

7-5-2016

Essays on Religion, Conflict, and Economic Development

Sadullah Yildirim
sadullah.yildirim@uconn.edu

Follow this and additional works at: <https://opencommons.uconn.edu/dissertations>

Recommended Citation

Yildirim, Sadullah, "Essays on Religion, Conflict, and Economic Development" (2016). *Doctoral Dissertations*. 1120.
<https://opencommons.uconn.edu/dissertations/1120>

Essays on Religion, Conflict, and Economic Development

Sadullah Yildirim, Ph.D.
University of Connecticut, 2016

This dissertation will examine, theoretically and empirically, the relationship between religion and state and how the historical evolution of this relationship has affected current economic outcomes. Developing an argument centered on legitimizing relationship between political rulers and religion, and using a new dataset that has information on the religious and political histories of today's nations since the year 1000, it first demonstrates how state religion has evolved over time and across space since the year 1000, then analyzes how historical religious differences between rulers and segments of populations affect current civil conflict, and finally extend the analysis to the historical religious roots of current state capacity and economic development across countries.

Sadullah Yildirim - University of Connecticut, 2016

Essays on Religion, Conflict, and Economic Development

Sadullah Yildirim
M.A., Marmara University, 2008



A Dissertation
Submitted in Partial Fulfillment of the
Requirements for the Degree of
Doctor of Philosophy
at the
University of Connecticut

2016

APPROVAL PAGE

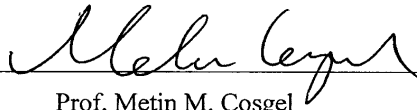
Doctor of Philosophy Dissertation

Essays on Religion, Conflict, and Economic Development

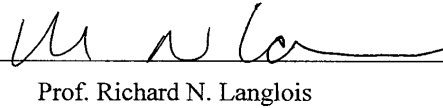
Presented by

Sadullah Yildirim, M.A.

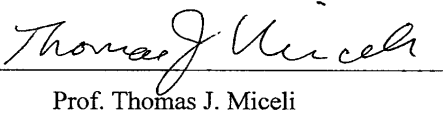
Major Advisor


Prof. Metin M. Coşgel

Associate Advisor


Prof. Richard N. Langlois

Associate Advisor


Prof. Thomas J. Miceli

University of Connecticut

2016

Acknowledgements

I would like to thank my mother Hafize and my father Fevzi for their support of my education over the years.

I would like to thank my major advisor Prof. Metin Cosgel for his mentorship and guidance during my Ph.D. I would also like to thank my associate advisors Prof. Thomas Miceli and Prof. Richard Langlois for their guidance.

I would like to acknowledge graduate fellowships from the Republic of Turkey Ministry of National Education.

Contents

Preface	1
1. CHAPTER 1: STATE AND RELIGION OVER TIME	3
1.1 Introduction	4
1.2 Description of the Data	6
1.2 State Religion since the Year 1,000	10
1.2.1 Differences among Religious Traditions	14
1.2.2 Differences across Continents.....	15
1.2.3 Differences between Dependent and Self-Ruled Territories	18
1.3 Why State Religion?.....	20
1.5 Conclusion.....	28
References	30
2. CHAPTER 2: RELIGIOUS ROOTS OF CIVIL CONFLICT	32
2.1 Introduction	33
2.2 Model	36
2.2.1 Setup	37
2.2.2 Citizens' Problem.....	41
2.2.3 Ruler's problem	42
2.2.4 Empirical Implications.....	47
2.3 Data and Empirical Framework	49
2.3.1 Dependent Variable	50
2.3.2 Measuring Grievances: An Index of Historical Religious Difference between State and Citizen (HRDI)	50
2.3.3 Summary Statistics.....	54
2.3.4 Empirical Framework	57
2.4 Results	58
2.4.1 How do historical religious difference between rulers and citizens affect civil conflict?	58
2.4.2 Do the Characteristics of Religions Matter?	62
2.4.3 Robustness	67
2.4.4 Evidence on Mediating Channels	72
2.5 Conclusion.....	74
References	76

Appendix A	80
3. CHAPTER 3: RELIGIOUS ROOTS OF CURRENT STATE CAPACITY AND ECONOMIC DEVELOPMENT ACROSS COUNTRIES.....	88
3.1 Introduction	89
3.2 Model	94
3.3 Data and Summary Statistics.....	95
3.4 Empirical Framework.....	97
3.5 Results	98
3.5.1 Historical Religious Differences and Current State Capacity?	98
3.5.2 Historical Religious Differences and Contemporary Economic Development? ..	106
3.6 Conclusion.....	109
References	112
Appendix B	116

Tables and Figures

Table 1.1 Majority Religions in 1000 and 2000	9
Table 1.2 Fraction of Territories with a State Religion between 1000 and 2000	11
Table 1.3 State's Involvement in Religion	13
Table 1.4 Fraction of State Religion in Different Traditions over Time.....	16
Table 1.5 Fraction of State Religion across Continents.....	17
Table 1.6 State Religion in Self-Ruled vs. Dependent Territories.....	19
Table 1.7 State Religion in Self-Ruled Territories.....	26
Table 1.8 State Religion in Dependent Territories.....	27
Table 2.1 Parameter Changes and Conflict Prediction	49
Table 2.2 OLS Estimates of Effect of HRDI1 and HRDI2 on PRIO25 Civil Conflict	59
Table 2.3 OLS Estimates of Effect of SHRDI1 and SHRDI2 on PRIO25 Civil Conflict	63
Table 2.4 OLS Estimates of Effect of HRDI1 on PRIO25 Civil Conflict When Missionary Characteristics of Religions Taken into Account	64
Table 2.5 OLS Estimates of Effect of HRDI2 on PRIO25 Civil Conflict When Missionary Characteristics of Religions Taken into Account	65
Table 2.6 Robustness to Changing the Weight Parameter ω in the Calculation of HRDI2 and SHRDI2.....	69
Table 2.7 Robustness to a Different Measure of Civil Conflict - PRIO1000 Civil Conflict.....	71
Table 2.8 HRDI2 and PRIO25 Civil Conflict- Mediating Channels	73
Table 2A.1 Religions in Historical Polities Dataset.....	82
Table 2A. 2 Descriptive Statistics.....	83
Table 2A. 3 Estimates of Effect of HRDI1 and HRDI2 on PRIO25 Civil Conflict-Poisson	

Regression..	84
Table 3.1 Historical Religious Difference and Legal Capacity	101
Table 3.2 Historical Religious Difference and Bureaucratic and Administrative Capacity	102
Table 3.3 Historical Religious Difference and Infrastructural Capacity	103
Table 3.4 HRDIs and the Other Determinants of State capacity	105
Table 3.5 Historical Religious Difference and Economic Development.....	107
Table 3.6 State Capacity as a Mechanism for Economic Development	109
Table 3B.1 Summary Statistics	116
Table 3B.2 Correlation between Dependent Variables (n=91)	118
Table 3B.3 Definition of Variables.....	119
Figure 1 Majority Religion and the Religious Difference between the Rulers and the Majority over Time	55
Figure 2 Minority Religion and the Religious Difference between the rulers and the Minority over Time	56
Figure 3 Robustness to Elimination of Countries Based on UN Regions	70

Preface

In this dissertation I will examine the relationship between religion and state and how the historical evolution of this relationship has affected current economic outcomes. Developing an argument centered on legitimizing relationship between ruler and religion, I investigate these topics empirically with a new dataset that has information on the religious and political histories of today's nations since the year 1000. In the first chapter, I demonstrate how state religion evolves over time and across space since the year 1000, and then in the second chapter analyze how historical religious difference between rulers and segments of populations affect current civil conflict, and finally in the third chapter extend the analysis to the historical roots of current state capacity and economic development.

The first chapter will examine the evolution of state religion over time and its variation across geographic regions and religious traditions. Using the variations over time and across countries in regression analysis it investigates the forces affecting the adoption of state religion during the period between the year 1000 and the year 2000. It also utilizes an instrumental variable approach to deal with the endogeneity problem by using variation in the missionary characteristics of religions as an exogenous source of variation that predicts the continuing presence of official monopolies in the religion market.

In the second chapter, I focus on the relationship between the religion of political rulers and that of different segments of population and examine how historical religious differences between political rulers and segments of population contribute to levels of current civil conflict. I

develop a political economy model in which the ruler's choices of public goods and services (e.g. infrastructure and law enforcement) and the access to them in a religiously segmented economy are linked to the civil conflict through grievances. To test the model's implications, I use recent data on armed civil conflict and incorporate variables constructed from the new dataset that includes information on the religious and political histories of today's nations since the year 1000.

Extending the political economy approach to economic development outcomes, in the third chapter, I develop formal hypotheses regarding the way historical religious differences between rulers and population affect current state capacity and economic development across countries. I then test the hypotheses empirically with the dataset on the religious and political histories of today's nations and recent data on measures of state capacity and economic development.

1. CHAPTER 1: STATE AND RELIGION OVER TIME



1.1 Introduction

Throughout history, the religion market has been regulated heavily by political rulers, who often designated an established provider as the official monopoly. Although the frequency of state monopolies has declined significantly in recent centuries, the tendency remains strong in some societies. The presence of a state religion has been at the core of numerous socio-economic concerns, such as the rights of religious minorities, restrictions on personal consumption and investment, and emergence of political and violent conflicts.

Scholars have long puzzled over the relationship between state and religion. Adam Smith laid the foundation for an economic approach to religion and discussed how the incentives of the clergy and the religiosity of the people differed between state religion and a competitive religion market (Anderson, 1988). Expanding on Smith's insights, Iannaccone, Finke, and Stark (1997:350) have argued that many of the recent religious trends can be explained by simple deregulation of religion markets, and that cross-country differences in religiosity depend on the competitiveness of the market and the presence of state religion. Their argument contrasts with the results of McCleary and Barro (2006), who found that the presence of state religion tends to raise participation and beliefs. A considerable literature has recently grown to investigate the effects of state regulation of religion (Chen and Hungerman, 2014; Fox, 2008: Chapter 2; Gill, 2008).

In a related development, researchers have examined the more fundamental question of why some countries regulate religion in the first place. Gill (2008) has proposed a theory

that depends on the political self-interest of government officials, and he has used the resulting predictions to explain state-religion relationships in the early United States and in Latin America during the 1800s. The relationship between state and religion has recently attracted rising interest among empirically-oriented social scientists. Barro and McCleary (2005) have identified countries with a state religion in 1900, 1970, and 2000, and used cross-national data to investigate the factors contributing to the likelihood of state religion in 1970 and 2000. Building a “Religion and State” dataset, Fox (2008) has examined how government involvement in religion has differed among countries and changed during the period between 1990 and 2008.

Coşgel and Miceli (2009) have similarly used cross-national data to study forces affecting a government’s decision to establish a state religion or to support, control, or suppress religion at the beginning of the twenty-first century.

In this article we offer a systematic analysis of the religion market in history with particular emphasis on its relationship to the state. Although previous researchers have identified significant patterns in state regulation of religion in today’s societies and in recent history, they have given limited insight into the deeper historical roots of these patterns and the long term trends that led to them. We contribute to this literature by using a political economy approach to the relationship between state and religion and examining the evolution of state religion since the year 1,000. We have developed a unique cross-national panel dataset on the political and religious histories of today’s nation states during this period. We use the data to pursue three objectives. First, we examine the evolution of state religion over time and its variation across geographic regions and religious traditions. Second, we use regression analysis to examine the influences on the adoption of state religion, such as regional

geographic factors and systematic differences between universal/missionary religions (Buddhism, Christianity, Islam) and others.¹

1.2 Description of the Data

For a systematic analysis of the relationship between state and religion over time, we have developed a unique dataset that includes long-term information on the political and religious histories of today's countries. We constructed the data in stages that involve blending two different datasets. The first is the "Country Ancestry Data" (CAD), which identifies the polities that have ruled today's countries in history. Taking today's nation-states as the unit of analysis, we recorded the name(s) of the polity that dominated each country's land area in 50- 100 year intervals since the year 1000. If in a certain interval this land area was dominated by two polities, we recorded this information as well.

Separately, we built the "Historical Polities Data" (HPD), which includes all of the polities encountered in CAD and contains information on the religious and political characteristics of these polities dating back to about 3,700 BCE. If these characteristics changed significantly during a polity's lifetime, such as if the rulers or the majority of the population converted to another religion, we incorporated the change by including the pre-change and post- change regimes as separate entries in the dataset. In the same vein, if the sub-regions of a polity varied significantly in religious composition or in the relationship between religious and political authorities, we incorporated these differences by including each regions as a separate entry. This was clearly the case for European colonies, where the majority religion differed significantly between the indigenous population and the colonizing country,

¹ For a recent study that goes even further back in time, see Vaubel (2015).

² By keeping the definition of "dependent" broad, we seek to avoid difficulties surrounding the classification of states and territories into controversial categories. For a discussion of these difficulties and controversies, see

as did the relationship between religious and political authorities. To consider these variations, we included the colonizing country and the territories as separate entries.

To construct the HPD, a team of research assistants combed through a wide variety of sources to gather information about the basic characteristics of these polities, their religion markets, and the relationship between political and religious authorities. We started with polities that have been included in readily available datasets constructed by other researchers, and we resorted to other sources as necessary to expand on the list of polities and to code variables that were not available in these sources (Iyigün, 2010; Turchin et al, 2012). For the year 2000, we used variables from the datasets of Barro and McCleary (2005) and Fox (2008). In cases of conflicting information about a particular variable, we looked for consistency by giving priority to sources with comprehensive coverage, such as *Encyclopædia Britannica*, *World Christian Encyclopedia*, *The Oxford International Encyclopedia of Legal History*, and the book series “Cambridge Histories Online.” Rather than restrict the dataset to polities of certain size, duration, or type, we included all polities for which we could find complete information. The final set includes information on over 500 polities observed in history and most of today’s nation states.

For each polity, the HPD includes variables on its basic characteristics, the organization and regulation of the religion market, and the relationship between political and religious authorities. The basic characteristics of a polity include variables on its size (e.g., peak land mass), geographic location, political type, and years of duration. In addition, we included a set of variables on the process of a polity’s formation and the cause of its demise.

For information on the religion market of a polity, we entered the names of the majority and minority religion(s) of the population, the religion of the rulers if it was

different from the majority religion, and whether there was a religious conversion. We also included a dummy variable on whether the political authorities chose one (or more) of the religions as the official provider (state religion).

The last group of variables describes the characteristics of religious and political providers and the nature of their relationship with each other. To depict the rulers' direct relationship with religious authorities, we included variables on whether the religious authorities were appointed by the political authority, whether they received direct payment from political authorities, and whether religious property and buildings were owned or supported by political authorities.

In the final stage of our data construction, we combined HPD and CAD to arrive at a dataset that includes information on the political and religious evolution of the lands corresponding to today's countries since the year 1000. Between 1000 and 1500, the information is in 100 year intervals, and for the period since 1500, in 50 year intervals. Although the CAD originally covered 249 countries, we dropped some of them from the final analysis because of their size (e.g., small islands, to prevent overrepresentation) or the unavailability of complete and reliable information about their history. The final set includes 204 countries covered in each interval in an unbalanced cross-national panel dataset that includes information on the current and historical polities dominating these lands during our period, thereby allowing us to identify the long-term trends in the religiosity of states and the relationship between political and religious authorities.

Table 1.1 Majority Religions in 1000 and 2000

Majority Religion	Africa		Asia		Europe		Oceania		Western Hemisphere	
	1000	2000	1000	2000	1000	2000	1000	2000	1000	2000
Traditional African	38	7								
Buddhist			7	13						
Other Eastern		1	15	4						
Christian	2	22	5	6	36	40		11		45
Muslim	7	20	19	25		2				
Other Religion	3		5	3	8	2	11		49	4

Table 1.1 shows the distribution of entries in our dataset by continent and majority religion in years 1000 and 2000, the beginning and end dates of our investigation. As seen in the table, there was a fundamental shift in the majority religions of these lands from indigenous religions (e.g., traditional African or Eastern) towards Islam, Christianity, and Buddhism, which are generally referred as missionary/universal religions. The transition towards Abrahamic faiths is particularly striking in the spread of Islam in Asia, Christianity in Oceania and the Western Hemisphere, and both Islam and Christianity in Africa during this period. Although we did not include the regional breakdown of these trends in the table, our data reflects the spread of Islam mainly in North Africa and Christianity in sub-Saharan Africa. The majority of eastern religions remained about the same in Asia, but there was a sharp decline in Oceania.

1.2 State Religion since the Year 1,000

We now use the data to investigate our first question, namely, how the presence of state religion changed over time. As noted, Barro and McCleary(2005) have found that the fraction of states with monopoly religion fell sharply between 1900 and 1970 and stayed about the same between 1970 and 2000. For the presence of state religion in 2000, we used information from Fox's (2008) "Official Government Involvement in Religion" variable" (=1 if the state has a "civil religion", "one official religion," or "more than one official religion") and applied the same basis for coding the presence of state religion in history to extend the analysis back to the year 1000.

We do not have complete data on the presence of state religion for the early histories of some societies. This is obviously the case for societies that left behind no written records or clear archeological evidence on the relationship between political and religious authorities. In addition, the concept of state religion is not well-defined for societies that occupied the lands corresponding to today's nation-states in history but were not at that time territorial political entities or governed by centralized power and institutions. For example, we know too little about the organization of many African societies prior to colonization to determine with a high degree of certainty whether they can be classified as having a state religion. The same can be said for many societies in Oceania and Western Hemisphere before the fifteenth century. Rather than base our coding on questionable assumptions about the organization of these societies or make ad hoc assumptions about the relationship between their political and religious authorities, we have decided to omit them from analysis.

As Table 1.2 shows, the falling incidence of state-religion that Barro and McCleary observed in the early part of the twentieth century was part of a longer trend that started

much earlier. Tracking the territories corresponding to today's nation-states back in time, we see that the fraction with state religions rose somewhat between 1000 and 1300, remained high until about 1600, and fell steadily thereafter. The increase in the fraction from 16 to 23 percent between 1950 and 2000 corresponds to choices made by many new states, previously under colonial rule in 1950, when they gained independence during this period.

Table 1.2 Fraction of Territories with a State Religion between 1000 and 2000

Year	Mean	Std. Dev.	Obs.
1000	0.83	0.38	124
1100	0.85	0.36	125
1200	0.82	0.39	125
1300	0.88	0.32	128
1400	0.83	0.37	133
1500	0.88	0.33	146
1550	0.88	0.32	163
1600	0.87	0.34	165
1650	0.76	0.43	182
1700	0.75	0.43	187
1750	0.76	0.43	188
1800	0.72	0.45	190
1850	0.58	0.49	195
1900	0.33	0.47	204
1950	0.16	0.36	204
2000	0.23	0.42	204

Measuring state religion through a binary variable as an all or nothing choice has limitations. State and religion are of course related to each other in numerous complex dimensions. Reviewing the limitations of previous measures of government involvement in religion developed by other researchers, Fox (2008) has built a massive new dataset that includes variables on several aspects of this involvement and on the separation of religion and

state for the period between 1990 and 2008. He has classified five types of government involvement in religion, one of which is the official role of religion in the state, measured on an 8 point scale ranging from state hostility towards religion to having an official religion. Although we recognize the limitations of reducing the official role of religion to a binary variable, we have no choice but to measure the presence of state religion in this simplified form because the information on all possibilities in Fox's scale are not available for our period.

Nevertheless, we test the robustness of our binary variable as a measure of state involvement in religion by using three other dummy variables in our dataset to construct an index of this involvement. These variables ask whether the religious authorities were appointed by the political authority (=1 if yes), whether their salaries were paid by the political authority (=1 if yes), and whether their property and buildings were owned by the political authority (=1 if yes). We took the simple average of these variables as an index of state involvement in religion, as seen in Table 1.3.

As Table 1.3 shows, all three measures of state involvement in religion have followed the same broad trend over time. Specifically, they rose steadily until about 1550, remained high until about 1800, and fell thereafter. These trends were therefore broadly the same as those observed for the fraction of state religion in Table 1.2. The correlation coefficient between the fraction of state religion and the index of state involvement of religion (the simple average of Appoint, Salary, and Property variables) is 0.75, confirming that "State Religion" as a simple binary variable is a robust measure of the relationship between state and religion.

Table 1.3 State's Involvement in Religion

Year	Appoint	Salary	Property	Average
1000	0.37	0.53	0.56	0.49
1100	0.34	0.53	0.55	0.48
1200	0.34	0.53	0.54	0.47
1300	0.35	0.56	0.57	0.49
1400	0.39	0.59	0.60	0.52
1500	0.47	0.66	0.67	0.60
1550	0.58	0.73	0.73	0.68
1600	0.57	0.72	0.72	0.67
1650	0.60	0.69	0.68	0.66
1700	0.60	0.69	0.69	0.66
1750	0.60	0.69	0.69	0.66
1800	0.58	0.65	0.65	0.63
1850	0.48	0.55	0.54	0.52
1900	0.32	0.37	0.34	0.34
1950	0.19	0.23	0.16	0.19
2000	0.18	0.29	0.13	0.20

1.2.1 Differences among Religious Traditions

Going beyond broad observations, we now examine whether the observed trends in the rise and fall of the aggregate fraction of state religion varied among religious traditions. Table 1.4 shows how the fractions of state religion changed over time when broken down by majority religions (same categories as in Table 1.1).

Lands occupied by majority Muslim populations started off our period dominated by state religions, and they maintained this high level of official monopolies until about 1800. Although the Christian world also started the period with a very high fraction of state religions, the fraction started to fall after about 1600, two centuries before the decline began in the Islamic world. The decline was sharp in both religious traditions after about 1800.

The fraction of state religions was similarly high in the Buddhist world and remained so until about the middle of the nineteenth century. In populations with other eastern religions, by contrast, the fraction of state religion was significantly lower than that in the Buddhist world until the twentieth century.

Although the fractions of state religion followed clear patterns in the Buddhist, Christian, and Muslim worlds during our period, no similar patterns existed on average in other religious traditions. In general, the fractions of state monopolies were lower in these other traditions as compared to the Buddhist, Christian, and Muslim traditions, the latter of which are classified as missionary and universal religions. We examine the reasons for this observation in more detail through regression analysis below. As a final observation on differences among religious traditions, note that the early rise in the aggregate state religiosity in the world that was seen in Table 1.1 came not from the Christian, Buddhist, or Muslim world, but mainly from the rise of religious monopolies in societies whose majority religions

were traditional African religions.

1.2.2 Differences across Continents

We now turn to geographic differences in the presence of state religion. Table 1.5 shows the fractions of states with religious monopolies in the five continents. Consistent with the patterns observed in Table 1.4, the fraction of state religion was initially high in Europe due to the dominance of Christianity, and similarly high in Asia due to Muslim and Buddhist populations. A pattern that becomes clearer in Table 1.5 is the high fraction of state religion in the Western hemisphere under polities that ruled prior to colonization. The fraction of state religion was initially low in Africa, but rose significantly until about 1300 due to the rising influence of Islam in the north, and the establishment of polities with state monopolies in religion in the continent as a whole. Throughout our period, the fraction of state religion was still lower in Africa than in Asia and Europe.

Table 1.4 Fraction of State Religion in Different Traditions over Time

Year	Traditional African	Buddhist	Other Eastern	Christian	Muslim	Other Religion
1000	0.33	0.86	0.71	0.98	1.00	0.74
1100	0.44	1.00	0.67	0.95	1.00	0.80
1200	0.50	1.00	0.50	0.96	0.90	0.71
1300	0.60	1.00	0.75	0.94	1.00	0.75
1400	0.58	0.90	0.50	0.90	1.00	0.70
1500	0.61	0.91	0.50	0.96	1.00	0.87
1550	0.59	0.82	0.50	0.95	1.00	0.80
1600	0.55	0.82	0.43	0.95	1.00	0.57
1650	0.48	0.82	0.44	0.78	0.95	0.43
1700	0.58	0.75	0.56	0.73	0.95	0.67
1750	0.58	0.75	0.56	0.74	0.95	0.60
1800	0.63	0.83	0.56	0.67	0.90	0.50
1850	0.54	0.77	0.57	0.49	0.80	0.50
1900	0.09	0.46	0.57	0.32	0.45	0.29
1950	0.20	0.08	0.33	0.13	0.16	0.43
2000	0.00	0.15	0.00	0.13	0.55	0.22

Table 1.5 Fraction of State Religion across Continents

Year	Africa	Asia	Europe	Oceania	Western Hemisphere
1000	0.58	0.89	0.95	0.50	0.70
1100	0.68	0.89	0.93	0.50	0.86
1200	0.74	0.79	0.93	0.50	0.71
1300	0.79	0.94	0.93	0.50	0.71
1400	0.75	0.86	0.88	0.50	0.86
1500	0.75	0.88	0.95	0.50	1.00
1550	0.76	0.88	0.95	0.50	0.97
1600	0.74	0.88	0.95	0.50	0.91
1650	0.67	0.84	0.98	0.50	0.55
1700	0.71	0.86	0.95	0.67	0.50
1750	0.71	0.86	0.95	0.67	0.51
1800	0.74	0.84	0.82	0.50	0.49
1850	0.66	0.76	0.77	0.29	0.20
1900	0.14	0.61	0.50	0.00	0.15
1950	0.08	0.22	0.25	0.00	0.13
2000	0.22	0.37	0.23	0.00	0.13

1.2.3 Differences between Dependent and Self-Ruled Territories

The presence of state religion may differ systematically between the dependent and self-ruled territories. By a “dependent” territory, we mean lands that were colonized or appended by an external authority, typically from a different ethnic background than the majority of the population, and therefore could not have decided on their own whether to have a state religion. This applied broadly to colonies, protectorates, client states, and other forms of dependency relationships in which a territory was subordinate to an external, more powerful authority.² By this definition all European colonies in the Western Hemisphere would be classified as dependent, as would the Balkans or Arab territories in the Ottoman Empire and Eastern Europe under the Soviet Union. Postponing to the next section the analysis of forces affecting the adoption of state religion, here we examine whether the adoption patterns differed systematically between the dependent and self-ruled territories.

