Monotheism
(From a Sociopolitical and Economic Perspective)

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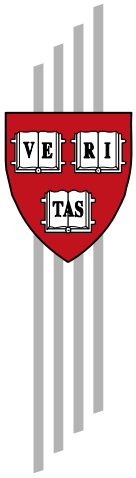

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The Axial Age, which lasted between 800 B. C. E. and 200 B. C. E., covers an era in which the spiritual foundations of humanity were laid simultaneously and independently in the various geographic areas, and all three major monotheisms of Judaism, Christianity and Islam were born between 606 B. C. E. and 622 C. E. in the Middle East. In this paper, I offer a taxonomy to comprehensively characterize the impact of monotheism on early economic development. Monotheist religions produced a paradigm shift in sociopolitical institutions because they (a) involve a strong degree of increasing returns to scale and the natural monopoly powers commensurate with it, (b) not only personalize the spiritual exchange relationship between the individual and the one deity, but also, due to the fact that this relationship extends into the afterlife as well, enhance individual accountability, and (c) expand their adherents' time horizon beyond biological life and impact the time discount between one's lifetime and the after-life. Taken together, these features suggest that the spread of monotheism ought to have promoted sociopolitical stability. Utilizing original historical data between 2500 B. C. E. and 1750 C. E. on 232 limited access orders, such as dynasties, kingdoms and empires. I show that monotheism had a positive and statistically significant impact on the length of reign as well as the average geographical size of social orders. Thus, I find empirical evidence that the birth and adoption of monotheistic religions aided early development both in the West and the Near East until the advent of the Industrial Revolution.

Keywords: economic development, religion, institutions

JEL codes: C72, D74, N33, N43, O10

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(From a Sociopolitical & Economic Perspective)

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The Axial Age, which lasted between 800 B. C. E. and 200 B. C. E., covers an era in which the spiritual foundations of humanity were laid simultaneously and independently in various geographic areas. And all three major monotheisms of Judaism, Christianity and Islam were born between 606 B. C. E. and 622 C. E. in the Middle East. In this paper, I offer a taxonomy to comprehensively characterize the impact of monotheism on early economic development. Monotheist religions produced a paradigm shift in sociopolitical institutions because they (a) involve a strong degree of increasing returns to scale and the natural monopoly powers commensurate with it, (b) not only personalize the spiritual exchange relationship between the individual and the one deity, but also, due to the fact that this relationship extends into the afterlife as well, enhance individual accountability, and (c) expand their adherents' time horizon beyond biological life and impact the time discount between one's lifetime and the after-life. Taken together, these features suggest that the spread of monotheism ought to have promoted sociopolitical stability. Utilizing historical data between 2500 B. C. E. and 1750 C. E. on 232 limited access orders, such as dynasties, kingdoms and empires, I show that monotheism had a positive and statistically significant impact on the length of reign as well as the average geographical size of social orders. Thus, I find empirical evidence that the birth and adoption of monotheisms aided early development in the West, the Near East and even parts of Africa until the advent of the Industrial Revolution.

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"If God does not exist, all is permitted."

Ivan in *The Brothers Karamazov* (1880), Fyodor Dostoyevsky.

1. Introduction

The spiritual foundations of human societies were laid in various different geographic regions of the world fairly simultaneously during what is defined as the Axial Age, which lasted between 800 B. C. E. and 200 B. C. E.[1] All three major monotheisms were born around this age between 606 B. C. E. and 622 C. E. in the Middle East and they spread fairly rapidly to Europe, Africa and Asia subsequently. By the year 2000, 161 countries subscribed predominantly to one or more of the three monotheistic faiths, representing 86 percent of the 188 countries for which data exist and close to 3.3 billion people or roughly 55 percent of the world population. In the words of Diamond (1997, pp. 266-67), "At the end of the last Ice Age, much of the world's population lived in [hunter-gatherer societies] and no people then lived in a much more complex society. As recently as 1500 A. D., less than 20 percent of the world's land area was marked off by boundaries into states run by bureaucrats and governed by laws. Today, all land except Antarctica's is so divided. Descendants of those societies that achieved *centralized government* and *organized religion* earliest ended up dominating the modern world. The combination of *government* and *religion* functioned, together with germs, writing, and technology, as one of the four main sets of proximate agents leading to history's broadest pattern."

Sociologists and political scientists have long been intrigued by how religion, governments and polities might have influenced each other historically. Various Enlightenment and early-20th century, post-Enlightenment scholars, such as David Hume, Auguste Comte, and Emile Durkheim, believed that faith and religion would experience an inevitable decline in the face of scientific and technological advances (see Hume, 1911, and Comte, 1855). But they also articulated in detail the social functions of faith and religion. According to Hume (1911), for example, benevolence and moral considerations associated with religion are the pillars of social harmony and stability. And Durkheim (1912) saw in group and social cohesion the manifestations of religious practices, norms and rituals. In the 1930s, the *structural-functionalist* school, led by Talcott Parsons began to assert that the cohesion of societies depended on their members sharing a common

[1]Term coined originally by Karl Jaspers (1953). See also Armstrong (2006, p. xvi).

purpose, conceptions of morality and an identity. In this, they were adhering to Emile Durkheim who saw in religion these social necessities. The validity of this line of thought has been called into question more recently, mostly on account of countries like the United States which were and are able to sustain social cohesion as well as a national identity in conjunction with religious pluralism and tolerance.[2] Still, the structural-functionalist concept can apply more generally at the level of not one particular faith but according to the (mono)theistic attribute of a plurality of faiths to which members of a society adhere. Along these lines, Stark (2001) has provided a sociological "theory of Gods" in which he identifies personalized supernatural exchange relations and otherworldly rewards as two features of monotheism that impact social organization and sociopolitical stability. In contrast, economists have been fairly mute on this issue despite the fact that Adam Smith had a section in *The Wealth of Nations* (1776) devoted to how religious affiliation or lack thereof could impact national and political stability via its influence on conflict and cooperation.[3]

In this paper, I argue that the birth of monotheism was a major breakthrough in sociopolitical organization and that it had a returns to scale advantage relative to paganist and polytheist religious traditions. That is, monotheist religions involve a strong degree of increasing returns to scale and the natural monopoly powers commensurate with it. Second, monotheistic faiths are unique in that they not only personalize the spiritual exchange relationship between the individual and the one deity, but due to the fact that this relationship extends into the afterlife as well, they also enhance individual accountability. On that basis, monotheistic faiths expand their adherents' time horizon beyond biological life and impact the time discount between one's lifetime and the afterlife.

There are two implications of these features: First, due to the fact that institutions of monotheism possessed the ecclesiastical monopoly power to legitimize or undermine the temporal powers of the political elite, they helped produce political and ecclesiastical institutions that were powerful. In particular, religious organizations derived substantial financial and political benefits from being associated with One God. Thus, the stability of civilizations came to be linked with their respective ecclesiastical institutions. Second, the fact that all monotheist religions hold individuals accountable to God on Judgment Day aided contract enforcement, commitment and respect for private property within social orders. The combination of this accountability with the stronger emphasis on the afterlife also complemented military technologies in external conflicts. Both of these

[2]For more details, see Stark (2001, p. 245).

[3]Stark, 2001, p. 116.

observations then imply, in Durkheimian fashion, that monotheist civilizations ought to have endured longer and perhaps even controlled larger geographic domains. As a result, monotheistic faiths should have spread and grown at the expense of paganist and polytheist religions.

Utilizing data between 2500 B. C. E. and 1750 C. E. on 232 limited access orders, such as dynasties, kingdoms and empires, I show that the birth of Judaism, Christianity and Islam and adherence to monotheism had statistically significant effects on the length of reign as well as the average geographical size of civilizations historically.[4] Specifically, I demonstrate below that kingdoms, dynasties and empires lasted about 340 years on average during this long time interval. And those historical civilizations that adopted monotheism, regardless of whether it was Judaism, Christianity, or Islam, lasted about 35 to 65 percent longer and had a 10 percent higher likelihood of surviving an extra century than non-monotheist social orders . Beyond the general impact of adherence to monotheism, I cannot find any empirical evidence that Judaism, Christianity or Islam exerted an impact on the length of reign of historical civilizations. I also confirm that monotheism had a roughly similar effect on the geographic domain over which historical civilizations reigned during their peak. That is, monotheist limited access orders controlled about twice the land area of their non-monotheist counterparts. Unlike the results on duration, however, I find some evidence that adherence to a specific religion — Islam — did exert an additional positive impact on geographic domain.

In the way of up-front clarification, one might be bound to think that, since One God faiths are built upon true revelations, they were destined to slowly wipe out the falsities of paganism, polytheism and the like. Be that as it may, such an assessment does not explain why monotheisms spread at the expense of other faiths at least partly due to the fact that monotheist societies lasted longer and spread wider. Put differently, monotheisms could have become the ecclesiastical norm among the historical societies of the Middle East, Africa, Europe and Asia without having had an effect on the duration and dominance of civilizations. But the role of monotheisms on empire's durability and dominance seems to have been an important reason why Christianity and Islam spread rapidly in Europe, North Africa and the Middle East between the 4th and 9th centuries.

This paper relates to a strand in economics that emphasizes religion, social norms and culture as important factors in individual behavior and/or social organization. The

[4]As I clarify below, I shall define a society as *monotheist* if a majority of its citizens adhered to one of the three main monotheist religions, and/or their government and political organizations promoted one of the three monotheist traditions through its social, economic and military policies. I shall also discuss some empirical issues that could complicate the analysis given this definition.

main focus of some work in this strand is religion and culture in general (e.g., North, 1990, Iannaccone, 1992, Temin, 1997, Landes, 1999, Greif, 2006, Glaeser and Sacerdote, 2002, Jones, 2003, Fernandez et al. 2004, Fernandez, 2007, Barro and McCleary, 2003, 2005, Guiso, Sapienza and Zingales, 2003, forthcoming, and Spolaore-Wacziarg, 2005). Others in this line focus on a specific religion, such as Judaism, Islam or different denominations of Christianity to emphasize how individual behavior and the evolution of sociopolitical institutions were — and still are — driven by them (e.g., Botticini and Eckstein, 2005a, 2005b, Kuran, 2004b, 2005, Becker and Woessmann, 2007, Lewis, 2002). Due to its emphasis on the links between ecclesiastical institutions and early development, the work below is also related to the theoretical and empirical literatures on institutions and economic progress (e.g., North, 1990, North et al. 2007, Acemoglu et al. 2001, and Rodrik et al. 2004).

The remainder of this paper is organized as follows: In Section 2, I summarize the role of monotheism in socio-politics, economics and vice versa. In Section 3, I describe my data, present the empirical findings and check for robustness. In Section 4, I conclude.

2. A Simple Taxonomy

Although they are not exclusive to the three main monotheist traditions, there are at least three salient traits of One-God faiths which impact the economic and sociopolitical realms.

2.1. Returns to Scale & Natural Monopoly

Judaism, Christianity and Islam all acknowledge and promote the "oneness" of God. By nature, this introduces monopoly power and a strong element of increasing returns to scale in the provision of religious services. The monopolization of faith is a defining characteristic of the three monotheistic traditions. Niebuhr (1932, p. 53) points out that "The omnipotence of God, as seen in the world of nature, invests his moral character with the quality of the absolute and transfigures it into holiness... The religious conscience is sensitive not only because its imperfections are judged in the light of the absolute but because its obligations are felt to be obligations toward a person. The holy will is a personal will."

Emphasizing a related point, Armstrong (1993, p. 49) identifies that monotheistic faiths were unique in their mutual exclusivity, especially with respect to the belief in one God. She states, "hostility toward other gods was a new religious attitude [of monotheism]. Paganism was an essentially tolerant faith: provided that the old cults

were not threatened by the arrival of a new deity, there was always room for another god alongside the traditional pantheon. Even where the new ideologies of the Axial Age were replacing the old veneration of the gods, there was no such vitriolic rejection of the ancient deities."

Stark (2001, p. 19, 34) draws a critical distinction between the individual's relationship with one God under monotheism and that with multiple deities in polytheism, according to which competition between various divine beings played a role in shortening the interactions between the adherents and their gods:

> "Polytheistic religions sustain only short-term exchanges, as humans seek specific and quite immediate benefits from the Gods and spread their risks by shopping around and patronizing multiple suppliers. If there is only one God, this necessitates an *exclusive* exchange relationship, there being no logical alternatives... It is illogical to deal with a flock of specialized Gods if there is One God of unlimited scope and capacity. An exclusive relationship with One God is also an *extended* relationship—usually lifelong. No longer are humans able to go "God shopping" or to pit one God against another. This results in extremely strong organizations possessed of immense resources, consistent with a God of unlimited power and concern."

Furthermore, monotheisms differ from one another in the extent to which they are 'clerical' or 'congregational' although, in this regard, the heterogeneity within Christianity — which for the most part is due to the Protestant Reformation and its offshoots — is unique.[5] Naturally, the clerical system enabled more of a fusion between ecclesiastical authority and temporal political power. That is, the extent to which the clergy

[5]In Islam, which by construction is congregationalist, the Caliphate was at least at times used to legitimize political authority. During its early tenure, the Caliphate represented a powerful religious and political authority for both the *Sunni* and the *Shi'a*. According to Armstrong (1988, p. 585). "The *Caliph* was the successor and deputy of the Prophet Mohammed and he was recognized as the supreme authority of the Muslims by the Sunni until the Mongolian invasions in the late thirteenth century. According to the Sharia, the caliph exercised full authority in both spiritual and political matters, but in fact, his position was weak. After the period of the *rashidun*, the first four Rightly Guided Caliphs, and the rise of the sultans and amirs throughout the huge Islamic empire, the caliph lost credibility and became a figurehead."

Even during the later era, however, the Sunni Caliphate represented a medium of legitimizing political authority: the Ottoman Emperor Yavuz Sultan Selim conquered the Arabian peninsula in 1517 and assumed the Sunni Caliphate, a title which all the Ottoman Sultans carried until 1924 when the fledgling Turkish Republic abolished it.

In contrast, for the Shi'a, there were twelve Caliphs who possessed religious and political authority. According to Shi'a liturgy, the Prophet Mohammed wanted his cousin Ali to succeed the first Caliph, Abu Bakr. Thus, after *rashidun* (which represents the reign of the first four caliphs recognized as

had ecclesiastical authority often influenced the political sphere because the clergy could use their powers to bolster or undermine the legitimacy of secular authorities. On this, Niebuhr (1932, pp. 6-7) notes "The two most obvious types of power are the military and the economic, though in primitive society the power of the priest, partly because he dispenses supernatural benefits and partly because he establishes public order by methods less arduous than those of the soldier, vies with that of the soldier and the landlord."

