

PRINTING AND INTEREST RESTRICTIONS IN ISLAM & CHRISTIANITY: AN
ECONOMIC THEORY OF INHIBITIVE LAW PERSISTENCE AND DIVERGENCE¹

JARED RUBIN

Abstract

Until recently, many scholars attributed the divergence in Middle Eastern and Western European economic development to the "conservative nature" of Islam. This paper departs from such scholarship, suggesting that institutions supporting economically inhibitive laws are more likely to be self-enforcing in the Muslim world – providing an *appearance* of conservatism. A theoretical model suggests that this outcome emanates from the greater dependence of Islamic political authorities on the dictates of religious authorities. I substantiate this claim by analyzing the history of interest bans and printing restrictions in Islam and Christianity, highlighting the institutional mechanisms supporting divergent paths within and across religions.

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DRAFT: JANUARY 22, 2008

¹ This paper is derived from chapter three of my dissertation, completed at Stanford University. I am extremely grateful to Avner Greif and Timur Kuran for helpful guidance, comments, and insight. I also wish to thank Ran Abramitzky, Gavin Wright, and participants in workshops at Cal State Fullerton, Stanford University, UC-Irvine, and the 2007 Meetings of the Association for the Study of Religion, Culture, and Economics for helpful observations. All errors are mine.

I. INTRODUCTION

Over the past few decades, a significant amount of research has been conducted in search of the causes underlying the “rise of the West” (North and Thomas 1973; Jones 1981; Diamond 1997; Landes 1998; Pomeranz 2000; Acemoglu, Johnson, and Robinson 2005). In relation to the Middle East, this research takes on a special significance. By almost any account, the Middle East was far more advanced economically and scientifically than Western Europe as late as the thirteenth century. Yet, Middle Eastern economies did not develop nearly as rapidly as Western European ones did in the ensuing centuries, and were far surpassed economically after the Industrial Revolution.² Maybe, then, instead of searching for the factors underlying the rise of the West, the correct question to pose is the converse one Bernard Lewis (2002) suggests: "What went wrong?"

Until recently, popular explanations for the economic divergence suggested that the "conservative" or "mystical" nature of Islam discouraged curiosity (to learn non-Muslim languages or European cartography, take foreign expeditions, adopt foreign methods and techniques, and so forth) and prevented risk-taking, innovation, and mechanization (Cromer 1908, p. 161-165, 228-235; von Grunebaum 1966; Weber 1978, p. 623-627). In this view, Islam is seen as inherently hostile to commerce and finance.³ While on the surface such explanations may appear to be purely culturalist in nature, there are indeed empirical phenomena that could

² Throughout this paper, I will use the terms "Christian world" and "Western Europe" to denote the pre-Reformation Christianized regions under the Church of Rome. I will also use the term "Islamic/Muslim world" somewhat broadly, comprising North Africa and the "Middle East" (that is, the entire Arab world, Iran, Turkey, the Balkan peninsula, and Spain up to the Reconquista). Muslim regions of Central Asia, the Indian subcontinent, and the Malay Peninsula are not the direct focus of this paper, though the results are applicable to these regions.

³ For an overview of this literature, see Kuran (1997, p. 49-53). Said (1978) gives a fascinating historical account of Western views towards the "Orient", and in particular, the Middle East. Lewis (1982, ch. 3-5, 2002) provides an account of the symptoms of the economic divergence. Mokyr (1990, p. 170-173, 200-206) argues that medieval Christianity was more receptive to technological change than medieval (post-10th century) Islam, but he does not go so far as to claim that this is an underlying reason for the economic divergence. On the other hand, Lerner (1958, p. 405) argues that the top policy problem (of the 1950s) for Middle Eastern leaders was the choice between "Mecca or mechanization".

lead one to believe their validity. In particular, there have existed numerous religious norms and laws – such as prohibitions on taking interest and printing, suppression of women, and laws against mass education – that have existed or persisted for much longer in Islam than in Christianity despite being inhibitive to economic development. It is thus *possible* that religion has played some salient role in the divergence.

Yet, arguments appealing to the “conservative nature” of Islam often overlook (or ignore) an important feature of Muslim history – from the 7th-10th centuries (C.E.), Islamic contract law, finance, and provision of public goods (to name just a few) were consistently modified in reaction to the exigencies of the day. Thus, there appears to be nothing in Islam *inherently* hostile to commerce. Indeed, some recent studies have searched for alternative, institutional causes underlying the economic divergence. For example, in a series of articles, Timur Kuran has analyzed specific Islamic institutions – such as the Islamic law of inheritance, Islamic legal pluralism, and the *waqf* (pious foundation) – and argued that the interactions between such institutions, which at one point in Islamic history had laudable and economically positive objectives, had numerous unintended consequences which effectively discouraged economic growth (Kuran 2001, 2003, 2004a, 2004b, 2005a, 2005b).

Along with such scholarship, this paper searches for the institutional roots underlying the divergence of Middle Eastern and Western European economies. In particular, given the history of scholarship on this topic, this paper addresses the question, “What role *did* religion play in the divergence, if any?” I analyze one important avenue through which religion has had a salient effect – the prevalence and persistence of economically inhibitive norms and laws – and seek the general forces underlying their historical paths in Islam and Christianity.

More specifically, I analyze the consequences of one exogenous institutional difference between the Islamic world and Western Christendom – the greater degree to which the political institutions are dependent on the religious institutions in the former. This difference is exogenous because it is a remnant of the circumstances surrounding each religion’s birth (I develop this concept in Section II). This argument thus falls into a broader literature that seeks exogenous roots of institutional and economic differences (Diamond 1997; Acemoglu, Johnson, and Robinson 2001, 2005; Engerman and Sokoloff 2002).

In order to shed light on the consequences of this institutional difference, I construct a general, theoretical model which analyzes how the interactions between political authorities, religious authorities, and the laity affect the sustainability of economically inhibitive religious laws under varying institutional settings. The basic tension is the one between the political authority, which has incentive to maximize the productivity of the laity, and the religious authority, which has incentive to uphold its “eternal” doctrine. When the political authority’s dependence on the dictates of the religious authority is sufficiently large, it is costly for the former to permit religiously-prohibited actions, so they are unlikely to do so. In turn, only a small portion of the laity transgresses the prohibition, since this entails worldly and other-worldly costs. With few individuals breaking its dictates, the religious authority has little incentive to enact a costly reinterpretation. Thus, the players’ interactions entail that no agent or authority has incentive to “push the envelope”, and the institutions upholding the law are *self-enforcing*. However, when the level of dependence is small, the institutional structure supports such incentives, and the institutions undermine the related laws, encouraging endogenous institutional change.⁴

⁴ This framework sheds light on the persistence of religious laws that diminish the welfare of the laity, but it does not account for inhibitive laws – such as those condemning murder or theft – which increase social welfare. Yet, this

I substantiate the model's claims by analyzing the histories of interest (usury)⁵ bans and printing restrictions in Islam and Christianity. Both laws were equilibrium outcomes under certain economic conditions (that is, before the commercial revolution or the advent of the printing press), yet they persisted in spite of changing circumstances under which they were inhibitive to economic development. Both histories conform to the model's predictions – interest bans were eradicated in the 15th and 16th centuries in Christianity yet remain an important part of modern Islamic doctrine, while the printing press spread rapidly in Western Europe but was not adopted in the Muslim world for over three centuries after its invention. I show that the interactions predicted by the model under differing institutional circumstances are salient features of these histories, and the unexpected predictions arising from the model's equilibrium conditions are also apparent in the historical record.

The paper is organized as follows. Section II overviews the historical relationship between religious and political institutions in Islam and Christianity, presenting the argument that differences between the religions and variations over time within the religions are exogenous to the phenomena under study. Section III presents the model, highlighting the (unintended) effects of the relationship between religious and political institutions. Section IV briefly overviews, in light of the model, the histories of interest and printing restrictions in the Muslim and Christian worlds. Section V considers the broader ramifications of this discussion, and Section VI concludes.

II. RELIGIOUS AND POLITICAL INSTITUTIONS IN ISLAM AND CHRISTIANITY

argument is not based on welfare optimization – instead, the self-interested actions of the salient parties drive the results. Welfare implications may arise, but are often ambiguous.

⁵ Though the terms interest and usury have different meanings in their modern context, in pre-modern times they were largely synonymous, and will thus be used interchangeably throughout the paper (Divine 1959, p. 4-5; Persky 2007).

The theoretical analysis presented in this paper exploits the fact that the political authorities of Islam have always been more dependent on the dictates of the religious authorities than their Christian counterparts. This difference stems from the birth of these religions and can therefore be considered exogenous to the specific doctrines in question.

The demarcation of the secular and the religious in Christian teaching is largely due to the circumstances under which Christianity arose. Born under the aegis of the Roman Empire, it was both unnecessary and infeasible for the Christians to create a legal system based on religious principles. As a persecuted minority faction until the “conversion” of Constantine in 312 C.E., Christians were forced to live under civil authority, and early Church leaders advocated a separation between political and religious institutions. The most famous dictate establishing this separation is attributed to Jesus: “Render unto Caesar the things which are Caesar's, and unto God the things that are God's" (Matthew 22:21).⁶ This set a precedent under which diverse legal systems (secular and religious) could coexist, each serving its own constituency (Kuran 2005a, p. 7).

Unlike Christianity, which was born within a powerful state, Islam was formed at a time of weak centralized power and tribal feuding in the Middle East. Due to the resulting institutional vacuum, Islamic ideals quickly became those of the state, which was in need of a practical, unifying ideology. Muhammad himself oversaw the formation of institutions with the ability to establish laws, dispense justice, collect taxes, and conduct diplomacy (Lewis 1974, 1993, 1995; Watt 1999). In Muhammad’s ideal Islamic polity, religion and state were one – indeed, he claimed that, “Islam and government are twin brothers. One cannot thrive without the other.