As seen in Table 1.6, until about 1600 the fraction of state religion was mostly higher among dependent territories than independent ones. The inequality was systematically reversed after 1600, as the fraction became higher among self-ruled as compared to dependent territories. These comparisons indicate that the forces affecting the adoption of state religion operated differently between the two groups and changed over time.

² By keeping the definition of “dependent” broad, we seek to avoid difficulties surrounding the classification of states and territories into controversial categories. For a discussion of these difficulties and controversies, see Goldstein and Pevehouse (2014).

Table 1.6 State Religion in Self-Ruled vs. Dependent Territories

	Self-Ruled		Dependent	
Year	Number of Territories in Sample	Fraction with State Religion	Number of Territories in Sample	Fraction with State Religion
1000	59	0.83	65	0.83
1100	59	0.81	66	0.88
1200	68	0.79	57	0.84
1300	67	0.87	61	0.90
1400	74	0.85	59	0.81
1500	72	0.85	74	0.91
1550	54	0.80	109	0.93
1600	53	0.81	112	0.89
1650	53	0.83	129	0.73
1700	55	0.80	132	0.73
1750	56	0.80	132	0.73
1800	54	0.76	136	0.70
1850	74	0.61	121	0.57
1900	60	0.47	144	0.27
1950	80	0.28	124	0.08
2000	204	0.22	0	

1.3 Why State Religion?

We now turn to our second question: why some societies have adopted a state religion. Barro and McCleary (2005) used a Hotelling spatial competition model to examine the likelihood of monopoly in the religion market and used cross-national data to identify forces that affected the likelihood of state religion in 1970 and 2000. Among other results, they have found the likelihood to be positively correlated with the adherence rate to the main religion. In previous work (Cosgel and Miceli, 2009, 2013; Cosgel, Miceli, and Rubin, 2012a,b) we have proposed a political economy approach to religion that was centered on the legitimizing relationship between political and religious authorities. In particular, we have argued that state religion is more likely, all else equal, if religion is able to confer legitimacy on the ruler, for example, by declaring the sovereign divine, or at least divinely inspired. Consistent with Barro and McCleary's approach (2005), we have also argued that a polity dominated by a single religion is more conducive to state religion than is a competitive religion market, all else equal, because a monopoly religion will command the allegiance of a greater fraction of the populous.

For an empirical analysis of the presence of state religion in history, we implement these ideas through the following equation:

$$S_{it} = \beta_0 + \beta_1 C_{it} + \beta_2 X_{it} + \delta_r + \mu_t + u_{it}$$

where S_{it} stands for the presence of state religion in territory i at time t , C_{it} is a measure of concentration in the religion market, δ_r is United Nation's region fixed effect. μ_t is the time fixed effect. X_{it} is a vector of other exogenous variables, and u_{it} is time and country specific

error term.

There is an endogeneity problem in estimation this equation by OLS. It seems reasonable to suppose that the rulers will often have the ability to affect the nature of the religion market, either by tolerating entry of different religions, or by suppressing competing religions so as to maintain (or create) monopoly power on the part of the dominant religion. If a regime expects to receive greater legitimacy from increased concentration of influence that a single religion can have on the population, the ruler will have an interest in promoting monopoly in the religion market by suppressing entry.

We use an instrumental variables approach to deal with the problem of endogeneity. More specifically, we include variables on whether the majority religion is one of the universal/missionary religions, which are known to have an internal dynamic towards expansion and dominance across national boundaries. Scholars of religion, including Max Mueller in a lecture in 1873 and Ugo Bianchi over a century later in an entry on the history of religions in *The Encyclopedia of Religion*, classified religions into two categories (Sharma, 2012). The first category consists of Buddhism, Christianity, and Islam, which he calls the “universal” or missionary religions of the world “because they are not linked to blood, racial, ethnic, or national groups, and anyone can join them.” In addition, these religions shared the distinct characteristics that each was “founded by a historic person who synthesized a variety of teachings current during his lifetime and created a new path,” provided “saints or other intermediaries to help believers reach or realize salvation,” and offered ways to “address and deal with the everyday problems and insecurities that people are experiencing.” (Johnson and Johnson, 2007: 6-7). The universalism of Buddhism, Christianity, and Islam is easy to see from the enormous expansion of these religions over time in Table 1.1. Whereas in the year

1000 their adherents constituted the majority in 76 (37%) of the 204 territories corresponding to today's nation states, the number rose to 184 (90%) by 2000.

The incidence of Buddhism, Christianity, or Islam as majority religion is a valid instrument for concentration in the religion market because they are partially correlated with concentration, and they do not appear as separate regressors in the regression equation. Based on the basic characteristics of universal religions and the information in Table 1.1, it is reasonable to assume a partial correlation between observing them as majority religions in polities and high concentration in their religion markets. As our results on first-stage regressions below show, this assumption seems justified. The exclusion condition is also satisfied because there is no direct causal link, such as theological justification for a ruler's legitimacy, between universal religions and the presence of state religion. The only link is through the concentration channel, i.e., the greater ability of religion to legitimize in highly concentrated markets.

To control for unobserved effects due to changes over time, we exploit the time dimensions of our panel data. We consider the effects of unit-invariant changes over time by including fixed effects for the "Year" variable. Each year contains various unobserved temporal characteristics, such as available technology and knowledge, which can be viewed as (roughly) constant among units. Through year fixed effects, we are able to control for secular trends in the world that caused the presence of state religion to change over time.

We account for unobserved heterogeneity among units by including region controls. We focus on variation at the broader regional level rather than among units, because the basic units of our data are the territories of today's nation states, which were not always distinct, well-defined political entities. (Possible exceptions are island nations and others with clear

boundaries.) Moreover, the heterogeneity among these territories has not remained constant over time because of numerous idiosyncratic changes in political systems, population characteristics (e.g., migration), and overall institutional structures. It is more reasonable to focus on broader regions that shared (roughly) constant characteristics in climate and natural resources during our period. To control for unobserved geographic effects, we use the United Nations classification of the world's regions, consisting of 22 categories that divide continents into smaller units (e.g., Northern Africa, Western Europe) with shared characteristics.

Exogenous variables include a dummy variable on whether the religion of political rulers was different from the majority of the population (=1 if yes). This could clearly happen in dependent territories, or even in self-ruled ones in which the ruling class belonged to a religious minority (e.g., a Shia Arab leader in a predominantly Sunni Arab territory). In such cases, our theory would predict a negative effect of this difference on the presence of state religion. Since the political legitimacy of the ruler in a colony would presumably depend more on military power or other sources of legitimacy than religious loyalty, we would expect the ruler to invest more in military superiority or other sources of legitimacy than on establishing a state religion.

Based on the systematic differences observed in Table 1.6 between the self-ruled and dependent territories in the adoption of state religion, we ran separate regressions for these subsets of data. In regressions for dependent territories, we included a set of dummy variables for the ten major empires that ruled during this period (British, Danish, Dutch, French, German, Ottoman, Portuguese, Russian, Spanish, and Swedish) to eliminate the effect of systematic differences in their imperial policies. Empires could differ in patterns of expansion, policies on settlement and missionary activities, exploitation of resources, and whether to

transplant their own institutions into conquered territories. We consider the impact of these differences on the presence of state religion in dependent territories by including dummy variables for the empires that had the largest numbers of colonies.

Our results on independent territories are displayed in Table 1.7. The dependent variable in all equations is the presence of state religion (=1 if yes). The first three columns show the results from OLS estimation, where each column corresponds to a different set of region and year fixed effects. The next three columns show the results of the Instrumental Variables method of estimation when we use universal religions as an instrument for market domination by a single religion, as discussed above.³ The first stage results show a strong relationship between universal religions and the presence of a single religion, with an R-squared of 0.27, controlling for other exogenous variables included in the analysis. The coefficients (robust standard errors) of specific religions are 0.44 (0.07) for Islam and 0.22 (0.08) for Buddhism, both of which are significantly more likely than Christianity (the reference category) to result in a single religion, all else equal.

The results support the argument made earlier about the greater likelihood of state religion in polities dominated by a single religion. The coefficient of “Concentrated Religion Market” is positive and highly significant in all equations as predicted. The coefficient falls as region controls and year fixed effects are included, indicating that some of the variation in state religion is due to systematic differences between regions and over time. But the remaining effect after removing unobserved variation is still positive and significant.

The coefficient of “Political Ruler Different Religion” (=1 if different religion) is not

³ If adherence data was available i.e. for 1900, 1950, and 2000), we defined a territory as having a concentrated religion market (single religion dummy) if more than two-thirds of the population adhered to a single religion. For earlier periods, we used the secondary historical literature discussed earlier to determine the presence of a single dominant religion.

consistent across equations, an interesting result that is observed with both estimation methods. Among the OLS results, whereas the coefficient is positive and somewhat significant in the first equation, the significance disappears when the region controls are introduced, and the coefficient becomes negative and significant, as expected, with time fixed effects. We get comparable results from the IV method, as the positive but insignificant coefficient becomes negative and significant with region and time effects. These observations indicate that the coefficient of this variable in the first equation overstated the effect of the difference in religion between the political authority and the majority of the population due to omitted variable bias caused by this variable's correlation with time. When the bias is removed with year fixed effects, the coefficient became negative as expected.

Table 1.8 shows how the results differ when we run the same regressions in dependent territories. In the Instrumental Variable estimation, the first stage results show a somewhat weaker relationship between universal religions and the presence of a single religion in this case as compared to self-ruled territories, with a lower R-squared of 0.22. The difference among universal religions becomes smaller and less significant in this case than in the above, as can be seen from the coefficients (robust standard errors) of the difference from Christianity (the reference category), which are 0.13 (0.06) for Islam and 0.03 (0.09) for Buddhism, controlling for other exogenous variables.

Table 1.7 State Religion in Self-Ruled Territories

	<u>Ordinary Least Squares</u>			<u>Two-Stage Least Squares (IV)</u>		
	(1)	(2)	(3)	(4)	(5)	(6)
Concentrated market	0.194 (0.030)***	0.187 (0.029)***	0.111 (0.027)***	0.053 -0.115	0.492 (0.115)***	0.299 (0.096)***
Political ruler different religion	0.111 (0.044)**	0.008 -0.043	-0.142 (0.039)***	0.058 -0.062	0.079 -0.054	-0.089 (0.049)*
Region Controls		Yes	Yes		Yes	Yes
Year Fixed Effect			Yes			Yes
Constant	0.512 (0.026)***	0.463 (0.057)***	0.675 (0.063)***	0.604 (0.077)***	0.264 (0.092)***	0.552 (0.083)***
R-squared	0.04	0.22	0.4	0.02	0.14	0.37
Observations	1140	1140	1140	1140	1140	1140

Notes:

1. The dependent variable is presence of state religion (=1 if yes).
2. Figures in parentheses are the robust standard errors.
3. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

There are two striking results in Table 1.8 that are different from those observed in Table 1.7, but which are entirely consistent with our argument about the relationship between the sources of ruler's legitimacy and the adoption of state religion. The coefficient of "Concentrated Religion Market" in dependent territories is positive and significant in the first two equations but becomes insignificant when we include dummy variables for empires. This indicates that the adoption of state religion in dependent colonies is highly correlated with imperial policies, which is not surprising. The coefficient of Single Religion in the first two equations thus overstates the importance of the structure of the local religion market because it is apparently overshadowed by colonial policies in determining whether to *impose* state

religion.

Table 1.8 State Religion in Dependent Territories

	Ordinary Least Squares			Two-Stage Least Squares (IV)		
	(1)	(2)	(3)	(4)	(5)	(6)
Concentrated religion market	0.258	0.114	0.025	0.477	-0.299	0.322
	(0.028)***	(0.022)***	-0.019	-0.414	-0.432	-0.229
Political ruler different religion	-0.244	-0.183	-0.09	-0.216	-0.197	-0.09
	(0.023)***	(0.020)***	(0.018)***	(0.057)***	(0.028)***	(0.019)***
Region controls		Yes	Yes		Yes	Yes
Year fixed effects		Yes	Yes		Yes	Yes
Empire controls			Yes			Yes
Constant	0.604	0.785	0.906	0.433	1.158	0.633
	(0.028)***	(0.054)***	(0.076)***	-0.325	(0.393)***	(0.222)***
R-squared	0.15	0.51	0.73	0.1	0.38	0.66
Observations	1,522	1,522	1,522	1,522	1,522	1,522

Notes:

1. The dependent variable is presence of state religion (=1 if yes).
2. Figures in parentheses are the robust standard errors.
3. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

The other striking and different result in Table 1.8 is the consistently negative and significant coefficient of the religious difference between political rulers and the majority of the population. Although the rulers of dependent territories did not have to have a different religion than the native populations, they often did. This was always the case in European colonies in Africa, Oceania, and the Western Hemisphere, a high fraction of the territories in our sample. As noted above, we would expect the religious differences between the colonizers and the majority of the population to have a strong negative effect on the presence of state religion in these territories, because we would expect these rulers to receive legitimacy from force rather than religious loyalty. Our results confirm these expectations.

1.5 Conclusion

Economists have long studied the role of religion in society, regarding both the religious behavior of individuals and the nature of religious institutions. Until recently, however, systematic empirical analysis of religion has largely been limited to the modern era because of the lack of good historical data. For example, conclusions about the nature of the relationship between religion and the state have focused on the twentieth century. The purpose of this paper has been to offer some preliminary evidence concerning the nature and causes of the religion- state relationship going back over 1,000 years. Such an analysis is now possible using a unique pair of data sets that includes information on political, geographic, and religious information on over 500 polities that have existed throughout history, beginning in the year 1000. The results offer insights into the long term trends in state religion as well as the factors that have affected that relationship through time.

As for trends, our data reveals that the downward trend in state religion observed by

Barro and McCleary (2005) for the twentieth century is a continuation of a longer-term trend that began 300-400 years ago, though with a slight uptick in recent times. Prior to that, state religion was prevalent and fairly steady or rising. Further, we find that Christian states began the secularization process about two centuries earlier than did Islamic and Bhuddist states. Observed differences in this trend by continent reflect geographic differences in the distribution of these major religions.

As to the causes of the decline, Barro and McCleary hypothesize that it reflects a modern trend toward increasing openness or competition in the religion market. We augment this explanation with a political economy argument that emphasizes the role of religion throughout history as one way of providing legitimacy for political leaders. We hypothesize that when religion is a cheaper source of legitimacy than, say, military force, it will be in the interest of rulers to ally with religious authorities. A monopolized religion market is conducive to this objective because it increases the fraction of the populous that a given religious leader can deliver. Thus, the two explanations are complementary. The data provide support for both factors throughout the long sweep of history.

While we believe that the preceding conclusions shed considerable light on the historical relationship between state and religion, they leave many questions unanswered. Some of these questions may lie beyond the scope of economics, such as the impact of doctrinal differences across religions. Other questions, however, are simply awaiting the availability of better data. We believe that formulating and answering those questions provides a rich agenda for future work.

References

- Anderson, Gary M. 1988. "Mr. Smith and the Preachers: The Economics of Religion in the Wealth of Nations" *Journal of Political Economy*, 96:5. 1066-1088.
- Barro, Robert J. and Rachel M. McCleary. 2005. "Which Countries have State Religions?" *Quarterly Journal of Economics*, 120:4. 1331-1370.
- Bianchi, Ugo. 1987. "History of Religions." In *Encyclopedia of Religion*, 2nd ed.
- Chen, Daniel L. and Dan Hungerman. 2014. "Economics, Religion, and Culture: A Brief Introduction" *Journal of Economic Behavior and Organization*, 104.
- Comin, Diego, William Easterly, and Erick Gong. 2010. "Was the Wealth of Nations Determined in 1000 BC?" *American Economic Journal: Macroeconomics*, 2:3. 65-97.
- Cosgel, Metin M., Thomas J. Miceli, and Jared Rubin. 2012a. "The Political Economy of Mass Printing: Legitimacy and Technological Change in the Ottoman Empire" *Journal of Comparative Economics*, 40:3. 357-371.
- 2012b. "Political Legitimacy and Technology Adoption" *Journal of Institutional and Theoretical Economics*, 168:3. 339-361.
- Cosgel, Metin and Thomas J. Miceli. 2009. "State and Religion" *Journal of Comparative Economics*, 37:3. 402-416.
- Fox, Jonathan. 2008. *A World Survey of Religion and the State*. Cambridge; New York: Cambridge University Press.
- Gill, Anthony J. 2008. *The Political Origins of Religious Liberty*. Cambridge; New York: Cambridge University Press.
- Goldstein, Joshua S. and Jon C. Pevehouse. 2014. *International Relations*, Tenth , 2013-2014 update ed. Boston: Pearson.
- Iannaccone, Laurence R., Roger Finke, and Rodney Stark. 1997. "Deregulating Religion: The Economics of Church and State" *Economic inquiry*, 35:2. 350-364.
- Iyigun, Murat. 2010. "Monotheism (from a Sociopolitical & Economic Perspective)" *University of Colorado Working Paper*.
- Johnson, Donald and Jean Johnson. 2007. *Universal Religions in World History: The Spread of Buddhism, Christianity, and Islam to 1500*. Boston: McGraw-Hill.

- McCleary, Rachel M. and Robert J. Barro. 2006. "Religion and Economy" *Journal of Economic Perspectives*, 20:2. 49-49.
- Putterman, Louis and David N. Weil. 2010. "Post-1500 Population Flows and the Long-Run Determinants of Economic Growth and Inequality" *Quarterly Journal of Economics*, 125:4. 1627-1682.
- Sharma, Arvind. 2012. "Religions: Missionary and Non-Missionary." In *Problematizing Religious Freedom*, ed. Arvind Sharma, 175-195. Vol. 9. New York: Springer.
- Spolaore, Enrico and Romain Wacziarg. 2013. "How Deep are the Roots of Economic Development?" *Journal of Economic Literature*, 51:2. 325-369.
- Turchin, Peter, et al. 2012. "A Historical Database of Sociocultural Evolution" *Cliodynamics: The Journal of Theoretical and Mathematical History*, 3:2. 271-293.
- Vaubel, Roland. 2015. "The Making of State Religion: Political Economy and Historical Evidence"

2. CHAPTER 2: RELIGIOUS ROOTS OF CIVIL

CONFLICT



2.1 Introduction

Although religion has played a large part in violent conflicts, the reasons for this association are far from clear. We cannot simply attribute violence to religious beliefs because all major religions foster peace and cooperation in fundamental tenets. Many civil conflicts in modern times have been between parties that differ along religious lines or they involve groups that define themselves through religious affiliation. Since religious differences do not always result in conflicts, however, we need to delve deeper into their causes to distinguish between those that result in civil conflicts of today and those that produce peaceful coexistence. As McBride and Richardson (2012, p. 118)) note in their review of the literature on religion and conflict, “[m]ore work is warranted” to understand the religious roots of civil conflict.

This chapter will study the association between religion and civil conflict by examining how religious differences between the political rulers and segments of population in history contribute to levels of civil conflict today. I develop a political economy model in which the ruler’s choices of public good and the access to it in a religiously segmented economy are linked to the civil conflict through grievances.⁴ The model includes a ruler and two types of citizens that differ based on whether they share the same religion with the ruler. For an argument based on economic incentives rather than unusual preferences, the model makes standard assumptions about the preferences and motivations of rulers and citizens. In a dynamic setting, the ruler chooses the level of public good as well as the access to it, and citizens choose private investment as a function of the ruler’s choice.⁵ The ruler may favor co-religionist group in his

⁴ For models of the legitimizing relationship between rulers and society, see Cosgel et al (2009) and Cosgel et al (2012)

⁵ This formulation is consistent with Mitra and Ray’s (2014) arguments about the Hindu-Muslim violence in India.

choice because of the higher tax revenue he may expect to receive from co-religionists through the higher tax compliance due to the greater legitimacy that shared religion may provide. This differential treatment creates grievances among disfavored group and may create conflict at some point as the accumulation of historical grievances motivate the disfavored group to fight against the ruler if the cost of fighting is reasonably low. The accumulation of grievances may vary depending on the size of religiously different groups and their tax compliance which may be the function of the characteristics of religions.

To examine the model's implication empirically, I use a new dataset on the religious and political histories of today's nations since the year 1000. The dataset includes variables on the religion of the political rulers and the majority and minority⁶ religions of the population for a given country. Using this information, I construct a new index to serve as a proxy for accumulated grievances for each country, called the Historical Religious Difference Index (HRDI), to analyze the way historical differences between the religion of the rulers and the majority religion or the minority religion have affected current (post-1960) levels of civil conflict. The results show that the frequency of civil conflict in the post-1960 period was significantly higher in societies that have historically had minority religions that differed from the religions of the rulers and that the effect depended on the characteristics of religions. The results hold when differences in geographic and bio diversity of countries and historical factors such as colonialism and transition to agriculture are controlled for.

The argument is closely related to the relative deprivation theory in sociology. According to this theory, individuals or social groups who may not be deprived in absolute terms may still feel deprived when their situation is worse as compared to others and that their relative

⁶ This is not any minority but a significant minority or second majority religion.

deprivation can accumulate grievances that may eventually fire up conflict. Relative deprivations leading to grievances might stem from government policy, historical or cultural reasons that create lack of economic, political and social rights for certain groups in society (Gurr, 1993; Gurr et al., 1970).⁷ Applying this framework to contemporary religious deprivations, Grim and Finke (2010) illustrate that governmental and social restrictions on religious freedom is positively correlated with religious persecution, a particular form of social conflict. The results contribute to this literature by providing a specific mechanism for the source of those grievances and a way of measuring them through a proxy index.

The analysis is also closely related to the economic literature on the relationship between diversity and conflict.⁸ Researchers in this literature have shown how conflict in a diverse society arises out of the difficulty of reconciling the demands for public good provision of different groups under scarcity. If the demands of some groups are unsatisfied, they may develop grievances that may lead to civil conflict. These kinds of grievance-related explanations are empirically tested in the literature through measures of diversity, such as ethnic and religious fractionalization (large number of small groups), polarization (small number of large groups), and dominance (a large group together with significant small group) based on data on the religious distributions of population. The findings are mixed and largely inconclusive (Arbatli et al., 2015; Basedau et al., 2014; Collier and Hoeffler, 2004; Esteban et al., 2012; Fearon and Laitin, 2003; Montalvo and Reynal-Querol, 2005). By emphasizing the deep roots of the diversity and grievance between religious groups and political rulers, the paper contributes to this literature a new mechanism through which accumulated grievances may lead to violent conflicts.

The argument is also related to a body of literature that explains conflict through religion-

⁷ For a review of grievance literature and examples, see (Cederman et al., 2013)

⁸ For reviews of this literature and examples, see Blattman and Miguel (2010), Garfinkel and Skaperdas (2007).

based hatred and irreconcilable hostility between groups (Horowitz, 1985; Huntington and others, 1993). Rather than considering the hatred and hostility as being a matter of current religious beliefs and preferences, I examine their historical roots. Using a political economy approach, I identify the source of the problem in the self-interested ruler who is trying to maximize his revenue. Going beyond general observations, I construct an index to measure the source and intensity of the grievance and to examine its effect on violence systematically.