These increasing returns and the associated powers of monopoly are what help to explain the prominent monopoly roles of the Roman Catholic Church in Western Europe during the common era, the Greek Orthodox Church in Eastern Europe between 4th century and the 19th centuries C. E., as well as that of the Caliphate in the Rashidun era, Ummayad and Abbasid dynasties between 600 C. E. and 900 C. E. and the Ottoman Empire between 1517 and 1924. As Stark explains the fact that individuals are held accountable by *one* God for their temporal deeds and that his rewards are often delayed until after death, "is a major factor allowing Godly religions to generate the long-term levels of commitment necessary to sustain strong religious organizations."

2.2. Personalized Spiritual Exchange and Accountability

Human spirituality is pillared on the desire to grasp the meaning of existence and rationalize, at least to an extent, natural phenomena that are incomprehensible to the human mind. With atheistic spiritual movements, explanations of such phenomena typically involve supernatural powers that do not have the conscious will that is required for personalized involvement and communication. With polytheistic faiths, there are multiple deities who rule various aspects of temporal life, but there exists none with the omnipotence to control all aspects of temporal and spiritual existence. In contrast, monotheistic faiths involve one omnipotent divine being who has not only control over the whole universe, but also desires he wishes humans to fulfill which he can communicate them.

Stark (2001, p. 15-19) observes that, by personalizing the spiritual exchange and reenforcing accountability, theology and faith provide a very effective means to deal with human wants and desires that are often fleeting and inherently in short supply, such as survival, health, financial security, etc.:

"Because Gods are conscious beings, they are potential exchange part-

legitimate by both the Sunni and the Shi'a), the descendants of Ali began to offer an alternative rule to the Sunni caliphs. When Ali's bloodline died out after the twelfth Caliph, the Shi'a declared that he would eventually return as their Messiah.

> ners because all beings are assumed to want something for which they might be induced to give something valuable. Indeed, the core of Godly religious doctrines consists of explanations about what Gods want and what one must do to earn their blessings... That is, Godly religions assume that divine beings not only have desires they wish humans to fulfill, but that they can communicate them... If theology, in effect, tells us what God wants, it is equally important that we understand the other side of this exchange relationship: what do people want from God? To answer, we must acknowledge the most fundamental aspect of the human predicament, namely that rewards are always in limited supply and some are entirely unavailable... In response, humans tend to seek alternative means to overcome limited supplies or complete unavailability, [such as miracles and otherworldly rewards.]"

By nature, otherworldly rewards are compensation for individuals' temporal deeds and, to an extent, they substitute for temporal needs and wants that are in limited supply or that are entirely unavailable.

2.3. Time Horizon & Time Discounting

The belief in afterlife is not unique to monotheist traditions but, the Judgement Day, when individuals are held accountable for their deeds and are judged by God accordingly, is a central tenet of all three major monotheist traditions. This is typically lacking in religions that involve reincarnation.

In Jewish liturgy there is significant prayer and talk of a "book of life" that one is written into, indicating that God judges each person each year even after death. This annual judgment occurs on *Rosh Hashanah*. In Christianity, the Last Judgment or *Day of the Lord* is the simultaneous judgment of every person when, after the resurrection of the dead, Christ will return to judge the living and the dead. Those positively judged will be saved and live in God's presence in Heaven and those who are negatively judged will be cast to eternal Hell. In Islam, the *Day of Judgment* is described in the Quran and the Hadith. The Islamic Judgment day starts 30 years before the end of the earth, and sees the return of prophet Jesus to the earth. The last 30 years on earth will be a line of events that will see the resurrection of the deceased. This is followed by judgment day beyond the universe involving Hell and Heaven and the weighing of Good and Evil.

In contrast, religions that include reincarnation (e.g., Hinduism) lack a Day of Judgment; the determination of how an individual is to be reborn being a particular judgment on the merit of the life just lived.

For our purposes, then, we can categorize the various effects of a personalized spiritual exchange between the individual and God in addition to the belief in the afterlife and the Judgement Day according to whether they are intra-social or extra-social in nature.

2.4. Intra-Social Effects

Scholars of theology, psychology, sociology and, to some extent, economics too have recognized the moral, ethical and egalitarian aspects of religion, in general, and monotheist traditions, in particular.

For example, while being dismissive of religion in general and arguing that it belonged to relatively primitive states of social order, such as the pre-Industrial era, Sigmund Freud recognized that it promoted ethical values and moral codes essential to a society's functioning. Karl Marx, who also had no room for faith in his vision of socialism, stated that it was "the opium of the people, which made this suffering bearable." According to Armstrong (1993, p. 48) "It has to be said that this imaginative portrayal of God in human terms has inspired a social concern that has not been present in Hinduism. All three of the God-religions have shared the egalitarian and socialist ethic of Amos and Isaiah. The Jews would be the first people in the ancient world to establish a welfare system that was the admiration of their pagan neighbors." Along the same lines, Farrington (2002) notes that, while for some empires religion was the main impetus for their existence, for most of them it served as a means of social stability and control.

With respect to the impact of each monotheist religion on its adherent societies, the economic history literature is fairly well-developed with regard to the impact of various Christian denominations — in particular, those of the Protestant Reformation and its offshoots — on the European economic takeoff. Moreover, in recent years, there has been a fledgling body of work which has begun to focus on the link between faith-related institutions and economic development within Jewish and Muslim societies.

As is very well known, the impact of Protestantism on European sociopolitical and economic evolution has been extensively debated. The origins of this debate can be traced back to Weber (1930) who subscribed to the view that Protestantism — particularly its offshoot Calvinism — had "cultivated an intense devotion to one's work or 'calling' in order to assure oneself that one had in fact been selected for salvation." Rosenberg and Birzdell (1986, p. 129) are sympathetic to this view and discuss it in detail. But various scholars dispute it strongly. For instance, Mokyr (1990 and 2002) dismisses this link by noting that the Counter-Reformation era was probably as bigoted a period as the pre-Reformation era.

One of the main thrusts of Martin Luther was his emphasis on the laity's responsibility to study and personally examine the Scripture for themselves. As such, Protestantism had two discernible, long-term effects on the European society and its organization. First, it clearly empowered the individual and emphasized his personal responsibility as superior over ecclesiastical regulations and regimentations (see Hillerbrand, 1968, p. xxiv). Second, the Lutheran calls for individuals to study and read the Bible themselves spurred a greater emphasis on literacy as well as various interpretations of the Scripture with the translation and the printing of the Bible in the vernacular instead of its original Latin.

This last point is emphasized by Becker and Woessmann (2007) who find empirical support for the idea that the Protestant Reforms spurred human capital accumulation among the followers of the Protestant reformers. In expounding on this idea, Hillerbrand (1968) notes that about one million copies of Luther's tracts had been published by 1523 and that the literature produced by the Reformation scholarship — led by the preeminent figures of the time such as Luther, Zwingli and Calvin as well as other minor reformers such as Bucer, Melanchthon and Carlstadt — would not have been published had there not been sufficient demand.

Botticini and Eckstein (2005, 2007) make this same argument with respect to Judaism: the reading of the Torah and the Talmud became a requirement of Judaism following the burning of the Jewish Temple in Jerusalem in 64 C. E., thereby leading to advanced literacy and a steep path of human capital accumulation in the Jewish communities of the Middle East between 64 C. E. and 200 C. E.

Others have emphasized that perhaps the most important legacy of the recognition of Protestantism and its various offshoots by the Catholic Church in the 16th century was greater social cohabitation in Europe (see, MucColloch, 2003, p. 652).

With regard to Islam, Armstrong (1993) and Lewis (2003) discuss in some detail various institutional features of Islam and the impact of the latter on ancient Arab civilizations, such as the Abbasids, Umayyads, and Mamluks. Kuran (2004a, 2004b) and Lewis (2002) also elaborate on how Islam and its interactions with Christianity and Judaism influenced the institutions of the Ottoman Empire. The common thread among these works is that the Islamic culture helped promote stability in social, political and the economic realms, although in the case of the Ottoman Empire some of the very institutional traits that promoted stability came at the cost of dynamic flexibility.

2.5. Extra-Social Effects

There is a well-established strand in the political science literature that focuses on reli-

gion in explaining the historical patterns of violent conflict and cooperation; it shows that differences in religious beliefs have historically induced violent conflicts. For instance, in compiling a data set with over 300 violent conflicts around the world between 1820 and 1949, Richardson (1960) reveals that differences of religion, especially those of Christianity and Islam, have been causes of wars and that, to a weaker extent, "Christianity incited war between its adherents." In addition, Richardson finds that war alliances had subdued and prevented wars between former allies, although this influence declined with the passage of time since the alliance. As Wilkinson (1980) points out, Richardson's analysis applies more broadly in the sense that "the propensity of any two groups to fight increases as the differences between them (in language, religion, race, and cultural style) increase."

The fall of Jerusalem to Islamic civilizations instigated (depending on how you count, about nine) Holy Crusades that had a profound impact on how the Christian, Muslim and Jewish civilizations interacted subsequently. With reference to the confrontations of Ottomans and Europeans, in particular, Faroqhi (2004, pp. 41-42) notes "these rivalries did not prevent Christians from both western and south-eastern Europe from seeing themselves as belonging to one and the same religion, and this sentiment was especially strong when they were confronted with a Muslim ruler." And in a companion paper, Iyigun (2006), I have shown how the conflict between the Muslim Ottoman Empire and European secular and ecclesiastical powers aided and abetted Protestants' rise. Such evidence lends further credence to the arguments that religious affiliation has historically been a key determinant of international conflicts and cooperation.

Niebuhr (1932, pp. 65-66) accepts that stoking patriotic notions of identity was important for galvanizing a society in external conflicts too. But what made religion especially effective as a complementary component of national defense was the "absolute" nature of its claims, rewards and punishments:

> "It is not only religion which gives a special dignity and worth to the life of the nation to which one belongs. Patriotism is a form of piety which exists partly through the limitation of the imagination, and limitation may be expressed by savants as well as by saints. The wise men of the nations were just as sedulous in proving, during the late Word War, that their particular nation had a peculiar mission to "culture" and "civilization" as were the religious leaders in asserting that the will of God was being fulfilled in the policy of their state. But since the claims of religion are more absolute than those of any secular culture the danger of sharpening the self-will of nations

through religion is correspondingly greater."

Stark (2001, p. 35) in fact ties this aspect of monotheism to its more benign forms, such as its adherents extensive missionary zeal and desire to spread the word of one true God:

> "When we examine history, we find no massive mobilizations on behalf of *the Gods*. Polytheistic societies are capable of prodigies of effort including those of conquest. But the armies of Rome, imperial China, or ancient Egypt did not march on behalf of divine will—unlike the armies of Islam or those enlisted by popes for Crusades to the Holy Land. Granted, many Christian crusaders and Islamic conquerors also had nonreligious motives, and some may even have been irreligious. But, lacking the powerful religious justification of doing God's Will, these events would not have taken place. Only One True God can generate great undertakings out of primarily religious motivations, chief among these is the desire, indeed the duty, to spread the knowledge of the One True God..."

3. The Empirical Analysis

3.1. Data Sources, Descriptions & Classifications

Testing the theory of monotheism I outlined above, in particular, the idea that monotheism produced sociopolitical stability, requires establishing specifically what is meant by a *monotheist* society. Thus, for practical purposes, I shall define a society as *monotheist* if a majority of its citizens adhered to one of the three main monotheist religions and/or its government and political organizations promoted one of the three monotheist traditions through their social, economic and military policies.

One potential objection to our definition could be that it treats all individuals of a given society identically. But as we clearly know, there exists a great deal of heterogeneity in the individuals' degree to which they adhered to and practiced the majority monotheism of their society. Even in the case of forced conversions following conquest and subversive campaigns, there was no guarantee that the converts practiced the dictated state monotheism.

A relevant example in this regard is the plight of the Jewish converts in al-Andalus prior and subsequent to the pogroms of 1391. The conversion of many Jews (the *conversos*) during this era in order to avoid massacre in Christian hands was not enough to quell suspicions that they were in fact 'closet Jews' and those coreligionists who dared

not to have converted were also promoting Judaism at the expense of Christianity. Thus began the infamous *Spanish Inquisition* which was the design of Ferdinand of Aragon and Isabella of Castile to purge Iberia of all non-Christian elements (for more details, see Iyigun, 2008).

In light of this potential concern, let us make the following observations: First, the main emphasis here is on whether the state and government apparatuses adhered predominantly to and promoted one of the monotheisms — be it via its conquests and trades or through its imperial, colonial and missionary activities. The emphasis is not so much on whether individuals properly and uniformly adhered to their state's monotheism. True, for monotheisms to have imparted the internal and external sociopolitical benefits that we discussed above, a majority of a society's members would have had to have practiced monotheism. But this bring us to the second point which is that this is ultimately an empirical matter. Since we cannot hope to have an accurate measure of individuals' overall intensity of *adherence to monotheism* and we use a definition which, for the most part, classifies each civilization according to its state and government attitudes regarding monotheism, if the former was what really mattered and not our definition, the empirical work below would refute any effects of monotheism on societies. Finally and related to our second point, we should acknowledge that any such variation and heterogeneity within societies would produce attenuation bias.

Turning back to the particulars of our definition, consider the Carolingian Empire of Charlemagne, the Ottoman Empire, the Bahmani Sultanate and the Mughal Empire. The defining characteristic of the Carolingian Empire was that its King Charlemagne was coronated by the Catholic Pope Leo III in 800 C. E. as the political leader of western Europe crowned by God. During all of his reign, Charlemagne was driven by his desire to conquer lands to his north and east with the intent to spread Christianity and he was quite successful in this endeavour. In contrast, the Ottoman Empire was orders of magnitude more pluralistic in its sociopolitical and imperial policies, at least judged by the norms of its era. Conquered peoples were free to practice their religion as long as they paid the levied taxes. The Greek, Armenian, Jewish and Frankish minorities practiced their trade and commerce and lived in their more or less isolated communities throughout the empire in relative peace. But rising in the bureaucratic or military ranks required a Muslim identity. And the *devşirme* system, which was introduced by Sultan Murad I in the early 15th century, was the act of gathering and converting to Islam the young boys of the non-Muslim Ottoman populations who were raised in palaces or military barracks with the sole intent of employing them in their adulthood in military or government posts. The Bahmani Sultanate, which ruled in southeast India between

the early-14th and early-16th centuries, also resembled the Ottoman Empire in that the Muslim groups dominated politically, but the Hindu areas were granted some degree of autonomy and coexistence was facilitated by mutual non-interference. Along these lines, the Muslim Mughal Empire was founded by the Chagatai Turkic ruler Babur and reigned in Northern India between the mid-16th to mid-18th centuries. While it became a politically and religiously intolerant regime later during the leadership of Aurangzeb, to which its seeds of decline is often attributed, by most accounts, the Mughals too were a religiously and politically tolerant society especially during the reign of Akbar. While this is a relatively crude generalization, the societies classified as monotheist in the sample below either resemble the Carolignian Empire or the Ottomans and the Bahmani Sultanate in terms of the role of religion in their political, administrative and social spheres.

