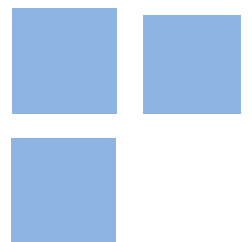E CONOMIA
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What Drives Religiosity in America? Evidence from an Empirical Hotelling Model of Church Competition

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Keywords: Religion; Ideology; Product Differentiation

JEL Codes: Z12; D72; H25; C57; L66

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Evidence from an Empirical Hotelling Model of Church Competition

Raphael Corbi[*]   Fabio A. Miessi Sanches[†]

February 14, 2022

Abstract

We develop and estimate a Hotelling model of religious competition that allows us to study how churches ideological views are built depending on both societal and their own ideological preferences as well as strategic interactions between churches. Demand for religion is a function of the distance between individuals ideology and the ideological type of each church. We show that churches ideological types can be identified using the structure of the demand model. We find that individuals choose churches that have ideological types close to their own ideological types. We also document that religious groups are overwhelmingly on the conservative side of the spectrum as they systematically deviate from profit maximization. Their ideological positioning is driven mainly by clergy intrinsic preferences (supply) as opposed to society ideological views (demand). Our counterfactuals indicate that the recent societal shift to the left in terms of political views and attitudes towards sexual norms is able to explain a substantial part of American religiosity trends observed in the last decades.

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1   Introduction

American religious attachment have remained at relatively high levels throughout its history to this day when compared with the rest of the developed world. Yet this relatively stable picture conceals a great deal of change associated with increasing religious switching across traditions, lower rates of religious inheritance and more interreligious marriage, affecting the relative size of major religious groups – partly in favor of more conservative protestant denominations – across the last few decades. Even more remarkable has been the observed recent decline in overall religiosity, with a growing share of Americans reporting as not being members of any church (or "nones"), and to a lesser extent not attending services nor believing in God (Chaves, 2011; Putnam et al., 2012). Put together, these movements have in effect polarized the American religious landscape at the expense of the moderate middle.

A diverse set of explanations has been put forward to rationalize these trends – see Chaves (2011); Putnam et al. (2012); Barro and McCleary (2019). A prominent thesis attributes the dramatic growth of the religious nones in the last decades to a backlash of an increasingly liberal share of the population against the ascent of the conservative religious right. Ultimately, this misalignment between churches and societal views on political and moral issues led to the decline of religious affiliation (Putnam et al., 2012; Hout and Fischer, 2014). In its essence, this argument blends considerations involving both the supply and the demand for religion. On the demand side, it implicitly assumes that the demand for religion is partially driven by individuals ideological preferences; on the supply side, that the ideological positioning of religious groups do not respond to societal changes. Despite its appeal, the formalization of these arguments is a challenging task as churches ideological type and its evolution over the last decades are not directly observed.

This paper develops and estimates a Hotelling model of religious competition that allows us (i) to identify churches ideological types for different time periods; (ii) to test whether differences between individual and church ideological positions affect demand for religion; and (iii) to investigate how churches ideological views are built as a function of societal and

church preferences, and strategic interactions between religious groups. We use the structure of the model to evaluate the consequences of recent changes in the distribution of individual ideology to the equilibrium levels of religiosity.

The estimates of the model show that churches differentiation across the ideological dimension is important to explain religious identity. In particular, we find strong positive assortative matching between individuals and churches in the ideological dimension: all else constant, more (less) conservative individuals prefer more (less) conservative churches. On the supply side, we report a significant dispersion in the disposition of churches on the Hotelling line of ideological differentiation. Importantly, the estimated ideology held by denominations look more extreme than the ideology of the average church member; see also Wald and Calhoun-Brown (2014) and Hersh and Malina (2017). Consistent with this result, we find that churches are systematically deviating from profit maximization as their ideological positioning are driven, at least partially, by clergy intrinsic preferences or prophetic orientations (supply), and not only by society ideological preferences (demand). Combining these findings, our counterfactual scenarios indicate that the recent shift to the left of ideological views of the US population serves to explain an important fraction of the fall in religiosity levels observed in the last decades.

We structure our analysis as follows. In Section 2 we present our main sources of data. The General Social Survey (GSS) is a long running dataset (1972 to 2018) for which we apply the standard religion classification system that assigns self-reported Protestants to three distinct groups – namely Mainline, Evangelical and Black Protestant traditions (Steensland et al., 2000). The other source is the Cooperative Congressional Election Study (CCES) which is a large scale internet-based survey of nationally stratified samples ranging from 35,000 to 55,000 respondents per year and spans from 2006 to 2020. While the CCES has a shorter time horizon than the GSS (12 vs 46 years), its much wider cross-sections allows us to explore a finer classification system, grouping individuals according to both religious family (e.g. Lutheran, Baptist) and tradition (e.g. Evangelical, Mainline). Following Gentzkow

(2016) we construct different measures of personal ideology from information present in both datasets. These measures are based on self-reported indicators of political ideology (ranging from extremely liberal to extremely conservative) and variables summarizing individual views on sexual norms that have been linked to religious choices (Putnam et al., 2012; Chaves, 2011).

In Section 3 we develop a simple model of supply and demand for religion that is very close in spirit to the empirical model in Gentzkow and Shapiro (2010); see also McBride (2019, 2008), Barro and McCleary (2005) and Barros and Garoupa (2002), among others, for theoretical models of church competition. In our demand model, the utility individual i derives from religious choices depends on the distance between her ideology and the church's, and on a time varying church specific effect that condenses all other church characteristics relevant to explain preferences for religion. Individuals may also choose non-affiliation as the outside (secular) option. The utility of the secular option varies over time and is designed to capture aggregate shocks on preferences for religion. From this standard set of assumptions we derive individuals demand for religion.

On the supply side, churches compete for members in religious markets by choosing at each period an ideological type. As in Gentzkow and Shapiro (2010) we allow churches to deviate from profit maximization. In other words, we assume that when choosing its ideological positioning church j's leaders take into account not only repercussions of this choice on the number of members of the church but also the "prophetic orientation" of the church. This simple formulation is in line with a number of studies suggesting that the ideologies of " (...) *religious elites blend a concern for rank-and-file opinion with a prophetic orientation*" (Wald and Calhoun-Brown, 2014).

One key assumption of the model is that individual ideology is exogenous to religious identity. Before closing Section 3 we present compelling reasons to support this assumption, especially the fact that political views are forged long before religious identities (Margolis, 2018) and that Americans overwhelmingly think that religious institutions should stay out

of politics (Pew, 2019). Importantly, we do not intend to claim that religion identity does not affect individual belief and behavior, but rather to suggest that the effect of church positioning on individual ideology accounts for only a small part of the cross-sectional variation in ideology that identifies our model – see also Gentzkow and Shapiro (2010) for related arguments in a study of drivers of media slant.[1]

In Section 4 we estimate the primitives of the model. We first show that churches ideological types (which are not directly observed in the CCES and GSS) can be recovered from the data using information on individuals religious choices and the measures of personal ideology. Next we validate our church ideology estimates by comparing it to a self-reported measure of clergy ideology obtained directly from the Cooperative Clergy Study Project (CCSP) – a large scale survey carried out in the US in 2001 with more than 9000 clergy of different denominations. The estimates of church ideology obtained from our model are highly correlated ($\rho = 0.9$) with the CCSP (observed) measure, which suggests that our approach to infer churches ideological positioning produces meaningful estimates.

We also note that this validation exercise serves to corroborate arguments in favor of the exogeneity of individuals ideology to religious choices: as churches ideology estimates obtained from the model are sensitive to this assumption and as clergy ideology observed from the CCSP data, by construction, does not depend on any assumption, the proximity between estimates and data indicates that exogeneity of individual ideology to religious choice is indeed a reasonable premise. In the same vein, we observe that the estimates of δ_{jt} do not change when we estimate richer versions of the model where preferences are allowed to vary with other individual characteristics, such as income, education, age and race. Again, we would expect that, if reverse causality running from religion to individuals ideology were indeed a major threat to our results, the inclusion of these other variables would cause relevant changes to our estimates.

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[1]This assumption is essentially the same as that used in Gentzkow and Shapiro (2010), which studies the determinants of media slant: "(...) Our demand estimates therefore rely (...) on the assumption that most variation in [individuals] ideology is exogenous with respect to newspaper content." Gentzkow and Shapiro (2010), page 50.

Then we apply our method to estimate churches ideological types using the GSS and CCES datasets. Our estimates of churches ideological types have significant dispersion, with Evangelicals and Mormons on the extreme right, Catholics and Mainline/Black Protestant denominations located on the more moderate center, and Jewish more to the left. This finding is also in line with evidences reported in other surveys; see Hersh and Malina (2017) and Wald and Calhoun-Brown (2014).

Using these estimates, on the demand side, we find that the difference between church and individual ideology is relevant to explain religious choices of the US population. On the supply side we see that churches' ideological positioning systematically deviates from profit maximization, indicating that churches choose their position to satisfy, at least partially, their prophetical orientation. Notably, the differences between profit maximizing and estimated levels of ideology are more pronounced for the religious groups in the left or right extremes of the Hotelling line. These results hold independently of the dataset, definition of religious group, definition of ideology and several changes in the specification of the demand model.

In Section 5 we explore the implications of these findings. Using our structural model, we first show that the shift to the left of the distribution of ideology observed since the 1990s accounts for roughly 50% of the increase in the share of nones between 1974 and 2018. Second, we document that the rise of nones would have occurred at a much slower pace if churches were acting as profit maximizers, i.e. if churches ideological types were chosen to satisfy the preferences of the demand only, irrespective of clergy preferences. Third, we also document that while the growing misalignment between ideological positions of individuals and churches had deep influences on the rise of nones, this fact alone is far from sufficient to explain the continuous fall of Mainline Protestant participation in the US religious scene. Instead, according to our estimates, the decline of Mainline protestants seems to be much more related to a decline in the interest of the US population for that religious group, independently of ideological differences. Lastly, our estimates indicate that the utility value of the outside (secular) option has slightly trended upwards overtime, consistent with the

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literature on the importance of secular competition to religious outcomes. However, coupled with the evidence discussed above, this finding suggests that the rise of the nones is mostly driven by changes in preferences for specific religions and in ideological values of the US population rather then changes in the secular sector.

Contribution. We add to the literature by providing the first large-scale structural estimates based on spatial model of religious market competition (Barro and McCleary, 2005; Gaskins et al., 2013; Barros and Garoupa, 2002; McBride, 2008; Montgomery, 2003; Iyer et al., 2014). In particular, we address the common critique that spatial models do not account for the dynamics that drive strictness levels of religious groups by allowing them to adjust their ideology over time in response to external (competition and demand pressures) as well as to internal factors (prophetic orientation). Another common criticism against standard spatial models is that they miss key aspects of inter-congregation competition when multiple dimensions matter for religious choice. We show that our estimates are robust to this additional concern by allowing individual utility to depend also on personal traits (income, education, race and age) interacted with church dummies. Also, we leverage the flexibility of these models by conceptualizing that religions compete for adherents by choosing levels of ideology or conservatism, which is different but indirectly related to strictness.

Our paper also offers new insights to the broad literature on the determinants of religion (see Iyer (2016) for a survey). It informs both the literature on demand-side (Hungerman and Ottoni-Wilhelm, 2021; Auriol et al., 2020; Bentzen, 2019; Ager and Ciccone, 2018; Chen, 2010; McCleary and Barro, 2006; Glaeser and Sacerdote, 2008; Becker and Woessmann, 2013; Buser, 2015; Costa et al., 2019; Hungerman, 2014) and supply-side (Corbi and Komtasu, 2019; McCleary, 2017; Iannaccone et al., 1997; Finke and Iannaccone, 1993; Barro and McCleary, 2005; Olson, 2011) drivers of religiosity. Moreover, we use our model to reinterpret the major trends in the American religious landscape (Putnam et al., 2012; Chaves, 2011) of the last few decades and show that they can be largely explained by changes in

ideology and trends in preferences.

2 Data and Institutional Background

We start by describing the main datasets used in this paper, important trends observed in the US religion market during the last 50 years and theories that have been developed to explain these trends. Ultimately, the economic model developed and estimated in the next sections formalizes these theories within a supply and demand framework and evaluates their capacity of explaining recent developments in the market of religion in the USA.

2.1 Datasets

In order to estimate our model and perform our counterfactual studies, we need our data sources to be (i) large in size, (ii) with detailed information on religious affiliation and ideology views, (iii) spanning across many years, and (iii) nationally representative. We take advantage of two data-sets that together fulfill these criteria: the Cooperative Congressional Election Study (CCES) and the General Social Survey (GSS).

The General Social Survey (GSS), conducted by the National Opinion Research Center, is one of the most extensively used survey instruments that contains questions concerning respondents' denominational affiliation and religious beliefs and practices, as well as political views and socio-demographic characteristics. It is a long running (1972 to 2018), roughly biennial nationally representative survey with roughly 2000 observations per wave.