My emphasis on the historical origins of conflict is consistent with the recent literature on the deep historical roots of economic growth and development.⁹ In this literature, scholars have shifted emphasis from the proximate determinants of current outcomes to more fundamental factors deeply rooted in long-term history. I contribute to this literature by providing the first systematic analysis and empirical measure of the deep religious roots of current conflicts. In doing so, my approach is similar to Persson and Tabellini's (2009) analysis of how the accumulation of democratic capital contributes to economic development, and (Bockstette et al., 2002) and Depetris-Chauvin's (2013) studies of how the accumulation of institutional experience under a state-level governance affects economic growth and civil conflict.

2.2 Model

This part develops a political economy model in which the ruler's choices of public good and the access to it are linked to the civil conflict through grievances in a religiously segmented society. The model builds on insights from Acemoglu (2005) and Cosgel and Miceli (2009). I use the basic setup of Acemoglu (2005) to formulate how the ruler may discriminate among segments of the population in their access to the public good. I focus segmentation of the

⁹ For a review of this literature, see Spolaore and Wacziarg (2013). For examples of the related analysis of historical, cultural and institutional factors, see Engerman and Sokoloff (1997), Laporta et al. (1997), (Acemoglu et al., 2001), Nunn (2014)

population according to religious affiliation and the differential abilities of religious groups to legitimize political rulers (Cosgel and Miceli, 2009). I expand on these insights by specifying why self-interested rulers may discriminate along religious lines and how this discrimination may lead to grievances that arise from the differences between the religion of the ruler and various segments of the population. I also show how the accumulation of grievances varies depending on the size of religious groups and their tax compliance to tax collection process. I use the model to identify the mechanisms through which religious differences may lead to conflict and to specify testable hypotheses for empirical analysis.

2.2.1 Setup

Consider a discrete time infinite horizon economy with a ruler and citizens. The population of citizens is normalized to 1 and consists of two types s and d , indicating that citizens have the same religion as the ruler's and different religion from the ruler's, respectively. There are n number of type s citizens and $(1 - n)$ number of type d citizens in the economy and n is equal to $\frac{1}{2}$ initially. I also assume that ruler will not change his religion.

Citizens are risk neutral and each citizen's utility function is given by

$$U_t^i = \sum_{j=0}^{\infty} \beta^j c_{t+j}^i, \quad i = s, d \quad (1)$$

where β is discount factor, c_{t+j}^i is the consumption of citizen i . Each citizen produces final good y_t^i for his consumption at each date t using the following Cobb-Douglas production technology with constant return to scale.

$$y_t^i = \begin{cases} \frac{1}{1-\alpha} [k_t A_t]^\alpha (e_t^i)^{1-\alpha} & \text{if } i = s \\ \frac{1}{1-\alpha} [(1 - k_t) A_t]^\alpha (e_t^i)^{1-\alpha} & \text{if } i = d \end{cases} \quad (2)$$

where e_t^i is citizen i 's effort or investment level. A_t denotes the public good choice of the ruler at time $t - 1$. A_t is in the citizen's production function and it captures the idea that the certain level of public good in the economy (e.g. infrastructure and law enforcement) is necessary for the citizen to be productive.¹⁰ I will argue that the ruler can regulate access to public goods. For that matter, these are not pure public goods which have non-excludability and non-rivalry properties. But they are ruler's choices that affect the productivity of each citizen in the economy.¹¹ $k_t \in (0,1)$ is the favor variable that the ruler chooses to regulate the access to the public good.¹² k_t may denote favoritism that makes occupational and educational opportunities in the economy more available for a certain group because of their religious identity. In particular, if the choice of k_t is less than $\frac{1}{2}$, the ruler is favoring type d citizens, and if greater than $\frac{1}{2}$, the ruler is favoring type s citizens. The self-interested ruler may have an incentive to favor type s citizens in his choice because of the higher tax revenue he may expect to receive from co-religionists due to the greater legitimacy that shared religion may provide.

The ruler collects taxes and makes public good investments. The tax rate is τ , and it is given in each date t . However, a fraction δ_i of income lost in the tax collection process due to tax compliance issue.¹³ Tax compliance varies depending on the religion of citizens. Specifically, we assume $\delta_s < \delta_d$ which reflects the argument of Cosgel and Miceli (2009) that the ruler is more legitimate among type s citizen than type d citizens.

¹⁰ For this kind of argument see Barro (1990)

¹¹ Later in Chapter 3 I will interpret A_t as state capacity created by the ruler that is crucial for economic development. Specifically, I will conceptualize it as legal capacity, bureaucratic and administrative capacity, and infrastructural capacity, then measure it accordingly.

¹² For a similar formulation in the context of legal capacity see Besley and Persson (2010). They argue that government can choose to protect legal rights of certain groups over others although one can think of the legal capacity is public good.

¹³ This is a deadweight lost because δ fraction of income neither goes to the ruler nor to the citizens. It can also be seen as transaction cost of tax collection. Tax compliance issue is widely discussed in public finance literature. For a review of this literature see Andreoni et al. (1998).

Given the tax rate the consumption of each citizen can be written as

$$c_t^i = (1 - \tau)(y_t^i - e_t^i) \quad (3)$$

Total tax revenue collected by the ruler at date t is given by

$$T_t = \tau[n(1 - \delta_s)(y_t^s - e_t^s) + (1 - n)(1 - \delta_d)(y_t^d - e_t^d)] \quad (4)$$

By this revenue the ruler spend G_t to determine the level of public good in the next period.

$$A_{t+1} = \left(\frac{(1-\alpha)\phi}{\alpha} G_t \right)^{1/\phi} \quad (5)$$

where $\phi > 1$ reflecting the diminishing return to G_t . Full depreciation for the public good is also assumed for simplicity.

The consumption of the ruler becomes whatever is left over from the tax revenue after spending on public good investment.

$$c_t^R = T_t - G_t \quad (6)$$

Citizens may get differential treatments from the ruler depending on their religious identity. The favor variable k_t is in citizen's production function and the choice of which by the ruler may create relative deprivation among the groups through utility differences, the deprivation that creates grievances and motivates un-favored group to replace the ruler with the one who share the same religion. However, the replacement is costly and the cost of which may depend on many factors such as technology, charismatic leadership or geography, and is therefore assumed to be a random variable. In particular, citizens are faced with a replacement cost $\theta_t A_t$ at each date t , where θ_t is non-negative continuous random variable with distribution function $F(x)$, which satisfies the monotone hazard rate assumption. It is multiplied by the

public good A_t in the economy. This simplifies the analysis significantly. This also can be true because the cost of replacement may increase by public goods such as a well-functioning bureaucracy and military or because the cost of replacement decreases by the public good investment that elevates citizens' economic conditions. On the other hand, the benefit of replacing the ruler at date t is $|(1 - n)(U_t^s - U_t^d)|$, utility differential among the groups. This utility difference is multiplied by the group size reflecting that there is no collective action problem. Citizens make the replacement decision $R_t \in \{0,1\}$ based on the realization of cost and expected benefit of the replacement. The ruler will be replaced if the following is true.

$$\theta_t < \left| \frac{(1-n)(U_t^s - U_t^d)}{A_t} \right| \quad (7)$$

Condition in (7) implies that the probability of the ruler's being replaced is $F(M(k_t))$, where $M(k_t) \equiv \left| \frac{(1-n)(U_t^s - U_t^d)}{A_t} \right|$

Timing of the events in the game as follows:

- Economy inherits public good A_t from the government spending from the previous period
- Citizens choose effort level e_t^i
- The ruler chooses the favor variable k_t and next periods public good A_{t+1} at date t
- θ_t is realized
- Citizens decide whether to replace the ruler or not

Markov Perfect Equilibrium (MPE) concept is used to solve this game. MPE is defined as set of strategies at date t such that these strategies only depend on the payoff-relevant current

state of the economy, set of strategies of $e^i(A_t)$, $k(A_t)$, $G(A_t)$, $R(A_t)$. In MPE one can determine equilibrium allocations and strategies within each date by the backward induction, taking the state of the economy from the previous period as given.¹⁴

2.2.2 Citizens' Problem

Citizens maximize their utility choosing effort level e_t^i

$$\text{Max } U_t^i = (1 - \tau)[y_t^i - e_t^i] \quad (8)$$

Solution to this problem is the optimal investment or effort level of each citizen as follows

$$e_t^s = k_t A_t \quad (9)$$

$$e_t^d = (1 - k_t) A_t \quad (10)$$

Substituting (9) and (10) into (2) gives production levels for each type of citizens as

$$y_t^s = \frac{1}{1-\alpha} k_t A_t \quad (11)$$

$$y_t^d = \frac{1}{1-\alpha} (1 - k_t) A_t \quad (12)$$

Using (9)-(12) citizens' optimized utility for each type will be

$$U_t^s = \frac{\alpha}{1-\alpha} k_t A_t \quad (13)$$

$$U_t^d = \frac{\alpha}{1-\alpha} (1 - k_t) A_t \quad (14)$$

¹⁴ For a discussion about and applications of MPE in political economy context see Acemoglu (2010).

2.2.3 Ruler's problem

Given the citizens' investment choice, the ruler's tax revenue function at date t can be written as follows after substituting (13) and (14) into (4)

$$T_t(A_t) = \frac{\alpha}{(1-\alpha)} \tau A_t [k_t S + (1 - k_t) D], \quad (15)$$

where $S = n(1 - \delta_s)$, $D = (1 - n)(1 - \delta_d)$, $S - D > 0$ since $\delta_s < \delta_d$. Again, given the citizen's choice of investment, the probability of replacement in (7) will be $F(M(k_t))$, where $M(k_t) = \lfloor \frac{(1-n)\alpha}{1-\alpha} (2k_t - 1) \rfloor$, obtained by substituting (13) and (14) into (7).

To find the ruler's choice of favor variable k_t and his choice of public good, A_{t+1} under replacement threat we write Bellman equation for the ruler's discounted net present value as follows

$$V(A_t) = \max \{ [1 - F(M(k_t))] [T(k_t, A_t) - \frac{\alpha}{(1-\alpha)\phi} A_{t+1}^\phi] + \beta [1 - F(M(k_t))] V(A_{t+1}) \} \quad (16)$$

The value function $V(A_t)$ is concave and continuously differentiable since $\phi > 1$ adds required curvature to A_t .¹⁵

First-order condition with respect to k_t is

$$[1 - F(M(k_t))] \left(\frac{dT_t}{dk_t} \right) - M'(k_t) f(M(k_t)) [T_t(k_t) - G_t + \beta V(A_{t+1})] = 0 \quad (17)$$

The first term is expected revenue brought by higher k_t . Increasing k_t , making the public good more available for type s citizens, will increase the tax revenue because of the legitimacy

¹⁵ See Stokey et al. (1989) for standard arguments on differentiability and concavity of value function

effect. On the other hand, the second term is expected lost due to higher k_t . Increasing k_t will increase the probability of replacement through the income difference it creates between type s and d citizens. The optimum k_t should balance these effects out.

First order condition with respect to A_{t+1} is

$$\frac{\alpha}{(1-\alpha)} A_{t+1}^{\phi-1} = \beta V'(A_{t+1}) \quad (18)$$

The envelop condition is given as

$$V'(A_{t+1}) = [1 - F(M(k_{t+1}))] \frac{\alpha}{(1-\alpha)} \tau [k_{t+1} (S - D) + D] \quad (19)$$

Combining (18) and (19) gives the ruler's optimal investment function as

$$A_{t+1} = ([1 - F(M(k_{t+1}))] \beta \tau [k_{t+1} S + (1 - k_{t+1}) D])^{1/(\phi-1)} \quad (20)$$

To make further progress let's focus on steady state equilibrium where $k_t = k_{t+1} = k^*$ and $A_t = A_{t+1} = A^*$.

$$A[k^*] \equiv ([1 - F(M(k^*))] \beta \tau [k^* S + (1 - k^*) D])^{1/(\phi-1)} \quad (21)$$

Combining (15) and (20) gives the value function for the ruler at steady state as

$$V(A[k^*]) = (1 - F(M(k^*))) (T(k^*)) + (1 - F(M(k^*))) \left(\frac{\phi-1}{\phi} \right) \frac{\beta (1 - F(M(k^*))) T(k^*)}{1 - \beta (1 - F(M(k^*)))} \quad (22)$$

$$\text{Define } h(k^*) \equiv (T(k^*)) + \left(\frac{\phi-1}{\phi} \right) \frac{\beta (1 - F(M(k^*))) T(k^*)}{1 - \beta (1 - F(M(k^*)))} \left(\frac{1}{A[k^*]} \right) \quad (23)$$

$h(k^*)$ is the normalized value of staying in power for the ruler. To get the expression that gives the steady state value for the favor variable k^* , first combine (16), (17) and (22) dividing them by $A[k^*]$, then insert explicit expressions for $\frac{dT_t}{dk_t}$ and $M'(k_t)$ into (17). Then, the equation

that implicitly defines the equilibrium k^* is obtained as

$$f(M(k^*))h(k^*) - \left(1 - F(M(k^*))\right) \left(\frac{\tau(S-D)}{2(1-n)}\right) = 0 \quad (24)$$

As k increases, the ruler gets the normalized value of staying in power with a lower probability (first term in (24)). An increase in k , on the other hand, increases the ruler's revenue due to the legitimacy effect given the ruler is staying in power (second term in (24)). To show whether a unique solution exists, it is handy to rewrite (24) as follows

$$\frac{f(M(k^*))}{(1-F(M(k^*)))} h(k^*) - \left(\frac{\tau(S-D)}{2(1-n)}\right) = 0 \quad (25)$$

The only asymmetry between type s and d citizens is that they have different δ values, specifically $\delta_s < \delta_d$. If $\delta_s = \delta_d$, then k^* can be anything within the boundaries of k in terms of raising revenue. However, any deviation from $k^* = \frac{1}{2}$ will increase the probability of replacement. Hence, the ruler will set $k^* = \frac{1}{2}$ as long as $\delta_s = \delta_d$ is true. That is, there is no reason for the ruler to discriminate if there no asymmetry among citizens. Further, as long as $\delta_s < \delta_d$ is true the ruler never set $k^* < \frac{1}{2}$. To see this, reduce $k^* = \frac{1}{2}$ in $h(k^*)$ by arbitrary small number ϵ the benefit of which $\epsilon(1 - \delta_d)$ will be less than the cost of which $\epsilon(1 - \delta_s)$.¹⁶ In addition, there will be an increase in the probability of replacement by type s citizens through the monotone hazard rate. This proves that the ruler only discriminates against type d citizens. The solution to (25) is unique because the first terms in (25) are increasing in k . That is,

$$\frac{d}{dk} \left(\frac{f(M(k^*))}{(1-F(M(k^*)))} \right) > 0 \text{ by monotone hazard rate and } \frac{d}{dk} (h(k^*)) > 0 \text{ as long as } \delta_s < \delta_d \text{ is true}$$

¹⁶ To see this, write $h(k^*)$ in (23) as $\frac{\alpha}{1-\alpha} \tau \{n(1 - \delta_s)k^* + (1-n)(1 - \delta_d)(1 - k^*)(1 + \frac{\phi-1}{\phi} \frac{\beta(1-F(M(k^*)))}{1-\beta(1-F(M(k^*)))})\}$. The only asymmetry in this equation is different δ values, specifically $\delta_s < \delta_d$.

just as discussed above.

These results are intuitive. The revenue-maximizing ruler will make the public goods more available for the group that shares the same religion with the ruler because doing so allow him to extract more tax revenue due to the legitimacy effect. However, the ruler should not be so ambitious for doing so because it becomes more likely that the group that has the different religion from the ruler's will overthrow him if the utility differential among the groups grows large due to the discrimination.

Let's rewrite the equilibrium probability of replacement of the ruler as a function of the parameters of the model as follows:

$$p^* \equiv F(M(k^*)) \equiv p(k^*(\delta_d, n, \alpha), n, \alpha) \quad (26)$$

where $M(k^*) = \frac{(1-n)\alpha}{1-\alpha} (2k^* - 1)$.

Proposition 1: Based on the discussion above, there exists a unique MPE, in which the ruler always favors type s citizens and type d citizens replace the ruler whenever (7) is true. In the equilibrium

- i. $\frac{dk^*}{dn} > 0$ or < 0
- ii. $\frac{dk^*}{d\delta_d} > 0$,
- iii. $\frac{dp^*}{dn} = \frac{\partial p}{\partial k} \cdot \frac{dk}{dn} + \frac{\partial p}{\partial n} < 0$ or > 0
- iv. $\frac{dp^*}{d\delta_d} = \frac{\partial p}{\partial k} \cdot \frac{dk}{d\delta_d} > 0$

(i) An increase in the population of type s citizens (n), has an ambiguous effect on the equilibrium level of k^* . There are two effects, survival and income effects, working in opposite directions through the first terms in (25), which is $\frac{f(M(k^*))}{(1-F(M(k^*)))} h(k^*)$. On the one hand, a higher n leads to an increase in k through $\frac{f(M(k^*))}{(1-F(M(k^*)))}$, which I call the survival effect, because it reduces the probability of replacement by type d citizens, which encourages the ruler to discriminate more. On the other hand, a higher n decreases k through $h(k^*)$, which I call the income effect, because it generates income for the ruler which he would otherwise generate by using k , a tool that is costly to use due to its effect on the probability of replacement. As for the sign of $\frac{dk^*}{dn}$, if the survival effect dominates the income effect, the net effect will be positive, and vice versa.

(ii) As type d citizens' compliance parameter (δ_d) goes up, k will go up, $\frac{dk^*}{d\delta_d} > 0$. The more type d citizens resist in the tax collection process, the more the ruler discriminates against them by switching the availability of public goods to type s citizens, who are more willing to pay taxes.

(iii) An increase in n has an ambiguous effect on p , the probability of replacement. n affects the probability of replacement in two channels: direct population and grievance channels. On the one hand, as n goes up, the probability of replacement goes down because now there will be less number of type d citizens that could potentially

revolt, which is the direct population channel, $\frac{\partial p}{\partial n} < 0$. This is always true since the collective action problem is not incorporated in the model. The other effect works through k , $\frac{\partial p}{\partial k} \cdot \frac{dk}{dn}$, which is the grievance channel. First, it is easy to see $\frac{dp}{dk} > 0$ with the help of equation (7). Given the comparative static result in (i), if the survival effect dominates both the income effect and the direct population effect, the change in the probability of replacement due to an increase in population share of type s citizens will be positive; and vice versa.

(iv) δ_d affects the probability of replacement only through its effect on the favor variable k (the grievance channel). As δ_d increases, the probability of replacement increases because there will be more discrimination due to the result in (ii).

2.2.4 Empirical Implications

The propositions derived from the model specify certain predictions on the effects of key variables on the probability of conflict, which can be tested by empirical analysis. Depending on religious segments of the population (n) and their tax compliance in the tax collection process (δ), grievances accumulate differently and induce different conflict probabilities. Further, for a cross-country comparison, an empirical specification should worry about sorting issue that may result from factors such as technology or geographic characteristics of countries that affect the effectiveness of public good in private production (α) as well as the cost of replacement (θ). Now, let's look at the model's predictions under the following scenarios on how the ruler's religion differs from those of the population.

Case (i): When ruler's religion is different from the majority of population

In this case, the probability of conflict increases due to direct population effect. The more people are involved, the easier is to replace the ruler. However, over all change in the probability of conflict depends also on the grievance channel. In the grievance channel, if the survival effect dominates both the income effect and direct population effect, the probability of conflict goes down. In other words, if the ruler cares more about his staying in power and enjoying his future revenue, he will not discriminate and cause many grievances because he knows that the future replacement would be easy by the majority. As a result, one can expect less conflict due to grievances when ruler's religion is different from the majority.

Case (ii): When ruler's religion is different from the minority of population

In this case, the probability of conflict decreases due to direct population effect. That is, the lesser people are involved, the more difficult is to replace the ruler. However, if the survival effect dominates the income effect and as well as direct population effect, the probability of conflict increases. In other words, if the ruler cares more about his future revenue, he will discriminate more because he knows that the future replacement would be difficult by the minority. As a result, one can expect more grievances and conflict when ruler's religion is different from the minority religion.

Further, in either of above cases the probability of conflict increases as δ_d increases. That is, holding other things equal, the more type d citizens resist in tax collection process, the more the ruler discriminates against them. This creates more grievances, hence increases the

probability of conflict. The above discussions are summarized in Table 2.1.

Table 2.1 Parameter Changes and Conflict Prediction

Form of religious difference	Parameter	Interpretation	Direct population effect	Grievance channel		Conflict prediction
				<i>Income effect</i>	<i>Survival effect</i>	
Ruler vs. minority	n ↑	Population of type s citizens	<0	<0	>0	If the survival effect dominates income and direct population effect as n changes, Ruler vs. minority yields more conflict than Ruler vs. majority through grievance channel . This would be true if the ruler cares his future more.
Ruler vs. majority	n ↓	Population of type s citizens	>0	>0	<0	
Either case	δ_d ↑	Type d citizens' resistance to paying tax		>0		

An empirical specification should worry about sorting issues as well. Countries may sort into cases where ruler's religion is the same as the population or different from population depending on the effectiveness of public good in private production (α) as well as the cost of replacement (θ). These parameters might be function of such variables as technology, geography or other characteristics of countries. An empirical specification should control such variables to mitigate any bias in estimates due to this potential sorting problem.

2.3 Data and Empirical Framework

To test the model's predictions empirically, I use cross-national data on civil conflict as well as other characteristics of each country that are associated with conflict. In addition, I introduce a novel dataset that includes information on the historical relationship between the religions of political rulers, segments of the population and whether the rulers imposed an official state religion. Using this data I constructed a new index to serve as proxy for

accumulated grievances. Empirical framework will specify regressions that explain the variation in frequency of new civil conflict across countries in the post-1960 period with respect to the proxy indices for accumulated grievances.

2.3.1 Dependent Variable

Following the common practice in the literature I use UCDP/PRIO Armed Conflict Dataset v.4-2012 for civil conflict measures (Gleditsch et al., 2002; Harbom and Wallensteen, 2012). This is a conflict-year dataset that includes two different codings, PRIO25 and PRIO1000. In particular, PRIO25 contains internal and internationalized internal armed conflict episodes, each of which takes place between government and internal actor(s) and causes at least 25 battle-related deaths per year. However, PRIO1000 includes those internal and internationalized internal conflicts that result in at least 1000 battle-related deaths per year. Using these measures I define the dependent variable as the frequency of new PRIO25(1000) civil conflict, not the new episodes of old conflicts, in the period between 1960 and 2011.¹⁷ I use PRIO25 in our main analysis and use PRIO1000 to see whether our findings are sensitive to the measure of civil conflict. Following the literature, I focus civil conflict in the post-1960 period since most colonies obtained their independence by 1960.

2.3.2 Measuring Grievances: An Index of Historical Religious Difference between State and Citizen (HRDI)

In the theoretical part I argued that the ruler will discriminate against the segment of

¹⁷ Differentiating between new conflict and new episode of old conflict is important to understand the nature of civil conflict. The literature has focused on three dimensions of civil conflict: onset, duration and incidence. Onset studies explain the variation in outbreak of new conflict, not a new episode of old one; but, sometimes new episode of old conflict is also incorporated into the analysis if the peace period continues long enough before new episode outbreaks. Studies on durations examine what makes civil war, which already started longer or shorter. Incidence or prevalence dimension is mixture of onset and duration. Studies on incidence divide time periods into 5-year intervals and define the dependent variable as a dummy variable equal to 1 if a new or a new episode of old conflict happens within a five-year interval. For a detailed discussion see Sambanis (2004).

population whose religion is different from the ruler's by restricting their access to public goods (i.e. $k^* > \frac{1}{2}$). In the model this creates grievances as the utility differential between co-religionist and the other group, and causes the conflict. To quantify these grievances over time across space we should have data on the components of right hand side of the inequality in (7), which is the utility differential among the religiously different type of citizens. However, it is not feasible to collect such data. Instead, I look at whether the religion of the ruler is different from that of citizens in a given time and territory because grievances eventually arise from such differences between the rulers and citizens. I, therefore, created an index that measures the historical religious difference between rulers and citizens (HRDI) to serve as proxy for accumulated grievances. Using the model's implications, I further created HRDIs that allows for different sizes of religious groups (n) and the values of tax compliance parameter (δ). This provides variations across indices that also help estimate the effect of grievances on civil conflict.