To proceed with our investigation, we need a comprehensive dataset on empires, kingdoms and dynasties that cover a wide enough historical timepsan which envelops the birth of the three monotheistic faiths on both ends. With these constraints and demands in mind, I focus on a 4250-year period between 2500 B. C. E. and 1750 C. E. The start date of 2500 B. C. E. is purely due to data limitations as a systematic record of historical civilizations only dates thus far back. And I chose to cap the sample dates at 1750 C. E. in order to establish the role of monotheism in socio-politics during the pre-Industrial and prior to the rise of nation states.

There are a variety of alternative sources of data for our purposes and for the historical record of empires, dynasties, and kingdoms, I used Rand McNally & Co.'s *Historical Atlas of the World* (2005), *Encyclopedia Britannica* (http://www.britannica.com), Anglin and Hamblin (1993), Farrington (2002, 2006) and Oxford *Atlas of World History* (2002). As I provide more detail below, I recorded various facts about these civilizations, the most important of which are their years of foundation and collapse (if they did so before 1750 C. E.). For geographical information on land areas, I relied on the C. I. A.'s *The World Factbook*. For geographic classification, I divided Europe, the Middle East, Africa, Asia, and America into thirty one regions according to their historical significance and as classified by Anglin and Hamblin. Using these historical records and various sources, I was able to identify 232 civilizations which inhabited one of the five continents. Appendix A presents the 232 limited access orders included in my dataset and Appendix B lists the thirty one historically important regions of the five continents as well as their land areas as compiled from *The World Factbook*.

Before, we proceed, three data clarifications are in order: First, while Appendix A lists the years in which each civilization was founded and ceased to exist, for all empirical

tests below the cap 1750 C. E. is relevant and, when the date on which a civilization ended is past that date, it also binding. In other words, even if a civilization lasted long past 1750 C. E., I only considered its duration up to that date. I have done this to abstract from the roles of the Industrial Revolution and the rise of the nation states on duration and peak land mass attained. But bear in mind that, since a state was more likely to have been predominantly monotheist later in my time span, capping the duration of societies which existed in the mid-18th century introduces a data construction bias against the main hypothesis advocated in this paper.

Second, this is a data construction exercise from scratch: as such it takes the information available in the main sources of Rand McNally & Co.'s *Historical Atlas of the World* (2005), *Encyclopedia Britannica*, Anglin and Hamblin (1993) and the *Atlas of World History* (2002) as a starting point. It is intended to be as comprehensive as possible, but to the extent that I could not verify relevant crucial data on the foundation and extinction dates, peak land mass, etc., of the civilizations in question from reliable sources, there are some non-systematic data omissions.

Finally and along the same lines, this is meant to be a data set on *all* ancient, medieval and pre-Industrial era civilizations that had some *autonomy* and *scale*. This is the reason why the data encompass kingdoms, dynasties and empires, as well as early American civilizations about which we have less-specific information on government structure, state organization and social life. This is also the reason why I have excluded from my sample feudal principalities, medieval fiefdoms, suzeranity, the Anatoilan derebeyliks and various city-states. As I shall explain in some detail below, this effectively yielded sovereigns that ruled over at least about 25,000 km^2, although the data yielded one outlier state in Asia with only a 4,000 km^2 domain (more on which below). Appendix C provides a list of civilizations which have been excluded from the dataset, either because of scale, autonomy or data availability issues.

Table 1.a presents some descriptive statistics. On average, monotheist civilizations lasted significantly less than non-monotheist social orders, with a typical non-monotheist civilization enduring about 370 years and a monotheist society lasting about 285 years. The monotheist societies attained a peak land mass of about 1.75 million km^2, which was roughly 50,000 km^2 larger than non-monotheist societies. For comparison purposes, when the non-monotheist civilizations of the Americas are excluded, monotheist civilizations lasted only about three decades short of non-monotheist civilizations (284 versus 316 years), whereas their peak land mass was about 200,000 km^2 smaller than non-monotheist orders. Hence, the early American civilizations lasted much longer than average (about 640 years) but they occupied more concentrated areas during their reign. Monotheist

societies were distributed fairly evenly between the Middle East, Africa and Asia, but there were a lot more of them in Europe. In contrast, non-monotheist establishments were predominantly centered in the Middle East, Asia and America.

In the whole sample, the civilization that lasted longest was Kingdom of Elam, a polytheist culture in what is now regions of Iran. It is one of the oldest recorded civilizations that existed between 2200 B. C. E. and 644 B. C. E. It lasted for close to 1600 years. The Muslim Nubian Kingdoms of Northeast Africa, which survived about 1200 years; the Byzantine Empire, which survived 113 decades in Asia Minor, Middle East and the Balkans; and two civilizations of the Americas, Adena in the Mississippi Delta and Olmecs in the Gulf of Mexico, which both lasted 1100 years, were some of the other durable civilizations. It is noteworthy to point out that among these most durable societies only the Nubian Kingdoms and the Byzantine Empire adhered to a monotheism.

In terms of the land mass achieved during the peak of empire, the Arab Umayyad dynasty top the list, with about 14 million km^2. That was followed by the Ottomans, various Chinese dynasties, such as Xia, Qin, Han and Song, as well as the Macedonian Empire, with the Ottoman Empire and the Chinese dynasties spreading as large as about 6 million km^2 and the Macedonian Empire exceeding 5 million km^2.[6] In contrast, the smallest geographies in my sample were covered by the Sharqi Dynasty (of Jaunpur in northern India, with about 4,000 km^2), Israel and the Kingdom of Judah (with 26,000 km^2 land mass) as well as the various North and Central American ancient civilizations, such as Mochica, Chavin and Chimu, each controlling about 60,000 km^2 around the Andes region. Of those outliers in peak land mass, some were monotheist and some were not, but with the exception of the various Chinese dynasties, the societies which attained the largest land masses were all monotheists.

Of the 141 non-monotheist limited access order in my sample, 25 were in the Middle East, 68 in Asia, 15 in Europe, 11 in Africa, and 22 were in the Americas. Some of the notable non-monotheist limited access orders in my data include the Egyptian Kingdoms (Old, Middle and New); the early Anatolian civilizations (Hittites, Luvians, and Lydians); the Mesopotamian Empires (such as Akkadians, Old Babylonian Kingdom, and Assyrian Empire); Iranian Empires (Seleucid, Parthian, and the Persian Empire); var-

[6]Here I consider the contiguous land mass of civilizations and exclude, in particular, the colonial conquests of maritime empires of the British, Spanish and the Portuguese.

Furthermore, although the Golden Horde and Mongol raids covered a vast geographic belt with an area of 33 million km^2 that stretched from the China Sea to central Europe, I treat this as an outlier in that the era of the Golden Horde and Mongol raids did not typically culminate in stable government and state organizations following the Mongol invasions.

ious Northern and Southern Chinese Dynasties (such as Xiongnu, Xian-bi, Xia, Shang, Song, and Ming); Indian dynasties (Shakas, Guptas, Viyajanagar, etc.); early American civilizations (Aztecs, Incas and Mayans) as well as Alexander the Great's fleeting Macedonian Empire.

Of the 91 monotheist limited access orders, 18 were in the Middle East, 38 in Europe, 17 in Africa and 18 were in Asia. Of those, 46 were Christian, 43 were Muslim and only two were Jewish (Israel/Judah Kingdom, r. 1200 B. C. E. - 584 B. C. E. and Khazaria, r. 650 C. E. to 965 C. E.). Besides Israel and the Judah Kingdom, among the notable monotheist limited access orders were the Axum Empire, the Byzantine Empire, the Holy Roman Empire, the Carolignian Empire, and the Portuguese and British Empires (all Christian); the Arab Empires of the Abbasid, the Ummayad, the Tulunid, the Fatimid, and the Ayyubid dynasties, the Mamluks, the Seljuk Empire, the Ottoman Empire, Sultanate of Delhi, and the Safavids (all Muslim).

The Roman Empire, the Mongol Hordes, Khazaria, Takrur, the Qarakhanids, the Axum Empire, Cumans, Bulgars, Nubian Kingdoms, and the Kievan Rus provide the ten mixed cases where the sovereigns officially adopted a monotheist tradition after the empire or kingdom began: The Roman Empire formally converted to Christianity in 313 C. E. during the reign of Constantine. The Mongol Empire adopted Islam in 1252 when the Mongol Khan Ghazan and his subjects converted to Islam. Given the timing of the exact conversion of these societies to monotheism, I shall classify the Roman Empire as a non-monotheist civilization. This is due to the fact that the Empire lasted only seventeen years after Constantine declared Christianity the official religion of his Empire. In contrast, I will treat the Mongol Empire as a Muslim civilization because Ghazan Khan's adoption of Islam is within 46 years of the foundation of the empire, which by various accounts lasted until the early-16th century. Khazaria was a Turkic civilization that occupied a swath of land in the Caucasus to the northeast of the Black Sea between 650 C. E. and 965 C. E. During the early reign of their state, Khazars practiced Turkic shamanism, but, either around 740 C. E. or 861 C. E., the Khazar ruling classes converted to Judaism. The extent to which the rest of the population adopted Judaism is subject to debate, but some archeological evidence seems to suggest that there were widespread shifts in the burial practices of the wider population consistent with high rates of conversion to Judaism.[7] In the analysis below, I will assume that Khazaria was a Jewish state. This is more appealing than the alternative (of assuming the Khazar state was non-monotheist) because it lasted slightly less than average (about 32 decades

[7]For further details, see Brook (2006) and Golden (1980).

versus the average of 34) and occupied a smaller-than-average geographic region too (about 850,000 km^2 as opposed to 1.8 million km^2). Takrur, an ancient Western African civilization which lasted about half a millennium, converted to Islam around 1030. This is just about halfway through its reign but, given that Takrur lasted longer than average, I shall treat it as a non-monotheist civilization in the baseline estimates. Cumans reigned in Transylvania from 1060 C. E. to 1237, but they converted to Christianity (Roman Catholicism) during prince Barc's tenure only in 1227. As such, I consider them non-monotheist. Bulgars reigned in the Balkans 679 C. E. and 1018 C. E. and they converted to Orthodox Christianity much later during the reign of Boris I in 869. This is why I categorize them non-monotheist. And while a precise date is harder to pin down for the conversion of the Qarakhanids, the available sources suggest it was rather early on. Thus, I classify them as a Muslim civilization. Nubian Kingdoms (of Nobatia, Pachoras and Alwah) converted to Christianity between 543 C. E. and 575 C. E., due primarily to the work of two missionaries, Julian and his successor Longinus. But they were all founded in the 4th century C. E. and existed for over a millennia in east central Africa until the early 16th century. Thus, I consider them to be Christian. Kievan Rus reigned between 860 C. E. and 1150 C. E. and converted to Orthodox Christianity in 988. Using the same reasoning above regarding the classification of Takrur, Qarakhanids, and the Nubian Kingdoms, I shall classify Kievan Rus as Christian.[8]

Among the civilizations that turned monotheist sometime during their reign, the Axum Empire stands out due to its isolated geography vis-a-vis other monotheistic civilizations as well as its endurance too. It lasted for about seven centuries (270 C. E. to 960 C. E.) in what is modern-day Ethiopia and parts of Yemen. Some folklore has it that the *Ark of the Covenant* in the *Old Testament* was actually stored in a monastery of Axum, although there are some alternative theories as to how it ended up in Ethiopia. The first rulers of Axum were pagans and polytheists and the empire grew to be an important trading center of Africa. It converted to Christianity in the fourth century C. E. after a "Christian philosopher by the name of Meropius, bound for India, was shipwrecked on the coast. Although he died, his two companions survived and when they began to spread to word of the gospels, they found a receptive audience," (Farrington, 2006, p. 64). Interestingly, Axum remained the only monotheist culture in Africa for another three centuries when in the 7th century C. E. the Arab Umayyad dynasty began to conquer Northern Africa and convert the local populations to Islam. Since Axum's conversion to Christianity is very early on during its tenure, I classify it as a monotheist

[8]For an excellent review of the (ecclesiastical) histories of various ancient and medieval civilizations, see Findlay and O'Rourke (2007, Ch. 1).

social order. As I shall discuss in subsection 3.5, none of these choices of classification influences the main results.

In all that follows, Israel/Judah Kingdom also has a peculiar role in that it represents the only historic civilization that adhered (unlike Khazaria, without a doubt) to Judaism. Nonetheless, it is also one society for which the exact date when it began to subscribe to the unambiguously monotheist version of Judaism is in question (see, for example, Armstrong, 1993, and Stark, 2001). In any case, none of the results I discuss below are influenced by whether Israel/Judah Kingdom is classified as monotheist before or after 606 B. C. E., although as the sole Jewish monotheist order in the sample, it usually ends up being an outlier which robust regression techniques typically omit.

The Sassanian Empire, which ruled in parts of modern day Iran and Mesopotamia between 208 C. E. and 651 C. E., provides another interesting case. Its ruling class, nobility and, for the most part, population subscribed to *Zoroastrianism*. While not exactly monotheist, Zoroastrianism does have a clear hierarchy among its various divine beings, with *Lord Mazda* as the Supreme God followed by seven other deities, *the Holy Immortals*. Nonetheless, precisely due to these distinctions, Zoroastrianism is accepted by some scholars as an early precursor of our modern monotheisms.[9]

In the bottom panel of Table 1.a, I provide a breakdown of civilizations according to their theistic attributes by century. The data confirm the steady rise of monotheistic societies and the displacement of others starting in the fourth century. In particular, there was only one monotheist state (the Christian Axum Empire in sub-Saharan Africa) in the fourth century, which accounts for only 7 percent of the sample for that period. By the eighth century, however, about one fifth of all sovereign countries were monotheist, with one being Jewish (Khazaria) and three being Christian (Axum Empire, Byzantine Empires and the Nubian Kingdom). By the twelfth century more than fifty percent of all countries in the sample was monotheist, while in the seventeenth century it was close to 90 percent.

[Table 1.a about here.]

Before we get to the empirical work, it is worth pointing out some further attributes of the social orders in the dataset. Take for instance the civilizations of the Americas where the indigenous cultures of Mesa Verde, such as the Mogollon Culture and Anasazi, survived in excess of a millennia; Adena lasted 1100 years in the Mississippi Delta;

[9] See Armstrong (2006), pp. 9 -14.

Hohokam lived a half a millennium in roughly the same geographic region. Down in South and Central America, the Chavin culture reigned for a millennium in the Andes region and the Classic Maya civilization survived for 650 years in Yucatan. On average, the historical social orders of the Americas controlled limited geographic territories over typically long periods of time. And none of these civilizations were monotheist.