The Cooperative Congressional Election Study (CCES) is a large scale internet-based survey that consists of national stratified samples ranging from 35,000 to 55,000 respondents per year. Specifically, we use the Cumulative CCES Common Content dataset (Kuriwaki, 2018), which combines all survey waves between 2006 and 2018, for a total sample of more than 450,000 respondents, which is representative even at the US county level. It is conducted online in November of every year since 2005 and asks a wide range of questions – from

Table 1: Summary Statistics According to Religious Groups

	Panel A: General Social Survey 1972-2018									
	Income	Education	Age	White	Black	Pol Ideo	Sex	Homosex	PC	Obs
Evangelical	28,305	12.31	47.11	0.89	0.07	0.58	0.46	0.81	0.60	15,790
Mainline	36,032	13.28	50.88	0.95	0.03	0.53	0.23	0.63	0.46	12,503
Black Protestant	19,426	11.61	45.36	0.04	0.96	0.48	0.30	0.79	0.52	5,723
Catholic	34,015	12.78	45.12	0.86	0.04	0.51	0.20	0.58	0.43	15,676
Jewish	52,498	15.03	50.16	0.97	0.02	0.41	0.09	0.26	0.24	1,285
Other faith	32,610	13.71	43.13	0.73	0.11	0.49	0.34	0.57	0.45	3,336
Non-affiliated	33,011	13.64	39.87	0.82	0.11	0.41	0.06	0.29	0.26	7,797
	Panel B: Cooperative Congressional Election Study 2006-2018									
	Income	College	Age	White	Black	Pol Ideo	Gay	Abortion	PC	Obs
Baptist Evangelical	6.32	0.36	52.27	0.759	0.165	3.83	0.70	0.37	0.33	23558
Lutheran Evangelical	7.22	0.45	57.17	0.929	0.018	3.70	0.60	0.46	0.12	5128
Non-deno Evangelical	6.91	0.47	49.91	0.738	0.127	3.79	0.73	0.29	0.43	17614
Other Evangelical	6.67	0.45	52.83	0.765	0.100	3.71	0.66	0.39	0.25	21807
Baptist Mainline	6.06	0.34	49.00	0.617	0.277	3.43	0.49	0.57	-0.18	3690
Episcopalian Mainline	8.19	0.67	58.82	0.878	0.062	2.93	0.26	0.75	-0.71	3910
Lutheran Mainline	7.31	0.49	55.74	0.934	0.016	3.32	0.40	0.62	-0.34	6104
Methodist Mainline	7.28	0.49	57.57	0.906	0.048	3.44	0.47	0.59	-0.20	12893
Other Mainline	7.25	0.50	55.46	0.850	0.063	3.20	0.36	0.66	-0.46	9262
Black Protestant	5.97	0.43	48.37	0.043	0.936	3.13	0.54	0.69	-0.31	8712
Catholic	7.33	0.47	50.96	0.720	0.038	3.37	0.40	0.57	-0.27	62177
Jewish	8.38	0.69	53.81	0.905	0.020	2.75	0.19	0.83	-0.91	7379
Jehovah's Witness	5.36	0.24	45.11	0.423	0.319	4.38	0.80	0.30	0.71	1188
Mormon	6.69	0.53	46.38	0.849	0.033	3.79	0.70	0.31	0.41	4430
Non-western	6.95	0.61	40.23	0.356	0.143	2.81	0.30	0.76	-0.72	5192
Non-affiliated	6.62	0.44	44.42	0.736	0.106	2.92	0.20	0.79	-0.81	90293

Note: In Panel A, *Income* represents family income in constant dollars (base = 1986), *Education* indicates highest year of school completed and *Age* is in years. *Other Faiths* include Buddhism, Hinduism, Other eastern, Moslem/Islam, Native American, Orthodox, inter-nondenominational and Others. Political Ideology is recoded in a scale from 0 (liberal) to conservative (1). Sex and Homosex are indicators whether respondents consider "sex before marriage" and "homosexual relations" always wrong. PC is the first principal component extracted from Ideology, Sex and Homosex using polychoric correlations to account for the data discreteness as discussed in Kolenikov and Angeles (2014). In Panel B, *Income* represents average family income bracket ranging from 1 (less than 10k) to 13 (more than 150k), *College* shows share of individuals with a college degree. Gay and Abortion are indicators whether respondents oppose gay marriage and support abortion, respectively. All other variables are defined as in Panel A.

political ideology and voting behavior to preferences for redistribution and views on the role of government, to a large number of demographic and socioeconomic questions such as nativity, age, gender, marital status, income, and education – and has been used extensively in the political science, sociology and political economy literatures (Ansolabehere and Rivers, 2013; Bazzi et al., 2020; Acharya and Sen, 2016; Giuliano and Tabellini, 2020).

In both datasets, respondents report to which specific religious congregations they belong. It is key to our analysis that we recode these disaggregated religious denominations, as originally reported in the surveys, into historically meaningful affiliation categories so as to avoid conflating religious, economic, social and political ideas into one monolithic measure. For the GSS, we follow the *reltrad* classificatory system introduced by Steensland et al.

Figure 1: Political Ideology Distribution by Religious Group
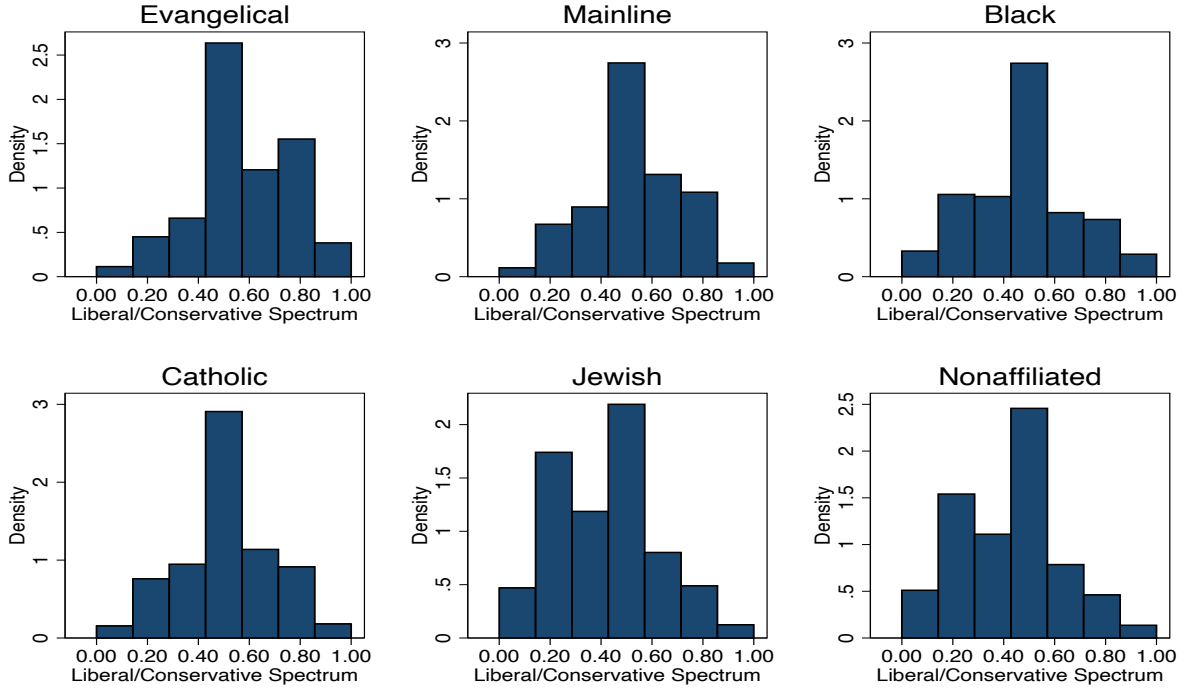
([2000]) which assigns self-reported Protestants to three distinct groups - namely Mainline, Evangelical and Black Protestant traditions - and has become the standard way to code GSS and other surveys affiliation data.[2] For the CCES, we take advantage of the larger number of observations and employ a finer classification system by grouping individuals according to both religious family (e.g. Lutheran, Baptist) and tradition (e.g. Evangelical, Mainline) whenever feasible,[3] following the congregation-level classification by Pew (2015). For instance, members of the Southern Baptist Convention are classified as *Evangelical Baptists*, those who belong to the American Baptist Churches USA are assigned to *Mainline Baptists* and members of the National Baptist Convention are included as *Black Protestants*.

Table 1 shows sample means of socio-demographics and ideology of members of the religious groups in each dataset. According to GSS data reported in Panel A, the Jewish are richer, older and more educated than other groups, on average. Among Christians,

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[2]We also incorporate the corrections suggested by Stetzer and Burge (2016).

[3]In particular, family-tradition groups that have more than 1,000 observations are classified as a separate category, while smaller are pooled into broader categories (e.g. Other Evangelical, Other Manline).

Mainline Protestants are richer, older and more educated, followed closely by Catholics, then Evangelicals and Black Protestants. Unsurprisingly, all traditions are overwhelmingly white, except for Black Protestants.

We measure ideology across two related but different dimensions: *political ideology* and *attitudes toward sexual norms*. Political ideology is recoded in a scale from 0 (liberal) to conservative (1). *Sex* and *Homosex* are indicators whether respondents consider "sex before marriage" and "homosexual relations" always wrong. We also combine both dimensions into a single measure that is the first principal component extracted (PC) from Ideology, Sex and Homosex using polychoric correlations to account for the data discreteness as discussed in Kolenikov and Angeles (2014). Regarding political ideology, Evangelicals are most conservative, with Catholics and Mainline Protestants reporting more moderate views. Black Protestants and Other Faiths are somewhat more liberal, with Jewish and Non-affiliated positioning themselves most to the left of the spectrum. Figure 1 depicts the distribution of political ideology by categories. Despite differences in mean, centrist positions are the most frequent and extreme views are rather rare across all groups. Finally, attitudes towards sexual norms follow a similar but not identical pattern. Evangelicals are again most likely to consider pre-marital sex and homosexual relations as always wrong, with Jewish and Non-affiliated being the least likely. Black Protestants appear with significantly more conservative views on sex than Catholics and Mainline.

Panel B reports descriptive statistics for the CCES dataset according to our finer classification system. While the CCES dataset spans across shorter time horizon than the GSS (12 vs 46 years), its much wider cross-sections allow us gain considerably variation within religious families and traditions. For instance, among Evangelicals, Baptists are more black, younger, and less wealthy and educated than Lutherans. Also, among Lutherans, those who follow the mainline tradition tend to be wealthier and significantly more liberal both in terms of politics and views on sexuality than their evangelical counterparts. As before, we compute the first principal component of ideology based on *political ideology* and *sexual and moral*

views, which due to CCES data availability are captured by *Gay* and *Abortion* indicators of whether respondents oppose gay marriage and support abortion, respectively.[4]

## 2.2   Trends in Religious Identity and Ideology: 1974-2018

One of the most notable facts about religion in the US is that Americans are and have been a relatively observant people – be it in terms of church attendance and membership, be it in private religious beliefs or practices. However, these stable trends conceals a great deal of change due to increasing religious switching (across traditions or into non-affiliation), lower rates of religious inheritance and higher rates of religious intermarriage, leading to tremendous religious diversity – including growing ranks of the nonreligious. Against this background of complex forces acting simultaneously, over the post-war history of American religion the direction and pace of change have shifted and accelerated in momentous periods of remaking and even reversal in religious practices and attitudes. The manifestation of these movements in American religion are best measured by looking at the evolution of church affiliation. While it does not necessarily reflect personal beliefs and church attendance, tracking religious identification does provide a window onto relative trends of religious diversity.

Figure 2 shows how membership of different religious traditions has evolved over the last 50 years according to the GSS. A few patterns stand out. First and foremost, the proportion of Americans who claim no affiliation has increased dramatically. The proportion of "nones" has been steadily rising for a long time – from 3% in 1957 according to a government survey, to 6.8% in 1974, 7.9% in 1990 and escalating to 23% in 2018.[5] Second, the proportion of overall Protestants has been declining since 1974, from 64% in 1974 to 46% in 2018. More importantly, the Protestant downfall has been concentrated almost entirely among the more liberal Mainline Protestant denominations. Catholics, which are the other relatively large

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[4]This is because the literature also stresses the importance of opinions about abortion as one of the most important differentials of religious vs non religious Americans (Putnam et al., 2012; Chaves, 2011) and this question was not in the GSS. On the other hand, the CCES has no information on opinions about pre-marital sex.

[5]As noted by many authors, nones are not necessarily non-believers as some still report to believe in God and attend religious services. These individuals are sometimes described as "spiritual but not religious".

Figure 2: Trends in Church Membership
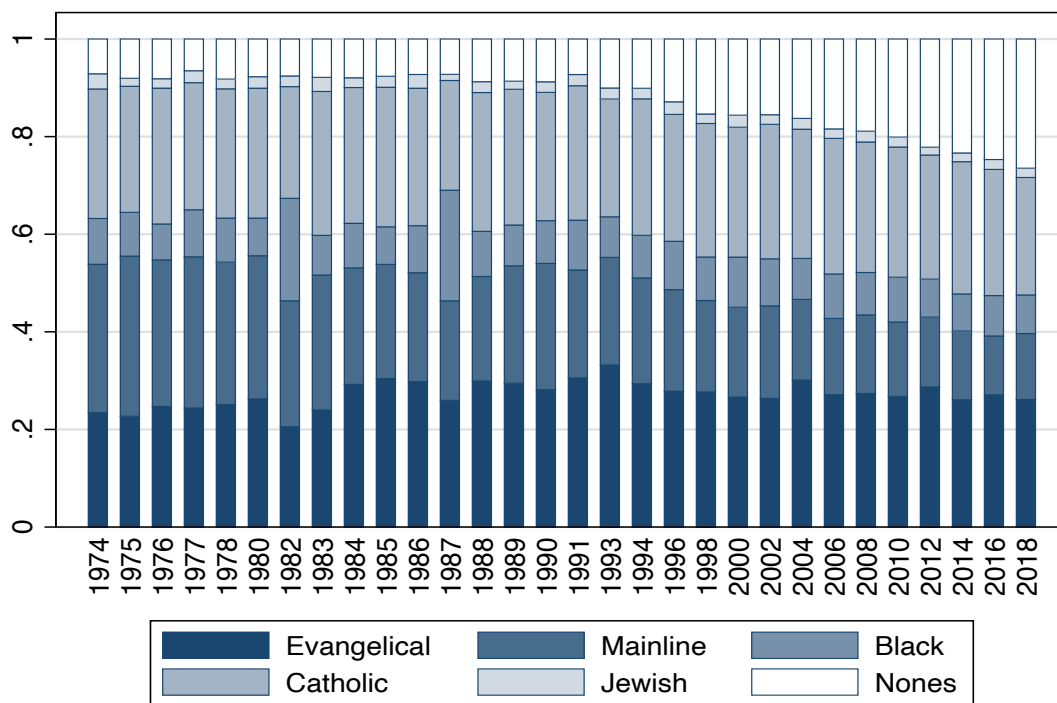
moderate group, did not experience a comparable fall in nominal membership, but saw a substantial decline in attendance throughout the same period. The share of Black Protestants has remained very stable across the same years, while Evangelicals initially experienced an increase of moderate magnitude, from 22% in 1974 to 30% in 1990, and then back to 22% in 2018.

What forces can account for these trends? Offering a single causal explanation for these massive movements in American society is a difficult task as it is likely that many factors are behind them. Yet Putnam et al. (2012) highlight the linkages between ideology – especially political views and sexual norms – and religious affiliations as a likely important driving force, deriving from the cultural revolution of the 1960s and its complicated aftermath. In particular, they attribute the rise of the nones to a backlash of an increasingly liberal share of the population against the ascent of the conservative religious right.

