Liberté, Égalité   Religiosité

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ABSTRACT

In this paper we study the effect of religiosity on the political choices over redistribution and over the legal restrictions on personal liberties. Religious teachings generally restrict individual behavior on issues such as consumption of some goods, sexual orientation, divorce, abortion, gay marriage, contraception and so on. We assume that the more religious an individual is, (i) the less he enjoys the use of *liberties* prohibited by his religion; and (ii) the higher the negative externality experienced when others in society practice those liberties beyond what he deems adequate. The first assumption implies that, when the law allows for the use of liberties, secular individuals have a higher incentive to work than religious ones. As a result, the political choice of legal restrictions on liberties has an impact on income inequality. The second implies that religious individuals may prefer to repress liberties in society. As repression of liberties reduces income inequality, poor religious individuals may still prefer low taxes compared with richer and less religious ones. We also analyze the choice of redistribution and the legal cap on liberties as the majoritarian outcome in a citizen-candidate model. We obtain that when the majority of the population is religious and the religious cleavage in society is large, high intolerance due to negative externalities leads to a political outcome consisting of repression of liberties and relatively low income taxes.

JEL-Classification:

Key-words: Religiosity, Redistribution, Individual Liberties, Political Economy.

1. Introduction

Religions typically establish codes of behaviour which include well-defined rules and attitudes towards personal liberties and individual conduct ranging from gender roles, marriage, divorce and sexual behaviour, to restrictions on alcohol, dressing, and food consumption. As Becker (1996) points out, these norms are "internalized as preferences" and clearly influence individual decisions.[3]

In many countries, religious individuals and organizations advocate that religious norms are regulated by law, so that they become mandatory for the whole population. The pressure to formulate such laws suggests a powerful externality effect: religious individuals or organizations may experience negative utility from the fact that others in society practice such liberties. Thus, while lifting restrictions on personal liberties can broaden the choices of the less devout, it may adversely affect the utility of the more religious.[4]

Yet, the past fifty years have been recognized by historians as years of an on-going *rights revolution* in developed countries (Hitchcock et al, 2012), where legal restrictions over personal decisions have been substantially relaxed. A good example is the effect of the change in women's rights, namely the rights over their bodies and the lifting of restrictions on labor market participation. While the more permissive legal environment has allowed secular women to benefit from more choices in terms of family planning and career opportunities, religious restrictions in those areas may still constrain the more religious women.

In this paper we show how such religious preferences affect the political choice of the legal limit of liberties. While the literature has extensively studied how religious restrictions affect individual behaviour,[5] our work is a first step in understanding how religious norms affect laws regulating individual liberties in the wider society. As a motivation, the following plot illustrates the cross-country correlation between the legal level of liberties and the country's degree of religiosity for the set of European countries studied in Esteban, Levy and Mayoral (2017).[6] The correlation between religious intensity and the Liberties index is -0.54 (see Appendix B for an extensive discussion).

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[3]There is a large literature on the economics of religion analyzing, theoretically and empirically, the effect of religiosity on preferences and behaviour; see for example Iannacconne (1992), Scheve and Stasavage (2006), Stegmueller (2013), Guiso, Sapienza, and Zingales (2003), Lipford and Tollison (2003), among others.

[4]There are various complementary reasons for the presence of such externalities. First, many religions tie individuals' rewards not with individual behaviour, but with average or general behaviour in society. Second, religious individuals may fear their temptation and state enforcement of religious restrictions provides an additional incentive not to be deviant. Levy and Razin (2012) suggest an information reason for such negative externality: if religious individuals see that "sinners" are not punished, then their religious beliefs may deteriorate.

[5]See for example Iannacconne (1992), Berman (2000), Carvalho and Koyama (2012) among many others.

[6]Countries included are: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom. Religious intensity is the country-wave average of an individual index of religious intensity computed using the 6 waves of the ESS, i.e., 2002, 2004, 2006, 2008, 2010, and 2012. The Liberties Index captures the legal evolution of the legislation on abortion, divorce, women's rights, LGBT rights and euthanasia, and is assembled from various sources such as the UN, the EU parliament, World Bank, the Human Rights project, Pew Research Center, Freedom to Marry, etc.

Figure 1. LIBERTIES INDEX VS. RELIGIOUS INTENSITY.
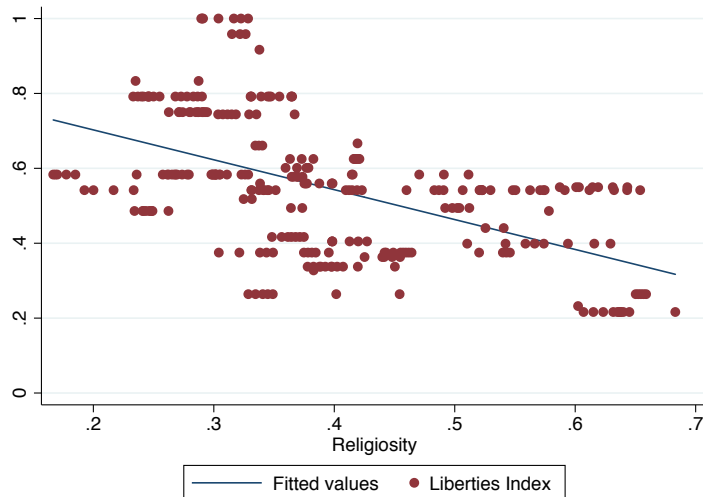
This graph plots country-level religious intensity for 34 European countries versus the Liberties Index, that captures the evolution of the regulation on issues such as abortion, divorce, women's rights, LGBT rights and euthanasia, for the period 2002–2012. A higher value of the Liberties Index implies laxer regulation.

We also highlight that the political choice of the legal limit on individual liberties is inherently linked to redistribution. Relaxing the legal regulation on individual liberties increases the choice set of the less religious individuals, while the more religious ones continue to be bounded by their own "moral" constraints. Moreover, the latter may suffer negative externalities. We show that these two effects can explain why poor religious individuals may prefer restriction of liberties along with low taxes, and how this can arise as a political outcome of a voting game.[7]

The core argument is as follows. Relaxing the legal caps on liberties, for example, by authorizing the consumption of certain goods (alcohol, meat, etc.), or by allowing for a larger set of career and family planning choices, can incentivize secular individuals to work more relative to individuals who are constrained by their religious values.[8] As a result of the differential work incentives, wider individual liberties will increase income inequality. Hence, the more secular population will be in favor of broadening personal liberties together with a low income tax, as their (relative) income goes up. The more religious individuals face a trade-off. When the legal caps on liberties are relaxed, their religious beliefs make them relatively poor and, thus, their desired tax level increases. But the more religious they are, the higher the negative externalities they experience when others practice liberties. This makes them prefer to repress liberties and, since repression of liberties reduces income inequality, they will also favor a lower tax rate.

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[7]Both these facts are empirically established, as we discuss below.

[8]The result that religiosity is associated with lower effort or labor supply has been attested by abundant empirical literature. Clark and Lelkes (2005), Berman (2000), Lehrer (1995), among others, find that religiosity has a negative effect on labor supply. At the aggregate level Barro and McCleary (2003) show that economic growth is negatively related to church attendance. We also provide more evidence on this in Esteban, Levy and Mayoral (2017).

We thus obtain that when intolerance to others practicing liberties is relatively large, very religious poor individuals prefer repression of liberties and modest redistribution. There are many empirical papers establishing the link between religiosity and support for low taxes.[9] But from our results it follows that the right-wing positioning of poor religious individuals would not necessarily be driven by a *"forced choice"* provoked by the specific policy mix of conservative parties, as suggested, e.g., in Huber and Stanig (2007). Our results imply that such a mix is in line with these voters' preferences on the two dimensions.

We also analyze the outcome of a two-dimensional citizen-candidate model where politicians offer a bundle of redistribution and the legal cap on liberties. We obtain that the political outcome depends on which distribution has higher dispersion, the one over productivities or the one over religiosity. When the productivity gap is wide relative to the religious gap, then low productive individuals can "collude" so that, even for intermediate levels of intolerance, liberties and high taxation are the political outcomes in society. However, when the dispersion of religious beliefs is high compared with that of productivity, such intolerance levels will yield a joint outcome of repression of liberties along with *lower taxes*. Thus, while our first result illustrates that individual preferences can be composed of a mix of low liberties and modest redistribution, our second set of results shows that the political outcome itself can bundle restriction on liberties with modest taxation. The result that the political outcome in more religious societies is associated with lower taxes is consistent with the empirical evidence, as in Scheve and Stasavage (2006) and Palani (2008), who show that more religious countries redistribute less.[10]

Our paper is related to the literature on religious restrictions or sacrifices; specifically, many models in the literature show that religiosity and its restrictions on daily life, can decrease labour effort relative to non-religious. These are the implications of the models of Iannaccone (1992), Berman (2000), and Carvalho and Koyama (2012), who argue that religions strategically choose restrictions on individual liberties to induce labour or capital contributions, or induce individuals to participate in costly rituals and hence reduce their material productivity. As far as we know, ours is the first paper that explores the implications of religious preferences over liberties on society's legal choices.