Next examine the kingdoms, dynasties and empires of Asia where you find that only the Xia and Shang Dynasties lasted more than 400 years, but all of the Chinese dynasties controlled vast geographic landscapes in what is now mostly China. The Gupta Empire ruled for a little over two centuries in India and the Srivijaya Empire ruled for six centuries in what is now parts of Indonesia.

Then take note of some interesting civilizations that literally lived, prospered and died by the swords of their founders and rulers. The Macedonian Empire lasted only 40 years but under the rule of Alexander the Great it became a vast and mighty empire that extended from the Balkans to all of Persia, parts of Egypt and the Middle East. The Mongol Empire lasted longer for about three centuries, but during the reign of Genghis Khan it raided territories in the West and East so effectively and brutally that between 1205 C. E. and 1260 C. E. it had managed to stretch between the China Sea and central Europe. Such was the case of the Empire of Tamerlane (the Timurids) which lasted barely over a century but became a powerful regional force in the Near East by triumphing over the Golden Hordes, sacking Belgrade and temporarily ending the Ottoman Empire's rule in Anatolia and the Balkans at the turn of the 15th century. The Islamic Seljuk Empire lasted only 157 years but moving west from their geographic origins in central Asia, they were able to enter Asia Minor in 1071 C. E. which marked the beginning of the Turkish presence in Anatolia that continues to this day. And the Arab Umayyad Dynasty was able to spread so rapidly between 661 C. E. and 750 C. E. that, by the time it fell in the middle of the 8th century to another Arab dynasty of the Abbasids, the Arab Empires controlled all of the Arabian Peninsula, Middle East, most of southeastern Anatolia, Persia, North Africa and the Iberian Peninsula.

3.2. Summary Statistics

I now empirically explore whether the birth of monotheist religions and their adoption by limited access orders had an impact on the duration and the geographic domain of the latter. To this end, I formulate two empirical specifications: the main one, which is a panel of 426 decades and 232 limited access societies and an alternative cross-section series aggregated over the whole time span covering the 232 limited access orders. For each of the 426 decades in my timespan, I created dummy variables for the timespan of

each limited access order as well as dummy variables for whether a limited access order reigned in each of the thirty three geographic regions. On the basis of this information, I also constructed derivative data on the number of limited access orders that existed, the number of geographic regions under the control of limited access orders during each decade and the average number of regions within the control of each limited access order during every decade.

Table 1.b presents the key summary statistics of the variables used in the empirical analyses. As can be seen in the bottom panel, the average limited access order lasted about 34 decades; there was a positive correlation between the duration length of a limited access order and the birth of the three monotheist religions; the duration of a limited access order was longer among Christian and Jewish establishments whereas this relationship was negative for a Muslim limited access order; the peak land mass of a limited access order was smaller for Christian and Jewish societies, while it was positively linked in the case of Muslim limited access civilizations. As shown in the bottom panel, the average land mass of limited access societies reached a peak of about 1.75 million square-kilometers although this statistic rose over time as well. In the cross-country sample of 232 total countries, 91 were subscribed to one of the three monotheist religions (i.e. the 86 that were monotheist from the start plus the Mongol Empire, Khazaria, Qarakhanids, Nubian Kingdoms, and the Axum Empire), which corresponds to about 40 percent the whole sample. Table 2 lists and defines all variables used in the empirical analysis.

[Tables 1.b and 2 about here.]

3.3. Panel-Data Estimates

My baseline estimates are derived with the panel data using the following specification:

$$\begin{aligned} LAO_{i,t} \;=\; & \mu_t + \lambda_1 MONOTHEIST_i + \lambda_2 MONOTIME_{i,t} \\ & + \lambda_3 LAO_{i,t-1} + \lambda_3 X_{i,t} + \varepsilon_{i,t}, \end{aligned} \tag{1}$$

where the left-hand-side variable $LAO_{i,t}$ denotes a dummy variable for the ith limited access order at time t (measured in decades); it takes on the value of one if i exists at time t and zero otherwise. The explanatory variables in this specification include a time trend, μ_t, a dummy variable for whether the limited access order was characterized by a

monotheistic governance and/or social structure, $MONOTHEIST_i$, the interaction of the latter with the time trend, $MONOTIME_{i,t}$, and the lagged-value of the dependent variable, $LAO_{i,t-1}$. Depending on the parsimony of the empirical specification, the control variables in $X_{i,t}$ include variables for which of the main three monotheistic religious faiths had been born at time t, $JUDAISM_t$, $CHRISTIANITY_t$ or $ISLAM_t$, as well as controls for the geographic domain of limited access order i.

In Table 3, I present my baseline estimates. They are derived with two population-average estimation alternatives: ordinary least squares with robust errors (OLS) and Probit regressions with robust errors.[10]

In columns (1) and (4), I present the estimates from the most parsimonious specification. As shown, the direct effect of monotheism was statistically significant and negative whereas its time-varying impact was positive and significant. According to the column (1) estimates, if a limited access order was associated with one of the three main monotheistic faiths, then the *net* effect on the likelihood that a kingdom, dynasty or empire existed in any decade was positive starting around the year 140 C. E.

The important thing to keep in mind here is that none of the monotheisms were born before 606 B. C. E. Moreover, prior to the 5th century C. E. there were only two historic civilizations that had adhered to monotheism — Israel/the Judah Kingdom and the Roman Empire. While the former embraced the monotheist version of Judaism much later in its history (around 606 B. C. E.), the latter converted to Christianity two decades short of the end of its reign (in 313 C. E.). Thus, in evaluating the impact of monotheism on survival likelihood we need to calculate its impact for dates at which all three monotheisms were born and more widely available to societies.

This was indeed the case according to the OLS estimates in column (1), with the impact of monotheism turning positive around 75 C. E. and the direct and time-varying effects of monotheism yielding a net effect of about 10 percent around the year 1500 C. E. That is, around 1500 C. E., a dynasty, empire or kingdom had more than ten percent higher likelihood of survival for an extra century when compared with an average society that was not monotheist around 1500 C. E.[11] With the Probit estimation, the net impact of monotheism on the likelihood of survival becomes positive around the year 745 C. E. And given the estimates in column (4), we again find that the net impact of monotheism

[10]In Section 4, I discuss in detail the choice of estimation methods and results derived using various alternatives too.

[11]I calculate these effects by taking into account the positive and significant interaction effect due to $MONOTIME$. In particular, an existing, non-monotheist civilization had a survival likelihood of slightly less than 87.5 percent for an extra decade in 1500 C. E., whereas an existing monotheist society had one around 98.7 percent. This corresponds to a 11 percent impact on survival an extra century.

on the likelihood of survival another century was roughly 5 percent.

In columns (2) and (5) I add, as additional controls, dummy variables for which of the main three monotheistic religious faiths existed at time t, $JUDAISM_t$, $CHRISTIAN–ITY_t$ and $ISLAM_t$. Doing this can help identify if the birth of the three monotheisms had a broad impact on the duration of all civilizations, beyond the direct impact of the monotheism status of each society. As shown in columns (2) and (5), the impact of the *birth* of Judaism and Christianity on the likelihood of existence of the limited access orders was statistically significant and positive. But note the important distinction between the variable $MONOTHEIST$ and the three religion dummies $JUDAISM$, $CHRISTIANITY$, and $ISLAM$: The former variable is specific to each limited access order while the latter three are variables which attain one after their respective religions are born and zero before. Hence, while the latter can capture a broader and wider-ranging impact of monotheism on all societies, any difference in the estimated coefficients may be suggestive of competition effects between the monotheistic faiths as more of them co-existed later in time (I shall explore this idea further below). The theistic attribute of a society is still important for its longevity: The net impact of $MONOTHEIST$ becomes positive again around 75 C. E. in column (2), yielding a net statistically significant and positive impact on the order of about 3 percent on survival likelihood of another century around 1500 C. E. And, in column (5), it has a net statistically significant effect that turns positive around the year 675 C. E. with the overall positive effect amounting to again about 11 percent by the year 1500 C. E.

In columns (3) and (6), I include geographic dummy variables to control for the central domain of the limited access order i. As shown, the variables $EUROD_i$, $MIDEASTD_i$, $AFRICAD_i$, and $AMERICAD_i$ all exerted statistically significant and positive effects in column (3), whereas only the dummy for the Middle East coming in negative and significant, with the dummy variable for America entering positively and with a p-value of about 13 percent in column (6). Given the estimated coefficients, we can perhaps infer that, all else equal, civilizations is the Americas lasted longer than their counterparts in other geographies. But more importantly, the inclusion of such controls have no impact on the direct and time-varying roles of monotheism on survival likelihood. The net effect of monotheism turns positive around 5 C. E. according to column (3) with a survival rate for an extra century of about 2.5 percent. The Probit estimate results reported in the last column show a net effect which turns positive around the year 670 C. E., with a net impact which amounts to more than 10 percent around the year 1500 C. E. Interestingly, in these expanded specifications, the birth of $JUDAISM$ still has the positive and statistically impact it had in columns (2) and (5).

Note also that, unlike the specification in column (1), those in (2) through (6) show a significant and negative time trend. In conjunction with the positive and statistically significant time-varying influence of monotheism on the survival of civilizations, we find that empires, kingdoms and dynasties lasted shorter over time. However, adherence to monotheism almost fully countervailed this adverse effect of time on survival — in fact, column (4), (5) and (6) estimates suggest monotheism more than compensated for this negative trend.

[Table 3 about here.]

In sum, these panel data estimates support the idea that monotheistic empires, kingdoms and dynasties did survive longer than others that were not associated with monotheistic religions. The net effect of monotheism on survival an extra century depended on time but, around the year 1500 C. E., it amounted to 10 percent on net consistently in four of the six most specifications. Furthermore, the birth of Judaism in particular seems to have had a positive impact on this survival likelihood and to some degree that of Christianity too, whereas there is some evidence to suggest that the birth of Islam did not. I interpret this latter finding to be suggestive of more intense competition between the three religious traditions as they started to coexist over time.

3.4. Cross-Section Estimates

In the cross-section version of the analysis, I estimate

$$LAO_i = \lambda_0 \ + \ \lambda_1 MONOTHEIST_i \ + \ \lambda_2 X_i \ + \ \varepsilon_i, \tag{2}$$

where, depending on the empirical specification, LAO_i is either the duration (in decades) of limited access order i or its peak land mass (in square kilometers). The explanatory variable $MONOTHEIST_i$ controls for whether i was monotheist or not.

In the baseline parsimonious estimates reported first, the only control variables in X_i include geographic dummy variables for the central domain of the limited access orders, $MIDDLEAST$, $EUROPE$, $AFRICA$, $ASIA$, and $AMERICA$. In less parsimonious estimates, I exclude and dissect $MONOTHEIST$ into the three monotheisms of $JEWISH$, $CHRISTIAN$, and $MUSLIM$ and include in the analysis the year in which the limited access order was founded, $BIRTHYEAR$, as well as the interaction of $BIRTHYEAR$ with $MONOTHEIST$, which I label $MONOTIME$. In some other specifications, I also control for whether civilization i was founded before or after the

births of monotheism (i.e., Judaism), Christianity and Islam, denoted respectively by $MONOBIRTH$, $CHRISTBIRTH$ and $ISLAMBIRTH$. The motivations for including some of these right-hand-side variables are self explanatory: I include $BIRTHYEAR$ to see if there are observation-specific time effects on the dependent variables and I consider its interaction with $MONOTHEIST$ to check if monotheism had systematically different effects on the left-hand side variables depending on the year in which the empire, kingdom or dynasty was founded.

The main results I report below rely on two alternative estimation techniques: ordinary least squares with robust errors (OLS) and robust regressions.[12] In Table 4, I present the robust-error OLS estimates where the dependent variable is the land mass (in square kilometers) of limited access order i at its imperial peak. As shown in all of the columns, I do not find that the theistic attribute of the society, $MONOTHEIST$, had a positive impact on the peak land mass of limited access orders. But, consistent with all of the estimates in Table 3, however, we do find in all columns that the birth of monotheism in the early-7th century B. C. E. provides a common structural break in the peak land mass attained by civilizations historically. Taking the lower estimates provided in the robust regression columns of (5) and (6), we see that societies which were founded after 606 B. C. E. had about 560, 000 km^2 or roughly 33 percent larger land mass. In all estimates, the continental dummy variable for $AMERICA$ is negative and significant reflective of the historically small sovereign establishments on that continent, such as the Mochica, Chavin and Chimu civilizations. This is also true in the case of $EUROPE$. In contrast, there is somewhat of a positive and significant effect in the case of $MIDDLEAST$. The American adverse effect on size, even when it is derived from the robust regression estimates, is substantial: whereas on average societies in the dataset attained about 1.7 million km^2, all else equal, being America generated a size of about 1.1 million km^2 or less, which is about a 35 percent impact.

In columns (2) and (5), I add the control variables for the birth of Christianity and Islam to see of they could provide additional explanatory power. With the robust regression estimate in column (5), we find that the birth of Christianity might have had an adverse statistically significant effect on peak land mass, but not enough to offset the positive and significant impact of the birth of monotheism.

In columns (3) and (6), I dissect $MONOTHEIST$ into the three religions to see if they had differential effects on $PEAKLANDMASS$. That is, instead of controlling for $MONOTHEIST$, I include $JEWISH$, $CHRISTIAN$, and $MUSLIM$. As in the

[12]Robust regressions first eliminate outlier observations (for which Cook's $D > 1$) then iteratively selects weights for the remaining observations to reduce the absolute value of the residuals.

earlier estimates in columns (1), (2), (4) and (5), I still control for $BIRTHMONO$. The interesting result is that, while Jewish and Christian civilizations might have attained smaller geographic land masses on average, their impact is not robust to the adjustment for the role of outliers. But that of Islam seems to have exerted a positive and robust influence on the peak land mass attained, as shown in column (6). Moreover, the robust regression estimate in the final column still implies that the birth of monotheism in 606 B. C. E. had a positive and significant role in leading to larger land mass for all civilizations in general.

[Table 4 about here.]

Next I examined the degree to which the duration of limited access orders over time depended on their theistic characteristics. This also helps us to verify the validity of the results reported in Section 3.3 using an alternative methodology. In Table 5, I present estimates where the dependent variable is the duration of limited access order i (in decades). As shown in columns (1), (2), (4) and (5), we verify that the theistic attribute of a society, $MONOTHEIST$, did have a positive, statistically significant and meaningful impact on length of reign: for example, around the year 1500 C. E., the estimates range from a low of about 12.5 extra decades (an impact of 37 percent on duration) to a high of a little over 22 decades (a 65 percent impact).[13] In contrast to the results on peak land mass, here we find that the birth of monotheism not to have had a generic impact on the duration of all societies which came to exist after 606 B. C. E. Moreover, we confirm that civilizations in America lasted much longer than others, followed by those in Africa and the Middle East.