Figure 3 shows trends in average ideology of the American population. It indicates that

Figure 3: Trends in Attitudes towards Sexual Norms
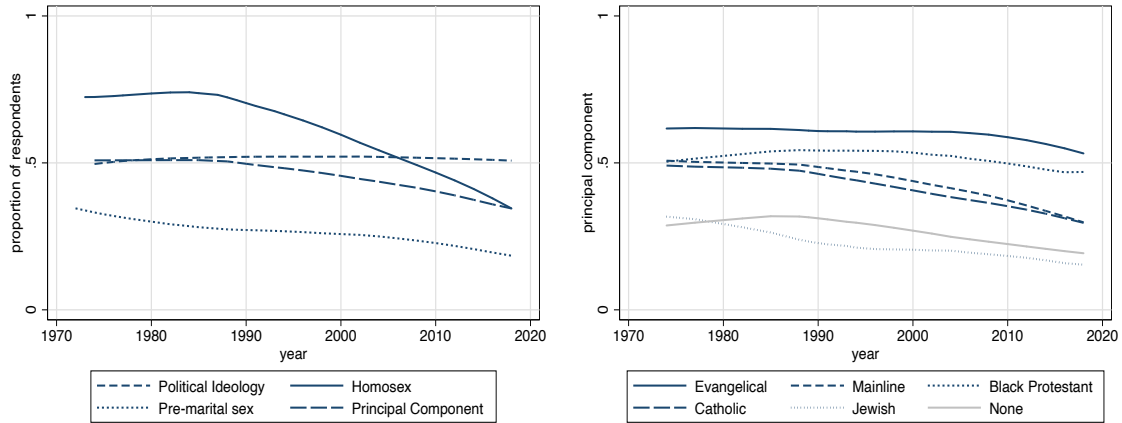
Note: The graph plots the average fraction of respondents who report pre-marital sex and homosexual relations as always wrong. It also plots the trend of average political ideology and the first principal component extracted from all three variables using polychoric correlations to account for the data discreteness as discussed in Kolenikov and Angeles (2014). Right-hand side graph plots the principal component for different religious groups. All trends are lowess-smoothed.

the share of individuals who consider homosexual relations as always wrong have consistently decreased starting from the 1990s until today, after a slight increase in the 1970-1980s. A similar but less pronounced pattern is visible for those who believe pre-marital sex is always wrong, albeit from a lower base level. In contrast, political ideology is remarkably constant throughout the period. Gentzkow (2016) unveils a similar stable pattern for party identification. The first principal component extracted from these three variables captures these movements well in a single dimension. On the right-hand side graph, we plot the principal component by religious groups. Evangelicals start from much more conservative levels and trend down only slightly, while moderate Catholics and Mainlines, and liberal nones trend down more clearly especially after 1990. The overall pattern discussed in this section suggests that both political ideology and attitudes towards sexual norms are important dimension of differentiation between religions and matter for individual affiliation decisions.

Nevertheless, an important distinction to be made is that *individual ideology* and *church ideology* are separate concepts. The thesis by Putnam et al. (2012) that trends in religious affiliations are linked to ideology implicitly assumes that the ideological positioning of re-

ligious groups are (i) fixed over time (e.g. they do not adapt to societal changes) and (ii) mostly concentrated towards the conservative end. An extra challenge for empirically testing this insight is that church ideology is not observable across time. In sections 3 and 4, we develop and estimate a model of demand and supply for religion that explicitly accounts for this distinction and gives us relevant model-based estimates of church ideology in each period. Then in Section 5 we use the model to formally test and quantify the role of the misalignment between church and individual ideology as a driving force behind these historical trends in American religiosity of the last few decades.

3   The Model

Following the arguments discussed in the previous section, we develop a simple model of supply and demand for religion that will allow us (i) to test whether differences between individuals ideological preferences and the ideological types assumed by churches affect religiosity levels and (ii) to understand how churches ideological views are built depending on society and churches ideological preferences and strategic interactions between churches.

3.1   A Hotelling Model of Demand for Churches

We first consider the demand for churches. Our demand model is close in spirit to the model developed in Gentzkow and Shapiro (2010); see also McBride (2019, 2008), Barro and McCleary (2005) and Barros and Garoupa (2002), among others, for Hotelling models of church competition. This section focus on a simpler version of our demand model. Subsection 3.3 discusses and justifies key assumptions of the model. Variations of this basic framework are analyzed in various parts of the paper – see, in particular, Section 4.5.

At each period t, an individual i chooses a church $j \in \{0, 1, 2, ..., J\}$. We assume that the utility individual i at period t derives from choosing church j is given by:

$$u_{ijt} = \gamma \left(\delta_{jt} - \delta_{it} \right)^2 + \xi_{jt} + \zeta_{ijt}. \tag{1}$$

In this equation, δ_{jt} represents church j's ideology at period t, δ_{it} represents individual i's ideology at the same period; and, ξ_{jt} is a time varying church specific effect that condenses all other churches characteristics affecting individuals choices (e.g. characteristics of temples, number of TV/radio channels owned by the church, characteristics of the clergy, etc.). This term is assumed to be observed by individuals and churches but not by the econometrician. Finally, ζ_{ijt} is an idiosyncratic taste shock observed by individual i but not by the econometrician. We assume that this variable is iid across (i, j, t) with distribution Extreme Value Type I. Heuristically, δ_{it} and δ_{jt} represent individuals and churches ideological views about different aspects of the society. As in Gentzkow and Shapiro (2010), we note that, all else constant, if $\gamma < 0$ individuals will prefer church j instead of church j' if church j has ideology closer to her ideology.

The choice $j = 0$ represents the outside option – i.e. if the individual i chooses $j = 0$, she will not be a member of any religion $j \in \{1, 2, ..., J\}$. We assume that the utility of the outside option is given by:

$$u_{i0t} = \xi_{0t} + \zeta_{i0t},$$

where, ξ_{0t} is a time-varying term that captures systematic variations in the utility of the "secular" option and is observed by all agents but the econometrician. All else constant, an increase in this component shifts down the demand for all religious groups at the same time indicating a generalized increase in the opportunity cost of religious participation. The last term ζ_{i0t} is also assumed to be an iid Extreme Value Type I taste shock. Utility maximization implies that individual i chooses church j with probability:

$$S_{ijt} \left(\delta_{jt}, \delta_{-\mathbf{jt}} \right) = \frac{exp \left(\gamma \left(\delta_{jt} - \delta_{it} \right)^2 + \xi_{jt}^0 \right)}{1 + \sum_{r=1}^{J} exp \left(\gamma \left(\delta_{rt} - \delta_{it} \right)^2 + \xi_{rt}^0 \right)}, \tag{2}$$

where, $\delta_{-\mathbf{jt}}$ is a vector containing the ideological types of all churches $j' \neq j$ and $\xi_{jt}^0 = \xi_{jt} - \xi_{0t}$,

that is, the utility of religion j at period t net of the value of the secular option. Finally, the aggregate demand for denomination j at period t, $S_{jt}(\delta_{jt}, \delta_{-\mathbf{jt}})$, is given by:

$$S_{jt}(\delta_{jt}, \delta_{-\mathbf{jt}}) = \frac{\sum_{i=1}^{N_t} S_{ijt}(\delta_{jt}, \delta_{-\mathbf{jt}})}{N_t}, \tag{3}$$

where N_t is the total number of individuals in the market.

3.2 Supply of Churches Ideology

Churches compete for individuals in religious markets by choosing at each period an ideological type, δ_{jt}. As in Gentzkow and Shapiro (2010) we allow churches to deviate from profit maximization. In other words, we assume that when choosing δ_{jt} church j's leaders take into account not only repercussions of this choice on the number of members of the church but also the "prophetic orientation" of the church. This simple formulation is in line with a number of studies suggesting that the ideologies of " (...) *religious elites blend a concern for rank-and-file opinion with a prophetic orientation*" (Wald and Calhoun-Brown, 2014). Mathematically, we assume that church j chooses δ_{jt} to maximize the following payoff function:

$$\Pi_{jt} = \theta_j S_{jt}(\delta_{jt}, \delta_{-\mathbf{jt}}) N_t - \psi_j (\delta_{jt} - \mu_{jt})^2, \tag{4}$$

where, $S_{jt}(\delta_{jt}, \delta_{-\mathbf{jt}})$ is the aggregate market share of church j at period t as specified by equation (3), μ_{jt} represents the "ideal" ideological type of church j at period t – or its prophetical orientation –, θ_j is the marginal benefit of an increase in church j's market share, such that $\theta_j S_{jt}(\delta_{jt}, \delta_{-\mathbf{jt}}) N_t$ may be interpreted as church j's pecuniary profits, and ψ_j captures the effects of deviations from churches "ideal" ideological type on its payoffs. In the same spirit as Gentzkow and Shapiro (2010) the last term in equation (4) represents, therefore, church j's non pecuniary motivations.

For an interior solution, the first order condition associated to the maximization of church

j's payoffs is given by:

$$2\psi_j \left(\delta_{jt} - \mu_{jt}\right) = \theta_j \frac{\partial S_{jt}\left(\delta_{jt}, \delta_{-\mathbf{jt}}\right)}{\partial \delta_{jt}} N_t,$$

where, the left hand side represents the supply of ideology – or, the marginal cost of an increase (decrease) in δ_{jt} relative to μ_{jt} – and the right hand side is the demand for ideology – or, the marginal benefit of an increase (decrease) in δ_{jt}. Rearranging:

$$\delta_{jt} = \frac{\theta_j}{2\psi_j} \frac{\partial S_{jt}\left(\delta_{jt}, \delta_{-\mathbf{jt}}\right)}{\partial \delta_{jt}} N_t + \mu_{jt}. \tag{5}$$

This equation holds for all $j \in \{1, 2, ..., J\}$ at any period of time. It shows that church j's ideological type is a function of society ideological preferences and ideological types chosen by other churches – captured by $\frac{\partial S_{jt}\left(\delta_{jt}, \delta_{-\mathbf{jt}}\right)}{\partial \delta_{jt}}$ – and its preferred ideology, μ_{jt}. If the ratio $\frac{\theta}{\psi}$ is close to zero, churches are not maximizing profits and their ideological types do not represent society ideological types; conversely, if this ratio is arbitrarily large, churches are maximizing profits and their ideological types are strongly influenced by society ideological preferences. The Bertrand-Nash equilibrium vector of types at any period t, $\delta_t^* = (\delta_{1t}^*, ..., \delta_{Jt}^*)$, is obtained from the numerical solution of the system of first order equations for all churches.[6] Next we discuss some limitations of the model.

3.3 Discussion

The model presented in this section is built on a set of restrictive assumptions. In this subsection we anticipate possible consequences of some these assumptions on our estimates and conclusions and raise evidences to justify them.

First, the demand model requires independence between the distribution of the Extreme Value shock, ζ_{ijt}, and individuals ideology. This assumption could be violated, for example, if individual ideology δ_{it} is endogenous to religious identity, that is, if individuals ideology

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[6]We do not have a formal proof of existence of the equilibrium in this model. To the best of our knowledge, existence and uniqueness of the Bertrand-Nash equilibrium with logistic demand is still an open question in the literature (Morrow and Skerlos, 2010, 2011). On the other hand, numerical simulations suggest that the equilibrium of this model exists and is unique. We resume this issue in the next section.

is influenced by religious choices. Americans frequently change their religion affiliation by marrying or divorcing, having children, and moving to different geographical areas. They may also do so in response to politics.

In her recent book, Margolis (2018) challenges the notion that religion produced the "God gap" by pointing out that partisan identities – solidified in adolescence and early adulthood ("impressionable years") – are forged long before religious identities, which are shaped when individuals form families and have children in school. She argues that it is partisanship that pushes people in or out of churches and not the other way around. Another important fact is that while there is a broad tendency of Americans to see religion as a positive force in society, US adults are resoundingly clear in their belief that religious institutions should stay out of politics. According to a 2019 Pew Research Center survey, close to two-thirds of the public say that organized religion should keep out of political matters, and three-quarters expresses the view that churches should not come out in favor of one candidate over another during elections (Pew, 2019).[7] Evidences of this type are also present in a much larger sample of countries (Grzymała-Busse, 2015).

The arguments laid out above do not intend to claim that religion identity does not affect individual belief and behavior. Indeed, our study is motivated in part by evidence that they do. Rather, our discussion suggests that the effect of church positioning on individual ideology accounts for only a small part of the cross-sectional variation in ideology that identifies our model – see also Gentzkow and Shapiro (2010) for related arguments in a study of drivers of media slant.[8] More formally, in next section we use the data and the model to raise evidences that are in consonance with these arguments.

Second, in the demand model the only term capturing taste heterogeneity at the individual level is the iid Extreme Value shock, ζ_{ijt}. Alternatively, we could have a more flexible

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[7]Also, the American law forbids religious organizations to endorse or opposing political candidates according to the "Johnson Amendment".

[8]Indeed, in their paper: "(...) *we do not have an analogous instrument for the within-market (cross zip code) variation in ideology that identifies our demand model. Our demand estimates therefore rely more heavily than our supply estimates on the assumption that most variation in ideology is exogenous with respect to newspaper content.*" Gentzkow and Shapiro (2010), page 50.

utility specification where individuals with different characteristics systematically attribute different utility for different churches. In Section 4 we estimate different specifications augmenting the demand model to incorporate more sophisticated forms of heterogeneity in preferences. Our results seem to indicate that the simpler version of the demand model described by equation (2) performs very well.

Third, our model also assumes that the effects of $(\delta_{jt} - \delta_{it})^2$ on individuals utility is fixed over time. Yet it might be the case that γ also varies across years, indicating that misalignment between individuals and churches ideology are getting more/less important to explain religious choices over time. In Section 4.5 we discuss versions of our models where we allow γ to vary across time. The results suggest that γ is very stable over time.

Fourth, we are implicitly assuming that δ_{jt} affects individuals utility only through the term $(\delta_{jt} - \delta_{it})^2$. Another possibility is to allow δ_{jt} to affect u_{ijt} also through ξ_{jt}^0. This would happen, for example, if people preferred more/less conservative religions independently of their own ideological positioning. This would have direct repercussions on the derivative of the demand for religion in equation (5) and, consequently, on our conclusions. In Subsection 4.5 we show, using different strategies, that ξ_{jt}^0 does not depend on δ_{jt}.

4   Estimation

We now discuss identification and estimation of the Hotelling model. To estimate the parameters of our supply and demand model we first need a measure of ideological types assumed by churches, δ_{jt}. While individuals ideological types, δ_{it}, are directly observed from our data, δ_{jt} has to be somehow estimated. Therefore, our first task is to show that δ_{jt} can be recovered from the data. Next we validate our methodology to estimate δ_{jt} using a self reported measure of clergy ideology from a large scale survey carried out in the US in 2001. Finally, we show our estimates of δ_{jt} for different religious groups and years and the estimates of our demand and supply model using both, the GSS and the CCES datasets. We end the section

with a battery of robustness checks of our main conclusions.