The nexus between religiosity and inherent preference for lower redistribution has been explained theoretically by several papers. Chen and Lind (2016), Ceyhun et al (2013) and Huber and Stanig (2011) argue that the lower support for redistribution is caused by the preference for social assistance and eventual redistribution within the own religious community. In Scheve and

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[9]Guiso, Sapienza and Zingales (2006) use the U.S. General Survey to find that Catholics, Protestant and Jewish respondents share a more negative attitude toward redistribution than those with no religion. Stegmueller (2013) finds empirical evidence for fifteen Western European countries that religious individuals have less liberal economic preferences, even among the poor. De la O and Rodden (2008) find that the relative importance of economic over moral issues displayed by individual preferences is increasing with income, so that poor individuals care more about "moral" issues. In our model it is religiosity which makes one poor.

[10]Palani (2008) finds a positive and significant relationship between inequality measures (the Gini coefficient and the ratio of top to bottom quantile) and the national average intensity of religiosity [obtained from surveys] using data from 80 countries of all continents. Using data on religious intensity from the European Social Surveys and an index of redistribution defined as $1 - \frac{G_d}{G_m}$, where G_d and G_m denote disposable and market Gini coefficients, we obtain that the (cross-country) correlation between religious intensity and redistribution is -.47. See Appendix B for a more detailed description of these variables.

Stasavage (2006) –see also Gill and Lansgaarde (2004) and Clark and Lelkes (2004)– the psychic benefit from religion allows individuals to cope with bad states which nullifies the need for social insurance and, hence, religious individuals prefer smaller governments. In Benabou and Tirole (2006) religion is a way of manipulating one's beliefs in order to motivate continued effort so that religious individuals work harder and demand less taxes. Our model provides a complementary explanation showing how religious restrictions on liberties affect the distribution of income and, hence, preferences over taxation.

In terms of political choices, our model is related to the two-dimensional models exploring choices of redistribution as well as other variables, such as targeted transfers or other benefits to religious individuals. Roemer (1998) was the first to formalize the voting over redistribution and religious provisions and to show that all parties may propose relatively moderate taxes as a result of the two-dimensional competition.[11] Levy (2004) analyzes a two-dimensional policy space, such as general income redistribution and targeted redistribution, and shows that the rich individuals may form a party with the religious poor that will reduce total taxation but target its revenue to specific religious interests at the expense of general redistribution. A similar argument is made by Huber and Stanig (2011) and Benabou et al (2015a, 2015b).

Our contribution with respect to this literature on two-dimensional voting is as follows. In all the models considered above, the ideal policy of poor religious individuals will include religious provisions as well as high taxes. However, in our case, the political choice of the second dimension –the legal cap of personal liberties– is inherently tied to income inequality and taxation. Religious individuals may prefer repression, and this will suppress work incentives and hence income inequality. As a result, such individuals' ideal policies may combine repression of liberties along with low taxes.

The remainder of the paper is organized as follows. In Section 2 we present the baseline model. Section 3 considers the (joint) preferences of individuals over taxes and liberties. In Section 4 we analyze the political determination of these policies and show how intolerance affects political outcomes differently depending on the relative importance of the religious and the productivity gaps. We also show that the secular elite may in some cases benefit from the spread of religiosity: While religiosity decreases aggregate output, it also induces a lower tax rate. Section 5 concludes. Proofs are relegated to Appendix A. Appendix B contains a simple empirical analysis that shows that the associations among the key variables (i.e, religiosity, liberties, inequality and redistribution) implied by the model are corroborated by the data.

2. THE POLITICAL ECONOMY ENVIRONMENT

In this Section we describe the economic environment and the two political variables: the legal cap on liberties and a simple linear tax rate.

There are two key assumptions that are important for our analysis. First, we need that the broadening of personal liberties increases the work incentives of the less religious individuals compared with more religious ones. This can arise in many environments. For example, the

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[11]See also Glaeser, Ponzetto and Shapiro (2005), who analyze the situations in which religious values are strategically used by Democrats and Republicans to maximize political support.

lifting of legal restrictions on women's access to work, education, and family planning in the West has benefited secular and moderately religious women. However, highly religious women were and still are constrained by the restrictions imposed by their religion. The second key assumption is that religious individuals may suffer from negative externalities when others around them practice liberties that are opposed to their code of conduct. The model we present below is a simple one that includes these two features.[12]

We consider a model in which individuals are fully characterized by two parameters: their productivity at work, w, and their preferred degree of practice of personal liberties $\ell \in [0, 1]$. For simplicity, the two characteristics are uncorrelated. In the following, $F(\cdot)$ denotes the cdf of w, while $G(\cdot)$ is the cdf of ℓ. Notice that religiosity is inversely related to ℓ: the larger is ℓ, the less religious the individual is.

Individuals enjoy utility from consumption c and from used personal liberties l, and experience disutility from effort e and from the social use of liberties, whenever the average level of used liberties $\bar{\ell}$ is above their ideal level, ℓ.

The utility function is as follows:

$$U(c, l, e) = c \left(1 + l - \frac{l^2}{2\ell} \right) - \frac{1}{2} e^2 - \delta \max\{0, \bar{\ell} - \ell\}$$

with $\bar{\ell}$ being the average use of liberties.

The first element of the utility function measures the valuation of material consumption and of liberties, with standard complementarity assumptions. The parametric form of the term in parenthesis, $(1 + l - \frac{l^2}{2\ell})$, has been chosen so as to capture the fact that ℓ is the ideal level of personal practice of liberties: utility increases with the use of liberties, l, up to ℓ and decreases thereafter. Notice also that because of the assumed complementarity between c and l, the choice of the use of liberties and the ideal level of liberties determine the marginal utility of consumption. The second element of the utility function is a standard specification of the utility cost of effort. The last element describes the extent to which individuals experience disutility from others consuming liberties beyond what they consider adequate. The parameter $\delta \geq 0$ measures the psychological cost of such externality, which we assume common to all the individuals. Religions that associate God's punishments with individual's behaviour may induce a low δ; religions that associate such punishments to average behavior in society, may induce a high δ. We sometimes refer to δ as the degree of *intolerance,* since individual utility can decrease as a result of the behavior of others.

While the degree of intolerance δ is common to all the population and captures a more general feature than religion itself, individual religiosity is captured by the parameter ℓ, the level of personal liberties the individual deems adequate to practice. Our political analysis in Section 4.2 will focus on how intolerance affects political outcomes, while Section 4.3 considers how the distribution of personal religious beliefs affects political outcomes.

We assume that a legal cap, $\hat{\ell} \in [0, 1]$, determines the highest level of liberties that individuals can consume so that $l \leq \hat{\ell}$ The legal cap on liberties has two effects. First, it establishes the

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[12]For a related model which we also test empirically, see Esteban, Levy and Mayoral (2017).

direct limit of what is accessible to individuals. Second, $\hat{\ell}$ affects the average level of liberties used in society: since a share of the population is constrained by $\hat{\ell}$, a higher $\hat{\ell}$ will permit a higher $\bar{\ell}$. Then, $\hat{\ell}$ affects the magnitude of negative externalities experienced by individuals.

Individuals maximize their utility subject to the budget constraint and the legal constraint on the maximum liberties permitted, $\hat{\ell}$. Income is subject to a linear tax with a marginal tax rate of t and a transfer T which is entirely consumed. Hence, $c = (1-t)ew + T$.

We assume for simplicity that liberties are costless to consume. It is then immediate that individuals will choose $l = \min\{\ell, \hat{\ell}\}$. The average use of liberties will be

$$(1) \qquad \bar{\ell}(\hat{\ell}) = \int_0^{\hat{\ell}} \ell dG(\ell) + \left[1 - G(\hat{\ell})\right]\hat{\ell}.$$

The average use of liberties depends on the legal cap $\hat{\ell}$ [and the distribution $G(\cdot)$], and is strictly increasing in $\hat{\ell}$, with

$$\frac{d\bar{\ell}}{d\hat{\ell}} = 1 - G(\hat{\ell}) > 0.$$

Let

$$(2) \qquad \lambda(\ell, \hat{\ell}) \equiv 1 + \frac{1}{2}\ell, \text{ if } \ell \leq \hat{\ell}, \text{ and } \lambda(\ell, \hat{\ell}) \equiv 1 + \hat{\ell} - \frac{1}{2}\frac{\hat{\ell}^2}{\ell}, \text{ if } \ell > \hat{\ell},$$

denote the effect of the personal use of liberties in the utility function. We can then solve for the optimal effort supply:

$$(3) \qquad e(w, \ell) = (1-t)w\lambda(\ell, \hat{\ell})$$

It follows that labor supply is linearly increasing in ℓ up to $\hat{\ell}$ and is increasing, in a concave manner in ℓ, thereafter. Consumption is then

$$c(\ell, \hat{\ell}) = (1-t)^2 w^2 \lambda(\ell, \hat{\ell}) + T(t, G(.), \hat{\ell}).$$

where t is the marginal tax rate and T the associated transfer of a purely redistributive linear income tax.