⁶ This point is also made clear in Augustine's influential fifth century work *The City of God*, which suggested that the civil government is an independent body and that Christians must obey its laws (Hyma 1938, p. 14; Tierney 1988, ch. 1; Feldman 1997, p. 25-27).

Islam is the foundation, and government the guardian. What has no foundation, collapses; what has no guardian, perishes” (Lewis 1995, p. 149).⁷

In both religions, the degree to which the political authorities have been subject to the dictates of the religious authorities has varied throughout time. I exploit this variation in this paper, and I argue that it is exogenous to the specific doctrines in question.

As early as 800 C.E., Christian leaders Pope Leo III and Charlemagne agreed to swear fidelity to each other, as long as it was recognized that each was the ruler in their respective realm of influence (Hyma 1938, p. 25). During the ninth and tenth centuries, however, lay lords appointed clerics of all ranks, a practice which led to the Investiture Struggle involving Pope Gregory VII (1073-1085) and King Henry IV of Germany (the Holy Roman Emperor). The Struggle culminated in the Concordat of Worms in 1122, a pact which granted the Church practical independence from royal authority, although ecclesiastical appointments were still made in the presence of the king or emperor (Hyma 1938, p. 30-32; Tierney 1988; Feldman 1997, p. 30-35).⁸ These struggles largely predated the emergence of capitalistic markets in Western Europe and are thus exogenous to the phenomena that are analyzed within the context of the model in this paper.

After the Concordat of Worms, papal authority was re-established, reaching its zenith in the thirteenth century. Yet, it is highly unlikely that the strengthening of papal power was a result of processes studied in this paper – as capitalistic markets emerged in Europe, lay economic actors had incentive to support secular regents over the Church, as the former were much more likely to support economic activity. By the turn of the fourteenth century, ecclesiastical leaders

⁷ For more on this intersection of the religious and the legal in Islam, see Lewis (1974, introduction, 1995, ch. 8, 2002, ch.5), and Hassan (1981, p. 26).

⁸ For an economic account of the impact of the Concordat of Worms on the appointment of bishops, see Bueno de Mesquita (2000).

lost much of their authority and secular regents were able to recapture domain over their lands (Feldman 1997, p. 45-46). It is possible that emperors were able to regain suzerainty because of secular support (that is, the laity supported secular leaders in return for future economic favors). Yet, as Tierney (1988, ch. 4) points out, the changing tide in church-state relations in the late-thirteenth century was a result of phenomena outside the scope of the argument in this paper – contributing factors include the growth of secular power into national kingdoms, new theories of the state based on Aristotelian foundations, and movements of criticisms within the Church (especially by the Franciscans). The institutional changes over time in Christianity were thus not the result of individuals “pushing the envelope” of legal and political interpretation and hence can be viewed as exogenous to the relationships studied in this paper.

In the Islamic world, there has never been a demarcation between religious authority and legal authority – it is the religious scholars (*ulamā'*) who interpret Islamic law (*sharī'a*). The relationship between these scholars' dictates and the actions of political authorities has varied throughout history, but there was always a strong interconnection between the two.⁹

After the institutionalization of the judicial class in the Umayyad (661-750 C.E.) and early `Abbāsīd (750-1258) periods, *mufītīs* (jurisconsultants – the primary source of legal and religious reinterpretation in Islam) and other religious scholars gained considerable independence from the state (Masud, Messick, and Powers 1996, ch. 1; Berkey 2003, ch. 13; Hallaq 2005, ch. 8). In the face of a powerful legal class, the caliphate (a political and religious office which oversaw the secular needs of the state) had little choice but to comply with Islamic law – otherwise, the philosophy underpinning its legitimacy would have been undermined (Berkey 2003, p. 201-215; Hallaq 2005, ch. 8). Indeed, the `Abbāsīds recognized religious law as the only

⁹ For an economic study of the institutional roots and economic consequences of the Muslim relationship between the legal and the political, see Coşgel, Ahmed, and Miceli (2007).

legitimate norm in Islam, and sovereign rulers were allowed to create policy (*siyāsa*) only if it did not conflict with the *sharī'a* (Schacht 1964, p. 49-54).

The *muftī*'s office has been largely independent of government interference throughout Muslim history (Masud, Messick, and Powers 1996, ch. 1; Hallaq 2001, p. 192). This independence was undermined by the Ottomans (1299-1922), who in the mid-fifteenth century incorporated the *muftī*'s office into the apparatus of the state.¹⁰ This arrangement gave the Ottoman *sultāns* greater power to push forward their prerogatives in relation to *sharī'a* – indeed, the powerful Grand *Muftī* (*Shaykh al-Islām*) Ebu's-su'ud (r. 1520-1566) was renowned for melding the *sultān*'s policies with *sharī'a* (Imber 1997; Berkey 2003, p. 261-265). Ultimately, however, the legitimacy of the *sultān* was still dependent on his conforming to Islamic law. In fact, Ottoman *sultāns* generally did not proceed with important decisions relating either to foreign or domestic policy without first securing a *fatwā* from a *muftī* (Gerber 1988, ch. 9; Lewis 1995, p. 224-225; Imber 1997, p. 39).¹¹ Yet, this institutional change was not the result of individuals “pushing the envelope” of legal and political interpretation. As noted in Coşgel, Ahmed, and Miceli (2007), the major changes in the relationship between Muslim political and legal/religious authorities in the Ottoman period resulted from demographic heterogeneity (which limited the coordinative ability of the masses) and lack of external threats (such as the Crusaders, who effectively ended the `Abbāsids regime) – phenomena outside the scope of the model's arguments.

¹⁰ In the early Muslim period, political leaders appointed jurists, but these appointments were generally confined to *kādīs*. *Kādīs* were the primary enforcers of the law, and thus their relationship with the political authorities may have been important to legal outcomes. Yet, *muftīs* remained more autonomous than *kādīs*, with their role becoming politicized only in the Ottoman Empire (Hallaq 2001).

¹¹ Similar institutional arrangements still exist in many modern Islamic polities; state *muftīs* were appointed in the twentieth century in Egypt, Saudi Arabia, Lebanon, Malaysia, Yemen, and Indonesia, and twentieth century constitutions in Egypt, Syria, Kuwait, Morocco and Iran (to name a few) include provisions making the *sharī'a* the law of the land (Schacht 1964 p. 107-110; Masud, Messick, and Powers 1996, p. 27).

In this paper, I examine the effects of these exogenous differences in institutional settings within and across Islam and Christianity. I suggest that they provided differing incentives to the relevant players to the extent that economically inhibitive religious norms persisted with greater frequency in Islam than in Christianity. In order to explore this possibility, I build a model which captures the salient institutional elements of both religions and exposes the causal relations underlying the persistence of religiously-influenced, economically inhibitive norms.

III. MODEL: INSTITUTIONAL DEPENDENCE AND PERSISTENT EQUILIBRIA

III.1. Overview of the Results

Before presenting the formal analysis, I informally discuss its assumptions and its basic arguments. The model consists of a political authority (PA), a religious authority (RA), and numerous laity (L) who derive utility from producing via some action which is an input in a production function. The model captures the interactions between these players, all of whom are infinitely-lived. There is no collective action, agents' utility is a function of the previous actions of the PA and RA, and there are enough agents such that no one agent is pivotal. I assume that the PA and RA know agents' past actions, but not their utility functions. Thus, the PA and RA do not act in order to affect future actions of the laity, but are only concerned with their own utility (given the current and past actions of the laity) in the present period. I therefore simplify the analysis without losing generality by assuming that the RA and PA are dynastic – each is a “dynasty” of successive generations of one period lived players with perfect knowledge of the past.¹²

¹² A full information model would undercut much of the model's insight – equilibria would emerge from the PA's or RA's knowledge of how their interpretations would affect future actions, a phenomenon outside of the scope of the model (and, in many cases, historical reality). On the other hand, if the RA or PA were able to obtain some signal

In "period 0" there is some exogenous event which increases the productivity of all agents (for example, the emergence of capitalistic markets allowing for investment lending or the invention of the printing press allowing for mass printing). In each subsequent period, an agent can choose to abstain from the action, openly act, or choose from a menu of ruses by which it acts but incurs a transaction cost. Indeed, most religiously-prohibited actions are not black and white – for instance, Muslim lenders have always found (costly) ways of skirting interest and inheritance restrictions while not directly violating the law. After agents act, the PA and RA, acting simultaneously, can ban the action, allow it openly, or allow it as long as a sufficiently large transaction cost (or sufficiently intricate ruse) is undertaken. The action is initially banned by the PA and RA.

Agents face costs for breaking the dictates of the PA and RA. The former cost is the one incurred from going to jail (if detected) and, if the action involves a contract, from lack of legal enforcement.¹³ Since greater actions entail less elaborate ruses, they entail a higher probability of being caught (or a lower probability of legal enforcement) and thus a greater legal cost. The latter cost is a "spiritual" one, such as the fear of hell, which is also increasing in action.¹⁴

The PA's utility is increasing in the total "legal" productivity (production achieved via legal actions) of the laity. This specification is a simplification of one in which the PA maximizes the rents it extracts and rents from legal activities are easier to collect.¹⁵ The PA finds

regarding the laity's objective function, the model's insights would be strengthened. Yet, such an addition would unnecessarily complicate the model, which is intentionally constructed to be as simple as possible.

¹³ There is little evidence in the Muslim world that individuals lending at interest faced temporal penalties beyond having their contracts not enforced. This is not true in Europe, where usurers were subject to legal and ecclesiastical prosecution (though it was primarily loans given at excessive interest that were subject to legal penalties). See Helmholtz (1986) and Gerber (1999, p. 129, 141).