4.1 Methodology and Validation

We start our empirical analysis by showing that δ_{jt} can be identified from the data. To see this we open the term in parenthesis in equation (2) and rearrange. The demand model is, therefore, rewritten as:

$$S_{ijt}\left(\delta_{jt}, \delta_{-\mathbf{jt}}\right) = \frac{exp\left(\widetilde{\xi}_{jt} + \tilde{\delta}_{jt}\delta_{it} + \gamma\delta_{it}^2\right)}{1 + \sum_{r=1}^{J} exp\left(\widetilde{\xi}_{rt} + \tilde{\delta}_{rt}\delta_{it} + \gamma\delta_{it}^2\right)} \tag{6}$$

where, $\widetilde{\xi}_{jt} = \gamma\delta_{jt}^2 + \xi_{jt}^0$ and $\tilde{\delta}_{jt} = -2\gamma\delta_{jt}$. With information on individuals ideology, religion and other characteristics we can estimate equation (6) by Maximum Likelihood and obtain $\widetilde{\xi}_{jt}$, $\tilde{\delta}_{jt}$ and γ. With the estimates of γ and $\tilde{\delta}_{jt}$ we recover δ_{jt} using the fact that $\tilde{\delta}_{jt} = -2\gamma\delta_{jt}$.

Two important aspects of this approach must be emphasized. First, as our comments in the previous section indicate, the identification of the model depends crucially on the independence between the distribution of taste shocks, ζ_{ijt}, and individuals ideology, δ_{it}. This assumption would be violated if individuals ideology is itself a function of religious choices. Additionally, even when individuals ideology is exogenous to religion, the same assumption does not hold if δ_{it} is correlated with certain individual characteristics that also determine individuals preferences for different religious groups. As our demand model contains already time varying church specific effects, this assumption would be violated if, for example, individuals with a given characteristic x_i are also more conservative/liberal and at the same time attribute higher/lower (than average) utility to some church j. To verify whether this assumption is reasonable we will also include interactions between individuals observed characteristics and church dummies in equation (6). Throughout this section, comparisons between the estimates of the simple model described by equation (6) and the augmented model with individuals characteristics will inform us about the plausibility of this assumption. Second, δ_{jt} is not identified if γ also varies with consumer characteristics

as in many discrete choice models – see, for example, Berry et al. (1995) Berry et al. (2004). To check whether this assumption holds, in Section 4.5 we estimate a version of our model where γ is allowed to vary across individuals. The empirical results seem to support the specification with fixed γ.

Before applying this idea, we want to make sure that it will produce, indeed, meaningful estimates of churches ideology. Our strategy is the following: we first compute δ_{jt} using self reported clergy ideology obtained from the Cooperative Clergy Study Project data (CCSP), a detailed survey with approximately 9000 clergy from various denominations carried out in 2001 in the US. The focus of the survey was to understand *"social characteristics, theological beliefs, civic endeavors, and political attitudes and behavior of American clergy"*.[9] Then, using the CCES, we estimate δ_{jt} for the same denominations that appear in the CCSP using equation (6) and correlate the estimates of δ_{jt} obtained from the model with the estimates obtained from the CCSP. We use the CCES for this exercise because the number of observations for each year is much larger than in the GSS, allowing us to estimate δ_{jt} for almost all denominations that appear in the CCSP.

Table 2: Estimates of γ (CCES for 2008)

	[1]	[2]
γ	-0.594***	-0.651***
	[0.2195]	[0.2288]
Observations	266220	250002
Covariates	No	Yes

Table 2 shows the estimates of γ (standard errors clustered by denomination in brackets) using CCES data for 2008, the first year for which the CCES data is available.[10] In the CCES (CCSP) individuals (clergy) ideology is measured by a discrete variable with 5 categories where 1 indicates "extremely liberal" and 5 indicates "extremely conservative". To facilitate the interpretation of our results we normalized this variable to the $[0, 1]$ interval, where 0

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[9]See appendix for a detailed description of the CCSP.

[10]Figure A1 in the appendix suggests that clergy ideology is pretty stable over time. Given this evidence, the differences between the years in which the CCSP (2001) and CCES (2008) were conducted will not have deep consequences for our validation exercises.

indicates that the individual is "extremely liberal" and 1 indicates that she is "extremely conservative".[11] Later in this section we discuss estimates of our model using different measures of ideology. Denominations in the sample used to produce the estimates in this table comprise almost all denominations present in the CCSP data. The first column shows the estimates from our baseline model, represented by equation (6). In the second column we estimated a more flexible model where we included individuals observed characteristics – income, education and age – with church dummies in individuals utility function, i.e. allowing individuals utility for each church to vary not only with ideology but also with other individual characteristics.[12]

As expected, γ is negative and significant at 1% in both specifications. The inclusion of covariates seems to have little effect on the point estimates. Also, the estimates of $\tilde{\delta}_{jt}$ are positive and significant at 1% *for all churches* and the inclusion of controls do not cause relevant changes in the results.[13] These findings are important and indicate that correlation of individuals ideology with unobserved individual attributes that also affect utility for religion does not seem to cause major concerns. We also note that the comparison between the estimates of the parsimonious model and of the model augmented with individual characteristics is also informative about the importance of reverse causality from religious choices to individual ideology. If reverse causality is a threat to the identification of our model, we would expect that the inclusion of interactions between individuals characteristics and church dummies in the model would cause important changes to our estimates, even when individuals ideology is not correlated with other individual characteristics. The apparent stability of the estimates to the inclusion of controls minimizes our concerns with reverse causality.

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[11]We used the popular min-max normalization, i.e. for any $x \in [a, b]$ and $a, b \in \mathbb{R}$ and $b > a$, $\tilde{x} = \frac{x-a}{b-a}$ is the normalized value of x in the $[0, 1]$ interval.

[12]In the other models shown in this section we also included race dummies in the set of covariates. Unfortunately, when these dummies where included in this specification, the estimation algorithm did not converge. Anyway, in the other models, the inclusion of race in the set of covariates did not cause any relevant change to our estimates.

[13]Figure A3 in the appendix shows a scatter plot of the estimates of δ_{jt} for each church from the model with and without covariates. The estimates lie very close to the 45 degrees line.

From the estimates of $\tilde{\delta}_{jt}$ and γ we can compute δ_{jt}. A potential limitation of this approach is that the estimates of δ_{jt} will not necessarily be in the $[0,1]$ interval – or in the $[1,5]$ interval with the unnormalized data – and the estimation of a model with hundreds of constraints for all these parameters showed to be unfeasible.[14] So, in practice we are going to estimate the demand model in two stages:

1. **First stage:** estimate equation (6), compute δ_{jt} and normalize these estimates on the $[0,1]$ interval.[15]

2. **Second stage:** estimate the demand model (2) using the normalized estimates of δ_{jt} obtained in the first stage.

That said, Figure 4 shows a scatter plot of the normalized estimates of δ_{jt} obtained from the model and the estimates of δ_{jt} obtained directly from the CCSP for 17 denominations that were present in both CCSP and CCES data. It seems clear that the model does a good job at estimating δ_{jt}. With very few exceptions, all points are very close to the 45 degrees line. The correlation between observed and estimated ideology is 0.9. This result is also interesting because it indicates that potential biases arising from the reverse causation running from religious choice to δ_{it} are not distorting our estimates of δ_{jt}.

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[14]The number of parameters we are estimating using the full CCES or GSS samples (see next subsection) is around 500 and the CCES (GSS) sample have millions (hundreds of thousands) of observations, which increases a lot the computational burden involved in the estimation of these models.

[15]As we explained before, we used the min-max normalization.

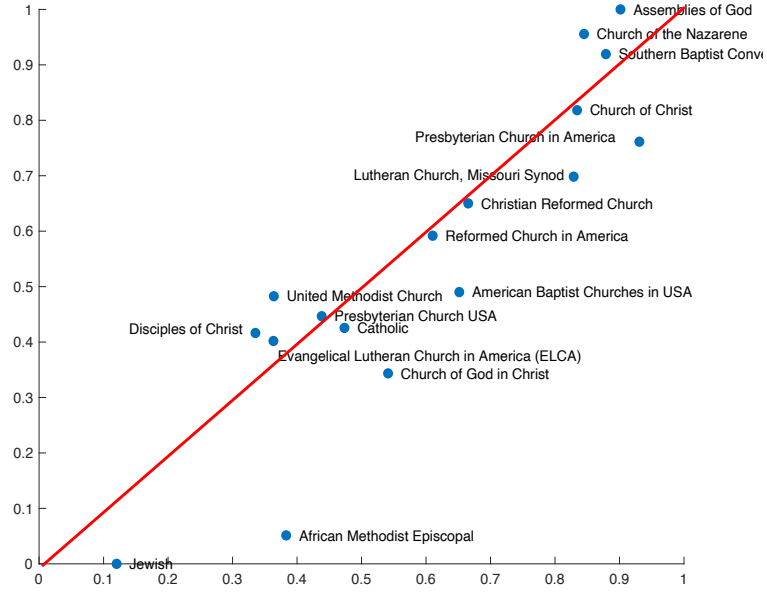Figure 4: Correlations Between Church Ideology: Model (y) and Cooperative Clergy Study Project Data (x)

Table 3: Estimates of γ Using δ_{jt} Obtained from the CCSP and from the Two-Step Estimation Procedure

	[1]	[2]
γ: CCSP δ_{jt}	-2.5734***	-2.5952***
	[0.1070]	[0.1001]
γ: Two-step procedure	-2.1160***	-2.0190***
	[0.0994]	[0.0873]
Observations	250002	266220
Controls	Yes	No

Figure 5: Correlations Between ξ_{jt}^0 Estimated Using δ_{jt} from the CCSP (y) and from the Two-Step Estimation Procedure (x)
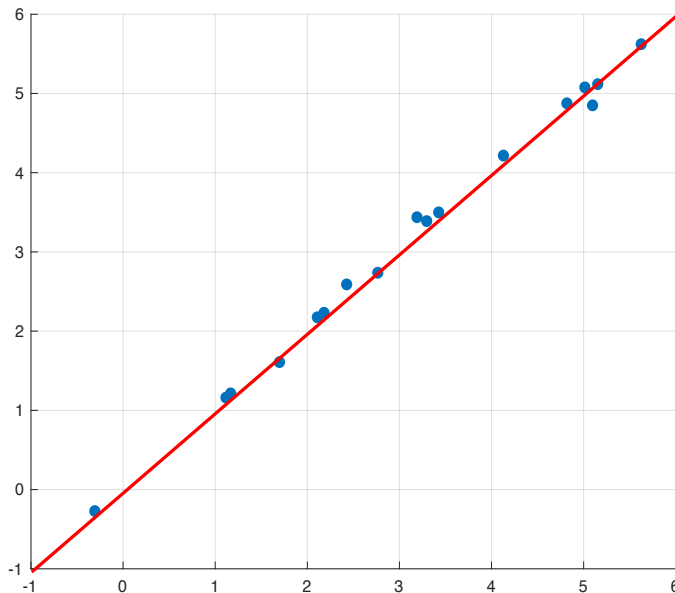
Lastly, we analyze whether the two step procedure used to estimate our demand model has relevant effects on the demand estimates. We estimate the demand model (2) using δ_{jt} obtained directly from the CCSP data and using the normalized estimates of δ_{jt} shown in Figure 4 – i.e. our second stage estimates. Table 3 shows the estimates of γ for both models and their corresponding standard-errors clustered by denomination. Reassuringly, the estimates produced by the model estimated using church ideology obtained from the CCSP (rows one and two) and from our two-step procedure (rows three and four) are very close. Independently of the model, the inclusion of covariates has little effect on the demand estimates. Figure 5 shows the estimates of ξ_{jt}^0 for the model (without covariates) estimated using δ_{jt} observed in the CCSP data and for the model estimated from our two-step procedure. Again, the estimates produced by both models are almost identical. The coefficient of correlation between the two sets of estimates is equal to 0.998.

4.2 Church Ideology Estimates

We now apply the procedures discussed in the previous section to estimate churches ideology using the GSS and the CCES. As mentioned, each of these datasets has their strengths and weaknesses. The estimation of our model using both datasets may bring complementary findings and reinforce key aspects of the analysis presented in this paper. For the CCES and GSS we estimate ideology for the religious groups presented in Table 1.

Panel 6 shows the average (across years) estimates of (normalized) δ_{jt} for each religious group in the CCES (left hand side) and the GSS (right hand side). Following the procedures described above we estimated δ_{jt} using equation (6) and normalized them to the $[0, 1]$ interval using the min-max formula. The estimates of γ from equation (6) for the CCES and GSS data are in the appendix. For both datasets these estimates are always negative and significant at 1%. The estimates of $\tilde{\delta}_{jt}$ are positive and significant at 1% for all religious groups and years.[16] Once again, the inclusion of socio-demographic variables in the estimation has little effect on the estimates of these parameters.

The disposition of churches in the Hotelling line is consistent with evidences in the literature – see, for instance, Wald and Calhoun-Brown (2014) and the references therein: in the CCES Jewish are on the left extreme; Mormons and religious groups composed mainly by Evangelical denominations are on the right extreme and Catholics and religious groups that have a majority of Mainline/Black Protestant denominations are located on the center of the line. The figure also indicates that there is significant dispersion in the disposition of churches on the Hotelling line.

In general, the same patterns are observed when we use the GSS data (and, therefore, a more aggregate definition of religious groups) and when we look at self-reported measures of clergy ideology (horizontal axis in Figure 4). This suggests that the composition of the Hotelling line shown in this figure holds independently of the two-step procedure we use to estimate δ_{jt} (δ_{jt} in the horizontal axis of Figure 4 was obtained directly from CCSP data)

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[16]Except for Jewish in the GSS, where the estimates of $\tilde{\delta}_{jt}$ are not statistically significant for some years.

and aggregation of religious group (in Figure 4 the analysis is done at the denomination level, without any aggregation).

