses a survey method to analyze the relationship between well-being and different indicators for intrinsic and extrinsic religious orientation for elderly people. She shows that religious affiliation and the frequency of religious attendance reduce the fear and increase the acceptance of death, but a purpose in life is found to be more important for the well-being of elderly people than holding religious beliefs per se. Robbins and Francis (1996) report a positive relationship between the attitude towards Christianity and happiness in a study among undergraduate students.

Lelkes (2006) uses the economic transition in Hungary after the collapse of socialism as an exogenous shock and corroborates that higher church attendance is positively correlated with reported well-being. Hayo (2007) also investigates the determinants of happiness across Eastern Europe after the collapse of the socialist systems and finds that frequent churchgoers report a significantly higher life satisfaction than those who do not attend church, with no difference in life satisfaction across different denominations. Elliott and Hayward (2009) use responses from the World Values Survey to differentiate between religious involvement, as measured by church attendance, and personal religious identity, which is proxied by selfreported levels of religiosity. They find that both measures have an independent and positive effect on life satisfaction.

However, tighter government regulation is found to decrease the effect of religious involvement and at very high levels of government regulation, it may even generate a negative effect on life satisfaction.

Focusing on life satisfaction as well, Okulicz-Kozaryn (2010) finds a bimodal relation with social and individual religiosity. It appears that religious people in general tend to be either very satisfied or dissatisfied and that they are happier in religious than in non-religious countries. Social religiosity, which is measured by the time spent in church, the adherence to a religious organization, and church attendance rates, appears to promote life satisfaction. In contrast, individual religiosity, which is measured by the reported belief in God and the importance of religion, appears to have a detrimental effect on life satisfaction. Clark and Lelkes (2009) analyze the spillover effects of other people's religiosity on well-being. They also find that people in religious societies report higher levels of well-being than people in non-religious societies.

Snoep (2008) provides further support for the importance of the social context in understanding the link between religiosity and happiness. She reports different effects of various measures of religiosity[1] on happiness in the US as compared to the Netherlands and Denmark. For the US, the correlations with happiness are positive and mostly statistically significant but they are not statistically significant in the Netherlands and Denmark.

Lim and Putnam (2010) analyze the channels through which religiosity affects subjective well-being. By running ordinal logistic regressions of life satisfaction on different measures of religiosity they find that church attendance and network membership within a congregation positively affect well-being. By contrast, more intrinsic forms of religious practice, such as praying and believing in an afterlife, are reported to have no effect on life satisfaction.

Durkin and Greeley (1991) present religion as an outcome of a decision under rational choice. In their model faith works as an insurance against perdition in a possible afterlife. Clark and Lelkes (2005) argue that religious belief may also be considered a form of insurance against adverse advents in present life, not only in afterlife. They estimate the impact of various measures of religiosity on individual consequences of major socioeconomic shocks over the life cycle, such as divorce, unemployment, and widowhood. Life satisfaction is found to rise with religiosity. In addition, religious persons who are insured by their religious belief system appear to be satisfied with lower levels of other benefits than nonreligious persons, for instance in the case of unemployment benefits.

Overall, the empirical literature points to a positive correlation between religious activities and measures of well-being such as life satisfaction and happiness. Given that income is a good proxy for happiness, as

[1]The measures are taken from the World Values Survey and include time spent at church, belonging to a religious organization, belonging to a denomination, church attendance, importance of God, frequency of praying, frequency of private prayer.

discussed in the Introduction to this chapter, it may appear straightforward to conclude that there should be a positive correlation between the prevalence of religious activities and the level of income as well[2].

The link between religious activities and income was modeled in the seminal paper on the economics of religion by Azzi and Ehrenberg (1975). Based on standard microeconomic theory, one of the main insights is that rising incomes originating from market work may generate a substitution effect due to changes in the opportunity cost of time for household production. Consequently, time-intensive activities in household production will be reduced in favor of activities that are more compatible with market work. Religious activities, especially those related to social networking, appear to be relatively time intensive and thus may be substituted for other activities with rising levels of income. However, it remains an empirical question whether the substitution effect dominates the income effect in the demand for religion.

One school of thought on the economics of religion, pioneered in a series of papers by Iannaccone (1990, 1991, 1992, 1995, 1996) and summarized by Iannaccone (1998), develops the concept of a market for religion, where the market outcome is determined by rational decisions of producers and consumers. The main insight from this line of research is that an efficient market for religion will supply the level and the quality of the product (religion) that is demanded. But if there is an inefficient market with monopolistic supply, the quality of the product may be rated as substandard by the consumers, who will reduce their demand accordingly. Thus, low levels of religiosity in developed countries may not be the consequence of substitution away from religion due to rising levels of market income. They may simply reflect government interference in the market for religion in the form of state churches, which supply a product that most consumers (believers) do not want. For this reason, Stark and Iannaccone (1994) claim that secularization, i.e., the long-run decline of religious activities with rising levels of income, is a myth.

In contrast, if the substitution effect dominates, the level of religious activities may decline with rising levels of income even in the presence of an efficient market for religion[3]. Paldam and Gundlach (2012) document a robust negative correlation between the level of income and a summary measure of religiosity (explained in more detail in Section 4). One interpretation of the negative correlation is that the weight that is given to religious beliefs in everyday decision making may decline with rising levels of income, which may be independent of the level of religious beliefs in a country.

[2] A positive correlation between specific religious activities and the level of income was proposed by Weber (1904/05), who identified the protestant work ethic as a causal factor in long-run economic growth in the early phase of the Industrial Revolution. Blum and Dudley (2001) argue that Protestantism did not play a causal role as a specific religious activity, but established a positive network effect that reduced the probability of default in a one-time game of exchange and thereby increased the possibilities for productivity enhancing specialization and trade. Becker and Woessmann (2009) also do not find a direct growth effect of Protestantism per se but claim that the income effect identified by Weber is mainly due to the higher literacy caused by the translation of the bible from Latin to German under Protestantism. Using a broader data set, Cantoni (2009) does not find a direct or indirect effect of Protestantism on economic growth in Europe in the early stages of the Industrial Revolution.

[3] For an empirical assessment of the efficient-market hypotheses in the case of religion, see Opfinger (2011).

Without a substitution effect, it is difficult to rationalize a negative income-religiosity correlation in the presence of a positive happiness-religiosity correlation and a positive happiness-income correlation. The next section uses basic utility theory to provide a consistent account of all three stylized correlations. Religiosity is modeled as one of the commodities of the happiness function and the observed correlations are disentangled as movements along and shifts of an indifference curve. To the best of our knowledge, this basic theoretical framework has not explicitly been estimated.

4.3 A theoretical framework for the empirical analysis of religiosity and happiness

We model the link between religiosity and happiness along the lines of the utility model proposed by Becker and Rayo (2008), but we treat happiness as a direct proxy for utility[4]. Happiness (utility) is modeled as a function of two non-marketable "commodities", with religiosity being one of them. The happiness function is of the form

$$H = H(R, Z), \tag{4.1}$$

where happiness H is a proxy for utility, R is a measure of religiosity, and Z represents another commodity of the happiness function. The partial derivatives of equation (4.1) are generally assumed to be positive:

$$\partial H/\partial R > 0 \qquad \text{and} \qquad \partial H/\partial Z > 0, \tag{4.2}$$

but the sign of the partial derivative of Z obviously depends on the definition of the commodities of the happiness function. For instance, if Z stands for a misery index of inflation and unemployment (see Section 4), its partial derivative is expected to be negative.

We assume that religiosity and also the other commodity of the happiness function cannot be bought and sold on markets. Both commodities have to be produced according to the two household production functions and have to be linearly homogeneous in the input factors and the allocation of time

$$R = R(x, h_r, C) \qquad \text{and} \qquad Z = G(y, h_z, C), \tag{4.3}$$

where x and y are inputs of various marketable goods, h_r and h_z are individual household time inputs, and C is a vector of socio-economic context variables. The context variables may include health and educational status of individual households, the level of religiosity in a country or the level of the other commodity produced by other households, or the household's command over technology necessary to

[4]In contrast to our approach, Becker and Rayo (2008) argue that happiness is not a direct proxy for utility but one of many commodities of the utility function. From this starting point, they show that a missing positive correlation between income and happiness, as reported in earlier empirical studies, may not necessarily point to systematic errors in individual utility maximization.

produce religiosity and the other commodity.

The budget constraint includes market and non-market income:

$$p_x x + p_y y = wl + N = I, \tag{4.4}$$

where p_x and p_y are market prices for the inputs x and y; w is the wage rate; l is hours worked with $l = 1 - h_r - h_z$; N is non wage income; and I is total income. Households maximize happiness (utility) subject to the household production functions and the budget constraint which leads to the Hicks demand function for religiosity

$$R = R(H, p_x, p_y, w, C). \tag{4.5}$$

The demand for religion obviously depends on the level of happiness that is to be attained, the prices for the input goods x and y, the wage rate, and the socioeconomic context variables. This simplified theoretical framework generates hypotheses that can be estimated empirically. For instance, equation (4.5) can be used to discuss the effect of religiosity on happiness, which depends on the assumed household production function for religiosity. Given that the production of religiosity is time intensive relative to the household production of other commodities, an increase in the wage rate w should increase the optimal amount of market work and hence decrease the level of religiosity for a given level of happiness ($\partial R/\partial w < 0$)[5]. For a variable level of happiness, it is worth noting that equation (4.5) also allows for the possibility that an increase in the wage rate simultaneously increases happiness and reduces religiosity, which accounts for the reported positive correlation between income and happiness and the reported negative correlation between income and religiosity[6].

The theoretical framework implies the presence of an indifference curve for the determinants of the happiness function. If consumers maximize their utility they choose a point on an unobservable indifference curve. As we suppose that the function H is linearly homogeneous, application of the Euler Theorem leads to $H = \frac{\partial H}{\partial R} R + \frac{\partial H}{\partial Z} Z$. If H is to be held constant and $\frac{\partial H}{\partial R} > 0$ and $\frac{\partial H}{\partial Z} > 0$ then rising levels of Z always have to correspond to reductions in R. Based on the happiness function (4.1), estimation of the equation

$$Z = \alpha R + \delta H + \epsilon \tag{4.6}$$

can deliver interesting insights into the quantitative relation between religiosity and other elements of

[5] Azzi and Ehrenberg (1975) emphasize how changes in market income or unemployment will affect the structure of religious activities that differ by their time intensity. In our approach, we simply assume that religious activities are generally more time-intensive in household production than the other commodities of the happiness function in order to generate a hypothesis that can be estimated, see Section 5.

[6] GDP per capita is proportional to the (real) wage because the shares of factor income in GDP appear to be rather constant across countries and over time (Bernanke and Gurkaynak 2001, Gollin 2002). The proportionality follows because the labor share is defined as the real wage divided by labor productivity, and labor productivity is proportional to GDP per capita for a constant share of the working-age population.

the happiness function. As we keep happiness constant this estimation may reveal, for example, how much more religiosity will be needed to make up for a one year lower life expectancy. Z may represent a single commodity or an index of commodities of the happiness function, α and δ are the parameters to be estimated, and ϵ is a random error term. When we hold constant the level of happiness we have to find that $\alpha < 0$ if Z is supposed to increase happiness. This proposition will be tested in Section 5, although, the size of the coefficients is of greater interest in these estimations.

Once the other commodity of the happiness function is held constant instead of happiness, a higher level of religiosity should produce a higher level of happiness. Put differently, increasing the level of religiosity and holding fixed the other input of the happiness function, we expect to find that $\mu > 0$ in

$$H = \eta Z + \mu R + \rho, \tag{4.7}$$

where ρ is a random error term.

4.4 Data and samples

All variables used for the empirical estimates of the next section are listed together with their sources in Table C.1 in Appendix C. The next subsection explains some details of the data. Subsection 4.2 considers restrictions of the sample to be used for the estimates.

