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Development and Religious Polarization:

The Emergence of Reform and Ultra-Orthodox Judaism

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Abstract

Jewish emancipation in nineteenth century Europe produced drastically different responses. In Germany, a liberal variant known as Reform developed, while ultra-Orthodox Judaism emerged in eastern Europe. We develop a model of religious organization which explains this polarization. In developed regions, religious authorities embrace the prospect of *cultural integration* by relaxing prohibitions and benefitting from greater financial contributions. In poorer regions, religious authorities adopt a strategy of *cultural resistance*, enforcing prohibitions to elicit greater contributions of effort. In regions of intermediate development, religious schisms and cycles occur. This analytic narrative sheds light on how economic development can lead to cultural change.

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1 Introduction

This paper explores how economic development can lead to cultural change. In particular, we investigate how economic incentives determine whether a minority community integrates or attempts to resist the majority culture. To address this issue, we analyse the emergence of Reform and ultra-Orthodox Judaism in nineteenth century Europe. Jewish emancipation—the gradual lifting of formal and informal barriers to Jewish participation in mainstream society—first occurred in Germany. There, a liberal variant of Judaism known as Reform emerged, based on ideas of the Enlightenment, becoming the dominant form of Judaism in western Europe by the end of the nineteenth century. In eastern Europe, traditional Judaism was reworked into various conservative forms of Judaism which emphasized strict adherence to rabbinical law. These developments had long-lasting effects. The denominational differences within Judaism today stem from the series of nineteenth century schisms that we analyze in this paper.[1]

To explain Jewish emancipation and schism we build on Iannaccone (1992) in developing a club-goods model of religion in which a religious authority can impose prohibitions on members which reduce their returns from outside activity. In so doing, a religious authority faces a trade-off between a relatively affluent community that expends little effort on religious participation and a poorer community that devotes a large amount of time and effort to religious activity. We develop a simple and tractable model of religious organization to examine how political and economic development shape this trade-off.

The model sheds light on how different economic regions reacted to emancipation. It predicts that where emancipation is accompanied by economic development, it is optimal for a religious authority to enable community members to engage in income-generating activity outside the community in return for increased financial contributions to the community. Where there is emancipation without economic development, any potential increase in financial contributions from outside activity is not sufficient to compensate religious authorities for the diminution in contributions of time and effort to the group.

The historical case study provides a "quasi-natural experiment" that isolates the role

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[1] Jewish religious identities are extremely persistent over time as Lasker and Lasker (1991) demonstrate. According to the 2000/2001 National Jewish Population Survey 81 percent of Orthodox Jews were brought up as Orthodox and 96 percent of Orthodox Jews marry other Orthodox Jews (*National Jewish Population Survey 2000-01. Strength, Challenge and Diversity in the American Jewish Population*, 2003). This persistence means that identities formed in the nineteenth century continue to shape Jewish religious practice today.

that economic incentives play in shaping culture. At the end of the eighteenth century all Jewish communities 'displayed substantially similar political, social, and economic features' (Vital, 1999, 31). We document how an exogenous event, Jewish emancipation, upset this equilibrium, producing drastically different reactions among Jewish communities across Europe, which less than a hundred years earlier had shared a common religious culture. Other examples of religious countermovements such as the Amish and the Hutterite communities do not allow us to address this question as cleanly, because they were small and localized developments that began in isolated rural areas making it difficult to disentangle whether their rejection of modernization was due to the peculiarities of their local culture or a product of the economic incentives that they faced.

We establish the following theoretical results. First, in a closed community, a religious authority responds to emancipation by relaxing religious prohibitions in areas of high economic development and by reinforcing religious prohibitions in areas of low economic development. Second, when individuals have the ability to exit the community a non-monotonicity is introduced. At intermediate levels of economic development it can be optimal for religious authorities to enforce a high level of strictness: even though individuals with low levels of attachment to the community are induced to exit, this is more than compensated for by increased contributions of time and effort by individuals with high attachment to the community. We use these predictions to construct analytic narratives of the emergence of the different variants of modern Judaism—Reform, Orthodox, and ultra-Orthodox Judaism.[2]

Finally, we explore a dynamic version of the model with intergenerational transmission of values. For intermediate levels of development there exist endogenous cycles in the strictness of religious communities. When the proportion of high-attachment types is low, religious authorities favour a strategy of cultural resistance which induces all members to exert high effort. This causes the proportion of high-attachment types in the community to increase. At some point it becomes optimal for the religious authority to switch to a strategy of cultural integration as high-attachment types contribute a high proportion

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[2]We will refer interchangeably to Haredi and ultra-Orthodox versions of Judaism. The latter is the term used in the economic and sociological studies of Orthodox Judaism (e.g. Berman, 2000). The former is a Hebrew term current in Israel. Haredi Jews themselves simply use the Yiddish term for Jews (*Yidn*) or virtuous Jews (*erlicher Yidn*) (Heilman, 1992, 11–13). Hasidism is a subset of Haredi Judaism. We provide details on the rise of Hasidism in Section 4. Hasidism was initially opposed to traditional Judaism—the *Misnagdim* or opponents—but by the middle of the nineteenth century they had overcome their differences in order to oppose Reform Judaism. Different branches of ultra-Orthodox Judaism espouse radically different opinions on many political issues such the state of Israel but their attitude towards secular society and Reform Judaism is similar.

of their outside earnings to the community. In turn, as they exert low effort within the community, the proportion of high-attachment types declines until it becomes optimal for the religious authority to switch back to a strategy of cultural resistance. This novel result could potentially explain church-sect cycles in which religious communities alternate between low and high strictness. Moreover, we show that concerns over the intergenerational transmission of values make religious authorities more likely to adopt a strategy of cultural resistance.

This paper is part of a growing literature on religious communities and religious extremism that builds on the work of Iannaccone (1992). Berman (2000) shows how the subsidy that ultra-Orthodox Jewish groups receive from the Israeli state has induced them to intensify the level of sacrifice required to participate, and in particular, to extend the time spent on yeshiva. Montgomery (1996, 2003), Barros and Garoupa (2002) and McBride (2008, 2010) model denominational choice in a Hotelling framework. The problem we consider is related to recent papers by Abramitzky (2008, 2009) who examines how Israeli Kibbutz communities manage to implement egalitarian policies of income-sharing whilst limiting shirking and preventing "too much" out-migration by high ability members. Our dynamic analysis is most closely related to McBride (2007) who studies how religious capital formation affects donations to a religious community.

The structure of the paper is as follows. Section 2 outlines the historical background to our paper. It sets out the details of Jewish emancipation and schism that need to be explained. We formalize our theory of religious polarization in Section 3. In Section 4 we apply this model to explain the historical evidence. Section 5 examines the dynamics of the model. Section 6 concludes.

2   Emancipation, Reform and Schism

Before Emancipation

Traditional Judaism was organized around the local religious community.[3] Jewish communities underwent little internal change between the middle ages and the end of the eighteenth century. As Jonathan Israel noted 'by and large the essential similarities in the institutions of Jewish organized life held true everywhere' (Israel, 1985, 184).

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[3]See Botticini and Eckstein (2005, 2007) for an economic analysis of how the development of rabbinical Judaism affected the economic and social profile of Jewish communities in the early middle ages.

Jewish communities spread out across central and eastern Europe during the middle ages.[4] They provided the following club goods to their members: religious services centred on the synagogue; a rabbinical court which adjudicated civil and criminal cases; collective insurance in the form of a poor house and an infirmary; and religious education through the *cheder* where Hebrew and the Talmud were taught. A ritual slaughterer and bakery assured that food was uncontaminated and bathhouses were maintained for ritual washing (Rudavsky, 1967).

Across Europe, Jews faced special taxes and restrictions on their choice of occupation, residency, marriage, and religious worship.[5] From 1500 onwards, Jews across Italy and Germany were confined to ghettos. Ghettos prevented or restricted social interaction between Christians and Jews.[6] In eastern Europe, Jews lived in their own communities and were not confined to ghettos but the overall effect was similar: they lived apart from the majority Christian population, and spoke their own language.[7] Developments in the Christian world had little impact on the evolution of religious practice and belief within Jewish communities. The restrictions Jews faced, limiting where they could work and even whether or not they had permission to marry, served to minimize social and economic interactions between Christian and Jewish communities.

Traditional Judaism was based on Jewish law (*halakhah*) as codified by rabbinical tradition in addition to Mosaic law. These practices had evolved over the course of the centuries and

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[4]We refer throughout to Ashkenazi Jews. It is estimated that European Jews, the preponderance of whom were Ashkenazi made up four fifths of the total Jewish population of 2.5 million at the end of the eighteenth century (Dubnov, 1971, 447).

[5]C.f. Goldscheider and Zuckerman (1984, 13). Jewish residency rights was conditional on the goodwill of the local ruler. The Jewish community of Vienna was expelled in 1670. Maria Theresa expelled the Jewish community from Prague in 1744 (Vital, 1999, 1–4). See Dubnov (1971, 192–198) and Katz (1974, 12–13). The so-called Pharaoh-law of 1726 meant that only the eldest son of a Jewish family was permitted to marry and settle in Moravia and Bohemia (Dubnov, 1971, 188–189).

[6]The ghettos were overcrowded and disease-prone. For example, the Jewish population of Frankfurt, which numbered more than 3000 people by the early eighteenth century, was confined to a single street, a quarter of a mile long and no more than twelve feet wide. As a result, fires were frequent, and in the 1780s the mortality rate was 58 percent higher amongst the Jewish population than it was for non-Jews (Ferguson, 1998, 27–38). Kaplan (2007), however, argues that in general ghettos prevented widespread religious persecution or pogroms. Ghettoization preserved Jewish culture: 'it stimulated the development of a richer, more comprehensive, more distinctly Jewish culture' (Kaplan, 2007, 318). C.f. Low (1979) who notes '[r]ecurrent expulsions encouraged maintenance of ties with kinfolk in other countries and kept Jewish solidarity alive' (Low, 1979, 13).

[7]In most of Eastern Europe Jews spoke Yiddish. In Germany, Jews spoke a dialect: Judendeutsch. 'Until quite modern times, few Jews in any part of Europe had more than such a limited knowledge of the language of a country, namely the language of their gentile neighbors, as might be necessary to conduct commercial transactions with them. Even this rarely extended to the ability to read and write in the vernacular' (Vital, 1999, 21–22).

reflected the precarious position of the Jews as a unique minority group within Christian society. The *halakhah* regulated the religious life of all Jewish communities. Traditions emerged so as to enable Jews to coexist as a minority group within Christian society whilst preserving their identity. Observant Jews were allowed to interact with gentiles and even visit their houses in order to sell goods to them but they were not allowed to eat together. Jewish women were not allowed to be alone with non-Jewish men. Distinctive forms of Jewish dress evolved which identified community members as Jews. These were 'considered tokens of the individual's membership in his community and testimony to his identification with his faith'; they had the practical effect of inhibiting integration between Jews and mainstream society (Katz, 1998, 50).[8]

Emancipation

Jewish communities across Europe were bound by a complex system of discriminatory restrictions and regulations.[9] This began to change at the end of the eighteenth century with Jewish emancipation. The process of emancipation resulted in Jews eventually obtaining equal civic and political rights by the third quarter of the nineteenth century. Jewish emancipation can be viewed as a largely exogenous shock. Few Jews 'anywhere in Europe had anticipated emancipation' (Vital, 1999, 99). However, once it had begun, emancipation transformed traditional Jewish communities: it 'augured unprecedented but also irreversible change in the structure and character of the Jewish people. From this point on, the questions on which virtually everything of importance in the lives of the Jews of Europe would turn was whether, if only as a hypothesis, such a change was to be the welcomed or rejected; and whether the welcome—or rejection—was to be flat or qualified. Upon these issues Jews in all parts of the continent would now begin to be deeply and, in the course of time, irreparably divided' (Vital, 1999, 99).

The process of emancipation was inaugurated by Christian Wilhelm Dohm's 1781 work,

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[8]Prior to emancipation, 'internal restrictions of the kinds of clothes Jews could wear were a form of 'foreign policy'. Dark and inconspicuous clothing was seen as appropriate to Jews living in this long and bitter exile, and wearing "Gentile clothing" was explicitly equated with immodesty and immorality. Implicitly, the accommodation choice of modest dress suggested that Jews would not seek power or position in the state' (Hundert, 2004, 87). Furthermore, Jews who wore luxurious clothing, or made visible displays of wealth, imposed a negative externality on the community, as a whole, because if Christian rulers supposed that the Jews were rich this could led to the imposition of higher taxes or forced loans.

[9]The exceptions to this generalization were Britain and the Netherlands where Jews had been granted effective civic equality in the seventeenth century. Our focus in this paper is on the much larger Jewish communities of central and eastern Europe.

entitled *Über die bürgerliche Verbesserung der Juden* (*On the Civic Improvement of the Jews*), which began a pan-European debate on the condition of the Jews in Europe by advocating emancipation as a means to make the Jews useful to society at large (Hess, 2002).[10] The first significant official act of emancipation took place in central Europe when Joseph II (1780–1790), ruler of the Habsburg empire, issued the Edit of Toleration or *Toleranzpatent* in 1782. It was an act of partial emancipation which granted certain civic rights to Jews provided that they attended secular schools and learn German; it did not grant Jews legal equality with Christians.[11] Jewish settlement in Vienna, for example, remained restricted and no public synagogues were allowed to be built (Low, 1979, 15-23).

A more complete form of emancipation resulted from the French Revolution. The doctrine of equal citizenship proclaimed by the Revolutionaries led the National Assembly to declare that Jews were full citizens in 1791 and this policy was spread across Europe with the armies of France during the Revolutionary and Napoleonic wars (Berkovitz, 1989, 111–114). Jews across western Germany, the Low Countries, and northern Italy gained full civic equality as a result of French conquest and a window of opportunity opened up enabling many Jews to leave the ghettos and begin careers in areas such as law or in government which had previously been closed to them. However, in 1808 some of the rights granted by the French were restricted by Napoleon and, after his defeat in 1815, many of the traditional restrictions on Jewish settlement and on the occupations Jews could have were reimposed in those states that had been conquered by France, and in some instances new, more severe, laws were introduced.[12]

A few German states did make permanent movements towards emancipation. The Duchies of Anhalt-Berburg and Anhalt-Köthen granted the Jews '[e]mancipation virtually without qualifications' in 1810 (Rurup, 1969, 75). Prussia followed France in granting Jews a limited form of citizenship in 1812 as part of the modernization programme imposed in the aftermath of Napoleon's victory at Jena.[13] Mecklenburg followed Prussia in 1813

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[10]This cameralist strain of thought argued that the Jews could be more usefully employed so as to benefit the body politic if they were freed and integrated. Traditional Jewish religious practice was considered corrupting. For example Dohm 'would go so far as to concede that the Jews were more morally corrupt, criminally inclined, and antisocial than other peoples . . . Using 'sophistic artistry," rabbinical exegesis had falsified Mosaic Law and had introduced "narrow-minded and petty regulations" to the Jewish religion' (Berkovitz, 1989, 26).

[11]It was not in fact the first Edit of Toleration, the Margrave of Baden, Karl Friedrich had issued a similar document, granting Jews some rights but not citizenship in 1781 (Goldstein, 1984, 47).

[12]For example Jews were expelled from Bremen and Lübeck in 1816. Frankfurt, Hamburg, Hanover, Nassau and other territories reinstated settlement regulations in the aftermath of the defeat of Napoleon (Jersch-Wenzel, 1997, 29).

[13]Jews in Prussia were still prevented from working in government and Judaism was not recognized as

(Sorkin, 1987, 29). Denmark granted Jews civic rights in 1814.

Substantive moves towards legal equality in the rest of Germany recommenced in the 1830s and 1840s. Political emancipation was accompanied, and in cases some preceded, by economic integration. Economic change, combined with the end of the legal restrictions on settlement and employment, provided tremendous opportunities for many, even though numerous German states, such as Württemberg, retained restrictions on Jewish settlement until the late 1860s, and the process of emancipation was only completed with the unification of Germany.[14]

Joseph II had been among the first European rulers to move towards emancipation but his successors, notably Francis II (1792–1835), imposed a number of additional impositions on Jews.[15] Jews in the Habsburg empire only obtained full emancipation in 1868.[16] Emancipation did not occur in the Russian empire. In the first half of the nineteenth century additional restrictions were imposed on Jewish communities and, from 1804 onwards, Jews were confined to the Pale of Settlement (Greenberg, 1976).