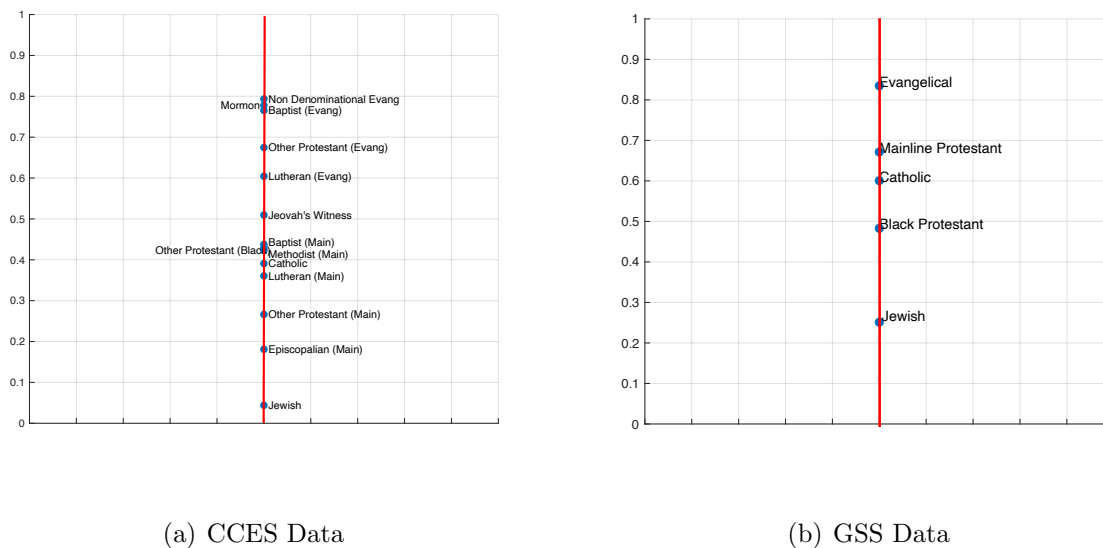Figure 6: Ideological Hotelling Line – CCES and GSS Datasets

(a) CCES Data

(b) GSS Data

Figure 7 shows the scatter plot of δ_{jt} and average δ_{it} across members of each denomination for the CCES and GGS data. The figure reveals that there is strong positive correlation between δ_{jt} and average δ_{it} of members of each church. The coefficient of correlation is 0.98 in the CCES and 0.92 in the GSS and they are significant at 1% suggesting that there is positive assortative matching between churches and individuals: more conservative (liberal) individuals prefer more conservative (liberal) churches.

Another important finding that appears in these figures is that clergy ideology looks more extreme than the ideology of the average church member. Figure A2 in the appendix, which plots self-reported measures of clergy and individuals ideology from the CCSP, reinforces the finding. Interestingly, all these graphs are in line with the conclusions in Hersh and Malina (2017) that show, using self-reported partisanship of more than 130000 clergy in the US and the CCES, that there is strong positive association between partisanship of pastors and faithfuls (i.e. either Democrat or Republican), but pastors are much more one-sidedly partisan than the mass public – see, in particular, Figure 2 in their paper; see also

the discussions Wald and Calhoun-Brown (2014) and Djupe and Gilbert (2008). Next we investigate further implications of these findings.

Figure 7: Correlations Between Church (y axis) and Individuals Ideology (x axis) – CCES and GSS Datasets

(a) CCES Data   (b) GSS Data
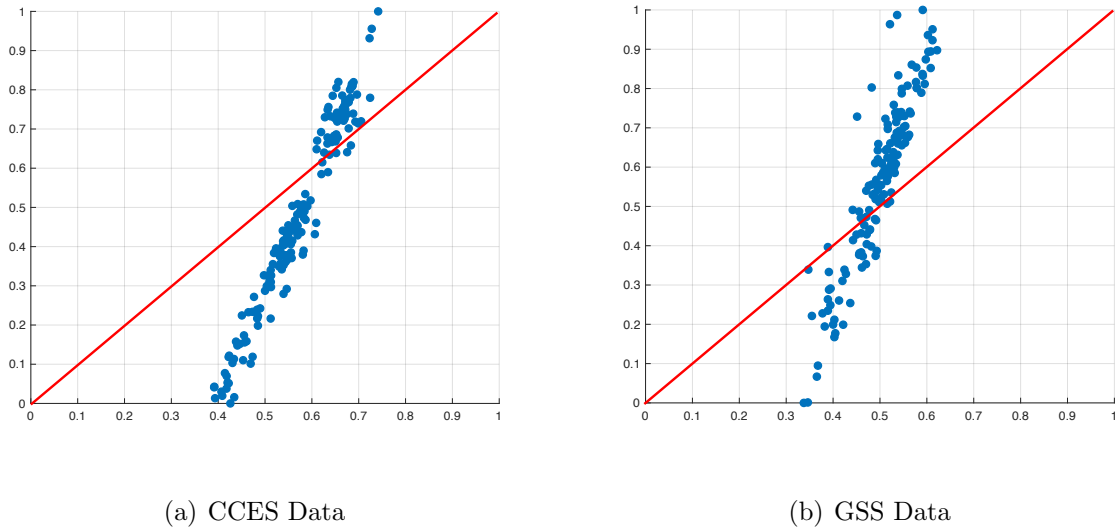
4.3   Demand and Supply Estimates

Now, using the (normalized) estimates of δ_{jt} shown in the previous section, we estimate the demand for churches in equation (2). The estimates of γ for the CCES and for the GSS are shown in Table 4. The models in the first column use the estimates of δ_{jt} obtained from the (first stage) model – equation (6) – with covariates and include income, education, age and race dummies interacted with church dummies as additional explanatory variables; the models in the second column use the estimates of δ_{jt} obtained from the first stage model estimated without individual characteristics and do not include individual characteristics. The results for the four models – standard-errors clustered at the denomination level are in brackets – show that γ is negative, significant at 1% and invariant to the inclusion of individuals observed characteristics. Interestingly, the CCES estimates shown in Table 4 are quite close in magnitude to the estimates shown in Table 2 which are based on ideology measures obtained directly from the CCSP data. Jointly, the estimates of γ reported throughout

this section strongly suggests that alignments between churches and individuals ideology are relevant to explain religious choices of the US population.

Table 4: Estimates of γ for the CCES and GSS Data and Normalized Estimates of δ_{jt}

	[1]	[2]
γ CCES	-2.1742***	-2.1727***
	[0.0741]	[0.0810]
Observations	4754265	5313285
γ GSS	-3.6509***	-3.4693***
	[0.0371]	[0.0282]
Observations	271308	301536
Controls	Yes	No

We now discuss the supply side of our model. More specifically, we are interested in the following question: are churches ideological positioning driven by clergy intrinsic preferences (supply) or by society ideological preferences (demand)? Or, in terms of the supply model developed in Section 3.2, are churches choosing their ideological positioning to maximize profits or to satisfy the prophetical orientation of their clergy?

Based on the supply model discussed in Section 3.2 there are two ways of answering this question. The first is to directly estimate equation (5) using our estimates of δ_{jt}, of $\frac{\partial S_{jt}(\delta_{jt}, \delta_{-\mathbf{jt}})}{\partial \delta_{jt}}$ and a proper set of instrumental variables to account for the correlation between $\frac{\partial S_{jt}(\delta_{jt}, \delta_{-\mathbf{jt}})}{\partial \delta_{jt}}$ and the residual term μ_{jt}. The second is to compute δ_{jt} that would be consistent with profit maximization, i.e. assuming that $\psi_j = 0$ in equation (4), finding the equilibrium vector of δ_{jt}'s from the first order conditions associated to the corresponding maximization problem and comparing this vector to the vector of δ_{jt} estimated directly from the data. As in Gentzkow and Shapiro (2010) we adopted the second approach.[17] Precisely, we do the following. First, we find the first order conditions of the problem

$$\max_{\delta_{jt}} \theta_j S_{jt}\left(\delta_{jt}, \delta_{-\mathbf{jt}}\right) N_t$$

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[17]The reason is that the sample size that we have to estimate $\frac{\theta}{2\psi}$ for all churches is relatively small and, in particular, in the CCES we do not have sufficient temporal variation in δ_{jt} to precisely identify $\frac{\theta}{2\psi}$ for all churches. Moreover, following the second approach we do not need instrumental variables and the usual IV assumptions to identify the parameters of interest.

for each church j and period of time t. The first order condition for any j and t can be trivially written as:

$$\frac{\partial S_{jt}\left(\delta_{jt}, \delta_{-\mathbf{jt}}\right)}{\partial \delta_{jt}} = 0,$$

and the vector of profit maximizing ideology levels, which we denote by $\delta_t^{pm} = (\delta_{1t}^{pm}, ..., \delta_{Jt}^{pm})$, can be obtained, at each period of time, as the solution to the set of first order conditions for all churches. Following the evidences discussed in Section 3.3, to compute the derivative of the aggregate demand for churches we assume that δ_{jt} affects demand only through the distances – see also Section 4.5. In light of the discussions in the same Section 3.3, we also assume that δ_{it} is exogenous to the model, i.e. it does not depend on δ_{jt}.

From the demand models in column 2 of Table 4 we computed δ_t^{pm} and compare δ_{jt}^{pm} with the estimates of δ_{jt} reported in Section 4 – and that were used to estimate the models in Table 4, column 2.[18] As briefly mentioned in Section 3, existence and uniqueness of the Bertrand-Nash equilibrium with logistic demand is still an open question in the literature (Morrow and Skerlos, 2010, 2011). To check the existence and stability of the equilibrium of our model we calculate δ_{jt}^{pm} changing the initial guesses several times. The solution algorithm always converged to the same vector, independent of the initial guess.

Figure 8 plots δ_{jt}^{pm} and δ_{jt} averaged across years for all j and both datasets. Evidently, if $\delta_{jt} = \delta_{jt}^{pm}$ for all j then all the dots should be aligned on the diagonal line. Instead, we observe most points below the diagonal and some above the diagonal. A simple linear regression of δ_{jt}^{pm} on δ_{jt} produces a constant of 0.34 and a slope of 0.26 for the GSS and a constant of 0.38 and a slope of 0.29 for the CCES. These coefficients are significant at 1% and the slopes are statistically different from 1 at 1% of significance, which indicates that churches are systematically deviating from profit maximization when choosing their ideological types.

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[18]The models in column 1 of Table 4 produce very similar results. As we explain in the next section, for the purposes of this paper, we find that the focus on models without covariates facilitates the exposition and interpretation of our main results.

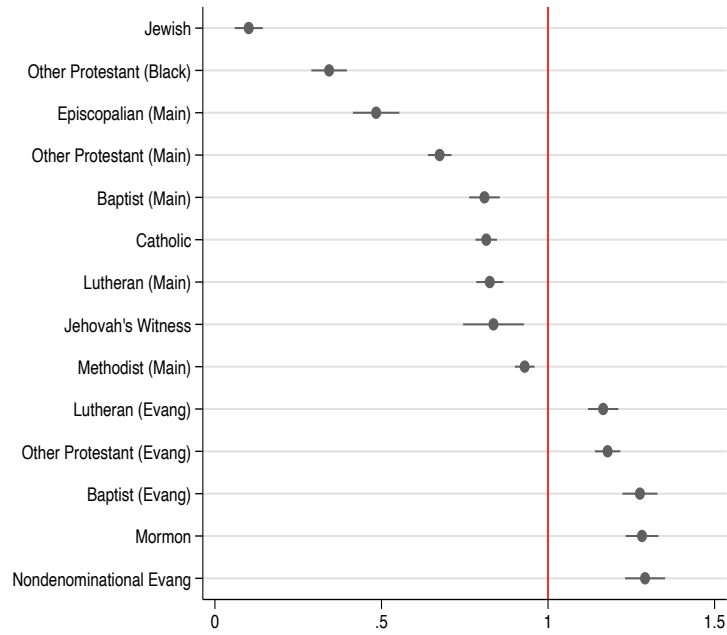Figure 8: Profit Maximizing (x) and Estimated (y) Church Ideology
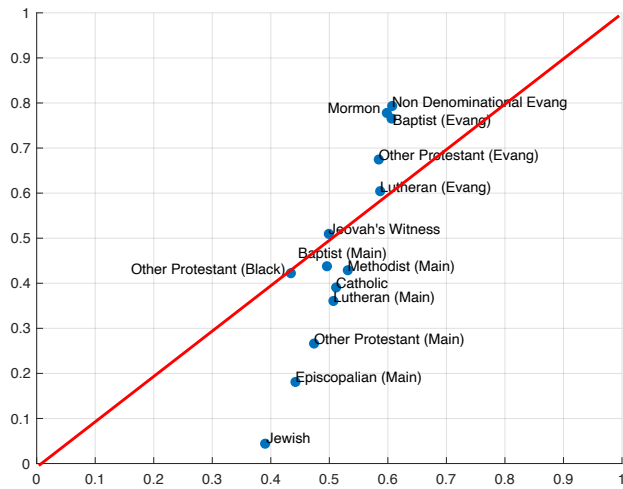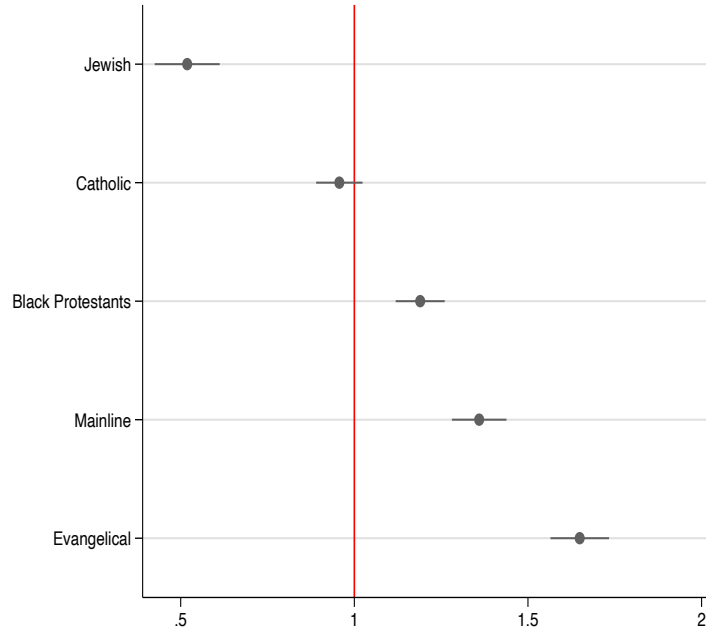

(a) CCES Data
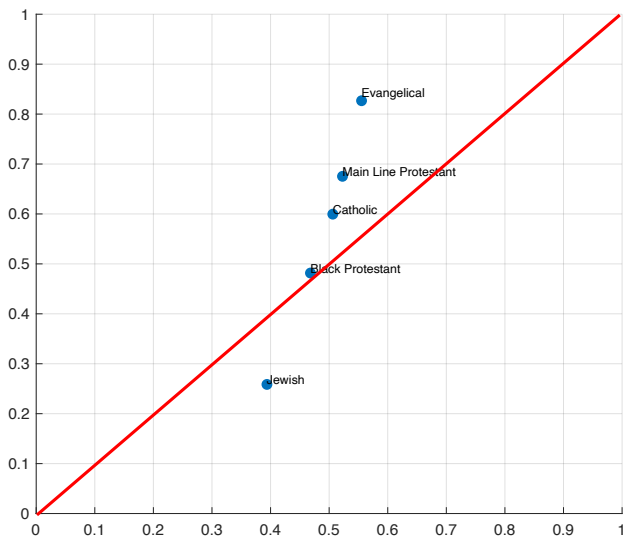
(b) GSS Data

Figure 9: Correlations Between Profit Maximizing and Estimated Church Ideology

(a) CCES Data

(b) GSS Data

Finally, Figure 9 shows the coefficients of a regression of observed church ideology on profit

maximizing ideology interacted with denomination dummies plus 95% confidence intervals of these estimates – for both, the GSS and CCES datasets. In line with Figure 8, Figure 9 shows that, independently of the dataset used, observed ideology is significantly different from profit maximizing levels of ideology for almost all religious groups. Notably, the differences between proxy maximizing and observed levels of ideology are more pronounced for the religious groups on the left or right extremes of the Hotelling line.