[Table 5 about here.]

Before I turn to the robustness of these findings in general, it is important to take note of the fact that, using an alternative cross-section dataset covering 232 kingdoms, dynasties and empires, we find that monotheism exerted a positive and statistically robust influence on the geographic land areas controlled by limited access orders at their historical peaks. To some extent, it is also possible to verify that monotheism

[13]The first figure comes from the column (5) estimates. The coefficient on $MONOTHEIST$ is 17.7 and netting out the negative time-varying effect of $MONOTIME$, which equals $-.0105 * 1,500 = 15.75$, we get around a 2 decade positive impact. The second figure is derived from column (1) in similar fashion.

influenced duration of limited access orders positively and statistically significantly too, which complements the results identified in section 3.3 (where the emphasis was on the role of theism in the likelihood of survival instead of the average length of duration).

3.5. Alternative Specifications & Robustness

As far as the panel-data estimates shown in Table 3 go, we would ideally like to control for all the fixed effects which might have been in operation at the level of civilizations. Alas, we would run into identification problems if we attempted to introduce fixed effects in conjunction with the controls for the theistic character of historical civilizations. Moreover, even if identification were not a hindrance, the fixed-effect estimates derived from Probit estimates would be biased, because there does not exist a sufficient statistic allowing the fixed effects to be conditioned out of the likelihood. It is with these complications in mind that I originally resorted to population-averaged estimation techniques. Nonetheless, if we focused solely on the general impact of the birth of the three monotheisms on the survival likelihood of historical civilizations by conditioning out the unique theistic attributes of each society along with its other fixed effects, we can examine with a bit more rigor the broad impact of the *birth of monotheism* on the *duration* of all civilizations. And, in some sense, this can provide the most stringent empirical test we can pursue given the data limitations, because we shall be able to factor out all fixed effects that applied at the civilization level and the time trends that led to drifts over time.

In the first two columns of Table 6, I report the results derived from fixed-effects panel-data OLS estimates with robust errors. As shown in both columns (1) and (2), we find that the births of Judaism in 606 B. C. E. and Christianity in year 0 as well as that of Islam in 622 C. E., all had positive and statistically significant impacts on the survival likelihood of any given civilization.

Omitted variable biases and reverse causality could be other potential problems which might be plaguing the panel-data estimates shown in Table 3. Recall that the main findings in Section 3.3 relied on a panel that extended well prior to the birth of the three monotheisms. This was done for the dual purpose of relying on a broader dataset and establishing that monotheism influenced duration not just among societies that existed after the monotheisms were born, but also relative to those non-monotheist societies which were around long before monotheism. Hence, by construction, there is bound to be some time varying effects of monotheism on duration (although not necessarily positive and statistically significant). But one could argue that the birth and spread of monotheisms are mainly what account for both the proliferation of civilizations and

their (most likely) being monotheist. This could be especially relevant to the extent that identification is achieved from across-group variations in the variables of interest (although when lagged dependent variable is included, as we have done throughout Table 3, the fit of within group estimates were consistently higher).

It is with these concerns in mind that a time trend as well as controls for the birth of monotheism (that is of Judaism around the year 606 B. C. E.), Christianity and Islam were included in Table 3 estimates. Nonetheless, we could address this issue directly by concentrating on a chunk of the data later in time. For example, given the main findings that monotheism began to exert statistically significant positive effects starting somewhere around the early-6th and 8th centuries, it would be worthwhile to examine if we would pick up an unconditional positive impact of monotheism using a truncated dataset which began around 300 C. E. (which is when there had been only one monotheist society prior). In columns (3), (4) and (5) of Table 6, I present the results from this alternative specification. Not surprisingly, we do find that monotheism's impact on the likelihood of duration was significantly positive.[14]

[Table 6 about here.]

As far as the main robustness concerns related to the cross-section estimates, we can discard the reverse causality argument more easily than we did with panel data. The reason for this is that, by 9th century C. E., a vast majority of North Africa, the European continent and the Middle East had become monotheist with the local populations having subscribed to one of the three main monotheisms. Thus, there is a structural time break in the adoption of monotheism in these geographic areas, roughly covering the period between 313 C. E., when the Roman Emperor Constantine I issued the Edict of Milan which legalized Christian worship turning the Roman Empire monotheist, and the 751 C. E. Talas War between the Asian Turks and the Abbasid Muslims, which exposed Turks to Islam and led to their adoption of monotheism as well as its spread in Asia subsequently.

In Table 7, I report results generated with some alternative control variables included in the cross-section empirical specifications.[15] For example, an interesting modification is provided in columns (1) and (4) where the dummy variables for the religion of the monotheist order, $JEWISH$, $CHRISTIAN$, and $MUSLIM$, are replaced with the

[14]Results similar to those reported in columns (3), (4) and (5) are attained for truncated data that begin in the third century C. E. or later.

[15]All of the results reported are from robust regression estimates.

code variable $RELIGION$, which takes on the value of 1 if the civilization is affiliated with Judaism, 2 if it is related to Christianity, 3 if associated with Islam and 0 otherwise. In columns (2) and (5), I add the interaction of $RELIGION$ with $BIRTHYEAR$, labeled as $RELITIME$. As shown in columns (1) and (4), religion exerts a positive and significant impact on peak land mass and a negative and significant impact on duration. In effect, this suggests that peak land mass (duration) grew progressively larger (shorter) as the monotheism in question went from Jewish to Christianity and Islam. The estimates in columns (2) and (5) also suggest this result is robust to the inclusion of a time-interaction effect of religion only with respect to the impact of religion on duration, i.e., in column (5).

In columns (3) and (6), I add $MONOTHEIST$ and drop $RELITIME$ and $BIRTHYEAR$ with the objective of identifying if monotheism or one of its main three traditions mattered more. As shown in columns (3) and (6), the impact of religion on the peak land mass of limited access orders was positive for Islam but it was negative for Christianity, which in turn was still higher than the impact of Judaism. For the duration specification in column (6), this finding is reversed: the impact of religion on the duration of limited access orders was relatively more positive for Judaism than it was for Christianity, but the impact of Islam was negative. These results imply that Muslim civilizations typically conquered more land than Christian societies but they did not last as long.

[Table 7 about here.]

As far as the classification issues are concerned, they are applicable for both the panel-data and cross-section estimates. Recall that, in ten civilizations in the dataset, the rulers (and in some cases, most of the populations) converted to one monotheism after the limited access order was founded (these include the Roman Empire, the Mongols, Khazaria, Takrur, Qarakhanids, the Axum Empire, Cumans, Bulgars, the Nubian Kingdoms, and Kievan Rus). In the case of all of these societies except Khazaria, Takrur, Cumans, Bulgars, and Kievan Rus, the conversions occurred sufficiently late or early so as to enable us to classify Romans as non-monotheist and the others as monotheist. In the case of Khazaria, Takrur and Kievan Rus, there is a great deal more uncertainty about the date and extent of conversions which took place neither early nor late enough to aid with classification. In eight of the ten cases, however, the classification employed was in the direction of attenuation. In any case, I reran all the empirical tests above by

excluding these ten societies and verified that neither of the findings reported here rides on this classification issue.[16]

A more important coding issue revolves around how to systematically account for the dates of foundation and termination. And this issue is most relevant in the treatment of the various Chinese dynasties, such as the Ming, Song, Shang, or Xia, the various Indian Dynasties which make up the Magadha Empire, such as the Brihadrathas, Pradyotas, Shishunagas, Kanvas, Nandas, Guptas, etc. All of these Indian and Chinese dynasties are traditionally classified as independent and separate observations. These classifications stand in contrast to those of the various Western and Northern European kingdoms, such as the British, Portuguese Empires, the Kingdoms of Sweden, Norway, Denmark, etc., or other Middle Eastern civilizations like the Ottoman and Seljuk Empires, among which no distinction is made in dynastic or ruling class transitions. To assess whether this distinction is important, I combined all the sequential Chinese dynasties to represent three independent limited access orders (the first starting with the Xia in 1994 B. C. E. and running through Shang, Zhou, Qin, to Han in 220 C. E., the second comprising of the era of the Sui and Tang between 581 C. E. and 907 C. E. and the third one beginning with the Song in 960 C. E., running through Liao, Jin, Yuan, Ming, and terminating with the Qing dynasty in 1911 C. E.). I did the same for the Indian dynasties that made up the Magadha Empire (r. 545 B. C. E. to 320 B. C. E.). Then, I reestimated my specifications using the combined Chinese Empires and the Indian Magadha Empire and treating the sequential Arab Muslim empires (of the Rashidun, Umayyads, Abbasids, Tulunids, Fatimids, Ayyubids and the Mamluks) as one too. Neither of these reclassification changes altered the results in any significant way. Thus, I do not report them here.

A similar complication arises from the fact that a number of the civilizations in the data had periods of interregnum; for instance, Kingdom of Portugal between 1580 and 1640 after it was occupied by the Kingdom of Castille; the Ottoman Empire between 1402 and 1413 after Timurids defeated Yildirim (Thunderbolt) Beyazit in the Battle of Ankara, the Byzantine Empire between 1204 and 1261 after Constantinople was sacked by the Fourth Crusaders, and the Kingdom of England between 1649 and 1660 following the English Civil War. I have essentially ignored these periods of interruption in autonomy on the basis of the fact that the Kingdoms and Empires recovered from the loss of sovereignty, typically with in a decade or two. Nonetheless, excluding these observations from the sample does not alter the main results.

[16] All results discussed but not shown are available from the author upon request.

Recall that I excluded from the sample a number of smaller city-states and (relatively more autonomous) principalities on the basis of scale. As listed in Appendix C, there are about 35 of those which could be included in the data because we have the primary relevant information on them. These include the Anatolian derebeyliks (of Çaka Bey, Sökmenli, Artuklu, Danişmend, Inaloğlu, Saruhan, Saltuklu, Dulkadir, Germiyan, Karamanoğlu, Ramazanoğlu, Mengücek, Ertena, Aydinoğlu, Karesi, Sahib Ata), the Greek city states (of Arcadia, Phocis, Messania, Argolis, Attica, Laconia, Locris, Epirus, Thessaly, Achaea, Aetolia) and the British Heptarchy Kingdoms of (East Anglia, Essex, Sussex, Wessex, Kent, Mercia, Northumbria). The Anatolian derebeyliks were all Muslim, prospering in various parts of Anatolia for relatively shorter periods of time (typically around a century or less) during the 11th through the 14th centuries. The non-monotheist Greek city-states existed in modern day Greece between 8th century B. C. E. and mid-4th century B. C. E. And the British Heptarchy Kingdoms, which together formed the basis of the Kingdom of England in the early-10th century, existed between the 5th century C. E. and mid-9th century C. E. Most of them began to convert to Christianity in the early-7th century, but given that they survived slightly longer than average, I consider them non-monotheist. The point is that all these city-states, minor kingdoms and derebeyliks controlled small geographic areas, not larger than 30,000 km^2, typically around 10,000 km^2 (as in the case of Greek city-states) or even below 5,000 km^2 (as with Essex, Kent, etc.). In any case, when I included these extra observations in the data (which yielded 267 total cross-section observations), I got results that were very similar to the ones I already reported (in some cases, with stronger statistical significance as well).

Finally, a word on a potential sample selection bias: Given the extremely long time horizon involved here, one could be concerned about antique civilizations that have not been included in the study because of incomplete or lacking data. If such civilizations also lasted long and spread large geographically, the results above could suffer from a bias of sample selection. This is a valid concern although there is a significant positive time trend in the peak land mass of limited access orders. And despite the fact that ancient civilizations typically lasted longer than their younger brethren, this very fact makes its less likely that we lack a large enough chunk of systematic archeological/anthropological evidence on ancient limited access orders that could bias the results above.

4. Conclusion

Economists have made significant strides in understanding the links between institutions and economic development. Despite the fact that they also long acknowledge religion as

an important component of the institutional infrastructure, explicit analyses of the role of religion in sociopolitical and economic development remain scant.

The birth of the three main monotheistic religions is particularly relevant in this regard, because they spread rapidly and eventually came to dominate other religious traditions. Recent work in economic history suggests that the transition from limited access orders to open access orders, in which the political and economic rights of the whole population is well-defined and political rents-seeking has been minimized, has typically been precipitated by prolonged periods of sociopolitical and economic stability (North et al., 2007). Thus, it is imperative to resolve how monotheism and limited access orders came to be strongly intertwined historically and ascertain whether monotheism promoted a modicum of sociopolitical and economic stability in limited access orders.

In this paper, I argue that the birth of monotheism was a major breakthrough in social institutional design and that its various salient features were the main impetus for sociopolitical stability and, to some extent, geographic expansion. Using historical data between 2500 B. C. E. and 1750 C. E. on 225 limited access orders, such as dynasties, kingdoms and empires, I have shown above that the birth of Judaism, Christianity and Islam and the adoption of monotheism by limited access orders had statistically significant effects on the length of reign as well as the average geographical size of all limited access orders. Specifically, kingdoms, dynasties and empires lasted about 340 years on average during this interval. But those historical civilizations that adopted monotheism, regardless of whether it was Judaism, Christianity, or Islam, lasted about 35 to 65 percent longer than non-monotheist social orders and they had about 10 percent higher likelihood to survive an extra century. Beyond the general impact of adherence to monotheism, I cannot find any empirical evidence that Judaism, Christianity or Islam exerted an impact on the length of reign of historical civilizations. I also confirm that monotheism had a roughly similar effect on the geographic domain over which historical civilizations reigned during their peak influence. That is, monotheist limited access orders controlled about twice the land area of their non-monotheist counterparts. Unlike the results on duration, however, I find that adherence to a specific religion — Islam — did exert somewhat of an additional positive impact on the geographic domain of civilizations historically. This is an important results which implies that Muslim civilizations typically conquered more land than Christian societies but they did not last as long.

To wrap things up, let me state that the various ideas I articulated above have some of their precedents in the philosophy, sociology and economics literatures. And they have been rigorously debated and challenged since their inceptions. My main objective was

to combine a sociopolitical and economic classification of these ideas with a systematic assessment of their empirical validity.

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Table 1.a: Some Descriptive Statistics

Monotheist Dynasties, Kingdoms & Empires (91 obs.)

Duration	Land	Europe	Africa	M. East	Asia	Jewish	Christian	Muslim
28.4	1,748,398	38	17	18	18	2	46	43
As share of total in region:		.72	.61	.42	.21	...	...	...
Jewish		0	0	.02	.01	...	...	...
Christian		.66	.21	.02	.05	...	...	...
Muslim		.06	.40	.38	.15	...	...	...

Non-Monotheist Dynasties, Kingdoms & Empires

All: (141 obs.)

Duration	Peak Land	Europe	Africa	M. East	Asia	America
36.6	1,701,053	15	11	25	68	22
As share of total in region:		.28	.39	.58	.79	1.0

Excluding the Americas: (119 obs.)