4.4.1 Notes on variables

Our measure of *happiness* is taken from the study by Stevenson and Wolfers (2008). Their measure is calculated from data provided by the World Values Survey (WVS). The WVS is based on surveys that have been conducted in many developing and industrialized countries in several waves. The survey questionnaire includes information about the respondents' demographics, such as age and gender, as well as the economic circumstances of the household and people's attitudes towards society in general. The data used in Stevenson and Wolfers (2008) span the four waves 1982, 1990, 1995, and 2000.

The WVS question concerning happiness is asked in the following way: "Taking all things together, would you say you are: very happy; quite happy; not very happy; not at all happy?" Stevenson and Wolfers (2008) create a measure of average national happiness from the sample data by running an ordered probit regression on country fixed effects[7]. We use their approach to generate an augmented sample that includes

[7]The WVS also includes a measure of life satisfaction. In parts of the literature, well-being, happiness, and life satisfaction have been used synonymously. But there may be differences between the concepts, notwithstanding a statistically significant correlation between the measures of happiness and life satisfaction. A possible discrepancy could be the time horizon that is considered when respondents answer questions about happiness and life satisfaction. Happiness is probably a more short-term measure of personal well-being, whereas life satisfaction takes into account a long-term perspective. In this paper, we focus on happiness as the dependent variable and report results for life satisfaction only when considering the robustness of our main result.

the 2005 WVS wave[8]. This unbalanced panel of happiness data with the aggregated individual information from the five WVS waves includes 93 countries, with 11 countries participating in all five waves and 32 countries participating in at least three of the five waves.

The ordered probit index of happiness is our dependent variable, i.e., our proxy for average national utility. This index of happiness is distributed mainly between -1 and 1. The lowest sample value of the happiness index is reported by Albania in 1995 (-1.142), the highest by Nigeria in the year 2000 (0.9982).

The WVS also includes a measure of *life satisfaction*. Life satisfaction, well-being, and happiness have been used synonymously in parts of the literature. But there may be differences between the concepts, notwithstanding a statistically significant correlation between the measures of happiness and life satisfaction. A possible discrepancy could be the time horizon that is considered when respondents answer questions about happiness and life satisfaction. Happiness is probably a more short-term measure of personal well-being, whereas life satisfaction might take into account a long-term perspective. In Tables C.2-C.4 in Appendix C, we replicate all reported estimates of Section 5 with life satisfaction as the dependent variable. However, we find only minor differences.

Our measure of *religiosity* is taken from Paldam and Gundlach (2012). Religiosity is defined as a latent variable that measures the importance of religion in all aspects of peoples' lives. If the full aspect space of religiosity would include $k = 1, ..., n$ variables, the measured religiosity score would be the largest common factor in all n variables. The actual religiosity score is estimated by a factor analysis of $n = 14$ items from the same waves of the WVS that have been used to construct the happiness index. The items from the WVS all disregard the specifics of a religion, but ask about the importance of religious behavior in a dozen fields of life. Examples include questions on the importance of believing in God, on the role of religion in one's own life and in teaching children, and on the relevance of attending religious services[9]. The religiosity score (in percent) is based on the fraction of the respondents giving the answer "high importance" to the 14 selected questions in each poll of the WVS. The resulting measure of religiosity is shown to be robust to a number of qualifications. We divide the religiosity score reported by Paldam and Gundlach (2012) by 100 to avoid four-digit regression coefficients, such that the rescaled religiosity score ranges from 0.1 points in Estonia in 1990 to 0.91 points in Nigeria in 1995 in our sample (see Section 4.2).

The data on *income* come from the Maddison homepage (Maddison 2010), where income is measured as Gross Domestic Product per person in constant international prices (ln *gdpc*). For countries that are included in the WVS but not in the Maddison data, we rely on income data from the CIA World Factbook. In our sample, per capita income in constant prices ranges from 686 dollars for Ethiopia in 2005 to 43,900

[8] We have been able to reproduce the Stevenson-Wolfers happiness data for the first four WVS waves up to minor differences in the range of second decimal points.

[9] The whole set of questions can be found in Appendix C.

dollars for Luxembourg in 2000.

A number of variables are considered to be other commodities of the happiness function, together with religiosity. For instance, Frey and Stutzer (2002) note that political participation, unemployment, and inflation have been identified as possible determinants of happiness in the empirical literature. Easterlin (1973, 2001) argues that happiness is not only influenced by political and economic factors, but also by personal and family matters, and by health (compare also Deaton, 2008). Political participation is measured by indices of *political rights* and *civil liberties*, which are taken from Freedom House (2011) and rescaled in a way that the highest value of 7 relates to a situation with the highest degree of political rights and civil liberties, respectively. The arithmetic average of these measures is called the *participation* index, which ranges from 1 for dictatorships to 7 for full democracies in our definition. Economic factors are measured as the rate of (log) *inflation* and the *unemployment* rate, which are both taken from World Bank (2010). The arithmetic average of these two measures is called the *misery* index, which ranges from -2.3 for Switzerland in 1995 to 1.7 for Brazil in 1990 across our sample countries. Finally, the presumed effect of health on happiness is measured by *life expectancy* at birth, which is also taken from World Bank (2010) and ranges in our sample from 43 years for Zambia in 2005 to 82 years in Hong Kong in 2005.

4.4.2 Sample selection

Measuring happiness, life satisfaction, and religiosity at the macro level may be classified as an attempt to measure the un-measurable. There is probably a higher danger of measurement error in this kind of data than in other macroeconomic variables like GDP per capita, inflation, or unemployment. If the measurement error is large and unsystematic, robust correlations are unlikely to show up. But the review of the literature has shown that there are robust correlations between happiness and religiosity and between happiness and income. It follows that a major concern should be to check for systematic measurement errors in the data, for instance in the form of coding errors.

We construct our sample of countries in two steps. Since we are mainly interested in the link between religiosity and happiness, we first delete all observations from the raw data with no entry for the religiosity score. This leaves us with an unbalanced panel of 237 observations on *religiosity*, which are matched with data on GDP per capita (income). In this sample, we have 235 observations for *happiness* and *life satisfaction* each, though with a missing overlap for two observations each. So the regression results reported for happiness in Section 5 and for life satisfaction in Appendix C are based on the same number of observations but on slightly different samples.

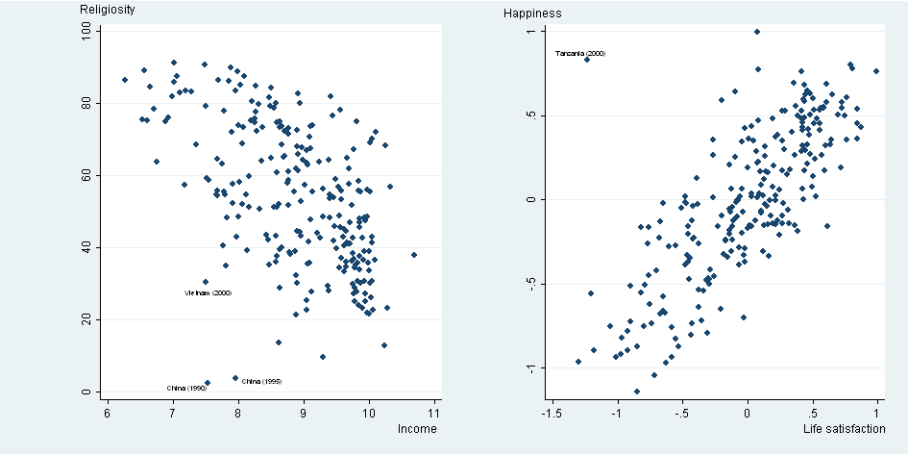
We use a method proposed by Hadi (1992, 1994) to detect multiple outliers in multivariate data, which is available in Stata as the package -hadimvo-. We run the Hadi test for outliers in the variables that

constitute the three stylized correlations reported in the literature, namely *happiness* (and *life satisfaction*), *religiosity*, and *income*. For our combined sample of 233 observations, the Hadi test identifies four outliers: the observations for China in 1990 and 1995, for Vietnam in 2000, and for Tanzania in 2000.

The outliers are also identifiable by visual inspection. The two scatter diagrams in Figure 4.1 show the four sample observations identified as outliers. In the income-religiosity correlation, China and Vietnam have suspiciously low levels of religiosity, relative to their (log) per capita income (left diagram). Measures of happiness and life satisfaction appear to be closely correlated (right diagram), so the observation on Tanzania looks like a coding error.

We delete the four identified outliers from our basic sample, which is thereby reduced to a maximum of 231 observations (see Table 4.1, column (1) in Section 5). The regression coefficients reported in the next section are somewhat affected by deleting the outliers, but the main results remain unchanged. Detailed regression results for the initial sample of 235 observations are available upon request.

Figure 4.1: Multivariate outliers in basic sample



4.5 Empirical results

The basic model of happiness and religiosity discussed in Section 3 presumes that religiosity is one of the commodities of the happiness function, which is substituted for other commodities. This reasoning based on the standard utility model implies a positive link between happiness and income, which captures the utility derived from consuming religiosity and the other commodities of the happiness function.

Our empirical analysis estimates the relationship between religiosity and other elements of the happiness function as implied by equation (4.6). Table 4.1 presents the OLS results for religiosity and alternative

other commodities of the happiness function, which are individually treated as endogenous variables. These commodities of the happiness function are held to reflect economic, political, and social conditions. The misery index (*mis*) is an average of log inflation (*lninfl*) and unemployment (*unemp*)[10]. The index of political participation (*part*) is an average of civil liberties (*cl*) and political rights (*pr*). The social conditions are proxied by a measure of life expectancy (*life*).

Table 4.1: Relationship between religiosity and alternative other commodities of the happiness function

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable	*mis*	*part*	*lninfl*	*unemp*	*cl*	*pr*	*life*
Explanatory variable: *religiosity*	0.85*	-3.48*	1.81*	0.07*	-3.48*	-3.47*	-0.21*
	(0.21)	(0.55)	(0.40)	(0.02)	(0.51)	(0.63)	(0.02)
Control variable: *happiness*	-0.71*	1.69*	-1.28*	-0.03*	1.63*	1.74*	0.05*
	(0.10)	(0.21)	(0.19)	(0.01)	(0.20)	(0.23)	(0.01)
Number of obs.	194	227	209	215	227	227	228
Number of countries	84	91	91	86	91	91	91
R squared	0.23	0.32	0.21	0.08	0.34	0.27	0.36
RESET test (p-value)	0.33	0.48	0.74	0.08	0.28	0.58	0.33

Note: All equations estimated with OLS. Robust standard errors in parentheses. *denotes statistical significance at the 5 percent level. R squared refers to adjusted R^2. The RESET test evaluates the null hypothesis of a nonlinear specification.

Conditional on the level of happiness, all coefficients on religiosity are statistically significant and have the expected sign. The RESET test does not indicate that the linear regression equations are misspecified. Religiosity is positively correlated with "bads" like unemployment and log inflation and negatively correlated with "goods" like civil liberties, political rights, and life expectancy.

Increasing the religiosity score by one percentage point can compensate for a 0.0085 points higher misery index. Raising the religiosity score by one standard deviation corresponds to a quarter of a standard deviation in the misery index to keep happiness constant. If the index of political participation is lower by one index point, religiosity has to be higher by 28.74 percentage points and by 50 percentage points to make up for a standard deviation change in participation. For each increase in inflation of one percent, the religiosity score would have to be higher by 0.55 percentage points to keep happiness constant. The coefficients on political rights and civil liberties are basically identical so that the interpretation is the same as for political participation. Finally, a reduction in life expectancy of one year can be compensated by an increase in the religiosity score by 4.76 index points. Decreases in life expectancy by one standard deviation would have to be accompanied by higher religiosity scores of 34 percentage points, or almost two standard deviations.

[10]Frey and Stutzer (2002) point out that empirical studies have shown that inflation should receive a smaller weight than unemployment in an aggregate index of unfavorable economic conditions. However, both variables are usually equally weighted in the misery index.