4.4 Alternative Indicators of Ideology

Although the measure of ideology used in the previous subsections is widely adopted by many papers, it fails to capture dimensions that also moulds opinions of the US population about different social issues – see Gentzkow (2016); see also the discussions in Section 2. This section reestimates the supply and demand model using an alternative measure of ideology.

We reestimate the GSS and CCES models. As mentioned in Section 2 the measure of ideology we build for the GSS is the first principal component of three variables: political ideology (same variable used in the previous subsections), a dummy variable that assumes 1 if the individual is against sex before marriage and 0 otherwise, and a dummy variable that assumes 1 if the individual opposes gay marriage and 0 otherwise. For the CCES, we compute the first principal component of ideology (same as in the previous subsections), the gay marriage dummy (same as in the GSS) and a dummy that assumes 1 if the individual is against abortion and 0 otherwise.[19] A drawback of these two measures is that the additional variables we use to estimate the principal components are not available for all years and, by this reason, the number of observations in the models shown in this subsection is much smaller than in the estimations shown in the previous subsections.

Table B4 in the Appendix shows the results of the first and second stage estimates of γ for the CCES and GSS. In both cases all the estimates are negative and significant at

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[19]The reason is that the literature also stresses the importance of opinions about abortion as one of the most important differentials of religious vs non religious Americans (Putnam et al., 2012; Chaves, 2011) and this question was not in the GSS. On the other hand, the CCES has no information on opinions about pre-marital sex.

1%. The magnitude of the second-stage estimates of these coefficients are relatively large (in absolute values) when compared to the estimates shown in the previous section. Based on these models we recompute the profit maximizing levels of ideology and plot these estimates against the estimates obtained from our two-step procedure.

Figure 10 shows the results. Patterns observed in Figure 10 are quite close to those displayed in Figure 8: independently of the dataset observed measures of church ideology are more extreme than the corresponding profit maximizing levels. Figure A4 reproduces Figure 9 discussed in the previous subsection. Results are, again, in consonance with results shown in the last subsection.

Figure 10: Profit Maximizing (x) and Estimated (y) Church Ideology (Principal Component Model)
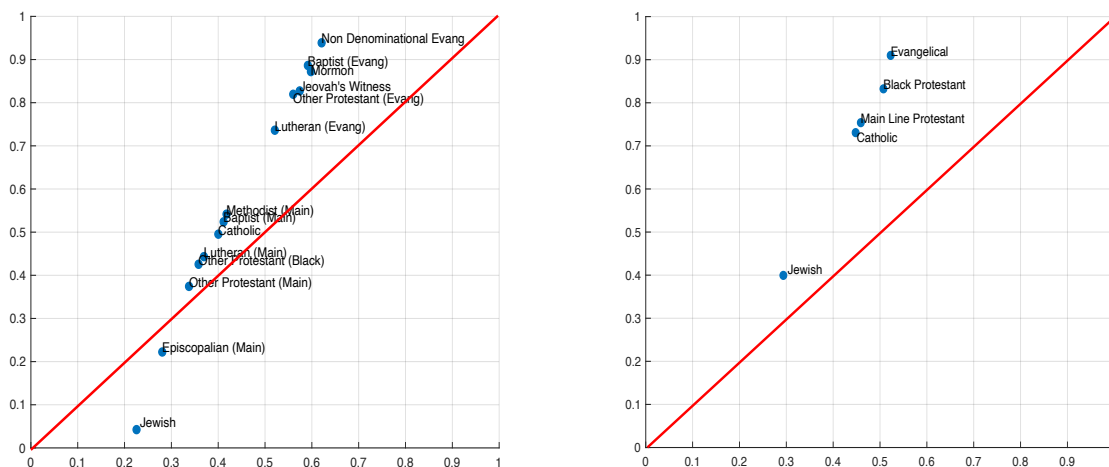
(a) CCES Data

(b) GSS Data

4.5 Robustness

Together, the findings presented throughout this section indicate that (i) individuals seem to prefer churches that adopt ideological positions that are closer to their own ideological positions and that (ii) churches ideology – especially those with more extreme ideological views – is strongly driven by clergy preferences (supply side) and not by society ideological

preferences (demand side). Importantly, these results hold independently of the dataset, definition of religious group, definition of ideology and specification of the demand model. This section discusses other robustness analyses of these conclusions.

First, the different versions of the demand model estimated in this section consider that γ is fixed across individuals – and without this assumption δ_{jt} cannot be identified from the data. To test whether this assumption is reasonable we match the CCSP data with the CCES data for 2008 and using clergy self-reported ideology from the CCSP we estimate a demand model similar to the model used to estimate the coefficient γ in the first row of Table 3 but allowing γ to vary across individuals and churches. Precisely, the model is the same as the model in the first column/first row of Table 3 but now we assume $\gamma_{ijt} = \gamma_0 + \Theta_{\mathbf{j}} \mathbf{X_{it}}$, where $\mathbf{X_{it}}$ is a vector containing i's income, education and age, γ_0 is a constant and $\Theta_{\mathbf{j}}$ is a vector of parameters multiplying $\mathbf{X_{it}}$. Results of the interactions between individuals covariates, church dummies and $(\delta_{jt} - \delta_{it})^2$ and of γ_0 are in Table C1 in the Appendix – the model also includes interactions between each covariate and church dummies (not shown). The results are pretty clear: γ_0 is quite close to the coefficients in Table 3 and almost all interactions of individual characteristics and distance are not significant. These results suggest that the model with fixed γ appear to be a very good approximation to describe the demand for religion in the US.

Second, we also assumed in all the models estimated so far that γ is fixed over time. This assumption is also critical for the identification of δ_{jt} from the data and for the counterfactual analysis performed in the next section. To check whether this assumption is reasonable, we estimate a version of our model where we split the GSS data into two subsamples. The first subsample covers the period 1974-1989; the second covers the period 1990-2018.[20] We reestimate the first and the second stage for these two subsamples separately. Table C2 in the appendix shows the (second-stage) estimates of γ. The estimates for both periods are

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[20]We choose to split the sample before and after 1990 because, as we argue in the next section, the 1990s (and the subsequent periods) correspond to a period of profound changes in the ideological positioning of the US population.

quite close and also close to the estimates shown in Table 4, where the full sample was used to estimate the model.

Third, we have assumed that ξ_{jt}^0 does not depend directly on δ_{jt}. If this dependence exists our estimates of δ_{jt}^{pm} (profit maximizing levels of churches ideology) will be biased. To verify whether this is the case (or not), Table B2 in the appendix shows the results of regressions of ξ_{jt}^0 on δ_{jt}. As δ_{jt} may be correlated with unobserved church characteristics affecting ξ_{jt} – and, therefore, ξ_{jt}^0, we also instrumented δ_{jt} using the average of δ_{kt}, $k > 0$, $k \neq j$ as an instrument – see Berry et al. (1995). We estimate these regressions for ξ_{jt}^0 obtained from the demand model that does not have interactions between church dummies and individual characteristics and from the model that has these interactions. For the former type of models, neither OLS or IV coefficients are statistically significant at the usual levels; for the latter, only the OLS estimates are significant at 10%.

Figure 11: Profit Maximizing (x) and Observed (y) Church Ideology – CCSP
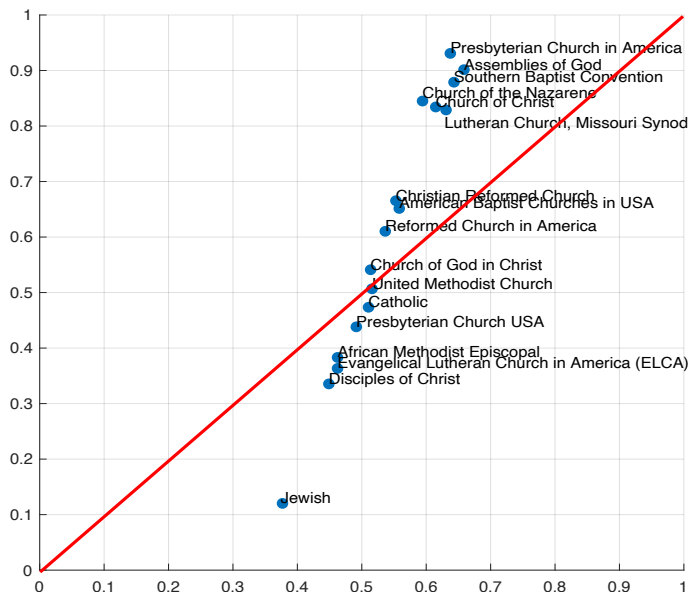
Finally, we close this section showing that our second conclusion – i.e. that churches ideology is driven by clergy preferences – also holds independently of how δ_{jt} is obtained.

To do this we compute profit maximizing church ideology using the CCSP demand model (without covariates) estimated from self-reported clergy ideology and compare it with self-reported clergy ideology. Figure 11 plots observed and profit maximizing levels of ideology using the CCSP data. The patterns shown by this graph are strikingly close to the patterns shown in figures 8 and 10. Notably, observed churches ideology is much more extreme than profit maximizing levels of ideology. Next section uses the model and findings reported in this section for a series of counterfactual exercises.

5   Model Application: Ideology and Religious Trends

We now explore the analytical possibilities of our demand and supply model to test the insights given by Putnam et al. (2012) that highlight the role of ideology in explaining the major trends that gradually altered the American religious landscape in the last 50 years – see discussions in Section 2.2. We proceed in three steps. First, we quantify the importance of changes in ideology of the US population to explain these trends. Second, we investigate how the fact that the ideological types chosen by churches are not consistent with profit maximization – as revealed by our model estimates in Section 4 – has affected religiosity in the US. Third, we evaluate the role of changes in preferences for religion (net of differences between churches and individuals ideology) on the evolution of the US religion market.

5.1   Model Fitting and the Importance of Ideology

We start by showing the fitting of our models to the data and quantifying the effects of misalignment of churches and individuals ideology on religious choices. First, we examine the fitting of our models to the data by comparing the average market share of each denomination observed in the data with market shares predicted by the demand models. Next, we evaluate the importance of alignments of churches and individuals ideology. To do this we first use the model to predict the average share of each denomination and the average share of the

37

outside option using both datasets, the CCES and the GSS. Then we recompute these same shares assuming $\gamma = 0$ or, in other words, assuming that differences between churches and individuals ideology do not affect the demand for churches.

As the discussions throughout this section indicate, the self-reported measure of political ideology is relatively constant over time and does not capture the polarization of opinions observed in the US since the 1990s (Gentzkow, 2016). In light of this observation, the exercises shown in this (and the next) subsection are based on our alternative measure of ideology – i.e. that computed from the principal component of self-reported political ideology and the dummy variables capturing individuals views on moral values. The appendix shows the results for the models where δ_{it} is approximated by the self-reported measure of political ideology only.

Table 5 shows the results. Column (a) has the market share of each religious group averaged across years as observed in the data; column (b) has the same numbers as predicted by the model; column (c) has the market shares under the counterfactual scenario where $\gamma = 0$ and column (d) has the difference between columns (c) and (b). The comparison between columns (a) and (b) reveals that the models fit remarkably well to the data, independently of the dataset we use. The comparison between columns (b) and (c) suggests that differences in society and churches ideological preferences explain roughly 1/3 (2/3) of the share of individuals that choose to do not be affiliated to any religious group in the CCES (GSS): when we eliminate ideological preferences from individuals utility function the share of the outside option (rows labeled as "Nones" in the table) falls from 30.14% to 19.37% (from 18.64% to 6.2%) in the CCES (in the GSS). Interestingly, the denominations occupying the right extreme and the left extreme of the Hotelling line would gain market share and the ones on the center of the Hotelling line would lose. Table B1 in the Appendix shows the results of the same exercises for the models where δ_{it} is approximated by the self-reported measure of political ideology. Our conclusions are qualitatively the same.

Table 5: Data, Model and Counterfactual $\gamma = 0$ Market Shares for the CCES and GSS (Principal Component Models)

Denomination	(a) Data	(b) Model	(c) $\gamma = 0$	(c)-(b)
CCES				
Baptist (Evang)	8.71%	8.77%	14.02%	5.25%
Baptist (Main)	1.32%	1.32%	1.21%	-0.11%
Catholic	23.23%	22.80%	20.61%	-2.19%
Episcopalian (Main)	1.53%	1.48%	1.25%	-0.23%
Jehovah's Witness	0.28%	0.30%	0.42%	0.12%
Jewish	2.77%	2.79%	2.78%	-0.01%
Lutheran (Evang)	2.01%	1.97%	2.37%	0.40%
Lutheran (Main)	2.36%	2.36%	2.04%	-0.32%
Methodist (Main)	5.03%	4.99%	4.66%	-0.33%
Mormon	1.66%	1.65%	2.48%	0.83%
Nondenominational Evang	6.51%	6.45%	11.62%	5.17%
Other Protestant (Black)	3.32%	3.26%	2.83%	-0.43%
Other Protestant (Evang)	8.19%	8.24%	11.42%	3.18%
Other Protestant (Main)	3.51%	3.49%	2.93%	-0.56%
Nones	**29.57%**	**30.14%**	**19.37%**	**-10.77%**
GSS				
Evangelical	25.10%	26.52%	41.21%	14.69%
Mainline	19.70%	18.84%	18.05%	-0.79%
Black Protestant	8.90%	8.87%	10.81%	1.94%
Catholic	23.90%	25.18%	22.64%	-2.54%
Jewish	1.77%	1.95%	1.08%	-0.87%
None	**16.70%**	**18.64%**	**6.20%**	**-12.44%**

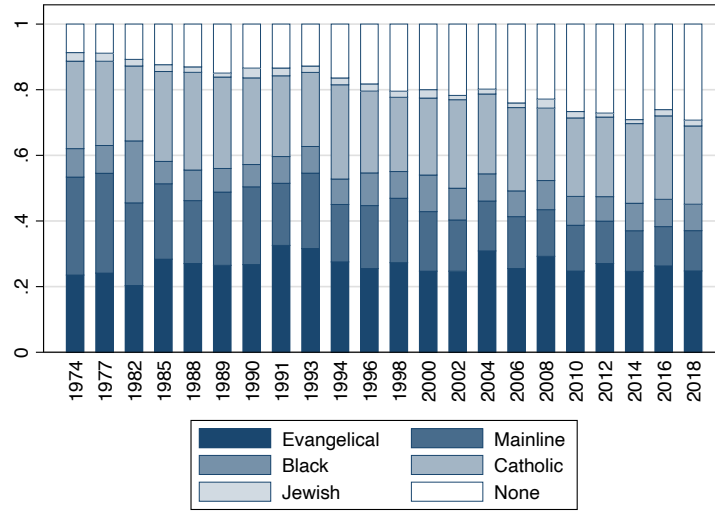## 5.2 Changes in Ideology and Religion Identity

The results in Table 5 (and Table B1 in the appendix), therefore, suggest that differences between individuals and churches ideology, summarized by the component $\gamma \left(\delta_{jt} - \delta_{it} \right)^2$ in our demand model, are relevant to explain the demand for religion. This subsection aims at quantifying the importance of this component to explain changes observed in the US religion market during the last decades. Given that the GSS has a longer time-series – which allows us to analyze long-run trends in the market – we focus our analysis on the estimates based on this dataset. Using the GSS demand estimates from this model we compute the distribution of δ_{it} in 1974 and recompute the market shares of each religious group from 1974 until 2018 drawing δ_{it} for each year from the 1974 distribution. This experiment allows us to understand how changes in ideological positioning of the US population affected religiosity in the US.