Reform Judaism

There were three reforming movements in nineteenth century Judaism. Each advocated far reaching changes in the practice of Judaism. The first Reform movement emerged in Germany at the turn of the nineteenth century.[17] It was associated with the career of

a religion. Nevertheless, the partial emancipation of Prussian Jews was significant because they were viewed as 'the culturally most advanced community of Jews in Western Europe' and because it was not subsequently revoked (Katz, 1974, 170).

[14]The last state to extend rights to Jews was Bavaria which did so when it ratified the new German constitution in 1872. The relationship between emancipation, industrialization, and religious change are the subject of a extensive historiography and considerable controversy. See Baron (1938); Berkovitz (1989); Graetz (1996); Vital (1999). The seminal work on the cultural impact of emancipation of the Jewish communities of central and eastern Europe was Katz (1972, 1974, 1986). This sparked a series of debates about how to conceptualize the process of emancipation and assimilation that are contained in the conference volumes *Towards Modernity* (Katz, 1987), *Assimilation and Community* (Frankel and Zipperstein, 1992), *Paths of Emancipation* (Birnbaum and Katznelson, 1995), and *Jewish Emancipation Reconsidered* (Brenner et al., 2003).

[15]In the major towns of Galicia, Jews were confined to Ghettos for the first time. See Katz (1974, 163–164) and Mahler (1985, 3–10).

[16]For consistency we refer to the territories ruled by the House of Habsburg as the Habsburg empire. Strictly speaking, we should refer to the Austrian Empire for the years 1804-1867 and Austria-Hungary for the period between 1867 and 1914.

[17]The most important precursor to Reform was the *haskala* movement begun by Moses Mendelssohn (1729–1786). The haskala drew on European and, more specifically, German Enlightenment thought. It applied the tools of critical reasoning to religion, particularly 'the mode of thought that subjected virtually all matters of contention to the test of universal quality, content and application and significance'
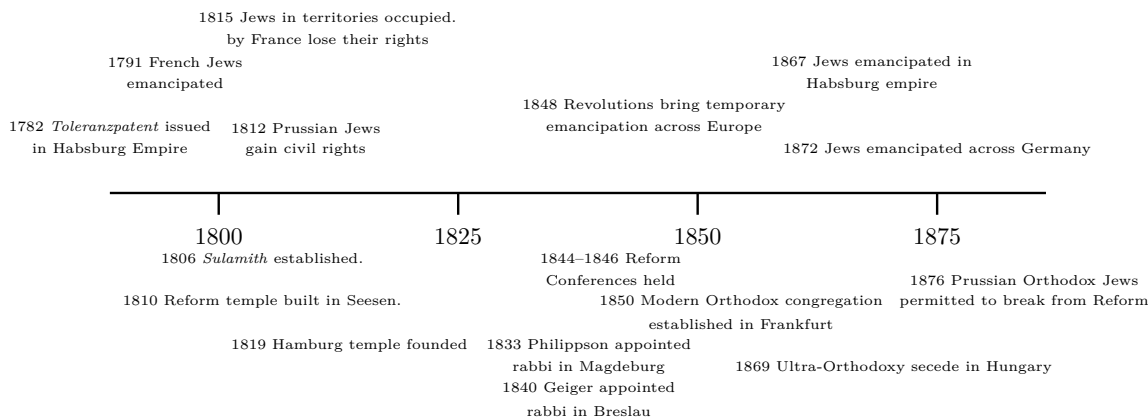
Figure 1: The timeline of emancipation, Reform and schism. Sources see text.

Israel Jacobson (1768–1828), a prominent advocate of secular education and of preaching in the vernacular, and with the first German-language Jewish periodical *Sulamith* (Meyer, 1988, 28–32). Jacobson built a new religious building in Dessau which he called a Temple rather than a synagogue and in which the service was accompanied by choral songs and German prayers and sermons (Meyer, 1988, 42–43).[18]

A second Reform movement built on this precedent by establishing a Temple in Hamburg in 1818 and dedicating a new prayer book, 'the first comprehensive Reform liturgy' (Meyer, 1988, 56). Reform finally gained momentum in the 1830s and 1840s with the third Reform movement when Ludwig Philippson (1811–1889), a moderate reformer was appointed preacher in Magdeburg, and when a more radical advocate of religious reform, Abraham Geiger (1810–1874) obtained the rabbinate of Breslau in 1840. The first Reform society formed in 1843, and, at the behest of Philippson, a series of rabbinical conferences were called, in Brunswick in 1844, in Frankfurt-am-Main in 1845, and in Breslau in 1846, to consolidate the various strands of Reform and establish what the movement stood for.

The timeline of both Reform and emancipation is depicted in Figure 1. Figure 2 shows those parts of Germany where Jews were either emancipated in 1825 or where they had been emancipated during the period of French rule.[19] Figure 3 depicts the German states

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(Vital, 1999, 137). It was an elite movement based around a small group of Berlin Jews – the Maskilim or young enlighteners – who applied historical and philological techniques to the study of Hebrew. This developed into a critique of rabbinical Judaism. Representative thinkers include Saul Ascher (1767–1822) author of *Leviathan, or On Religion with Respect to Judaism*, and David Friedläender (1750–1834).

[18]The significance of renaming a synagogue a 'Temple' was that it implied that the community had come to terms with the loss of the Temple of Jerusalem in A.D. 70 and was giving up on the hope of returning to Israel.

[19]Many German Jews—including many reformers—first experienced emancipation during the period

where Reform communities had sprung up as measured by whether or not they sent rabbis to any of the Reform conferences held in Brunswick in 1844, Frankfurt-am-Main in 1845, or Breslau in 1846.[20] Even where movements towards Reform preceded emancipation, as in the case of Jacobson and the *Sulamith*, these can be interpreted as products of the 'mood of anticipation' that had been created by Napoleon's conquests: both were based in Dessau which joined Napoleon's Confederation of the Rhine in 1807 (Sorkin, 1987).[21]

The content of Reform Judaism differed from that of traditional Judaism in a number of ways. Many traditional Jewish rites and rituals were abandoned by Reform congregations. The bar mitzvah was replaced by confirmation. Reform congregations introduced new liturgies, replaced traditional chanting and praying with singing, and either reformed or abandoned many traditional Jewish rites and rituals. Choirs and organ music were introduced into the synagogue (Lowenstein, 1981, 270).[22]

Reform meant fundamentally reinterpreting the Jewish religion—separating out the biblical commandants from the later rabbinical injunctions that comprised most of Jewish law. The aim of this religious change was to enable Jews to accommodate themselves to Christian or secular society. Reform allowed Jews to enjoy the benefits of modern secular society without abandoning all of their traditions or leaving their communities. Jews 'who deviated from the Jewish way of life under the pressure of these conditions solved their problem by limiting the demands of religion along Reform principles' (Katz, 1998, 50).

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of French occupation so it is worth distinguishing those regions of Germany where some form of emancipation occurred before 1825 from those where no emancipation took place, even though, in many areas, emancipation was subsequently reversed.

[20]Lowenstein (1981) provides information on the 38 German based rabbis who attended at least one of these conferences. Of these 40 percent came from territories where Jews had obtained civic emancipation and 63 percent came from territories in which Jews had been emancipated at some point between 1800 and 1825. This is an imperfect indication of the relationship between emancipation and reform because the size of each community could vary greatly.

[21]In cities like Frankfurt, Reform was driven by men like Samuel Holdheim (1806–1860) who were interested in attempting to reverse the reimposition of legal restrictions on Jews that had occurred across much of Germany in 1815. To obtain legal equality, they felt they needed to change the public perception of Judaism and to 'project an image of being worthy of those rights' (Liberles, 1985, 31). Similarly, David Fränkel urged Jews to abandon their traditional trades (which were perceived to be corrupting) and become farmers and agriculturalists (see Sorkin, 1987).

[22]Some Reform communities considered abandoning circumcision. Olry Terquem argued that the Sabbath should be moved from Saturday to Sunday (Goldfarb, 2009, 128).
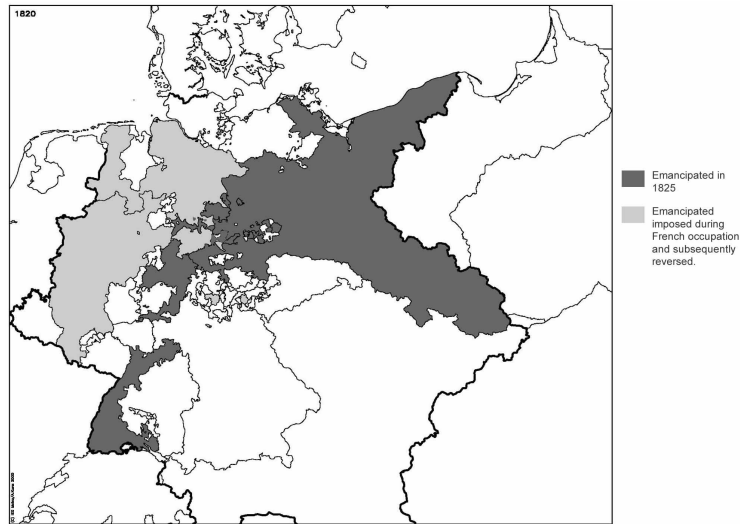
(a) Emancipation

Figure 2: Jewish communities in Germany that experienced civic emancipation in the first part of the nineteenth century. Data from Acemoglu et al. (2010).
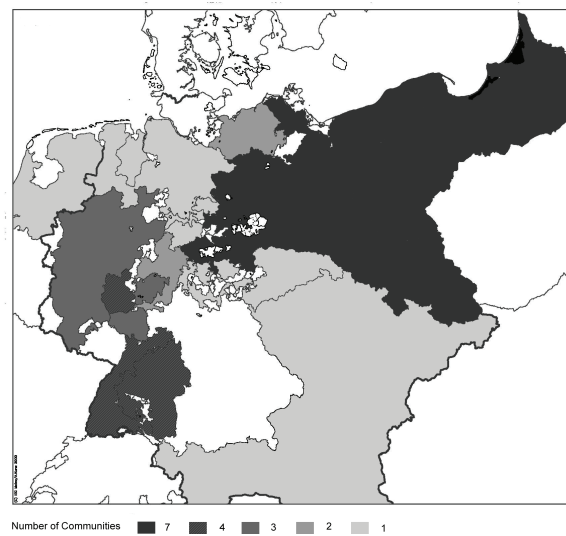
(a) Reform Communities

Figure 3: The German Reform communities that sent rabbis to the Rabbinical Conferences of 1844 to 1846. Data from Lowenstein (1981).

Members of Reform communities did not necessarily consume less religion than members of traditional Judaism had done—Reform was accompanied by an ambitious programme of synagogue building—but they consumed religion in a different form. Specifically, Reform made less demands on the time of community members. In the words of one advocate of Reform,

> '[m]any petty regulations such as the prohibition of shaving, the requirement that women wear *Scheitels* (wigs) the institution of the *Mikvah* (ritual bath) as an adjunct of the synagogue, and customs like *Tashlikh* (propitiatory rite based on the literal interpretation of Micah 7:19 b) and *Kapparoth Schlagen* (substitution of a fowl for a human being as a means of atonement) lost all religious meaning' (Cohon, 1922, 36).

Hence we refer to Reform Judaism as an example of *cultural integration*.[23] This is consistent with the views of both critics and advocates of Reform. Joseph Wolf, a leading reformer described one of the purposes of Reform as demonstrating 'that Judaism in its reconstructed pristine form "is not in the least harmful to the individual or to bourgeois society"' (quoted in Sorkin, 1987, 36). A conservative opponent of Reform, Hermann Schab referred to Reform as 'an attempt to level down the Jewish synagogue Service to that of the Protestant Church' (Schwab, 1950, 26).

Polarization and Schism

As a result of Reform, the common religious culture shared by all Jews in central and eastern Europe became fragmented. A process of religious and cultural polarization took place between Jewish communities in eastern and western Europe. While communities in Germany adopted Reform or moderate forms of Orthodoxy, in the Russian empire there was no emancipation, and traditional forms of Judaism could remain largely intact.

In parts of the Habsburg empire this process of polarization brought about religious schism as individual religious communities broke apart. In Hungary both a reform-movement and the most partisan form of ultra-Orthodoxy emerged. Ultra-Orthodoxy was diametrically

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[23]We use the neutral term cultural integration to describe this process of 'cultural acculturation'. It is not the same as cultural assimilation. The term "assimilation" is controversial in this context because it 'implies that the vast majority of Jews sought to fuse with other Germans in the desire to give up their religious or cultural distinctiveness. It suggests a kind of submission, an exchange of "Jewishness" for Germanness," and perpetuates contemporary negative stereotypes that German Jews felt no Jewish solidarity' (Kaplan, 1991, 11).

opposed to Reform: while Reform sought to change Judaism in order to accommodate changes in the outside world, ultra-Orthodoxy reformed Judaism in such a way as to insulate it from these changes. Ultra-Orthodoxy was a form of *cultural resistance.* Reform sought a common ground between Judaism and Christianity; ultra-Orthodox communities emphasized features that distinguished them from outsiders. Reform facilitated relations with non-Jews; ultra-Orthodoxy imposed new proscriptions and prohibitions on their members. It emphasized strictness (in Hebrew *machmir*) and fixed traditional practices as matters of religious law, blurred biblical and rabbinical injunctions and elevated the importance of prohibitions restricting contact with outsiders.

This historical narrative raises a number of puzzles. Why did emancipation result in a lessening of religious prohibitions and strictness in some communities and the strengthening of prohibitions and strictness in others? The existing literature can explain a movement in one direction but cannot generate the splintering of Judaism in different directions that we observe historically. The rest of the paper will be dedicated to developing a model that can explain the differing responses to emancipation among Jewish communities across Europe.

3   A Model of Religious Polarization

In this section, we develop a model of religious polarization that builds on the club-goods theory of religious organization, introduced by Iannaccone (1992). In our model, individuals choose how much effort and money to allocate to secular consumption and how much to contribute to the production of a religious club good. Through religious prohibitions, religious leaders can effectively 'tax' opportunities to earn income outside of the group and thereby induce members of the community to redirect effort toward production of the religious club good. In the presence of production complementarities, Iannaccone (1992) shows that religious prohibitions which diminish members' outside opportunities may enhance an agent's welfare by more closely aligning the privately and socially optimal contributions to the religious club good. This rationalizes many of the prohibitions and dietary restrictions that characterize orthodox variants of Judaism. However, the theory of religious club goods has not been extended to explain religious polarization. Why did some Jewish communities respond to emancipation by liberalizing and becoming less strict, while others enforced traditional prohibitions? Why did schism occur in some communities?

To address these questions and more generally analyze the impact of economic development on religion, we explore three main departures from Iannaccone's (1992) model. First, religious organizations in our model are not utilitarian planners—they only care about their members' religious participation and impose prohibitions to maximize members' contributions of effort to group production. This means that production complementarities in religious groups are not required for our results and we do not assume them here. Second, members have the option of exiting the community. This constrains the ability of religious groups to impose prohibitions and induce higher contributions to production of the club good. Finally, we analyze a dynamic extension of the model with overlapping generations and intergenerational transmission of values.

The Model

Consider a game played by n individual agents and a religious authority. Agents choose whether to join the religious community (there is only one), and divide effort between income-generating activity outside the community and production of a religious club good within the community. Earned income can be spent on a consumption good or donated to the community. Effort and money contributions to the community are combined to produce the religious club good. To induce agents to redirect effort towards group production, the religious authority can impose prohibitions, e.g. dress, dietary and behavioral restrictions, that stigmatize agents in the broader society. These prohibitions act as a 'tax' on outside income-generating activity by its members. We shall refer to the degree of prohibitions imposed by the group as its level of *strictness*.

Let us begin by analyzing the following one-shot game without an option to exit from the group:

Date 0. An agent can be one of two types denoted by θ, where $\theta = L$ is a type with low attachment to the community and $\theta = H$ is a type with high attachment to the community. The proportion of type-H agents in the population is $p \in (0, 1)$.