The implication of our finding is that the same level of happiness can be attained with high and with low levels of religiosity by simultaneous compensation through other elements of the happiness function. The negative correlation between income and religiosity reported by Paldam and Gundlach (2012) is in line with this finding. Higher levels of income are associated with lower levels of religiosity because religiosity is substituted for other goods of the happiness function once people become richer.

Table C.2 in the appendix repeats the same regression equations with life satisfaction as control variable. All regression coefficients have the expected sign and are statistically significant. The size of the coefficients is also similar, so that the above interpretation holds. The only difference is the RESET test pointing to a possible misspecification of the functional form in columns (4) and (7) of Table C.2.

Table 4.2 considers the robustness of the results gained above, thereby focusing on the misery index, the index of political participation, and the measure of life expectancy. Since there is insufficient time series variation in the measure of religiosity, we do not report fixed effects estimates but test for the consistency of the random effects estimator, which is a weighted average of the between- and the fixed-effects estimator.

Table 4.2: Robustness tests of the happiness function for religiosity

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	*mis*	*mis*	*part*	*part*	*life*	*life*
Explanatory variable	0.76*	0.88*	-4.34*	-2.28*	-0.27*	-0.15*
religiosity	(0.32)	(0.29)	(0.79)	(0.66)	(0.04)	(0.02)
Control variable	-0.73*	-0.81*	1.72*	1.37*	0.06*	0.03*
happiness	(0.14)	(0.12)	(0.35)	(0.27)	(0.02)	(0.01)
Estimator	BE	RE	BE	RE	BE	RE
Number of obs.	194	194	227	227	228	228
Number of countries	84	84	91	91	91	91
R squared	0.23	0.23	0.32	0.32	0.37	0.37
Gould test (p-value)	-		-		-	
religiosity		0.55		0.00		0.00
happiness		0.03		0.24		0.08
Joint coefficient equality		0.08		0.00		0.00

Source: calculations by the authors
Note: BE and RE estimation. *denotes statistical significance at the 5 percent level. R squared refers to overall R^2. The Gould test evaluates the RE hypothesis that the BE and the FE parameters are not statistically significantly different from each other.

For all three alternative commodities of the happiness function, the coefficients on religiosity are statistically significant for the BE and the RE estimator and resemble the OLS estimates in Table 4.1. The coefficients on the control variables are also all statistically significant and close to the OLS estimates. The Gould test reveals that the hypothesis of equal time-series and cross-country effects for both right-hand-side variables cannot be rejected if the misery index is the dependent variable (column (2)). For the other two specifications, this only holds for the control variable *happiness*. Overall, these results tend to confirm that religiosity may be considered a substitute for other commodities of the happiness function.

Table C.3 in the appendix demonstrates that the robustness also holds with life satisfaction as the dependent variable. The coefficient on religiosity in column (1) of Table C.3 is not statistically significant, but otherwise the results resemble the estimates in Table 4.2, including the performance of the Gould test.

Table 4.3: Estimates of the happiness function

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
religiosity	1.09*	1.13*	0.42	0.81*	-1.52	-0.57	-0.94	-1.06
	(0.16)	(0.24)	(0.28)	(0.18)	(0.83)	(1.30)	(0.73)	(0.62)
log income	0.35*	0.29*	0.33*	0.29*	0.34*	0.29*	0.33*	0.29*
	(0.06)	(0.08)	(0.12)	(0.06)	(0.06)	(0.08)	(0.12)	(0.06)
misery	-0.15*	-0.19*	-0.07*	-0.10*	-0.11*	-0.15*	-0.07*	-0.09*
	(0.04)	(0.07)	(0.03)	(0.03)	(0.04)	(0.07)	(0.03)	(0.03)
participation	0.02	0.00	0.05*	0.03	0.04	0.02	0.05*	0.04*
	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)
life expectancy	-0.89	-0.58	-0.49	-0.61	-0.47	-0.21	-0.50	-0.34
	(0.69)	(0.87)	(1.21)	(0.72)	(0.68)	(0.91)	(1.20)	(0.71)
religiosity squared					2.44*	1.59	1.37*	1.81*
					(0.76)	(1.20)	(0.68)	(0.57)
Estimator	OLS	BE	FE	RE	OLS	BE	FE	RE
Number of obs.	191	191	191	191	191	191	191	191
R squared	0.46	0.45	0.28	0.45	0.49	0.47	0.31	0.48
Gould test (p-value)				0.02				0.35

Note: Alternative estimators. Standard errors in parentheses; robust standard errors for OLS. *denotes statistical significance at the 5 percent level. R squared refers to overall R^2. for BE, FE, and RE. The Gould test evaluates the RE hypothesis that the BE and the FE parameters are not statistically significantly different from each other.

In a next step we try to understand, within our theoretical framework, the positive correlation between happiness and religiosity that has been reported in the literature (see Section 2). Happiness is positively correlated with income (Stevenson and Wolfers, 2008) but religiosity is negatively correlated with income (Paldam and Gundlach, 2012). Hence a positive correlation between happiness and religiosity deserves second thoughts.

Equation (4.7) predicts a positive effect of religiosity on happiness conditional on other commodities of the happiness function. This relationship is investigated in Table 4.3. Religiosity enters significantly in columns 1 through 4 in all cases but the fixed effects regression. The small variation in our measure for religiosity over time explains this finding. Most of the impact of religiosity is captured by the country fixed effect. But the other estimations support the idea that religiosity has a positive effect on happiness. Income affects happiness positively as well which is in line with the finding in Stevenson and Wolfers (2008). The misery index seems to be another element of the happiness function as it enters statistically significantly. Higher values of the misery index correlate with lower levels of happiness. Consequently, high levels of unemployment or inflation reduce average happiness. Political participation and life expectancy seem to be of only minor importance. This finding might be caused by the correlation of these variables

with income.

In columns 5 through 8 we add a squared term for religiosity to account for the proposition that there might be a non-linear relationship between happiness and religiosity as suggested by Okulicz-Kozaryn (2010). The OLS and random effects results appear to support this proposition, although the linear term is only significant at the ten percent level. The random effects estimator is efficient as we cannot reject the hypothesis of joint within and between variation. It seems that, starting from low levels of religiosity, happiness decreases as religiosity rises. At some point the squared term makes happiness rise again.

Table C.4 in the appendix repeats these estimations with life satisfaction as dependent variable. Columns 5 through 8 do not support the idea of a non-linear relationship between religiosity and life satisfaction. In contrast, columns 1 through 4 propose that the relationship is linear and positive as religiosity enters significantly and positively, except for the case of fixed effects. Again, the small within variation of the religiosity variable can explain this result. Once again, income enters positively and highly significantly. Columns 1 through 4 also support the result that the misery index is an important element of well-being as it is significant at the five percent level. Participation and life expectancy are, if at all, only marginally significant.

4.6 Discussion

Our results, which we base on a simple theoretical framework, seem to confirm three hypotheses which have previously mostly been investigated separately. We find that income has a strong positive impact on average happiness. Furthermore, we show that religiosity is also positively related to happiness and that religiosity is an element of the happiness function as it is negatively related to other possible commodities of the happiness function if happiness is held constant.

However, the possible non-linear relationship between happiness and religiosity is worth taking a closer look at. In Table 4.3 we find that there is a positive impact of religiosity on happiness. But columns 5 through 8 imply that this relationship might follow a U-shape, where, starting from low levels of religiosity, happiness decreases with rising religiosity, but from some point the squared term makes happiness rise. At high levels of religiosity happiness then is higher than at very low levels. This result suggests that at the beginning of the secularization process, i.e. the beginning of decreasing religiosity, happiness is reduced but then rises again. However the level of happiness at the end of the secularization process is lower before secularization.

According to Hirschle (2011) this might be due to a substitution effect away from religious affairs to consumption related practices. This substitution process decreases the importance of religiosity in the

creation of happiness and its place is taken by other elements of the happiness function whose production was not possible before the secularization process. Following the argument of Opfinger (2011) and Harttgen and Opfinger (2011) a substitute for religiosity is national identity. In the process of secularization people weaken their ties to their religion as worldly matters become more important. Nevertheless, people feel a desire to belong to and identify with a larger network which offers a common set of beliefs and values. This might be found in national identity, which might take over the role religiosity played before secularization.

It is important to note that the proposition of a U-shaped relationship between religiosity and happiness only makes sense if the minimum of the happiness function is in a reasonable range of the religiosity score. Taking the values from the random effects estimation (column 8 of Table 4.3) delivers a value of 29 percentage points for religiosity at which happiness reaches its minimum (the OLS estimates imply a value of 31 percentage points). Theses values imply that starting from high levels of religiosity, the secularization process reduces happiness for a fairly long time. Only shortly before the end of the secularization process does the impact of religiosity on happiness rise again. Apparently people need a certain amount of time until they feel comfortable in a low religiosity environment. After this point is crossed people are happy with their low religious involvement.

It could be objected that our results suffer from at least three shortcomings. One qualification is that we solely rely on happiness and religiosity data from the World Values Survey (WVS). These data may include some rather extreme observations, as already discussed in the previous section. More generally, survey responses to questions about happiness and religiosity may be biased in countries with autocratic regimes. However, the results in Stevenson and Wolfers (2008) on the effect of income on happiness did not depend on WVS data, so a possible bias in the happiness data does not seem to be systematic. Along the same lines, Paldam and Gundlach (2012) do not find evidence for a systematic bias in the WVS religiosity data.

Another qualification is that we have considered a limited set of possible commodities of the happiness function. For instance, family matters and health conditions can be expected to have a strong effect on the level of happiness. It could well be that our proxy variable for social context (life expectancy) does not appropriately capture all of these effects. However, our main interest is the effect of religiosity on happiness. Our results already indicate that religiosity may be considered a substitute in the happiness function, so that the inclusion of further control variables may improve the estimates of the happiness function but is unlikely to reverse the role of religiosity.

A third qualification is that our results are mainly driven by the cross-country variation of our data, due to a limited amount of time series variation in our unbalanced panel data. Since sufficient time series

evidence on changes in religiosity will not become available in the form of panel data anytime soon, the robustness of our model of happiness and religiosity may be tested on individual or household data within countries in future research.

4.7 Conclusion

Empirical research on religiosity and happiness has not been based on a clear foundation in utility theory. We address this gap in the literature with a simple theoretical framework that is inspired by Becker and Rayo (2008). In our version of their approach, happiness is modeled as a direct proxy for utility and religiosity enters as one of the commodities of the happiness function.

Our theoretical framework generates hypotheses, which we estimate empirically. First, higher income should lead to higher levels of happiness. Second, the same level of happiness should be attainable with alternative levels of religiosity, given that religiosity is substitutable for other commodities of the happiness function. Third, higher levels of religiosity should lead to higher levels of happiness given that all other commodities of the happiness function are held constant. These hypotheses are validated by our empirical results.

In addition, we show that the relationship between religiosity and happiness might not be linear. Apparently there is a U-shaped relationship with the minimum shortly before the end of the secularization process. We argue that this might be due to a substitution of religiosity for other elements of the happiness function, such as national identity. Only after people found a network to identify with, the nation, are they happy with their lower level of religiosity which might be of less importance in the production of happiness.