In the construction of HRDI two dimensions are important: the time period and the unit of analysis. HRDI is constructed for the period between year 1000 and 1950 because before the year 1000 historical information is limited, especially for the new world and Africa, and after 1950 there would be a reverse causality issue since civil conflict in the post-1960 period will be explained in this study. Similar to Bocksette et al (2002) and Depetris-Chauvin(2013) this time period is divided into 100-year intervals until 1500 and 50-year intervals thereafter. The unit of analysis is territories that today's countries occupy. In order to construct HRDI, the history of each country that exists today is examined. The religion of rulers and that of citizens are spotted at each one of those intervals. Citizens' religions in my analysis can take at most two forms in terms of diversity in a given time interval and country: the religion of the majority and the religion of the minority since it is unlikely to observe the religious distribution of population as

we go back in history. This information comes from CAD (Country Ancestry Data) and HPD (Historical Politics Data) datasets that we introduce in detail in Chapter 1. Then, for each country today HRDI is constructed as follows:

$$HRDI_i = \sum_{t=1}^{15} \omega^{15-t} R_{it}$$

where $t = 1(\text{year } 1000), 2(\text{year } 1100) \dots 6(\text{year } 1500), 7(\text{year } 1550), \dots,$

$15(\text{year } 1950)$, i indexes country, and R_{it} is a binary variable equal to 1 if the ruler has religion different from that of citizens in country i at interval t . ω is a weight parameter, and it is initially set equal to 1 since the deep root literature does not provide a theory suggesting what value it should take. Later in the empirical analysis, I assign values lower than 1 for ω to assess how sensitive the results are to the different values of ω .

I calculate various forms of HRDI that take the size of religious groups (n) and their tax compliance behavior (δ_d) into account. Regarding (n), I calculate two indices that account for religious composition of population: HRDI1 that measures the historical religious difference between rulers and the majority of population, and HRDI2 that measures historical religious difference between rulers and the minority of population.

As for δ_d , I calculate SHRDI1 and SHRDI2. They measure the historical religious difference between rulers and the majority of population, and the difference between rulers and the minority of population, respectively, while rulers have an official state religion. Further, following the literature on comparative religion, I categorize religions that are in the dataset into two groups: missionary and non-missionary religions. Missionary religions, also called universal religions, consist of Islam, Christianity and Buddhism and tend to expand by converting people.

On the other hand, non-missionary religions such as ethnic religions (Hinduism, Judaism etc.) and indigenous religions are passive in terms of spreading out. Such characteristics of religions may contribute to the likelihood of conflict through δ_d , as well. Then, I construct HRDI1 and HRDI2 when (i) both rulers and citizens have missionary religions, (ii) rulers have missionary but citizens have non-missionary religions and vice versa, (iii) both rulers and citizens have non-missionary religions. These indices are used as main explanatory variables in the regression analysis.

When calculating HRDIs I treat different sects in Islam and Christianity as different religions since the focus here is civil conflict, and sectarian differences often are an important source of wars.¹⁸

Several challenges emerge in the construction of HRDIs. First, since it is not possible to observe exact religious distribution of population as we go back in history until the year 1000, I only coded the majority and the minority religions in a given polity. If there were several minority religions, I picked the significant one. Second, if a given territory was ruled by more than one polity at the same time, a representative one is selected, one that controls the most of that country's territory. These challenges create measurement errors that can potentially affect my estimates.

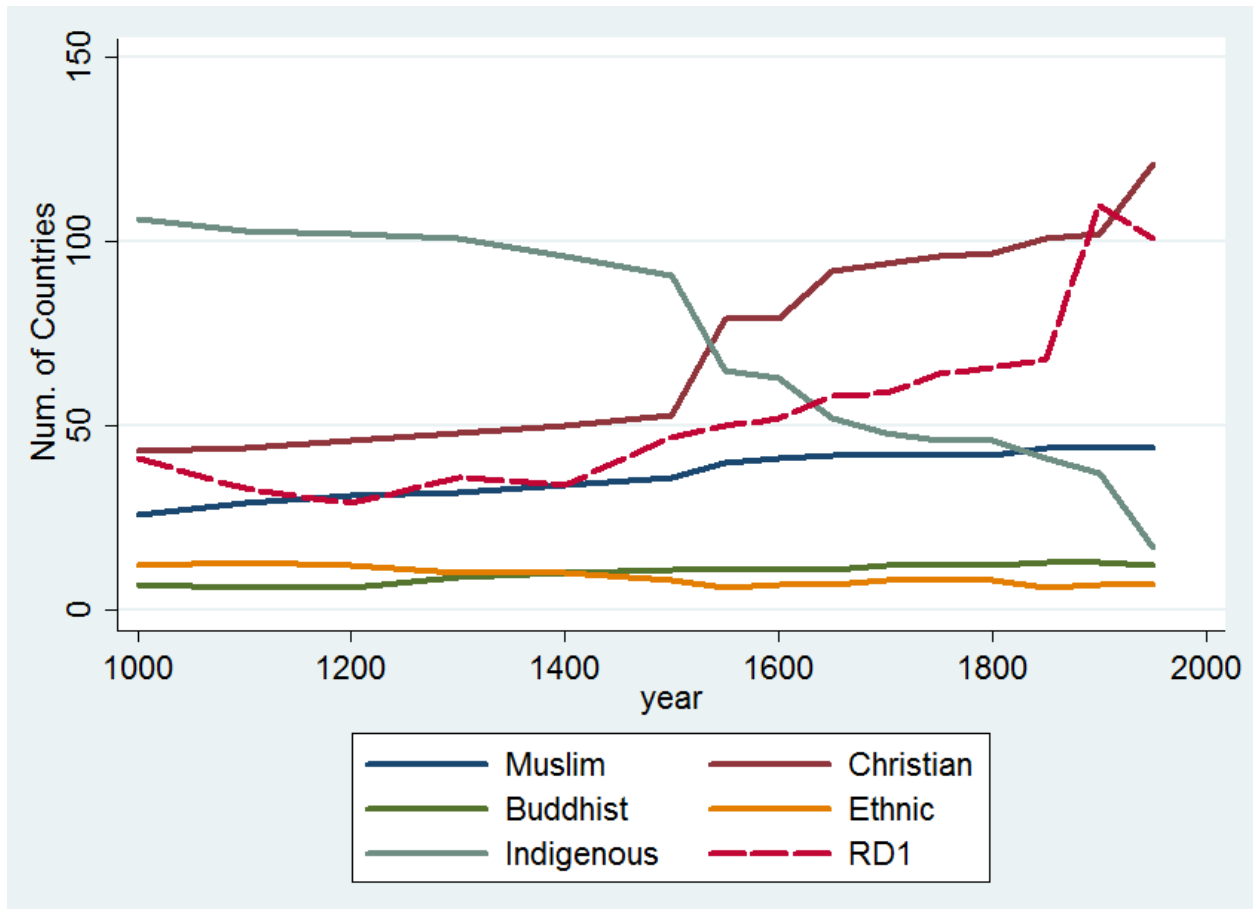
¹⁸ See Table 2A. 1 in Appendix A for the list of religions that are present in Historical Polities Dataset.

2.3.3 Summary Statistics

Figure 1 shows the evolution of majority religions over time across territories that today's countries occupy. Christianity has been the majority religion in most of the countries since the year 1000 and it increased faster after the 16th century. This expansion coincides with the colonization and the missionary activities of Christians in the new world and Africa. The number of countries whose majority religion is Islam has gone up over time as well, but not as sharp as Christianity. In contrast to these expansions, the number of countries where indigenous religions are the majority has declined over time, especially after the 16th century. As a result, the number of countries where the ruler's religion is different from the majority of population (RD1) has gone up over time.

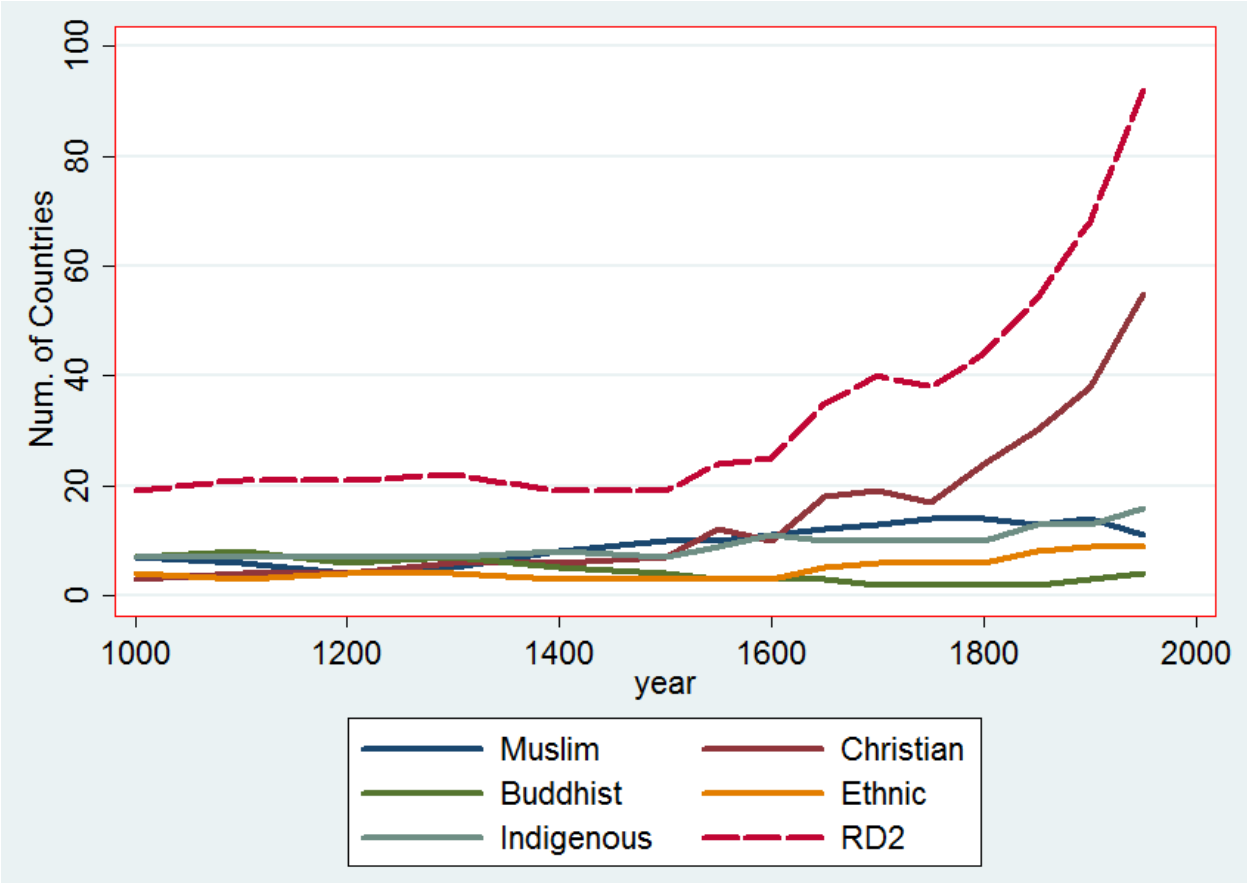
Figure 2 shows the evolution of minority religions over time across territories that today's countries occupy. The most noticeable change is again with Christianity. The number of countries where Christianity is the minority religion went up dramatically during the 18th century. Similarly, the number of countries where the ruler's religion is different from the minority (RD2) has increased dramatically over time. This development in RD2 is possibly due to remaining impacts of the dynamics in Figure 1.

Figure 1 Majority Religion and the Religious Difference between the Rulers and the Majority over Time



Note: RD1 is Religious difference between the ruler and the majority. For the list of Ethnic and Indigenous religions see Table 2A. 1 in Appendix A.

Figure 2 Minority Religion and the Religious Difference between the rulers and the Minority over Time



Note: RD2 is Religious difference between the ruler and the minority. For the list of Ethnic and Indigenous religions see Table 2A.1 in Appendix A.

2.3.4 Empirical Framework

To test the model's predictions empirically I specify cross-country regressions that explain variations across countries in count of new civil conflict as a function of HRDI, the proxy for accumulated grievances, in the post-1960 period.

$$\log(1 + CW_i) = \beta_0 + \beta_1 HRDI_i + X_i' \gamma + u_i$$

where CW_i is the number of new civil conflicts that started in country i in period 1960-2011. The dependent variable is $\log(1 + CW_i)$ because CW_i is a count variable.¹⁹ $HRDI$ is the index of the historical religious difference between rulers and citizens for country i , and serves as proxy for accumulated grievances. As argued before, I have calculated various forms of HRDI based on the model's predictions on the accumulation of grievances that result from the differences in parameters n and δ_d . Differences across these indices also provide relevant variations to estimate the effect of accumulated grievances on civil conflict. Vector of controls X_i' is added into the regressions to mitigate the heterogeneity across countries that, according to the theoretical model, stems from different parameter value of α for each country. u_i is the country specific error terms. Civil conflict appears mostly in certain regions of the world such as Middle East, Balkans and Southern Asia. The model's errors for countries in the same region may be correlated. To deal with this, I cluster the errors at UN region level. Clustering at the UN region level appears to be the most conservative approach for avoiding over-rejection of the null hypothesis related to the statistical significance of β_1 , the coefficient of variable of interest. There are twenty-two UN regions for which the clusters are defined. This model is estimated using OLS estimator.

¹⁹ Since the dependent variable is a count variable I also use Poisson regression. Poisson regression results are similar to OLS results. See Table 2A.3 in Appendix A.

2.4 Results

This part presents empirical findings about the effect of HRDIs, proxy for accumulated grievances, on various civil conflict measures. First, I present results from empirical analysis on how the historical religious difference between rulers and the majority (HRDI1) as well as difference between rulers and the minority (HRDI2) affect civil conflict. Second, I present results on whether the characteristics of religions that rulers and citizens have any differential effect on the estimates. Then, I show how robust the results are to the change in the weight parameter used in the calculation of the indices, the use of different conflict measures, and the exclusion of countries from the sample based on UN regions. Then, I conclude introducing well-known predictors of civil conflict into regressions to see possible mediating channels which the indices' effects may work through. Results show that HRDI2 is positively and significantly associated with civil conflict measures and the size of the effect goes up when rulers have had official state religions. These results survive after those robustness checks. The findings are also consistent with the model's predictions.

2.4.1 How do historical religious difference between rulers and citizens affect civil conflict?

In the model grievances accumulate differently depending on the value of n , about which I calculated two indices using the historical data: whether the religion of rulers is different from that of majority (HRDI1) and the religion of rulers is different from that of significant minority (HRDI2), historically. Table 2.2 shows the effects of these indices on the frequency of new PRIO25 civil conflict for the period 1960-2011. Columns 1 and 4 reveal bivariate relationships between HRDI1 and the civil conflict and HRDI2 and the civil conflict, respectively. These relationships are positive; but they are statistically insignificant. Clearly, these estimates are

Table 2.2 OLS Estimates of Effect of HRDI1 and HRDI2 on PRIO25 Civil Conflict

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
HRDI1	0.0167 (0.0115)	0.000346 (0.0105)	-0.00606 (0.0107)	-0.00743 (0.00982)					-0.00442 (0.00987)
HRDI2					0.0247 (0.0149)	0.0206* (0.0104)	0.0243** (0.0109)	0.0237* (0.0114)	0.0240** (0.0106)
Observations	176	147	142	127	176	147	142	127	142
R-squared	0.023	0.494	0.589	0.648	0.039	0.515	0.616	0.671	0.617
Foreign Ruler	no	yes	yes	yes	no	yes	yes	yes	yes
Continent Dummy	no	yes	yes	yes	no	yes	yes	yes	yes
Geo&Bio Diversity	no	yes	yes	yes	no	yes	yes	yes	yes
Historical Factors	no	no	yes	yes	no	no	yes	yes	yes
Technology	no	no	no	yes	no	no	no	yes	no

Note: Robust standard errors clustered at UN region level are in parentheses. * represents p-values: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is logarithm of count

of new civil conflicts in period 1960-2011, obtained from UCDP Armed Conflict Data. *HRDI1* is Historical Religious Difference Index calculated when the ruler's religion is different from the majority religion. *HRDI2* is Historical Religious Difference Index calculated when the ruler's religion is different from the minority religion. *Foreign Ruler* measures how many times a country in history is ruled by rulers originated from other countries. For the definition and the source of other controls see

Appendix A

contaminated by omitted variable bias. Countries may experience the religious differences as well as conflict due to various reasons such as invasion, migration or replacements of rulers by revolutions. These reasons may correlate with countries' economic, geographical and social conditions. Next, I will control variables on such conditions in the regressions.

In Table 2.2 Column 2 and 6 include continental dummies and variables on foreign ruler, biogeographical diversity of countries. Foreign ruler measures how many times in its history a country was governed by rulers that originated from other countries. This information comes from CAD and HPD datasets. This variable should mitigate concerns about the effect of invasion from religiously different rulers, as well as the effect of ethnic difference between rulers and citizens on conflict. Biogeographical diversity of countries may correlate with conflict and the religious difference through its effect on economy, institution and ethnic diversity. Countries that are more ethnically diverse may experience more religious difference between rulers and citizens. Ethnically diverse groups may be religiously different and compete in capturing the state to dominate each other. Also, ethnically diverse places could have been more vulnerable to invasion by an outside power. Empirical studies show that geographic factors such as land quality, elevation and latitude can determine ethno-linguistic fractionalization (Collard and Foley, 2002; Michalopoulos, 2012). The migratory distance from east Africa is also a significant predictor for genetic hence ethnic diversity (Ashraf and Galor, 2013a). Economically different places may receive different assignments of the religious differences, as well. Conflict theory predicts that the poor fight stronger than the rich because of the opportunity cost they face.²⁰ Thus, one can expect that economically better places may experience religious difference between rulers and population more often, holding other things constant. Empirical studies

²⁰ This is called “paradox of power” in the conflict literature. See (Hirshleifer, 1991).

establish that geographic factors that are related to temperature, disease environment and suitability for transportation matter for economic development (Sachs and Warner, 2001). The literature also argues that countries' geographic endowments may shape their institutions, which affects their economic development (Easterly and Levine, 2003). After controlling for continent dummies, foreign ruler and variables on biogeographical diversity, HRDI1 has yet no effect on the civil conflict. However, the coefficient of HRDI2 becomes positive and statistically significant at 10% level. R-squared value changes from 0.039 in Column 5 to 0.515 in Column 6.

Column 3 and 7 include historical factors such as transition to agriculture and colonialism. Such factors may also correlate with the religious differences and civil conflict through its effect on economy, institution and ethnic diversity. Empirical studies show that three historical factors may affect ethnic diversity. First, places that have a long human settlement history will have more ethnic diversity because they will be subject to more genetic and cultural drifts. Second, places that transitioned to agriculture earlier will have more ethnic diversity because such places will create state level institution earlier and therefore ethnicity is less needed as a device for provision of public goods. Third, colonization may have a homogenizing effect on colonial countries ethnic diversity through migration or state formation that is based on certain ethnic groups (Ahlerup and Olsson, 2012). These factors may affect economic and institutional outcomes, too. The agricultural transition determined by suitable plants and animals predicts present day developmental differences across countries (Olsson and Hibbs, 2005). Adding these controls does not change the effect of HRDI1, still statistically not significant; but it causes a small increase in the coefficient of HRDI2 and makes it statistically significant at a 5% level. The estimated coefficient of HRDI2 in column 9 suggests that one point increase in HRDI2 is associated with an increase of almost 2.5% of number of new civil conflict, a

relationship statistically significant at 5% level.

Columns 4 and 8 add variables on technology use in agriculture, military, transportation and communication sectors for the year 0 AC from Comin et al(2010) considering that the level of technology use may also affect economic, political and social outcomes which may correlate with the religious differences and the civil conflict. The results are similar. But, the sample size goes down from 142 to 127.

Column 9 includes both HRDI1 and HRDI2 together with the controls on the biogeographical factor, the historical factors and continent dummies. Again, the effect of HRDI2 is statistically significant at 5 % significance level. The coefficient suggest that in its history if a country experience one more religious difference between ruler and minority in one of those 15 intervals, it will experience almost 2.5% increase in new civil conflict today compared to a country where there is no religious difference between ruler and population.

Results from Table 2.2 establish that, rather than HRDI1, HRDI2 has positive and a significant effect on civil conflict. This is consistent with the model's predictions.

2.4.2 Do the Characteristics of Religions Matter?

According to the model, the accumulation of grievances also varies depending on the value of δ_d , which can be affected by the characteristics of religions that the ruler and the population have. If the ruler has an official state religion, the segment of the population who does not share the same religion with the ruler may resist more in paying their taxes because their religion is not favored by the ruler.²¹ δ_d can also be influenced by the missionary characteristics of religions because missionary religions are more absolutist and competitive with each other than non-missionary religions.

²¹ See Chapter 1 for the definition of state religion.

Table 2.3 shows the how historical religious difference between rulers and citizens affect the civil conflict when rulers have an official state religion. In Table 2.3 SHRDI1 and SHRDI2 indicate the historical religious difference between rulers and the majority of population and the difference between rulers and the minority of population, respectively while rulers have an official state religion. The general pattern in Table 2.2 is repeated here. Bivariate relationships in Columns 1 and 3 between SHRDI1, SHRDI2 and the civil conflict are insignificant. However, when the continent dummies and other control variables are added as in Columns 2 and 5, the coefficient of SHRDI2 becomes significant at 5% level. Although this result is similar to Column 7 of Table 2.2, the effect size goes up from 0.0243 to 0.0295 because of the likely effect through δ_d .

Table 2.3 OLS Estimates of Effect of SHRDI1 and SHRDI2 on PRIO25 Civil Conflict

VARIABLES	(1)	(2)	(3)	(4)	(5)
SHRDI1	0.00625 (0.00918)	-0.00168 (0.0111)			-0.00220 (0.0104)
SHRDI2			0.0291 (0.0199)	0.0295** (0.0121)	0.0296** (0.0121)
Observations	176	142	176	142	142
R-squared	0.002	0.587	0.037	0.618	0.618
Foreign Ruler	no	yes	no	yes	yes
Continent Dummy	no	yes	no	yes	yes
Geo&Bio Diversity	no	yes	no	yes	yes
Historical Factors	no	yes	no	yes	yes
Technology	no	no	no	no	no

Note: Robust standard errors clustered at UN region level are in parentheses. * represents p-values: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is logarithm of count of new civil conflicts in period 1960-2011, obtained from UCDP Armed Conflict Data. *SHRDI1* is Historical Religious Difference Index calculated when the ruler's religion is different from the majority religion and the ruler has an official state religion. *SHRDI2* is Historical Religious Difference Index calculated when the ruler's religion is different from the minority religion and the ruler has an official state religion. *Foreign Ruler* measures how many times a country in history is ruled by rulers originated from other countries. For the definition and the source of other controls see Appendix A.

Table 2.4 OLS Estimates of Effect of HRDI1 on PRIO25 Civil Conflict When Missionary Characteristics of Religions Taken into Account

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
missionaryVSnonmissionary	0.0395* (0.0199)	-0.0231* (0.0122)							-0.0232* (0.0125)	-0.0188 (0.0111)
missionaryVSmissionary			-0.00336 (0.00917)	0.0101 (0.0153)					0.0118 (0.0160)	0.0122 (0.0157)
nonmissionaryVSnonmissionary							-0.0505*** (0.0156)	-0.0499 (0.0319)	-0.0323 (0.0244)	-0.0264 (0.0182)
nonmissionaryVSmissionary					-0.0438*** (0.0142)	0.0368 (0.0230)			0.0449 (0.0289)	0.0117 (0.0308)
HRDI2										0.0215* (0.0107)
Observations	176	142	176	142	176	142	176	142	142	142
R-squared	0.079	0.601	0.001	0.590	0.010	0.591	0.010	0.591	0.613	0.631
Foreign Ruler	no	yes	no	yes	no	yes	no	yes	yes	yes
Continent Dummy	no	yes	no	yes	no	yes	no	yes	yes	yes
Geo&Bio Diversity	no	yes	no	yes	no	yes	no	yes	yes	yes
Historical Factors	no	yes	no	yes	no	yes	no	yes	yes	yes
Technology	no	no	no	no	no	no	no	no	no	no

Note: Robust standard errors clustered at UN region level are in parentheses. * represents p-values: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is logarithm of count of new civil conflicts in period 1960-2011, obtained from UCDP Armed Conflict Data. *missionaryVSnonmissionary* is Historical Religious Difference Index calculated when the ruler's religion is different from the majority religion and the ruler has missionary but the majority has non-missionary religion. *missionaryVSmissionary* is Historical Religious Difference Index calculated when the ruler's religion is different from the majority religion and both the ruler and the majority have missionary. *nonmissionaryVSnonmissionary* is Historical Religious Difference Index calculated when the ruler's religion is different from the majority religion and both the ruler and the majority have non-missionary. *nonmissionaryVSmissionary* is Historical Religious Difference Index calculated when the ruler's religion is different from the majority religion and the ruler has non-missionary but the majority has missionary religion. *HRDI2* is Historical Religious Difference Index calculated when the ruler's religion is different from the minority religion. *Foreign Ruler* measures how many times a country in history is ruled by rulers originated from other countries. For the definition and the source of other controls see the Appendix A.