Duration	Peak Land
31.6	1,960,533

	Total	Monoth.		Jewish		Christian		Muslim	
Century	no.	no.	%	no.	%	no.	%	no.	%
300 - 399 C. E.	16	1	7	0	0	1	6	0	0
500 - 599 C. E.	16	5	33	0	0	5	33	0	0
700 - 799 C. E.	20	4	20	1	5	3	15	0	0
900 - 999 C. E.	28	14	50	0	0	11	39	3	11
1100 - 1199 C. E.	39	21	54	0	0	19	49	2	5
1400 - 1499 C. E.	26	19	73	0	0	11	42	8	31
1600 - 1699 C.E.	17	15	89	0	0	12	71	3	18

Table 1.b: Summary Statistics and the Correlation Matrix

2500 B. C. E. - 1750 C. E.			*The Correlation Matrix (Panel Data)*							
$n = 98,832$	*Mean*	*St. Dev.*	*LAO*	*MONO*	*JUDAISM*	*CHRS.*	*ISLAM*	*REL*	*DEC*	*MTIME*
LAO	.084	.278	1	...	...	...	...	...	...	...
MONOTHEIST	.396	.489	−.055	1	...	...	...	...	...	...
JUDAISM	.695	.460	.153	−.0001	1	...	...	...	...	...
CHRISTIANITY	.413	.492	.187	−.0001	.556	1	...	...	...	...
ISLAM	.268	.443	.179	−.0001	.400	.720	1	...	...	...
RELIGION	.921	1.21	−.064	.936	−.0001	−.0000	−.0001	1	...	...
DECADE	2125	1230	.197	−.0001	.798	.853	.766	−.000	1	...
MONOTIME	842.4	1296	.064	.802	.300	.321	.288	.750	.377	1

2500 B. C. E. - 1750 C. E.			*The Correlation Matrix (Cross-Section Data)*							
$n = 232$	*Mean*	*St. Dev.*	*DUR*	*PLMASS*	*MONO*	*JWSH*	*CHRS*	*MSLM*	*BYEAR*	*MTIME*
DURATION	33.4	26.9	1	...	...	...	...	...	...	...
PLMASS	1,719,624	3,290,388	−.139	1	...	...	...	...	...	...
MONOTHE.	.392	.489	−.149	.007	1	...	...	...	...	...
JEWISH	.009	.092	.046	−.036	.116	1	...	...	...	...
CHRISTIAN	.198	.400	.100	−.139	.619	−.0416	1	...	...	...
MUSLIM	.185	.389	−.303	.048	.594	−.045	−.209	1	...	...
BIRTHYEAR	384.2	1003	−.318	.045	.507	−.063	.305	.334	1	...
MONOTIME	400.1	558.6	−.229	.011	.894	−.113	.538	.589	.567	1

Table 2.a: Variable Definitions for Panel Data

- $LAO_{i,t}$: Dummy variable for limited access order i if it exists at t.
- $MONOTHEIST_i$: Dummy variable for limited access order i if monotheist.
- $JUDAISM$: Dummy variable; 0 on or before 606 B. C. E. and 1 thereafter.
- $CHRISTIANITY$: Dummy variable; 0 on or before year 0 and 1 thereafter.
- $ISLAM$: Dummy variable; 0 on or before 622 C. E. and 1 thereafter.
- $DECADE$: Decade t.
- $MONOTIME : MONOTHEIST * DECADE$.
- $\left.\begin{array}{l} EUROD_i : \\ MIDEASTD_i : \\ ASIAD_i : \\ AFRICAD_i : \\ AMERICAD_i : \end{array}\right\}$ Indicator for the geographic region of LAO i.

Table 2.b: Variable Definitions for Cross-Section Data

- $LAO_i : \begin{cases} DURATION_i : \text{ Number of decades limited access order } i \text{ survived.} \\ \\ PEAKLANDMASS_i : \text{ Land mass achieved at maximum by } LAO_i \ (km^2). \end{cases}$
- $MONOTHEIST$: Dummy variable for a monotheist LAO.
- $JEWISH$: Dummy variable for a Jewish LAO.
- $CHRISTIAN$: Dummy variable for a Christian LAO.
- $MUSLIM$: Dummy variable for a Muslim LAO.
- $BIRTHYEAR$: Decade in which LAO was founded.
- $MONOTIME : MONOTHEIST * BIRTHYEAR$
- $RELIGION$: 1 for Jewish LAO; 2 for Christian LAO, 3 for Muslim LAO; 0 otherwise.

- $RELITIME : RELIGION * BIRTHYEAR$

- $\left.\begin{array}{l} BIRTHMONO : \\ BIRTHCHRST. \\ BIRTHISLAM : \end{array}\right\}$ Dummy variable indicating whether LAO founded before or after the birth of the monotheism.

- $\left.\begin{array}{l} MIDDLEAST : \\ NAFRICA : \\ EUROPE : \\ ASIA : \\ AMERICA : \end{array}\right\}$ Continental dummies for capitals of LAO's.

Table 3: Panel Data Population-Averaged Estimates, 2500 B. C. E. - 1750 C. E.

Dependent Variable: Limited Access Order Dummy, LAO

	OLS			Probit		
	(1)	(2)	(3)	(4)	(5)	(6)
$MONOTHEIST_i$	$-.0035^*$	$-.0035^*$	$-.0035^*$	$-.807^*$	-1.06^*	-1.06^*
	(.0004)	(.00044)	(.00051)	(.176)	(.210)	(.212)
$DECADE_t$	$-.0000003^{**}$	$-.0000002^*$	$-.000002^*$	.00003	$-.00025^*$	$-.00025^*$
	(.00000018)	(.0000001)	(.0000006)	(.00002)	(.00008)	(.00008)
$MONOTIME_{i,t}$	$.0000014^*$	$.0000014^*$	$.0000014^*$	$.00025^*$	$.00033^*$	$.00033^*$
	(.0000002)	(.0000002)	(.0000002)	(.00006)	(.00007)	(.00007)
$LAO_{i,t-1}$	$.973^*$	$.973^*$	$.973^*$	4.92^*	4.87^*	4.86^*
	(.002)	(.0015)	(.0015)	(.051)	(.0.49)	(.053)
$JUDAISM_t$	...	$.0034^*$	$.0034^*$	...	$.503^*$	$.496^*$
		(.0010)	(.0010)		(.149)	(.147)
$CHRISTIANITY_t$	...	$.0035^*$	.0035	...	$.300^*$	$.297^*$
		(.0010)	(.0010)		(.103)	(.103)
$ISLAM_t$	...	.0015	.0015	...	.097	.097
		(.0011)	(.0011)		(.095)	(.095)
$EUROD_i$	...	...	$.0009^*$	...	...	.023
			(.0004)			(.035)
$MIDEASTD_i$	...	...	$.0025^*$	...	...	-2.81^*
			(.0006)			(.078)
$ASIAD_i$	...	...	.0005	...	...	.0035
			(.0004)			(.030)
$AFRICAD_i$	...	...	$.0010^*$	...	...	.012
			(.00044)			(.040)
$AMERICAD_i$	...	...	$.0022^*$	...	...	.049
			(.0005)			(.032)
No. of obs.	98,600	98,600	98,600	98,600	98,600	98,600

Note: *, ** respectively denote significance at the 5 percent and 10 percent levels.

Table 4: Cross-Section Estimates, 2500 B. C. E. - 1750 C. E.

Dependent Variable: Peak Land Mass

	OLS			Robust Regressions		
	(1)	(2)	(3)	(4)	(5)	(6)
MONOTHEIST	.160	.325	...	.039	.131	...
	(.804)	(.815)		(.203)	(.217)	
MIDDLEAST	.864	1.54*	1.53**	.473*	.666*	.501*
	(.637)	(.720)	(.782)	(.183)	(.244)	(.184)
AFRICA	−1.74*	−1.77*	−1.68*	−.184	−.255	−.242
	(.520)	(.524)	(.515)	(.160)	(.164)	(.165)
EUROPE	−1.77*	−1.81*	−1.48*	−.636*	−.703*	−.518*
	(.647)	(.645)	(.589)	(.142)	(.147)	(.174)
ASIA	.173	.129	−.193	−.238*	−.303*	−.274*
	(.835)	(.848)	(.582)	(.138)	(.142)	(.143)
AMERICA	−2.07*	−2.10*	−2.58*	−.619*	−.659*	−.645*
	(.643)	(.674)	(.573)	(.186)	(.193)	(.192)
JEWISH	...	...	−1.81*	...	...	−.220
			(.413)			(.473)
CHRISTIAN	...	...	−.872	...	...	−.094
			(.560)			(.156)
MUSLIM	...	...	−.378	...	...	.358*
			(.713)			(.145)
BIRTHYEAR	−.0004	.00001	−.0001	−.00014	−.00003	−.0001
	(.0004)	(.0005)	(.0005)	(.0001)	(.0001)	(.0001)
MONOTIME	.00034	.00031	...	.00011	.00004	...
	(.0008)	(.00085)		(.00018)	(.0002)	
BIRTHMONO	1.87*	1.52**	1.58**	.514*	.610*	.515*
	(.783)	(.816)	(.880)	(.211)	(.232)	(.211)
CHRISTBIRTH	...	−.311	...	...	−.374*	...
		(.714)			(.191)	
ISLAMBIRTH	...	−.633	...	...	.012	...
		(.530)			(.163)	
No. of obs.	232	232	232	232	232	232
R^2	.095	.099	.100	...	...	...

Note: *, ** respectively denote significance at the 5 percent and 10 percent levels.

Table 5: Cross-Section Estimates, 2500 B. C. E. - 1750 C. E.

Dependent Variable: Duration						
	OLS			Robust Regressions		
	(1)	(2)	(3)	(4)	(5)	(6)
MONOTHEIST	21.3*	18.1*	...	13.1*	12.7**	...
	(7.92)	(7.90)		(6.71)	(7.08)	
MIDDLEAST	19.8*	18.6*	20.8*	18.8*	18.8*	18.8*
	(6.31)	(7.76)	(6.47)	(6.07)	(7.97)	(5.86)
AFRICA	14.8*	14.4*	11.9*	13.0*	13.0*	11.2*
	(5.72)	(5.57)	(5.25)	(5.30)	(5.36)	(5.26)
EUROPE	17.8*	17.0*	6.49	13.7*	13.2*	4.36
	(5.02)	(4.99)	(6.08)	(4.72)	(4.79)	(5.53)
ASIA	13.5*	12.6*	9.97*	11.6*	11.0*	8.20*
	(4.40)	(4.33)	(4.46)	(4.56)	(4.64)	(4.54)
AMERICA	47.4*	45.1*	43.3*	46.2*	44.7*	41.9*
	(6.58)	(6.63)	(6.73)	(6.15)	(6.31)	(6.10)
JEWISH	...	...	15.5**	...	...	18.8
			(8.08)			(15.0)
CHRISTIAN	...	...	19.4*	...	...	13.6*
			(5.41)			(4.95)
MUSLIM	...	...	−1.63	...	...	−3.50
			(3.35)			(4.60)
BIRTHYEAR	−.011*	−.013*	−.012*	−.0081*	−.0083*	−.0091*
	(.0032)	(.0058)	(.003)	(.0029)	(.0046)	(.0027)
MONOTIME	−.013*	−.011**	...	−.0087	−.0079	...
	(.0065)	(.0060)		(.0060)	(.0063)	
BIRTHMONO	−.344	−2.88	3.61	−.251	−1.80	4.62
	(7.57)	(8.10)	(7.85)	(6.99)	(7.58)	(6.73)
CHRISTBIRTH	...	11.4**	...	...	6.58	...
		(7.10)			(6.25)	
ISLAMBIRTH	...	−6.53	...	...	−4.96	...
		(6.59)			(5.34)	
No. of obs.	232	232	232	232	232	232
R^2	.299	.311	.322	...	...	...

Note: *, ** respectively denote significance at the 5 percent and 10 percent levels.

Table 6: Panel Data Fixed-Effects Estimates, 2500 B. C. E. - 1750 C. E.
Truncated Panel Data Population-Averaged Estimates, 300 C. E. - 1750 C. E.

Dependent Variable: Limited Access Order Dummy, LAO

	OLS				
	(1)	(2)	(3)	(4)	(5)
$MONOTHEIST_i$	...	...	.0034*	.0032*	.0033*
			(.0011)	(.0006)	(.0006)
$DECADE_t$	−.0000014	−.0000019**	−.0000038*	−.0000039*	−.000007*
	(.0000023)	(.0000006)	(.0000012)	(.0000010)	(.0000016)
$JUDAISM_t$	.043*	.0039*	...	...	...
	(.0033)	(.0008)			
$CHRISTIAN._t$	.046*	.0036*	...	...	...
	(.0035)	(.0009)			
$ISLAM_t$	.058*	.0019**	...	...	.0050*
	(.004)	(.0010)			(.0017)
$LAO_{i,t-1}$	...	.968*	.965*	.973*	.973*
		(.0021)	(.0014)	(.0018)	(.0019)
$EUROD_i$	...	...	...	.0032*	.0032
				(.00076)	(.00078)
$MIDEASTD_i$	...	...	...	.014*	.022*
				(.0036)	(.0047)
$ASIAD_i$	...	...	...	.0030*	.0031*
				(.0005)	(.00052)
$AFRICAD_i$	...	...	...	.0031*	.0032*
				(.0012)	(.0011)
$AMERICAD_i$	...	...	...	.0045*	.0046*
				(.0014)	(.0014)
No. of obs.	98,832	98,600	32,915	32,915	32,915
R^2	.040	.941	...	...	...

Note: *, ** respectively denote significance at the 5 percent and 10 percent levels.

Table 7: Cross-Section Robust Regression Estimates, 2500 B. C. E. - 1750 C. E.

Dependent Variable: (1) - (3) Peak Land Mass; (4) - (6) Duration

	(1)	(2)	(3)	(4)	(5)	(6)
MONOTHEIST	...	...	−.683**	...	...	42.2*
			(.377)			(12.7)
MIDDLEAST	.668*	.650*	.721*	26.4*	20.5*	26.9*
	(.102)	(.113)	(.106)	(3.59)	(3.91)	(3.56)
AFRICA	−.055	−.050	−.142	8.85**	12.5*	9.32*
	(.149)	(.152)	(.155)	(5.25)	(5.28)	(5.20)
EUROPE	−.457*	−.448*	−.413*	5.93	13.0*	−1.34
	(.126)	(.136)	(.149)	(4.42)	(4.71)	(4.99)
ASIA	−.079	−.054	−.113	1.41	10.1*	.490
	(.116)	(.132)	(.121)	(4.08)	(4.56)	(4.05)
AMERICA	−.426*	−.404*	−.470*	36.3*	44.2*	35.9*
	(.166)	(.178)	(.172)	(5.81)	(6.15)	(5.77)
RELIGION	.069**	.140	.338*	−3.21*	2.67	−18.2*
	(.035)	(.096)	(.142)	(1.24)	(3.32)	(4.75)
RELITIME	...	−.00006	...	...	−.0022	...
		(.00008)			(.0028)	
BIRTHYEAR	...	−.00001	...	...	−.0076*	...
		(.00006)			(.0019)	
No. of obs.	232	232	232	232	232	232

Note: *, ** respectively denote significance at the 5 percent and 10 percent levels.