Date 1. The religious authority announces a level of strictness $\tau \in [0, 1]$.[24]

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[24]In our historical application the strictness parameter τ reflects how rigorously religious authorities interpreted Jewish law. A high value of τ can thus be thought of as consisting of prohibitions that emphasize a distinctive Jewish identity and were likely to increase the discrimination that Jews faced in Christian or secular society. The religious authority had discretion over how strictly this could be interpreted. A high value of τ corresponds to the rabbinical concept of *Humrah* (stringency) whereas a low value of τ corresponds to the concept of *kullah* (lenience). In Section 4 we discuss how τ acted as a barrier to Jewish integration.

Date 2. Agents then choose to devote effort $e \in [0, 1]$ to the production of a religious club good. Effort $1 - e$ is devoted to income-generating activity outside the community. Income equals $(1 - \tau)\lambda(1 - e)$, where λ is a productivity parameter. It shall become clear that λ is a natural measure of economic development in our model. Strictness τ acts as a linear tax on income-generating activity outside the community. Income can be divided between consumption of a unique non-storable good with unit price and a financial contribution to the community. Let c be the quantity consumed of the secular good and g be the amount of income donated to the religious community.

Date 3. Output of the religious club good is produced by a combination of members' effort and money contributions.

We shall now proceed to specify payoffs. The utility function for each type-θ agent who joins the community is given by the following CES form:

$$\left(c^\sigma + \beta_\theta R^\sigma\right)^{\frac{1}{\sigma}}, \tag{1}$$

where $\sigma < 1$. R is a measure of the agent's overall contribution to the religious club good and we assume $\beta_H > \beta_L > 0$ so that high-attachment types derive greater enjoyment from contributing to production of the club good. For simplicity, we assume that $R = e + g$, the sum of the agent's effort and money contributions. We view the payoff from contributing to the religious club good as a combination of (i) warm glow, (ii) community status and (iii) rewards in terms of allocation of the final club good.

The budget constraint is:

$$c + g \leq (1 - \tau)\lambda(1 - e), \tag{2}$$

which will bind in equilibrium, because (1) is strictly increasing in c. Therefore, $c = (1 - \tau)\lambda(1 - e) - g$.

Substituting the expressions for c and R into (1) we get:

$$\left(\left[(1 - \tau)\lambda(1 - e) - g\right]^\sigma + \beta_\theta(e + g)^\sigma\right)^{\frac{1}{\sigma}}. \tag{3}$$

We assume that $e = g = \tau = 0$ for individuals who exit the community, i.e. they cannot contribute effort or money to production of the religious club good, and they do not face the tax τ on outside activity. Substituting this into (3) yields a payoff of λ from remaining outside the community, which we shall henceforth refer to as the level of economic development.
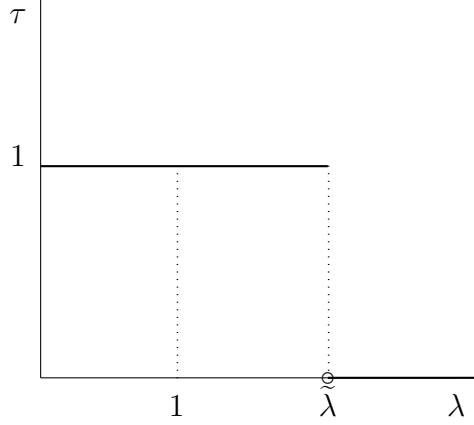
14

Figure 4: Strictness τ as a function of economic development λ.

Unlike in prior work, the religious authority is not a utilitarian planner, but instead attempts to maximize religious participation. In particular, we assume that the religious authority chooses τ to maximize aggregate contributions to the religious club good as follows:

$$\sum_{i \in N} \left(e_i + g_i \right), \tag{4}$$

where in equilibrium e_i and g_i will depend on τ.

Equilibrium

The first tradeoff faced by a religious authority in setting the community's level of strictness τ is between contributions of effort and money. A higher τ diminishes agents' income-generating opportunities outside of the community, inducing them to redirect effort to production of the religious club good. However, this also means that they have less income to donate to production of the religious club good. Analyzing the version of the game without an exit option from the religious community allows us to focus on this tradeoff.

According to the following proposition, the strategy adopted by a religious authority will depend on the level of economic development faced by members of its community.

Proposition 1 Development & Religion*: There exists a unique subgame perfect equilibrium (SPE) of the game without exit, characterized by a threshold for development $\widetilde{\lambda}$, such that:*
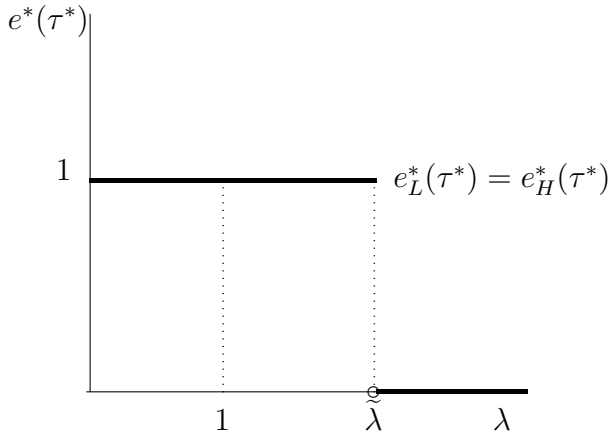
15

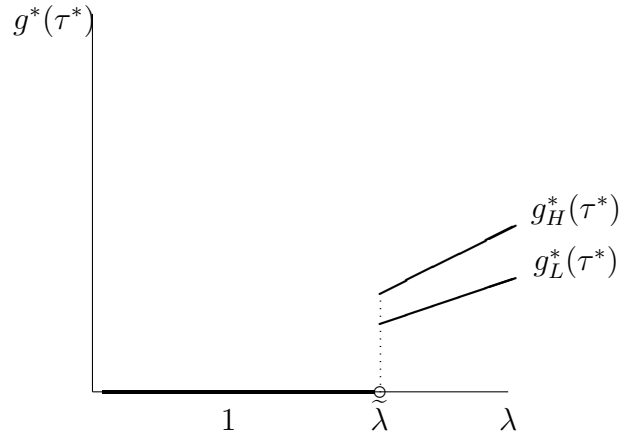Figure 5: Equilibrium effort contributions $e^*(\tau^*)$ as a function of economic development λ.

Figure 6: Equilibrium money contributions $g^*(\tau^*)$ as a function of economic development λ.

(i) For $\lambda \leq \widetilde{\lambda}$, every SPE implements:

$$\tau^* = 1, \quad e_i^* = 1 \quad and \quad g_i^* = 0,$$

for all $i \in N$.

(ii) For $\lambda > \widetilde{\lambda}$, every SPE implements:

$$\tau^* = 0, \quad e_i^* = 0 \quad and \quad g_i^* = \frac{\beta_i^{1/1-\sigma}}{1 + \beta_i^{1/1-\sigma}}\lambda,$$

for each $i \in N$.

Proofs of all propositions are provided in the appendix.

Proposition 1 describes how the character of a religious community can shift with an increase in development, from effort-intensive to money-intensive modes of production. The intuition behind this result is as follows. Through religious prohibitions religious leaders can effectively 'tax' outside activities and thereby induce the members of the community to redirect effort toward production of the religious club good. When economic development is low the gains to the religious authority associated with lowering τ and thereby increasing monetary contributions g are small compared to the foregone contributions in terms of effort. Thus the optimal level of strictness τ^* is equal to its maximum value at low levels of economic development λ. This is depicted in Figure 4. When economic development is high the increased financial contributions from a richer congregation more

than compensate for the lower levels of effort. Once economic development reaches $\widetilde{\lambda}$, the religious authority switches to $\tau^* = 0$. The best response of community members to religious authority's choice of τ is depicted in Figures 5 and 6.

This result accords with cross-sectional evidence on religious denominations. Richer congregations make lower demands in terms of time-consuming rituals and rely more heavily on the services of professional ministers, teachers, choir directors and caretakers (Iannaccone, 1998, 1480). The following corollary analyzes the determinants of the switching threshold $\widetilde{\lambda}$.

Corollary The threshold for switching to money-intensive contributions, $\widetilde{\lambda}$, is:

   (i) strictly decreasing in the proportion of high-attachment types, p,

   (ii) strictly decreasing in the attachment levels for each type, β_L and β_H.

The reasoning behind this result is as follows. When $\tau = 1$, all agents choose the maximal level of effort contribution $e = 1$, regardless of their type. When $\tau = 0$, each agent contributes instead by donating to the community and their money contributions are increasing in their attachment to the community. Hence, a money-intensive form of club good production is relatively more attractive than an effort-intensive form of production when the proportion of high-attachment types p and the attachment levels of each type are sufficiently high.

In this section, we have demonstrated that cultural polarization can arise between religious communities in different regions. For a *schism* to occur in a single community, however, agents need to have the option to exit the community.

Schism

When agents have the option to exit, the religious authority may be constrained in its choice of strictness. In particular, setting a high τ may induce low-attachment types to leave the community—a religious *schism*. Hence, the religious authority faces a new trade-off: relax prohibitions to keep low-attachment types in the community or induce their exit and cater to a smaller, stricter, poorer and more committed community. The following lemma characterizes the exit constraint faced by the religious authority.
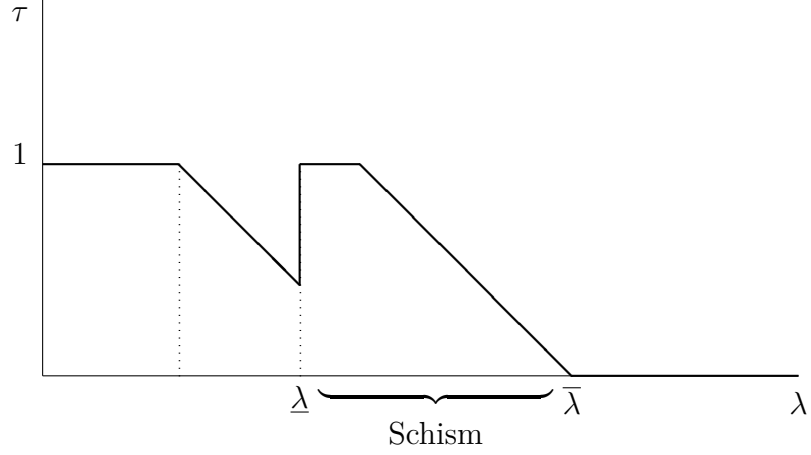
Figure 7: Strictness τ as a function of economic development λ when agents have an exit option.

Lemma 1 ***Exit Constraint***. *The following applies for both types of agents $\theta = L, H$.*

(i) *For $\lambda \leq \beta_\theta^{1/\sigma}$, all type-$\theta$ agents remain members of the community, regardless of $\tau \in [0,1]$.*

(ii) *For $\beta_\theta^{1/\sigma} < \lambda < \left(1 + \beta_\theta^{\frac{1}{1-\sigma}}\right)^{\frac{1-\sigma}{\sigma}}$, there exists a unique threshold $\tau_\theta \in (0,1)$, such that all type-θ agents exit the community if and only if $\tau > \tau_\theta$.*

The threshold τ_θ is strictly decreasing in economic development λ and strictly increasing in β_θ. Hence $\tau_H > \tau_L$.

When economic development is low, all agents will remain in the group, regardless of its level of strictness. However, as economic development reaches an intermediate level, the exit constraint begins to bind. An agent's 'tolerance for strictness', τ_θ, is then decreasing in economic development and increasing in her attachment to the group.[25]

We can now analyze the equilibria of the game when agents have the option to exit the community. The following proposition states that if low types have sufficiently low attachment, then such a schism occurs for intermediate levels of development.

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[25]Note that we do not need to characterize the exit constraint for high levels of development, i.e. $\lambda \geq \left(1 + \beta_\theta^{\frac{1}{1-\sigma}}\right)^{\frac{1-\sigma}{\sigma}}$. For such high levels of economic development, agents switch to money-intensive contributions and the religious authority has an incentive to set $\tau = 0$. At $\tau = 0$, no agent will exit the community—they can do at least as well by remaining in the community and setting $e^* = g^* = 0$. Hence the exit constraint will not bind in this case.

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Proposition 2 *Schism: Consider the game with exit. For β_L sufficiently low, there exists a unique SPE as follows:*

(i) *For $\lambda \leq \beta_L^{1/\sigma}$, every agent remains a member of the community and equilibrium actions are as in Proposition 1(i).*

(ii) *There exist unique thresholds $\underline{\lambda}$ and $\overline{\lambda}$, such that for all $\beta_L^{1/\sigma} < \lambda < \underline{\lambda}$ every agent remains a member of the community and:*

$$\tau^* = \tau_L, \quad e_i^* = \frac{\beta_i^{\frac{1}{1-\sigma}}}{\beta_i^{\frac{1}{1-\sigma}} + [(1-\tau_L)\lambda]^{\frac{\sigma}{1-\sigma}}} \quad and \quad g_i^* = 0 \quad for \ all \ i \in N.$$

For $\underline{\lambda} \leq \lambda \leq \overline{\lambda}$, there is a schism. Only high-attachment types remain members of the community and:

$$\tau^* = \min\{\tau_H, 1\}, \quad e_H^* = \frac{\beta_H^{\frac{1}{1-\sigma}}}{\beta_H^{\frac{1}{1-\sigma}} + [(1-\min\{\tau_H, 1\})\lambda]^{\frac{\sigma}{1-\sigma}}} \quad and \quad g_i^* = 0.$$

(iii) *For $\lambda > \overline{\lambda}$, all agents remain members of the community and equilibrium actions are as in Proposition 1(ii).*

The intuition behind Proposition 2 is as follows. Economic development increases the incentive that individuals, especially low-attachment individuals, have to exit the community and participate in the outside economy (see Lemma 1). Therefore, the religious authority lowers τ as economic development increases in order to retain low-attachment types. This is costly for the religious authority because it means that the amount of effort that is devoted to production of the religious club good declines for both types. At an intermediate level of λ it becomes prohibitively costly to retain low-attachment types. It is possible for the religious authority to generate higher aggregate contributions to the religious club good by raising τ, and thereby inducing greater effort from the remaining high-attachment types, even though low-attachment types exit the community. Consequently, there exists an intermediate range of λ, $(\underline{\lambda}, \overline{\lambda})$, such that the religious authority will increase τ to maximize religious participation from H-types as shown in Figure 7. In other words, there is a religious schism. As the level of economic development becomes high, however, the religious authority switches to $\tau = 0$. All agents join the group and switch to money-intensive contributions.[26]

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[26]Alternatively, we could conduct the analysis with high and low ability types. The results of the one-shot game when agents differ in their ability are qualitatively similar. When economic development is high,

4   The Model Applied to the History

Emancipation and Reform

In this section we apply our model to explain the emergence of Reform and ultra-Orthodox Judaism in nineteenth century Europe. Prior to emancipation all Jewish communities had few economic opportunities: they faced a low level of λ. Isolated from mainstream society, communities in different parts of central and eastern Europe shared a common religious culture. Emancipation, however, exposed community members to contrasting outside opportunities depending on the economic development of the region. The level of economic development across central and eastern Europe varied considerably: per capita GDP in Germany was approximately twice that in what is now Poland.[27] Exposure to different economic environments produced different cultural reactions. Proposition 1 predicts that emancipation in a region where economic development was high should generate a movement towards cultural integration. In order to illustrate this insight we consider the case of Germany.

Emancipation was a necessary but not sufficient condition for Reform to succeed. Reform was possible first of all because rabbis could in principle alter the strictness of their religious community. Many aspects of traditional Jewish practice had evolved gradually over time and religious law afforded considerable room for interpretation. As noted earlier, Jews wore distinctive clothes but this was a matter of tradition rather than religious law. Therefore Reformers could argue that Jewish dress and clothing 'were not actually anchored in *halakhic* sources, and they could be abandoned with the changing conditions' (Katz, 1998, 50).

Reform could succeed because emancipation coincided with an upsurge in the German economy. The German economy did not begin to industrialize until after 1850 but the

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the religious authority induces members to switch to money intensive contributions by relaxing strictness. One difference is the tradeoff faced by the religious authority when exit is an option. High-ability types, like low-attachment types, have an incentive to leave the community when economic development is sufficiently high. High-ability types however earn higher incomes and hence may make greater financial contributions to the community, even if they have lower attachment to the community. This means that while schisms can still occur, the religious authority raises strictness and induces the exit of high-ability types for a smaller range of values for λ.