¹⁴ Otherworldly sanctions are widely seen as an important force in sustaining economic equilibria. See, for example, Azzi and Ehrenberg (1975), Richardson and McBride (2006), and Rubin (2007a).

¹⁵ Likewise, agents could be more productive when their action is permitted; though adding this specification would require the PA to be forward-looking and would complicate the model. On the other hand, a political authority may have incentive to prohibit an action in order to extract rents from violators. Yet, at least with regard to interest bans

it costly to diverge from the RA's interpretation (for reasons noted in Section II), and this cost is increasing in a “dependence parameter”.

The RA's utility is increasing in the number of agents following its dictates. This specification is a simplification arising from the historical fact that Islamic and Christian authorities have always considered circumstance and custom when interpreting doctrine, particularly ones dealing with economic matters. Generally, when the community overwhelmingly favors an action, religious authorities massage their dictates to accommodate it (Schacht 1964, p. 78-85; Noonan 1966, 1993, 2005; Rodinson 1973; Imber 1997, ch. 5-6; Libson 1997; Gerber 1999; Hallaq 2001; Zubaida 2003, ch. 1-3; Rubin 2007b).¹⁶ The RA also incurs a cost from diverging from its previous interpretation. Such a cost – which often results in a “stickiness” of religious interpretation – is in some respects unique to religious authorities (and not political, legal, social, or economic authorities), since they derive much of their legitimacy from the “eternalness” of the laws they espouse.

The model sheds light on the avenues through which institutional dependence supports welfare-diminishing religious norms. Its primary result is that the size of the parameter set over which an economically inhibitive religious norm persists is increasing in the level of dependence of the political authority on the interpretation of the religious authority.

The logic underlying this result is as follows. The first order effect of an increase in dependence is that the PA's interpretation is less permissive. In turn, lay agents are discouraged from transgressing the law, as they face both a spiritual and a legal cost from doing so. With few

and printing presses, there is no evidence that this motivation was realized – the potential productivity gains from legalization (and the ensuing tax revenue) significantly outweighed rents available via punishment.

¹⁶ A more worldly view would instead consider the RA’s concern with maximizing the productivity of the laity (like the PA) – indeed, this may help explain the historical importance placed on accommodating custom. Altering the model to incorporate this consideration (that is, modeling the RA’s objective function similar to that of the PA, with the only difference arising in the cost function) does change the results, but only slightly. Proposition 1 still holds, and Propositions 2 and 3 hold over smaller portions of the parameter space.

agents openly breaking its dictates, the RA has little incentive to reinterpret, since doing so is costly and there is little to be gained on the margin. No player has incentive to change actions and the institutions upholding the norms/laws are *self-enforcing*. However, when the level of dependence is small, the PA has greater incentive to legalize the action. In turn, more agents transgress the RA's law, as they only face spiritual (and not legal) costs from doing so. With more agents breaking its dictates, the RA has greater incentive to reinterpret its doctrine. The implications of the institutional structure thus *undermine* the related norms/laws, encouraging endogenous institutional change.

III.2. Setup

Consider an economy in which all players are infinitely lived and actions are common knowledge.¹⁷ These players engage in a dynamic game with perfect information of previous actions. There are $N + 2$ players (for some large N): N members of the laity (L), a religious authority (RA), and a political authority (PA). N is large enough such that the actions of any one L do not affect the equilibrium action of the RA or PA (that is, no agent is pivotal). There exists some action which is an input in some production function $g(\cdot)$. L's derive utility from producing, and the RA and PA interpret the spiritual and secular "legality" of the action, respectively.

In each period (denoted with subscript t), L's act first, and choose an action $a_t \in A$, where $A = \{0, a^1, a^2, \dots, a^m, 1\}$, $0 < a^1 < a^2 < \dots < a^m < 1$. A is interpreted as follows: $a_t = 1 \Rightarrow$ openly acting; $a_t = 0 \Rightarrow$ not acting; $a_t \in \{a^1, a^2, \dots, a^m\} \Rightarrow$ acting, but with a ruse which incurs transaction cost $tc = 1 - a_t$. All L's have different types, $\tau_i \in [\underline{\tau}, \bar{\tau}]$, distributed over a cdf $F(\cdot)$, where L's marginal product is increasing in type.

¹⁷ As noted in III.1, the PA and RA are dynastic, comprised of an infinite number of one-period lived agents. Since this is equivalent to an infinitely lived player who only derives utility from the current period, I will employ the term "infinitely lived" throughout this section.

After L acts, the PA and the RA simultaneously choose an interpretation, $i_t^{PA} \in A$ and $i_t^{RA} \in A$, respectively. L faces a legal cost $\ell(\cdot)$ when its actions are greater than the PA's interpretation ($a_t > i_t^{PA}$). This function has the properties $\ell' > 0$, $\ell'' > 0$, and $\ell(x) = 0$ if $x \leq 0$. L also faces a spiritual cost $s(\cdot)$ for actions greater than the RA's interpretation.¹⁸ The spiritual cost is increasing in the degree of deviation from the religious law.¹⁹ This function has the properties $s' > 0$, $s'' > 0$, and $s(x) = 0$ if $x \leq 0$.

Each L (denoted with subscript i) solves the following problem in each period t .²⁰

$$(1) \quad \max_{a_{t,i}} g(a_{t,i}; \tau_i) - \ell(a_{t,i} - i_{t-1}^{PA}) - s(a_{t,i} - i_{t-1}^{RA}),$$

where $g_1 > 0$, $g_{11} < 0$, $g_{12} > 0$, $g_{112} \leq 0$, and $g(0; \cdot) = 0$.²¹

The RA faces a reinterpretation cost, $c^{RA}(\cdot)$, which is increasing in the distance between the new and old interpretations. This function has the properties $c^{RA'} > 0$, $c^{RA''} > 0$, and $c^{RA}(x) = 0$ if $x \leq 0$. The RA derives utility from L's following its dictates. Denote the number of agents complying with its interpretation $K(i_t^{RA}; \bar{a}_t) = \sum_{j=1}^N 1\{a_{t,j} \leq i_t^{RA}\}$, where \bar{a}_t is the vector of L's actions and $1\{a_{t,j} \leq i_t^{RA}\}$ is an indicator function equaling one if $a_{t,j} \leq i_t^{RA}$ and zero otherwise. I assume that the RA is dynastic, with each "generation" only deriving utility in the current period. The RA solves the following problem in each period t :

$$(2) \quad \max_{i_t^{RA}} K(i_t^{RA}; \bar{a}_t) - c^{RA}(i_t^{RA} - i_{t-1}^{RA}).$$

¹⁸ These two types of costs are similar to those modeled in Kandel and Lazear (1992), who look at internal and external motivations in the context of peer pressure and partnerships.

¹⁹ Similar assumptions are employed in Iannaccone (1988) and Kuran (1995).

²⁰ Although L's are infinitely lived, their utility is not maximized over an infinite horizon. Their individual actions do not affect the PA, RA, or other laity, so a discount factor would merely act as a scalar. I am not concerned with changes in equilibria across different discount factors, so this consideration has been omitted. Likewise, the PA and RA are dynastic, so their utility is also not maximized over an infinite horizon.

²¹ $g_{112} \leq 0$ entails that productivity is (weakly) increasingly concave in type. Likewise, at larger actions there is less difference in marginal product between two types than there is at smaller actions. This assumption allows for clean results, but dropping it does not dramatically change the qualitative results.

There exists a parameter $\gamma \in [0,1]$ denoting the level of dependence of the PA on the interpretation of the RA. This parameter enters the PA's utility through its reinterpretation cost function, $c^{PA}(\cdot; \gamma)$. There is no inherent cost to reinterpretation for the PA, but differing from the RA is costly if there is institutional dependence. This function has the properties $c_1^{PA} \geq 0$, $c_2^{PA} > 0$, $c_{11}^{PA} > 0$, $c_{12}^{PA} > 0$, $c^{PA}(x; \cdot) = 0$ if $x \leq 0$, $c^{PA}(y; 0) = 0 \forall y$, and $\{c^{PA}(z; 1) = \begin{cases} 0 & \text{if } z \leq 0 \\ \infty & \text{if } z > 0 \end{cases}\}$. At $\gamma = 0$, there is no reinterpretation cost, at $\gamma = 1$, there is infinite reinterpretation cost, and for $\gamma \in (0,1)$, there is a positive reinterpretation cost which is increasing in γ . The PA derives utility from the legal productivity ($g(\cdot)$) when $a_t \leq i_t^{PA}$. Denote $h(i_t^{PA}; a_{t,i}) = \begin{cases} g(a_{t,i}; \tau_i) & \text{if } a_{t,i} \leq i_t^{PA} \\ 0 & \text{if } a_{t,i} > i_t^{PA} \end{cases}$. The PA is dynastic and solves the following problem in each period t :

$$(3) \quad \max_{i_t^{PA}} \sum_{k=1}^N h(i_t^{PA}; a_{t,k}) - c^{PA}(i_t^{PA} - i_{t-1}^{RA}; \gamma).$$

The RA and PA break indifference by not reinterpreting. The initial conditions are $\bar{a}_0 = i_0^{RA} = i_0^{PA} = 0$.