Table 2.5 OLS Estimates of Effect of HRDI2 on PRIO25 Civil Conflict When Missionary Characteristics of Religions Taken into Account

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
missionaryVSnonmissionary	0.0483** (0.0178)	0.0376* (0.0214)							0.0391* (0.0211)
missionaryVSmissionary			-0.00343 (0.0207)	0.00818 (0.0174)					0.0123 (0.0159)
nonmissionaryVSmissionary					0.0430*** (0.0149)	0.0154 (0.0128)			0.0189 (0.0113)
nonmissionaryVSnonmissionary							-0.0481*** (0.00739)	0.0153 (0.0176)	0.0103 (0.0191)
Observations	176	142	176	142	176	142	176	142	142
R-squared	0.072	0.619	0.000	0.588	0.018	0.589	0.011	0.587	0.625
Foreign Ruler	no	yes	no	yes	no	yes	no	yes	yes
Continent Dummy	no	yes	no	yes	no	yes	no	yes	yes
Geo&Bio Diversity	no	yes	no	yes	no	yes	no	yes	yes
Historical Factors	no	yes	no	yes	no	yes	no	yes	yes
Technology	no	no	no	no	no	no	no	no	no

Note: Robust standard errors clustered at UN region level are in parentheses. * represents p-values: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is logarithm of count of new civil conflicts in period 1960-2011, obtained from UCDP Armed Conflict Data. *missionaryVSnonmissionary* is Historical Religious Difference Index calculated when the ruler's religion is different from the majority religion and the ruler has missionary but the minority has non-missionary religion. *missionaryVSmissionary* is Historical Religious Difference Index calculated when the ruler's religion is different from the majority religion and both the ruler and the minority have missionary. *nonmissionaryVSnonmissionary* is Historical Religious Difference Index calculated when the ruler's religion is different from the minority religion and both the ruler and the majority have non-missionary. *nonmissionaryVSmissionary* is Historical Religious Difference Index calculated when the ruler's religion is different from the minority religion and the ruler has non-missionary but the majority has missionary religion. *Foreign Ruler* measures how many times a country in history is ruled by rulers originated from other countries. For the definition and the source of other controls see Appendix A.

Table 2.4 shows the effect of the historical religious difference between the ruler and the majority of population (HRDI1) on the civil conflict when the missionary characteristics of the religions of the parties are taken into account. In Columns 1 and 2 when the ruler's religion is missionary but the majority's religion is non-missionary, HRDI1 has a positive and significant effect on the civil conflict in bivariate regressions, but adding the control variables changes its sign to negative, and it is still significant at 10% level. In column 3 and 4 when the religion of both the ruler and the majority is missionary, HRDI1 has no effect on the civil conflict. In Columns 5 and 6 when the ruler's religion is non-missionary but the religion of the majority is missionary, HRDI1 has a negative and significant effect on the civil conflict. But, this effect disappears when the control variables are included as in Column 6. In Columns 7 and 8 when the religion of both the ruler and the majority is non-missionary, HRDI1 has a negative and significant effect on the civil conflict.

However, this effect disappears when the controls are added to the regression as in Column 8. In column 9 all the above indices are included into the regression with the control variables; the effect of HRDI1 still survives and is significant at 10% level when the ruler has missionary but the majority has non-missionary religion. This negative effect might result from that the ruler's missionary religion homogenizes the population through conversion over time. Column 10 shows evidence of this because the conversion happens over time and most probably the former majority religion gradually becomes minority and then disappears gradually. If there is such a channel, the effect of HRDI1 should diminish when we add HRDI2 into the regression. The results in Column 10 support this expectation because adding HRDI2 to the regression makes this negative effect disappear while the effect of HRDI2 is still positive and significant.

I repeat the same exercise for HRDI2. Table 2.5 shows the effects of the historical

religious difference between rulers and minority (HRDI2) on the civil conflict when the missionary characteristics of the religions of the parties are taken into account. HRDI2 has positive and significant effect on the civil conflict in Column 1 and 2 in Table 2.5 when the ruler's religion is missionary but the majority's religion is non- missionary, similar to the results in Table 2.4.

The results in this section show that when state religion is taken into account in the calculation of the indices, (S)HRDI1 is yet not a significant predictor for the civil conflict, but (S)HRDI2 is with a higher coefficient. This is consistent with the model in a sense that whether rulers have official state religions affect accumulation of grievances and likelihood of conflict through δ_d . However, when missionary characteristics of religions taken into account in the calculation of the indices, HRDI1 becomes negative and significant predictor of the civil conflict if the religion of rulers is missionary, but that of majority is non-missionary. But, this effect disappears when HRDI2 (calculated without any categorization of religions in terms of being missionary or not) is added into regression, suggesting a religious conversion over time. On the other hand, HRDI2 which is calculated when the religion of rulers is missionary but that of minority is non-missionary has a positive and significant effect on conflict. These results are also consistent with the model's predictions and suggest that missionary characteristics may work through δ_d as well as n because of religious conversion.

2.4.3 Robustness

Robustness to different values for the weight parameter, ω . Previously, when calculating the indices I set ω equal to 1 since the deep root literature has not provided yet a theoretical guideline about what value ω should take. The natural tendency one may have is to

regard it as a time discount factor, and set its value to it accordingly.²² Following this intuition I choose $\omega \in \{.95, .80, .65, .50\}$. Previously, I divided the period between 1000 and 1950 into 15 intervals. For these intervals I calculate weight as follows. Let ω be .95, then for the year 1000, $\omega = (.95)^{15}$, for the year 1100, $\omega = (.95)^{14}$ and so on.²³

Table 2.6 shows the effects of HRDI2 and SHRDI2 when different values are assigned to ω in the calculation of these indices. The effect of HRDI2 disappears when ω is equal to .80 and lower. But, the effect of SHRDI2 survives even if ω is equal to .65

Robustness to elimination of countries UN regions. Now, I demonstrate if the results that I have shown are driven by influential observations in a certain region of the world. To do this, I drop countries based on United Nations' regions from the sample and estimate the coefficient of HRDI2 conditioning on continent dummies, foreign ruler, the biogeographical diversity and the historical factors as in Table 2.2 column 7. Results from this exercise are shown in Figure 3. When region 5, East African countries, is dropped, the 95% interval for the estimate becomes narrower. However, when region 15, South-central Asian countries, is excluded, the estimate becomes less precise, widening the 95% confidence interval.

Robustness to a different measure of conflict. In the conflict literature regression results are usually sensitive to alternative measures of conflict. Now, instead of PRIO25, I use PRIO1000 coding in UCDP Armed conflict dataset as a dependent variable. PRIO1000 includes only conflicts that resulted in at least 1000 battle related deaths per year.

²² Choosing a weight lower than one might be irrelevant in deep root context. If there is any deep root story ω should be some function of variables affecting persistence or non-persistence of cultural or institutional traits. Maybe, places that interact frequently with outside world should get less weight compared to isolated places, or maybe the characteristics of religions and quality of institutions influence persistence/non-persistence, hence the weight parameter most. For such examples see Voigtländer and Hans-Joachim (2012), (Alesina and Fuchs-Schundeln, 2007)).

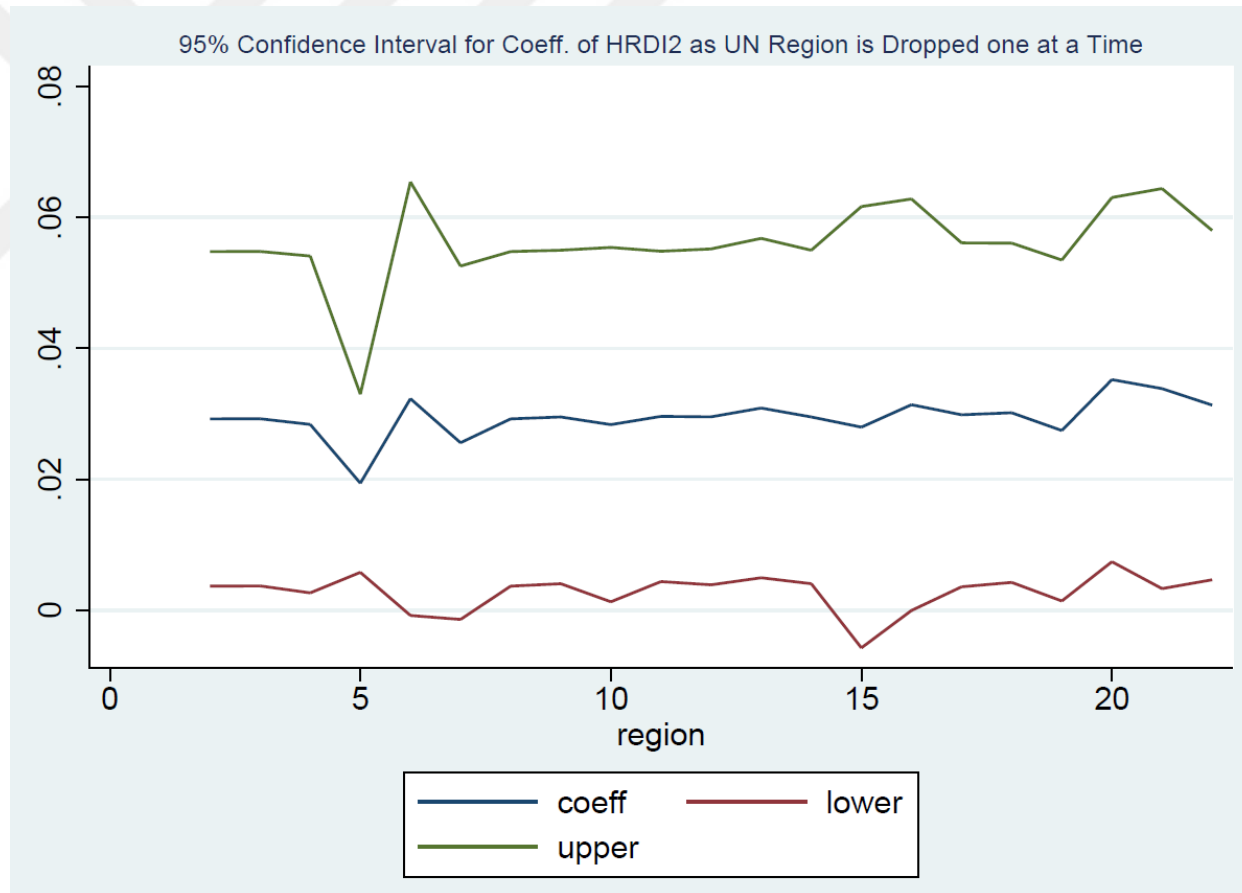
²³ Similar to (Bockstette et al., 2002).

Table 2.6 Robustness to changing the weight parameter ω in the calculation of HRDI2 and SHRDI2

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
HRDI2(ω =.50)	0.0531 (0.0931)									
HRDI2(ω =.65)		0.0647 (0.0555)								
HRDI2(ω =.80)			0.0534 (0.0319)							
HRDI2(ω =.95)				0.0320** (0.0152)						
HRDI2(ω =1)					0.0243** (0.0109)					
SHRDI2(ω =.50)						0.354 (0.257)				
SHRDI2(ω =.65)							0.212* (0.121)			
SHRDI2(ω =.80)								0.103* (0.0492)		
SHRDI2(ω =.95)									0.0420** (0.0178)	
SHRDI2(ω =1)										0.0295** (0.0121)
Observations	142	142	142	142	142	142	142	142	142	142
R-squared	0.588	0.592	0.600	0.612	0.616	0.598	0.604	0.609	0.616	0.618
Foreign Ruler	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Continent Dummy	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Geo&Bio Diversity	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Historical Factors	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Technology	no	no	no	no	no	no	no	no	no	no

Note: Robust standard errors clustered at UN region level are in parentheses. * represents p-values: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is logarithm of count of new civil conflicts in period 1960-2011, obtained from UCDP Armed Conflict Data. *HRDI2* is Historical Religious Difference Index calculated when the ruler's religion is different from the minority religion. *SHRDI2* is Historical Religious Difference Index calculated when the ruler's religion is different from the minority religion as well as ruler has official state religion *Foreign Ruler* measures how many times a country in history is ruled by rulers originated from other countries. For the definition and the source of other controls see Appendix A.

Figure 3 Robustness to Elimination of Countries Based on UN Regions



Note: UN regions are: 1. Antarctica, 2.Australia/New Zealand, 3.Caribbean, 4.Central America, 5.East Africa, 6.East Asia, 7.Eastern Europe, 8.Melanesia, 9.Micronesia, 10.Middle Africa, 11.Northern Africa, 12.Northern America, 13.Northern Europe,14.Polynesia, 15.South-central Asia, 16.South-eastern Asia, 17.South America, 18.Southern Africa, 19.Southern Europe, 20.Istern Africa, 21.Istern Asia, 22.Eestern Europe

Table 2.7 Robustness to a Different Measure of Civil Conflict - PRIO1000 Civil Conflict

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
HRDI1	0.0113 (0.00843)	-0.00193 (0.00958)	-0.00495 (0.00989)	-0.00359 (0.0107)					-0.00326 (0.00795)
HRDI2					0.0223* (0.0112)	0.0232* (0.0119)	0.0249* (0.0121)	0.0251* (0.0124)	0.0247* (0.0119)
Observations	176	147	142	127	176	147	142	127	142
R-squared	0.022	0.369	0.422	0.485	0.065	0.426	0.484	0.544	0.485
Foreign Ruler	no	yes	yes	yes	no	yes	yes	yes	yes
Continent Dummy	no	yes	yes	yes	no	yes	yes	yes	yes
Geo&Bio Diversity	no	yes	yes	yes	no	yes	yes	yes	yes
Historical Factors	no	no	yes	yes	no	no	yes	yes	yes
Technology	no	no	no	yes	no	no	no	yes	no

Note: Robust standard errors clustered at UN region level are in parentheses. * represents p-values: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is logarithm of count of new civil conflicts in period 1960-2011, obtained from UCDP Armed Conflict Data. *HRDI1* is Historical Religious Difference Index calculated when the ruler's religion is different from the majority religion. *HRDI2* is Historical Religious Difference Index calculated when the ruler's religion is different from the minority religion. *Foreign Ruler* measures how many times a country in history is ruled by rulers originated from other countries. For the definition and the source of other controls see the Appendix A.

Table 2.7 presents results where the dependent variable is the number of new PRIO1000 civil conflict during the period 1960-2011. These results are largely similar to the results from Table 2.2 where the dependent variable was the number of new PRIO25 civil conflict for the same period. In Table 2.7 HRDI1 is not a significant predictor of PRIO1000 civil conflict. However, HRDI2 has a positive and significant effect on the civil conflict even in bivariate regressions as in Column 5.

2.4.4 Evidence on Mediating Channels

So far I have not included typical determinants of civil conflict that the literature uses in analyzing civil conflict such as GDP, current population and current polity characteristics because these variables themselves could be dependent variables explained by HRDI2. However, including these variable leads to bias in estimates.²⁴ Despite that, I include these variables into regression to assess whether the effect of HRDI2 are working through these variables. If inclusion of these variables leads to a decline in the coefficient of HRDI2 in the regressions, and a substantial increase in R-squared value, this would suggest that these determinants are the channels through which HRDI2 is affecting the civil conflict.²⁵ I include them one at a time and all together. For time variant variables such as GDP and democracy, I take the period (1960-2011) average.

Table 2.8 shows the result from this exercise. Including these variables one at a time does not change the coefficient much, but when I include them all together as in Column 12 the coefficient of HRDI2 becomes statistically insignificant.

²⁴ This is known as the bad control problem. For more detail see Angrist and Pischke, (2008, p. 64)

²⁵ For a similar exercise see Maccini and Yang (2009)

Table 2.8 HRDI2 and PRIO25 Civil Conflict- Mediating Channels

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
HRDI2	0.0236** (0.0110)	0.0257* (0.0144)	0.0283* (0.0147)	0.0235** (0.0111)	0.0251** (0.0107)	0.0229* (0.0110)	0.0233* (0.0114)	0.0222* (0.0112)	0.0205* (0.0115)	0.0244** (0.0112)	0.0241** (0.0109)	0.0162 (0.00999)
Observations	137	103	103	137	137	137	137	137	136	137	137	136
R-squared	0.571	0.703	0.707	0.572	0.582	0.578	0.572	0.583	0.585	0.579	0.573	0.597
Continent Dummy	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no
Foreign Ruler	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no
Geo&Bio Diversity	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Historical Factors	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Autocracy											yes	yes
Democracy										yes		yes
Executive									yes			yes
Constraint												
Average GDP per Capita								yes				yes
Average Oil Production							yes					yes
Average Population						yes						yes
Ethnic Fractionalization					yes							yes
Ethnic Fractionalization				yes								yes
Religious Polarization			yes									no
Ethnic Polarization		yes										no

Note: Robust standard errors clustered at UN region level are in parentheses. * represents p-values: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is logarithm of count of new civil conflicts in period 1960-2011, obtained from UCDP Armed Conflict Data. *HRDI2* is Historical Religious Difference Index calculated when the ruler's religion is different from the minority religion. *Foreign Ruler* measures how many times a country in history is ruled by rulers originated from other countries. These well-known determinants of civil conflict come from (Fearon and Laitin, 2003; Wimmer et al., 2009). For the definition and the source of other controls see Appendix A.

2.5 Conclusion

This chapter analyzes the link between the civil conflict and the historical religious difference between ruler and the segments of population theoretically and empirically. I develop a political economy model in which the ruler's choice of public good and the access to it in a religiously segmented economy is linked to conflict through grievances. In the model the accumulation of grievances varies depending on population of different religious groups as well as their compliance in the tax collection process. The model predicts that the case in which the religion of rulers is different from that of minority is more conducive to grievances and conflict than the case in which the religious difference is between rulers and the majority if rulers care more about their staying in power and enjoying their future revenue.

To test the implications of the model, I use cross-country data on civil conflict as well as data on geographical and historical characteristics of each country. In addition, I use a new dataset that contains information on the religious and political histories of each country since the year 1000. Using this dataset I construct the historical religious difference indices in the light of the model to serve as proxy for accumulated grievances.

Empirical specifications using the variation in these indices establish that the frequency of new civil conflict in the post-1960 period was significantly higher in societies that have historically had minority religions that differed from the religions of the rulers and that the effect depended on the characteristics of religions.

In future studies, the empirical associations found here should be challenged by studies with clear identification strategies to find causal effects. Also, the theoretical model formulated

here can be extended by allowing religious conversion over time, productivity differences across religious groups, and endogenous choice of religion by the ruler.



References

- Acemoglu, Daron. "Politics and Economics in Weak and Strong States." *Journal of monetary Economics* 52.7 (2005): 1199–1226.
- Acemoglu, Daron, Simon Johnson, and James A. Robinson. "The Colonial Origins of Comparative Development: An Empirical Investigation." *American Economic Review* 91.5 (2001): 1369–1401.
- Ahlerup, Pelle, and Ola Olsson. "The Roots of Ethnic Diversity." *Journal of Economic Growth* 17.2 (2012): 71–102.
- Alesina, Alberto, and Nicola Fuchs-Schundeln. "Good-Bye Lenin (or Not?): The Effect of Communism on People's Preferences." *American Economic Review* 97.4 (2007): 1507–1528.
- Andreoni, James, Brian Erard, and Jonathan Feinstein. "Tax Compliance." *Journal of Economic Literature* 36.2 (1998): 818–860.
- Angrist, Joshua D., and Jörn-Steffen Pischke. *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton university press, 2008.
- Arbatli, Cemal Eren, Quamrul H. Ashraf, and Oded Galor. The Nature of Conflict. No. w21079. National Bureau of Economic Research, 2015. Ashraf, Quamrul and Oded Galor. 2013. "Genetic Diversity and the Origins of Cultural Fragmentation." *American Economic Review*, 103(3): 528-33.
- Barro, Robert J. "Government Spending in a Simple Model of Endogenous Growth." *Journal of Political Economy* 98.S5 (1990): 103-125.
- Basedau, Matthias, Birte Pfeiffer, and Johannes Vüllers. "Bad Religion? Religion, Collective Action, and the Onset of Armed Conflict in Developing Countries." *Journal of Conflict Resolution* (2014):226-255.
- Besley, Timothy, and Torsten Persson. "State Capacity, Conflict, and Development." *Econometrica* 78.1 (2010): 1–34.
- Blattman, Christopher, and Edward Miguel. "Civil War." *Journal of Economic Literature* 48.1 (2010): 3–57.

- Bockstette, Valerie, Areendam Chanda, and Louis Putterman. "States and Markets: The Advantage of an Early Start." *Journal of Economic Growth* 7.4 (2002): 347–369.
- Cederman, Lars-Erik, Kristian Skrede Gleditsch, and Halvard Buhaug. *Inequality, Grievances, and Civil War*. Cambridge University Press, 2013.
- Collard, Ian F., and Robert A. Foley. "Latitudinal Patterns and Environmental Determinants of Recent Human Cultural Diversity: Do Humans Follow Biogeographical Rules?" *Evolutionary Ecology Research* 4.3 (2002): 371–383.
- Collier, Paul, and Anke Hoeffler. "Greed and Grievance in Civil War." *Oxford Economic Papers* 56.4 (2004): 563–595.
- Comin, Diego, William Easterly, and Erick Gong. "Was the Wealth of Nations Determined in 1000 BC?" *American Economic Journal: Macroeconomics* 2.3 (2010): 65–97.
- Coşgel, Metin M., Thomas J. Miceli, and Jared Rubin. "Political Legitimacy and Technology Adoption." *Journal of Institutional and Theoretical Economics JITE* 168.3 (2012): 339–361.
- Coşgel, Metin, and Thomas J. Miceli. "State and Religion." *Journal of Comparative Economics* 37.3 (2009): 402–416.
- Depetris-Chauvin, Emilio. "Local State History and Contemporary Conflict: Evidence from Sub-Saharan Africa." *Brown University Working Paper*, 2013.
- Easterly, William, and Ross Levine. "Tropics, Germs, and Crops: How Endowments Influence Economic Development." *Journal of Monetary Economics* 50.1 (2003): 3–39.
- Engerman, Stanley L., and Kenneth L. Sokoloff. "Factor Endowments, Institutions, and Differential Paths of Growth among New World Economies." *How Latin America Fell Behind* (1997): 260–304.
- Esteban, Joan, Laura Mayoral, and Debraj Ray. "Ethnicity and Conflict: An Empirical Study." *The American Economic Review* (2012): 1310–1342.
- Fearon, James D., and David D. Laitin. "Ethnicity, Insurgency, and Civil War." *American Political Science Review* 97.1 (2003): 75–90.
- Garfinkel, Michelle R., and Stergios Skaperdas. "Economics of Conflict: An Overview.", *Handbook of Defense Economics*. Ed. Todd Sandler and Keith Hartley. Vol. 2. Elsevier, 2007. 649–709.

- Gleditsch, Nils Petter et al. "Armed Conflict 1946-2001: A New Dataset." *Journal of Peace Research* 39.5 (2002): 615–637.
- Grim, Brian J., and Roger Finke. *The Price of Freedom Denied: Religious Persecution and Conflict in the Twenty-First Century*. Cambridge University Press, 2010.
- Gurr, Ted Robert. "Why Minorities Rebel: A Global Analysis of Communal Mobilization and Conflict since 1945." *International Political Science Review* 14.2 (1993): 161–201.
- Gurr, Ted Robert. *Why Men Rebel*. Princeton University Press, 1970.
- Harbom, Lotta, and Peter Wallensteen. "Armed Conflict, 1989-2011." *Journal of Peace Research* 49.4 (2012).
- Hirshleifer, Jack. "The Paradox of Power." *Economics & Politics* 3.3 (1991): 177–200.
- Horowitz, Donald L. *Ethnic Groups in Conflict*. University of California Press, 1985.
- Huntington, Samuel P. "The Clash of Civilizations?." *Foreign Affairs*, Summer, 1993.
- La Porta, Rafael et al. "Legal Determinants of External Finance." *The Journal of Finance* 52.3 (1997): 1131–1150.
- Maccini, Sharon, and Dean Yang. "Under the Weather: Health, Schooling, and Economic Consequences of Early-Life Rainfall." *American Economic Review* 99.3 (2009): 1006–1026.
- Michalopoulos, Stelios. "The Origins of Ethnolinguistic Diversity." *The American Economic Review* 102.4 (2012): 1508.
- Mitra, Anirban, and Debraj Ray. "Implications of an Economic Theory of Conflict: Hindu-Muslim Violence in India." *Journal of Political Economy* 122.4 (2014): 719–765.
- Montalvo, Jose G., and Marta Reynal-Querol. "Ethnic Polarization, Potential Conflict, and Civil Wars." *American Economic Review* 95.3 (2005): 796–816.
- Nunn, Nathan. "Historical Development." *Handbook of Economic Growth* 2 (2014): 347-402.
- Olsson, Ola, and Douglas A. Hibbs. "Biogeography and Long-Run Economic Development." *European Economic Review* 49.4 (2005): 909–938.
- Persson, Torsten, and Guido Tabellini. "Democratic Capital: The Nexus of Political and Economic Change." *American Economic Journal: Macroeconomics* 1.2 (2009): 88–126.
- Sachs, Jeffrey D., and Andrew M. Warner. "The Curse of Natural Resources." *European economic review* 45.4 (2001): 827–838.