[27]According to Angus Maddison's calculations per capita GDP in 1990 Geary-Khamis dollars was $1,839 in Germany in 1870, and $946 and $931 in what are now Poland and Romania, respectively (Maddison, 2003). In the nineteenth century the territory of modern Poland belonged to Russia, Prussia and the Habsburg empires. Modern Romania roughly corresponds to the Habsburg province of Galicia.

period between the end of the Napoleonic wars and the onset of industrialization was characterized by commercial expansion and economic growth along Smithian lines. This growth process created opportunities for Jews—even prior to formal emancipation—as the gradual transformation of the economic and legal institutions of the ancien regime resulted in the 'steady erosion of (Christian) guild privileges and monopolies, a growing freedom of choice of occupation, and with it a larger element of . . . social mobility' (Mosse, 1987, 31). Discriminatory barriers that had limited interaction between Jews and Christian were eroded away by economic incentives to participate in an expanding economy (Richarz, 1975).

Emancipation plunged Jewish communities in Germany into a high λ environment which provided economic opportunities for minorities willing to seize them. As Schofer writes: 'the economic opportunities of the post-1848 boom encouraged large numbers of Jews to leave the small-town economy and to enter the urban, national one, (Schofer, 1981, 81). Jewish community leaders now faced a different set of incentives: '[i]nter-action with non-Jews, which had been the exception, often deliberately avoided, now became the inescapable norm' (Pulzer, 1992, 5).

Reform took hold in those parts of Germany where economic opportunities were greatest. It was in the larger and more advanced cities that Reform was initially most successful. Reform began in Berlin and spread to cities like Hamburg, Frankfurt-am-Main, Breslau before moving to Vienna and Prague.[28] Economic growth accelerated after mid-century. The 'two decades c. 1853–1873 witnessed the fastest economic growth rates in Germany in modern times' (Breuilly, 2003, 206). Urbanization increased at a rapid rate: the proportion of the population living in towns with more than 2,000 inhabitants rose from around 26 percent in 1834 to 35 percent in 1871 and 47 percent in 1890. Berlin roughly doubled in size between 1850 and 1870; Hamburg, Leipzig, Dresden, and Breslau grew by approximately 75 percent on average during the same period (Guinnane, 2003, 51).

After 1850, German industrialization began to raise incomes, and newly emancipated, Reform-minded and secular, Jews particularly benefited. As Rahden observes 'the more the economy was liberalized, and the more trade and industry grew at the expense of agriculture, all the clearer was the road that beckoned to the hard worker, and the more chances emerged for the advancement of Jews from Central Europe . . . From the perspective of many German-speaking Jews in Central Europe, the long nineteenth century

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[28]Exogenous political factors prevented the establishment of a Reform community in Berlin (see Meyer, 1980).

was a golden age of economic advancement' (van Rahden, 2008, 27).[29] Sustained growth meant that there was space within society for Jews to move into new professions and ascend the class ladder (Barkai, 1981). The rising prosperity of the German economy and the growth of Reform Judaism went hand-in-hand.

The attractiveness of new economic opportunities led religious communities to relax practices which inhibited economic and social interaction such as dietary laws and strict observance of Jewish holidays. The 'need to be economically competitive forced many to do business on Saturday, the Jewish Sabbath' (Lowenstein, 1981, 256).[30] Reform Judaism was at first driven by practical men rather than rabbis and intellectuals. Freehof observes that a distinction should be made between the two movements: initally the 'laity, as business and professional men, came first into contact with the modern age. They were changed by it and therefore they wanted Jewish observances changed to fit their life. They confined their interest to outer manifestations of Jewish religious life' (Freehof, 1955, 354). Subsequently intellectual leaders such as Holdeim and Geiger began to rethink and remodel the religious foundations of Judaism in a way that justified the innovations that had taken place.[31] This sequence of events from practical changes to intellectual reevaluation is consistent with the analysis provided by our model.

Cultural integration did not result in secularization but in a different form of religiosity. By the middle of the nineteenth century, it was possible for Jews to enter secular society whilst retaining their religion. The new form of Judaism was less time-intensive that traditional Judaism had been: '[b]y 1871 the great majority of the German Jews were no longer observant of Jewish ritual law in its totality'. But they continued to practice their religion and were generous with financial donations. The urban Jewish communities

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[29]By 1871 more than 60 percent of all German Jews were in the middle or higher income brackets (Barkai, 1981). In 1871, 43 percent of inhabitants of Hamburg earned less than 840 marks a year. Among Jews the proportion who belonged to this low income category was only 3.4 percent (Richarz, 1975, 70).

[30]Lowenstein observes that '[t]he causes for the abandonment of Orthodox religious practice were manifold, but they were often as much economic and social as ideological.' (Lowenstein, 1981, 256). Mosse notes that '[b]y mid-century, the use of a separate language (Yiddish) had largely disappeared. So had traditional observances impeding Jewish integration: observance of the sabbath and of the ritual laws, which had, to some extent, promoted the maintenance of a distinct Jewish economic network' (Mosse, 1987, 168).

[31]Moderate reformers like Zachariah Frankel (1801–1875) and Nachman Krochmal (1785–1840s) and radicals like Geiger argued that the halakhah was manmade and hence malleable; it could be adapted to meet the needs of modern society. Geiger observed that even 'when the ceremonial laws were much more highly esteemed and considered much more binding, the ancient sages said that in fact a Jew was everyone who rejected idolatry and who did not place another power next to the one God. But Judaism developed greatly later on, and especially so during the last century. In the historical process it has reached a level of knowledge which lays less stress of external acts and more on those fundamental convictions of the unity of God' (Geiger, 1858, 1963, 240).

'now boasted lavish new synagogues and attractive liturgical music' (Meyer, 1997, 352). Between 1850 and 1900, 91 major new synagogues were build in Germany—more than had been constructed in the previous two hundred years combined (Kober, 1947). Reform Judaism permitted urban and secularly educated Jews to maintain their religious and cultural identity while also allowing them to profitably participate in social and economic spheres previously reserved for Christians.

The Orthodox Reaction

Across central Europe, traditionalist groups opposed the Reformers, forming their own communities where possible. They were called Orthodox or *Altgläubigen* (Old Believers) by their enemies.[32] In Germany there were conservatives who attempted to oppose Reform, first in Frankfurt and then in Hamburg. However they were not successful. Reform triumphed and the majority of German Jews belonged to Reform Judaism by 1900 (see Lowenstein, 1981, 1997).[33]

Proposition 2 predicts that if emancipation occurs in a region with an intermediate level of economic development, λ, then a schism can occur in which high-attachment types break away to form their own strict community. The historical evidence is consistent with this prediction. One region we can examine in order to illustrate this point is the Habsburg empire, and in particular Hungary — a region with an intermediate level of economic development and also the 'cradle of Ultra-Orthodoxy, the most un-enlightened, ardently anti-assimilationist Jews in Europe' (Lupovitch, 2006, 4).

Development and Schism in Hungary

Hungarian Jewry was influenced by the German Haskalah movement from the 1780s onwards. This was initially a purely intellectual movement which did not affect religious

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[32]The term Orthodox or ultra-Orthodox refers to not belief but to practice. Ultra-Orthodoxy involved 'the invention of a new, more potent tradition . . . In order to preserve tradition uncompromised, these most conservative of men, paradoxically, employed methods in arriving at halakhic decisions which departed from what had been the accepted norm, not only in traditional Judaism, but also in the more recent past, in post traditional mainstream Orthodoxy' (Silber, 1992, 26).

[33]In Germany the overall movement was in the direction of liberalization. Nevertheless a split occurred between followers of Reform and traditionalists who came to form a branch of Judaism known as Modern or Neo-Orthodoxy. The formation of modern Orthodoxy can be dated to a meeting in Frankfurt-am-Main in 1850, called by rabbi Samson Ralphael Hirsch, which established a separate Orthodox congregation in 1851.

practice. In fact, the Hungarian rabbinate was initially favourable towards the Jewish Enlightenment movement: '[t]he boundaries between rabbinic and Haskalah culture were not sharply defined in Hungary and the Bohemian provinces. Significantly in these lands the Haskalah was welcomed without abandoning appreciation for traditional rabbinic culture' (Silber, 1987, 113).[34] The Haskalah movement was not initially perceived as a threat to the traditional order until emancipation and some of level of economic development occurred.

The German Reform movement influenced Jews in Hungary via Vienna in the form of a mild variant of Reform, a shadow—in Simon Dubnow's words—of the German model (Dubnov, 1973, 126).[35] In Hungary, the Reform movement became known as Neologism, and was led by Loeb Schwab, Leopold Lőw and Meir Zipser, rabbis from Pest, Szeged, and Rohonc. Like Reform in Germany, the Neolog movement was in part a response to economic change as 'the modernization of Hungary, from the reform period onward ...raised religious-halakhic problems which had no precedent under the former conditions' (Katz, 1998, 43). The Neologs did not advocate a radical reformation of Judaism along the lines suggested by many in Germany. The changes advocated by the Neologs were largely confined to changes in the practice of prayer, educational reforms and the introduction of a vernacular liturgy.

Jewish emancipation was completed in Hungary in 1868.[36] The Habsburg empire conforms to our definition of an economy with an intermediate level of λ.[37] Growth in the Habsburg

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[34]Thus Silber observes that '[o]ne would be hard pressed to come up with a Bohemian, Moravian, or Western Hungarian rabbi at the turn of the century who did not display an intellectual curiosity concerning "external studies," be it medieval Jewish philosophy, grammar, [or] the sciences' (Silber, 1987, 113).

[35]This Viennese model of Reform, pioneered by Isaac Noah Mannheimer (1793–1865), was adopted in Pest in 1827, in Prossnitz in 1832, in Prague in 1832, and in Lemberg in 1846. Mannheimer was trained in Reform Temples in Copenhagen, Berlin, and Hamburg. In Vienna, however, 'he was careful to tone down the radical aspects of German Reform (such as use of an organ, of priestly clothing, or the imitation of church songs), and to avoid any changes that contradicted Schulhan Arukh' (Wistrich, 1990, 24).

[36]Though the Habsburg empire had been the first central European state to begin the process of emancipation, after the death of Joseph II the process stalled, and political momentum towards civil rights for Jews only got started again in the 1840s, when it became linked to a more general push for liberal and nationalist reforms in the empire. In Hungary, those advancing the cause of Jewish emancipation were therefore allies of liberal Magyar (Hungarian) reformers, who were pushing for national independence and opponents of the policies of the Habsburg monarchy.

Jews were given the prospect of emancipation when civic rights were granted by a Hungarian Diet in 1849, only for this to be snatched away from them with the victory of the Habsburg monarchy over the revolutionaries of 1848. A decade of repression followed during the period of Habsburg no-absolutism and conditions only began to become liberalized in 1859. Full emancipation was achieved in 1867, driven through by Baron József Eőtvős.

[37]The Habsburg empire saw increases in both population and per capita income in this period but

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empire was highly uneven. Heavy industry and textiles manufacturing were concentrated in Austria and in Bohemia and the latter region benefited especially from the growth of metallurgy and the chemical industry from 1850 onwards (Good, 1984, 132). Living standards varied considerably within the empire.[38] In Hungary emancipation had occurred in an economy that was still poor but where some economic development was underway. In 1870, it was amongst the poorest regions of Europe; per capita income was around $1000 compared to around $1,830 in Germany in 1870 (1990 Geary-Khamis dollars).[39] Urbanization levels were low. The combined populations of Pest, Buda and Óbuda was only around 100,000 in 1830. However, unlike the rest of Eastern Europe and the Balkans, the Hungarian eocnomy did experienced growth after 1870. Per capita income reached $1,313 in 1890 and $1,722 in 1913 (Schulze, 2000, 324).[40]

In terms of the model, the Hungarian Reform (Neolog) movement was an attempt to reduce τ in the face of gradually improving outside economic options. Their efforts correspond to the initial downwards-sloping segment of the τ^* function in Figure 7.[41] However, as emancipation and development progressed, the movement towards Reform

did not experience a prolonged period of catch-up growth or rapid industrialization after 1850 along German lines (Good, 1974). Per capita growth rates of around 1.15 percent per annum between 1870 and 1914 raised living standards in absolute terms but did not generate convergence with the most advanced economies in western Europe (Good, 1984). The per capita GDP of the economic leader Great Britain remained 2.5 times that of the Habsburg empire's in 1913, the same ratio that had obtained in 1870 (Schulze, 2000; Maddison, 2003). The richest part of the empire, the lands corresponding to Modern Austria had a similar per capita GDP to Denmark in 1870 but by 1913 Danish per capita GDP was thirty percent greater (see Schulze, 2000, 324).

[38]As late as 1890 nominal wages in Lemberg (modern Lwów) were half those of Lower Austria (Good, 1984, 122). Men born in the poorest parts of the empire—Hungary, Galicia, Transylvania—in 1860s were, on average. only 161-162.5 cm tall. That was 3.3 cm shorter than men born in Austria proper, 7 cm shorter than those born in Dalmatia, and amongst the shortest men in Europe at the time (Komlos, 2007, 215).

[39]Estimates for Hungarian GDP in 1870 vary slightly. Maddison reports an estimate of $1,092 (1990 Geary-Khamis dollars) (Maddison, 2003). But the lower estimate of $ 978 (1990 Geary-Khamis dollars) due to Schulze is probably more reliable (Schulze, 2000).

[40]Schulze estimates that Hungary after 1870 experienced an annualized rate of growth of 1.32 percent, faster than that recorded in western Austria or in Russia, or Southern Europe, but considerably less than the growth rate experienced by Germany, Finland, Denmark or Switzerland (Schulze, 2000, 324).

[41]Furthermore, in addition to the features stressed in our model, the Neolog movement was a response to the political situation in Hungary. The alliance between Magyar nationalists and Jews was fragile, and after 1848 it began to fragment. Nationalists demanded that the Jews reform themselves in order to qualify for civic rights. This was an additional but external and artificial stimulus to reform: 'a politically savvy nobility held out the promise of a tantalizingly near emancipation, but expressly made it conditional on religious reforms' (Silber, 1987, 135–136). The nationalist leader Louis Kossuth made the following statement in 1844: 'in what fashion could Jews prepare their full emancipation most effectively, I would reply, "with timely reforms"' (Silber, 1987, quoted in 137). These religious reforms were combined with a policy of 'Magyarization'—which was interpreted by traditionalists as the demand that they 'completely renounced their national identity, and to merge with the Magyars' (Dubnov, 1973, 303).

eventually provoked a backlash from conservative rabbis.

Traditionalists like Moshe Sofer (1762–1839), known as the Hatam Sofer, the most influential figure in Eastern European Orthodoxy, fled from Germany to Hungary where his ideas gained greater traction. Sofer insisted that the *halakha* had to be obeyed absolutely and that there was no middle way between their strict observance and abandoning them. All aspects of the religious laws were equal and this meant that no law could be changed by the reformers: 'the attempt to subject the fundamentals of Judaism to reconsideration was itself damnable' (Vital, 1999, 116). Moreover 'to the deterioration of tradition in Germany, his native country, and to the first signs of dissolution in Hungary, including his own community of Pressburg, his reaction was not one of accommodation and change but rather of preservation by a conscious enhancement of the tradition' (Katz, 1986, 29). Sofer's disciples 'carried the idea of cultural asceticism and organizational separation to extremes scarcely contemplated by the master' (Katz, 1986, 30). In particular, Sofer influenced a group of still more radical rabbis who would break away to form ultra-Orthodoxy causing a schism as predicted by Proposition 2. The leaders of Hungarian ultra-Orthodoxy were Maharam Schick (1807–1879), Hillel Lichtenstein (1814–1891) and Akiva Yosef Schlesinger (1837–1922).

Hungarian ultra-Orthodoxy began in a meeting held in 1866 that condemned innovations and prohibited entering a synagogue in which there were sermons in the vernacular, choirs, where men and women were not separated, where the prayer platform was not in the centre or where weddings had been held. The ultra-Orthodox formally broke with the Neologs and Orthodox Jews in 1869 to form their own separate religious community. Schick, and the other leaders of Hungarian Orthodoxy, created a religiously pure community isolated from those they viewed as heretics or 'evil people' (Ellenson, 1994, 52). Orthodox communities were 'committed to the pre-emancipatory image of Judaism' (Katz, 1990, 23). The Orthodox and ultra-Orthodox came to view Reform Jews almost as members of a different religion (Katz, 1998, 231).