Appendix A

Appendix to Chapter 2

Table A.1: Religious Diversity across countries

Albania	0.765	Germany	0.703	Peru	0.183
Algeria	0.064	Ghana	0.828	Philippines	0.510
Andorra	0.202	Greece	0.133	Poland	0.153
Argentina	0.345	Hungary	0.574	Portugal	0.163
Armenia	0.425	Iceland	0.194	Puerto Rico	0.425
Australia	0.837	India	0.421	Romania	0.201
Austria	0.404	Indonesia	0.645	Russia	0.672
Azerbaijan	0.296	Iran	0.085	Rwanda	0.675
Bangladesh	0.247	Iraq	0.078	Saudi Arabia	0.121
Belarus	0.693	Ireland	0.268	Serbia	0.638
Belgium	0.327	Israel	0.388	Singapore	0.754
Bosnia-Herzeg.	0.621	Italy	0.320	Slovakia	0.505
Brazil	0.514	Japan	0.615	Slovenia	0.300
Bulgaria	0.454	Jordan	0.125	South Africa	0.763
Burkina Faso	0.633	Korea (South)	0.848	Spain	0.137
Canada	0.784	Kyrgyzstan	0.574	Sweden	0.486
Chile	0.556	Latvia	0.795	Switzerland	0.634
China	0.719	Lithuania	0.321	Taiwan	0.681
Colombia	0.119	Luxembourg	0.185	Tanzania	0.792
Croatia	0.232	Macedonia	0.542	Thailand	0.267
Cyprus	0.234	Malaysia	0.701	Trinidad	0.813
Czech Rep.	0.705	Mali	0.303	Turkey	0.055
Denmark	0.197	Malta	0.097	Uganda	0.670
Domenican Rep.	0.209	Mexico	0.239	United Kingdom	0.741
Egypt	0.269	Moldova	0.732	Ukraine	0.670
El Salvador	0.363	Morocco	0.034	Uruguay	0.508
Estonia	0.792	Netherlands	0.761	United States	0.829
Ethiopia	0.736	New Zealand	0.827	Venezuela	0.198
Finland	0.187	Nigeria	0.743	Viet Nam	0.707
France	0.464	Norway	0.179	Zambia	0.795
Georgia	0.605	Pakistan	0.076	Zimbabwe	0.750

Source: World Christian Encyclopedia; own calculations

Table A.2: Robustness (instrumental variable estimation; religious diversity is instrumented by a dummy variable which equals one if the country's legal origin is French law and zero otherwise)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Rel. Diversity	-37.08	-44.04	-54.57	-40.48	-47.51	-45.08	-44.64	-43.17	-42.85	-36.85	-18.50	-37.23	-21.26	-31.11
	(-2.08)	(-3.19)	(-3.09)	(-2.81)	(-2.78)	(-2.75)	(-2.69)	(-2.64)	(-2.72)	(-2.22)	(-1.32)	(-2.20)	(-1.45)	(-1.94)
Log income '73	-8.71	-8.46	-8.41	-8.04	-11.63	-11.59	-11.76	-11.12	-12.92	-7.96				-5.17
	(-3.53)	(-4.98)	(-3.94)	(-4.44)	(-5.40)	(-5.63)	(-5.62)	(-4.83)	(-7.09)	(-3.13)				(-1.31)
Sec. Education	-0.31									-0.19	-0.14	-0.34	-0.29	-0.16
	(-1.44)									(-0.95)	(-0.83)	(-1.82)	(-1.92)	(-0.92)
Ethnic Diversity		36.34		35.60						30.82	20.36	28.73	16.95	21.99
		(4.70)		(3.81)						(3.05)	(2.16)	(2.76)	(1.91)	(2.27)
Ling. Diversity			27.00	2.09						7.50	5.31	11.70	10.50	8.31
			(2.92)	(0.22)						(0.79)	(0.63)	(1.22)	(1.33)	(0.94)
Polity sc. '73					0.06					0.18	0.09	-0.01	0.01	0.27
					(0.24)					(0.80)	(0.43)	(-0.07)	(0.07)	(1.21)
Pol. Rights '73						0.13								
						(0.15)								
Civic Lib. '73							-0.04							
							(-0.04)							
Educ. Spending								-0.64						
								(-0.42)						
Population									-0.03	-0.03	-0.02	-0.02	-0.02	-0.03
									(-2.76)	(-2.50)	(-2.47)	(-2.00)	(-2.60)	(-3.24)
Tot. Fertility '73											5.16			-2.94
											(4.69)			(-0.81)
Urbanization '73												-0.20		-0.07
												(-2.24)		(-0.68)
Pop. Growth '73													8.14	11.52
													(5.32)	(2.35)
cons	154.72	136.77	145.96	130.99	179.22	176.50	178.46	175.04	189.10	134.57	41.93	80.06	52.41	107.60
	(6.97)	(8.61)	(7.83)	(8.14)	(8.52)	(8.56)	(8.56)	(9.27)	(10.71)	(6.36)	(4.94)	(10.98)	(8.52)	(2.72)
N	82	90	88	87	86	90	90	87	91	75	68	75	75	68
adj. R^2	0.30	0.42	0.22	0.44	0.19	0.22	0.22	0.22	0.30	0.51	0.64	0.47	0.64	0.64

Table A.3: Robustness (3 largest denominations)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Rel. Diversity	-7.27	-20.19	-15.52	-18.37	-11.25	-10.90	-10.50	-9.41	-9.82	-14.39	-11.21	-14.62	-12.83	-17.21
	(-1.01)	(-2.80)	(-1.74)	(-2.29)	(-1.54)	(-1.53)	(-1.49)	(-1.28)	(-1.34)	(-2.01)	(-1.63)	(-1.95)	(-1.95)	(-2.16)
Log income '73	-7.26	-9.13	-10.00	-9.19	-11.29	-11.72	-12.10	-11.23	-12.90	-8.24				-3.73
	(-2.54)	-(4.11)	(-3.92)	(-3.72)	(-4.92)	(-5.33)	(-5.56)	(-5.45)	(-6.88)	(-2.69)				(-1.24)
Sec. Education	-0.51									-0.35	-0.19	-0.51	-0.37	-0.23
	(-2.97)									(-2.03)	(-1.13)	(-2.99)	(-2.74)	(-1.40)
Ethnic Diversity		30.07		36.96						28.59	19.48	26.44	15.90	20.27
		(3.92)		(4.18)						(2.77)	(1.99)	(2.45)	(1.70)	(2.20)
Ling. Diversity			13.00	-7.05						0.69	2.58	4.83	7.69	3.43
			(1.58)	(-0.84)						(0.08)	(0.38)	(0.59)	(1.17)	(0.45)
Polity sc. '73					0.03					0.12	0.06	-0.08	-0.01	0.19
					(0.13)					(0.49)	(0.30)	(-0.36)	(-0.05)	(1.01)
Pol. Rights '73						-0.24								
						(-0.29)								
Civic Lib. '73							-0.61							
							(-0.66)							
Educ. Spending								-0.05						
								(-0.05)						
Population									-0.04	-0.03	-0.02	-0.03	-0.02	-0.03
									(-2.66)	(-3.05)	(-2.42)	(-2.73)	(-2.58)	(-2.83)
Tot. Fertility '73											5.45			-0.79
											(4.71)			(-0.25)
Urbanization '73												-0.21		-0.08
												(-2.20)		(-0.86)
Pop. Growth '73													8.53	9.07
													(6.74)	(2.19)
cons	131.75	130.52	143.37	130.18	156.93	161.25	165.85	155.91	172.03	130.94	38.12	74.75	48.87	85.90
	(5.86)	(6.23)	(6.26)	(5.64)	(7.88)	(7.95)	(8.24)	(9.07)	(10.37)	(5.00)	(4.72)	(9.06)	(8.76)	(2.70)
N	82	90	88	87	86	90	90	87	91	75	68	75	75	68
adj. R^2	0.36	0.43	0.32	0.44	0.29	0.31	0.31	0.30	0.38	0.52	0.63	0.49	0.65	0.69

Table A.4: Robustness (rich countries)

	Income '73 > 8.52					oecd = 1				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Rel Diversity	-21.80	-10.42	-20.43	-13.39	-15.38	-20.11	-19.10	-15.32	-21.84	-19.45
	(-2.24)	(-1.03)	(-1.94)	(-1.38)	(-1.80)	(-2.42)	(-2.34)	(-1.96)	(-2.68)	(-1.83)
Log income '73	-14.11				-17.80	-12.88				-8.24
	(-0.95)				(-2.25)	(-2.61)				(-0.66)
Sec. Education	-0.19	-0.06	-0.24	-0.14	-0.08	0.00	-0.03	-0.02	-0.02	0.02
	(-0.92)	(-0.33)	(-1.18)	(-1.00)	(-0.49)	(0.01)	(-0.14)	(-0.12)	(-0.08)	(0.08)
Ethnic Diversity	35.38	32.48	33.31	28.79	31.46	32.75	26.40	38.28	26.46	36.52
	(2.71)	(2.67)	(2.64)	(2.35)	(2.42)	(2.04)	(1.64)	(2.26)	(1.60)	(1.66)
Ling. Diversity	-9.09	-19.35	-9.67	-14.25	-12.21	-4.53	-4.95	-12.98	-6.34	-9.30
	(-0.73)	(-1.91)	(-0.81)	(-1.42)	(-1.19)	(-0.24)	(-0.26)	(-0.68)	(-0.31)	(-0.43)
Polity sc. '73	0.25	0.00	-0.17	-0.11	0.69	0.31	-0.03	0.00	-0.05	0.21
	(0.38)	(0.02)	(-0.52)	(-0.49)	(1.87)	(0.76)	(-0.08)	(0.00)	(-0.15)	(0.52)
Population	0.05	0.04	0.04	0.04	0.06	0.07	0.07	0.05	0.07	0.06
	(0.97)	(0.75)	(0.79)	(0.72)	(0.89)	(1.45)	(1.23)	(1.03)	(1.07)	(1.06)
Tot. Fertility '73		6.80			1.10		3.09			-2.37
		(3.87)			(0.26)		(1.33)			(-0.33)
Urbanization '73			-0.07		-0.06			-0.27		-0.16
			(-0.52)		(-0.47)			(-3.01)		(-1.00)
Pop. Growth '73				7.60	8.33				5.10	3.43
				(4.82)	(1.48)				(1.64)	(0.36)
cons	183.60	32.34	62.42	45.38	204.17	162.85	40.83	63.45	45.12	133.87
	(1.43)	(3.26)	(5.67)	(7.32)	(2.72)	(3.93)	(3.59)	(9.53)	(5.96)	(1.13)
N	40	37	40	40	37	26	26	26	26	26
adj. R^2	0.22	0.39	0.18	0.41	0.42	0.31	0.26	0.33	0.27	0.22

Table A.5: Robustness (poor countries)

	Income '73 < 8.52					oecd = 0				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Rel. Diversity	-21.40	-21.19	-20.81	-25.37	-33.96	-25.36	-17.80	-26.42	-18.84	-25.47
	(-2.13)	(-2.30)	(-2.02)	(-3.22)	(-2.65)	(-2.91)	(-1.81)	(-3.11)	(-2.60)	(-2.25)
Log income '73	-5.36				-8.19	-5.13				-3.20
	(-1.34)				(-1.26)	(-1.66)				(-0.90)
Sec. Education	-0.43	-0.28	-0.59	-0.26	-0.34	-0.52	-0.27	-0.64	-0.45	-0.51
	(-1.63)	(-0.93)	(-2.19)	(-0.97)	(-1.16)	(-2.30)	(-1.22)	(-2.93)	(-2.69)	(-2.35)
Ethnic Diversity	21.95	13.20	19.80	5.66	2.34	15.35	8.66	11.43	6.17	6.56
	(1.95)	(1.14)	(1.75)	(0.62)	(0.27)	(1.46)	(0.76)	(1.00)	(0.62)	(0.76)
Ling. Diversity	11.85	15.30	13.60	20.29	25.89	11.20	9.27	13.83	13.37	12.40
	(1.22)	(2.58)	(1.81)	(4.45)	(2.79)	(1.73)	(1.82)	(2.85)	(2.82)	(2.06)
Polity sc. '73	0.12	0.05	0.05	0.13	0.02	0.14	0.29	0.08	0.12	0.30
	(0.39)	(0.18)	(0.18)	(0.71)	(0.07)	(0.55)	(1.28)	(0.34)	(0.51)	(1.39)
Population	-0.03	-0.03	-0.03	-0.03	-0.04	-0.03	-0.03	-0.03	-0.03	-0.04
	(-4.46)	(-4.35)	(-4.43)	(-5.52)	(-5.57)	(-4.74)	(-4.70)	(-4.74)	(-5.00)	(-7.58)
Tot. Fertility '73		2.78			-7.93		4.53			-4.52
		(1.51)			(-1.39)		(2.96)			(-1.08)
Urbanization '73			-0.10		0.08			-0.14		-0.11
			(-0.74)		(0.48)			(-1.48)		(-0.86)
pop. Growth '73				8.61	19.02				7.64	13.80
				(6.10)	(2.07)				(4.97)	(2.57)
cons	113.79	59.06	78.37	56.64	141.19	118.69	53.19	86.68	60.52	106.63
	(3.40)	(3.83)	(6.09)	(6.45)	(2.42)	(4.49)	(4.37)	(7.66)	(8.65)	(3.24)
N	35	31	35	35	31	49	42	49	49	42
adj. R^2	0.55	0.62	0.53	0.69	0.69	0.52	0.64	0.51	0.66	0.69