- Sambanis, Nicholas. "What Is Civil War? Conceptual and Empirical Complexities of an Operational Definition." *Journal of Conflict Resolution* 48.6 (2004): 814–858.
- Spolaore, Enrico, and Romain Wacziarg. "How Deep Are the Roots of Economic Development?" *Journal of Economic Literature* 51.2 (2013): 325–369.
- Stokey, N. L., R. E. Lucas, and E. C. Prescott. *Recursive Methods in Dynamic Economics*. Cambridge, MA: Harvard University Press, 1989.
- Voigtländer, Nico, and Hans-Joachim Voth. "Persecution Perpetuated: The Medieval Origins of Anti-Semitic Violence in Nazi Germany." *Quarterly Journal of Economics* 127.3 (2012): 1339–1392.
- Wimmer, Andreas, Lars-Erik Cederman, and Brian Min. "Ethnic Politics and Armed Conflict: A Configurational Analysis of a New Global Data Set." *American Sociological Review* 74.2 (2009): 316–337.

Appendix A

A.1 Derivation of Proposition 1

- i. To show that the change in n has an ambiguous effect on the equilibrium value of k^* , it is enough to show the following. Remember that k^* and p^* are not a function of A .

$$\frac{dk^*}{dn} = - \frac{\frac{\partial}{\partial n} \left(\frac{f(M(k^*))}{(1-F(M(k^*)))} \right) h(k^*) + \frac{f(M(k^*))}{(1-F(M(k^*)))} \frac{\partial}{\partial n} (h(k^*)) - \frac{\partial}{\partial n} \left(\frac{\tau(S-D)}{2(1-n)} \right)}{\frac{\partial}{\partial k} \left(\frac{f(M(k^*))}{(1-F(M(k^*)))} h(k^*) - \left(\frac{\tau(S-D)}{2(1-n)} \right) \right)} > 0 \text{ or } < 0 \quad (\text{A1})$$

By the implicit differentiation of equation (25). First, note that in the text we showed that the denominator in (A1) is positive due to monotone hazard rate and the legitimacy assumption of $\delta_d > \delta_s$. The effect of change in n on k is ambiguous. To see this

$$\frac{d}{dn} \left(\frac{f(M(k^*))}{(1-F(M(k^*)))} \right) < 0 \text{ by monotone hazard rate.} \quad (\text{A2})$$

On the other hand,

$$\begin{aligned} \frac{dh}{dn} = \frac{\alpha}{1-\alpha} \tau \{ (1-\delta_s)k^* + (1-\delta_d)(1-k^*) \left(1 + \frac{\phi-1}{\phi} \frac{\beta(1-F(M(k^*)))}{1-\beta(1-F(M(k^*)))} \right) \} \\ + \{ \frac{\phi}{\phi-\beta(1-F(M(k^*)))} \frac{\beta(1-F(M(k^*)))}{1-\beta(1-F(M(k^*)))} \frac{1}{2} (2k^*-1)(\delta_d-\delta_s) \} \end{aligned} \quad (\text{A3})$$

That is, $\frac{dh}{dn} > 0$, because at the equilibrium $k^* > \frac{1}{2}$

To derive (A3), first take derivative of h with respect to n , and then replace $f(M(k^*))$ with its expression in (24))

$$\text{ii. } \frac{dk^*}{d\delta_d} = - \frac{\left(\frac{\alpha}{1-\alpha} (1-n)(k^*-1) \left(1 + \frac{\phi-1}{\phi} \frac{\beta(1-F(M(k^*)))}{1-\beta(1-F(M(k^*)))} \right) \frac{f(M(k^*))}{(1-F(M(k^*)))} \right) - \frac{1}{2}}{\frac{\partial}{\partial k} \left(\frac{f(M(k^*))}{(1-F(M(k^*)))} h(k^*) - \left(\frac{\tau(S-D)}{2(1-n)} \right) \right)} > 0 \quad (\text{A4})$$

By the implicit differentiation of equation (25)

iii.
$$\frac{dp^*}{dn} = \frac{\partial p}{\partial k} \cdot \frac{dk}{dn} + \frac{\partial p}{\partial n} < 0 \text{ or } > 0$$

Remember $p^* \equiv F(M(k^*))$ where $M(k^*) = \frac{(1-n)\alpha}{1-\alpha}(2k^* - 1)$. Then $\frac{\partial p}{\partial k} > 0$ and $\frac{\partial p}{\partial n} < 0$. Also

$\frac{dk}{dn} > 0$ or < 0 is shown in (A3)

iv.
$$\frac{dp^*}{d\delta_d} = \frac{\partial p}{\partial k} \cdot \frac{dk}{d\delta_d} > 0$$

$\frac{\partial p}{\partial k} > 0$ as above in (iii) and $\frac{dk}{d\delta_d} > 0$ which is shown in (A4)



A.2 Appendix Tables

Table 2A.1 Religions in Historical Polities Dataset

Category	Religion	Characteristics	religion_code
Traditional/Indigenous	Traditional Africa	I	40
	Western Hemisphere indigenous religion	I	50
	N. American indigenous religion	I	51
	Caribbean indigenous religion	I	52
	Meso American indigenous religion	I	53
	S. American indigenous religion	I	54
	Mesoamerican (Aztec and Mayan)	I	61
	Native Andean	I	62
	Pre-Christian European	I	70
	Aboriginal Oceania Religion	I	230
Eastern	Native/Local Asian religion	I	20
	hindu	E	130
	jainism	E	140
	sikh	E	150
	buddhist	M	160
	chinese_folk_religion	E	171
	confucian	E	172
	taoism (daoism)	E	173
	Japan (Shinto)	E	110
	Tengrism	I	220
Abrahamic	Shamanism	I	240
	jewish	E	190
	christian_catholic	M	201
	christian_orthodox	M	202
	christian_protestant	M	203
	Christianity (Anglican)	M	205
	Christianity (other)	M	209
	islam_shia	M	211
	islam_sunni	M	212
	Islam_Karijite	M	213
None	Secular/Non-religion	M	300

Note: E: Ethnic religion, I: Indigenous religion, M: Missionary religion

Table 2A. 2 Descriptive Statistics

VARIABLES	mean	sd	min	max
Average new civil conflict for the period 1960-2011	0.251	0.643	0	4
Ruler vs. Majority				
HRDI1	4.193	4.486	0	15
SHRDI1	2.316	3.564	0	13
missionaryVSnonmissionary	1.594	3.444	0	15
missionaryVSmissionary	2.208	3.308	0	13
nonmissionaryVSnonmissionary	0.179	0.927	0	9
nonmissionaryVSmissionary	0.184	1.118	0	10
Ruler vs. Minority				
HRDI2	2.665	3.828	0	15
SHRDI2	1.344	3.045	0	15
missionaryVSnonmissionary	0.882	2.552	0	15
missionaryVSmissionary	1.373	2.432	0	11
nonmissionaryVSnonmissionary	0.118	0.993	0	10
nonmissionaryVSmissionary	0.274	1.448	0	15
Geo&Bio Diversity				
Migratory distance from East Africa	9.591	7.319	0	26.77
Total land area	634,088	1.769e+06	1.950	1.638e+07
Absolute latitude	25.78	17.20	1	72
Percentage of arable land	14.78	13.67	0.0400	62.10
Mean land quality	0.371	0.248	0	0.960
Mean elevation	0.505	0.472	0.00100	2.674
Dispersion in elevation	0.370	0.347	0	1.921
Roughness of terrain	0.208	0.189	0.00350	1.242
Temperature	18.67	8.668	-19.45	28.64
Precipitation	94.78	66.70	2.911	379.3
Distance to nearest waterway	0.338	0.466	0.00795	2.386
Variation in land quality	0.199	0.0898	0.000753	0.396
Dispersion in elevation	1.745	1.399	0.0434	6.176
Disease richness	208.5	13.07	186	248
Island nation dummy	0.0470	0.212	0	1
Landlocked dummy	0.245	0.432	0	1
Historical Factors				
Population at year 1000	1.818e+06	7.850e+06	2	6.600e+07
Settlement duration	6.245	4.835	0.120	16
Duration as colony	1.188	1.844	0	11.45
Years since Neolithic Revolution (Ancestry adjusted)	5,514	2,102	1,357	10,400
Technology Use at year 0 AD				
Agriculture	0.951	0.217	1.49e-08	1
Communications	0.469	0.501	1.49e-08	1
Transportations	0.556	0.440	1.49e-08	1
Military	0.810	0.394	1.49e-08	1
Industry	0.923	0.200	1.49e-08	1
Foreign Ruler	13	4.113	3	16

Table 2A. 3 Estimates of Effect of HRDI1 and HRDI2 on PRIO25 Civil Conflict-Poisson Regression

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
HRDI1	0.0738 (0.0476)	-0.0963 (0.0594)	-0.0736 (0.0607)				-0.0563 (0.0658)
HRDI2				0.124*** (0.0430)	0.148** (0.0660)	0.125 (0.0771)	0.116 (0.0873)
Observations	176	147	142	176	147	142	142
Foreign Ruler	no	yes	yes	no	yes	yes	yes
Continent Dummy	no	yes	yes	no	yes	yes	yes
Geo&Bio Diversity	no	yes	yes	no	yes	yes	yes
Historical Factors	no	no	yes	no	no	yes	yes
Technology	no	no	no	no	no	no	yes

Note: Robust standard errors clustered at UN region level are in parentheses. * represents p-values: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is count of new civil conflicts in period 1960-2011, obtained from UCDP Armed Conflict Data. *HRDI1* is Historical Religious Difference Index calculated when the ruler's religion is different from the majority religion. *HRDI2* is Historical Religious Difference Index calculated when the ruler's religion is different from the minority religion. *Foreign Ruler* measures how many times a country in history is ruled by rulers originated from other countries. For the definition and the source of other controls see Appendix A.

A.3 Definitions of Variables and their Sources

Dependent Variable

Count of New Civil Conflict: number of new civil conflict according to PRIO25 and PRIO1000 codings of UCDP armed conflict dataset between year 1960 and 2011. These come from Gleditsch et al.,2002; Harbom and Wallensteen, 2012.

Independent Variables

HRDI: generic form of historical religious difference index between rulers and population is as follows:

$$HRDI_i = \sum_{t=1}^{15} \omega^{15-t} R_{it}$$

where $t = 1$ (year 1000), 2 (year 1100) ... 15 (year 1950), i indexes country, and R_{it} is a binary variable equal to 1 if the ruler has religion different from that of citizens in country i at interval t . ω is a weight parameter, and it is initially set equal to 1. We calculated various form of this index as follows

HRDI1: Historical religious difference index that shows historical religious difference between rulers and the majority.

HRDI2: Historical religious difference index that shows historical religious difference between rulers and the minority.

SHRDI1: Historical religious difference index that shows historical religious difference between rulers and the majority when rulers have official state religion.

SHRDI2: Historical religious difference index that shows historical religious difference between rulers and the minority when rulers have official state religion.

missionaryVSnonmissionary is Historical religious difference index calculated when the ruler has missionary but the majority/minority has non-missionary religion

missionaryVSmissionary is Historical religious difference index calculated when the ruler has missionary and the majority/minority has missionary religion

nonmissionaryVSnonmissionary is Historical religious difference index calculated when the ruler has non-missionary and the majority/minority has non-missionary religion

nonmissionaryVSmissionary is Historical Religious Difference Index calculated when the ruler has non-missionary but the majority/minority has missionary religion

Foreign Ruler measures how many times a country in history is ruled by rulers originated from other countries.

Geographic and Bio Diversity and Historical Factors

Variables related biogeographical diversity and historical factors were taken from (Ashraf and Galor, 2013a, 2013b) and are openly available at <https://www.aeaweb.org/articles.php?doi=10.1257/aer.103.1.1> . and <https://www.aeaweb.org/articles.php?doi=10.1257/aer.103.3.528>. For more detailed explanations of these variables see (Ashraf and Galor, 2013b).

Migratory distance from East Africa: The great circle distance from Addis Ababa, Ethiopia to a country's modern capital city ((Ashraf and Galor, 2013b).

Total land area: The total land area of a country, in millions of square kilometers, as reported for the year 2000 by the World Bank's World Development Indicators online.

Absolute latitude: The absolute value of the latitude of a country's geodesic centroid, as reported on the Gothos website.

Percentage of arable land: The fraction of a country's total land area that is arable, as reported for the year 2000 by the World Bank's World Development Indicators online.

Mean land quality: A geospatial index of the suitability of land for agriculture (Michalopoulos, 2012; Ramankutty et al., 2002)

Mean elevation: The average elevation of a country, in thousands of kilometers above sea level (New et al., 2002; Nordhaus, 2006).

Variation in elevation: The standard deviation of elevation within a country's national borders (New et al., 2002; Nordhaus, 2006).

Roughness of terrain: The degree of terrain roughness of a country (New et al., 2002; Nordhaus, 2006)

Temperature: The average monthly temperature of a country, in units of ten degrees Celsius per month, over the 1961.1990 time period (New et al., 2002; Nordhaus, 2006).

Precipitation The average monthly precipitation of a country, in units of ten millimeters per month, over the 1961.1990 time period(New et al., 2002; Nordhaus, 2006).

Distance to nearest waterway: The distance, in thousands of kilometers, from a geospatial grid cell to the nearest ice-free coastline or sea-navigable river, averaged across the grid cells that are located within a country's national borders(Gallup et al., 1999).

Variation in land quality: The standard deviation of the agricultural suitability index (as discussed above) across the grid cells (at a half-degree resolution) that are located within a country's national borders (Michalopoulos, 2012; Ramankutty et al., 2002).

Dispersion in elevation: The difference between the maximum and minimum values of elevation across the grid cells (at a 1-degree resolution) that are located within a country's national borders (New et al., 2002; Nordhaus, 2006).

Island nation dummy: An indicator for whether or not a country shares a land border with any

other country, as reported by the CIA's World Factbook online

Landlocked dummy: An indicator for whether or not a country is landlocked, as reported by the CIA's World Factbook online.

Historical Factors

Population at year 1000; Population density at year 1000 AD: Population density (in persons per square km) for a given year is calculated as population in that year, as reported by McEvedy and Jones (1978), divided by total land area, as reported by the World Bank's World Development Indicators ((Ashraf and Galor, 2013b).

Settlement duration: The maximum duration, in tens of thousands of years, of uninterrupted settlement by anatomically modern humans across locations within a country's modern national borders (Ahlerup and Olsson, 2012)

Duration as colony: Duration as colony. The duration, in centuries, of experience by a country (or any sub-region thereof) as a colony of one or more colonial powers, including the United Kingdom, France, Spain, Portugal, the Netherlands, Belgium, Italy, Germany, and the United States (Ashraf and Galor, 2013a)

Years since Neolithic Revolution (Ancestry adjusted): The number of thousand years elapsed (as of the year 2000) since the majority of the population residing within a country's modern national borders began practicing sedentary agriculture as the primary mode of subsistence. This measure, reported by (Putterman, 2008; Putterman and Weil, 2010)

Technology Use

Technology use data come from (Comin et al., 2010). For more detail on these variables see (Comin et al., 2010). This data is openly available at <https://www.aeaweb.org/articles.php?doi=10.1257/mac.2.3.65>

Agriculture: average technology adoption in agriculture (a2) in period at 0 AD

Communication: average technology adoption in communications (c2) in period 0 AD

Transportation: average technology adoption in transportation (t2) in period 0 AD

Military: average technology adoption in military (mt2) in period 0 AD

Industry: average technology adoption in industry (mw2) in period 0 AD

**3. CHAPTER 3: RELIGIOUS ROOTS OF CURRENT
STATE CAPACITY AND ECONOMIC
DEVELOPMENT ACROSS COUNTRIES**



3.1 Introduction

Although there is a growing consensus among scholars on the importance of the state capacity for economic development, the question of why political rulers should have incentive to invest such capacity has not been fully explored yet. According to Tilly (1985), one of the pioneers of the field, the state capacity has evolved over centuries in response to external wars. Wars made rulers to invest institutions that help them increase their tax revenue to finance those wars. Religion may also play role in emergence or non-emergence of such capacity. Recently, Alesina et al(2003) in a cross-country empirical analysis show that religious diversity is positively associated with public good provisions and the quality of government, which are the certain aspects of the state capacity. They explain this finding by the fact that the developed countries have higher religious freedom, hence higher religious diversity. Endogeneity is apparent in this explanation. This also raises the question of whether the religious segmentation of population provides any incentive or disincentive for political rulers to make any investment on the state capacity that are crucial for economic development. Moreover, in the long-term perspective can we argue that the state capacity has evolved over time as a result of political rulers' response to religious segmentation of population?

A body of literature in political science argues that the state capacity is crucial for economic development. Migdal (1988, p. 33) says "In parts of the Third World, the inability of state leaders to achieve predominance in large areas of their countries has been striking...". Evan (1995) attributes economic success of East Asian countries to their state capacity. Similarly, Herbst ((Herbst, 2000) attributes economic failure of African countries to their lack of state capacity. These types of arguments have been supported by empirical studies (Acemoglu et al.,

2015; Gennaioli and Rainer, 2007; Michalopoulos and Papaioannou, 2013).

In this chapter I will argue that the religious segmentation of population affects the rulers' choice of state capacity and that such capacity is essential for economic development. I will empirically examine the validity of these arguments using a historical dataset. I conceptualize state capacity as the presence of legal capacity, bureaucratic and administrative capacity, and infrastructural capacity.²⁶ This reflects the one aspect of Mann's conceptualization of "infrastructural power" of state (Mann, 1986; Soifer, 2008). Extending the political economy model developed in Chapter 2, I explore in detail the ruler's choice of A_t , which is the capacity that shapes the private production and total output in the economy, and interpret it as the state capacity conceptualized here, and examine the way such capacity is affected by the historical religious differences between the political rulers and segments of population. As discussed in Chapter 2, the ruler may favor co-religionist group in his choice because of the higher tax revenue he may expect to receive from co-religionists through the higher tax compliance due to the greater legitimacy that shared religion may provide. This differential treatment creates grievances among disfavored group and may create conflict at some point as the accumulation of historical grievances motivate the disfavored group to fight against the ruler if the cost of fighting is reasonably low. Depending on the replacement threat the ruler may be encouraged or discouraged to invest in the state capacity (A_t). Ruler's decision and replacement threat will be the function of the characteristics of religions and the size of religious groups in the economy.

To examine the model's implication empirically, I use the Historical Religious Difference Index (HRDI) constructed from the Historical Politics Data (HPD) and Country Ancestry Data (CAD) as in Chapter 2. HRDI captures the historical religious differences between the rulers and

²⁶ For a discussion about the measurements of state capacity, see (Savoia and Sen, 2012)

the population since the year 1000 and serves as a proxy for accumulated grievances, hence the probability of replacement. I also use data on the state capacity and economic development from Quality of Government Dataset, which contains variables on the quality of government institutions as well as the well-being of people such as the quality of infrastructure, corruption, the effectiveness of bureaucracy, schooling, GDP per capita and so on. Empirical findings establish that countries that have historically had majority religions that differed from the religions of the rulers have significantly lower state capacity measured as legal capacity, bureaucratic and administrative capacity, and infrastructural capacity. The findings also shows that countries that have experienced more religious difference between the rulers and the majority have lower GDP per capita, literacy rate and primary school attainment, and higher infant mortality rate.

My approach is related to the literature that regards state capacity as tax or fiscal capacity and examines how such capacity has evolved over time in response to external wars (Besley and Persson, 2010; Dincecco, 2009; Gennaioli and Voth, 2015; Tilly et al., 1985). Although my approach considers tax capacity as exogenous and dependent on religious legitimacy, it overlaps with this literature through the fact that fiscal capacity also requires the capacity that makes the economy more productive through such things as laws, ports, and roads. Such complementarity between fiscal capacity and the productive capacity is pointed out by Besley and Persson (2010). Further, in this literature Besley and Persson (2010) suggest that state-capacity will be deterred if each group who competes for controlling the state's power perceives that the capacity that they created will be used against them in the future. Differently, in this chapter, I argue that state capacity will be deterred when the ruler's religion differs from the citizens'. A Self-interested ruler may discriminate against religiously different group by switching the availability of public

good to the co-religionist group to extract more revenue due to the higher legitimacy working through citizens' tax compliance. This in return may motivate the disfavored group to replace the ruler, which puts the ruler's return from investing in the state capacity into risk, hence deters him to make such investment.

My approach is also related to standard macro view of government's role in economic growth through productive investment in infrastructures (Barro, 1990; Barro and Sala-I-Martin, 1992). However this literature does not endogenize the ruler's incentive to make such investments. I contribute this literature by tying the ruler's investment choice of infrastructure to religious difference between the ruler and the population.

My approach is also related to literature on public good provision in ethnically and religiously diverse societies. Some researchers have found that ethnic heterogeneity has a negative effect of on public goods provision and poor government performance (Alesina et al., 2003, 1999; Easterly and Levine, 1997; Porta et al., 1999). The mechanism identified by the literature is that the provision of public good in a diverse society will be low in quality because the groups in a diverse society will differ in preferences and face a collective action problem in the provision of public goods.²⁷ One may incline to expand this argument to religious diversity, as well. However, Alesina et al (2003) show, in cross-country regressions, that religious diversity has a positive association with the quality of public goods and government, which are the elements of the state capacity conceptualized here. To explain this correlation, they argue that developed countries have more religious freedom and hence diversity. I contribute to this literature by focusing on a different mechanism to explain the way religion affects the quality of public goods and government. Through an argument centered on the legitimizing relationship

²⁷ For more elaborate discussion on the mechanism see (Habyarimana et al., 2007)

between ruler and religion, I reason that when rulers' religion is different from the segments of population, the rulers may have less incentive to invest in productive capacity of the economy since they may be replaced by religiously different group in the future.

My approach is also related to the literature on the political economy of growth and development that focuses on the role of distribution of political power in developmental process. Government may become predatory, failing to create policies that promote economic growth and development-friendly institutions, because such policies change the distribution of political power in such a way that the current ruler may not be able to receive the benefit of his efforts for development. This can happen because of the commitment problem in political settings (Acemoglu, 2005; Acemoglu et al., 2005, 2002, 2001; Evans, 1995; La Porta, 1998; Robinson, 1998, 1999; Rodrik, 1996). In contrast, I focus on the legitimizing relationship between rulers and religion and emphasize a different channel that may cause the political rulers to fail to invest in the productive capacity of the economy that promotes economic growth and development. In other words, the state may become predatory depending on the religious distribution of society where religion has role in legitimizing political rulers.

My emphasis on the historical origins of state capacity is consistent with the recent literature on the deep historical roots of economic growth and development.²⁸ In this literature, scholars have shifted emphasis from the proximate determinants of current outcomes to more fundamental factors deeply rooted in long-term history (Acemoglu et al., 2001; Bockstette et al., 2002; Engerman and Sokoloff, 1997; La Porta et al., 1997). I contribute this literature by providing an index that shows historical religious difference between political rulers and population for each country of today.

²⁸ For a review of this literature, see Spolaore and Wacziarg (2013) and Nunn (2014)

3.2 Model

This part is the continuation of the model presented in Chapter 2 and intends to analyze the how religious differences between the ruler and the population determine the level of the state capacity created by the ruler, and specify testable predictions for an empirical analysis.

In the model in Chapter 2, A_t represents the level of capacity chosen by the ruler which is essential for private production and total output in the economy. In this section, I interpret A_t as the state capacity, and focus on how the choice of it is affected by the religious segmentation of population (n). Comparative static results around steady state value of A_t presented in Proposition 2, which is an extension of Proposition 1 presented in Chapter 2.