III.3. Institutional Dependence and Persistent Equilibria

In this section I study players' behavior in order to derive a link between the level of institutional dependence (γ) and the RA's and PA's interpretation in equilibrium. The following definitions simplify the analysis:

DEFINITION 1. The institutional structure is **self-enforcing** in period t if $a_{t,k} = a_{t-1,k} \forall k$,

$$i_t^{RA} = i_{t-1}^{RA}, \text{ and } i_t^{PA} = i_{t-1}^{PA}.$$

DEFINITION 2. An equilibrium is **persistent** in period t if the institutional structure is self-enforcing in every period $\bar{t} \geq t$.²²

DEFINITION 3. A persistent equilibrium in which either $i^{PA} < 1$ or $i^{RA} < 1$ is **inhibitive**.

First, note that there exists a persistent equilibrium in *every* parameter set. To see this, assume that this is not true – that is, there is a parameter set in which a persistent equilibrium does not exist. Then, in every period, either $a_{t,k} > a_{t-1,k}$ for some k , $i_t^{RA} > i_{t-1}^{RA}$, or $i_t^{PA} > i_{t-1}^{PA}$.²³ Since A is finite, these three inequalities cannot hold *ad infinitum* (if it were always true that some player's action is greater than it was in the previous period, eventually it must be true that $a_{t,k} = 1 \forall k$, $i_t^{RA} = 1$, and $i_t^{PA} = 1$, in which case the equilibrium is persistent). Thus, because players are infinitely lived, there must exist some persistent equilibrium.

Moreover, this persistent equilibrium is unique. This result arises from the simplicity of the model – there is no randomness nor exogenous change, an explicit rule exists for breaking indifference, and persistent equilibria are a steady state. Thus, for each parameter set, there exists a unique persistent equilibrium.

Next, consider the relationship between γ and the existence of inhibitive equilibria. Since multiple equilibrium paths exist over the parameter space – largely driven by the shape of $F(\cdot)$ – this analysis is nearly impossible to conduct without confining attention to a specific subset of cases. Hence, for the remainder of the analysis I follow a methodology advocated by Greif (1993, 2006) and Bates et al. (1998), in which historically relevant facts guide concentration to the *appropriate* equilibria.

²² A persistent equilibrium is by definition supergame stable (for every period after t) – the same strategies are played in each subgame of the supergame.

²³ There cannot exist an equilibrium in which actions decrease over time. Also, an equilibrium is persistent in period t if and only if the institutional structure is self-enforcing in period t . This is straight-forward to verify following Definitions 1 and 2 – I have omitted the proof here, but it is available upon request.

In this light, I follow Noonan (1966, 1993, 2005) and Rodinson (1973), who show that religious institutions generally "accept" practices that have become custom. In the present model, such "acceptance" occurs endogenously under some parameter specifications. For the remainder of the analysis, I confine attention to these parameter sets. The following definition is useful for this analysis.

DEFINITION 4. The interpretations in the unique persistent equilibrium are **accepted religiously** in period t^* if and only if $i_t^{RA} = i_t^{PA}$.

Accepted religiously persistent equilibria (ARPE) have the desirable property that religious interpretation is never "lagging" in the long run – that is, custom is “accepted”. Although concentrating on such equilibria diminishes some of the model's traction, history points to equilibria in which religious interpretation is malleable to economic exigencies.

Concentrating on ARPE permits for a more straight-forward analysis of the consequences of institutional dependence. The first-order effect of dependence is an inherent inflexibility arising from the PA's reinterpretation cost function. Because of this inflexibility, high-dependence PA's differ less in their interpretation from the RA, *ceteris paribus*, and the incentive for the laity to "push the envelope" and break the religious and/or legal dictates are diminished. This in turn provides less incentive for the PA and RA to reinterpret. If the level of institutional dependence is sufficiently large, a situation emerges in which *no* player has incentive to “push the envelope”, and the resulting inhibitive equilibrium is supported by self-enforcing institutions. Proposition 1 formalizes this intuition, providing the primary comparative statics result of this paper. Proofs of all propositions are in Appendix A.

PROPOSITION 1. The magnitude of the interpretations i^{RA} and i^{PA} in the unique ARPE is weakly decreasing in γ .

Proposition 1 highlights the effect of dependence in persistent equilibria. Yet, it provides no insight into periods before such equilibria are reached. The remaining analysis sheds light on these periods, in turn increasing the number of testable predictions arising from the model.

Consider periods in which the PA's interpretation is greater than the RA's interpretation. Since the PA's interpretation is decreasing in dependence, *ceteris paribus*, L's are encouraged to "push the envelope" more in low-dependence economies, evading religious laws to a greater extent. This in turn makes it more costly for the low-dependence RA to permit each L's actions and it thus optimizes by legalizing a smaller portion of actions. Hence, the low-dependence RA takes "smaller steps", reinterpreting more frequently before the interpretation is accepted religiously. This argument results in a testable prediction: a low-dependence RA should reinterpret more frequently than a high-dependence RA before "catching up with custom". The intuition underlying this result is formalized in Proposition 2.

PROPOSITION 2. In an ARPE, if $i_t^{RA} < i_t^{PA}$ in any period t° , the number of reinterpretations by the RA before $i_{t^*}^{RA} \geq i_{t^*-1}^{PA}$ in some period $t^* > t^\circ$ is weakly decreasing in γ , *ceteris paribus*.

Pushing the intuition of Proposition 2 further, consider another consequence of the PA's interpretation decreasing in dependence. Since this results in L's "pushing the envelope" less in high-dependence economies, in the short run it is less costly for a high-dependence RA to permit L's actions, *ceteris paribus*, and it thus optimizes by legalizing a (weakly) larger portion of actions. Indeed, under some parameter sets, it is possible that L's actions encourage the high-dependence RA to interpret at least to i^{PA} while the low-dependence RA is taking "smaller steps" in order to catch up with custom. This intuition, which is formalized in Proposition 3, entails the unexpected, testable prediction that a greater level of dependence can temporarily lead to a *more permissive* religious interpretation.

PROPOSITION 3. Consider two economies, A and B , with dependence parameters γ_A and γ_B , respectively, where $\gamma_A > \gamma_B$ and all other parameters are equal. In an ARPE, \exists some parameter sets in which i_t^{RA} in economy A is greater than i_t^{RA} in economy B in some period t° prior to the one in which both interpretations are accepted religiously.

With this result, the theoretical exercise is complete. Appendix B provides a qualitative view of the model's results, analyzing how i^{PA} and i^{RA} change over time across different levels of dependence.

By focusing on ARPE, we have derived the following testable predictions:

- It is more likely that an ARPE will be inhibitive the greater the level of institutional dependence (Proposition 1).
- The number of religious reinterpretations that occur before the RA “catches up with custom” is decreasing in institutional dependence (Proposition 2).
- When comparing two economies with different levels of institutional dependence, the one with greater dependence may temporarily be *more* permissive than the one with less dependence, though this equilibrium will not persist (Proposition 3).

IV. TESTING THE MODEL: INTEREST AND PRINTING RESTRICTIONS IN ISLAM & CHRISTIANITY

IV.1. Interest Bans in Islam and Christianity

In this section I briefly overview the history of interest bans in Islam and Christianity. Interest bans are a prime example of a type of law subject to the interactions described in the model – although interest restrictions may have been an equilibrium outcome in economies in which loans are primarily taken for consumption (Rubin 2007a), when investment lending became economically feasible, interest bans limited the ability of two willing parties to transact.

The predicted interactions of the model illuminate the mechanisms underlying the ban's persistence in Islam but not in Christianity as well as the paths that interest theories have taken within the religions.²⁴

In Christendom, pre-twelfth century secular leaders held significant power over ecclesiastical affairs. In terms of the model, this arrangement constituted a “reverse dependence” – instead of political authorities being subject to religious interpretation (as in the model), the reverse situation emerged. Yet, interest laws remained strong in this period – precisely the opposite of the model's prediction. Why? Prior to the eleventh century, capitalistic markets were not widespread enough to encourage potential merchants to “push the envelope” and transgress the ban. The emergence of such markets in the eleventh and twelfth centuries can thus be viewed as the “period 0” event which motivates the interactions of the model.

As capitalistic markets materialized in Western Europe, papal power was also increasing. In the twelfth and thirteenth centuries ecclesiastical power reached its zenith (γ was relatively large), and secular authorities were more subject to Church dictates than at any other time in the medieval period. As predicted by the model, the Church's most vehement condemnations of interest were articulated in this period, with Lateran II and III (1139 and 1179) strongly denouncing all usury and usurers (Le Goff 1979).

However, papal influence over the secular realm weakened significantly in the mid-to-late thirteenth century. Because of the lower level of institutional dependence, secular authorities faced less cost from permitting interest. It is precisely in this period that secular interest caps –

²⁴ Several economic models have recently been advanced to explain interest bans. A common theme in many of these models is that interest bans are socially optimal given the conditions of the pre-modern economy (Posner 1980; Brenner 1983; Glaeser and Scheinkman 1998). However, these models have difficulty accounting for some of the historical phenomena analyzed in this paper, such as the divergence in interest theory in Islam and Christianity and the persistence of interest restrictions despite the feasibility of investment loans.

which legalized moderate interest – emerged.²⁵ A far from exhaustive listing of interest caps throughout medieval Europe is provided in Table I. Subsequently, the Church commenced a series of relaxations of the ban beginning in 1270, when it was suggested that the *societas* (partnership) might be valid, despite attributes similar to interest-based lending (Noonan 1957, 1969; Divine 1959). In subsequent centuries, Church leaders allowed other open, circumventive practices – such as annuities, exchange banking, and the triple contract – that were similar in spirit to lending at interest, and by the nineteenth century taking moderate interest was permitted. This history thus accords with the model’s intuition – as institutional dependence diminished in medieval Europe, incentives emerged for lenders to “push the envelope”, and the institutions that had been supporting the ban were undermined. A stylized chronology of institutional history and interest philosophy in Christianity is summarized in Table II.