Table A.6: Robustness (split sample: The first five columns show the results for the waves 1982, 1990, 1995, the last five columns for the waves 2000 and 2005.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Rel. Diversity	-17.57	-16.55	-19.89	-21.08	-18.54	-18.62	-14.01	-18.81	-16.11	-20.37
	(-2.22)	(-1.89)	(-2.33)	(-2.57)	(-1.95)	(-2.59)	(-1.87)	(-2.60)	(-2.48)	(-2.64)
Log income '73	-13.50				-8.11	-7.71				-4.92
	(-5.50)				(-1.38)	(-2.56)				(-1.42)
Sec. Education	-0.13	-0.07	-0.31	-0.23	-0.12	-0.30	-0.20	-0.40	-0.28	-0.18
	(-0.73)	(-0.37)	(-1.60)	(-1.54)	(-0.54)	(-2.13)	(-1.37)	(-2.71)	(-2.22)	(-1.46)
Ethnic Diversity	26.15	11.05	27.51	6.50	12.00	33.68	24.52	30.74	22.12	27.31
	(1.73)	(0.79)	(1.82)	(0.47)	(0.78)	(3.40)	(2.38)	(3.12)	(2.24)	(2.71)
Ling. Diversity	6.09	10.68	7.64	16.63	11.72	-2.58	0.40	2.67	4.10	-1.55
	(0.44)	(0.97)	(0.49)	(1.56)	(0.93)	(-0.30)	(0.05)	(0.34)	(0.54)	(-0.19)
Polity sc. '73	0.67	0.28	0.33	0.19	0.48	-0.03	-0.07	-0.19	-0.16	0.11
	(2.36)	(0.96)	(1.08)	(0.77)	(1.71)	(-0.14)	(-0.38)	(-0.93)	(-0.85)	(0.61)
Population	-0.04	-0.03	-0.03	-0.03	-0.04	-0.02	-0.01	-0.02	-0.01	-0.02
	(-3.35)	(-2.40)	(-2.26)	(-2.28)	(-2.44)	(-3.22)	(-3.08)	(-3.20)	(-3.12)	(-3.82)
Tot. Fertility '73		7.18			0.95		4.84			-3.11
		(4.83)			(0.21)		(4.15)			(-1.00)
Urbanization '73			-0.29		0.08			-0.22		-0.11
			(-2.16)		(0.57)			(-2.23)		(-1.14)
Pop. Growth '73				10.46	6.79				7.90	11.76
				(5.16)	(1.28)				(5.25)	(2.81)
cons	174.76	35.53	77.82	49.90	114.04	128.71	41.91	76.44	50.37	104.56
	(8.07)	(2.98)	(7.32)	(6.52)	(1.91)	(5.16)	(5.15)	(10.26)	(8.47)	(3.14)
N	52	47	52	52	47	67	61	67	67	61
adj. R^2	0.49	0.54	0.37	0.52	0.52	0.57	0.66	0.56	0.65	0.69

Table A.7: Robustness (income from Penn World Tables)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Rel. Diversity	-11.70	-20.89	-20.41	-20.51	-14.15	-14.68	-14.96	-14.04	-13.03	-17.66	-14.96	-19.84	-17.42	-18.09
	(-1.64)	-3.36)	(-2.52)	(-2.90)	(-1.93)	(-2.05)	(-2.08)	(-1.96)	(-2.08)	(-3.06)	(-2.24)	(-2.85)	(-3.18)	(-2.38)
Log income '73 (PWT)	-4.91	-5.79	-6.44	-5.66	-6.99	-7.22	-7.27	-7.58	-10.02	-5.79				-2.36
	(-1.54)	(-2.82)	(-2.66)	(-2.46)	(-3.27)	(-3.19)	(-3.25)	(-3.86)	(-6.36)	(-2.34)				(-0.87)
Sec. Education	-0.59									-0.18	-0.15	-0.44	-0.31	-0.10
	(-2.11)									(-0.91)	(-0.91)	(-2.68)	(-2.48)	(-0.44)
Ethnic Diversity		37.32		37.89						32.90	19.73	26.54	16.39	21.56
		(4.29)		(4.63)						(3.79)	(2.19)	(2.77)	(1.97)	(2.16)
Ling. Diversity			21.49	0.87						6.13	4.33	7.09	9.48	6.80
			(2.48)	(0.11)						(0.95)	(0.81)	(1.13)	(2.01)	(0.97)
Polity sc. '73					-0.34					-0.05	0.08	-0.06	0.00	0.04
					(-1.54)					(-0.23)	(0.42)	(-0.33)	(0.03)	(0.21)
Pol. Rights '73						1.10								
						(1.13)								
Civic Lib. '73							1.10							
							(0.94)							
Educ. Spending								-1.31						
								(-1.06)						
Population									-0.04	-0.03	-0.02	-0.02	-0.02	-0.03
									(-2.65)	(-2.74)	(-2.36)	(-2.70)	(-2.51)	(-2.62)
Tot. Fertility '73											5.26			-0.90
											(4.82)			(-0.25)
Urbanization '73												-0.20		-0.08
												(-2.36)		(-0.81)
Pop. Growth '73													8.21	8.80
													(6.31)	(1.62)
cons	118.95	107.36	119.47	105.13	128.84	126.70	127.25	138.91	157.23	110.74	40.68	76.43	51.46	75.88
	(4.80)	(5.32)	(5.32)	(4.69)	(6.84)	(5.72)	(5.72)	(8.24)	(11.15)	(4.71)	(5.01)	(9.49)	(9.46)	(2.56)
N	68	71	70	69	67	71	71	70	72	62	68	75	75	59
adj. R^2	0.32	0.48	0.35	0.49	0.26	0.28	0.27	0.27	0.37	0.58	0.65	0.52	0.64	0.64

Table A.8: Robustness (income from Penn World Tables for 1993)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Rel. Diversity	-17.75	-28.30	-27.71	-27.73	-23.87	-24.51	-24.29	-22.81	-22.81	-21.69	-14.96	-19.84	-17.42	-19.15
	(-2.59)	(-4.15)	(-3.50)	(-3.74)	(-3.40)	(-3.51)	(-3.55)	(-3.10)	(-3.32)	(-3.38)	(-2.24)	(-2.85)	(-3.18)	(-2.67)
Log income '93 (PWT)	-6.58	-6.53	-7.33	-6.36	-9.53	-10.30	-10.51	-8.85	-9.43	-5.59				-1.34
	(-4.50)	(-4.51)	(-4.56)	(-3.96)	(-6.91)	(-6.51)	(-6.75)	(-8.16)	(-7.78)	(-3.15)				(-0.74)
Sec. Education	-0.52									-0.42	-0.15	-0.44	-0.31	-0.22
	(-4.28)									(-2.90)	(-0.91)	(-2.68)	(-2.48)	(-1.13)
Ethnic Diversity		29.03		30.40						23.48	19.73	26.54	16.39	18.32
		(3.74)		(3.70)						(2.57)	(2.19)	(2.77)	(1.97)	(2.07)
Ling. Diversity			15.71	-0.13						5.45	4.33	7.09	9.48	5.95
			(2.28)	(-0.02)						(0.89)	(0.81)	(1.13)	(2.01)	(0.92)
Polity sc. '73					0.15					0.12	0.08	-0.06	0.00	0.18
					(0.70)					(0.59)	(0.42)	(-0.33)	(0.03)	(1.06)
Pol. Rights '73						-0.99								
						(-1.16)								
Civic Lib. '73							-1.25							
							(-1.31)							
Educ. Spending								-0.60						
								(-0.45)						
Population									-0.03	-0.02	-0.02	-0.02	-0.02	-0.03
									(-2.00)	(-2.71)	(-2.36)	(-2.70)	(-2.51)	(-2.79)
Tot. Fertility '73											5.26			0.04
											(4.82)			(0.01)
Urbanization '73												-0.20		-0.09
												(-2.36)		(-0.99)
Pop. Growth '73													8.21	8.05
													(6.31)	(1.89)
cons	136.25	119.97	132.46	117.34	155.51	166.74	169.64	151.49	155.79	118.66	40.68	76.43	51.46	68.60
	(10.62)	(7.73)	(8.47)	(6.97)	(12.00)	(9.66)	(9.96)	(13.99)	(13.20)	(6.67)	(5.01)	(9.49)	(9.46)	(2.87)
N	81	88	87	86	84	88	88	86	89	75	68	75	75	68
adj. R^2	0.41	0.45	0.36	0.45	0.34	0.35	0.35	0.34	0.37	0.54	0.65	0.52	0.64	0.66

Appendix B

Appendix to Chapter 3

Table B.1: Index values by country

	Index value				Index value		
country	Mean	SD	N	country	Mean	SD	N
Albania	-0.037	0.946	505	Latvia	-0.208	0.982	693
Azerbaijan	0.077	0.978	1521	Lithuania	-0.271	1.012	1036
Argentina	-0.515	0.924	803	Luxembourg	0.279	0.984	453
Australia	0.200	0.984	1718	Malta	-0.149	1.015	218
Austria	0.163	1.012	2023	Mexico	0.079	0.964	2543
Bangladesh	0.709	0.961	1022	Moldova	-0.331	0.966	809
Armenia	-0.035	1.018	1524	Netherlands	0.376	1.001	831
Belgium	-0.480	0.947	1849	New Zealand	0.202	0.933	1181
Bosnia and Herzegovina	0.412	1.033	925	Nigeria	-0.244	1.006	2243
Brazil	-0.118	0.920	2691	Norway	0.613	0.906	2146
Bulgaria	0.145	0.950	1235	Peru	-0.350	0.847	950
Belarus	-0.125	0.965	1966	Philippines	0.189	0.908	1098
Canada	0.258	0.964	1368	Poland	0.208	0.998	1974
Chile	-0.240	0.944	2116	Portugal	-0.403	0.898	855
Taiwan	-0.004	0.955	565	Puerto Rico	-0.181	0.974	1005
Croatia	-0.061	0.961	821	Romania	-0.284	0.905	776
Czech Republic	0.062	0.968	2427	Russia	-0.288	0.969	4389
Denmark	0.276	0.969	896	Slovakia	-0.072	0.960	1415
Dominican Republic	-0.323	0.880	288	Slovenia	-0.182	0.892	2245
Estonia	-0.079	0.983	608	South Africa	0.485	1.049	3876
Finnland	-0.092	0.894	2125	Spain	-0.488	0.928	3297
France	-0.132	0.968	1862	Sweden	0.307	1.003	1644
Georgia	-0.065	1.008	1687	Switzerland	0.060	1.001	847
Germany	0.080	0.939	2627	Turkey	0.382	0.893	2614
Hungary	-0.082	0.963	1315	Ukraine	-0.253	0.979	2050
Iceland	0.125	0.919	602	Macedonia	-0.327	0.890	621
India	0.358	0.966	3032	United Kingdom	0.136	1.006	1219
Ireland	-0.096	0.941	858	United States	0.417	0.912	2620
Italy	-0.391	0.996	3702	Uruguay	-0.094	1.047	762
Japan	0.194	1.000	965	Venezuela	-0.458	0.828	975
South Korea	0.652	0.825	1165	Serbia	-0.294	0.980	1081

Source: World Value Survey; calculations by the authors.