Proposition 2:

i. $\frac{dA[k^*]}{dn} > 0 \text{ or } < 0$

A change in the population of type s citizens (n) has an ambiguous effect on $A[k^*]$. To see this, let's look at equation (21) in Chapter 2, which is given as $A[k^*] \equiv$

$\left([1 - F(M(k^*))] \beta \tau [k^* S + (1 - k^*) D] \right)^{1/(\phi-1)}$, where $S = n(1 - \delta_s)$, $D = (1 - n)(1 - \delta_d)$. Holding other things constant, $A[k^*]$ is increasing in n . However, as n changes k changes, as well. In equation (21), the expression in the first square bracket is a decreasing function of k due to probability of replacement, and the expression in the second square bracket is an increasing function of k due to the legitimacy effect ($\delta_s < \delta_d$). So, the total effect of change in n on $A[k^*]$ is ambiguous.

Empirical Implications. The propositions derived from the model specify certain predictions on the effects of key variables on the level of the state capacity, which can be tested empirically. Depending on religious segments of the population (n) the ruler may invest or disinvest in the state capacity. Let's look at the model's predictions under the scenarios on how the ruler's religion differs from those of the population, whether it is different from the majority or the minority of population. The choice of A will be lower in places where the ruler's religion is different from that of the majority compared to places where the ruler's religion is different from the minority because in the former case the probability of that ruler is staying in the power will be lower. If the ruler realizes that he will not enjoy the fruit of his choice of A he created, he will not invest in it as much.

The model speaks about the level of economic output, too. I argued in the theoretical part in Chapter 2 that the capacity created by the ruler (A) shapes the level of economic output (Y). If changes in the parameters of the model help the creation of the state capacity, economic development will also be enhanced by these changes, for the countries that have the higher state capacity will have the higher level of economic development in the model by construction.

3.3 Data

Dependent variables. How one should quantify the variable A_t in the model that indicates the capacity created by the ruler that affects the level of private production and the total output in the economy? With reference to the theoretical framework three dimensions of the state capacity are the most relevant for my analysis: legal capacity, bureaucratic and administrative capacity, and infrastructural capacity. Dependent variables that I use to capture such aspects of the state capacity come from the cross-country version of Quality of Government Dataset, which contains

variables on the quality of government institutions as well as the well-being of people from various sources, and is compiled and maintained by the Quality of Government Institute (Teorell et al., 2015). This cross-country dataset includes data around 2010 for time varying variables.

Bureaucratic and administrative capacity in general refers to competence and ability of state's bureaucracy. I quantify this aspect of the state capacity by using the indices of control of corruption and government effectiveness from World Bank's Worldwide Governance Indicators (WGI), ICRG indicator of quality of government, Transparency International's corruption perception index, indices on proficiency and impartiality of public administration from Quality of Governance Expert-Survey, and an index measuring the ease of doing business in a country from World Bank's World Development indicators (WDI).

Legal capacity dimension of the state capacity in general refers to the independency of judiciary, and the capacity that enforces contracts and protects property rights. As measures of such capacity I use the indices of independence of judiciary, rule of law, quality of legal institutions, and the indices of property rights from various sources.

Infrastructural capacity refers to the capacity that reflects the territorial reach of the state. To quantify this aspect of the state capacity I use data on road density (km of road per 100 sq. km of land area), telephone lines, quality of electricity supply, mobile telephone subscriptions, quality of air transport infrastructure, quality of port infrastructure, quality of railroad infrastructure, quality of roads, and quality of overall infrastructure.

To test the model's implication on economic development empirically, I use cross country data on real GDP per capita, infant mortality, literacy rate, and primary school attainment among adults as measures of contemporary economic development.

The definition of dependent variables used in this study and their original sources can be found in Table 3B.3 in Appendix B.

Independent variables. The main variables of interest are the indices of the historical religious differences between the ruler and the population. These indices are explained in detail in Chapter 2. I use the same sets of controls as in Chapter 2 such as variables on the historical factors, the biological and geographical diversity, and continent fixed effects. I also use cross-country data on the other determinants of state capacity discussed in the literature. These are variables on legal origin, ethnic fractionalization, democracy, military expenditure, and the value of oil export.²⁹

Table 3B.1 in the Appendix B shows the summary statistics of these variables, and Table 3B.2 shows the correlation between various dependent variables. As seen in the table these variables are highly correlated with each other. This might be due to the complementarity among the measures of the state capacity, and the measures of economic development.

3.4 Empirical Framework

In order to examine the effect of the historical religious differences between the ruler and the population on the state capacity and the economic development today, I specify the following cross country regression equation:

$$W_i = \beta_0 + \beta_1 HRDI1_i + HRDI2_i + X_i' \gamma + u_i$$

where W_i is various measures of the state capacity and the economic development as described above for country i . $HRDI1_i$ is the index that measures the historical religious

²⁹ Definition of variables on the historical factors, and the biological and geographical diversity can be found in Appendix A in chapter 2. The definition of variables on the other determinants of the state capacity is in the in Table 3B.3 in Appendix B in chapter 3.

difference between rulers and the majority for country i . $HRDI2_i$ is the index that measures historical religious difference between the ruler and the significant minority for country i . X_i' is the vector of control variables as in Chapter 2. u_i is the country specific error term. I report robust standard errors and estimate this model by using OLS estimator.

3.5 Results

This part presents empirical findings about the effect of HRDIs on the measures of the state capacity and the economic development. First, I present results from empirical analysis on how the historical religious difference affects the current state capacity across countries. Then, I include well-known determinants of the state capacity discussed in the literature into the regression analysis to see how sensitive the effects of HRDIs are to the inclusion of these determinants. Finally, I look at the effect of HRDIs on the contemporary economic development, and show evidence in favor of the state capacity being a mechanism through which the religious differences affect the economic development.

3.5.1 Historical Religious Differences and Current State Capacity?

In this chapter the state capacity is conceptualized as the legal capacity, the bureaucratic and administrative capacity, and the infrastructural capacity, then measured accordingly. This part presents results where such state capacity measures are dependent variables to be explained by HRDIs. I sometime use the similar dependent variables from different sources in the regression analysis to mitigate concerns about whether the effect of HRDIs, if any, is not stemming from the peculiarities of certain measures. When I use different dependent variables across regressions, the sample size varies due to the availability of data.

Legal Capacity. Table 3.1 shows the relationship between various measures of the legal

capacity and the historical religious differences. From column 1 to column 4 the dependent variables are various indices of property rights from different sources. They measure the degree to which a country's laws protect private property rights and the degree to which its government enforces those laws. HRDI1 is significantly and negatively associated with these indices. The higher the historical religious difference between the ruler and the majority, the lower the protection of private property rights. In column 5 and 6 the dependent variables are the indices of rule of law measuring whether there is established mechanism of dealing with disputes in a country. HRDI1 is significantly and negatively associated with these indices, as well. In column 7 and 8 the dependent variables are the measures of independence of the judiciary from different sources. HRDI1's effects on these variables are also negative and statistically significant. In column 9 the dependent variable is a measure of overall quality of legal institution in a country. This measure has also negative and significant relationship with HDRI1.

On the other hand, HRDI2, the index measuring the historical religious difference between the ruler and the significant religious minority, has no statistically significant effect on any measures of the legal capacity in Table 3.1. These findings are in line with the predictions of the economic model.

Bureaucratic and administrative capacity. Table 3.2 shows the relationship between the measures of the bureaucratic and administrative capacity and the indices of historical religious differences. In column 1 the dependent variable is the index of government effectiveness from WGI. It takes values between 0 and 1 and higher values indicate good governance. HRDI1 is significantly and negatively associated with this measure. In column 2 the dependent variable is ICRG indicator of quality of government, which is the mean value of the ICRG variables of corruption, law and order, and bureaucracy quality indices, and scaled between 0 and 1. Higher

values indicate higher quality of government. This measure is also negatively and significantly associated with HRDI1. In column 3 the dependent variable is an index of ease of doing business from WDI. It takes values between 1 and 189, and 1 being the most business-friendly regulations. HRDI1 is positively and significantly associated this variable. That is, countries become less business friendly on average as they experience more religious difference between the ruler and the majority in their history. In column 4 and 5 the dependent variables are the indices of corruption from WGI and Transparency International, respectively. These indices capture the one aspect of the bureaucratic quality, which is whether government officials exercise public power for private gain. The lower values indicate the higher corruption. So, in columns 4 and 5, HRDI1 is significantly associated with high corruption. In column 6 the dependent variable is the index of impartial public administration that measures to what extent the public administration is professional rather than politicized. In Column 7 the dependent variable is the index of professional public administration that measures to what extent government institutions exercise their power impartially. HRDI1 is negatively and significantly associated with these measures, too. However, HRDI2 is not a statistically significant predictor of any of these measures. These results are consistent with predictions of the model.

Infrastructural capacity. Table 3.3 shows the relationship between the measures of the infrastructural capacity and the historical religious differences. The dependent variables from column 1 to column 9 are road density, telephone lines, the quality of electricity supply, mobile telephone subscriptions, and the quality of air transport infrastructure, the quality of port infrastructure, the quality of railroad infrastructure, the quality of roads, and the quality of overall infrastructure, respectively. HRDI1 is negatively and significantly associated with all of these measures of the infrastructural capacity. In column 10 the dependent variable is an index

Table 3.1 Historical Religious Difference and Legal Capacity

VARIABLES	(1) hf_prights	(2) wef_pr	(3) fi_legprop	(4) fh_pair	(5) fh_rol	(6) wbgi_rle	(7) wef_ji	(8) ciri_injud	(9) kun_legabs
HRDI1	-1.185*** (0.378)	-0.0682*** (0.0168)	-0.0965*** (0.0244)	-0.126** (0.0559)	-0.136* (0.0733)	-0.0482*** (0.0156)	-0.0996*** (0.0221)	-0.0511*** (0.0151)	-0.00888*** (0.00293)
HRDI2	0.222 (0.447)	0.0120 (0.0191)	-0.0271 (0.0229)	-0.0402 (0.0633)	0.0170 (0.0768)	0.00108 (0.0164)	0.0254 (0.0208)	0.00618 (0.0136)	0.00123 (0.00326)
Observations	133	116	120	137	137	137	116	136	137
R-squared	0.555	0.523	0.687	0.682	0.615	0.623	0.561	0.534	0.612
Continent FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Bio&geo diversity	yes	yes	yes	yes	yes	yes	yes	yes	yes
Historical factors	yes	yes	yes	yes	yes	yes	yes	yes	yes

Dependent variables: *hf_prights* is Property Right Index from Heritage Foundation. *wef_pr* is Property Right Index from World Economic Forum. *fi_legprop* is Legal Structure and Security of Property Rights from Fraser Institute. *fh_pair* is Personal Autonomy and Individual Rights from Freedom House. *fh_rol* is Rule of Law Index from Freedom House. *wbgi_rle* is Rule of Law Index from Worldwide Governance Indicators. *wef_ji* is Judicial Independence from World Economic Forum. *ciri_injud* is Independence of the Judiciary from the Cingranelli-Richards (CIRI) Human Rights Dataset. *kun_legabs* is Absolute legal institutional quality from Kuncic (2013). Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 3.2 Historical Religious Difference and Bureaucratic and Administrative Capacity

VARIABLES	(1) wbgi_gee	(2) icrg_qog	(3) wdi_eodb	(4) wbgi_cce	(5) ti_cpi	(6) qs_impar	(7) qs_proff
HRDI1	-0.0512*** (0.0159)	-0.0106*** (0.00338)	1.980** (0.763)	-0.0484*** (0.0145)	-0.110*** (0.0295)	-0.0534*** (0.0112)	-0.0692*** (0.0200)
HRDI2	-0.00757 (0.0173)	-0.000373 (0.00352)	0.692 (0.928)	-3.57e-05 (0.0149)	0.00143 (0.0323)	0.0111 (0.0147)	0.00946 (0.0227)
Observations	137	118	132	137	137	94	94
R-squared	0.619	0.653	0.628	0.646	0.648	0.664	0.574
Continent FE	Yes	yes	yes	yes	yes	yes	yes
Bio&geo diversity	Yes	yes	yes	yes	yes	yes	yes
Historical factors	Yes	yes	yes	yes	yes	yes	yes

Dependent variables: *wbgi_gee* is Government Effectiveness from Worldwide Governance Indicators. *icrg_qog* is ICRG indicator of quality of government. *wdi_eodb* is an index of ease of doing business from World Development Indicators. *wbgi_cce* is Control of Corruption Index from Worldwide Governance Indicators. *ti_cpi* is Corruption Perceptions Index from Transparency International. *qs_impar* is Impartial Public Administration from the Quality of Governance Expert-Survey. *qs_proff* is Professional Public Administration from The Quality of Governance Expert-Survey. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 3.3 Historical Religious Difference and Infrastructural Capacity

VARIABLES	(1) wdi_roaddens	(2) wdi_telephone	(3) wef_elec	(4) wef_mobile	(5) wef_qair	(6) wef_qport	(7) wef_qrail	(8) wef_qroad	(9) wef_qoi	(10) ffp_ps
HRDI1	-4.626** (1.774)	-0.580*** (0.196)	-0.0900*** (0.0242)	-1.452*** (0.496)	-0.0629*** (0.0222)	-0.0720*** (0.0210)	-0.102*** (0.0250)	-0.124*** (0.0258)	-0.0992*** (0.0212)	0.108*** (0.0282)
HRDI2	1.070 (1.409)	0.0190 (0.274)	-0.0287 (0.0287)	-1.418** (0.543)	0.0167 (0.0256)	0.00267 (0.0234)	-0.00189 (0.0309)	-0.00828 (0.0294)	-0.0209 (0.0243)	0.0456 (0.0363)
Observations	98	137	116	116	116	116	108	116	116	137
R-squared	0.593	0.774	0.700	0.680	0.521	0.584	0.636	0.570	0.631	0.776
Continent FE	yes	Yes	yes	yes	yes	Yes	yes	Yes	yes	yes
Bio&geo diversity	yes	Yes	yes	yes	yes	Yes	yes	Yes	yes	yes
Historical factors	yes	Yes	yes	yes	yes	Yes	yes	Yes	yes	yes

Dependent variables: *wdi_roaddens* is road density (km of road per 100 sq. km of land area) from World Bank's World Development Indicators. *wdi_telephone* is telephone lines (per 100 people) from World Development Indicators. *wef_elec* is quality of electricity supply from World Economic Forum. *wef_mobile* is mobile telephone subscriptions/100 pop World Economic Forum. *wef_qair* is quality of air transport infrastructure World Economic Forum. *wef_qport* is quality of port infrastructure World Economic Forum. *wef_qrail* quality of railroad infrastructure World Economic Forum. *wef_qroad* is quality of roads World Economic Forum. *wef_qoi* is quality of overall infrastructure World Economic Forum. *ffp_ps* is Public Services Index from Found for Peace. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.

that measures the provision of public services such as the services of health, education, and sanitation. This variable takes values between 0 and 10, and higher values indicate lower provisions. HRDI1 has positive and statistically significant effect on this measure of infrastructure. That is, as countries experience more religious difference between the ruler and the majority in their history, their level of the public service provisions worsens, on average. However, HRDI2 is not a statistically significant predictor of any infrastructural capacity measures. These results are consistent with the predictions of the economic model.

The other determinants of state capacity. Next, I introduce the other determinants of the state capacity discussed in the literature into the regression analysis. The literature considers legal origins, ethnic fractionalization, democracy, the value of oil export, and military expenditure as important determinants of the state capacity.³⁰ The purpose of this exercise is to see how sensitive the effect of HRDI1 to the inclusion of these variables. I have not incorporated these variables in the main analysis because of the bad control problem. Namely these variables themselves can be dependent variable explained by HRDIs. If the inclusion of these variables changes the effect size of HRDIs, this would suggest that HRDIs affect the measures of the state capacity through these variables. Instead of using all the capacity measures discussed so far, I use a subset of them that suffice to capture the aspects of the legal capacity, the infrastructural capacity, and the bureaucratic and administrative capacity so that results can be presented in one table.

Table 3.4 shows the results. Across all columns the effects of HRDI1 survive, and they are still statistically significant. However, after the inclusion of these other determinants of the state capacity, the effect sizes go down significantly compared to results in Tables 3.1 - 3.3. This

³⁰ For example see (Dincecco and Prado, 2012; Savoia and Sen, 2012). For the definition and original sources of these variables see Table 3B.3 in Appendix B.

Table 3.4 HRDIs and the Other Determinants of State capacity

VARIABLES	(1) fi_legprop	(2) wbgi_rle	(3) ciri_injud	(4) wbgi_gee	(5) icrg_qog	(6) ti_cpi	(7) qs_impar	(8) wef_qoi	(9) ffp_ps
HRDI1	-0.0654*** (0.0203)	-0.0227* (0.0121)	-0.0305** (0.0139)	-0.0260** (0.0125)	-0.00618** (0.00280)	-0.0566*** (0.0207)	-0.0346*** (0.0113)	-0.0731*** (0.0201)	0.0662*** (0.0217)
HRDI2	-0.0284 (0.0257)	-0.00637 (0.0152)	-0.00711 (0.0120)	-0.0161 (0.0163)	-0.00225 (0.00342)	-0.0207 (0.0268)	-0.00283 (0.0120)	-0.0360* (0.0186)	0.0607* (0.0330)
Democracy	0.0331 (0.0533)	0.0836*** (0.0267)	0.0754** (0.0359)	0.0777*** (0.0269)	0.00479 (0.00614)	0.146*** (0.0517)	0.00518 (0.0312)	0.0301 (0.0385)	-0.132** (0.0528)
Ethnic fractionalization	-1.179* (0.597)	-0.453 (0.326)	-0.145 (0.318)	-0.362 (0.311)	-0.0286 (0.0687)	-0.493 (0.603)	0.0317 (0.364)	-0.185 (0.424)	0.559 (0.599)
Net oil exports value per capita, constant 2000 \$	0.000108** (5.39e-05)	8.75e-05** (4.16e-05)	-4.23e-06 (3.76e-05)	5.02e-05 (3.93e-05)	1.15e-05 (8.47e-06)	0.000117 (7.47e-05)	-2.71e-06 (4.73e-05)	-3.36e-06 (5.62e-05)	-0.000358*** (7.76e-05)
Legal Origin-United Kingdom	0.352 (0.561)	0.214 (0.244)	0.395 (0.308)	-0.132 (0.250)	-0.0148 (0.0488)	-0.733 (0.598)	-0.125 (0.350)	0.593 (0.502)	-0.366 (0.636)
Legal Origin- France	-0.403 (0.608)	0.0568 (0.273)	0.282 (0.331)	-0.234 (0.270)	-0.0666 (0.0571)	-1.142* (0.643)	-0.366 (0.401)	0.345 (0.544)	-0.255 (0.661)
Legal Origin-Soviet Union	-0.779 (0.567)	-0.492* (0.256)	-0.0705 (0.329)	-0.772*** (0.244)	-0.230*** (0.0466)	-2.247*** (0.591)	-0.728* (0.380)	-0.189 (0.490)	0.477 (0.673)
Legal Origin-Germany	0.522 (0.586)	0.353 (0.261)	0.525 (0.349)	0.254 (0.283)	0.0172 (0.0495)	0.174 (0.579)	0.0611 (0.361)	1.263** (0.495)	-2.062** (0.864)
Military Expenditure	-1.54e-08 (1.62e-08)	3.98e-09 (1.07e-08)	2.67e-08** (1.17e-08)	-2.01e-09 (8.58e-09)	2.68e-10 (2.15e-09)	1.97e-09 (2.24e-08)	2.00e-09 (1.12e-08)	3.96e-09 (1.07e-08)	-5.80e-09 (1.58e-08)
Observations	119	136	135	136	118	136	93	115	136
R-squared	0.783	0.761	0.653	0.759	0.783	0.802	0.752	0.715	0.873
Continent FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Bio&geo diversity	yes	yes	yes	yes	yes	yes	yes	yes	yes
Historical factors	yes	yes	yes	yes	yes	yes	yes	yes	yes

Dependent variables: *fi_legprop* is Legal Structure and Security of Property Rights from Fraser Institute. *wbgi_rle* is Rule of Law Index from Worldwide Governance Indicators. *ciri_injud* is Independence of the Judiciary from the Cingranelli-Richards (CIRI) Human Rights Dataset. *wbgi_gee* is Government Effectiveness from Worldwide Governance Indicators. *icrg_qog* is ICRG indicator of quality of government. *ti_cpi* is Corruption Perceptions Index from Transparency International. *qs_impar* is Impartial Public Administration from the Quality of Governance Expert-Survey. *wef_qoi* is quality of overall infrastructure World Economic Forum. Scandinavian legal origin is the base category. See Table 3B.3 in Appendix B for the definition of the other variables. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

suggests that a portion of the effect of HRDI1 on the state capacity is working through these other determinants.

The results in this section establish that the historical religious differences between the political rulers and the majority of population have negative and significant effect on current state capacity. This effect still survive after the other determinants of the state capacity, namely legal origins, ethnic fractionalization, democracy, military expenditure, and the value of oil export are controlled for in the regressions.

3.5.2 Historical Religious Differences and Contemporary Economic Development?

So far I have showed that the historical religious differences negatively affect the current state capacity. Especially, when the differences were between the ruler and the majority, these effects are statistically significant. As I argued before, the state capacity is the pathway to economic development. In this part I will first empirically examine whether the historical religious differences are affecting current economic development across countries, and then test whether such effect, if any, is working through the state capacity channel. In the regression analysis I will use GDP per capita, infant mortality rate, literacy rate, and a measure of primary school attainment as measures of economic development.

Table 3.5 shows the relationship between the measures of development and indices of the historical religious differences between the political rulers and the population. In column 1 the dependent variable is per capita GDP based on purchasing power parity, constant in 2011 international dollars. HRDI1 is negatively associated with this GDP per capita measure, and this relationship is statistically significant at 1% level. The coefficient of HRDI1 in the table suggests that when a country experiences one more religious difference between the ruler and the

majority of population in one of those 50 or 100-year-intervals in their history, its per capita GDP become lower by 772.7 dollars today. This implies that, if a country experienced religious difference between rulers and the majority throughout history, instead of having no religious difference between population and the ruler, its per capita GDP would be lower by almost 11,590 dollars.³¹ This is a significant number when we consider that the average GDP per capita in the sample is around 16,000 dollars. In column 2 the dependent variable is the literacy rate for adult female and male. HRDI1 has negative and significant association with this variable. In column 3 the dependent variable is the infant mortality rate. HRDI1 has positive and significant effect on this variable, That is, as countries experience more religious difference between the ruler and the majority in their history, their infant mortality rate goes up, on average. In column 4 the dependent variable is a measure of primary school attainment. HRDI1 has a negative and significant effect on this measure, as well.

Table 3.5 Historical Religious Difference and Economic Development

VARIABLES	(1) wdi_gdppcPPPcon	(2) une_lit	(3) une_imr	(4) bl_lp_15mf
HRDI1	-772.7*** (227.6)	-0.544** (0.271)	0.595* (0.341)	-0.606* (0.342)
HRDI2	-153.3 (250.0)	-1.334*** (0.270)	0.428 (0.370)	-0.0997 (0.381)
Observations	131	108	136	118
R-squared	0.667	0.808	0.795	0.519
Continent FE	yes	yes	yes	yes
Bio&geo diversity	yes	yes	yes	yes
Historical factors	yes	yes	yes	yes

Dependent variables: *wdi_gdppcPPPcon* is per capita GDP based on purchasing power parity, constant in 2011 international dollars from World Development Indicators. *une_lit* is literacy rate adult total from UNESCO. *une_imr* is infant mortality rate from UNESCO. *bl_lp_15mf* is percentage with primary schooling, female and male (15+) from Barro and Lee (2013). Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

³¹ Remember that I divided each country's history into 15 periods from year 1000 to 1950 (100-year interval up to the year 1500, and 50-year interval thereafter). So, the GDP per capita difference is calculated as 15x772.7=11590.5

However, HRDI2 is not a statistically significant predictor of the most of these economic outcomes. It has significant and negative effect only on the literacy rate in column 2.

Mechanism. Table 3.5 has established the negative relationship between the historical religious differences (between the rulers and the population) and contemporary economic development. Now I empirically examine whether the state capacity, as I argued in the theoretical part, is the mechanism leading to economic development. If inclusion of the state capacity measures leads to a decline in the coefficient of HRDI1 in the development regressions, and a substantial increase in R-squared value, this would suggest that those state capacity measures are the channels through which the historical religious differences influence the current economic development.