Schism thus occurred in a region which had experienced emancipation but only an intermediate level of economic development. The Hungarian economy grew but the growth experienced did not resemble Germany's. The Hungarian economy remained rural: 74 percent of the population were still in agriculture according to the 1880 census. Land tenure was highly unequal; the largest 1 percent of farms accounted for 45 percent of the land (Good, 1984, 139). Urban growth lagged behind western Europe: only 2 percent of the population lived in Budapest in 1870 (Beluszky and Gyõri, 2005, 35). Much of the growth

recorded after 1850 was based on rising levels of agricultural output and on agricultural biproducts. The largest industry in Hungary was flour milling (0.73 of industrial value added in 1864-1866 according to Good (1984, 132)). The customs union with Austria in 1851 permitted Hungary to specialize in agriculture and in industries related to agriculture, while heavy industry was located in Bohemia, and textile manufacturing was predominantly based in Austria. Hungary also lagged in terms of investment in human capital. Literacy rates remained low. In 1880, only 41.8 percent of the population over the age of 6 could read (Beluszky and Gyõri, 2005, 37). Hence the kinds of opportunities that were available for German Jews—in finance and manufacturing—were not open to Hungarian Jews, at least, not on the same scale.[42]

Persistence of Traditional Judaism in Russia and Hasidism

Proposition 1 is consistent with the observation that in Russia traditional conservative forms of Judaism maintained themselves relatively easily without the exit of low-attachment types from the community. The reasons for the success of traditional Judaism and the failure of Reform can be examined by considering the social and economic conditions facing Jews in the Russian empire.

As late as the late 1850s, the 'mass of Russian Jewry was still remarkably untouched by the Haskalah—to say nothing of the German Reform Movement— or by the myriad phenomenon associated with modernization' (Klier, 1995, 82).[43] Reform failed because

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[42]Regional variation within Hungary provides further evidence in favour of our results. The Neolog movement had support in western Hungary where the 'majority were materially well situated, having rapidly established themselves in the commercial, financial and to some small degree—industrial life of the Hungarian state, particularly in its centers in Budapest and Pressburg' (Adler, 1974, 120). This is consistent with our model: '[t]he difficulties confronting the urban merchant who wished to observe the religious laws were many times greater than those facing the villager' (Katz, 1998, 43). Ultra-Orthodoxy was successful in north-eastern Hungary, in Unterland, which was the most backwards and rural part of the country. Overall literacy rates in 1880 in Unterland were around half that of the rest of country (Silber, 1992, 42). These were areas in which economic opportunities remained limited and the financial gains to the religious authority associated with reducing strictness were meagre. According to Silber: '[d]welling in the backwater of Unterland enabled one to take a tougher stance, one of resolute rejection rather than weak-kneed compromise' whereas 'a spirit of despondency and cultural despair prevailed among many of the Orthodox in the northwest' (Silber, 1992, 42).

[43]German-style Reformed services were introduced in Odessa, Warsaw, Riga and Vilna (Meyer, 1988, 197). As Dubnow puts it the 'breezes of Western culture had hardly a chance to penetrate to this realm, protected as it was by the double wall of Rabbinism and Hasidism. And yet here and there one may discern on the surface of social life the foam of the wave from the far-off West. From Germany the free-minded "Berliner," the nickname applied to these "new men," was moving towards the borders of Russia' (Dubnow, 1975, 384).

emancipation had not taken place, discrimination remained high, and economic opportunities remained limited. Even for those who were aware of Reform, the premises underlying the movement appeared inappropriate in a Russian context. It was tainted from the start because it was seen as partnering the repressive Tzarist bureaucracy. Even after the regime liberalized following the death of Tsar Nicholas I in 1855, most Jews had scant incentive to embrace change their behaviour or beliefs because the economic conditions remained stagnant until the end of the nineteenth century (Gregory, 1994).

Another piece of evidence consistent with our model is the path taken by Hasidism in the nineteenth century. Hasidism is now part of the broader Haredi movement but the origins of Hasidism differ from those of other forms of ultra-Orthodox Judaism. Hasidism was a popular movement of religious enthusiasm that emerged in the Russian Empire and in Galicia. Hasidism built on earlier Kabbalistic traditions and emerged in the context of a traditional Judaism that had been weakened by a succession of crises following Khmelnytsky uprisings (1648-1656) and failure of the 'false messiah' Shabbetai Tsevi (1626-1676). It was based on the authority of charismatic leaders known as *rebbes* or *tsaddik*. Though it criticized the religious establishment: 'its innovations never actually threatened the normative foundations of Torah and commandments' (Hundert, 2004, 186).

Once the Reform movement began to make its presence felt in the Habsburg empire it became clear that traditional rabbinism and Hasidism had to make peace in order to oppose a common enemy. As Dubnow put it 'rabbinism and Hassidism concurred only in one aspect: in their hatred for the new enlightenment, the *Hasklah*, that was beginning to infiltrate from Germany, from the circle of Moses Mendelssohn and of the "Berliners."' (Dubnov, 1971, 407). By the middle of nineteenth century traditional, rabbinical Judaism had joined forces with Hasidism:

> 'Hasidism eventually became a conservative force . . . because of its defense of religion and tradition against the attacks of Haskalah. Non-Hasidic orthodoxy discerned in the Haskalah a much greater danger to the Jewish religion and to its own hegemony in Jewish life than in Hasidism, and, therefore, its struggles against Hasidism gradually gave way to the struggle against the modernization of Jewish life' (Mahler, 1985, 24).

The differences between Hasidism and rabbinical Judaism were minor relative to the gulf that had arisen between them both and Reform. This is consistent with our model. The economic environments in which rabbinical Judaism and Hasidism flourished were very similar. And indeed, both Hasidism and Misnagdim emphasized high levels of strictness

τ, both represented forms of cultural resistance.

5   A Dynamic Model

The religious identities formed by the schism of the mid-nineteenth century have persisted to this day. Based on a 2000/2001 national survey 13 percent of the current total American Jewish population of 5.25 million describe themselves as Orthodox, 34 percent belong to Reform, while of the reminder 26 percent belong to the Conservative variant of Reform that emerged in the 1850s (Ament, 2005, 4–5).[44] Religious identities are transmitted across generations since 81 percent of Orthodox Jews were brought up Orthodox and 96 percent of Orthodox Jews marry other Orthodox Jews (Ament, 2005, 12–19). The schism between Reform and Orthodox Judaism in the nineteenth century had a lasting affect on economic outcomes.

This leads us naturally to consider how religious values can be transmitted from one generation to the next and how this intergenerational transmission effects the response to emancipation. To model the intergenerational transmission of values, we extend our model to the infinite horizon case with overlapping generations of agents and an infinitely lived religious authority. To convey our main points as straightforwardly as possible, we focus here on the version of our model without exit.

At the beginning of every period each agent gives birth to one other agent before choosing their level of effort and money contributions e and g. At the end of the period the parent transmits values to its child and dies. The probability that the child of parent i ends up with high attachment to their community is $f(e_i)$ which is strictly increasing in the effort parent i contributes to the religious community e_i. Effort represents time devoted to the religious community and it is this time that plays a crucial role in socializing children.[45] An additional interpretation of e is that it includes investment in religious education. Both interpretations are consistent with Iannaconne's notion that religious participation

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[44]This data is from the 2000/2001 National Jewish Population Survey (*National Jewish Population Survey 2000-01. Strength, Challenge and Diversity in the American Jewish Population*, 2003). The corresponding numbers are as follows: 567,000 Jews belong to Orthodoxy; 1,714,000 belong to Reform, 1,297,000 belong to Conservative Judaism. Unfortunately this survey does not distinguish between different forms of Orthodox Judaism.

[45]The religious affiliations of parents have a large effect on the religiosity of their children. Himmelfarb notes that '[o]ne of the most consistent findings in the Jewish identification literature is the positive relationship between an individual's Jewish identification and that of his parents (Himmelfarb, 1980, 55). See Lazerwitz (1973) and Cohen (1974).

builds up religious capital (Iannaccone, 1990).

To focus on the religious authority's dynamic considerations when setting τ, we assume that parents do not consider the effect that their actions have on their childs' values. Each individual's payoffs are as in the one-shot game and the distribution of religious values evolves as a by-product of religious participation. The religious authority, however, cares about the distribution of values in the population. Facing a sequence of short-lived agents, the long-lived religious authority takes into account not only the current level of religious participation, but also its effect on future levels of attachment to the religious community. Specifically, religious authority chooses a sequence $\{\tau_t\}_{t=0}^{\infty}$ to maximize:

$$\sum_{t=0}^{\infty} \sum_{i=1}^{n} \delta^t \left[e_i^*(\tau_t) + g_i^*(\tau_t) \right], \tag{5}$$

where e_i^* and g_i^* are best responses to τ_t.

To illustrate the dynamic considerations faced by the religious authority, consider its choice of τ_t when the state is $p_t = f(0)$. Without intergenerational transmission of values, the distribution of values is constant, so the religious authority simply chooses τ_t to maximize $e_i^*(\tau_t) + g_i^*(\tau_t)$. By proposition 1(ii), $\tau^* = 0$ in every period for λ large enough. Under intergenerational transmission of values, however, p_t evolves with the religious authority's choice of τ. If the religious authority chooses $\tau_t = 0$, then $e_i^* = 0$ for all agents and $p_{t+1} = f(0)$, i.e. the same as p_t. If the religious authority chooses $\tau_t = 1$, then $e_i^* = 1$ for all agents and $p_{t+1} = f(1)$, which is greater than p_t. Hence, the religious authority must choose between liberalizing today in state $p_t = f(0)$ or waiting to liberalize in the next period after building up the proportion of high types in the community to $f(1) > f(0)$. In this way, the religious authority can enjoy greater financial contributions in the next period. This dynamic consideration may mean that choosing $\tau^* = 0$ in every period is not optimal, for any λ.

Let $d(\beta_\theta) \equiv \beta_\theta^{1/1-\sigma}/(1 + \beta_\theta^{1/1-\sigma})$. We will show that $\tau^* = 0$ in every period for some λ if and only if:

$$f(0)d(\beta_H) + \left(1 - f(0)\right)d(\beta_L) \geq \delta\left(f(1) - f(0)\right)\left[d(\beta_H) - d(\beta_L)\right]. \tag{6}$$

This condition holds when the future is heavily discounted (δ is low), the distribution of values is not sensitive to choice ($f(1)$ is close to $f(0)$), and low and high types do not differ markedly in their degree of attachment to the community (β_L is close to β_H). It is under these conditions that the religious authority is unwilling to sacrifice a higher

current payoff from liberalizing today, for the greater financial contributions that accrue from liberalizing in the future after building up the proportion of high-attachment types in the community.

The general implications of intergenerational value transmission are stated in the following proposition:

Proposition 3 *For any initial state p_0, the infinitely repeated game without exit has a unique SPE as follows:*

(i) *There exists a threshold λ_1 such that if $\lambda \leq \lambda_1$, then equilibrium actions each period $t > 1$ are as in Proposition 1(i), i.e.*

$$\tau^* = 1, \quad e_i^* = 1 \quad and \quad g_i^* = 0 \quad for \ all \ i \in N.$$

(ii) *If (6) holds, then there exists a threshold λ_2 such that if $\lambda \geq \lambda_2$, then equilibrium actions in every period $t > 1$ are as in proposition 1(ii), i.e.*

$$\tau^* = 0, \quad e_i^* = 0 \quad and \quad g_i^* = \frac{\beta_i^{1/1-\sigma}}{1 + \beta_i^{1/1-\sigma}} \lambda,$$

for each $i \in N$.

(iii) *If (6) holds and $\lambda_1 < \lambda < \lambda_2$, or (6) does not hold and $\lambda > \lambda_1$, then equilibrium actions alternate in each period $t > 1$ between those specified in part (i) and those specified in part (ii).*

If development is sufficiently low the religious authority chooses a strategy of cultural resistance in every period. If condition (6) holds and economic development is sufficiently high then the religious authority adopts a strategy of cultural integration in every period.

If these conditions do not hold or if development is in the intermediate range, religious communities cycle between high and low levels of strictness and between emphasizing effort over money intensive contributions. The reasoning here is that when the proportion of high-attachment types is sufficiently large, the religious authority has an incentive to relax strictness as a preponderance of the income earned outside of the community, as a consequence, is donated back to the community. However, as agents exert less effort in the community, the proportion of high-attachment types declines. If it declines far enough then the additional financial contributions from relaxing strictness will not be

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enough to compensate the religious authority for the lost effort. Hence it may be optimal for the religious authority to reintroduce strict prohibitions. These cycles reflect periods of religious flux and the model predicts that cycles will appear in regions characterized by intermediate levels of economic development.

The transmission of cultural and religious values from parents to children was an important consideration for Orthodox rabbis in resisting Reform. In our model, we can show that such dynamic considerations make it less likely that the religious authority will respond to emancipation with cultural integration.

Proposition 4 *Consider the game without exit. Fix a state p_t. Let Λ^* (resp. Λ^{**}) be the set of values of λ for which $\tau^* = 1$ in period t in the unique SPE without (resp. with) intergenerational transmission of values. Then:*

(i) For all p_t, $\Lambda^* \subseteq \Lambda^{**}$,

(ii) For $p_t < f(1)$, $\Lambda^* \subset \Lambda^{**}$.

Therefore, concerns about the intergenerational transmission of values sustain cultural resistance for a larger set of λ. In particular, we can prove that when the proportion of high-attachment types is not too high ($p < f(1)$), there are values of λ for which cultural integration takes place in the model without intergenerational transmission of values, but for which cultural resistance is adopted in the model with intergenerational transmission of values. This proposition captures the fears felt by Orthodox rabbis who believed that Reform would lead to a decline in religious attachment. These insights can be applied to gain further understanding of the actions of the ultra-Orthodox in Hungary.

Intergenerational Transmission and Polarization in Hungary

Tensions between Reform, Orthodox and ultra-Orthodox in Hungary were exacerbated by concerns over the intergenerational transmission of religious values. Schick referred to the Reformers as "the enemies of God" and accused them of uprooting the Torah and the religious law (Ellenson, 1994, 45). He argued that Reform Jews had effectively ceased to be Jews and that contact between them and Orthodox Jews had to be prevented. In particular he emphasized that their 'their sons and daughters are forbidden to us' because 'they are akin to complete gentiles' and they 'will certainly lead away your son' (quoted in Ellenson, 1994, 45–46). Schlesinger was similarly concerned with what would happen

to the *children* of those Jews who embraced Reform. He saw Reformers as 'an evil family' who lead the children of sainted ancestors away from the heritage of their fathers toward sectarianism and heresy,' lamenting the fact that children no longer knew how to say *kaddish* over the dead and have to read the blessings of the Torah in 'foreign characters' (Schlesinger, 1864, 1995, 204).

In their response to the threat of emancipation and Reform, the ultra-Orthodox elevated the importance of prohibitions within Judaism.[46] Schlesinger argued that a Jew who did not wear distinctive clothes or did not speak a different language [to the non-Jewish population] ceased to be Jew (Satlow, 2006, 270). Lichtenstein went further than Schick in issuing categorical prohibitions on preaching in German and in condemning all 'alien wisdom'. Non-normative traditions, in dress and language were held to be normative and binding. Thus the act of emancipation had produced the most anti-assimilationist Jewish community in Europe.

6   Concluding Comments

In this paper we have developed a model of religious polarization which provides an explanation of the emergence of Reform and Ultra-Orthodox Judaism in response to emancipation in nineteenth century Europe. This analytic narrative illustrates how economic development can generate cultural change and illuminates the mechanisms driving religious polarization.

In our framework the level of economic development determines whether or not closed religious communities react to liberalization by adopting a strategy of cultural integration or cultural resistance. This insight emerges out of the self-interested behaviour of local community leaders who must choose between a poor and devout community or relatively rich and less devout one. In addition, when agents have the option of exiting the community, the model generates a non-monotonic relationship between development and cultural resistance. We show how schisms can emerge in religious communities at intermediate levels of development. Finally, dynamic considerations, associated with the intergenerational transmission of values, lead to religious cycles and support cultural resistance for a larger set of parameters.