Figure 12 illustrates our results. Panel (a) shows the shares of each religious group as predicted by our baseline model; Panel (b) shows the shares of the same groups holding the distribution of δ_{it} fixed at 1974 levels. The comparison between both panels shows that if the distribution of ideology were fixed at the 1974 levels the fraction of nones in 2018 would have been approximately 10 percentage points lower than that predicted by the model. Roughly speaking, this estimate suggests that changes in δ_{it} represent more than 50% of the increase in the level of nones in the 1974-2018 period. The exercise, therefore, indicates that changes in ideology had non negligible effects on the evolution of the share of nones.

We now look at the supply side of our model. The question we want to answer is: what would happen to the trends observed during the last decades in the US religion markets if churches had updated their ideological types to accommodate changes in the distribution of δ_{it}? To answer question we recompute the demand for churches using δ_{jt}^{pm}, i.e. δ_{jt} consistent with profit maximization as defined in Section 4, instead of observed values of this variable. Figure 13 shows the results of the experiment. Succinctly, under this alternative scenario, levels of religiosity would be much larger at any point in time and the effects of movements

in δ_{it} on the growth of nones would be inexpressive compared to the evidences present in the data.

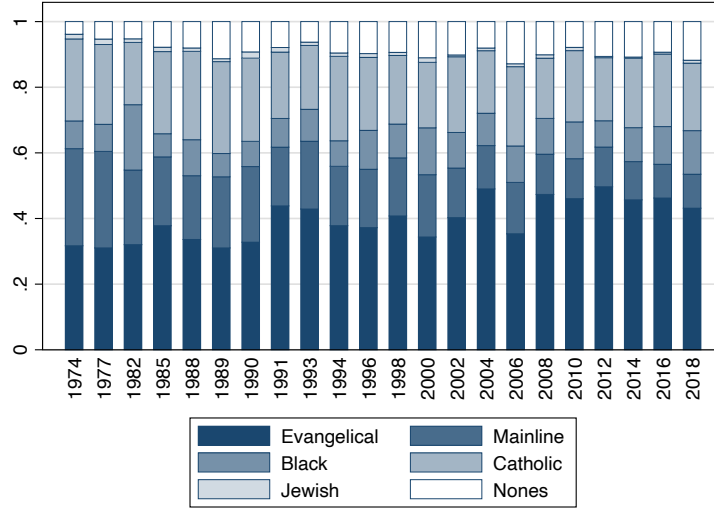Figure 12: Changes in Ideology and their Effects on the Demand for Religion

(a) Market Shares as Predicted by the Model
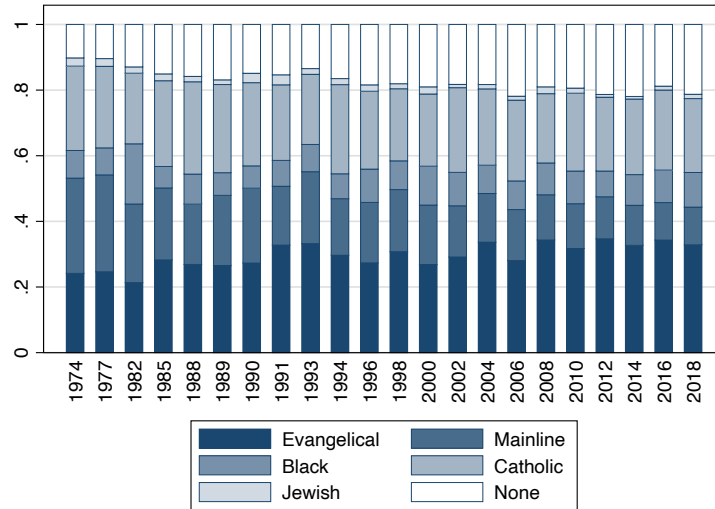
(b) Market Shares with δ_{it} 1974

Figure 13: Demand for Religion of Profit Maximizing Churches

In summary, the evidences presented by figures 12 and 13 support the view that changes in ideology had deep consequences for religiosity in the US. Importantly, our analysis indicates that these consequences were the result, at the same time, of supply and demand forces. On the one hand, as the distribution of δ_{it} moved to the left of the ideological spectrum it shifted the demand away from major religious groups and towards the secular option. On the other hand, this movement had deeper repercussions on the religion market as a whole, and in the levels of nones in particular, because churches have not updated their ideological types to fulfill the necessities of the public. Had this happened, we would have still observed increases in the level of nones, but at much slower pace.

5.3 Changes in Preferences and Religion in the US

Having established the importance of changes in ideology and its implications for religious choices, we now look at the role of other factors influencing religious preferences, summarized in our model by the demand shifter ξ_{jt}^0. This exercise is particularly relevant because changes in the distribution of δ_{it} are not able to explain the dramatic fall of participation of Mainline Protestant denominations in the US religious scene (see Figure 2) as we show below. Figure

14 plots the lowess-smoothed difference between the graphs in panels (a) and (b) of Figure 12. The fall of Mainline Protestants market share has little to do with changes in ideology. On the other hand, it shows that changes in ideology have affected mainly Evangelicals, that could have gained much more space in the US religious life if the δ_{it} distribution had remained constant at the 1974 levels, as well as the nones.

Figure 14: Difference in Shares with δ_{it} 1974 and Baseline Model Prediction
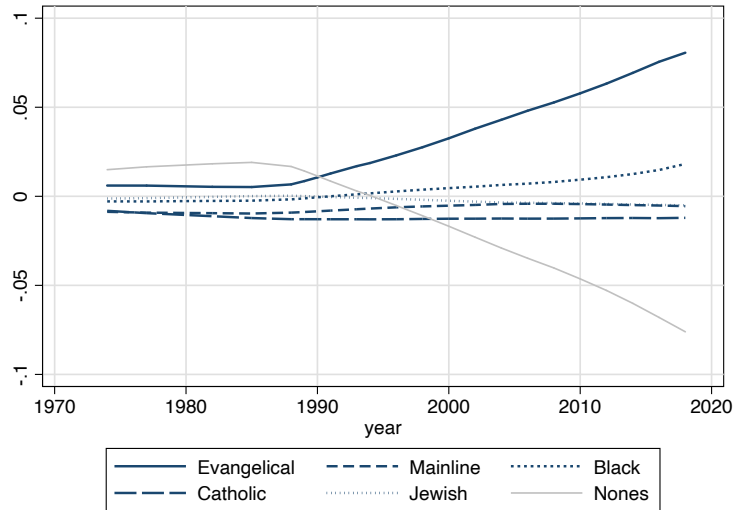
To investigate the role of changes in preferences on the demand for religion, we recompute the numbers in Figure 14 keeping constant the term ξ_{jt}^0 in the demand model – i.e. the time-varying demand shifter for each church – at the 1974 levels, instead of the distribution of ideology. The results are in Figure 15. We see here three important findings. First, the graph suggests that the fall in the share of Mainline protestants is explained by the fall in the interest of the US population for that religious group. For reasons that may be beyond the scope of this paper, being affiliated to Mainline Protestant denominations has become less attractive to the typical US citizen, independently of her ideology.[21] Second, if changes in ideology affected negatively the growth of Evangelical denominations, preferences worked in opposite direction. In other words, the relatively stable share of Evangelicals during the

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[21]One can speculate that secular forces have been better substitutes for traditional Mainline churches, while creative Evangelical leaders were able to keep their congregations more interesting to their members. See more about the utility of the secular option below.

last 40-50 years was the result of two countervailing forces: the shift of ideological values of the US population to the left, which had negative impacts on the demand of Evangelical denominations, and changes in preferences for religion of the population, which, on the other hand, led to an increase in the demand for Evangelical denominations. Third, it seems that the increase in the share of nones is explained not only by changes in the distribution of ideology but also by changes in preferences for religion.

Figure 15: Lowess-Smoothed Differences of Religion Shares with and without Changes in Preferences
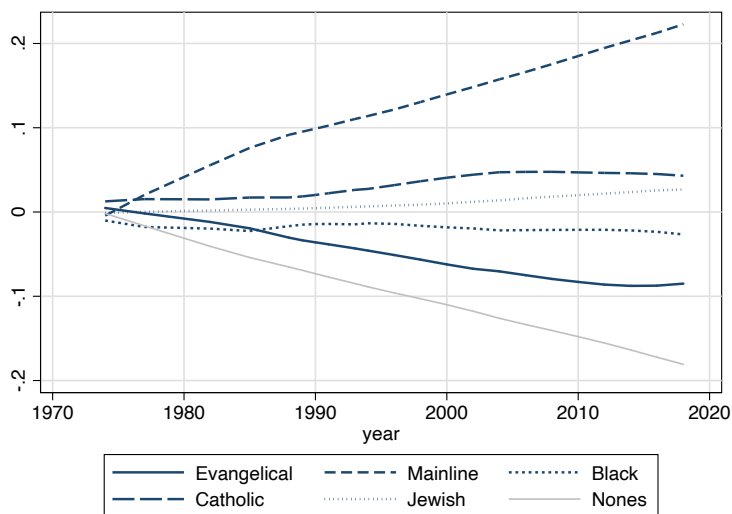
The utility of the secular option. We finally examine the factors behind changes in preferences for religion. Recall that the term ξ_{jt}^0 is a function of two model primitives, ξ_{jt}, i.e. a "bundle" of characteristics of religious group j, $j \neq 0$, at period t, and ξ_{0t}, i.e. the utility of the secular option (net of the idiosyncratic taste shock ζ_{i0t}). Having estimated ξ_{jt}^0 for all religious groups j we can decompose this term into its two components by regressing it on year dummies. The (negative of the) estimate of the coefficient attached to each year dummy is our estimate of ξ_{0t}; the residuals of the regression are the estimates of ξ_{jt}.

Figure 16 shows the estimates of ξ_{0t} and corresponding 95% confidence intervals. We find a positive but gentle trend in the utility of the secular option which connects with the literature on the importance of secular competition to religious outcomes which considers

how congregations interact with the shopping mall, the government, the schools and other institutions (Hungerman, 2010; Gruber and Hungerman, 2008) as well as the growing options of leisure associated with the computer and the internet age. However, coupled with the evidences in figures 14 and 15, this finding suggests the rise of the nones cannot be quanitatively explained only to secularization of the US society (Putnam et al., 2012; Chaves, 2011; Hout and Fischer, 2014). Changes in preferences for specific religions and in ideological values of the US population seem to be more salient to explain the demand for religion in the US than changes in the utility of the secular option.

Figure 16: Estimates of the Utility for the Secular Option, ξ_{0t}
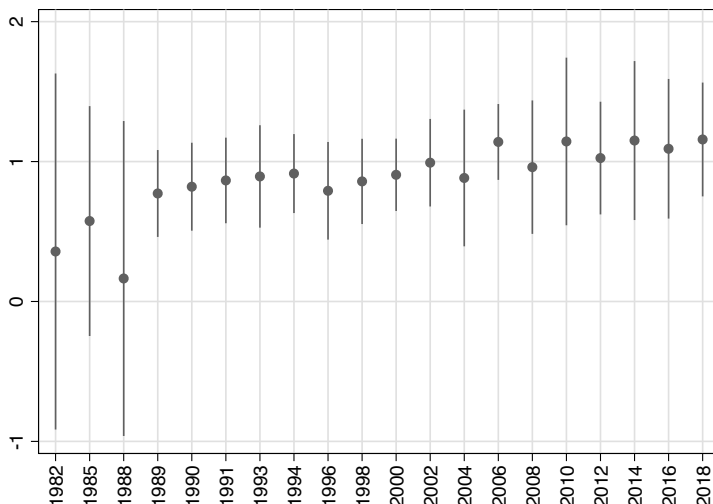
6 Summary and Conclusions

In this paper we develop and estimate a Hotelling model of religious competition that allows us to test whether differences between individuals ideological preferences and the ideological types assumed by churches affect demand for religion, and to understand how churches ideological views are built depending on society and churches ideological preferences and strategic interactions between churches.

The estimates of the model show that churches differentiation across the ideological di-

mension is important to explain religious identity. On the supply side, we report a significant dispersion in the disposition of churches on the Hotelling line of ideological differentiation. Importantly, churches are overwhelming on the conservative side of the spectrum as they systematically deviate from profit maximization. Their ideological positioning are driven, at least partially, by clergy intrinsic preferences or prophetic orientations (supply), and not only by society ideological preferences (demand). Our counterfactual scenarios indicate that the recent shift to the left of ideological views of the population, especially in terms of attitudes towards sexual norms, serves to explain an important fraction of major trends in American religiosity levels observed in the last decades.

Taken together, our findings show that the rise of the nones is a reflection of the growing misalignment between the increasingly liberal ideological views of the general public and the more static and conservative positioning of organized religion. However, a note of caution is warranted as we close this narrative. As Putnam et al. (2012) puts it, *history never ends.* In a dynamic religious market with free entry, religious entrepreneurs have the incentive to attend to this growing under-served niche and thus considering the falling in affiliation rates as a symptom of secularization forces might prove to be misleading.