Table 3.6 the dependent variables across all columns are GDP per capita, the main economic development measure in the analysis. I include Property Right and Rule of Law variables in columns 1 and 2 as measures of the legal capacity, the ICRG Indicator of Quality of Government, and Corruption Perception index in columns 3 and 4 as measures of the bureaucratic and administrative capacity, and in column 5 Quality of Overall Infrastructure variable as a measure of the infrastructural capacity. Inclusion of these variables decreases the coefficient of HRDI1 across all columns (compare them with column 1 in Table 3.5). Each of these variables has a statistically significant effect on per capita GDP, and increases R-squared value significantly in the table. This provides evidence in favor of the state capacity being a channel through which the historical religious difference between the ruler and the majority is affecting current economic development.

The results in this section establish that the historical religious differences between the

political rulers and the majority have negative and significant effect on current economic development, and that the effect of the historical religious differences works through the state capacity channel.

Table 3.6 State Capacity as a Mechanism for Economic Development

VARIABLES	(1) GDP per capita	(2) GDP per capita	(3) GDP per capita	(4) GDP per capita	(5) GDP per capita
HRDI1	-346.8* (181.5)	-274.5 (176.7)	-261.1 (215.4)	-166.0 (180.7)	-322.7 (326.0)
HRDI2	-250.0 (168.1)	-222.5 (176.4)	-306.4 (206.0)	-247.1* (144.9)	26.42 (208.3)
Property Rights (hf_prights)	366.5*** (48.68)				
Rule of Law (wbgi_rle)		10,186*** (1,138)			
ICRG Indicator of Quality of Government (icrg_qog)			50,735*** (5,820)		
Corruption Perceptions Index (ti_cpi)				5,565*** (475.5)	
Quality of Overall Infrastructure (wef_qoi)					5,674*** (1,374)
Observations	128	131	112	131	114
R-squared	0.787	0.803	0.825	0.824	0.745
Continent FE	yes	yes	yes	yes	yes
Bio&geo diversity	yes	yes	yes	yes	yes
Historical factors	yes	yes	yes	yes	yes

Dependent variables across all columns are per capita GDP based on purchasing power parity, constant in 2011 international dollars from World Development Indicators. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

3.6 Conclusion

In conclusion, religious histories of today's nations have lingering effects on their state capacity and economic development. This chapter establishes that the historical religious differences between the political rulers and the majority of population are strongly associated with the state capacity as well as economic development, and that the state capacity is the

pathway to economic development. Countries that have experienced more historical religious differences between the political rulers and the majority of the population have lower levels of the legal capacity, the bureaucratic and administrative capacity, and the infrastructural capacity. These countries also have lower levels of economic development, measured as the GDP per capita, the schooling, and the infant mortality rate. These findings hold after controlling for the biogeographic variables (e.g. latitude, elevation), the historical factors (e.g. colonialism, Neolithic transition to agriculture), and continent fixed effects.

Explanation for these results suggested by the economic model developed in chapter 2 and 3 is that a self-interested ruler may discriminate against members of a different religious group by favoring the co-religionist group in access to public goods and services in an effort to extract more revenue due to the higher legitimacy that works through citizens' tax compliance behavior. However, the disfavored group may rebel against the ruler, which creates replacement threat for the ruler, which deters him to invest in the state capacity. This explanation also connects religious legitimacy arguments with productive investment, a missing link in the literature.

The strong association between the religious differences and economic development deserves attentions from comparative development literature. Even though this literature highlights the importance of institutional and cultural factors for development outcomes, it has neglected the significance of religious differences between political rulers and segments of population in development process. State and religion are the two oldest institutions in human history and their interactions over time must affect wide range of economic outcomes.

In future studies, the empirical associations found here should be challenged by analysis with clear identification strategies to find causal effects. Also, the theoretical model formulated

here can be extended by allowing religious conversion over time, productivity differences across religious groups, and endogenous choice of religion by the ruler.



References

- Acemoglu, Daron. "Politics and Economics in Weak and Strong States." *Journal of monetary Economics* 52.7 (2005): 1199–1226.
- Acemoglu, Daron, Camilo Garcia-Jimeno, and James A. Robinson. "State Capacity and Economic Development: A Network Approach." *American Economic Review* 105.8 (2015): 2364–2409.
- Acemoglu, Daron, Simon Johnson, and James Robinson. "The Rise of Europe: Atlantic Trade, Institutional Change, and Economic Growth." *American Economic Review* 95.3 (2005): 546–579.
- Acemoglu, Daron, Simon Johnson, and James A. Robinson. "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution." *Quarterly Journal of Economics* 117.4 (2002): 1231–1294.
- . "The Colonial Origins of Comparative Development: An Empirical Investigation." *American Economic Review* 91.5 (2001): 1369–1401.
- Alesina, Alberto et al. "Fractionalization." *Journal of Economic Growth* 8.2 (2003): 155–194.
- Alesina, Alberto, Reza Baqir, and William Easterly. "Public Goods and Ethnic Divisions." *The Quarterly Journal of Economics* 114.4 (1999): 1243–1284.
- Barro, Robert J. "Government Spending in a Simple Model of Endogenous Growth." *Journal of Political Economy* 98.S5 (1990): S103.
- Barro, Robert J., and Xavier Sala-I-Martin. "Public Finance in Models of Economic Growth." *The Review of Economic Studies* 59.4 (1992): 645–661.
- Barro, Robert J., and Jong Wha Lee. "A new data set of educational attainment in the world, 1950–2010." *Journal of Development Economics* 104 (2013): 184–198.
- Besley, Timothy, and Torsten Persson. "State Capacity, Conflict, and Development." *Econometrica* 78.1 (2010): 1–34.
- Besley, Timothy, and Torsten Persson. "The origins of state capacity: Property rights, taxation, and politics." *The American Economic Review* 99.4 (2009): 1218–1244.
- Bockstette, Valerie, Areendam Chanda, and Louis Putterman. "States and Markets: The Advantage of an Early Start." *Journal of Economic Growth* 7.4 (2002): 347–369.

- Cingranelli, David L., and David L. Richards. "The Cingranelli and Richards (CIRI) human rights data project." *Human Rights Quarterly* 32.2 (2010): 401-424.
- Dincecco, Mark. "Fiscal Centralization, Limited Government, and Public Revenues in Europe, 1650–1913." *The Journal of Economic History* 69.1 (2009): 48–103.
- Dincecco, Mark, and Mauricio Prado. "Warfare, Fiscal Capacity, and Performance." *Journal of Economic Growth* 17.3 (2012): 171–203.
- Easterly, William, and Ross Levine. "Africa's Growth Tragedy: Policies and Ethnic Divisions." *The Quarterly Journal of Economics* 112.4 (1997): 1203–1250.
- Engerman, Stanley L., and Kenneth L. Sokoloff. "Factor Endowments, Institutions, and Differential Paths of Growth among New World Economies." *How Latin America Fell Behind* (1997): 260–304.
- Evans, Peter B. *Embedded Autonomy: States and Industrial Transformation*. Princeton University Press, 1995.
- Found for Peace. *Failed States Index*. 2014. <http://fsi.fundforpeace.org/>
- Freedom House. *Freedom in the World: Aggregate and Subcategory Scores*. 2014. <https://freedomhouse.org/report/freedom-world-aggregate-and-subcategory-scores>
- Gennaioli, Nicola, and Ilia Rainer. "The Modern Impact of Precolonial Centralization in Africa." *Journal of Economic Growth* 12.3 (2007): 185–234.
- Gennaioli, Nicola, and Hans-Joachim Voth. "State Capacity and Military Conflict." *The Review of Economic Studies* (2015): rdv019.
- Gwartney, James, et al. "2010 economic freedom dataset, published in economic freedom of the world: 2010 annual report." *Fraser Institute*, 2012.
- Habyarimana, James et al. "Why Does Ethnic Diversity Undermine Public Goods Provision?" *American Political Science Review* null.4 (2007): 709–725.
- Herbst, Jeffrey. *Power and States in Africa: Comparative Lessons in Authority and Control*. Princeton: Princeton University Press, 2000.
- Heritage Foundation. *Index of Economic Freedom*. 2014. <http://www.heritage.org/index/explore>
- Kaufmann, D., et al. "The worldwide governance indicators: A summary of methodology, data and analytical issues." *World Bank Policy Research*. No. 5430. working paper, 2010
- Kuncic, Aljaz. "Institutional quality dataset." *Journal of Institutional Economics*, 2013.

La Porta, Rafael. "Law and Finance." *Journal of Political Economy* 106.6 (1998): 1113–1155.

---. "Legal Determinants of External Finance." *The Journal of Finance* 52.3 (1997): 1131–1150.

Michalopoulos, Stelios, and Elias Papaioannou. "Pre-Colonial Ethnic Institutions and Contemporary African Development." *Econometrica* 81.1 (2013): 113–152.

Migdal, Joel S. *Strong Societies and Weak States: State-Society Relations and State Capabilities in the Third World*. Princeton University Press, 1988.

Nunn, Nathan. "Historical Development." *Handbook of Economic Growth* 2 (2014): 347–402.

Porta, R. La et al. "The Quality of Government." *Journal of Law, Economics, and Organization* 15.1 (1999): 222–279.

PRS Group. "International country risk guide." (2014).

Robinson, James. "Theories of 'Bad Policy.'" *Policy Reform* 1 (1998): 1–46.

Robinson, James A. *When Is a State Predatory?* CES Working Paper Series, 1999..

Rodrik, Dani. "Understanding Economic Policy Reform." *Journal of Economic Literature* 34.1 (1996): 9–41.

Ross, Michael L. "Oil and gas data, 1932-2011." *Harvard Dataverse Network*(2013).

Savoia, Antonio, and Kunal Sen. "Measurement and Evolution of State Capacity: Exploring a Lesser Known Aspect of Governance." *Effective States and Inclusive Development Research Centre Working Paper* 10 (2012).

Singer, J. David, et al. (1972). "Capability Distribution, Uncertainty, and Major Power War, 1820-1965." in Bruce Russett (ed) *Peace, War, and Numbers*, Beverly Hills: Sage, 19-48.

National Capabilities Dataset v 4.0

Spolaore, Enrico, and Romain Wacziarg. "How Deep Are the Roots of Economic Development?" *Journal of Economic Literature* 51.2 (2013): 325–369.

Teorell, Jan, et al. "The QoG Expert Survey Dataset." *The Quality of Government Institute University of Gothenburg*(2011).

Teorell, Jan et al. "The Quality of Government Standard Dataset, Version Jan15." *University of Gothenburg: The Quality of Government Institute* (2015).

Tilly, Charles. *War Making and State Making as Organized Crime*. Cambridge University Press Cambridge, 1985.

Treisman, Daniel. "What have we learned about the causes of corruption from ten years of cross-national empirical research?." *Annu. Rev. Polit. Sci.*10 (2007): 211-244.

UNESCO Institute for Statistics, 2014.

<http://www.uis.unesco.org/Datacentre/Pages/instructions.aspx?SPSLanguage=EN>

W. B. Group, *World Development Indicators 2012*. World Bank Publications, 2012.

W. E. Forum. “The global competitiveness report 2012-2013,” 2012.



Appendix B

Table 3B.1 Summary Statistics

Variable Name	Variable code as in the QoG dataset	Mean	SD	Min	Max
<i>Legal capacity</i>					
Property Rights	hf_prights	43.23	23.57	5	95
Property rights	wef_pr	4.29	1.02	1.79	6.45
property right	fi_legprop	5.58	1.59	2.12	8.85
Personal Autonomy and Individual Rights	fh_pair	9.66	4.03	0	16
Rule of Law	fh_rol	8.46	4.79	0	16
Rule of Law - Estimate	wbgi_rle	-0.07	0.99	-2.45	1.98
Judicial independence	wef_ji	3.87	1.3	1.27	6.69
Independence of the Judiciary	ciri_injud	0.9	0.91	0	2
Absolute legal institutional quality (simple averages)	kun_legabs	0.55	0.21	0.08	0.96
<i>Bureaucratic and administrative capacity</i>					
Government Effectiveness - Estimate	wbgi_gee	-0.06	1	-2.24	2.26
ICRG Indicator of Quality of Government	icrg_qog	0.54	0.2	0.08	1
Ease of doing business index (1=most business-friendly regulations)	wdi_eodb	95.23	54.19	1	189
Control of Corruption - Estimate	wbgi_cce	-0.06	1	-1.74	2.41
Corruption Perceptions Index	ti_cpi	3.99	2.08	1.01	9.3
Impartial Public Administration	qs_impar	-0.11	0.71	-1.48	1.51
Professional Public Administration	qs_proff	3.93	0.95	2.06	6.32
<i>Infrastructural capacity</i>					

Road density (km of road per 100 sq. km of land area)	wdi_roaddens	111.23	373.61	1.03	3850
Telephone lines (per 100 people)	wdi_telephone	19.23	18.97	0.02	116.46
Quality of electricity supply	wef_elec	4.5	1.58	1.18	6.8
Mobile telephone subscriptions/100 pop.	wef_mobile	102.74	37.07	14.46	203.88
Quality of air transport infrastructure	wef_qair	4.59	1.1	2.2	6.81
Quality of port infrastructure	wef_qport	4.24	1.1	1.5	6.77
Quality of railroad infrastructure	wef_qrail	3.07	1.41	1.03	6.78
Quality of roads	wef_qroad	4	1.26	1.52	6.48
Quality of overall infrastructure	wef_qoi	4.3	1.14	1.89	6.64
Public Services	ffp_ps	5.83	2.37	1.1	9.7
<i>Economic development</i>					
GDP per capita, PPP (constant 2011 international \$)	wdi_gdppcPPPcon	16098.11	18629.36	416.17	1.31E+05
Literacy Rate, Adult, Total	une_lit	82.81	18.51	25.31	100
Infant mortality rate	une_imr	28.61	28.01	1.7	120.9
Percentage with Primary Schooling, Female and Male (15+)	bl_lp_15mf	27.12	15.85	2.44	70.43
<i>Other determinates of state capacity</i>					
Democracy	democ	3.72	3.65	0	10
Ethnic fractionalization	al_ethnic	0.44	0.26	0	0.93
Net oil exports value per capita, constant 2000 \$	ross_oil_netexpc	403.01	2152.57	-5133.54	14410.85
Legal origin - English	legor_uk	0.34	0.47	0	1
Legal origin - French	legor_fr	0.44	0.5	0	1
Legal origin -Soviet	legor_so	0.17	0.38	0	1
Legal origin - German	legor_ge	0.03	0.17	0	1
Legal origin - Scandinavian	legor_sc	0.02	0.16	0	1

For summary statistics of variables on biogeographic diversity, historical factors and continent fixed effects see Table 2A.1 in Appendix A in Chapter 2.

Table 3B.2 Correlation between Dependent Variables (n=91)

	fi_legprop	wbgi_rle	ciri_injud	wbgi_gee	icrg_qog	ti_cpi	qs_impar	wef_qoi	ffp_ps	wdi_gdppcPPPcon..	une_imr
fi_legprop	1										
wbgi_rle	0.9287	1									
ciri_injud	0.7173	0.8272	1								
wbgi_gee	0.9022	0.9673	0.8004	1							
icrg_qog	0.9047	0.9362	0.7592	0.9377	1						
ti_cpi	0.9036	0.9456	0.8159	0.9405	0.9245	1					
qs_impar	0.7978	0.8578	0.7964	0.855	0.8238	0.8751	1				
wef_qoi	0.8303	0.8206	0.6724	0.8564	0.8217	0.8136	0.6923	1			
ffp_ps	-0.8367	-0.8819	-0.7295	-0.8862	-0.8226	-0.8576	-0.7467	-0.8122	1		
wdi_gdppcPPPcon	0.8199	0.8319	0.6462	0.8466	0.8274	0.841	0.6923	0.8063	-0.8787	1	
une_imr	-0.5739	-0.6279	-0.5233	-0.6755	-0.5611	-0.5906	-0.4958	-0.6189	0.7878	-0.6678	1

Note: *fi_legprop*: Legal Structure and Security of Property Rights (current) from Fraiser Institute, *wbgi_rle*: Rule of law index from WGI, *ciri_injud*: an index of Independence of the Judiciary, *wbgi_gee*: Government Effectiveness from WGI, *icrg_qog*: Quality of government, *qs_impar*: Impartial Public Administration, *wef_qoi*: Quality of overall infrastructure, *ffp_ps*: Public Services, *wdi_gdppcPPPcon*: GDP per capita PPP (constant 2011 international \$) from WDI, *une_imr*: Infant mortality rate from UNESCO.

Table 3B.3 Definition of Variables

Variable code as in Quality of Government data	Variable name	Definition
Legal Capacity		
ciri_injud	Independence of the Judiciary	Independence of judiciary from other branches of government or military. 0 indicates not independent, 1 indicates partially independent, 2 indicates generally independent. From Cingranelli and Richards(2010)
fh_pair	Personal Autonomy and Individual Rights	It measures state's controls over people's economic choices such as residence, family size, and employment; evaluates the right of citizens to own property and establish private businesses. It takes values between 0 (worst) and 16 (best). From Freedom House. Available at https://freedomhouse.org/report/freedom-world-aggregate-and-subcategory-scores
fh_rol	Rule of Law	The variable measures the independence of the judiciary; rule of law exists in civil and criminal matters; equal treatments from law and police for segments of the population; the protection from political terror. It takes values between 0 (worst) and 16 (best). From Freedom House. Available at https://freedomhouse.org/report/freedom-world-aggregate-and-subcategory-scores
fi_legprop	Legal Structure and Security of Property Rights (current)	The variable measures trust in legal framework, protection of property rights, independence from military It ranges from 0(worst) to 10(best). From Fraser Institute, Gwartney et. al (2010).
hf_prights	Property Rights	It measures whether private property rights are protected by law and law is enforced by government. It also measures the chance that private property will be expropriated, and the presence of corruption within the judiciary. It ranges from 0 and 100, where 100 represents the maximum degree of protection of property rights. From Heritage Foundation, 2014. Available at http://www.heritage.org/index/explore
kun_legabs	Absolute legal	Absolute legal institutional quality (simple averages). From Kuncic (2013).

	institutional quality (simple averages)	
wbgi_rle	Rule of Law – Estimate	It includes perceptions of the incidence of crime, the effectiveness and predictability of the judiciary, and the enforceability of contracts. From World Bank's Worldwide Governance Indicators, Kaufmann et al.(2010).
wef_ji	Judicial independence	To what extent is the judiciary in your country independent from influences of members of government, citizens, or firms? [1 = heavily influenced; 7 = entirely independent]. From W. E. Forum, "The global competitiveness report 2012-2013," 2012.
wef_pr	Property rights	How would you rate the protection of property rights, including financial assets, in your country? [1 = very weak; 7 = very strong]. From W. E. Forum, "The global competitiveness report 2012-2013," 2012.
Bureaucratic and Administrative Capacity		
icrg_qog	ICRG indicator of quality of government	The mean value of the ICRG variables Corruption, Law and Order, and Bureaucracy Quality, scaled 0-1. Higher values indicate higher quality of government. From International Country Risk Guide.
ti_cpi	Corruption Perceptions Index	It measures corruption in the public sector, whether the abuse of public office for private gain as perceived by business people, risk analysts and the general public. It takes values between 10 (highly clean) and 0 (highly corrupt). From Transparency International, Treisman (2007).
wbgi_cce	Control of Corruption - Estimate	This variable measures perceptions of corruption, conventionally defined as the exercise of public power for private gain. From World Bank's Worldwide Governance Indicators, Kaufmann et al.(2010).
wbgi_gee	Government Effectiveness - Estimate	It consists of the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies. From World Bank's Worldwide Governance Indicators, Kaufmann et al.(2010).
qs_impar	Impartial Public Administration	The index measures to what extent government institutions exercise their power impartially. The impartiality norm is defined as: When implementing laws and policies, government officials shall not take into consideration anything about the citizen/case that is not beforehand stipulated in the policy or the law. From Quality of Government Expert Survey, Teorell et al.(2011).

qs_proff	Professional Public Administration	The index measures to what extent the public administration is professional rather than politicized. Higher values indicate a more professionalized public administration. From Quality of Government Expert Survey, Teorell et al.(2011).
wdi_eodb	Ease of doing business index (1=most business-friendly regulations)	Ease of doing business ranks economies from 1 to 189, with first place being the best. A high ranking (a low numerical rank) means that the regulatory environment is conducive to business operation. From W. B. Group, World Development Indicators 2012.
Infrastructural Capacity		
ffp_ps	Public Services	It includes pressures and measures related to policing, criminality, education provision, literacy, water and sanitation, infrastructure, quality healthcare, telephony, internet access, energy reliability, roads. It ranges between 0 (good) and 10 (bad). From Found for Peace, available at http://fsi.fundforpeace.org/
wdi_roaddens	Road density (km of road per 100 sq. km of land area)	Road density is the ratio of the length of the country's total road network to the country's land area. The road network includes all roads in the country: motorways, highways, main or national roads, secondary or regional roads, and other urban and rural roads. W. B. Group, World Development Indicators 2012
wdi_telephone	Telephone lines (per 100 people)	Telephone lines are fixed telephone lines that connect a subscriber's terminal equipment to the public switched telephone network and that have a port on a telephone exchange. W. B. Group, World Development Indicators 2012
wef_elec	Quality of electricity supply	How would you assess the quality of the electricity supply in your country (lack of interruptions and lack of voltage fluctuations)? (1 = insufficient and suffers frequent interruptions; 7 = sufficient and reliable). From W. E. Forum, "The global competitiveness report 2012-2013," 2012.
wef_mobile	Mobile telephone subscriptions/100 pop	Number of mobile telephone subscriptions per 100 population. From W. E. Forum, "The global competitiveness report 2012-2013," 2012.
wef_qair	Quality of air transport infrastructure	How would you assess passenger air transport infrastructure in your country? (1 = extremely underdeveloped; 7 = extensive and efficient by international standards). From W. E. Forum, "The global competitiveness report 2012-2013," 2012.
wef_qoi	Quality of overall infrastructure	How would you assess general infrastructure (e.g., transport, telephony, and energy) in your country? (1 = extremely underdeveloped; 7 = extensive and efficient by international standards). From W. E. Forum, "The global competitiveness report 2012-2013," 2012.
wef_qport	Quality of port infrastructure	How would you assess the port facilities in your country? (1 = extremely underdeveloped; 7 = well developed and efficient by international standards). For landlocked countries, the question is as follows: How accessible are port facilities? (1 = extremely inaccessible; 7 = extremely accessible). From W. E. Forum, "The global competitiveness report 2012-2013," 2012.

wef_qrail	Quality of railroad infrastructure	How would you assess the railroad system in your country? (1 = extremely underdeveloped; 7 = extensive and efficient by international standards). From W. E. Forum, “The global competitiveness report 2012-2013,” 2012.
wef_qroad	Quality of roads	How would you assess the road system in your country? (1 = extremely underdeveloped; 7 = extensive and efficient by international standards). From W. E. Forum, “The global competitiveness report 2012-2013,” 2012.
Economic Development		
wdi_gdppcPPPcon	GDP per capita PPP (constant 2011 international \$)	GDP per capita based on purchasing power parity (PPP). Data are in constant 2011 international dollars. From W. B. Group, World Development Indicators 2012.
une_lit	Literacy Rate Adult Total	Percentage of persons aged 15 and over who can read and write. From UNESCO available at http://www.uis.unesco.org/Datacentre/Pages/instructions.aspx?SPSLanguage=EN
une_imr	Infant Mortality rate	Probability of dying between birth and exactly one year of age expressed per 1,000 live births. From UNESCO available at http://www.uis.unesco.org/Datacentre/Pages/instructions.aspx?SPSLanguage=EN
bl_lp_15mf	Percentage population with Primary Schooling	Percentage of primary schooling in male and female population aged 15 and over. From Barro and Lee (2013).
Other Determinants of the State Capacity		
al_ethnic	Ethnic fractionalization	It measures the probability of that two-randomly drawn people in a country belong different ethnic groups. From Alesina et al.(2003).
ross_oil_netexpc	Oil export	Net oil exports value per capita, constant 2000 \$. From Ross(2013).
lp_legor	Legal Origin	The legal origin of the Company Law or Commercial code of each country: English Common Law, French Commercial Code, Socialist/Communist Laws, German Commercial Code, Scandinavian Commercial Code. From La Porta et al.(1999)
	Democracy	It measures the extent of institutionalized democracy, averaged for the period 1960-2000. From Polity IV data set.
	Military expenditure	Total military budget for a given country and year, averaged over the period 1800-2001. From National Material Capabilities Dataset version 4.0, Singer et al.(1972).

Note: *Democracy* variable was taken from Ashraf and Galor(2013), *Military Expenditure* was taken from National Material Capabilities Dataset version 4.0, Singer et al.(1972), and the other variables in the table were taken from the Quality of Government Dataset 2014 version.