Appendix A: Dynasties, Kingdoms & Empires — 2500 B. C. E. to 1750 C. E.
(j : Jewish; c: Christian; m: Muslim)
(Peak Land Mass, PLM, in millions of km^2)

MIDDLE EAST:					
	Name	**Birth Year**	**Death Year**	**PLM**	**Region**
1	Early Dynasty	2900 B.C.E.	2371 B.C.E.	1	Mesopotamia
2	Ebla	2400 B.C.E.	2250 B.C.E.	0.09	Syria
3	Akkadian Empire	2371 B.C.E.	2230 B.C.E.	.65	Mesopotamia
4	Gutains	2230 B.C.E.	2112 B.C.E.	.43	”
5	Kingdom of Elam	2200 B.C.E.	644 B.C.E.	.50	Iran
6	Ur Dynasty	2112 B.C.E.	2004 B.C.E.	.43	Mesopotamia
7	Isin, Larsa & Mari	2002 B.C.E.	1792 B.C.E.	.43	”
8	Old Babylonian	1792 B.C.E.	1595 B.C.E.	.50	”
9	Mittani-Kassite	1595 B.C.E.	1200 B.C.E.	.43	Mesopotamia
10	Hittites	1450 B.C.E.	1200 B.C.E.	.75	Anatolia
11	Aramean Kingdom	1350 B.C.E.	850 B.C.E.	.185	Syria
12	Assyrians	1305 B.C.E.	609 B.C.E.	1.4	Mesopotamia
13	Israel^{j}	1200 B.C.E.	584 B.C.E.	.026	Isael/Palestine
14	Luvians	1200 B.C.E.	680 B.C.E.	.75	Anatolia
15	Phrygians	1000 B. C. E.	690 B. C. E.	.20	”
16	Urartu	880 B.C.E.	590 B.C.E.	.15	Armenia
17	Lydia	680 B.C.E.	547 B.C.E.	.08	Anatolia
18	Media	728 B.C.E.	559 B.C.E.	1.64	Iran
19	Babylonia	626 B.C.E.	539 B.C.E.	.50	Mesopotamia
20	Achaemenid Empire	559 B.C.E.	330 B.C.E.	4	Iran, Anatolia, Mesopotamia, Egypt, Armenia, Isreal/Palestine Syria.
21	Empire of Antigonus	323 B. C. E.	301 B. C. E.	.50	Israel/Palestine Syria Anatolia
22	K. of Atropatene	323 B.C.E.	20 B.C.E.	.25	Armenia
23	Seleucid Empire	305 B.C.E.	64 B.C.E.	3.9	Mesopotamia, Iran.
24	Parthian Empire	250 B.C.E.	226 C. E.	2.5	Mesopotamia, Iran.

Appendix A (continued):

MIDDLE EAST (continued)					
	Name	**Birth Year**	**Death Year**	**PLM**	**Region**
25	Sasanian Empire	208 C. E.	651 C. E.	7.9	Mesopotamia, Iran.
26	Rashidun[m]	632 C. E.	661 C. E.	9	Arab pen., Mesopotamia, N. Africa
27	Umayyads[m]	661 C. E.	750 C. E.	13.2	Arab pen., Mesopotamia, N. Africa Iberian Pen.
28	Abbasids[m]	750 C. E.	861 C.E.	11	Arab pen., Mesopotamia, N. Africa Iberian Pen.
29	Qarmatians[m]	819 C. E.	1005 C. E.	1.7	Arabian pen., Mesopotamia.
30	Tulunids[m]	868 C. E.	905 C. E.	3	Arabian pen., Mesopotamia, Egypt, N. Africa.
31	Hamdanids[m]	905 C. E.	1004 C. E.	.20	Mesopotamia, Syria, Iraq.
32	Fatimids[m]	909 C. E.	1171 C. E.	5	Arabian pen., Mesopotamia, Egypt, N. Africa.
33	Buyids[m]	945 C. E.	1055 C. E.	1.5	Iran, C. Asia Anatolia.
34	Ghaznavids[m]	977 C. E.	1186 C. E.	2.2	Iran, C. Asia.
35	Seljuk Empire[m]	1037 C. E.	1194 C. E.	3.9	Anatolia, Mesopotamia, Turkestan.
36	K. of Jerusalem[c]	1099 C. E.	1291 C. E.	.026	Israel/Palestine

Appendix A (continued):

MIDDLE EAST (continued)					
	Name	**Birth Year**	**Death Year**	**PLM**	**Region**
37	Ayyubids[m]	1172 C. E.	1250 C. E.	3	Arabian pen., Mesopotamia, Egypt, N. Africa.
38	Mamluks[m]	1250 C. E.	1517 C. E.	1.5	Arabian pen., Mesopotamia, Egypt, N. Africa.
39	Ilkhanate Khanate	1260 C. E.	1324 C. E.	2.2	Iran
40	Ottoman Empire[m]	1299 C. E.	1923 C. E.	5.5	Anatolia, Mesopotamia, Balkans, E. Europe, N. Africa Arabian Pen.
41	Ak Koyunlu[m]	1378 C. E.	1508 C. E.	.60	Anatolia Iran.
42	Kara Koyunlu[m]	1390 C. E.	1468 C. E.	.50	Anatolia Mesopotamia, Iran, Iraq.
43	Safavid Empire[m]	1492 C. E.	1736 C. E.	2.9	Iran Arabian pen., Mesopotamia, Egypt, N. Africa.

Appendix A (continued):

EUROPE:					
	Name	**Birth Year**	**Death Year**	**PLM**	**Region**
1	Minoan Civilization	2000 B. C. E.	1450 B. C. E.	.07	Balkan pen.
2	Etruscans	1200 B. C. E.	100 B. C. E.	.07	Italian pen.
3	Athenian Empire	479 B. C. E.	404 C. E.	.12	Balkans
4	Macedonian Empire	360 B. C. E.	320 B. C. E.	5.4	Balkans, Anatolia, C. Asia, Iran, NW. India.
5	Dacia Kingdom	350 B. C. E.	40 B. C. E.	.70	E. Europe
6	Roman Empire	200 B.C.E.	330 C. E.	5.7	Italian pen., Mesopotamia, Anatolia, N. Africa
7	Sarmatians	200 B. C. E.	200 C. E.	1	Balkans, S. Russia.
8	Byzantine Empire[c]	330 C. E.	1453 C. E.	4.5	Anatolia, Balkans, E. Europe, Mesopotamia, N. Africa.
9	Visigoths[c]	382 C. E.	711 C. E.	.50	N. C. Europe
10	Merovingian Kingdom[c]	476 C. E.	750 C. E.	.45	W. Europe
11	K. of Italy (Odoacer)[c]	476 C. E.	493 C. E.	.30	S. C. Europe
12	K. of Italy (Ostrogothic)[c]	493 C. E.	100 B. C. E.	.45	Italian pen.
13	Thuringian Kingdom	500 C. E.	730 C. E.	.02	C. Europe
14	Avars	562 C.E.	805 C.E.	.10	Balkans
15	K. of Italy (Lombard)[c]	568 C. E.	774 C. E.	.30	Italian pen.
16	Bulgars (1st Empire)	679 C.E.	1018 C.E.	.11	Balkans
17	Kingdom of Denmark[c]	737 C. E.	1397 C. E.	.04	N. C. Europe
18	Carolignian Empire[c]	750 C. E.	887 C. E.	1.2	W. Europe C. Europe
19	Caliphate of Cordoba[m]	755 C. E.	1009 C. E.	.46	Iberian pen.
20	K. of Pamplona (Navarre)[c]	824 C. E.	1513 C. E.	.70	Iberian pen.
21	Kingdom of Alba[c]	843 C. E.	1286 C. E.	.06	N. W. Europe
22	Kingdom of Scotland[c]	843 C.E.	1707 C.E.	.08	N. W. Europe
23	Magyars	850 C.E.	955 C.E.	.10	Balkans

Appendix A (continued):

EUROPE:					
	Name	**Birth Year**	**Death Year**	**PLM**	**Region**
24	Kingdom of Castille[c]	850 C. E.	1479 C. E.	.15	Iberian pen.
25	Moravians	850 C. E.	900 C. E.	.05	E. Europe
26	Kingdom of Norway[c]	872 C. E.	1397 C. E.	.39	N. Europe
27	Pechenegs	900 C.E.	1070 C.E.	1.5	Balkans S. Russia
28	Kingdom of Leon[c]	910 C. E.	1230 C. E.	.10	Iberian pen.
29	Kingdom of England[c]	927 C. E.	1649 C. E.	.17	N. W. Europe
30	Kingdom of Arles[c]	933 C. E.	1032 C. E.	.13	S. W. Europe
31	Holy Roman Empire[c]	962 C. E.	1806 C. E.	1.8	C. Europe
32	Caretian Dynasty	987 C. E.	1328 C. E.	.55	S. W. Europe
33	Valencia[m]	1010 C. E.	1238 C. E.	.02	Iberian pen.
34	K. of Poland (Piast)[c]	1025 C. E.	1385 C. E.	.30	C. Europe
35	Kingdom of Naples	1130 C. E.	1860 C. E.	.10	Italian pen.
36	Kingdom of Aragon[c]	1035 C. E.	1707 C. E.	.10	W. Europe
37	Cumans	1060 C.E.	1237 C.E.	1	Transylvania
38	Kingdom of Sicily[c]	1130 C.E.	1282 C.E.	.07	Mediterranean
39	Kingdom of Portugal[c]	1139 C. E.	1910 C. E.	.09	Western Europe
40	Angevin Dynasty[c]	1154 C. E.	1399 C. E.	.82	W. Europe
41	Bulgarian Empire[c] (2^{nd})	1185 C. E.	1396 C. E.	.11	Balkans
42	K. of Granada (Nasrid)[m]	1238 C.E.	1492 C.E.	.07	Iberian pen.
43	K. of Lithuania	1251 C. E.	1263 C. E.	.07	N. E. Europe
44	Kingdom of Cyprus[c]	1291 C.E.	1480 C.E.	.09	Mediterranean
45	K. of Poland (Jagiellon)[c]	1385 C.E.	1569 C. E.	.30	C. Europe
46	Kalmar Union[c]	1397 C. E.	1524 C. E.	.76	Scandinavia
47	Khanate of Crimea[c]	1443 C. E.	1783 C. E.	.03	N. E. Europe
48	Muscovy (Russian Emp.)	1462 C. E.	1795 C. E.	16.5	N . E. Europe
49	Cmw. of Poland-Lithuania[c]	1569 C. E.	1791 C. E.	.37	N. E. Europe
50	Duchy of Savoy[c]	1559 C. E.	1601 C. E.	.05	W. Europe
51	Dutch Kingdom (United. Prov.)	1581 C. E.	1795 C. E.	.03	N. W. Europe
52	Empire of Sweden[c]	1611 C. E.	1718 C. E.	.60	Scandinavia
53	Kingdom of Prussia[c]	1708 C. E.	1918 C. E.	.35	N. E. Europe

Appendix A (continued):

ASIA:					
	Name	**Birth Year**	**Death Year**	**PLM**	**Region**
1	Xia Dynasty	1994 B. C. E.	1523 B. C. E.	6.5	N. China S. China
2	Brihadratha (Magadha E..)	1700 B. C. E.	799 B. C. E.	.50	India
3	Shang Dynasty	1523 B. C. E.	1027 B. C. E.	6.5	N. China
4	Kingdom of Colchis	1250 B. C. E.	725 B. C. E.	.06	C. Asia
5	Pradyota (Magadha E.)	799 B. C. E.	684 B. C. E.	.50	India
6	Shishunaga (Magadha E.)	684 B. C. E.	424 B. C. E.	.50	India
7	Scythians	500 B.C.E.	150 C. E.	5	C. Asia S. Russia.
8	Zhou Dynasty	403 B.C.E.	221 B.C.E.	5.5	N. China
9	Nanda Dyn. (Magadha E.)	343 B. C. E.	321 B. C. E.	1.5	India
10	Mauryan Empire	320 B.C.E.	183 B.C.E.	5	India
11	Qin Dynasty	247 B. C. E.	209 B. C. E.	12	N. China S. China
12	Xiongnu	210 B. C. E.	155 C. E.	4	Mongolia
13	Han Empire	202 B.C.E.	220 C. E.	6	N. China, S. China.
14	Shungas	183 B. C. E.	73 B. C. E.	1.5	India
15	Toucherans	162 B. C. E .	230 C. E.	2	C. Asia
16	Koguryo	150 B. C. E.	668 C. E.	.20	Korean pen.
17	Satavahanas Empire	100 B.C.E.	225 C. E.	1	India
18	Shakas	90 B. C. E.	20 C. E.	1.5	India
19	Kanva (Magadha E.)	71 B. C. E.	26 B. C. E.	.50	India
20	Kushan Empire	50 B.C.E.	240 C. E.	6	C. Asia, NW. India.
21	Paekche	18 B. C. E.	668 C. E.	.06	Korean pen.
22	Funan	1 C. E.	630 C. E.	.20	Cambodia
23	Kaya	42 C. E.	562	.03	Korean pen.
24	Xian-bi	155 C. E.	400 C. E.	4	Mongolia
25	Three Kingdoms	220 C. E.	265 C. E.	6.5	China
26	Ganga Dynasty	250 C. E.	1004 C. E.	.15	India
27	Jin (eastern)	265 C. E.	420 C. E.	5	S. China
28	Vakatakas	300 C. E.	500 C. E.	1.5	India
29	Sixteen Kingdoms	302 C. E.	589 C. E.	6.5	China
30	Gupta Empire	320 C. E.	535 C. E.	3.5	India

Appendix A (continued):

ASIA:					
	Name	**Birth Year**	**Death Year**	**PLM**	**Region**
31	Pallavas	330 C. E.	890 C. E.	1	S. India
32	Hun Empire	370 C. E.	560 C. E.	4	C. Asia, Mongolia, Balkans, E. Europe, S. Russia.
33	Ruan Ruan	440 C. E.	550 C. E.	6.5	Mongolia
34	Champa	550 C. E.	1145 C. E.	.10	Korean pen.
35	Dvaravati	580 C. E.	1080 C. E.	.10	S. E. Asia
36	Karluks/Oghuz	552 C. E.	1070 C. E.	1	C. Asia
37	Siu Dynasty	589 C. E.	628 C. E.	6.5	N. China S. China
38	Srivijaya Empire	600 C. E.	1200 C. E.	.47	Indonesia
39	T'ang Dynasty	618 C. E.	907 C. E.	6.5	N. China S. China
40	Chenla	630 C. E.	802 C. E.	.20	Cambodia
41	Khazaria[j]	650 C. E.	965 C. E.	.85	Asia Caucasus
42	Silla	668 C. E.	935 C. E.	.12	Korean pen.
43	Nanzhao	729 C. E.	902 C. E.	.39	S. China
44	Uighars	745 C. E.	840 C. E.	1.5	Mongolia
45	Kingdom of Abkhazia[c]	780 C. E.	1008 C. E.	.05	N. W. Asia
46	Heian Civilization	794 C. E.	1185 C. E.	.37	Japan
47	Khmer Empire	802 C. E.	1432 C. E.	.20	Cambodia
48	Tahirids[m]	821 C. E.	873 C. E.	1.2	N. E. Iran
49	Bagan Dynasty	849 C. E.	1287 C. E.	.66	Burma
50	Kievan Rus[c]	860 C. E.	1150 C. E.	.08	N. W. Asia
51	Saffarids[m]	873 C. E.	900 C. E.	2	Eastern Iran
52	Sinkiang	900 C. E.	1050 C. E.	1	N. W. China
53	Qarakhanids[m]	900 C. E.	1090 C. E.	1.5	C. Asia
54	Khitan	907 C. E.	1124 C. E.	1.5	Mongolia
55	Liao	916 C. E.	1125 C. E.	2	N. China
56	Samanids[m]	932 C. E.	1062 C. E.	2	C. Asia Iran.
57	Koryo	935 C. E.	1392 C. E.	.15	Korean pen.