A higher valuation of the practice of personal liberties will result therefore in higher effort incentives. Thus, religious individuals would be on average poorer than secular ones, everything else equal. Intuitively, due to complementarities in the utility function, the marginal utility of consumption is lower for those that like and practice less liberties, inducing a lower effort incentive. It is also easy to see that income inequality would increase when more liberties are legally allowed. Notice that the last term in the utility function, $\delta \max\{0, \bar{\ell} - \ell\}$, which captures the negative externalities experienced from others' consumption of liberties beyond one's ideal ℓ, does not affect labour effort choices.

Other papers have also shown how religiosity may affect labour supply and aggregate output through individuals investing in non-productive activities such as rituals, or by being limited by

religious restrictions.[13] Henceforth our focus will be on the political implications of the above in terms of the choice of taxation and the choice of the legal cap on liberties.

3. PREFERENCES OVER LIBERTIES AND REDISTRIBUTION

In this section we derive the ideal policies of individuals over $t \in [0, 1]$ and the legal cap $\hat{\ell}$. As we will show, it is sometimes the case that more religious individuals prefer repression of liberties along with low taxes, albeit being poor. In fact, those individuals prefer lower taxes than richer ones.

To proceed, consider the indirect utility over the political variables: taxation $t \in [0, 1]$ and the legal cap $\hat{\ell}$. To this effect, let us compute the average pre-tax income $\bar{y}(\hat{\ell})$. Since individual pre-tax income is $y = we$, integrating y over w and ℓ, we obtain

$$\bar{y}(\hat{\ell}) = (1 - t)E(w^2)\Lambda(\hat{\ell}),$$

with,

$$(4) \quad \Lambda(\hat{\ell}) \equiv \int_0^1 \lambda(\ell, \hat{\ell})dG(\ell) = \left(1 + [1 - G(\hat{\ell})]\hat{\ell}\right) + \frac{1}{2}\int_0^{\hat{\ell}} \ell dG(\ell) - \frac{1}{2}\hat{\ell}^2 \int_{\hat{\ell}}^1 \frac{1}{\ell}dG(\ell) > 0.$$

The term $\Lambda(\hat{\ell})$ measures the effect of liberties on productivity in society. The higher the use of liberties, the higher the incentive to exert effort (as consumption is more rewarding). Thus, since $T = t\bar{y}$, it follows that

$$(5) \qquad\qquad T(t, \hat{\ell}) = t(1 - t)E(w^2)\Lambda(\hat{\ell}).$$

Using the previous results we can obtain the indirect utility function in terms of the characteristics of the individual, (w, ℓ), and the policy parameters, $(t, \hat{\ell})$:

$$(6) \quad u(w, \ell, t, \hat{\ell})) = \frac{1}{2}(1 - t)^2 w^2 \lambda(\ell, \hat{\ell})^2 + t(1 - t)E(w^2)\Lambda(\hat{\ell})\lambda(\ell, \hat{\ell}) - \delta \max\{0, \bar{\ell} - \ell\}.$$

Differentiating with respect to t we obtain

$$(7) \qquad\qquad \frac{du}{dt} = -(1 - t)w^2\lambda(\ell, \hat{\ell})^2 + (1 - 2t)E(w^2)\Lambda(\hat{\ell})\lambda(\ell, \hat{\ell}) =$$

$$= \lambda(\ell, \hat{\ell})\left[\frac{1 - 2t}{1 - t}\bar{y}(\hat{\ell}) - y(w, \ell, \hat{\ell})\right].$$

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[13]See Levy and Razin (2012), Iannaccone (1992), Berman (2000) and the empirical evidence in Barro and Mc-Cleary (2003).

Hence we can obtain the optimal tax for an individual (w, ℓ) to be

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(8) \qquad t(w, \ell, \hat{\ell}) = \max \left\{ 0, \frac{1 - \frac{y(w,\ell)}{\bar{y}(\hat{\ell})}}{2 - \frac{y(w,\ell)}{\bar{y}(\hat{\ell})}} \right\} = \max \left\{ 0, \frac{E(w^2)\Lambda(\hat{\ell}) - w^2\lambda(\ell, \hat{\ell})}{2E(w^2)\Lambda(\hat{\ell}) - w^2\lambda(\ell, \hat{\ell})} \right\}
$$

Note that $t(w, \ell) \leq \frac{1}{2}$. The preferred tax rate by an individual (w, ℓ) is decreasing in the productivity w, as standard, and in ℓ. This is reasonable, as higher valuation for liberties increases productivity due to complementarities with consumption. Hence, less religious individuals (with a higher ℓ) are richer and prefer lower taxes, everything else equal. Specifically, whenever the liberties-adjusted social productivity, $E(w^2)\Lambda(\hat{\ell})$, is greater than the personal one, $w^2\lambda(\ell, \hat{\ell})$, positive taxation will be preferred.

Note that for any *given* $\hat{\ell}$ all individuals with the same income will prefer the same tax rate, independently of their religiosity and of their productivity. Thus, the above replicates Meltzer and Richard's (1982) result. This implies that, for a *given* $\hat{\ell}$, on average, the more religious will demand higher redistribution because they are poorer. We will see later on that this will not necessarily be the case when the joint preferences over the legal cap on liberties and redistribution are considered.

To gain a further insight into the interaction between religiosity and preferences for redistribution, consider now the effect of a relaxation of the legal cap of liberties on the preferred level of taxation. Note that if more liberties are permitted, income inequality will increase. This is so because, while a part of society –those with $\ell < \hat{\ell}$– are not affected in terms of their personal income, while that of all above $\hat{\ell}$ increase their income.

Consider an individual with $\ell < \hat{\ell}$. Her preferred level of taxation is increasing in the legal cap $\hat{\ell}$, as this change increases average productivity in society while her own individual income remains the same. On the other hand, when $\ell > \hat{\ell}$, an increase in the cap increases taxes iff $\frac{\partial \Lambda(\hat{\ell})}{\partial \hat{\ell}} \lambda(\ell, \hat{\ell}) > \frac{\partial \lambda(\ell, \hat{\ell})}{\partial \hat{\ell}} \Lambda(\hat{\ell})$. In other words, while average productivity increases, so does the personal income for these individuals. For individuals close enough to $\hat{\ell}$, personal income does not increase enough compared with that of society,[14] while for those who value liberties sufficiently, the opposite arises. We then have:

Lemma 1. *Fix $\hat{\ell}$. There exists $\ell' > \hat{\ell}$ such that all individuals with $\ell < \ell'$ increase their preferred tax level when $\hat{\ell}$ increases, and all individuals with $\ell > \ell'$ decrease their preferred tax level when $\hat{\ell}$ increases.*

The Lemma above implies that if more religious individuals prefer to repress liberties (which may happen because of the negative externalities), they will also couple this with preferences for lower taxes.

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[14]Note that $\frac{\partial \lambda(\ell, \hat{\ell})}{\partial \hat{\ell}} = 0$ when $\ell = \hat{\ell}$ and thus at the boundary the individual's preferred taxation will increase.

We now proceed to analyze preferences over $\hat{\ell}$. Differentiating u with respect to $\hat{\ell}$ we have:[15]

$$\frac{du(w,\ell)}{d\hat{\ell}} = \left[(1-t)^2 w^2 \lambda(\ell, \hat{\ell}) + t(1-t)E(w^2)\Lambda(\hat{\ell})\right] \frac{\partial \lambda(\ell, \hat{\ell})}{\partial \hat{\ell}}$$

$$+ \quad t(1-t)E(w^2)\lambda(\ell, \hat{\ell}) \frac{\partial \Lambda(\hat{\ell})}{\partial \hat{\ell}} - I\delta(1 - G(\hat{\ell})),$$

with $I = 1$ if $\bar{\ell}(\hat{\ell}) > \ell$ and $I = 0$ otherwise, and where

$$\frac{\partial \lambda(\ell, \hat{\ell})}{\partial \hat{\ell}} = 0 \text{ for } \ell \leq \hat{\ell}, \text{ and } \frac{\partial \lambda(\ell, \hat{\ell})}{\partial \hat{\ell}} = 1 - \frac{\hat{\ell}}{\ell} > 0 \text{ for } \ell > \hat{\ell},$$

and

$$\frac{\partial \Lambda(\hat{\ell})}{\partial \hat{\ell}} = \int_{\hat{\ell}}^1 \frac{\partial \lambda}{\partial \hat{\ell}} dG(\ell) = \int_{\hat{\ell}}^1 \left[1 - \frac{\hat{\ell}}{\ell}\right] dG(\ell) = 1 - G(\hat{\ell}) - \int_{\hat{\ell}}^1 \frac{\hat{\ell}}{\ell} dG(\ell) > 0.$$

Individuals who are sufficiently pro-liberties, those with $\ell \geq \bar{\ell}(1)$, will prefer the highest level of liberties allowed in society as there will be no negative externalities in their utility function. Similarly, when there is no social intolerance, that is, when $\delta = 0$, then each individual's ideal policy is maximum liberties ($\hat{\ell} = 1$), to enjoy the highest possible productivity in society (along with her ideal level of redistribution).