Islamic history also accords with the model’s predictions. Once judicial power became institutionalized in the first Muslim century, political authorities obtained legitimacy by complying with Islamic law – in terms of the model, institutional dependence was large. Concurrently, lenders employed ruses (*hiyal*) in order to circumvent the interest ban, generally acting within the scope of contractual forms permitted by the political and religious authorities (Khan 1929, p. 241-244; Schacht 1964, 2006; Coulson 1969, p. 87-88; Grice-Hutchinson 1978, p. 26).²⁶ While *hiyal* were allowed (and created) by religious authorities, merchants rarely conducted (and political authorities rarely allowed) interest-bearing transactions beyond those

²⁵ As noted in Rubin (2007a), the Church could have benefitted from imposing an interest cap, but there was no precedent for such a cap – unlike interest bans, which were noted in three books of the Old Testament – and thus the reinterpretation cost for a cap (which may have seemed arbitrary, anyway) was too great to make it a viable option.

²⁶ A popular example of a *hiyal* is the double sale (*mukhātara*), in which the prospective debtor sells to a creditor some commodity for cash, then immediately buys it back for a greater sum payable at a later date.

allowed by the religious authorities.²⁷ As predicted by the model, an “inhibitive” equilibrium subsequently emerged in which *hiyal* were practiced and permitted, but no player had incentive to further “push the envelope”.

A less inhibitive equilibrium materialized in the mid-fifteenth century in the Ottoman Empire. Under the Ottoman *sultāns*, the religious authorities became a part of the state – a change which enabled a “limited but significant expansion in the ruler’s prerogatives in relation to the *sharī’a*” (Berkey 2003, p. 264). This slight decrease in institutional dependence entailed that *sultāns* incurred less cost from permitting interest. Concurrently, interest was de facto legalized in much of the Empire, as long as sufficient lip service was paid to the *sharī’a* (Gerber 1988, ch. 7; Imber 1997, p. 145). A stylized chronology of institutional history and interest philosophy in Islam is summarized in Table II.

The model sheds thus light on the divergent paths of interest theory in Islam and Christianity as well as the paths that interest theories have taken within these religions. Further, it also accounts for the unexpected historical phenomena that Islamic religious authorities were *more* permissive of interest-bearing transactions than Christian authorities for much of their shared histories (Proposition 3) and that interest theory was reinterpreted with greater frequency in Christianity (Proposition 2).

Indeed, as Islamic law was forming in its first two centuries, some lenders evaded the ban with ruses (*hiyal*) that were arguably within the confines of the law. Since permitting these ruses was relatively inexpensive – the “envelope” was not pushed too far – Muslim religious (and political) authorities often allowed them. Even though new *hiyal* arose throughout Islamic history, the theory permitting them can be understood as being “reinterpreted” only once, with

²⁷ There were numerous books published in the first few Islamic centuries expounding various forms of *hiyal*. As long as the external evidence of any contract did not violate the law, the motive of the parties was viewed as immaterial (Khan 1929, p. 233-236; Rodinson 1973).

subsequent permissions as extensions within the broader framework already elaborated. On the other hand, by the mid-thirteenth century, European political authorities were much more permissive of open interest-bearing transactions than their Islamic counterparts. Since completely allowing such practices would have been quite costly to the Church – it would have required a complete reversal of a millennium of anti-interest doctrine – Christian authorities frequently reinterpreted on the margin, allowing only *specific* practices to be conducted without sin. As the model predicts, the Church accommodated custom with a series of “small” reinterpretations – unlike the one, major Islamic reinterpretation (*hiyal*) – and was less permissive than Muslim religious authorities for much of their shared history. Indeed, many early Islamic *hiyal* were much closer to open lending at interest than any type of transaction allowed by the Church until the fifteenth century.²⁸

IV.2. Delayed Adoption of the Printing Press in the Islamic World

Another phenomenon on which the model sheds light is the delayed adoption of the printing press in the Islamic world. Before the advent of the press, laws forbidding the replication of words and images would not have had a significant economic impact. Yet, as in the case of interest bans, the relevant question is, “why did such laws persist when economic circumstances changed?” Indeed, the press was known in the Ottoman Empire soon after its mid-15th century invention – yet, the first Muslim-run press was not formed until the 18th century. Although some of the model’s formulae do not directly apply – most importantly, the relevant action set is “print” or “not print”, with no available ruse – the interactions predicted by the

²⁸ An important set of questions (left for future research) arising from this brief synopsis of interest ban history include: Did the ban have any practical effect? If not, does it matter that the ban persisted in Islam but not in Christianity? We know that the ban has always been easily evaded by Muslims; why then, would the ban have had any effect on commerce or trade? Indeed, Rubin (2007b) shows that while the micro-level consequences of the ban may have been minimal, especially with regards to personal loans, the macro-level, institutional consequences were substantial. For example, institutions such as the cash *waqf* became popular in the Ottoman period as a means of legitimately circumventing the ban, but rigidities associated with the cash *waqf* likely postponed the advent of institutional elements vital to the expansion of Western banking.

model (particularly Proposition 1) illuminate the rapid spread of the press in the Christian world but not the Muslim world.

For over three centuries, Ottoman religious and political authorities were quite hostile towards the printed word. This was not because the press was unknown in Ottoman lands – in 1493, Jewish refugees from Spain established a press in Istanbul, but were only authorized to print in Hebrew or Latin characters (Göçek 1987, p. 111; Robinson 1993). Over the next few centuries, edicts espoused by Ottoman *sultāns* explicitly forbade Muslims from printing in Arabic script despite the potential revenue the press could bring to the Sultanate – indeed, non-Muslim printing presses were frequently allowed within the Empire. There was no Muslim press in the Ottoman Empire until 1727, and outside the Ottoman Empire the press spread even slower – a press was not established in Egypt until 1798 or in Persia until 1817 (Savage-Smith 2003).

Given the clear economic benefits arising from mass printing, why did so much hostility towards the press reign in the Muslim world? One reason may have been that the press struck at the very heart of an important Islamic institution – the oral transmission of the Qur’an (Robinson 1993). This system of transmission, important since the time of Muhammad, gave knowledge value and authority, and was thereby the backbone of Muslim education. Yet, this system also entailed that the mass production of books threatened the religious authority’s control of the educational and legal systems.²⁹

It was not until the nineteenth century that the press became truly established in the Muslim world, and it was particularly prominent in regions in which the authority of religious

²⁹ This concern was made quite clear in the controversy surrounding the first Muslim press – in a note expressing his trouble establishing a press, İbrahim Müteferrika, who started the first Muslim press in the Ottoman Empire, stated that “the religious dignitaries ... insistently did not give permission for this new invention ... They have mentioned that the aforesaid invention would be dangerous to public order and to the conduct of religion; it would place more than the necessary amount of books into circulation” (Göçek 1987, p. 113; Savage-Smith 2003).

scholars was threatened.³⁰ In India, the press emerged in the early nineteenth century as a tool to combat recent converts from converting back to Hinduism or to Christianity – the latter was an especially pressing concern, as Christian missionaries used literature and newspapers to achieve their goals (Robinson 1993). In response, Muslim religious authorities distributed literature of their own, translating the Islamic classics into the vernacular. More broadly, the press flourished with greater rapidity in regions where Muslims were under some form of colonial rule and the threat of the West to Islam was more apparent (such as Tsarist Russia), and was delayed longer – although eventually accepted – in regions that were threatened by Europe, but were not under direct Western control (such as the Ottoman Empire, Egypt, and Iran) (Robinson 1993).

Within the context of the model, the costs to the religious authorities of permitting the press were substantial – not only did it entail a reinterpretation of doctrine, but it diminished their monopoly power over the educational and legal systems.³¹ In response to disapproval from religious authorities, the political authorities forbade the press despite its potential as a source of revenue. Only non-Muslim presses, which did not threaten the religious authority's monopoly, were permitted in this period. It was only when printing became sufficiently profitable to the political authorities (largely in combating Western advances) that the costs of diverging from religious dictates were not sufficient to obstruct its permission. In terms of the model, the high level of institutional dependence entailed that an inhibitive equilibrium emerged and persisted for centuries; the “escape” from this equilibrium occurred only after Western aggression caused a dramatic change in the parameter set.

³⁰ Initially, Müteferrika's press was permitted only after he composed a lengthy treatise to the *sultān* emphasizing its practical consequences. Printing did not become widespread in Muslim lands until over a century later.

³¹ Indeed, Robinson (1993) notes that in India, once the press gained widespread currency the power of the religious authority was noticeably diminished.

In the Christian world, on the other hand, the press spread quite rapidly after Gutenberg introduced his invention in Mainz circa 1450. By 1480, there were over 110 presses operating throughout a cross-section of important Western European towns, arising (amongst other places) in Germany, Italy, France, Holland, Belgium, Spain, and England (Febvre and Martin 1958, ch. 6). Yet, much as in the Muslim world, there were plenty of reasons why the Church would have wanted to control the spread of the press – most prominently, the success of the Reformation was dependent on the Reformers ability to circulate vast amounts of literature.³² However, unlike in the Muslim world, as the press began to spread, the Church was amongst its greatest *supporters* – in general, Church leaders viewed the press as a means of expanding the religious texts contained in clerical and monastic libraries (Febvre and Martin 1958, p. 170-172).

If the Church stood to potentially lose so much by permitting the press, why did it – unlike its Muslim counterparts – support the spread of the press? A salient difference between the two histories was that by the advent of the press, the Church had already lost its monopoly on educational and intellectual (especially book-producing) institutions. The Church's loss of this power – which it had previously held via the book-producing efforts of the monasteries – commenced in the thirteenth century when the newly-founded Universities began to undertake major book-publishing programmes of both religious and secular tracts.³³ The relatively independent University Doctors translated the works of the early Church fathers as well as the philosophical treatises of the ancient Greeks, especially Aristotle. The central concentrations of supply and demand for books were thus near the Universities, not the monasteries or other Church holdings (Haskins 1957, p. 38-53; Schachner 1962; Christ 1984, p. 237-238).