Appendix A (continued):

ASIA:					
	Name	**Birth Year**	**Death Year**	**PLM**	**Region**
58	Song Dynasty	960 C. E.	1279 C. E.	6.5	N. China S. China
59	Airlangga	991 C. E.	1049 C. E.	.04	Java
60	Hoysala Empire[m]	1006 C. E.	1346 C. E.	.30	India
61	Kingdom of Georgia[c]	1008 C. E.	1466 C. E.	.07	C. Asia
62	Naimans & Keraits[c]	1009 C. E.	1300 C. E.	.40	C. Asia
63	Kalinga Dynasty	1028 C. E.	1434 C. E.	.25	India
64	Kediri	1049 C. E.	1290 C. E.	.02	Java
65	Singharasi	1049 C. E.	1290 C. E.	.02	Java
66	Jin (late)	1115 C. E.	1234 C. E.	8	N. China
67	Ghurids[m]	1173 C. E.	1215 C. E.	3	C. Asia
68	Kamakura Period	1185 C. E.	1335 C. E.	.37	Japan
69	G. Horde/Mongols[m]	1206 C. E.	1502 C. E.	33.2	C. Asia, Turkestan, Mongolia Balkans, E. Europe, S. Russia.
70	Sultanate of Delhi[m]	1211 C. E.	1398 C. E.	1.5	India
71	Chaghatai Khanate	1260 C. E.	1324 C. E.	2.2	C. Asia
72	Yuan Dynasty	1279 C. E.	1368 C. E.	6.5	N. China S. China
73	Majapahit Empire	1293 C. E.	1500 C. E.	.13	Java Isl.
74	Ashikaga (Muachi) Period	1335 C. E.	1573 C. E.	.37	Japan
75	Vijayanagar Kingdom	1336 C. E.	1646 C. E.	.60	S. India
76	Bahmani Sultanate[m]	1347 C. E.	1518 C. E.	.70	India
77	Ming Dynasty	1368 C. E.	1644 C. E.	6.5	N. China S. China
78	Sharqi Dyn. (Jaunpur)[m]	1394 C. E.	1479 C. E.	.004	India
79	Timurids	1401 C. E.	1505 C. E.	4	C. Asia
80	Sultanate of Melaka[m]	1403 C. E.	1511 C. E.	.002	S. E. Asia
81	Toungoo Dynasty	1486 C. E.	1752 C. E.	.66	Burma
82	Mughal Empire[m]	1526 C. E.	1765 C. E.	1.5	India
83	Sur Dynasty	1540 C. E.	1556 C. E.	.60	India

Appendix A (continued):

AMERICA:					
	Name	**Birth Year**	**Death Year**	**PLM**	**Region**
84	Azuchi-Momoyama Period	1573 C. E.	1613 C. E.	.37	Japan
85	Tokugawa Period	1613 C. E.	1867 C. E.	.37	Japan
86	Qing	1644 C. E.	1911 C. E.	12	N. China S. China

Appendix A (continued):

AMERICA:					
	Name	**Birth Year**	**Death Year**	**PLM**	**Region**
1	Olmecs	1500 B. C. E.	400 B. C. E.	.12	G. of Mexico
2	Chavin	1200 B. C. E.	200 B. C. E.	.06	Andes
3	Adena	1000 B. C. E.	100 C. E.	.08	Mississippi $\triangle$
4	Nazca	400 B. C. E.	450 C. E.	.07	Andes
5	Kaminaljuyu & Izapa	300 B. C. E.	300 C. E.	.07	Guatemala
6	Hopewell	200 B. C. E.	400 C. E.	.12	Mississippi Δ
7	Mochica	1 C. E.	650 C. E.	.06	Andes
8	Teotihuacan	1 C. E.	650 C. E.	.20	Mexico Guatemala
9	Mogollon	150 C. E.	1350 C. E.	.60	S. W. America
10	Classic Maya	200 C. E.	850 C. E.	.50	Yucatan
11	Monte Alban	200 C. E.	700 C. E.	.08	Mexico
12	Mesa Verde	500 C. E.	1300 C. E.	.08	SW. America
13	Huari & Tiahuan.	500 C. E.	900 C. E.	.10	Andes
14	Anasazi	500 C. E.	1450 C. E.	.50	S. W. America
15	Mississippi Culture	800 C. E.	1500 C. E.	.12	Mississippi Δ
16	Chimu	900 C. E.	1476 C. E.	.06	Andes
17	Chaco Canyon	900 C. E.	1150 C. E.	.08	SW. America
18	Hohokam	900 C. E.	1400 C. E.	.08	Mississippi Δ
19	Toltecs	900 C. E.	1156 C. E.	.50	Mexico
20	Mayapan	987 C. E.	1446 C. E.	.30	Yucatan
21	Inca	1463 C. E.	1533 C. E.	.09	Andes
22	Aztecs	1325 C. E.	1519 C. E.	.90	Mexico

Appendix A (continued):

AFRICA:					
	Name	**Birth Year**	**Death Year**	**PLM**	**Region**
1	Old Kingdom	2686 B. C. E.	656 B. C. E.	1	Egypt
2	Middle Kingdom	2040 B.C.E.	1786 B.C.E.	1	Egypt
3	New Kingdom	1552 B.C.E.	1069 B.C.E.	1	Egypt
4	Late Period	1069 B. C. E.	730 B. C. E.	1	Egypt
5	Kushites	730 B.C.E.	656 B.C.E.	1	Egypt
6	Saite	668 B.C.E.	525 B.C.E.	1	”
7	Ptolemaic Empire	323 B.C.E.	20 B.C.E.	1	Egypt, Isreal/Palestine
8	Meroe	295 B. C. E.	320 C. E.	.59	N. Africa
9	Axum Empire[c]	270 C. E.	960 C. E.	1.11	Ethiopia
10	Nubian Kingdoms[c]	320 C. E.	1504 C. E.	1.1	NE. Africa
11	Soninke Dynasty	770 C. E.	1240 C. E.	.25	Ghana
12	Rustamids[m]	776 C. E.	909 C. E.	.80	N. W. Africa
13	Idrisids	789 C. E.	906 C. E.	.45	”
14	Aghlabids	800 C. E.	909 C. E.	.16	”
15	Takrur	800 C. E.	1285 C. E.	.07	W. Africa
16	Ethiopian Empire[c]	961 C. E.	1450 C. E.	.20	SusSah. Africa
17	Almoravids[m]	1056 C. E.	1147 C. E.	1	N. Africa
18	Abyssinia[c]	1117 C. E.	1974 C. E.	1.1	Ethiopia
19	Almohadids[m]	1130 C.E.	1269 C.E.	1	N. Africa
20	Hafsids[m]	1229 C. E.	1574 C. E.	.16	N. W. Africa
21	Mali[m]	1235 C. E.	1400 C. E.	1.1	West Africa
22	Zayyanids (Abd al-Wadid)[m]	1236 C. E.	1550 C. E.	2	N. W. Africa
23	Marinids (Banu Marin)[m]	1248 C. E.	1548 C. E.	.60	N. W. Africa
24	Djolof Empire[m]	1350 C. E.	1556 C. E.	.19	SubSah. Africa
25	Oyo Empire	1400 C. E.	1835. C. E.	.20	W. Africa
26	Songhai[m]	1464 C. E.	1591 C. E.	1.1	West Africa
27	Kongo[c]	1490 C. E.	1718 C. E.	.13	Central Africa
28	Bunyoro[c]	1550 C. E.	1850 C. E.	.15	SubSah Africa.

Appendix B: Regions of the World and their Land Areas (in km^2)

The Near East:	
Anatolia	770,760
Armenia	28,400
Iran	1,636,000
Israel	20,330
Mesopotamia	432,162
Palestinian Territories	6,000
Syria	184,050
The Eastern Mediterranean	200,000
Central Asia:	
Afghanistan	647,500
China (South)	4,663,205
China (North)	4,663,205
India	2,229,892
India (Northwest)	743,298
Mongolia	1,564,116
Pakistan	778,720
Southern Russia	2,919,800
Tajikistan	142,700
Turkestan	1,190,900
Europe:	
Britain	241,590
Western Continental Europe	1,295,707
Central Continental Europe	765,457
Eastern Continental Europe	553,699
The Balkans	616,769
Africa:	
Egypt	995,450
N. Africa (Northeast exc. Egypt)	1,923,140
N. Africa (West)	2,828,290
The Americas:	
Yucatan	60,000
Andes	60,000

Guatemala	120,000
Mexico	200,000
Gulf of Mexico	150,000
Southwest America	70,000
Mississippi Delta	150,000

Appendix C: Omitted Civilizations (due to autonomy, scale or data issues)

MIDDLE EAST:			
	Name	**Notes**	**Region**
1	Anatolian Derebeyliks	Scale (Çaka Bey, Sökmenli, Artuklu, Danişmend, Inaloğlu, Saruhan Menteşe, Tekke, Saruhan Saltuklu, Ramazanoğlu, Mengücek Ertena, Aydin, etc.)	Anatolia
2	Nicaea Empire	Byzantine principality	”
3	Sumerians	City-states until Sargon I unites Akkadian Emp.	Mesopotamia

EUROPE:			
	Name	**Notes**	**Region**
1	Mycenaean Civilization	info n.a.	Balkan pen.
2	Early Germanic tribes	Chamavi, Marcomani, Harii, Cherusci, Vandals, etc.	N. C. Europe
3	Genoans	scale	Italian pen.
4	Venetians	”	”
5	Medieval Germanic groups	Bavarians, Thuringians, Alemanni, Saxons, Burgundians, Salians, etc.	N. C. Europe
6	Peoples of the European Steppe	Gepids, Sueves, Rugians	”
7	Greek city-states	750 B. C. E. - 400 B. C. E. city-states (Arcadia, Phocis, Messania, Argolis, Attica, Laconia, Locris, Epirus, Thessaly, Achaea Aetolia, etc.)	Balkan pen.
8	English Heptarchy Kingdoms	scale, (EastAnglia, Essex, Kent, Mercia, Northumbria, Sussex, Wessex)	British Isl.

Appendix C: (continued)

ASIA:			
	Name	**Notes**	**Region**
1	Asian Nomad Cultures	6000 B. C. E. - 500 C. E. info n. a. (Andronovo, Srubnaya Cultures, Kizil Kum, Kara Kum, Pamris, Cimmerians, Yuezhi, Massagatae, Dahae, Alans, Hunas, etc.)	Central Asia
2	Xixia	info n.a.	China
3	Dai Vet	”	Vietnam
4	Chiao-chih	”	”
5	Chiu-chen	”	”
6	Lan Chang	”	Burma
7	Pegu	”	”
8	Chiengmai	”	”
9	Arakan	”	”
10	Ahom	”	”
11	Sultanate of Sulu	info n.a. 1450C.E. - 1899C.E.	Indonesia
12	Sultanate of Macassar-Gowa	info n.a.	”
13	Angkor	”	Thailand
14	Silla	”	
15	Gondwana	”	India
16	Telingana	”	”
17	Gujarat	”	”
18	Orissa	”	”
19	Malwa	”	”
20	Chin	”	China
21	Yen	”	”
22	Cheng	”	”
23	Sogdiana	Tang Dynasty suzeranity	”
24	Uighur Turks	Tang Dynasty auxiallry	”
25	Sung	info n.a.	S. China
26	Nan Chao (Taj)	”	”
27	Gurjarat	”	India
28	Gauda	”	”

Appendix C: (continued)

ASIA:			
	Name	**Notes**	**Region**
29	Lanna	”	”
30	Annam	”	”
31	Gangga Negara	”	Malaysia
32	Langkasuka	”	”
33	Pan Pan	”	”
34	Kedah Sultanate	1136 C. E. - present	”
35	Johor Sultanate	1528 C. E. - 1899 C. E.	”
36	Hsiung-nu Empire	info n.a.	”
37	Yadava Dynasty	vassals of Sul. of Delhi	India
38	Pandya Dynasty	info n.a.	
39	Calukya Dynasty	info n.a.	
40	Kanva	Magadha Emp. dynasty	India
41	Indus Civilization	2500 B C. E. - end date uncertain	S. E. Asia
42	Pre-Mauryan Indian civ.	info n. a. Pancalas, Kashis, Kurus, Vitihotras	S. India

AMERICA:			
	Name	**Notes**	**Region**
1	Native American Tribes	scale, info n.a. 500 C.E.-1500 C.E. (Nootka, Chinook, Yurok, Pomo, Kaska, Inuit, Sioux, Cheyenne, Arapaho, Apache, Cherokee, Algonkin Nations, etc.)	N. America
2	Zapotec	info n.a.	Meso America
3	Mixtec	”	”
4	Tarascan	”	”

Appendix C: (continued)

AFRICA:			
	Name	**Notes**	**Region**
1	Lunda Empire	info n.a.	SubSah. Africa
2	Borno Kanem	”	”
3	Great Zimbabwe	city-state	”
4	Banu Hilal	no settlement nomadic Bedouin tribe	N. W. Africa
5	Zirids	did not gain full control splinter from Fatimids	”