Table B.2: Regression with various controls

	Ethnic Diversity				Ethnic Polarization				Religious Diversity				Religious Polarization			
	OLS		IV		OLS		IV		OLS		IV		OLS		IV	
	Coef.	P>t	Coef.	P>z	Coef.	P>t	Coef.	P>z	Coef.	P>t	Coef.	P>z	Coef.	P>t	Coef.	P>z
Ethhnic Dversity	-0.12	0.71	0.92	0.31												
Ethnic Polarization					-0.45	0.18	-0.36	0.46								
Religious Diversity									0.53	0.09	0.86	0.01				
Religious Polarization													0.06	0.82	0.67	0.27
Log of Income '73	-0.39	0.02	-0.49	0.00	-0.39	0.04	-0.41	0.01	-0.45	0.01	-0.48	0.00	-0.39	0.02	-0.30	0.06
Polity Score '73	0.01	0.49	0.01	0.43	0.01	0.57	0.01	0.43	0.01	0.57	0.01	0.57	0.01	0.50	0.01	0.51
Secondary Educ.	0.01	0.53	0.02	0.18	0.01	0.53	0.01	0.43	0.00	0.74	0.00	1.00	0.01	0.42	0.00	0.47
Area in square km	0.00	0.33	0.00	0.33	0.00	0.82	0.00	0.74	0.00	0.18	0.00	0.05	0.00	0.33	0.00	0.22
Landlocked	-0.04	0.86	-0.12	0.59	-0.11	0.71	-0.13	0.58	-0.08	0.71	-0.10	0.57	-0.05	0.83	-0.03	0.88
# neighboring coun.	0.02	0.56	0.00	0.94	0.02	0.48	0.02	0.39	0.02	0.43	0.03	0.23	0.02	0.60	0.02	0.52
% fertile soil	0.00	0.79	0.00	0.40	0.00	0.85	0.00	0.77	0.00	0.39	0.00	0.15	0.00	0.74	0.00	0.77
Former Colony	0.16	0.55	-0.20	0.61	0.24	0.44	0.19	0.53	-0.06	0.81	-0.18	0.40	0.10	0.71	-0.12	0.69
Former Communist coun.	0.18	0.50	0.05	0.84	0.25	0.45	0.26	0.28	0.08	0.76	0.02	0.93	0.17	0.53	0.17	0.46
Constr. Trade Share '85	-0.01	0.37	-0.01	0.14	0.00	0.52	-0.01	0.39	0.00	0.54	0.00	0.69	-0.01	0.33	0.00	0.38
Roads per inh. Per sq km	0.00	0.47	0.00	0.89	0.00	0.68	0.00	0.70	0.00	0.44	0.00	0.29	0.00	0.52	0.00	0.40
Phone lines per 100	0.02	0.08	0.01	0.19	0.02	0.07	0.02	0.01	0.02	0.13	0.01	0.10	0.02	0.10	0.01	0.17
cons	3.05	0.03	3.95	0.01	3.05	0.05	3.20	0.01	3.59	0.01	3.86	0.00	3.07	0.03	2.30	0.09

Table B.3: Stepwise Regression Results

	Ethnic Diversity		Ethnic Polarization		Religious Diversity		Religious Polarization	
	Coef.	P>t	Coef.	P>t	Coef.	P>t	Coef.	P>t
Ethnic Polarization			-0.35	0.07				
Religious Diversity					0.42	0.03		
Phone Lines per 100	0.02	0.00	0.02	0.01	0.02	0.00	0.02	0.00
Log of Income '73	-0.41	0.00	-0.41	0.00	-0.42	0.00	-0.41	0.00
Constr. Trade Share '85			-0.01	0.09				
Secondary Educ.			0.01	0.07				
cons	3.26	0.00	3.39	0.00	3.22	0.00	3.26	0.00

Appendix C

Appendix to Chapter 4

List of questions for construction of the religiosity score:

1. How important is religion in your life?
2. Do you consider religious faith an important child quality which it should be taught at home?
3. Do you belong to a religious denomination?
4. Apart from weddings, funerals, christenings, about how often do you attend religious services these days?
5. Independently of whether you go to church or not, would you say you are a religious person?
6. Generally speaking, do you think that the churches in your country are giving adequate answers to moral problems and needs of the individual?
7. Generally speaking, do you think that the churches in your country are giving adequate answers to the problems of family life?
8. Generally speaking, do you think that the churches in your country are giving adequate answers to people's spiritual needs?
9. Generally speaking, do you think that the churches in your country are giving adequate answers to the social problems facing our country today?
10. Do you believe in God?
11. How important is God in your life (on a 1 to 10 scale)?
12. Do you take some moments of prayer, meditation or contemplation or something like that?
13. Do you agree: Politicians who do not believe in God are unfit for public office?
14. Do you think it is better if more people are strongly religious?

Table C.1: Description of variables

Dependent variable	
happiness	Measure of average national happiness, generated by ordered probit regression with country fixed effects from individual answers to the World Values Survey question: "Taking all things together, would you say you are: very happy; quite happy; not very happy; not at all happy?" Sources: Own calculations based on Stevenson and Wolfers (2008) and WVS data for 1982, 1990, 1995, 2000, and 2005.
Explanatory variables (alphabetical order)	
civil liberties	Index of civil liberties, here rescaled so that a higher value corresponds to a higher level of civil liberties. Source: Freedom House (2011). http://www.freedomhouse.org/template.cfm?page=439
income	Natural logarithm of GDP per capita, measured in 1990 international Geary-Khamis dollars. Sources: Maddison (2010), CIA (2011). http://www.ggdc.net/MADDISON(oriindex.htm https://www.cia.gov/library/publications/the-world-factbook/
life expectancy	Years of life expectancy at birth Source: World Bank (2010). http://data.worldbank.org/indicator
ln inflation	Natural logarithm of the rate of inflation. Source: World Bank (2010). http://data.worldbank.org/indicator
misery	Arithmetic average of unemployment rate and inflation.
participation	Arithmetic average of civil liberties and political rights.
political rights	Index of political rights, here rescaled so that a higher value corresponds to a higher level of political rights. Source: Freedom House (2011). http://www.freedomhouse.org/template.cfm?page=439
religiosity	Index of the intensity of religion, compiled from 14 items of the WVS. Source: Paldam and Gundlach (2009).
unemployment	Unemployment rate. Sources: World Bank (2010). http://data.worldbank.org/indicator
Alternative dependent variable	
life satisfaction	Measure of average national life satisfaction, generated by ordered probit regression with country fixed effects from individual answers to the World Values Survey question: "All things considered, how satisfied are you with your life as a whole these days?" Source: Own calculations based on Stevenson and Wolfers (2008) and WVS data for 1982, 1990, 1995, 2000, and 2005.

Table C.2: Relationship between religiosity and alternative other commodities of the life-satisfaction function

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable	*mis*	*part*	*lninfl*	*unemp*	*cl*	*pr*	*life*
Explanatory variable	0.65*	-2.75*	1.34*	0.06*	-2.73*	-2.78*	-0.19*
religiosity	(0.23)	(0.57)	(0.43)	(0.02)	(0.52)	(0.64)	(0.02)
Control variable	-0.62*	1.86*	-1.18*	-0.03*	1.80*	1.93*	0.07*
life satisfaction	(0.10)	(0.17)	(0.19)	(0.01)	(0.16)	(0.20)	(0.01)
Number of obs.	194	227	209	215	227	227	228
Number of countries	84	91	91	86	91	91	91
R squared	0.21	0.39	0.21	0.09	0.41	0.34	0.47
RESET test (p-value)	0.80	0.49	0.71	0.03	0.46	0.72	0.04

Note: All equations estimated with OLS. Robust standard errors in parentheses. *denotes statistical significance at the 5 percent level. R squared refers to adjusted R^2. The RESET test evaluates the null hypothesis of a nonlinear specification.

Table C.3: Robustness tests of the life-satisfaction function for religiosity

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	*mis*	*mis*	*part*	*part*	*life*	*life*
Explanatory variable	0.35	0.60*	-3.18*	-2.08*	-0.22*	-0.16*
religiosity	(0.32)	(0.29)	(0.74)	(0.65)	(0.03)	(0.02)
Control variable	-0.64*	-0.65*	1.94*	1.39*	0.08*	0.03*
life satisfaction	(0.12)	(0.11)	(0.28)	(0.25)	(0.01)	(0.01)
Estimator	BE	RE	BE	RE	BE	RE
Number of obs.	194	194	227	227	228	228
Number of countries	84	84	91	91	91	91
R squared	0.22	0.22	0.39	0.39	0.47	0.44
Gould test (p-value)	-		-		-	
religiosity		0.30		0.00		0.04
life satisfaction		0.36		0.00		0.00
Joint coefficient equality		0.35		0.00		0.00

Note: BE and RE estimation. *denotes statistical significance at the 5 percent level. R squared refers to overall R^2. The Gould test evaluates the RE hypothesis that the BE and the FE parameters are not statistically significantly different from each other.

Table C.4: Estimates of the life satisfaction function

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
religiosity	1.00*	0.83*	0.15	0.63*	-1.29	-1.52	0.07	0.05
	(0.17)	(0.25)	(0.30)	(0.20)	(0.86)	(1.34)	(0.82)	(0.70)
log income	0.33*	0.25*	0.37*	0.35*	0.32*	0.24*	0.37*	0.35*
	(0.06)	(0.08)	(0.13)	(0.07)	(0.06)	(0.08)	(0.13)	(0.07)
misery	-0.10*	-0.17*	-0.08*	-0.06*	-0.07	-0.12	-0.08*	-0.06*
	(0.04)	(0.07)	(0.03)	(0.03)	(0.04)	(0.08)	(0.03)	(0.03)
participation	0.04*	0.04	0.03	0.03	0.05*	0.06	0.03	0.04*
	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)
life expectancy	1.02	1.34	-3.48*	-0.42	1.35	1.84*	-3.49*	-0.32
	(0.70)	(0.89)	(1.30)	(0.77)	(0.70)	(0.92)	(1.31)	(0.77)
religiosity squared					2.14*	2.20	0.08	0.56
					(0.79)	(1.24)	(0.77)	(0.65)
Estimator	OLS	BE	FE	RE	OLS	BE	FE	RE
Number of obs.	191	191	191	191	191	191	191	191
R squared	0.54	0.57	0.19	0.52	0.56	0.58	0.19	0.54
Gould test (p-value)				0.00				0.00

Note: Alternative estimators. Standard errors in parentheses; robust standard errors for OLS. *denotes statistical significance at the 5 percent level. R squared refers to overall R^2. for BE, FE, and RE. The Gould test evaluates the RE hypothesis that the BE and the FE parameters are not statistically significantly different from each other.

References

Ainsworth, Martha, Deon Filmer (2006). Children's Schooling: AIDS, Orphanhood, Poverty, and Gender. *World Development* 34(6), 1099-1128.

Akerlof, George A., Rachel E. Kranton (2000). Economics and Identity. *Quarterly Journal of Economics* 115(3), 715-753.

Alesina, Alberto, Reza Baqir, William Easterly (1999). Public Goods and Ethnic Divisions. *Quarterly Journal of Economics* 114(4), 1243-1284.

Alesina, Alberto, Arnaud Devleeschauwer, William Easterly, Sergio Kurlat, Romain Wacziarg (2003). Fractionalization. *Journal of Economic Growth* 8, 155-194.

Alesina, Alberto, Enrico Spolaore (2003). The Size of Nations. *Cambridge, MA: MIT Press.*

Anderson, Benedict (2006). Imagined Communities (2^{nd} ed.). *London: Verso.*

Ardelt, Monika (2003). Effects of Religion and Purpose in Life on Elders' Subjective Well-Being and Attitudes Toward Death. *Journal of Religious Gerontology* 14 (4), 55-77.