³² For a classic overview on the effects of the press on Europe, see Eisenstein (1979).

³³ Thompson (1967, p. 129-135) and Christ (1984, p. 297-310) note a similar growth in the late twelfth century of a lay element in the type of books collected in libraries and the type of individuals amassing libraries. See also Febvre and Martin (1958, p. 22-25).

The secular wings of the Universities were able to grow to prominence largely because they received the support of lay rulers. For example, after a mid-thirteenth century schism with the Church, the Doctors at the University of Paris sided with and were supported by the French king, who stood to gain a significant amount in revenues and legitimacy from the University's support (Schachner 1962, ch. 9-11).³⁴ Secular support for the Universities was a general phenomenon – the French and English founded Universities to promote patriotic feelings during the Hundred Years' War, Florence established a University in order to repopulate after a plague, and numerous other cities solicited Universities in order to establish a new source of income (Schachner 1962, p. 50).

The model predicts that as the European rulers began to regain suzerainty over their lands in the mid-13th century (dependence was decreasing), they would support the writing and copying of non-religious (especially political) tracts which were not encouraged when the Church dominated the Universities (that is, such works were “banned” or only written at high cost). Not surprisingly, this shift to secular rule over the Universities coincided with the emergence of interest rate caps – the macro forces changing the dependence parameter undermined the equilibrium state in both cases. Moreover, as the model predicts, a feedback loop emerged between the growth of Universities, non-religious writing, and lay independence – the latter encouraged non-religious writing as the Universities grew, which in turn created greater demand and supply for such writing. This phenomenon burgeoned to the point where the Church accepted the validity of such tracts (so long as they were not heretical).

³⁴ As with many of the great European Universities, Paris was originally supported by the Church, which provided favors and protection (from kings and avaricious Churchmen) in return for control over the curriculum (Schachner 1962, p. 47). This arrangement lasted for over half of the University's first century, but deteriorated in the mid-thirteenth century when the Church attempted to extend its influence by supporting the Mendicant friars' control within the University over that of the Doctors. The ensuing schism persuaded the Doctors to side with the king.

Yet, as noted in Section II, new theories on the state (emerging from the Universities) based on Aristotelian foundations were a crucial “exogenous” force behind the changing Church-State relations of the mid-thirteenth century. Does this entail that the causal arrow may point the other way – that the rise of the Universities, and thus the increase in books not produced by the Church, *caused* the change in “dependence”, and not the other way around? While this is possible – it is indeed likely that causation runs both ways – it does not detract from two important points. The first is that the rise of the Universities, especially in their role as book producers, came about largely because there was a sphere outside and disassociated from the religious in which it gained financial and political support. Relative to Islam, the existence of this secular sphere is a remnant of the birth of Christianity, not the political forces of the thirteenth century. Secondly, the rise of the Universities was merely the precursor to the episode in question – the rapid spread of the press. The rise of the Universities is not necessarily a phenomenon that can be explained by the model, yet their rise had an important unintended consequence – by establishing a separate sphere of book production, it provided a setting in which, after the invention of the printing press, there was widespread demand for books yet no Church-held monopoly on supply.

V. THE BIG PICTURE: WAS THE “GATE OF IJTIHĀD” REALLY CLOSED?

This paper tackles an important route through which religion has a direct impact on economic outcomes: the perpetuation of norms and laws inhibiting welfare-enhancing actions. Its insights shed light on the general forces underlying the persistence of such outcomes *without* ascribing anything inherent to the religions themselves. It also provides a concrete framework for

analyzing a variety of economically inhibitive religious norms which have had an important impact in their own right on the divergence between the Islamic and Christian worlds.

By refraining from ascribing anything inherent in religion as the force underlying the economic divergence, this framework encourages a reconsideration of traditional notions of conservatism in the Islamic world. The most influential of these ideas is that the "gate of *ijtihād*" (independent reasoning) was closed. Until recently, historians generally agreed that some informal consensus arose in the 10th century (C.E.) that independent reasoning, an important method of reinterpretation in the first three Islamic centuries, was no longer an acceptable means of finding truth and that henceforth jurists were only allowed to follow precedents (Schacht 1964, ch. 10; Coulson 1969, p. 43; Weiss 1978, p. 208; Rahman 1979, p. 77-78; Watt 1988, p. 29). Under this theory, juristic ingenuity was stifled in Sunni Islam after the founding of the four schools consolidated what had been widely dispersed judicial authority. Instead of exercising *ijtihād*, jurists were confined to practicing *taqlīd* (acceptance of religious authority) (Hallaq 2001, ch. 4).

Some recent scholarship disputes this notion. Gerber (1999, ch. 4-7) cites numerous cases throughout the medieval period where *ijtihād* was employed. In a study of *fatwās* by the seventeenth-century Palestinian muftī Khayr al-Dīn al-Ramlī, Gerber notes that numerous disagreements (*ikhtilāf*) which remained unresolved in the classical and post-classical periods arose in al-Ramlī's time, necessitating a relaxation of devotion to the ancient masters. Hallaq (1984, 2001) notes in great historical detail that the gate of *ijtihād* was never closed in theory nor in practice, though its practice became increasingly rare in the medieval period.³⁵

If the gate of *ijtihād* was not closed, independent reasoning *was* less frequently practiced after the tenth and eleventh centuries. Indeed, Gerber (1999, p. 138) admits that *ijtihād* was not

³⁵ Also see Shepard (1987, p. 319) and Rodinson (1973, p. 101)

freely permitted in every field, but only in those in which the law remained open. In this light, I propose an alternative metaphor: the "gate of *ijtihād*" may have been closed, but the gate was *not* locked. All that was necessary for the gate to be opened was a sufficient number of individuals attempt to push it open. But, due to the incentives and behaviors supported by the surrounding institutions, few had incentive to "push the envelope" (the gate), and observed behavior led to the *appearance* that the gate was closed. If the gate were not really locked, we would expect to see *ijtihād* in some aspects of law (such as those studied by Gerber and Hallaq), particularly ones which fostered better economic outcomes. However, the overwhelming cost of pushing the gate open when such pressures do not exist would be the precise reason that the gate would *seem* locked. In turn, once inhibitive equilibria emerged in the 10th century, beliefs in the gate's closure were supported. This insight allows us to view Islamic legal and economic history through a different lens by looking beyond the scope of observed actions to understand the institutions, behaviors, and incentives underlying them.³⁶

VI. CONCLUSION

This paper analyzes the role that religious, political, and legal institutions have played in sustaining and undermining economically inhibitive religious laws in the Middle East and Western Europe. I identify the salient players involved in reinterpretation of religious doctrine (religious authorities, political authorities, and the "laity") and construct a model to identify their

³⁶ This analogy gains more weight when combined with Kuran's (1995) theory of preference falsification, in which he argues that when ideas fall out of the mainstream, they can be forgotten or marginalized. If *ijtihād* fell into disuse due to a paucity of individuals "pushing the envelope", then it is much more likely to become forgotten and not brought up in every day discourse. Moreover, Greif's (1994) analysis of Christian "individualism" versus Islamic "collectivism" entails that Christians face less social sanctions from breaking a religious norm, and hence a greater impetus towards reinterpretation exists for reasons spelled out in the model. However, one testable prediction arising from this argument is that norm-breakers should receive less social condemnation in individualistic societies. Yet, in the case of interest bans, this was by no means true; Christian usurers were considered amongst the worst types of evil-doers, often being compared with murderers and rapists (Le Goff 1979, 1988).

interactions under varying institutional conditions. I argue that when the dependence of the political authorities on the dictates of the religious authorities is significant – as it is in much of the Muslim world – the institutions supporting such laws are more likely to be self-enforcing. In this case, political authorities are discouraged from permitting religiously banned actions (even though permitting such actions increases the productivity of the laity and thus the amount of extractable rents), which in turn discourages the laity from transgressing the religious ban. With few individuals openly acting against its dictates, religious authorities have little incentive to reinterpret doctrine, and the institutional structure is self-enforcing – no player has incentive to "push the envelope". On the other hand, when the level of dependence is small – as it has been (relatively) in Western Europe since the late-thirteenth century – political authorities have incentive to permit productivity-enhancing, religiously banned actions, which in turn encourages the laity to transgress the religious ban. In order to accommodate custom, religious authorities have incentive to reinterpret doctrine, and the institutional structure is self-undermining – the players “push the envelope” to the point that the law is eradicated.

I substantiate the model’s claims by analyzing the history of interest and printing restrictions in Islam and Western Christianity. This analysis supports the model's predictions – interest bans were eventual relaxed in Christianity but not in Islam, and the type of interactions predicted by the model were important factors driving this outcome. Likewise, the printing press spread rapidly in Western Europe after its invention but was delayed for over three centuries in the Muslim world – a driving force underlying this divergence in outcomes was the differing level of influence that the dictates of the religious authorities (who had incentive in both regions to suppress the press) had over the actions of the political authorities.

The predictions not only shed light on the divergence of interest theory and printing restrictions across the two religions, but also help explain change over time within each religion. Other testable and unexpected predictions that arise from the model – such as high-dependence religious authorities being temporarily be *more* permissive than low-dependence authorities – are also found to be salient features of the historical record.