When society displays intolerance with respect to others' actions, (i.e., $\delta > 0$) more religious individuals with $\ell < \bar{\ell}(1)$, face a trade-off. If they increase the legal cap on liberties they increase output (and can get some of this increase transferred to themselves via their ideal tax), but they may suffer from negative externalities if $\bar{\ell}(\hat{\ell}) > \ell$ due to intolerance. If δ is not too high, then the first order condition described above will be satisfied with equality, with the more religious individuals choosing $\hat{\ell}$ satisfying $\bar{\ell}(\hat{\ell}) > \ell$. As the benefit of individuals from more liberties beyond ℓ is through redistribution from the less religious, it is the less productive that would support more liberties. For example, the sufficiently productive individuals who prefer $t = 0$ will only lose from liberties beyond the level satisfying $\bar{\ell}(\hat{\ell}) = \ell$.

When intolerance δ is sufficiently high, the more religious individuals will be at a corner solution; such individuals will rather avoid negative externalities and will settle for $\hat{\ell}$ satisfying $\bar{\ell}(\hat{\ell}) = \ell$ (or $\hat{\ell}(\ell) = \bar{\ell}^{-1}(\ell)$). In this case, the desired cap is such that the average use of liberties equals the individual's own preferred liberty choice. This is the highest level of allowed liberties they can support without suffering the externality cost.

The Proposition below summarizes our analysis on the ideal $(t, \hat{\ell})$ as conditioned by the social level of intolerance δ, where we henceforth assume that $g(1) > 0$.[16]

Proposition 1. *The ideal political choice of $(t, \hat{\ell})$ for an individual (w, ℓ) is:*

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[15]We show in Appendix A that the first order condition approach is necessary and sufficient for the solution.

[16]In fact it suffices with the condition that, if $g(1) = 0$, then $\lim_{\ell \to 1} g'(\ell) < 0$.

(1) *if $\ell \geq \bar{\ell}(1)$ then $\hat{\ell} = 1$ and t as in (8);*

(2) *if $\ell < \bar{\ell}(1)$, then $\hat{\ell}(\ell)$ satisfies $\ell \leq \bar{\ell}(\hat{\ell}) \leq \hat{\ell}(\ell) < 1$. Moreover, there exists a function $\delta(w,\ell)$, decreasing in w, and increasing in ℓ for a low enough ℓ, so that:*

    (a) *For individuals (w,ℓ) such that $\delta(w,\ell) \geq \delta$, the ideal policy consists of $\hat{\ell}$ satisfying (9), with $\hat{\ell}(\ell) > \bar{\ell}^{-1}(\ell)$, and t satisfying (8); and*

    (b) *For individuals (w,ℓ) such that $\delta(w,\ell) \leq \delta$, the ideal policy is $\hat{\ell}$ such that there is no externality cost, that is with $\hat{\ell}(\ell)$ satisfying $\hat{\ell}(\ell) = \bar{\ell}^{-1}(\ell)$, and t satisfying (8).*

Among the more religious individuals (those with $\ell < \bar{\ell}(1)$), those with a low value of $\delta(w,\ell)$ are the ones that are more productive. Proposition 1 says that they are the ones that most likely will prefer a low cap on liberties (bear no psychological cost) because their benefit from a higher cap -namely more redistribution- is less valued relative to the psychological effect of negative externalities. Conversely, the individuals that are less productive –hence with a large $\delta(w,\ell)$– will prefer a higher cap on liberties, even at the cost of suffering from the externality, because the benefit of a more generous redistribution exceeds the effect of social intolerance.

We now examine more closely how the preferred policies change with the different individual characteristics (w,ℓ). We show an important implication of the above: when δ is high enough, the very religious individuals will prefer lower levels of liberties. As a result, religious individuals might also prefer lower taxes than their more secular counterparts with the same or higher income. Specifically, total differentiation of the optimisation conditions imply the following result.

Proposition 2. *For all $\delta > 0$, when individuals are sufficiently religious, an increase in religiosity (a lower ℓ) results in preferences for a lower cap on liberties $\hat{\ell}$; moreover, when δ is sufficiently large, this also results in a preference for a lower level of taxation. Finally, preferences for taxation are not monotonic, with very poor individuals preferring lower taxes compared with richer ones.*

It is easier to gain intuition for the case of a high δ. In that case, individuals choose the cap on liberties so as not to suffer from negative externalities, equating $\bar{\ell}(\hat{\ell})$ with their own ideal consumption ℓ. As a result, a higher religiosity –a lower ℓ– induces a preference for a lower cap. With regard to taxes, a more religious individual again has a preference for higher taxation, given that she exerts relatively little effort compared to the rest of society. However, her preference for a lower cap implies that others produce less as well, which induces a preference for low taxes. In other words, a lower cap creates lower inequality in society and, thus, lower taxes are desired. For individuals with high religiosity, this social incentive of taxation dominates (as can also be seen from Lemma 1).

Thus for some range of values of w there is non-monotonicity in the preference for taxation with respect to religiosity. Consider now a fixed value of w. The highly secular individuals prefer full liberties and low taxes, because of their high income. For an intermediate level of religiosity individuals will demand lower liberties but their higher level of religiosity (and hence their lower income) will also imply a demand for a higher tax. However, for the very religious the desired cap on liberties would be very low together with low taxation, because in a repressed society –and hence compressed incomes– their income will not be as low relative to the mean.

Our result is consistent with empirical findings showing that religious individuals who are also poor often prefer low taxes compared with their secular counterparts, and vote accordingly to right-wing parties, as documented by Huber and Stanig (2007) and De La O and Rodden (2008). Note that in our model the preference for repression of liberties and modest redistribution is not driven by the "forced choice" imposed by the political parties choice of policies.

We next turn to the political determination of liberties and taxation. We will show that a similar effect can arise when we allow for strategic political choices. Specifically, we will show that high levels of intolerance δ can be associated with repression of liberties and will be accompanied by lower taxes.

4. VOTING ON REPRESSION AND REDISTRIBUTION

In this section we examine the political choice over the two policies: the cap on liberties $\hat{\ell}$, and taxation t. We consider a simple version of the citizen candidate political model (Osborne and Slivinski 1996, Besley and Coate 1997).

In order to better capture the forces at work, we focus on a simplified model with four groups. The groups are obtained as a result of the crossing of two productivity levels, w_H and w_L, high and low, and two religiosity levels, $\{\ell, 1\}$, the religious and the secular respectively. The four groups are then the religious high-productivity agents (RH), the secular high-productivity agents (SH), the religious low-productivity agents (RL) and the secular low-productivity agents (SL). We assume that no single group has a majority. We also assume, as standard, that the low productive workers are in a majority, that is, their share p satisfies $p > \frac{1}{2}$. We shall denote by π_w the "productivity gap", $\pi_w \equiv \frac{w_H^2}{w_L^2}$ and by π_r the "religious gap", $\pi_r(\hat{\ell}) \equiv \frac{\lambda(1,\hat{\ell})}{\lambda(\ell,\hat{\ell})}$. We denote by σ the share of the secular population. As we will show, the interaction between these gaps will be important to determine the political outcome. The two distributions are uncorrelated so that, for instance, σp is the share of SL, the total population that is secular and with low productivity. We also assume for simplicity that society has to choose over the two alternative levels of liberties deemed adequate by the population $\hat{\ell} \in \{\ell, 1\}$. Hence, the religious gap can take two values only: $\pi_r(\ell) = \frac{2+\ell+\ell(1-\ell)}{2+\ell}$ and $\pi_r(1) = \frac{3}{2+\ell}$. When liberties are repressed ($\hat{\ell} = \ell$), the religious gap cannot be too wide, while under full liberties ($\hat{\ell} = 1$), the differences in religious preferences play a role as they possibly induce a substantial gap.

We assume that each type in the population is represented in the political process by one representative, a politician, whereas the remaining individuals of each type participate in the election as voters. For simplicity, there are no costs of running for election or benefits from holding office. Each representative cares, therefore, only about the political outcome, i.e., the tax rate and the legal cap on liberties chosen by the political process and commits to her preferred policy. It follows that politicians decide whether to run or not, knowing that their platform has to reflect their own ideal policies.