Ashraf, Quamrul, Oded Galor (2007). Cultural Assimilation, Cultural Diffusion and the Origin of the Wealth of Nations. *CEPR Discussion Paper No. DP6444.*

Ashraf, Quamrul, Oded Galor (2011). The "Out of Africa" Hypothesis, Human Genetic Diversity, and Comparative Economic Development. *NBER Working Paper No. 17216.*

Austen-Smith, David, Roland G. Fryer, Jr. (2005). An Economic Analysis of 'Acting White'. *Quarterly Journal of Economics* 120 (2), 551-583.

Azzi, Corry, Ronald Ehrenberg (1975). Household Allocation of Time and Church Attendance. *Journal of Political Economy* 83 (1), 27-56.

Bar-El, Ronen, Teresa Garcia-Munoz, Shoshana Neuman, Yossef Tobol (2012). The Evolution of Secularization: Cultural Transmission, Religion and Fertility Theory, Simulations and Evidence. *Journal of Population Economics*, forthcoming.

Barrett, David B., George T. Kurian, Todd M. Johnson (2001). World Christian Encyclopedia. *Oxford University Press.*

Barro, Robert J., Jong-Wha Lee (2010). A New Data Set of Educational Attainment in the World, 1950-2010. *NBER Working Paper, 15902.*

Barro, Robert J., Rachel McCleary (2002). Religion and Political Economy in an International Panel. *NBER Working Paper 8931.*

Battu, Harminder, McDonald Mwale, Yves Zenou (2007). Oppositional identities and the labor market. *Journal of Population Economics* 20, 643-667.

Beck, Ulrich, Elisabeth Beck-Gernsheim (2005). Individualization. *London: SAGE Publications.*

Becker, Gary S., Luis Rayo (2008). Comment. *Brookings Papers on Economic Activity* 2008 (1), 88-95.

Becker, Sascha O., Ludger Woessmann (2009). Was Weber Wrong? A Human Capital Theory of Protestant Economic History. *Quarterly journal of Economics* 124(2), 531-596.

Beit-Hallahmi, Benjamin, Michael Argyle (1997). The psychology of religious behavior, belief and experience. *London: Routledge.*

Bellah, Robert N., Richard Madsen, William M. Sullivan, Ann Swidler, Steven M. Tipton (2008). Habits of the Heart. Individualism and Commitment in American Life. *Berkeley: University of California Press.*

Bernanke, Ben S., Refet S. Gürkaynak (2001). Is Growth Exogenous? Taking Mankiw, Romer, and Weil Seriously. *NBER Macroeconomics Annual* 16, 11-57.

Bisin, Alberto, Eleonora Patacchini, Thierry Verdier, Yves Zenou (2010). Bend It Like Beckham: Ethnic Identity and Integration. *NBER Working Paper, 16465.*

Blau, Judith R., Kent Redding, Kenneth C. Land (1993). Ethnocultural Cleavages and the Growth of Church Membership in the United States, 1860-1930. *Sociological Forum* 8 (4), 609-637.

Bloom, William (1990). Personal Identity, National Identity and International Relations. *British Journal of Political Science* 20, 1-10.

Blum, Ulrich, Leonard Dudley (2001). Religion and Economic Growth: Was Weber Right? *Journal of Evolutionary Economics* 11(2), 207-230.

Bodenhorn, Howard, Christopher S. Ruebeck (2003). The Economics of Identity and the Endogeneity of Race. *NBER Working Paper, 9962.*

Bollen, Kenneth A., Jennifer L. Glanville, Guy Stecklov (2002). Economic Status Proxies in Studies of Fertility In Developing Countries: Does the Measure matter?. *Population Studies* 56(1), 81-96.

Bond, Ross (2006). Belonging and Becoming: National Identity and Exclusion. *Sociology* 40 (4), 609-626.

Breault, Kevin D. (1989). New Evidence on Religious Pluralism, Urbanism, and Religious Participation. *American Sociological Review* 54 (6), 1048-1053.

Bréchon, Pierre (2007). Religiosity. in *Beckford, James A., N.J. Demerath III (Ed.). The SAGE Handbook of the Sociology of Religion. London: SAGE Publications.*

Bruce, Steve (2000). The Supply-Side Model of Religion: The Nordic and Baltic States. *Journal for the Scientific Study of Religion* 39, 32-46.

Calhoun, Craig (1993). Nationalism and Ethnicity. *Annual Review of Sociology* 19, 211-239.

Cantoni, Davide (2010). The economic effects of the Protestant Reformation: Testing the Weber

hypothesis in the German Lands. *Economics Working Papers, 1260.* Department of Economics and Business, Universitat Pompeu Fabra.

Casanova, Jose (1994). Public religions in the modern world. *Chicago: University of Chicago Press.*

Cervelatti, Matteo, Uwe Sunde, Simona Valmori (2011). Disease Environment and Civil Conflicts. *IZA Discussion Paper No. 5614.*

Chamberlain, Kerry, Sheryl, Zika (1988). Religiosity, Life Meaning and Well-Being: Some Relationships in a Sample of Women. *Journal for the Scientific Study of Religion* 27 (3), 411-420.

Chaves, Mark (1994). Secularization as declining religious authority. *Social Forces* 72 (3), 749-774.

Chaves, Mark, Philip S. Gorski (2001). Religious Pluralism and Religious Participation. *Annual Review of Sociology* 27, 261-281.

Checkel, Jeffrey T. (1999). Norms, Institutions, and National Identity in Contemporary Europe. *International Studies Quarterly* 43(1), 84-114.

CIA (2011). The World Factbook. *Central Intelligence Agency, Washington, DC.*

Clark, Andrew E., Orsolya Lelkes (2005). Deliver us from evil: religion as insurance. *Paris-Jourdan Sciences Economiques Working Paper 2005-43.*

Clark, Andrew E., Orsolya Lelkes (2009). Let us pray: Religious interactions in life satisfaction. *Paris School of Economics Working Paper 2009-01.*

Clayton, Richard R. (1971). 5-D or 1? *Journal for the Scientific Study of Religion* 10(1), 37-40.

Collier, Paul, Anke Hoeffler (1998). On economic causes of civil war. *Oxford Economic Papers* 50, 563-573.

Constant, Amelie F., Klaus F. Zimmermann (2008). Measuring Ethnic Identity and its Impact on Economic Behavior. *Journal of the European Economic Association* 6(2-3), 424-433.

Constant, Amelie F., Liliya Gataulina, Klaus F. Zimmermann (2009). Ethnosizing immigrants. *Journal of Economic Behavior and Organization* 69, 274-287.

Darity, William A.,Jr., Patrick L. Mason, James B Stewart (2006). The economics of identity: The origin and persistence of racial identity norms. *Journal of Economic Behavior and Organization* 60, 283-305.

Deaton, Angus (2008). Income, Health, and Well-Being Around the World: Evidence From the Gallup World Poll. *Journal of Economic Perspectives* 22 (2), 53-72.

Durkin, John T., Andrew M. Greeley (1991). A Model of Religious Choice Under Uncertainty: On Responding Rationally to the Nonrational. *Rationality and Society* 3, 178-196.

Easterlin, Richard A. (1973). Does Money Buy Happiness? *The Public Interest* 30 (Winter), 3-10.

Easterlin, Richard A. (1974). Does Economic Growth Improve the Human Lot? Some Empirical Evidence.

In: Paul A. David, Melvin W. Reder (eds.), *Nations and Households in Economic Growth: Essays in Honor of Moses Abramowitz. New York: Academic Press*, 89-125.

Easterlin, Richard A. (1995). Will Raising the Incomes of All Increase the Happiness of All? *Journal of Economic Behavior and Organization* 27 (1), 35-47.

Easterlin, Richard A. (2001). Income and Happiness: Towards a Unified Theory. *The Economic Journal* 111, 465-484.

Easterly, William, Ross Levine (1997). Africa's Growth Tragedy: Policies and Ethnic Divisions. *Quarterly Journal of Economics* 112(4), 1203-1250.

Elliot, Marta, R. David Hayward (2009). Religion and Life Satisfaction Worldwide: The Role of Government Regulation. *Sociology of Religion* 70 (3), 285-310.

Ellison, Christopher G. (1991). Religious Involvement and Subjective Well-Being. *Journal of Health and Social Behavior* 32 (1), 80-99.

Ellison, Christopher G., Jason D. Boardman, David R. Williams, James S. Jackson (2001). Religious Involvement, Stress, and Mental Health: Findings from the 1995 Detroit Area Study. *Social Forces* 80 (1), 215-249.

Esteban, Joan-María, Debraj Ray (1994). On the Measurement of Polarization. *Econometrica* 62(4), 819-851.

Fearon, James D. (2003). Ethnic and Cultural Diversity by Country. *Journal of Economic Growth* 8, 195-222.

Fearon, James D., David D. Laitin (2003). Ethnicity, Insurgency, and Civil War. *American Political Science Review* 97(1), 75-90.

Ferriss, Abbott L.(2002). Religion and the Quality of Life. *Journal of Happiness Studies* 3, 199-215.

Filmer, Deon, Lant H. Pritchett (2001). Estimating Wealth Effects without Expenditure Data - or Tears: An Application to Educational Enrollments in States of India. *Demography* 38(1), 115-132.

Filmer, Deon, Kinnon Scott (2008). Assessing Asset Indices. *World Bank Policy Research Working Paper No. 4605.*

Fincher, Corey L., Randy Thornhill (2008). Assortative sociality, limited dispersal, infectious disease and the genesis of the global pattern of religious diversity. *Proceedings of the Royal Society B: Biological Sciences.*

Finke, Roger, Rodney Stark (1988). Religious Economies and Sacred Canopies: Religious Mobilization in American Cities, 1906. *American Sociological Review* 53 (1), 41-49.

Franck, Raphael, Laurence R. Iannaccone (2009). Why did religiosity decrease in the Western World

during the twentieth century? *Bar-Ilan University Discussion Paper.*

Frankel, Jeffrey A., David Romer (1999). Does Trade Cause Growth? *American Economic Review* 89(3), 379-399.

Freedom House (2010). Freedom in the World.

Frey, Bruno S., Alois Stutzer (2002). What Can Economists Learn from Happiness Research? *Journal of Economic Literature* 40 (2), 402-435.

Frey, Bruno S., Alois Stutzer (2006). Mispredicting Utility and the Political Process. In: Edward J. McCaffery, Joel Slemrod (eds.), *Behavioral Public Finance. New York: Russel Sage Foundation,* 113-140.

Gillis, John R. (Ed.) (1994). Commemorations: the politics of national identity. *Princeton: Princeton University Press.*

Glock, Charles Y., Rodney Stark (1965). Religion and Society in Tension. *Chicago: Rand McNally & Company.*

Gollin, Douglas (2002). Getting Income Shares Right. *Journal of Political Economy* 110(2), 458-474.

Gould, William (2001). What Is the Between Estimator? Stata Home, Resources & Support, Frequently Asked Questions, March. http://www.stata.com/support/faqs/stat/xt.html

Greene, Kenneth V., Bong Joon Yoon (2004). Religiosity, Economics and Life Satisfaction. *Review of Social Economy* 62 (2), 245-261.

Gruber, Jonathan (2005). Religious Market Structure, Religious Participation, and Outcomes: Is Religion Good For You? *NBER Working Paper 11377.*

Gundlach, Erich, Matthias Opfinger (2010). Religiosity as a Determinant of Happiness. *University of Hannover Discussion Paper, No. 467.*

Gurr, Ted R., Monty G. Marshall, Keith Jaggers (2011). Polity IV Project: Political Regime Characteristics and Transitions, 1800-2010.

Hadi, Ali S. (1992). Identifying multiple outliers in multivariate data. *Journal of the Royal Statistical Society, Series B* 54, 761-771.

Hadi, Ali S. (1994). A modification of a method for the detection of outliers in multivariate samples. *Journal of the Royal Statistical Society, Series B* 56(2), 393-396.