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Online Appendix (Not for Publication)

Appendix A: The Cooperative Clergy Study Project

Table A1: CCSP Clergy Ideology

Denomination	δ_{jt}	Observations
African Methodist Episcopal	0.383	83
American Baptist Churches in USA	0.652	530
Assemblies of God	0.901	336
Catholic	0.474	429
Christian Reformed Church	0.665	397
Church of God in Christ	0.541	83
Church of Christ	0.834	358
Disciples of Christ	0.335	557
Evangelical Free (*)	0.899	261
Evangelical Lutheran Church in America (ELCA)	0.363	681
Jewish	0.120	377
Lutheran Church, Missouri Synod	0.829	652
Mennonite (*)	0.531	377
Church of the Nazarene	0.845	605
Presbyterian Church USA	0.438	473
Presbyterian Church in America	0.931	464
Reformed Church in America	0.610	372
Southern Baptist Convention	0.879	455
Unitarian-Universalists (*)	0.062	488
United Methodist Church	0.507	453
United Methodist Women	0.364	199
Willow Creek Association (*)	0.783	303
Total	0.589	8933

This table shows the denominations in the CCSP data that was used in the estimations in Section 4. Denominations market with (*) are present in the CCSP data but not in the CCES data and, therefore, were dropped from our empirical exercises.

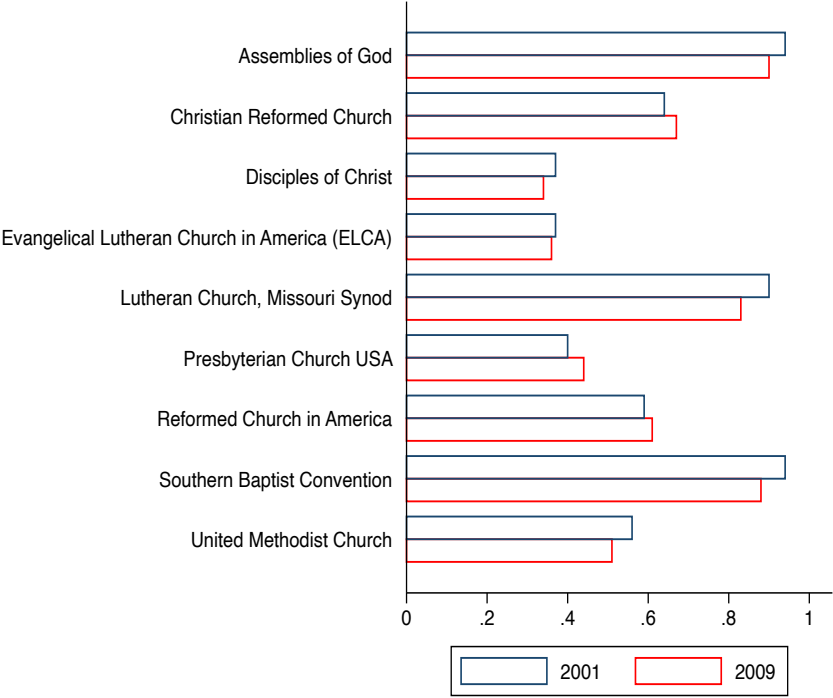Figure A1: CCSP Clergy Ideology for 2001 and 2009

Figure A2: Correlations Between Church (y axis) and Individuals Ideology (x axis) – CCSP Dataset
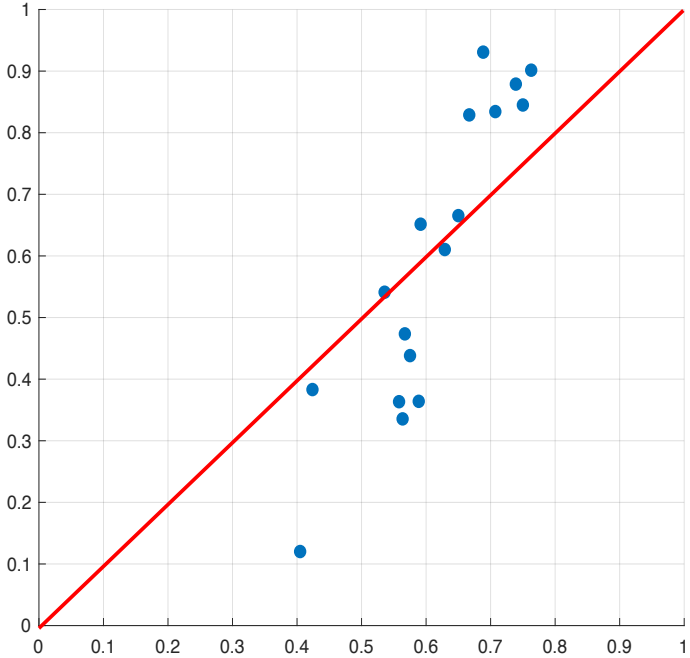
Figure A3: Correlations Between δ_{jt} from the Model with (y axis) and without (x axis) Covariates – CCSP Dataset
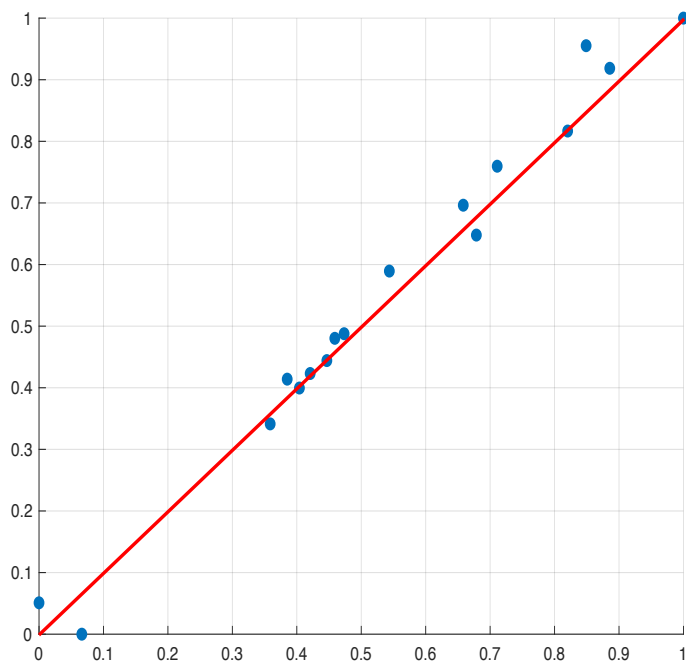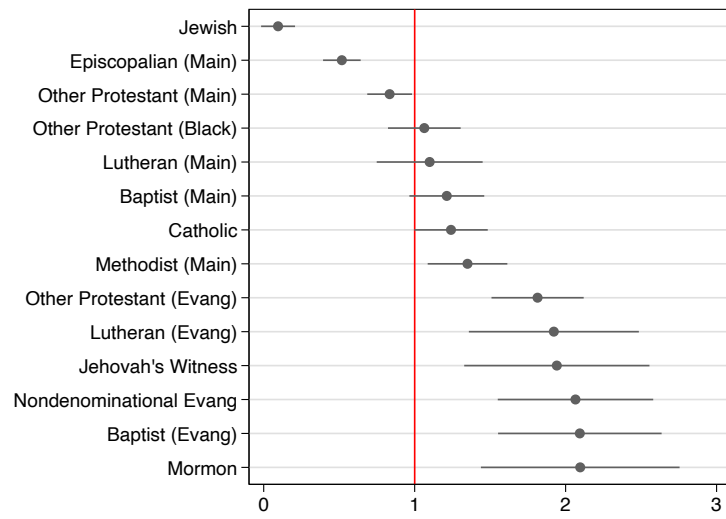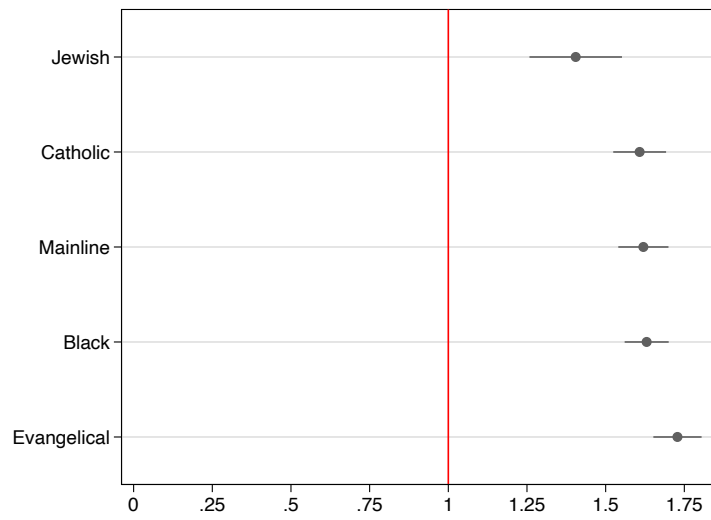
Figure A4: Correlations Between Profit Maximizing and Estimated Church Ideology

(a) CCES Data

(b) GSS Data

Appendix B: Auxiliary Tables and Figures

Table B1: Data, Model and Counterfactual $\gamma = 0$ Market Shares for the CCES and GSS (Ideology Models)

Denomination	(a) Data	(b) Model	(c) $\gamma = 0$	(c)-(b)
		CCES		
Baptist (Evang)	8.84%	8.82%	9.60%	0.78%
Baptist (Main)	1.30%	1.27%	1.30%	0.03%
Catholic	23.03%	23.04%	23.44%	0.40%
Episcopalian (Main)	1.68%	1.68%	1.96%	0.28%
Jehovah's Witness	0.26%	0.25%	0.26%	0.01%
Jewish	2.65%	2.79%	4.01%	1.22%
Lutheran (Evang)	1.97%	1.95%	2.01%	0.06%
Lutheran (Main)	2.37%	2.37%	2.41%	0.04%
Methodist (Main)	5.06%	5.08%	5.07%	-0.01%
Mormon	1.76%	1.76%	1.91%	0.15%
Nondenominational Evang	6.71%	6.71%	7.38%	0.67%
Other Protestant (Black)	3.09%	2.94%	3.68%	0.74%
Other Protestant (Evang)	8.39%	8.46%	8.74%	0.28%
Other Protestant (Main)	3.62%	3.65%	3.91%	0.26%
Nones	**29.27%**	**29.24%**	**24.31%**	**-4.93%**
		GSS		
Evangelical	26.17%	26.9%	33.21%	6.27%
Mainline	20.43%	22.3%	22.44%	0.15%
Black Protestant	8.82%	9.3%	8.34%	-0.95%
Catholic	25.36%	26.8%	24.93%	-1.91%
Jewish	1.91%	2.2%	2.18%	0.02%
None	**13.09%**	**12.5%**	**8.90%**	**-3.58%**

Table B2: Regressions of ξ_{jt}^0 on δ_{jt}

	Model without Controls		Model with Controls	
	OLS	IV	OLS	IV
δ_{jt}	0.1018	-0.0926	0.2743*	-1.8184
	[0.2841]	[0.4995]	[0.1599]	[3.7761]
First Stage IV Coefficient		0.6027***		0.1355***
		[0.1091]		[0.1408]
Observations	145	145	145	145
First Stage F-Stat		30.5		33.8
R-squared	0.739	0.738	0.718	0.519

Table B3: Estimates of γ for the CCES and GSS Data – First Stage Models

	[1]	[2]
γ CCES	-0.2155**	-0.2771***
	[0.0995]	[0.0840]
Observations	4754265	5313285
γ GSS	-1.4234***	-0.9833***
	[0.3310]	[0.3027]
Observations	271308	301536
Controls	Yes	No

Table B4: Estimates of γ for the CCES and GSS with Alternative Measure of Ideology

	1st Stage	2nd Stage
γ CCES	-1.5151***	-3.7335***
	[0.1478]	[0.0671]
Observations	2590890	2590890
γ GSS	-4.2400***	-4.6625***
	[0.4259]	[0.0766]
Observations	97950	97950
Controls	Yes	No

Appendix C: Robustness Checks

Table C1: Demand Model Estimated with CCSP Ideology and γ_{ij}

Denomination	γ_0	Distance×Education	Distance×Income	Distance×Age
	-2.2556***			
	[0.5057]			
African Methodist Episcopal		-4.7951	-0.2211	0.0928
		[4.0315]	[1.4615]	[0.1468]
American Baptist Churches in USA		-0.8249	-0.1856	0.0670*
		[0.6426]	[0.3378]	[0.0345]
Assemblies of God		-1.1900**	0.1603	-0.0284
		[0.5711]	[0.2500]	[0.0338]
Catholic		-0.1813	0.1341**	0.0168
		[0.1342]	[0.0659]	[0.0103]
Christian Reformed Church		0.9370	-0.3775	-0.0335
		[1.0333]	[0.5994]	[0.0948]
Church of God in Christ		-0.4048	-0.2183	-0.0012
		[0.6167]	[0.3145]	[0.0415]
Church of Christ		-0.5505	-0.1857	0.0510
		[2.1657]	[1.0521]	[0.1623]
Disciples of Christ		-6.1003**	1.0204	0.0124
		[2.7218]	[0.7713]	[0.1189]
Evangelical Lutheran Church in America (ELCA)		-1.2230*	0.6656**	0.0060
		[0.7078]	[0.3281]	[0.0423]
Jewish		-0.0766	0.1845	0.0175
		[0.2615]	[0.1292]	[0.0175]
Lutheran Church, Missouri Synod		0.0644	0.0804	-0.0100
		[0.1752]	[0.0869]	[0.0134]
Church of the Nazarene		-0.4163	0.0117	0.0145
		[0.3095]	[0.1521]	[0.0201]
Presbyterian Church USA		-0.4480	0.3738**	0.0122
		[0.3335]	[0.1664]	[0.0231]
Presbyterian Church in America		-0.7154*	0.1509	0.0197
		[0.3929]	[0.1823]	[0.0247]
Reformed Church in America		-3.2115	0.0959	0.0682
		[2.3886]	[0.9558]	[0.1201]
Southern Baptist Convention		-0.3720*	-0.3397***	0.0108
		[0.2076]	[0.1078]	[0.0141]
United Methodist Church		-0.0194	0.0824	-0.0018
		[0.2361]	[0.1196]	[0.0161]
Observations		250,002		

Table C2: Estimates of γ with Normalized δ_{jt} 1974-1989 and 1990-2018 Samples – GSS

	1974-1989 Sample	1990-2018 Sample
γ	-3.3349***	-3.4758***
	[0.0685]	[0.0283]
Observations	110,820	190,716