A number of further extensions are possible. For simplicity we have studied the beha-

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[46]Schick stated that as a matter of principle "[i]t is good to elevate a prohibition" (quoted in Silber, 1992, 48).

viour of a single religious community. Future work might model religious competition. This could generate variants of Judaism with intermediate levels of strictness such as Modern Orthodoxy and Conservative Judaism which also emerged in Germany in the mid-nineteenth century. Extending the model to allow for endogenous fertility is another natural extension of the model. Ultra-Orthodox Jewish communities in both Israel and the United States have very high levels of fertility (see Berman, 2000). Higher levels of fertility amongst high-attachment types could potentially increase the likelihood of a religious schism as the loss in religious activity brought about by the exit of low-attachment types may be more than compensated for by a greater number of high-attachment types in future periods. We have focused in this paper on the accumulation of religious capital in shaping the character of religious communities. Future work could develop this framework to allow for human capital accumulation.

Mathematical Appendix

Proof of Proposition 1

We solve for an SPE via backward induction. Let us begin by fixing $\tau \in [0,1]$ and analyzing optimal effort and money contributions for each player at date 2.

A type-θ agent solves the following problem:

$$\max_{(e,g)} \left(\left((1-\tau)\lambda(1-e) - g \right)^\sigma + \beta_\theta(e+g)^\sigma \right)^{\frac{1}{\sigma}} + \frac{1}{n}G\left(\sum_{i \in N}(e_i + g_i) \right) \tag{7}$$

$$s.t. \quad e \quad \geq \quad 0 \tag{8}$$

$$e \quad \leq \quad 1 \tag{9}$$

$$g \quad \geq \quad 0 \tag{10}$$

$$g \quad \leq \quad (1-\tau)\lambda(1-e). \tag{11}$$

Define $H \equiv \left((1-\tau)\lambda(1-e) - g \right)^\sigma + \beta_\theta(e+g)^\sigma$. The partial derivatives of the objective function with respect to e and g can then be written as

$$H^{\frac{1}{\sigma}-1}\left[-(1-\tau)\lambda\left((1-\tau)\lambda(1-e) - g \right)^{\sigma-1} + \beta_\theta(e+g)^{\sigma-1} \right], \tag{12}$$

and

$$H^{\frac{1}{\sigma}-1}\left[-\left((1-\tau)\lambda(1-e) - g \right)^{\sigma-1} + \beta_\theta(e+g)^{\sigma-1} \right], \tag{13}$$

respectively.

We proceed by partitioning the parameter space as follows.

Case 1: $(1-\tau)\lambda < 1$. Suppose $g^* > 0$. Then $e^* < 1$ by (11). Consider an alternative pair $(e', g') = (e^* + a, g^* - a)$ for some small $a > 0$. For (e^*, g^*) to indeed be a best response:

$$\left[[(1-\tau)\lambda(1-e^*) - g^*]^\sigma + \beta_\theta(e^* + g^*)^\sigma \right]^{\frac{1}{\sigma}} \geq \left[[(1-\tau)\lambda(1-e') - g']^\sigma + \beta_\theta(e' + g')^\sigma \right]^{\frac{1}{\sigma}},$$

where the right-hand-side is equal to

$$\left([(1-\tau)\lambda(1-e^*) - g^* + a[1 - (1-\tau)\lambda]]^\sigma + \beta_\theta(e^* + g^*)^\sigma \right)^{\frac{1}{\sigma}},$$

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which is a contradiction, because $(1 - \tau)\lambda < 1$ by hypothesis. Therefore $g^* = 0$.

Substituting $g^* = 0$ into (12), we find that the partial derivative of the objective function with respect to e is ∞ at $e = 0$ and $-\infty$ at $e = 1$. Together with the continuity of (12), this implies that the objective function is maximized at an interior e, which sets (12) equal to zero. That is:

$$
\begin{aligned}
\beta_\theta e^{*\sigma-1} &= (1-\tau)\lambda((1-\tau)\lambda(1-e^*))^{\sigma-1}, \\
\implies (1-\tau)\lambda(1-e^*) &= \left[\frac{(1-\tau)\lambda}{\beta_\theta}\right]^{\frac{1}{1-\sigma}} e^*, \\
\implies (1-\tau)\lambda &= e^*\left((1-\tau)\lambda + \left[\frac{(1-\tau)\lambda}{\beta_\theta}\right]^{\frac{1}{1-\sigma}}\right), \\
\implies e^* &= \frac{(1-\tau)\lambda}{(1-\tau)\lambda + (\frac{(1-\tau)\lambda}{\beta_\theta})^{1/1-\sigma}}, \\
\implies e^* &= \frac{\beta_\theta^{\frac{1}{1-\sigma}}}{\beta_\theta^{\frac{1}{1-\sigma}} + \left[((1-\tau)\lambda)^{\frac{\sigma}{1-\sigma}}\right]} \in (0,1). \quad (14)
\end{aligned}
$$

Case 2: $(1-\tau)\lambda = 1$. By inspection, (12) and (13) coincide and are equal to:

$$
H^{\frac{1}{\sigma}-1}\left[-\left(1-(e+g)\right)^{\sigma-1} + \beta_\theta(e+g)^{\sigma-1}\right]. \quad (15)
$$

Therefore, an agent chooses $e + g$ to maximize their objective function. The minimum feasible $e + g$ is zero and the maximum is one (i.e. when the agent donates their entire income $1 - e$ so that $e + g = e + (1 - e) = 1$). The partial derivative of the objective function with respect to $e + g$, (15), is ∞ at $e + g = 0$ and $-\infty$ at $e + g = 1$. Together with the continuity of (15), this implies that the objective function is maximized at an interior $e + g$, which sets (15) equal to zero. That is:

$$
\beta_\theta(e+g)^{\sigma-1} = \left(1-(e+g)\right)^{\sigma-1}, \quad (16)
$$

which implies that:

$$
e^* + g^* = \frac{\beta_\theta^{1/1-\sigma}}{1 + \beta_\theta^{\frac{1}{1-\sigma}}}. \quad (17)
$$

Case 3: $(1-\tau)\lambda > 1$. Suppose $e^* > 0$. Consider an alternative pair $(e'', g'') = (e^* - a, g^* + a)$ for some small $a > 0$ (this is feasible because the agent earns an additional $a(1-\tau)\lambda$ units

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and donates an additional $a < a(1 - \tau)\lambda$ units). For (e^*, g^*) to indeed be a best response:

$$\left[[(1 - \tau)\lambda(1 - e^*) - g^*]^\sigma + \beta_\theta(e^* + g^*)^\sigma \right]^{\frac{1}{\sigma}} \geq \left[[(1 - \tau)\lambda(1 - e'') - g'']^\sigma + \beta_\theta(e'' + g'')^\sigma \right]^{\frac{1}{\sigma}},$$

where the right-hand-side is equal to

$$\left([(1 - \tau)\lambda(1 - e^*) - g^* + a[(1 - \tau)\lambda - 1]]^\sigma + \beta_\theta(e^* + g^*)^\sigma \right)^{\frac{1}{\sigma}},$$

which is a contradiction, because $(1 - \tau)\lambda > 1$ by hypothesis. Therefore $e^* = 0$.

Substituting $e^* = 0$ into (13), we find that the partial derivative of the objective function with respect to g is ∞ at $g = 0$ and $-\infty$ at $g = 1$. Together with the continuity of (12), this implies that the objective function is maximized at an interior g, which sets (13) equal to zero. That is:

$$[(1 - \tau)\lambda - g]^{\sigma-1} = \beta_\theta(g)^{\sigma-1}$$

$$\implies g^* = \frac{\beta_\theta^{1/1-\sigma}}{1 + \beta_\theta^{1/1-\sigma}}(1 - \tau)\lambda. \tag{18}$$

Now let us turn to the religious authority's choice of τ at date 1. Recall that the religious authority solves:

$$\max_{\tau \in [0,1]} \sum_{i \in N} \left[e_i^*(\tau) + g_i^*(\tau) \right]$$

Consider the case where $\lambda < 1$. Then $(1 - \tau)\lambda < 1$ for all $\tau \in [0, 1]$. In this case, we have established that $g^* = 0$ and $e^* = \beta_\theta^{\frac{1}{1-\sigma}} / \left(\beta_\theta^{\frac{1}{1-\sigma}} + \left[((1 - \tau)\lambda)^{\frac{\sigma}{1-\sigma}} \right] \right)$. Hence, the religious authority sets $\tau = 1$ for $\lambda < 1$.

Now consider the case where $\lambda \geq 1$. We have established that the most the religious authority can get by setting τ such that $(1 - \tau)\lambda < 1$ is n (i.e. by setting $\tau = 1$, so that $e_i = 1$ and $g_i = 0$ for all $i \in N$). By setting τ such that $(1 - \tau)\lambda = 1$, the religious authority gets (from case 2 above)

$$\sum_{i \in N} \left[e_i^*(\tau) + g_i^*(\tau) \right] = \sum_{i \in N} \frac{\beta_i^{1/1-\sigma}}{1 + \beta_i^{1/1-\sigma}},$$

which is less than $\sum_{i \in N} 1 = n$. By setting τ such that $(1 - \tau)\lambda > 1$, we know $(e_i^*, g_i^*) = (0, \frac{\beta_i^{1/1-\sigma}}{1 + \beta_i^{1/1-\sigma}}(1 - \tau)\lambda)$ for each $i \in N$. Therefore $\sum_{i \in N}(e_i^*(\tau) + g_i^*(\tau))$ is maximized, for τ

in this range, by setting $\tau = 0$. In this case the religious authority receives:

$$\sum_{i \in N} \frac{\beta_i^{1/1-\sigma}}{1 + \beta_i^{1/1-\sigma}} \lambda.$$

For this to be a better response than $\tau = 1$, we require:

$$n < \left(\sum_{i \in N} \frac{\beta_i^{1/1-\sigma}}{1 + \beta_i^{1/1-\sigma}} \lambda \right)$$

$$\Longleftrightarrow n < \lambda \sum_{i \in N} \frac{\beta_i^{1/1-\sigma}}{1 + \beta_i^{1/1-\sigma}}$$

$$\Longleftrightarrow n < \lambda n \left(p \frac{\beta_H^{1/1-\sigma}}{1 + \beta_H^{1/1-\sigma}} + (1-p) \frac{\beta_L^{1/1-\sigma}}{1 + \beta_L^{1/1-\sigma}} \right)$$

$$\Longleftrightarrow \lambda > \frac{1}{p \frac{\beta_H^{1/1-\sigma}}{1 + \beta_H^{1/1-\sigma}} + (1-p) \frac{\beta_L^{1/1-\sigma}}{1 + \beta_L^{1/1-\sigma}}} \equiv \bar{\lambda}.$$

Therefore the religious authority's best response is $\tau = 0$ for all $\lambda > \bar{\lambda}$ and $\tau = 1$ for all $\lambda \in (1, \bar{\lambda}]$. Consequently, $e^*(\tau^*) = 1$ for all $\lambda \in (1, \bar{\lambda}]$ and $e^*(\tau^*) = 0$ for all $\lambda > \bar{\lambda}$. $\square$

Proof of Lemma 1

Let $\beta_\theta^{1/\sigma} < \lambda < \left(1 + \beta_\theta^{\frac{1}{1-\sigma}} \right)^{\frac{1-\sigma}{\sigma}}$. We are going to show that all type-θ agents exit the community if and only if $\tau > \tau_\theta = 1 - \left(\lambda^{\frac{\sigma}{1-\sigma}} - \beta_\theta^{\frac{1}{1-\sigma}} \right)^{\frac{1-\sigma}{\sigma}} / \lambda$.

Note that $\lambda < \left(1 + \beta_\theta^{\frac{1}{1-\sigma}} \right)^{\frac{1-\sigma}{\sigma}}$ implies $(1 - \tau_\theta)\lambda < 1$. We have established in the proof of proposition 1 that, in this case, type-θ agents choose $e^* > 0$ and $g^* = 0$, yielding a payoff from remaining in the group at strictness level τ_θ of:

$$\left(\left[(1 - \tau_\theta)\lambda(1 - e^*) \right]^\sigma + \beta_\theta(e^*)^\sigma \right)^{1/\sigma},$$

where $e^* = \dfrac{\beta_\theta^{\frac{1}{1-\sigma}}}{\beta_\theta^{\frac{1}{1-\sigma}} + \left[(1-\tau)\lambda \right]^{\frac{\sigma}{1-\sigma}}}$.

The payoff from exiting the community is λ. Therefore, τ_θ solves:

$$\left(\frac{\left[(1-\tau_\theta)\lambda\right]^{\frac{1}{1-\sigma}}}{\beta_\theta^{\frac{1}{1-\sigma}} + \left[(1-\tau)\lambda\right]^{\frac{\sigma}{1-\sigma}}}\right)^\sigma + \beta_\theta\left(\frac{\beta_\theta^{\frac{1}{1-\sigma}}}{\beta_\theta^{\frac{1}{1-\sigma}} + \left[(1-\tau)\lambda\right]^{\frac{\sigma}{1-\sigma}}}\right)^\sigma \;=\; \lambda^\sigma$$

$$\Longleftrightarrow \frac{\beta_\theta^{\frac{1}{1-\sigma}} + \left[(1-\tau_\theta)\lambda\right]^{\frac{\sigma}{1-\sigma}}}{\left(\beta_\theta^{\frac{1}{1-\sigma}} + \left[(1-\tau)\lambda\right]^{\frac{\sigma}{1-\sigma}}\right)^\sigma} \;=\; \lambda^\sigma$$

$$\Longleftrightarrow \left(\beta_\theta^{\frac{1}{1-\sigma}} + \left[(1-\tau_\theta)\lambda\right]^{\frac{\sigma}{1-\sigma}}\right)^{1-\sigma} \;=\; \lambda^\sigma$$

$$\Longleftrightarrow \beta_\theta^{\frac{1}{1-\sigma}} + \left[(1-\tau_\theta)\lambda\right]^{\frac{\sigma}{1-\sigma}} \;=\; \lambda^{\frac{\sigma}{1-\sigma}}$$

$$\Longleftrightarrow (1-\tau_\theta)^{\frac{\sigma}{1-\sigma}} \;=\; \frac{\lambda^{\frac{\sigma}{1-\sigma}} - \beta_\theta^{\frac{1}{1-\sigma}}}{\lambda^{\frac{\sigma}{1-\sigma}}}$$

$$\Longleftrightarrow (1-\tau_\theta) \;=\; \frac{\left(\lambda^{\frac{\sigma}{1-\sigma}} - \beta_\theta^{\frac{1}{1-\sigma}}\right)^{\frac{1-\sigma}{\sigma}}}{\lambda}$$

$$\Longleftrightarrow \tau_\theta \;=\; 1 - \frac{\left(\lambda^{\frac{\sigma}{1-\sigma}} - \beta_\theta^{\frac{1}{1-\sigma}}\right)^{\frac{1-\sigma}{\sigma}}}{\lambda}.$$

First note that $\tau_L \geq 1$ for $\lambda^{\frac{\sigma}{1-\sigma}} \leq \beta_\theta^{\frac{1}{1-\sigma}}$ or $\lambda \leq \beta_\theta^{1/\sigma}$. Hence, in this case, a type-θ agent will not exit for any $\tau \in [0,1]$. This establishes part (i) of the lemma.

Second, by inspection, $\tau_\theta < 1$ for $\lambda > \beta_\theta^{1/\sigma}$ and $\tau_\theta > 0$ for $\beta_\theta > 0$.

Third, partially differentiating τ_θ with respect to β_θ yields:

$$\frac{\partial \tau_\theta}{\partial \beta_\theta} = \frac{\beta_\theta^{\frac{\sigma}{1-\sigma}}\left(\lambda^{\frac{\sigma}{1-\sigma}} - \beta_\theta^{\frac{1}{1-\sigma}}\right)^{\frac{1-2\sigma}{\sigma}}}{\sigma\lambda} \;>\; 0.$$

Hence, $\beta_H > \beta_L$ implies $\tau_H > \tau_L$.