Assume in addition that voters vote sincerely for the platform they like most. As a tie breaking rule, we assume that any candidate would withdraw if, by doing so, she cannot have an effect on

the set of winning platforms.[17] We assume that the default policy is bad enough so that at least one politician always participates.

4.1. **Ideal policies.** We first provide the ideal policies of the four groups, which, in line with the citizen-candidate model, will be the only policies that can arise in equilibrium. Recall that we limit to $\hat{\ell} \in \{\ell, 1\}$ and that $t(w, \ell, \hat{\ell}) = \max\left\{0, \frac{1 - \frac{y(w,\ell)}{\bar{y}(\hat{\ell})}}{2 - \frac{y(w,\ell)}{\bar{y}(\hat{\ell})}}\right\} = \max\left\{0, \frac{E(w^2)\Lambda(\hat{\ell}) - w^2\lambda(\ell,\hat{\ell})}{2E(w^2)\Lambda(\hat{\ell}) - w^2\lambda(\ell,\hat{\ell})}\right\}$.

Hence the desired tax level, given $\hat{\ell}$, is determined by $\frac{w^2}{E(w^2)} \frac{\lambda(\ell,\hat{\ell})}{\Lambda(\hat{\ell})}$, that is, by the product of relative productivity and relative secularism, as derived in Proposition 1. The higher these terms are, the lower the desired tax rate.

Note that for the simple case of four groups, we have that

$$(9) \qquad \Lambda(\hat{\ell}) = (1-\sigma)\lambda(\ell, \hat{\ell}) + \sigma\lambda(1, \hat{\ell}) = 1 + (1-\sigma)\frac{\ell}{2} + \sigma\hat{\ell}\left(1 - \frac{\hat{\ell}}{2}\right).$$

Ideal policies for each of the groups will be either $(1, t(w_i, \ell_j, 1))$ or $(\ell, t(w_i, \ell_j, \ell))$ for $i \in \{L, H\}$, and $j \in \{S, R\}$. To simplify notation, let $t(w_i, \ell_j, 1) \equiv t_{ji}(\hat{\ell})$.

From Lemma 1 and the above it is easy to see that: (i) for religious individuals, $t_{Ri}(\ell) < t_{Ri}(1)$, as liberties make them relatively poorer, whereas for secular individuals, $t_{Si}(\ell) > t_{Si}(1)$, as liberties make them relatively richer; (ii) as standard, $t_{jL}(\hat{\ell}) > t_{jH}(\hat{\ell})$, so that more productive individuals demand less taxation, if at all; (iii) $t_{Ri}(\hat{\ell}) > t_{Si}(\hat{\ell})$, so that for the same productivity level, secular individuals demand less taxes than religious ones, as they are richer.

Note that, even in the case of equality in productivities, with $w_i^2 = E(w^2)$, the religious would support taxation in order to partially offset the effect on income from the incentives the secular enjoy from individual liberties. It is also easy to see that for SH, $t_{SH}(\ell) = t_{SH}(1) = 0$, as they are always the group with the highest income, while for RL, it must be that $t_{RL}(\ell) > 0$, as they are always the poorest group.

From the above and in accordance with Proposition 1, we have the following:

Lemma 2. *The ideal policies for the four groups are as follows*

- *secular groups Si, $i = \{L, H\}$: $(1, t_{Si}(1))$;*
- *religious groups Ri, $i = \{L, H\}$: there exist thresholds δ_i, with $\delta_H < \delta_L$, such that the ideal policies are $(1, t_{Ri}(1))$ when $\delta < \delta_i$, and $(\ell, t_{Ri}(\ell))$ when $\delta > \delta_i$.*

As in the previous section, the religious face a trade-off between living in a more productive economy, with higher overall per capita income, but at the cost of negative externalities from society's consumption of liberties. Alternatively, they can choose a less productive economy (hence with lower taxation) in which no such negative externalities exist. As this trade-off is

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[17]This can be thought of as the candidates choosing the least "costly" action (we do not explicitly assume that there are costs of offering a platform, but introducing some small costs will not alter our results). This condition further simplifies the analysis by reducing the number of equilibria.

more pronounced for the less productive, they prefer liberties for a larger range of parameter values.

4.2. **Political outcomes: main results.** In this section we provide a characterization of the citizen-candidate equilibria, and show two main results. First, when the productivity gap is sufficiently wide, the political process doesn't need to lead to repression of liberties, even in relatively intolerant societies (those with moderate values of δ). Second, if the productivity gap is narrow compared to the religious gap and society exhibits sufficient intolerance, repression arises and is accompanied by lower taxes compared to those that would result from full liberties.

While there can be many equilibria in the citizen-candidate model, in our environment it will generically be the case that pure-strategy equilibria will involve one candidate running and winning. Two-candidate (or more) equilibria can only arise when a tie occurs, which, as long as there are not two groups that constitute exactly half of the population, cannot be the case. Moreover, whenever there is a one-candidate equilibrium, it will be unique. This is so because, for this candidate to win, she has to be able to assemble a majority of votes so that no other candidate can beat her. When a pure-strategy equilibrium fails to exist, a mixed-strategy equilibrium will involve candidates mixing between running (and offering their ideal policy) and not running.

We start considering first the straightforward case when intolerance is sufficiently low. If $\delta < \delta_H$, all individuals in society prefer full liberties. Recall that $\pi_r(\hat{\ell}) \equiv \frac{\lambda(1,\hat{\ell})}{\lambda(\ell,\hat{\ell})}$ is the religious gap at the cap $\hat{\ell}$, and that $\pi_w \equiv \frac{w_H^2}{w_L^2}$ is the productivity gap. We therefore have:

Proposition 3. *When $\delta < \delta_H$ the equilibrium political outcome always is with full liberties. Furthermore,*

- *if the secular are a majority, then SL runs alone and wins with $(1, t_{SL}(1))$.*
- *if the religious are a majority, then*
    - *if $\pi_w > \pi_r(1)$, SL runs alone and wins with $(1, t_{SL}(1))$ and*
    - *if $\pi_w \leq \pi_r(1)$, RH runs alone and wins with $(1, t_{RH}(1))$.*

Intuitively, both RH and SL are candidates for being "median" voters in the sense that they offer intermediate tax levels. RL always offers the highest tax, while SH offers the lowest tax $t_{SH} = 0$. When the secular are the majority, SL can either assemble the support of the secular coalition, when $\pi_w > \pi_r(1)$, or the support of the low productive agents, when $\pi_w < \pi_r(1)$. If the religious are the majority, then RL is the crucial group, siding with either SL or RH depending on whoever promises higher taxes. If the productivity gap is wider than the religiosity gap, that would be the SL group, otherwise, that would be the RH one.

We have analyzed the case of a low effect for negative externalities, or low intolerance. We now proceed to examine the case of a higher δ, where individuals have more intolerance towards others practicing liberties. We start with the case of narrow productivity gap, π_w. Since the differences in productivity are modest, groups are aligned along the religiosity dimensions, the main social cleavage. We show now that in this case, whenever δ is large enough, repression arises in equilibrium at least with some probability and sometimes always.
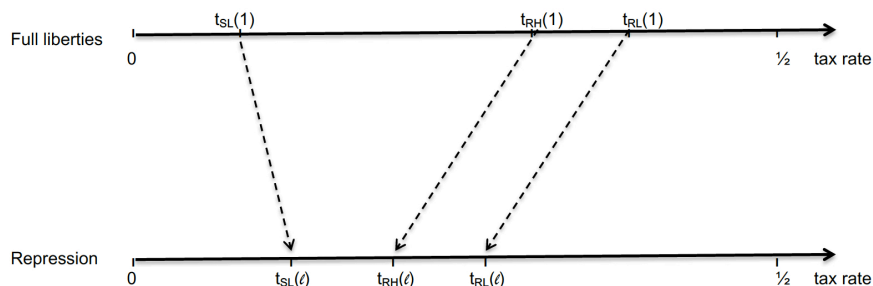
Figure 2: Ideal Tax Rate and Liberties: narrow productivity gap

Lemma 3. *Suppose that $\delta > \delta_H$ and $\pi_w < \frac{\Lambda(\ell)}{\Lambda(1)}\pi_r(1)$.[18] Then:*

- *When the secular are a majority, SL runs alone and wins with $(1, t_{SL}(1))$.*
- *When the religious are a majority there is no equilibrium in which SL runs alone and wins. Specifically, when $\delta > \delta_L$ then all equilibria involve repression with a strictly positive probability. Furthermore, there exists $\delta' > \delta_L$ such that if $\delta > \delta'$, repression arises with probability one.*

When δ is large enough, RH starts supporting repression. As the productivity gap is relatively narrow, the tax level she supports is high enough to allow her to gain the support of RL, even when the ideal policy of the latter favours full liberties. This means that SL cannot run alone in equilibrium.[19] When δ is high enough, it is also the case that the interests of the religious groups are sufficiently aligned, so that neither religious group will vote for SL against the other religious group. This means that either RL or RH must win in a pure strategy equilibrium (this will be the group preferred by SL). Figure 2 is instructive in showing the ideal policies; crucially, a wide religious gap implies that the taxes advocated by the religious under repression are higher than those advocated by the secular under libertes.[20]

In the previous section we have shown that there are environments in which the ideal policies of religious individuals combine repression with lower taxation. Here we show that the political outcome can satisfy this feature as well when the productivity gap is sufficiently narrow as above:

Remark 1. Consider a religious majority and let $\pi_w < \min\{\frac{\Lambda(1)}{\Lambda(\ell)}, \frac{\Lambda(\ell)}{\Lambda(1)}\pi_r(1)\}$. Then, whenever repression arises in equilibrium (which is the case for a high enough δ), it is combined with lower taxation than when full liberties arise in equilibrium.