Hanson, Gordon H., Chong Xiang (2011). Exporting Christianity: Governance and Doctrine in the Globalization of US Denominations. *NBER Working Paper 16964.*

Harttgen, Kenneth, Matthias Opfinger (2011). In the Nation We Trust: National Identity as a Substitute for Religion. *University of Hannover Discussion Paper, 491.*

Hayo, Bernd (2007). Happiness in transition: An empirical study on Eastern Europe. *Economic Systems* 31, 204-221.

Heston, Alan, Robert Summers, Bettina Aten (2011). Penn World Table Version 7.0. Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, May 2011.

Hirschle, Jochen (2011). The affluent society and its religious consequences: an empirical investigation of 20 European countries. *Socio-Economic Review* 9 (2), 261-285.

Iannaccone, Laurence R. (1990). Religious Practice: A Human Capital Approach. *Journal for the Scientific Study of Religion* 29 (3), 297-314.

Iannaccone, Laurence R. (1991). The Consequences of Religious Market Structure. *Rationality and Society* 3 (2), 156-177.

Iannaccone, Laurence R. (1992). Religious Markets and the Economics of Religion. *Social Compass* 39 (1), 123-131.

Iannaccone, Laurence R. (1995). Risk, Rationality, and Religious Portfolios. *Economic Inquiry* 33 (2), 285-295.

Iannaccone, Laurence R. (1996). Religion, Science, and Rationality. *American Economic Review* 86 (2), 433-437.

Iannaccone, Laurence R. (1998). Introduction to the Economics of Religion. *Journal of Economic Literature* 36 (3), 1465-1495.

Inglehart, Ronald, Wayne E. Baker (2000). Modernization, Cultural Change, and the Persistence of Traditional Values. *American Sociological Review* 65 (1), 19-51.

Jetten, Jolanda, Tom Postmes, Brendan J. McAuliffe (2002). 'We're *all* individuals':group norms of individualism and collectivism, levels of identification and identity threat. *European Journal of Social Psychology* 32(1), 189-207.

Jones, F.L. (1997). Ethnic diversity and national identity. *Journal of Sociology* 33(3), 285-305

Koenig, Harold G., Michael McCullough, David B. Larson (2001). Handbook of Religion and Health. *Oxford: Oxford University Press.*

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer (2008). The Economic Consequences of Legal Origins. *Journal of Economic Literature* 46(2), 285-332.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, Robert Vishny (1997). Legal Determinants of External Finance. *Journal of Finance* 52(3), 1131-1150.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, Robert Vishny (1999). The Quality of

Government. *The Journal of Law, Economics and Organization* 15(1), 222-279.

Layard, Richard (2003). Happiness: Has Social Science A Clue? Lionel Robbins Memorial Lectures 2002/3, *London School of Economics, March 3-5.*

Lelkes, Orsolya (2006). Tasting Freedom: Happiness, Religion and Economic Transition. *Journal of Economic Behavior and Organization* 59 (2), 173-194.

Lim, Chaeyoon, Robert D. Putnam (2010). Religion, Social Networks, and Life Satisfaction. *American Sociological Review* 75 (6), 914-933.

Lukes, Steven (2006). Individualism. *Colchester: ECPR Press.*

Maddison, Angus (2010). Statistics on World Population, GDP and Per Capita GDP, 1-2008 AD.

Mahoney, Paul G. (2001). The Common Law and Economic Growth: Hayek Might Be Right. *Journal of Legal Studies* 30 (2), 503-525.

Maier, Charles S. (1997). The unmasterable past: history, holocaust and German national identity. *Cambridge, MA: Harvard University Press.*

Martin, David (1978). A General theory of Secularization. *Harper & Row, New York.*

Marx, Karl (1844). Zur Kritik der Hegelschen Rechtsphilosophie. in *Deutsch-Französische Jahrbücher*, Band 1, 378-379.

Masella, Paolo (2012). National Identity and Ethnic Diversity. *Journal of Population Economics*, forthcoming.

McCleary, Rachel, Robert J. Barro (2006). Religion and Economy. *The Journal of Economic Perspectives* 20 (2), 49-72.

Miles, William F.S., David A. Rochefort (1991). Nationalism Versus Ethnic Identity in Sub-Saharan Africa. *American Political Science Review* 85(2), 393-403.

Miller, David (2000). Citizenship and national identity. *Malden, MA: Polity Press.*

Montalvo, Jose G., Marta Reynal-Querol (2005). Ethnic diversity and economic development. *Journal of Development Economics* 76, 293-323.

Montalvo, Jose G., Marta Reynal-Querol (2005a). Ethnic Polarization, Potential Conflict, and Civil Wars. *American Economic Review* 95(3), 796-816.

Noiriel, Gérard (1996). The French melting pot: Immigration, citizenship, and national identity. *Minneapolis: University of Minnesota Press.*

Nunn, Nathan, Diego Puga (2009). Ruggedness: The Blessing of Bad Geography in Africa. *NBER Working Paper, 14918.*

Okulicz-Kozaryn, Adam (2010). Religiosity and Life Satisfaction Across Nations. *Mental Health, Religion*

& Culture 13 (2), 155-169.

Olson, Daniel V. A. (1999). Religious Pluralism and US Church Membership: A Reassessment. *Sociology of Religion* 60 (2), 149-173.

Opfinger, Matthias (2011). Religious Market Theory vs. Secularization: The Role of Religious Diversity Revisited. *University of Hannover Discussion Paper, 475.*

Oyserman, Daphna, Heather M. Coon, Markus Kemmelmeier (2002). Rethinking individualism and collectivism: Evaluation of theoretical assumptions and meta-analyses. *Psychological Bulletin* 128(1), 3-72.

Paldam, Martin (2009). An Essay on the Muslim Gap. Religiosity and the Political System. in Wintrobe, R. and Ferrero, M. (eds.) *The political economy of theocracy. Palgrave Macmillan.* Chapter 10, 213-242

Paldam, Martin, Erich Gundlach (2012). The Religious Transition: A long-run perspective. *Public Choice*, forthcoming.

Peacock, James R., Margaret M. Poloma (1999). Religiosity and Life Satisfaction Across the Life Course. *Social Indicators Research* 48 (3), 321-345.

Poutvaara, Panu, Andreas Wagener (2010). The Invisible Hand Plays Dice: Multiple Equilibria in Sects Markets. *Public Choice* 145, 483-502.

Riggs, Thomas (ed.)(2006). Worldmark Encyclopedia of Religious Practices. *Thomson Gale*

Robbins, Mandy, Leslie J. Francis (1996). Are Religious People Happier? A Study among Undergraduates. In: Leslie J. Francis, William K. Kay, William S. Campbell, *Research in Religious Education. Herefordshire: Gracewing*, 207-217.

Sachs, Jeffrey D. (2001). Tropical Underdevelopment. *NBER Working Paper, 8119.*

Sacks, Daniel W., Betsey Stevenson, Justin Wolfers (2010). Subjective Well-being, Income, Economic Development and Growth. *NBER Working Paper, 16441.*

Sahn, David E., David Stifel (2001). Poverty Comparisons over Time and Across Countries in Africa. *World Development* 28(12), 2123-2155.

Sahn, David E., David Stifel (2003). Exploring Alternative Measures of Welfare in the Absence of Expenditure Data. *Review of Income and Wealth* 49(4), 463-489.

Sastry, Narayan (2004). Trends in Socioeconomic Inequalities in Mortality in Developing Countries: The case of Child Survival in Sao Paulo, Brazil. *Demography* 41(3), 443-464.

Schwartz, Shalom H. (1994). Beyond individualism/collectivism: New cultural dimensions of values. *in Kim, Triandis, Kagitcibasi, Choi, Yoon (Ed.): Individualism and collectivism: Theory, method, and applications. Cross-cultural research and methodology series. Thousand Oaks, CA: SAGE Publications*,

85-119.

Sherkat, Darren E. (1991). Leaving the Faith: Testing Theories of Religious Switching Using Survival Models. *Social Science Research* 20, 171-187.

Smith, Adam (1776[1976]). An Inquiry into the Nature and Causes of The Wealth of Nations. *University of Chicago Press, Chicago.*

Smith, Anthony D. (1991). National Identity. *University of Nevada Press, Reno.*

Smith, Anthony D. (1992). National identity and the idea of European unity. *International Affairs* 68(1), 55-76.

Snoep, Liesbeth (2008). Religiousness and happiness in three nations: a research note. *Journal of Happiness Studies* 9, 207-211.

Stark, Rodney, William S. Bainbridge (1985). The Future of Religion: Secularization, revival, and cult formation. *University of California Press.*

Stark, Rodney, Iannaccone, Laurence R. (1994). A supply-side reinterpretation of the "secularization" of Europe. *Journal for the Scientific Study of Religion* 33, 230-52.

Stevenson, Betsey, Justin Wolfers (2008). Economic Growth and Subjective Well-Being: Reassessing the Easterlin Paradox. *Brookings Papers on Economic Activity* 2008 (1), 1-87.

Stifel, David, Luc Christiaensen (2007). Tracking Poverty Over Time in the Absence of Comparable Consumption Data. *The World Bank Economic Review* 21(2), 317-341.

Stock, James H., Motohiro Yogo (2002). Testing for Weak Instruments in Linear IV Regression. *NBER Working Paper, 10284.*

Terry, Deborah J., Michael A. Hogg, Katherine M. White (1999). The theory of planned behaviour: Self-identity, social identity and group norms. *British Journal of Social Psychology* 38, 225-244.

Triandafyllidou, Anna (1998). National identity and the 'other'. *Ethnic and Racial Studies* 21(4), 593-612.

Triandis, Harry C., Christopher McCusker, C. Harry Hui (1990). Multimethod probes of individualism and collectivism. *Journal of Personality and Social Psychology* 59(5), 1006-1020.

Tschannen, Oliver (1994). Sociological controversies in perspective. *Review of Religious Research* 36 (1), 70-86.

Turner, John C. (1975). Social comparison and social identity: Some prospects for intergroup behaviour. *European Journal of Social Psychology* 5(1), 1-34.

United Nations (UN) (various issues). Statistical Yearbook. *New York.* http://unstats.un.org/unsd/syb/

United Nations (UN) Statistics Division. Demographic and Social Statistics. http://unstats.un.org/unsd/demographic/default.htm

Vanhanen, Tatu (1999). Domestic Ethnic Conflict and Ethnic Nepotism: A Comparative Analysis. *Journal of Peace Research* 36(1), 55-73.

Voas, David, Alasdair Crockett, Daniel V.A. Olson (2002). Religious Pluralism and Participation: Why Previous Research Is Wrong. *American Sociological Review* 67(2), 212-230.

Walls, Carla Tooles, Steven H. Zarit (1991). Informal Support From Black Churches and the Well-Being of Elderly Blacks. *The Gerontologist* 31 (4), 490-495.

Weber, Max (1904/05). Die protestantische Ethik und der "Geist" des Kapitalismus. *Archiv für Sozialwissenschaft und Sozialpolitik* 20, 1-54 and 21, 1-110.

Willits, Fern K., Donald M. Crider (1988). Religion and Well-Being: Men and Women in the Middle Years. *Review or Religious Research* 29 (3), 281-294.

Witter, Robert A., William A. Stock, Morris A. Okun, Marilyn J. Haring (1985). Religion and Subjective Well-Being in Adulthood: A Quantitative Synthesis. *Review of Religious Research* 26 (4), 332-342.

Wodak, Ruth, Rudolf de Cillia, Martin Reisigl, Karin Leibhart (1998). Zur diskursiven Konstruktion nationaler Identität. *Frankfurt/Main: Suhrkamp.*

World Bank (2010). World Development Indicators. http://data.worldbank.org/indicator

Yamane, David (1997). Secularization on trial: In defense of a neosecularization paradigm. *Journal for the Scientific Study of Religion* 36 (1), 109-122.

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