This framework is also likely to shed new light on a variety of historical phenomena in which the interactions between religious institutions and other institutions (political, economic, legal, social) have affected economic outcomes. For example, it should aid our understanding of the differing paths that Islamic and Christian beliefs concerning slavery, insurance, and the economic role of women have taken in the last millennium, as well as the economic effects of the dependence of educational institutions on religious institutions. Concerning the latter, Easterlin (1981, p. 12-13) notes that "a deterrent to mass education appears to have been a situation in which the Roman Catholic Church exercised substantial secular power [in Latin America] ... The rapid rise in mass education in Argentina after 1880 and in Mexico after 1920 both occurred in conjunction with a substantial shift in power from church to state. In the Middle East, Islam frequently appears to have been a negative influence in the development of formal schooling."³⁷ By analyzing the incentives and actions of all salient parties within the relevant institutional framework, we can better understand the features driving these important historical episodes.

While significant in their own right, especially given the role that unintended consequences can play in institutional development, studying these cases within the framework presented in this paper provides insight into a much broader economic reality. Contrary to the predilections of many previous scholars, this framework turns purely cultural explanations

³⁷ For more on the role that religion has played in creating incentives to acquire education, see Botticini and Eckstein (2006), Becker and Woessmann (2007).

(based on the “conservative nature” of Islam) of the divergence between Western European and Middle Eastern economies on their head. That is, while we certainly see conservatism in the Islamic world, this phenomenon can be understood as a *result* of the institutional structures and not as a *cause* of economic stagnation.

CALIFORNIA STATE UNIVERSITY, FULLERTON

APPENDIX A: PROOFS

Proof of Proposition 1. I prove this proposition by contradiction. Assume that Proposition 1 is false, and imagine two economies, A and B , with corresponding parameters γ_A and γ_B , where $\gamma_A > \gamma_B$ and all other parameters are equal. Since $i_0^{PA,A} = i_0^{PA,B} = 0$ and $i_0^{RA,A} = i_0^{RA,B} = 0$, it must be that $i_1^{PA,A} \leq i_1^{PA,B}$ – the only difference between the two PA's optimization problem is γ . Thus, there must exist some period \bar{t} in which $i_{\bar{t}-1}^{PA,A} \leq i_{\bar{t}-1}^{PA,B}$, $i_{\bar{t}}^{PA,A} > i_{\bar{t}}^{PA,B}$, and $i_t^{PA,A} > i_t^{PA,B} \forall t \geq \bar{t}$.

We can restrict attention to periods in which the interpretations are accepted religiously. To see why, consider the following. On the one hand, $i_{\bar{t}}^{PA,B}$ is (weakly) larger when $i_{\bar{t}-1}^{PA,B}$ is accepted religiously, thus restricting attention to such periods provides a “worst-case scenario” to contradict. On the other hand, while $i_{\bar{t}}^{PA,A}$ is also (weakly) larger when $i_{\bar{t}-1}^{PA,A}$ is accepted religiously, we are concentrating on ARPE – so it must be that the interpretation will eventually be accepted religiously, and it must hold that $i_t^{PA,A} > i_t^{PA,B}$ in such a period.

Denote τ^* as the largest type who, in equilibrium, chooses action $a_{\bar{t}}(\tau^*) = i_{\bar{t}}^{PA,B}$ in economy B in period \bar{t} (and chooses some action $a_{\bar{t}}(\tau^*) = x$ in economy A in period \bar{t}). Denote τ^{**} as the largest type who chooses $a_{\bar{t}}(\tau^{**}) = i_{\bar{t}}^{PA,A}$ in economy A in period \bar{t} (and chooses some

action $a_{\bar{t}}(\tau^{**}) = y$ in economy B in period \bar{t}). Note that the difference in the sum of total legal productivity of agents with types between τ^* and τ^{**} is weakly greater in economy B , since agents choose a higher action in this economy. That is,

$$(4) \quad \sum_{k=1}^N [h^B(y; a_{t,k}) - h^B(i_{\bar{t}}^{PA,B}; a_{t,k})] > \sum_{k=1}^N [h^A(i_{\bar{t}}^{PA,A}; a_{t,k}) - h^A(x; a_{t,k})],$$

where $h^i(\cdot)$ is the sum of total legal productivity in economy i . Since the PA in economy A optimizes by choosing $i_{\bar{t}}^{PA,A}$ in period \bar{t} , revealed preference indicates that

$$(5) \quad \sum_{k=1}^N h^A(i_{\bar{t}}^{PA,A}; a_{t,k}) - c^{PA}(i_{\bar{t}}^{PA,A} - i_{\bar{t}-1}^{PA,A}; \gamma_A) \geq \sum_{k=1}^N h^A(x; a_{t,k}) - c^{PA}(x - i_{\bar{t}-1}^{PA,A}; \gamma_A).$$

Moreover, $g_{11} < 0$, $g_{12} > 0$, and the convexity of L's cost functions imply that the following inequalities hold:

$$(6) \quad i_{\bar{t}}^{PA,A} - i_{\bar{t}-1}^{PA,A} \geq y - i_{\bar{t}-1}^{PA,B},$$

$$(7) \quad i_{\bar{t}}^{PA,A} - i_{\bar{t}-1}^{PA,A} > x - i_{\bar{t}-1}^{PA,A},$$

$$(8) \quad x - i_{\bar{t}-1}^{PA,A} \geq i_{\bar{t}}^{PA,B} - i_{\bar{t}-1}^{PA,B}, \text{ and}$$

$$(9) \quad y - i_{\bar{t}-1}^{PA,B} > i_{\bar{t}}^{PA,B} - i_{\bar{t}-1}^{PA,B}.$$

Furthermore, since $g_{112} \leq 0$, the difference in equilibrium action between types τ^* and τ^{**} is decreasing in the RA's and PA's interpretation. That is,

$$(10) \quad i_{\bar{t}}^{PA,A} - x \geq y - i_{\bar{t}}^{PA,B},$$

implying that

$$(11) \quad (i_{\bar{t}}^{PA,A} - i_{\bar{t}-1}^{PA,A}) - (x - i_{\bar{t}-1}^{PA,A}) \geq (y - i_{\bar{t}-1}^{PA,B}) - (i_{\bar{t}}^{PA,B} - i_{\bar{t}-1}^{PA,B}).$$

Rewriting inequality (5) gives

$$(12) \quad \sum_{k=1}^N [h^A(i_{\bar{t}}^{PA,A}; a_{t,k}) - h^A(x; a_{t,k})] \geq c^{PA}(i_{\bar{t}}^{PA,A} - i_{\bar{t}-1}^{PA,A}; \gamma_A) - c^{PA}(x - i_{\bar{t}-1}^{PA,A}; \gamma_A),$$

and from (6) through (9), (11), and the convexity of c^{PA} we know that

$$(13) \quad c^{PA}(i_{\bar{t}}^{PA,A} - i_{\bar{t}-1}^{PA,A}; \gamma_A) - c^{PA}(x - i_{\bar{t}-1}^{PA,A}; \gamma_A) > c^{PA}(y - i_{\bar{t}-1}^{PA,B}; \gamma_A) - c^{PA}(i_{\bar{t}}^{PA,B} - i_{\bar{t}-1}^{PA,B}; \gamma_A).$$

and since $c_{12}^{PA} > 0$,

$$(14) \quad c^{PA}(y - i_{\bar{t}-1}^{PA,B}; \gamma_A) - c^{PA}(i_{\bar{t}}^{PA,B} - i_{\bar{t}-1}^{PA,B}; \gamma_A) > c^{PA}(y - i_{\bar{t}-1}^{PA,B}; \gamma_B) - c^{PA}(i_{\bar{t}}^{PA,B} - i_{\bar{t}-1}^{PA,B}; \gamma_B).$$

Combining (4), (12), (13), and (14) gives

$$(15) \quad \sum_{k=1}^N [h^B(y; a_{t,k}) - h^B(i_{\bar{t}}^{PA,B}; a_{t,k})] > c^{PA}(y - i_{\bar{t}-1}^{PA,B}; \gamma_B) - c^{PA}(i_{\bar{t}}^{PA,B} - i_{\bar{t}-1}^{PA,B}; \gamma_B)$$

$$(16) \Rightarrow \sum_{k=1}^N h^B(y; a_{t,k}) - c^{PA}(y - i_{\bar{t}-1}^{PA,B}; \gamma_B) > \sum_{k=1}^N h^B(i_{\bar{t}}^{PA,B}; a_{t,k}) - c^{PA}(i_{\bar{t}}^{PA,B} - i_{\bar{t}-1}^{PA,B}; \gamma_B).$$

But if inequality (16) is true, then the PA in economy B strictly prefers y to $i_{\bar{t}}^{PA,B}$ in period \bar{t} , and thus does not optimize at $i_{\bar{t}}^{PA,B}$ – a contradiction. Thus, there cannot exist an ARPE in economy A that has a greater magnitude of interpretation than the ARPE in economy B .

Q.E.D.

Proof of Proposition 2. Consider two economies, A and B , with corresponding parameters γ_A and γ_B , respectively, where $\gamma_A > \gamma_B$ and all other parameters are equal. Proposition 2 states that if $i_{t^\circ}^{RA,A} = i_{t^\circ}^{RA,B}$, $i_{t^\circ}^{PA,A} = i_{t^\circ}^{PA,B}$, and $i_{t^\circ}^{RA,A} < i_{t^\circ}^{PA,A}$ in some period t° , then the RA in economy A will reinterpret (weakly) less frequently than the RA in economy B before $i_{t^*}^{RA} \geq i_{t^*-1}^{PA}$ (in some period $t^* > t^\circ$) in both economies.