The condition in Remark 1 ensures that $t_{RL}(\ell) \leq t_{RH}(1)$. When δ is low enough, then all equilibria with a religious majority have full liberties and $t_{RH}(1)$. However, when $\delta > \delta_L$, all

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[18]It can be shown that $\frac{\Lambda(\ell)}{\Lambda(1)}\pi_r(1) > 1$.

[19]If it is also the case that neither RL nor RH can run unopposed in equilibrium, then a mixed strategy equilibrium will arise when candidates will mix between running and not running.

[20]The condition in the Lemma implies that $t_{SL}(1) < t_{RH}(\ell)$. In Figure 2 it is also the case that $t_{SL}(\ell) < t_{RH}(\ell)$ which implies that for a high δ, RH is the winner of the election gaining support from both SL and RL.
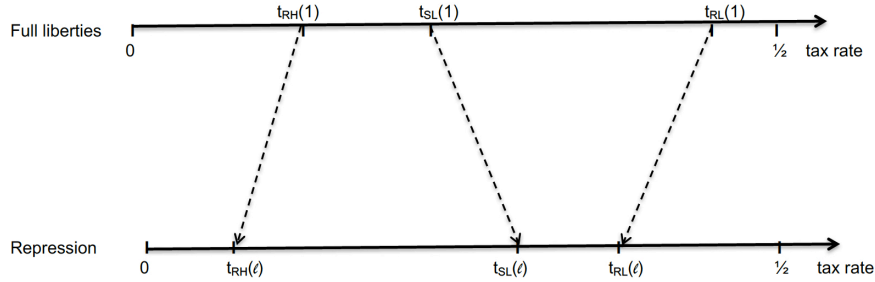
Figure 3: Ideal Tax Rate and Liberties: wide productivity gap

equilibria must involve repression. Moreover, whenever repression arises, taxes are lower than $t_{RH}(1)$. It is either the case that RH wins and then naturally $t_{RH}(\ell) \leq t_{RH}(1)$, or that RL wins with the ideal policy of $(\ell, t_{RL}(\ell))$.[21] Intuitively, whenever there is a religious majority, the religious candidates always win, due to the aligned interests between the religious groups. As their preferred tax level is lower under repression, we either observe full liberties and high taxation, or repression and lower taxation. In other words, as the religious gap is sufficiently wide, it is the religious groups that stick together and win the election. As for these groups desired taxation decrease together with less liberties, a higher intolerance implies both repression and lower taxation.

We now consider the case of a wide productivity gap. As we show, a wider productivity gap implies that repression may not arise, even when religious individuals are relatively intolerant and are in the majority. In this case it is more important for the low productive religious individuals to side with the low productive secular to achieve a large level of redistribution. Thus a "class" vote arises -when SL and RL support one of their candidates- rather than a "religious" vote -which arises when RH and RL support each other:

Lemma 4. *There exists $\kappa < \infty$, such that when $\pi_w > \kappa \pi_r(1)$:*

- *If $\delta_H < \delta < \delta_L$, then SL runs alone and wins with $(1, t_{SL}(1))$, both when there is a secular and a religious majority.*
- *When there is a religious majority, there exists δ'' so that when $\delta > \delta'' > \delta_L$, then RL runs alone and wins with $(\ell, t_{RL}(\ell))$.*

Again, it is instructive to observe this in a figure. Figure 3 shows the preferred tax rate when the productivity gap is sufficiently wide. In this case, the low productive secular group offers higher taxes than the high productive religious group under full liberties:

As a result, a wide productivity gap means that social classes "stick" together. Thus, even when there is relatively high intolerance, so that $\delta > \delta_H$, class voting persists with RL voting with SL for liberties, in return for high taxation. In addition, when δ is sufficiently large, the religious groups are also bound by their dislike for liberties and will vote for their fellow religious group no matter what tax level they offer. Thus RL enjoys both the support of the low productive secular group SL, as well as the support of the high productive religious group. The former

appreciates the high level of tax offered by RL, while the latter appreciates repression. As the winner switches from SL to RL, repression necessitates higher taxes. This implies that:

Remark 2. Consider a religious majority and let π_w be sufficiently large compared with π_r. Then when the degree of intolerance δ increases (from some $\delta < \delta_L$ to a high enough δ), the political outcome switches from liberties and some positive taxation to repression and higher taxes.

We summarise the key insights from our analysis for the case of a religious majority in the result below.

Proposition 4. *The equilibria of the citizen-candidate vote in the presence of a religious majority are such that (i) tolerant societies (low δ) are characterised by full liberties while very intolerant societies are characterised by repression. (ii) When the religiosity gap is sufficiently wide (narrow) compared with the productivity gap, a switch from a tolerant society to a sufficiently intolerant society, implies a switch from a political outcome of full liberties to that of repression, and is accommodated by a decrease (increase) in taxation.*

The results are consistent with empirical evidence that shows that more religious societies will be associated with lower taxation.[22] We highlight a particular mechanism showing how this can arise. In our model religious intolerance induces repression of liberties. If it is also the case that the religious division in society is deep (i.e., society is quite polarized in terms of preferences over individual consumption of liberties), then such repression also induces lower taxes.

4.3. **Comparative statics: religiosity and taxation.** We have already shown that large intolerance will result in lower taxes when the productivity gap is narrow, and in higher taxes when the productivity gap is wide, compared to the case of small intolerance. We now examine the effects on taxes of changes in the parameters of the distribution of religious beliefs: the share of the seculars, σ, and the degree of religiosity, ℓ.

Let us start by considering the case in which the winning tax rate is $t_{SL}(1)$. This case arises when secular are a majority or when δ is sufficiently low. Then it is easy to see that the equilibrium tax is strictly increasing in both ℓ and σ. Under full liberties, the larger is the share of the secular, the higher is the average income. This reduces the relative income of SL and thus increases the demand for redistribution. Likewise, an increase in ℓ will increase the income of the religious and, hence, the average income in society. Now the relative income of SL has come down and hence they demand more redistribution.

We now consider the environments in which the winning tax is $t_{RH}(1)$. Specifically, this arises for a religious majority and low δ, when the productivity gap is narrow compared with the religious gap. In that case a higher σ increases the demanded tax rate again as average income in society increases. What happens when ℓ increases? The demanded tax increases if and only if $\frac{\partial \Lambda(1)}{\partial \ell} \lambda(\ell, 1) > \frac{\partial \lambda(\ell, 1)}{\partial \ell} \Lambda(1)$, as both individual income and that of society increases. However, it is easy to show due to the simple linear structure of $\Lambda(1)$ and $\lambda(\ell, 1)$, that the above does not hold and hence the demand for taxation decreases.

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[22]See for example Scheve and Stasavage (2006).

As we have shown, when δ is large, repression arises, and then RH or RL can win with a policy of $(\ell, t_{Ri}(\ell))$. Again an increase in σ will increase the demand for taxation. However, an increase in ℓ will increase the demand for taxation, as above, if $\frac{\partial \Lambda(\ell)}{\partial \ell} \lambda(\ell, \ell) > \frac{\partial \lambda(\ell, \ell)}{\partial \ell} \Lambda(\ell)$. This is in fact positive for a low enough ℓ, and negative otherwise. Thus if individuals are sufficiently religious, taxes will increase in religiosity (locally), and otherwise they will decrease.

4.4. Inequality and religiosity: a reverse causality.
Does higher religiosity translate into lower demands for redistribution by the low income population? Solt et al (2011) and Solt (2014) argue that the direction of causality is the reverse one: inequality breeds religiosity. These papers argue that, as inequality becomes sufficiently high, the elite has an interest in spreading religious values among the poor. Indeed, a complementary question to address is whether the elite in society (the highly productive agents, or possibly the secular productive agents who are on average richer) can alter economic outcomes and, in particular, lower redistribution by affecting religiosity. We show below that indeed the secular elites prefer to increase religiosity when the productivity gap is wide, as this results in lower taxation.