Finally, partially differentiating τ_θ with respect to λ yields:

$$\frac{\partial \tau_\theta}{\partial \lambda} = -\frac{\lambda^{\frac{\sigma}{1-\sigma}}\left(\lambda^{\frac{\sigma}{1-\sigma}} - \beta_\theta^{\frac{1}{1-\sigma}}\right)^{\frac{1-\sigma}{\sigma}-1} - \left(\lambda^{\frac{\sigma}{1-\sigma}} - \beta_\theta^{\frac{1}{1-\sigma}}\right)^{\frac{1-\sigma}{\sigma}}}{\lambda^2},$$

which is negative if and only if:

$$\lambda^{\frac{\sigma}{1-\sigma}}\left(\lambda^{\frac{\sigma}{1-\sigma}} - \beta_\theta^{\frac{1}{1-\sigma}}\right)^{\frac{1-\sigma}{\sigma}-1} > \left(\lambda^{\frac{\sigma}{1-\sigma}} - \beta_\theta^{\frac{1}{1-\sigma}}\right)^{\frac{1-\sigma}{\sigma}}$$

$$\Longleftrightarrow \lambda^{\frac{\sigma}{1-\sigma}} > \lambda^{\frac{\sigma}{1-\sigma}} - \beta_\theta^{\frac{1}{1-\sigma}}.$$

Therefore, τ_θ is strictly decreasing in λ. This completes the proof of the lemma. $\square$

Proof of Proposition 2.

Henceforth set $\beta_L < 1$. Part (i) then follows immediately from Lemma 1 and Proposition 1(i).

To establish part (ii), let $\beta_L^{1/\sigma} < \lambda < \min\{\beta_H^{1/\sigma}, 1\}$. As $\lambda < 1$ by hypothesis, we have established in the proof of proposition 1 (case 1) that every type-θ agent chooses:

$$e_\theta^* = \frac{\beta_\theta^{\frac{1}{1-\sigma}}}{\beta_\theta^{\frac{1}{1-\sigma}} + [(1-\tau)\lambda]^{\frac{\sigma}{1-\sigma}}} \quad \text{and} \quad g_\theta^* = 0.$$

Therefore, without an exit constraint, the religious authority will maximize aggregate contributions by setting τ at its maximum. As $\lambda > \beta_L^{1/\sigma}$ by hypothesis, the religious authority can only set τ as high as $\tau_L < 1$, while retaining both H and L types (by Lemma 1). This yields an aggregate contribution of:

$$np\frac{\beta_H^{\frac{1}{1-\sigma}}}{\beta_H^{\frac{1}{1-\sigma}} + [(1-\tau_L)\lambda]^{\frac{\sigma}{1-\sigma}}} + n(1-p)\frac{\beta_L^{\frac{1}{1-\sigma}}}{\beta_L^{\frac{1}{1-\sigma}} + [(1-\tau_L)\lambda]^{\frac{\sigma}{1-\sigma}}}.$$

Alternatively, as $\lambda < \beta_H^{1/\sigma}$, the religious authority could set $\tau = 1$ and retain only H types, yielding an aggregate contribution of np.

The latter is preferred when:

$$p \geq p\frac{\beta_H^{\frac{1}{1-\sigma}}}{\beta_H^{\frac{1}{1-\sigma}} + [(1-\tau_L)\lambda]^{\frac{\sigma}{1-\sigma}}} + (1-p)\frac{\beta_L^{\frac{1}{1-\sigma}}}{\beta_L^{\frac{1}{1-\sigma}} + [(1-\tau_L)\lambda]^{\frac{\sigma}{1-\sigma}}}$$

$$\Longleftrightarrow p\frac{[(1-\tau_L)\lambda]^{\frac{\sigma}{1-\sigma}}}{\beta_H^{\frac{1}{1-\sigma}} + ((1-\tau_L)\lambda)^{\frac{\sigma}{1-\sigma}}} \geq (1-p)\frac{\beta_L^{\frac{1}{1-\sigma}}}{\beta_L^{\frac{1}{1-\sigma}} + [(1-\tau_L)\lambda]^{\frac{\sigma}{1-\sigma}}}. \quad (19)$$

Note that $\tau_L = 1 - \left(\lambda^{\frac{\sigma}{1-\sigma}} - \beta_L^{\frac{1}{1-\sigma}}\right)^{\frac{1-\sigma}{\sigma}}/\lambda$ by Lemma 1. This implies that $(1-\tau_L)\lambda = \left(\lambda^{\frac{\sigma}{1-\sigma}} - \beta_L^{\frac{1}{1-\sigma}}\right)^{\frac{1-\sigma}{\sigma}}$. Substituting this expression into (19) yields:

$$p\frac{\lambda^{\frac{\sigma}{1-\sigma}} - \beta_L^{\frac{1}{1-\sigma}}}{\beta_H^{\frac{1}{1-\sigma}} + \lambda^{\frac{\sigma}{1-\sigma}} - \beta_L^{\frac{1}{1-\sigma}}} \geq (1-p)\frac{\beta_L^{\frac{1}{1-\sigma}}}{\lambda^{\frac{\sigma}{1-\sigma}}}.$$

We claim that this inequality holds for β_L close enough to zero. First, by inspection, the LHS is strictly decreasing in β_L. It is also positive, because $\lambda > \beta_L^{1/\sigma}$ by hypothesis, which implies $\lambda^{\frac{\sigma}{1-\sigma}} > \beta_L^{\frac{1}{1-\sigma}}$. Second, the RHS is strictly increasing in β_L and goes to zero as $\beta_L \to 0$. This establishes the claim.

Hence at $\lambda = \min\{\beta_H^{1/\sigma}, 1\}$, the LHS of (19) is greater than the RHS, for β_L sufficiently close to zero. At $\lambda = \beta_L^{1/\sigma}$, the LHS of (19) is zero and the RHS is $(1-p) > 0$. Hence, the RHS is greater than the LHS. In addition, the LHS of (19) is strictly increasing in λ and the RHS is strictly decreasing in λ.

Taken together, this suggests that for β_L sufficiently small, there exists a threshold $\underline{\lambda} \in \left(\beta_L^{1/\sigma}, \min\{\beta_H^{1/\sigma}, 1\}\right)$ such that for $\lambda < \underline{\lambda}$, $\tau^* = \tau_L$ and all agents remain members of the group; and for $\lambda \in \left[\underline{\lambda}, \min\{\beta_H^{1/\sigma}, 1\}\right]$, $\tau^* = 1$ and schism occurs.

Now consider $\lambda \geq \min\{\beta_H^{1/\sigma}, 1\}$. We shall show that there exists a threshold $\overline{\lambda}$ such that for $\underline{\lambda} \leq \lambda \leq \overline{\lambda}$, $\tau^* = \min\{\tau_H, 1\}$ and there is a schism; for $\lambda > \overline{\lambda}$, $\tau^* = 0$ and all agents remain members of the community.

Case 1: $\beta_H^{1/\sigma} \leq 1$.

(a) Consider $\lambda \in [\beta_H^{1/\sigma}, 1]$.

Because $\lambda \leq 1$, $(1-\tau)\lambda \leq 1$ for all $\tau \in [0, 1]$, so the best responses for group members are given by Proposition 1 (case 1). For each member i, $e_i^*(\tau) + g_i^*(\tau)$ is strictly increasing in τ. As $\lambda \geq \beta_H^{1/\sigma}$, however, setting $\tau = 1$ would induce exit by both types. Therefore, the religious authority will choose either τ_L, the maximum τ such that it attracts both types, or τ_H, the maximum τ such that it attracts high types (only).

The payoff from choosing τ_H is:

$$u(\tau_H) = np\frac{\beta_H^{\frac{1}{1-\sigma}}}{\beta_H^{\frac{1}{1-\sigma}} + [(1-\tau_H)\lambda]^{\frac{\sigma}{1-\sigma}}} = np\frac{\beta_H^{\frac{1}{1-\sigma}}}{\lambda^{\frac{\sigma}{1-\sigma}}}, \tag{20}$$

because $(1-\tau_\theta)\lambda = \left(\lambda^{\frac{\sigma}{1-\sigma}} - \beta_\theta^{\frac{1}{1-\sigma}}\right)^{\frac{1-\sigma}{\sigma}}$.

The payoff from choosing τ_L is once again:

$$u(\tau_L) = np\frac{\beta_H^{\frac{1}{1-\sigma}}}{\beta_H^{\frac{1}{1-\sigma}} + [(1-\tau_L)\lambda]^{\frac{\sigma}{1-\sigma}}} + n(1-p)\frac{\beta_L^{\frac{1}{1-\sigma}}}{\beta_L^{\frac{1}{1-\sigma}} + [(1-\tau_L)\lambda]^{\frac{\sigma}{1-\sigma}}}$$

$$= np\frac{\beta_H^{\frac{1}{1-\sigma}}}{\beta_H^{\frac{1}{1-\sigma}} + \lambda^{\frac{\sigma}{1-\sigma}} - \beta_L^{\frac{1}{1-\sigma}}} + n(1-p)\frac{\beta_L^{\frac{1}{1-\sigma}}}{\lambda^{\frac{\sigma}{1-\sigma}}}. \tag{21}$$

As $\beta_L \to 0$, $u(\tau_L)$ goes to:

$$np\frac{\beta_H^{\frac{1}{1-\sigma}}}{\beta_H^{\frac{1}{1-\sigma}} + \lambda^{\frac{\sigma}{1-\sigma}}},$$

which is less than $u(\tau_H)$ for all λ. Hence, for β_L sufficiently small, the religious authority chooses τ_H and induces schism for $\lambda \in [\beta_H^{1/\sigma}, 1]$.

(b) Consider $\lambda > 1$.

For $\tau < 1 - \frac{1}{\lambda}$, i.e. $(1-\tau)\lambda > 1$, we have established that the religious authority's payoff is strictly decreasing in τ. For $\tau \geq 1 - \frac{1}{\lambda}$, $(1-\tau)\lambda \leq 1$, we have established that the total contribution per agent is strictly increasing in τ. Therefore, we are left with three candidates for τ^*, namely $0, \tau_L$, and τ_H.

First, we claim that for β_L small enough $\tau^* \neq \tau_L$.

Suppose $\tau_L > 1 - \frac{1}{\lambda}$. We have established in case 1(a) that the religious authority chooses τ_H in this case, for β_L sufficiently small.

Suppose alternatively that $\tau_L < 1 - \frac{1}{\lambda}$. Recall that all agents join the community for $\tau \leq \tau_L$. The payoff from choosing τ_L is then:

$$\tilde{u}(\tau_L) = np\frac{\beta_H^{\frac{1}{1-\sigma}}}{1 + \beta_H^{\frac{1}{1-\sigma}}}(1-\tau_L)\lambda + n(1-p)\frac{\beta_L^{\frac{1}{1-\sigma}}}{1 + \beta_L^{\frac{1}{1-\sigma}}}(1-\tau_L)\lambda, \tag{22}$$

which is clearly less than $\tilde{u}(0)$. Therefore, the religious authority never chooses τ_L, when β_L is sufficiently small.

Now we claim that there exists a threshold $\overline{\lambda}$ such that $\tau^* = 0$ rather than τ_H if and only if $\lambda > \overline{\lambda}$. To establish the claim, observe that $\tilde{u}(0) > u(\tau_H)$ if and only if:

$$np\frac{\beta_H^{\frac{1}{1-\sigma}}}{1+\beta_H^{\frac{1}{1-\sigma}}}\lambda + n(1-p)\frac{\beta_L^{\frac{1}{1-\sigma}}}{1+\beta_L^{\frac{1}{1-\sigma}}}\lambda > np\frac{\beta_H^{\frac{1}{1-\sigma}}}{\lambda^{\frac{\sigma}{1-\sigma}}}, \tag{23}$$

which implies that:

$$\lambda > \frac{p^{1-\sigma}\beta_H}{\left(p\frac{\beta_H^{1/1-\sigma}}{1+\beta_H^{1/1-\sigma}} + (1-p)\frac{\beta_L^{1/1-\sigma}}{1+\beta_L^{1/1-\sigma}}\right)^{1-\sigma}} \equiv \overline{\lambda}. \tag{24}$$

This establishes part (ii)–(iii) of the proposition in case 1.

Case 2: $\beta_H^{1/\sigma} > 1$.

(a) Consider $\lambda \in [1, \beta_H^{1/\sigma}]$.

Since $\lambda \leq \beta_H^{1/\sigma}$, the religious authority can set $\tau = 1$ without inducing the exit of high types. When high types are members, we have already established that $u(1) > u(\tau_L)$ for $\lambda > \underline{\lambda}$, where $\underline{\lambda} < 1$. By hypothesis, $\lambda \geq 1$. Hence, $\tau^* \neq \tau_L$ in the case under consideration.

Turning to the remaining candidates, the best responses of group members to $\tau = 0$ are given by Proposition 1(ii) (because $\lambda \geq 1$) and the best responses to $\tau = 1$ are given by Proposition 1(i). Hence the religious authority chooses $\tau = 0$ rather than $\tau = 1$ if and only if:

$$np\frac{\beta_H^{\frac{1}{1-\sigma}}}{1+\beta_H^{\frac{1}{1-\sigma}}}\lambda + n(1-p)\frac{\beta_L^{\frac{1}{1-\sigma}}}{1+\beta_L^{\frac{1}{1-\sigma}}}\lambda > n \tag{25}$$

which implies that:

$$\lambda > \frac{1}{p\frac{\beta_H^{1/1-\sigma}}{1+\beta_H^{1/1-\sigma}} + (1-p)\frac{\beta_L^{1/1-\sigma}}{1+\beta_L^{1/1-\sigma}}} \equiv \widetilde{\lambda}. \tag{26}$$

(b) Consider $\lambda > \beta_H^{1/\sigma}$.

We have already established that when $\lambda > \max\{\beta_H^{1/\sigma}, 1\}$, then the religious authority chooses $\tau = 0$ if (23), and equivalently (24), holds and $\tau = \tau_H$ otherwise.

Because $\lambda > \beta_H^{1/\sigma}$, an upper bound on the RHS of (23) is np. This implies that if (25) holds for $\lambda \in (\widetilde{\lambda}, \beta_H^{1/\sigma}]$, then (23) holds for all $\lambda > \beta_H^{1/\sigma}$ and hence $\tau^* = 0$ over this parameter range.

If (25) does not hold for some $\lambda \in [1, \beta_H^{1/\sigma}]$, then $\tau^* = 0$ if and only if (23) holds, so that $\lambda > \bar{\lambda}$; $\tau^* = \tau_H$ otherwise. This completes the proof. $\square$

Proof of Proposition 3.

By assumption, members of the religious group live for one period and are self regarding. Hence, in each period members choose the same best responses to τ as they do in the one-shot game (given by Proposition 1). In particular, in any given period, if $(1 - \tau)\lambda < 1$ then $g_\theta^* = 0$ and:

$$e_\theta^* = \frac{\beta_\theta^{\frac{1}{1-\sigma}}}{\beta_\theta^{\frac{1}{1-\sigma}} + \left[((1-\tau)\lambda)^{\frac{\sigma}{1-\sigma}}\right]}. \tag{27}$$

If $(1 - \tau)\lambda = 1$, then:

$$e_\theta^* + g_\theta^* = \frac{\beta_\theta^{\frac{1}{1-\sigma}}}{1 + \beta_\theta^{\frac{1}{1-\sigma}}}. \tag{28}$$

If $(1 - \tau)\lambda > 1$, then $e_\theta^* = 0$ and:

$$g_\theta^* = \frac{\beta_\theta^{\frac{1}{1-\sigma}}}{1 + \beta_\theta^{\frac{1}{1-\sigma}}}(1-\tau)\lambda. \tag{29}$$

Given these responses, recall that the religious authority chooses a sequence $\tau_{t=0}^\infty$ to maximize:

$$\sum_{t=0}^\infty \sum_{i=1}^n \delta^t \left[e_i^*(\tau) + g_i^*(\tau)\right]. \tag{30}$$

Note that $\sum_{i=1}^n \left[e_i^*(\tau) + g_i^*(\tau)\right]$ is a function of the religious authority's choice variable τ and the state variable, p, which is the proportion of high-attachment types in the current period, p. Hence we can write the religious authority's current period payoff as $u(\tau, p)$.