Since agents' actions are the same in both economies in period $t^\circ + 1$, $i_{t^\circ+1}^{PA,A} \leq i_{t^\circ+1}^{PA,B}$ and $i_{t^\circ+1}^{RA,A} = i_{t^\circ+1}^{RA,B}$. Any agent j who's action is such that $a_{t^\circ+2,j} < i_{t^\circ+1}^{PA,A}$ in economy A must also choose the same action in economy B , since the agent faces the same constraints in either case. On the other hand, agents who choose actions greater than or equal to $i_{t^\circ+1}^{PA,A}$ in economy A choose (weakly) greater actions in economy B , since they face a lower legal cost in the latter.

Consider two cases. In the first, the RA in economy A reinterprets in period $t^\circ + 2$ such that $i_{t^\circ+2}^{RA,A} < i_{t^\circ+1}^{PA,A}$. By revealed preference, the RA in economy B must choose $i_{t^\circ+2}^{RA,B} = i_{t^\circ+2}^{RA,A}$ – the marginal returns and costs are the same in both cases, and any larger interpretation increases

$K(\cdot)$ by a (weakly) greater amount in economy A than in economy B . After this reinterpretation, there is a similar situation as in period $t^\circ + 1$, with $i_{t^\circ+2}^{RA,A} = i_{t^\circ+2}^{RA,B}$, $i_{t^\circ+2}^{PA,A} \leq i_{t^\circ+2}^{PA,B}$, $i_{t^\circ+2}^{RA,A} < i_{t^\circ+2}^{PA,A}$, and $i_{t^\circ+2}^{RA,B} < i_{t^\circ+2}^{PA,B}$. This case is repeated – with the RA’s in the two economies making the same number of reinterpretations – until the second case is realized (and it must be realized, since the equilibrium is accepted religiously).

In the second case, the RA in economy A reinterprets in some period $t^* \geq t^\circ + 2$ such that $i_{t^*}^{RA,A} \geq i_{t^*-1}^{PA,A}$. In this case, not only is it *not* necessarily true that $i_{t^*}^{RA,B} \geq i_{t^*-1}^{PA,B}$, but it may even be such that $i_{t^*}^{RA,B} < i_{t^*-1}^{PA,A}$. $K(\cdot)$ is (weakly) smaller at all interpretations for the RA in B than it is for the RA in A , and thus on the margin the former has less to gain from such an interpretation. Hence, it must be true that the number of reinterpretations by the RA in economy A before it “reaches” a period t^* in which $i_{t^*}^{RA,A} \geq i_{t^*-1}^{PA,A}$ is weakly less than the number of reinterpretations by the RA in economy B before it “reaches” a period t^* in which $i_{t^*}^{RA,B} \geq i_{t^*-1}^{PA,B}$, *ceteris paribus*.

Q.E.D.

Proof of Proposition 3. This result follows directly from the proof of Proposition 2. In that proof, we saw (in the “second case”) that in the first period t^* in which $i_{t^*}^{RA,A} \geq i_{t^*-1}^{PA,A}$, it is *possible* that $i_{t^*}^{RA,B} < i_{t^*-1}^{PA,A}$. It follows that if such a period t^* exists, then $i_{t^*}^{RA,A} > i_{t^*}^{RA,B}$.

Q.E.D.

APPENDIX B: THE MODEL, QUALITATIVELY

In this Appendix, I qualitatively map i^{PA} and i^{RA} for one parameter set over the first five periods and period t (in which a persistent equilibrium emerges). For illustrative purposes, I omit

the interpretations of the N members of the laity. The interpretations are shown over the entire range of γ (institutional dependence) in Figure B.1. Below, I discuss the intuition underlying the interpretations in each period and relate these interpretations to Propositions 1, 2, and 3.

Period 1: Since $\bar{a}_0 = i_0^{RA} = i_0^{PA} = 0$, all RA's will face the same optimization problem regardless of γ , and will all choose the same interpretation (which in this case is greater than zero, as some of L's actions are positive). The only difference for the PA's is γ . It thus follows from the PA's maximization problem that i_1^{PA} is weakly decreasing in γ . For sufficiently large γ it is too costly for the PA to differ from i_0^{RA} , so $i_1^{PA} = 0$.

Period 2: All agents actions are weakly larger than in period 1, since i_1^{PA} and i_1^{RA} are weakly larger. Agents actions are increasing in i_1^{PA} (since i_1^{RA} is constant), so i_2^{PA} is decreasing in γ . All PA's choose $i_2^{PA} \geq i_1^{RA}$, since there is no cost associated with interpretations lower than the RA's.

The RA's interpretation sheds light on Propositions 2 and 3. For low- γ RA's, a large i_1^{PA} entails that L's choose large actions – so large that the marginal reinterpretation cost outweighs the marginal benefit of allowing such actions. Yet, at a sufficiently low i_1^{PA} (or sufficiently high γ), L's actions are not large enough to discourage the RA to choose $i_2^{RA} \geq i_1^{PA}$. Thus, a higher level of dependence may lead to a temporarily more permissive interpretation (Proposition 3), and it takes higher-dependence RAs fewer interpretations before they “catch up with custom” and interpret such that $i_2^{RA} \geq i_1^{PA}$ (Proposition 2).

Periods 3-5: These periods contain phenomena similar to those in Period 2, but over a larger part of the parameter set. Agents' actions are increasing in period $j \in [3,5]$ in i_{j-1}^{RA} and i_{j-1}^{PA} , which in turn entails greater i_j^{RA} and i_j^{PA} . It is clear that Propositions 2 and 3 hold over varying values of γ . In all three periods there are values of γ for which a higher-dependence RA has a greater

interpretation than a lower-dependence RA (Proposition 3), and the number of interpretations before the first period in which $i_j^{RA} \geq i_{j-1}^{PA}$ is weakly decreasing in γ (Proposition 2).

Period t: This period represents an ARPE. A portion of the interpretations are inhibitive, and the magnitude of interpretation is decreasing in γ (Proposition 1).

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TABLES

Table I: Interest Laws in Medieval Europe

Location	Date(s)	Law
Legal Maxima, General Laws		
Catalonia (h)	10th century	Legal max rate of 12.5%
England (e)	12th-15th centuries	Only immoderate interest subject to persecution
Aragon (d)	1241	Jews and Moors limited to 20%, Christians limited to 12%
Cordova (d)	1241	Legal max rate of 12.5%
Seville (d)	1250	Legal max rate of 12.5%
Murcia (d)	1266	Legal max rate of 12.5%
Florence (c)	1345-1346	Following a financial crash, the Republic stopped all usury persecution
France (d)	1349	Crown authorized interest up to 15% for fairs at Champagne and Brie
London (c)	1363	Usury prosecution became sole jurisdiction of civil authorities
Venice (c,f)	15th century	Loans at 20% long regarded as custom, 5-12% regarded as legal and just
Legal Maxima, Pawnshops		
Milan (b)	End of 12th century	Legal max rate of 15%
Verona (b)	1228	Legal max rate of 12.5%
Sicily (b)	Mid-13th century	Legal max rate of 10%
Modena (b)	1270	Legal max rate of 20%
Genoa (b)	13th century	Legal max rate of 15%
England (g)	13th century	Legal max rate of 43 1/3%
Provence (g)	13th century	Legal max rate of 300%
Germany (g)	13th-14th centuries	13th: Legal max rate of 173%; 14th: Legal max rate of 43 1/3%
Bruges (a)	1306, 1404, 1432	Legal max rate of 43 1/3%
France (b,g)	1311, 1361	1311: Legal max rate of 20%; 1361: Legal max rate of 86%
Lombardy (b)	1390	Legal max rate of 10%
Burgundy (g)	End of 14th century	Legal max rate of 87%
Florence (g)	15th century	Legal max rate of 20%

Sources: (a) de Roover (1948, p. 104); (b) Cipolla (1967, p. 65); (c) Gilchrist (1969, p. 112-113); (d) Grice-Hutchinson (1978, p. 36-41, 48); (e) Helmholz (1986); (f) LeGoff (1988, p. 72); (g) Homer and Sylla (1991, p. 97, 103, 110); (h) Gelpi and Julien-Labruyère (2000, p. 27)

Table II: Interest Philosophy Chronology and Institutional Dependence in Islam and Christianity

Time Period (C.E.)	Prominent Polities, Dynasties and Religious Leaders	γ (Institutional Dependence)	Commercial Opportunities	Interest Philosophy
Western Christianity				
8th - late-11th century	Franks, Holy Roman Empire	"Reverse" dependence: Powerful secular leaders appoint clerics - culminating in Investiture Controversy	Few	Strong restrictions
late-11th - late-13th century	Popes Gregory VII (1073-1085), Urban II (1088-1099), Innocent III (1198-1216); Italian city-states	Large dependence: Papal authority reaches zenith, Church gains suzerainty over secular lands	Growing	Restrictions strengthened (esp. Lateran II, III)
late-13th - 18th century	Avignon Papacy, Reformation, Independent European monarchs	Small dependence: Papal authority diminishes, Reformation further cripples Church's secular power, powerful lay regents reclaim suzerainty	Widespread	Restrictions relaxed, eventually eliminated
Near East/North African Islam				
7th - mid-15th century	Caliphate, Umayyad, `Abbāsīd, early Ottoman, regional powers (e.g., Mamluk, Saljuq)	Very large dependence: Some <i>kādīs</i> appointed by the state, but <i>mufītīs/ulamā'</i> largely independent of the political authority	Available	<i>Hiyal</i> allowed, but no further relaxations
mid-15th century - 18th/19th century	Ottoman	Large dependence, but smaller than in previous periods: incorporation of the <i>mufītī's</i> office into the apparatus of the state	Widespread	Restrictions relaxed, but lip-service to <i>sharī'a</i> still paid

FIGURES

Figure B.1: Qualitative Representation of one Parameter Set over Varying Dependence Parameters