We focus on the case in which the SL are pivotal. Specifically, assume that the seculars are a majority, and that intolerance is relatively low. In this case, the political outcome is $(1, t_{SL}(1))$. What happens when ℓ increases or when σ decreases? Is it possible that secular groups in society are interested in increasing religiosity?

To see who gains and who loses, recall the indirect utility of the secular groups under $(1, t_{SL}(1))$:

$$u(w_i, 1, t_{SL}(1), 1)) = \frac{1}{2}(1 - t_{SL}(1))^2 w_i^2 \lambda(1,1)^2 + t_{SL}(1)(1 - t_{SL}(1))E(w^2)\Lambda(1)\lambda(1,1).$$

For SL, there is a clear loss from increasing the intensity of religious feeling, ℓ, as well as the size of the religious population. As SL is pivotal, the tax level chosen is at her optimum. Thus any benefit from changes in society will come only through increasing $\Lambda(1)$. Higher religiosity only decreases $\Lambda(1)$ and hence SL will advocate more "secularity".

However, when we consider SH two effects arise from higher religiosity. Religiosity decreases $\Lambda(1)$, which is a loss as above, but also induces SL to choose a lower level of tax. This is because SL becomes richer relative to aggregate mean income, and thus more aligned with SH. Differentiating the indirect utility of the SH with respect to σ we can observe the two effects in opposite directions:

$$\frac{du(w_i, 1, t_{SL}(1), 1))}{d\sigma} = -(1 - t_{SL}(1))w_i^2(\lambda(1,1))^2 + (1 - 2t_{SL}(1))E(w^2)\Lambda(1)\lambda(1,1)$$
$$+ t_{SL}(1)(1 - t_{SL}(1))E(w^2)\Lambda(1)\lambda(1,1).$$

The first two effects are (jointly) negative. This simply is the effect on SH's utility via the induced increase of t, obviously negative. The last element is positive and results from a higher average income in society. Plugging in the optimal condition for $t_{SL}(1)$, and re-arranging, we get that a sufficient condition for the aggregate effect on SH's utility be negative is that [p is the

share of low productivity workers]:

$$\pi_w = \frac{w_H^2}{w_L^2} > \frac{6 + p(1 - \ell)}{6 - (1 - p)(1 - \ell)}$$

This condition will insure that a higher σ reduces utility or in other words, that SH prefers to lower the share of the seculars (as long as the majority is maintained). Intuitively, a higher productivity gap implies that it is more important for SH to reduce taxation –which SL will do once religiosity in society is more pronounced– rather than have a more productive population.

We summarize this discussion in the following Remark.

Remark 3. Whenever the political outcome is according to the preferred policy of SL, an increase in ℓ or σ decreases the utility of SL. On the other hand, SH can benefit from increased religiosity when the productivity gap is sufficiently wide.

5. CONCLUSIONS AND FUTURE RESEARCH

We study the interplay of the economic and religious cleavages in determining the outcome of the political choice of redistribution and of the extent of liberties. Clearly most religions have a strong stand on prohibiting some individual activities. This ranges from what should not be eaten or drunk to who cannot be your partner or what gender is the dominant one. To the best of our knowledge, ours is the first formal analysis of the effect of individual religiosity on the political choice of the extent of individual liberties together with that of taxation.

We show that the preferences of poor religious individuals for taxation may not follow directly from their "class" interest. Highly religious individuals will prefer less liberties and as a result, lower taxes than those demanded by secular individuals with the same or even lower productivity. We can then rationalize the vote of the religious poor to right-wing parties, without having to appeal to a "forced choice" imposed by the given platform of the political parties.

We also show how this effect arises at the aggregate level: religious societies may be associated with low level of liberties and with low level of taxation. However, we show that if the religious cleavage is not too dominant, even a society with a religious majority may vote for personal liberties. It is the joint effect of a religious majority and high levels of intolerance that makes repression the chosen policy. The implications of the model provide a new theoretical explanation for the existing empirical evidence showing negative correlation between religiosity and redistribution at the country level. This is also in line with the cross-country correlation plotted in the Introduction showing a negative relationship between religious intensity and the legal cap on personal liberties. Furthermore, as a first cut, Appendix B provides a first empirical test of the role of religiosity and liberties, as well as their interaction, in explaining market income inequality. The results obtained confirm the predictions of the model.

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<div align="center">APPENDIX A</div>

Proof of Lemma 1

From equation (8) it is easy to see that the derivative of $t(w, \ell, \hat{\ell})$ w.r.t. depends on the sign of $\frac{\partial \Lambda(\hat{\ell})}{\partial \hat{\ell}} \lambda(\ell, \hat{\ell}) - \frac{\partial \lambda(\ell, \hat{\ell})}{\partial \hat{\ell}} \Lambda(\hat{\ell})$. $\frac{\partial \Lambda(\hat{\ell})}{\partial \hat{\ell}}$ is positive and does not depend on ℓ, while $\frac{\partial \lambda(\ell, \hat{\ell})}{\partial \hat{\ell}} \geq 0$ and is strictly increasing in ℓ. Whenever $\ell \leq \hat{\ell}$, as $\frac{\partial \lambda(\ell, \hat{\ell})}{\partial \hat{\ell}} = 0$, this is strictly positive, whereas when $\ell = 1$ this is strictly negative. Thus there exists $\ell' > \hat{\ell}$ so that for $\ell \leq \ell'$ the preferred taxes increase and for $\ell > \ell'$ they decrease.□

Proof of Proposition 1

Using (9), it is clear that when $\ell \geq \bar{\ell}(1)$ we have that $\frac{du(w, \ell)}{d\hat{\ell}} > 0$. It follows that all the individuals with $\ell \geq \bar{\ell}(1)$ choose $\hat{\ell} = 1$ and $t(w, \ell, 1)$.

We now examine the subset of parameter values with $\ell < \bar{\ell}(1)$. We first show that in this set $\hat{\ell} = 1$ can never be the ideal policy choice for any individual. To this effect, we observe that if we evaluate $\frac{du(w, \ell, \hat{\ell})}{d\hat{\ell}}$ at $\hat{\ell} = 1$ in (9), this derivative is zero. Assuming that $g(1) > 0$ and taking the second derivative, we obtain that the indirect utility is locally strictly convex in $\hat{\ell}$ if and only if $\ell < \bar{\ell}(1)$. Hence, for the subset of parameter values we are now examining, $\hat{\ell} = 1$ is a local minimum. We can strengthen this result by showing that the ideal $\hat{\ell}$ satisfies $\bar{\ell}(\hat{\ell}) \geq \ell$. Suppose that the ideal $\hat{\ell}$ is such that $\bar{\ell}(\hat{\ell}) < \ell$. Then, as long as this inequality is satisfied we can strictly raise the utility using (9) by increasing $\hat{\ell}$.[23] Therefore, since we have shown that when $\ell < \bar{\ell}(1))$ the ideal $\hat{\ell}$ has to be an interior maximum, then it has to be that for this subset of parameter values $\bar{\ell}(\hat{\ell}) \geq \ell$. Notice that this result implies that the ideal cap satisfies $1 > \hat{\ell}(\ell) \geq \bar{\ell}(\hat{\ell}) \geq \ell$. Note that as $\ell < \hat{\ell}(\ell)$, we have that $\lambda(\ell, \hat{\ell}) = 1 + \frac{\ell}{2}$.

If we now evaluate $\frac{du(w, \ell, \hat{\ell})}{d\hat{\ell}}$ at $\hat{\ell} = 0$ we find this derivative to be strictly positive. From these two results we can deduce that the ideal $\hat{\ell}$ is interior. Hence, it follows that u is locally concave at the ideal $\hat{\ell}$. This is a property we shall use later on.

The ideal $t(w, \ell, \hat{\ell})$ is a corner solution whenever $w^2 \left(1 + \frac{\ell}{2}\right) \geq E(w^2) \Lambda(\hat{\ell})$ and interior otherwise. From the utility function it is straightforward to see that whenever the ideal choice involves $t = 0$, the preferred $\hat{\ell}(\ell)$ satisfies $\bar{\ell}(\hat{\ell}) = \ell$.