Let us denote the proportion of high-attachment types in the next period by p'. Recall that the probability that agent i's child inherits high-attachment to the group equals $f(e_i)$. Hence p' depends on the profile of effort choices by members in the current period. In particular:

$$p' = \frac{1}{n}\sum_{i \in N} f(e_i).$$

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In equilibrium:
$$p' = pf\left(e_H^*(\tau)\right) + (1-p)f\left(e_L^*(\tau)\right) \equiv F(\tau,p).$$

We can define the value of being in state p as $v(p)$. Then the Bellman equation for the religious authority's problem is:

$$v(p) = \max_{\tau \in [0,1]} \left\{u(\tau,p) + \delta v\left(F(\tau,p)\right)\right\},$$

where v is (weakly) increasing in p because $e_H^*(\tau) + g_H^*(\tau) \geq e_L^*(\tau) + g_L^*(\tau)$ for all τ.

Suppose $\lambda < 1$. Then in every period $(1-\tau)\lambda < 1$ regardless of $\tau \in [0,1]$. Hence, each type chooses $g_\theta^* = 0$ and $e_\theta^*(\tau)$ as in (27) in every period. Therefore, the religious authority maximizes the discounted sum of contributions by setting $\tau^* = 1$ in every period.

Henceforth, consider the case in which $\lambda \geq 1$. This implies that $(1-\tau)\lambda \geq 1$ for $\tau \leq 1 - \frac{1}{\lambda}$.

First, we claim that the religious authority never chooses $\tau = 1 - \frac{1}{\lambda}$ in equilibrium. To see this, note that by (27) and (28):

$$e_\theta^*(\tau) + g_\theta^*(\tau) = \frac{\beta_\theta^{\frac{1}{1-\sigma}}}{1 + \beta_\theta^{\frac{1}{1-\sigma}}} < e_\theta^*(1) = 1,$$

for $\tau = 1 - \frac{1}{\lambda}$. This holds for both types.

Hence, $u\left(1,p\right) > u\left(1 - \frac{1}{\lambda},p\right)$, which establishes the claim.

In addition, because (1) $e_\theta^*\left(1 - \frac{1}{\lambda}\right) < e_\theta^*(1)$ for both types, and (2) p' is increasing in e_θ^* for both types and (3) $v(p')$ is (weakly) increasing in p', we have $v\left(F(1,p)\right) \geq v\left(F(1 - \frac{1}{\lambda},p)\right)$. Therefore, both the current period payoff and the continuation payoff are higher when setting $\tau = 1$, thus establishing the claim.

Second, consider the domain $\tau > 1 - \frac{1}{\lambda}$, i.e. $(1-\tau)\lambda < 1$. The religious authority's discounted payoff is:

$$u(\tau,p) + \delta v\left(F(\tau,p)\right)$$

$$= np\frac{\beta_H^{\frac{1}{1-\sigma}}}{\beta_H^{\frac{1}{1-\sigma}} + \left[((1-\tau)\lambda)^{\frac{\sigma}{1-\sigma}}\right]} + n(1-p)\frac{\beta_L^{\frac{1}{1-\sigma}}}{\beta_L^{\frac{1}{1-\sigma}} + \left[((1-\tau)\lambda)^{\frac{\sigma}{1-\sigma}}\right]} + \delta v\left(F(\tau,p)\right).$$

The unique maximizer of the first two terms is $\tau = 1$. Since $e_\theta^*(\tau)$ is maximized at $\tau = 1$ for both types, $F(\tau,p)$ is maximized at $\tau = 1$. In addition, recall that v is weakly

increasing. Hence $\tau = 1$ is also a maximizer of the third term. This implies that the unique maximum of the religious authority's discounted payoff on the domain $\tau > 1 - \frac{1}{\lambda}$ is attained when $\tau = 1$.

Third, consider the domain $\tau < 1 - \frac{1}{\lambda}$, so that $(1 - \tau)\lambda > 1$. The religious authority's discounted payoff is:

$$
u(\tau, p) + \delta v\Big(F(\tau, p)\Big)
$$

$$
= np \frac{\beta_H^{\frac{1}{1-\sigma}}}{1 + \beta_H^{\frac{1}{1-\sigma}}} (1 - \tau)\lambda + n(1 - p) \frac{\beta_L^{\frac{1}{1-\sigma}}}{1 + \beta_L^{\frac{1}{1-\sigma}}} (1 - \tau)\lambda + \delta v\Big(F(\tau, p)\Big).
$$

The unique maximizer of the first two terms is $\tau = 0$. Since $e_\theta^*(\tau) = 0$ for all τ on the domain being considered, $v\Big(F(\tau, p)\Big)$ is the same for all τ. Hence, the unique maximum of the religious authority's discounted payoff on the domain $\tau < 1 - \frac{1}{\lambda}$ is attained when $\tau = 0$.

Therefore, we only need to compare the payoff streams under the two remaining candidates for best responses by the religious authority, $\tau = 0$ and $\tau = 1$.

Consider the subgame beginning in any period $t > 1$. We have established that in period $t - 1$ either $\tau^* = 0$ or $\tau^* = 1$. Hence in period t the proportion of high attachment types is either

$$
\underline{p} \equiv pf\Big(e_H^*(0)\Big) + (1 - p)f\Big(e_L^*(0)\Big) = pf(0) + (1 - p)f(0) = f(0)
$$

or

$$
\overline{p} \equiv pf\Big(e_H^*(1)\Big) + (1 - p)f\Big(e_L^*(1)\Big) = pf(1) + (1 - p)f(1) = f(1),
$$

where $\overline{p} > \underline{p}$ because f is strictly increasing. The same applies for all $t > 1$.

Moreover, the repeated game has a Markov structure. For each τ, community members choose the same best response in every period. Hence, the decision of the religious authority depends only on the state p and not on t. Thus, an SPE will attach an action τ to each state p and we have established that either $\tau^* = 0$ or $\tau^* = 1$.

Suppose the religious authority always chooses $\tau = 0$ when $p = \underline{p}$. This occurs if and only if:

$$u(0, \underline{p}) + \delta v(\underline{p}) \geq u(1, \underline{p}) + \delta v(\bar{p}), \tag{31}$$

where $v(\underline{p}) = \frac{u(0,\underline{p})}{1-\delta}$ because the religious authority chooses $\tau = 0$ whenever $p = \underline{p}$. This in turn implies that:

$$u(0, \bar{p}) + \delta v(\underline{p}) > u(1, \bar{p}) + \delta v(\bar{p}), \tag{32}$$

because $u(0, \bar{p}) > u(0, \underline{p})$ and $u(1, \underline{p}) = u(1, \bar{p}) = n$. Therefore, if the religious authority always chooses $\tau = 0$ when $p = \underline{p}$, then it always chooses $\tau = 0$ when $p = \bar{p}$. This in turn implies that $v(\bar{p}) = u(0, \bar{p}) + \delta v(\underline{p})$. Substituting this into (31) yields:

$$u(0, \underline{p}) + \delta \frac{u(0, \underline{p})}{1 - \delta} \geq u(1, \underline{p}) + \delta u(0, \bar{p}) + \delta^2 \frac{u(0, \underline{p})}{1 - \delta}$$
$$\Longleftrightarrow u(1, \underline{p}) \leq u(0, \underline{p}) - \delta \Big[u(0, \bar{p}) - u(0, \underline{p}) \Big] \tag{33}$$

Define $\bar{b} \equiv \bar{p} \frac{\beta_H^{1/1-\sigma}}{1+\beta_H^{1/1-\sigma}} + (1 - \bar{p}) \frac{\beta_L^{1/1-\sigma}}{1+\beta_L^{1/1-\sigma}}$ and $\underline{b} \equiv \underline{p} \frac{\beta_H^{1/1-\sigma}}{1+\beta_H^{1/1-\sigma}} + (1 - \underline{p}) \frac{\beta_L^{1/1-\sigma}}{1+\beta_L^{1/1-\sigma}}$, where $\bar{b} > \underline{b}$. Inequality (33) can then be written:

$$n \leq \lambda n \underline{b} - \delta \Big(\lambda n \bar{b} - \lambda n \underline{b} \Big). \tag{34}$$

As $n > 0$, this can only hold if:

$$\underline{b} - \delta(\bar{b} - \underline{b}) > 0, \tag{35}$$

which is simply condition (6). Therefore, if (6) does not hold, there is no value of λ for which $\tau^* = 0$ in every period $t > 1$.

Now consider the case in which (6) holds. Then $\tau^* = 0$ in every period $t > 1$ if and only if:

$$\lambda \geq \frac{1}{\underline{b} - \delta(\bar{b} - \underline{b})} \equiv \lambda_2. \tag{36}$$

This establishes part (ii) of the proposition.

To establish part (i) suppose alternatively that the religious authority always chooses $\tau = 1$ when $p = \bar{p}$. This occurs if and only if:

$$u(1, \bar{p}) + \delta v(\bar{p}) \geq u(0, \bar{p}) + \delta v(\underline{p}), \tag{37}$$

where $v(\bar{p}) = \frac{u(1,\bar{p})}{1-\delta}$. This in turn implies that:

$$u(1, \underline{p}) + \delta v(\bar{p}) > u(0, \underline{p}) + \delta v(\bar{p}), \tag{38}$$

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because $u(0, \bar{p}) > u(0, \underline{p})$ and $u(1, \underline{p}) = u(1, \bar{p}) = n$. Therefore, if the religious authority chooses $\tau = 1$ when $p = \bar{p}$, then it chooses $\tau = 1$ when $p = \underline{p}$. This in turn implies that $v(\underline{p}) = u(1, \underline{p}) + \delta v(\bar{p})$. Substituting this into (37) yields:

$$u(1, \bar{p}) + \delta \frac{u(1, \bar{p})}{1 - \delta} \geq u(0, \bar{p}) + \delta u(1, \underline{p}) + \delta^2 \frac{u(1, \bar{p})}{1 - \delta} \tag{39}$$
$$\Longleftrightarrow u(1, \bar{p}) \geq u(0, \bar{p}),$$

where we have used the fact that $u(1, \underline{p}) = u(1, \bar{p})$. Inequality (39) in turn holds if and only if:

$$n \geq \lambda n \bar{b}$$
$$\Longleftrightarrow \lambda \leq \frac{1}{\bar{b}} \tag{40}$$
$$\equiv \lambda_1.$$

Notice that $\lambda_1 < \lambda_2$. This establishes part (ii) of the proposition.

Let us turn to part (iii). Suppose the religious authority chooses $\tau = 1$ when $p = \underline{p}$ and $\tau = 0$ when $p = \bar{p}$. This occurs if and only if:

$$u(1, \underline{p}) + \delta v(\bar{p}) > u(0, \underline{p}) + \delta v(\underline{p}) \tag{41}$$

and

$$u(1, \bar{p}) + \delta v(\bar{p}) < u(0, \bar{p}) + \delta v(\underline{p}),$$

where the value equation associated with a large proportion of high types is:

$$v(\bar{p}) = u(0, \bar{p}) + \delta v(\underline{p}) = \frac{u(0, \bar{p})}{1 - \delta^2} + \delta \frac{u(1, \underline{p})}{1 - \delta^2}, \tag{42}$$

because τ alternates each period between zero and one. Substituting (42) into the first line of (41) yields:

$$u(1,\underline{p}) + \delta u(0,\bar{p}) + \delta^2 v(\underline{p}) > u(0,\underline{p}) + \delta v(\underline{p})$$

$$\iff u(1,\underline{p}) + \delta u(0,\bar{p}) > u(0,\underline{p}) + \delta(1-\delta)\left(\delta\frac{u(0,\bar{p})}{1-\delta^2} + \frac{u(1,\underline{p})}{1-\delta^2}\right)$$

$$\iff u(1,\underline{p}) + \delta u(0,\bar{p}) > u(0,\underline{p}) + \delta^2\frac{u(0,\bar{p})}{1+\delta} + \delta\frac{u(1,\underline{p})}{1+\delta} \tag{43}$$

$$\iff \frac{u(1,\underline{p})}{1+\delta} + \delta\frac{u(0,\bar{p})}{1+\delta} > u(0,\underline{p})$$

$$\iff u(1,\underline{p}) > (1+\delta)u(0,\underline{p}) - \delta u(0,\bar{p})$$

$$\iff u(1,\underline{p}) > u(0,\underline{p}) - \delta\big[u(0,\bar{p}) - u(0,\underline{p})\big],$$

which holds if and only if ((6) does not hold or $\lambda < \lambda_2$.

Substituting (42) into the second line of (41) yields:

$$u(1,\underline{p}) + \delta\left[\frac{u(0,\bar{p})}{1-\delta^2} + \delta\frac{u(1,\underline{p})}{1-\delta^2}\right] < u(0,\bar{p}) + \left[\frac{u(0,\bar{p})}{1-\delta^2} + \delta\frac{u(1,\underline{p})}{1-\delta^2}\right]$$

$$\iff u(1,\underline{p})\left[1 + \frac{\delta^2}{1-^2} - \frac{\delta}{1-^2}\right] < u(0,\bar{p})\left[1 + \frac{\delta^2}{1-^2} - \frac{\delta}{1-^2}\right] \tag{44}$$

$$\iff u(1,\underline{p}) < u(0,\bar{p}),$$

which holds if and only if $\lambda > \lambda_1$.

Hence, the religious authority chooses $\tau = 1$ when $p = \underline{p}$ and $\tau = 0$ when $p = \bar{p}$ if and only if (6) and $\lambda_1 < \lambda < \lambda_2$ or (6) does not hold and $\lambda > \lambda_1$. Since $\tau = 1$ induces a transition to state $\bar{p}$ and $\tau = 0$ induces a transition to state $\underline{p}$, this implies that in these cases the process alternates each period between $\tau = 0$ and $\tau = 1$. This completes the proof. $\square$

Proof of Proposition 4.

Fix an arbitrary state p. Let Λ^* (resp. Λ^{**}) be the set of values of λ for which $\tau^* = 1$ in the current period in the unique SPE without (resp. with) intergenerational transmission of values. Without intergenerational transmission of values, $\tau^* = 0$ if and only if:

$$u(0,p) + \delta v(p) \geq u(1,p) + \delta v(p). \tag{45}$$

This implies that $u(0,p) \geq u(1,p)$, which in turn occurs if and only if:

$$\lambda \geq \frac{1}{p\frac{\beta_H^{1/1-\sigma}}{1+\beta_H^{1/1-\sigma}} + (1-p)\frac{\beta_L^{1/1-\sigma}}{1+\beta_L^{1/1-\sigma}}} \equiv \widetilde{\lambda}(p) \tag{46}$$

by the proof of Proposition 1.

When there is intergenerational transmission of values, $\tau^* = 0$ if and only if:

$$u(0, p) + \delta v(\underline{p}) \geq u(1, p) + \delta v(\bar{p}). \tag{47}$$

This implies $u(0, p) \geq u(1, p) + \delta[v(\bar{p}) - v(\underline{p})]$. We have established that $v(\bar{p}) = v(\underline{p})$ if $\lambda \leq \lambda_1 = \tilde{\lambda}(\bar{p})$ and $v(\bar{p}) > v(\underline{p})$ if $\lambda > \lambda_1 = \tilde{\lambda}(\bar{p})$. Therefore whenever the religious authority chooses $\tau = 0$ under intergenerational transmission it will also choose $\tau = 0$ without intergenerational transmission, i.e. $\Lambda^* \subseteq \Lambda^{**}$ for all p. This establishes part (i) of the proposition.

We shall now show that for $p < \bar{p}$, $\Lambda^* \subset \Lambda^{**}$.

Suppose $\lambda = \tilde{\lambda}(p)$. Then the religious authority is indifferent between $\tau = 0$ and $\tau = 1$ when there is no intergenerational transmission. Under intergenerational transmission, the religious authority will strictly prefer $\tau = 1$ at $\lambda = \tilde{\lambda}(p)$ if and only if $v(\bar{p}) > v(\underline{p})$ which occurs if and only if $\tilde{\lambda}(p) > \lambda_1 = \tilde{\lambda}(\bar{p})$. By inspection of (46), $\tilde{\lambda}(p)$ is strictly decreasing in p. This implies that $\tilde{\lambda}(p) > \tilde{\lambda}(\bar{p})$ if and only if $p < \bar{p}$. Hence for $p < \bar{p}$, there exist values of λ such that the religious authority chooses $\tau = 0$ without intergenerational transmission and $\tau = 1$ with intergenerational transmission. This establishes part (ii) and indeed the proposition. $\square$

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