We now define $\delta(w, \ell)$ as the level of δ satisfying:

$$t(w, \bar{\ell}^{-1}(\ell))(1 - t(w, \bar{\ell}^{-1}(\ell))) E(w^2) \left(1 + \frac{\ell}{2}\right) \frac{d\Lambda}{d\hat{\ell}}|_{\bar{\ell}^{-1}(\ell)} - \delta(1 - G(\bar{\ell}^{-1}(\ell))) = 0$$

This is the value of δ at which, when $\hat{\ell} = \bar{\ell}^{-1}(\ell)$, then (9) is satisfied with equality. Taking total differentiation of (9) with respect to δ and using the concavity of u at the optimal solution, it

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[23]And not decrease it if the optimal t satisfies $t = 0$ along the way.

is easy to show that $\frac{\partial \hat{\ell}}{\partial \delta} > 0$. Thus, everything else equal, for all $\delta \geq \delta(w, \ell)$ the solution must involve the corner solution of $\hat{\ell} = \bar{\ell}^{-1}(\ell)$, whereas the solution for a lower δ will have $\hat{\ell} > \bar{\ell}^{-1}(\ell)$ with the two first order conditions, (8) and (9), satisfied with equality. Note moreover that the higher is w, the lower is the first element above, and hence the lower is $\delta(w, \ell)$. On the other hand, for the very religious, when increasing ℓ, the first element increases implying that $\delta(w, \ell)$ is higher. Note also that

$$t(1-t)E(w^2)\left(1 + \frac{\ell}{2}\right)\frac{d\Lambda}{d\hat{\ell}} - \delta(1 - G(\hat{\ell}))$$

$$= t(1-t)E(w^2)\left(1 + \frac{\ell}{2}\right)(1 - G(\hat{\ell}) - \int_{\hat{\ell}}^1 \frac{\hat{\ell}}{\ell}dG(\ell)) - \delta(1 - G(\hat{\ell}))$$

$$= (1 - G(\hat{\ell}))(t(1-t)E(w^2)\left(1 + \frac{\ell}{2}\right) - \delta) - t(1-t)E(w^2)\left(1 + \frac{\ell}{2}\right)\hat{\ell}\int_{\hat{\ell}}^1 \frac{1}{\ell}dG(\ell)$$

Therefore, if $t(1-t)E(w^2)\left(1 + \frac{\ell}{2}\right) < \delta$, the condition cannot be satisfied with equality. Thus for all $\delta > \delta^* = \frac{1}{4}E(w^2)\left(1 + \frac{\ell}{2}\right)$, we know that the solution must be a corner solution where $\hat{\ell} = \bar{\ell}^{-1}(\ell)$.$\square$

Proof of Proposition 2

Consider first the case of $\delta < \delta(w, \ell)$. Performing total differentiation on the two first order conditions (which hold with equality), with respect to secularism ℓ, bearing in mind that $\ell \leq \bar{\ell} < \hat{\ell}(\ell)$, and rearranging we obtain:

$$sign\frac{d^2u}{d\hat{\ell}d\ell} = sign\left[\frac{2}{3} - \frac{w^2(1 + \frac{\ell}{2})}{E(w^2)\Lambda(\hat{\ell})}\right].$$

The cross derivative is positive (negative) for $\frac{w^2(1+\frac{\ell}{2})}{E(w^2)\Lambda(\hat{\ell})} < (>)\frac{2}{3}$, or when $t(w, \frac{\ell}{2}, \hat{\ell}) > \frac{1}{4}$. Using the local concavity of u with respect to $\hat{\ell}$ at the maximum, we have that for high religiosity —low ℓ— higher religiosity makes individuals wish more repression, while at lower levels of religiosity —above the threshold— a marginal increase in religiosity will make individuals to support a wider cap on liberties. For the case of $\delta \geq \delta(w, \ell)$, the optimal solution satisfies $\hat{\ell}(\ell) = \bar{\ell}^{-1}(\ell)$, and thus $\hat{\ell}(\ell)$ increases with ℓ for all individuals. Thus when the individual becomes more religious, she supports more repression.

We now consider the effect on the preferred taxes when $\delta \geq \delta(w, \ell)$. Now note that for the same ℓ, $t(w, \ell)$ increases in $\hat{\ell}$ but also decreases in ℓ. Thus the effect on t is ambiguous. We hence use total differentiation. First as $\ell = \bar{\ell}(\hat{\ell})$, we have that $\partial \ell = (1 - G(\hat{\ell}))\partial \hat{\ell}$ so that

$$\frac{\partial \hat{\ell}}{\partial \ell} = \frac{1}{1 - G(\hat{\ell})} > 0.$$

And using the condition (8) we have

$$\frac{\partial t}{\partial \ell} = w^2 E(w^2) \frac{\frac{\partial \Lambda(\hat{\ell})}{\partial \hat{\ell}} \frac{\partial \hat{\ell}}{\partial \ell} \lambda(\ell) - \frac{\lambda(\ell)}{\partial \ell} \Lambda(\hat{\ell})}{(2E(w^2)\Lambda(\hat{\ell}) - w^2 \lambda(\ell))^2}$$

We therefore need to find the sign of

$$\frac{\partial \Lambda(\hat{\ell})}{\partial \hat{\ell}} \frac{\partial \hat{\ell}}{\partial \ell} \lambda(\ell) - \frac{\lambda(\ell)}{\partial \ell} \Lambda(\hat{\ell})$$

$$= \quad (1 - \frac{\int_{\hat{\ell}}^1 \frac{\hat{\ell}}{\ell} dG(\ell)}{1 - G(\hat{\ell})})(1 + \frac{\ell}{2}) - \frac{1}{2}\Lambda(\hat{\ell}).$$

Plugging for $\Lambda(\hat{\ell}) = 1 + \int_0^{\hat{\ell}} (\frac{\ell}{2}) g(\ell) d\ell + \hat{\ell}(1 - G(\hat{\ell})) - \frac{\hat{\ell}}{2} \int_{\hat{\ell}}^1 \frac{\hat{\ell}}{\ell} g(\ell) d\ell$, we need the sign of

$$(1 - \frac{\int_{\hat{\ell}}^1 \frac{\hat{\ell}}{\ell} dG(\ell)}{1 - G(\hat{\ell})})(1 + \frac{\ell}{2}) - \frac{1}{2}(1 + \int_0^{\hat{\ell}} (\frac{\ell}{2}) g(\ell) d\ell + \hat{\ell}(1 - G(\hat{\ell})) - \frac{\hat{\ell}}{2} \int_{\hat{\ell}}^1 \frac{\hat{\ell}}{\ell} g(\ell) d\ell)$$

$$= \quad \frac{1}{2} + \frac{\ell}{2} - \int_{\hat{\ell}}^1 \frac{\hat{\ell}}{\ell'} dG(\ell')(\frac{1 + \frac{\ell}{2}}{1 - G(\hat{\ell})} - \frac{\hat{\ell}}{4}) - \frac{1}{2}[\int_0^{\hat{\ell}} (\frac{\ell'}{2}) g(\ell') d\ell' + \hat{\ell}(1 - G(\hat{\ell}))]$$

Suppose that $\ell \to 0$, so must have $\hat{\ell} \to 0$ with normally behaved distribution with no atom around 0. This implies that the above converges to $\frac{1}{2}$. This implies that for a low enough ℓ, higher ℓ implies higher $\hat{\ell}$ and higher taxes, while more religiosity (lower $\hat{\ell}$) will imply lower $\hat{\ell}$ and lower taxes, as the result states.□

Proof of Lemma 3

When $\pi_w < \frac{\Lambda(\ell)}{\Lambda(1)} \frac{\lambda(1,1)}{\lambda(\ell,\ell)}$, then $t_{SL}(1) < t_{RH}(\ell)$. When the secular are in the majority, then SH prefers the ideal policy of SL to that of RH. Since $\delta > \delta_H$, we know by Lemma 2 that RH's preferred policies are $(\ell, t_{RH}(\ell)$. Hence, by supporting SL the SH can obtain liberties and lower taxation. Thus SL must win.

We now proceed to analyze the political outcome when the religious are the majority. We first show that when $\delta > \delta_H$, RL prefer $(\ell, t_{RH}(\ell))$ to $(1, t_{SL}(1))$. To see why, note that when RH prefers repression, she must prefer $(\ell, t_{RH}(\ell))$ to $(1, t_{RH}(\ell))$. But for the same taxes, the personal productivity w_H^2 is not relevant. Specifically, RH prefers $(\ell, t_{RH}(\ell))$ to $(1, t_{RH}(\ell))$ if and only if

$$t_{RH}(\ell)(1 - t_{RH}(\ell))E(w^2)(1 + \frac{\ell}{2})(\Lambda(1) - \Lambda(\ell)) < \delta \sigma (1 - \ell).$$

As personal productivity is not relevant, the above implies that also RL prefers $(\ell, t_{RH}(\ell))$ to $(1, t_{RH}(\ell))$. As she also prefers $(1, t_{RH}(\ell))$ to $(1, t_{SL}(1))$ because $t_{SL}(1) < t_{RH}(\ell) < t_{RL}(\ell) < t_{RL}(1)$, then she prefers $(\ell, t_{RH}(\ell))$ to $(1, t_{SL}(1))$.

From the above we can deduce the following. When the religious are the majority and $\delta > \delta_H$, there is no equilibrium in which SL runs alone and wins. If this were the case, then RH can

deviate and run against her. In this case RH will assemble both her own voters and that of RL, a majority. Naturally, SH cannot run alone and win as then RH can also win against her. All the above implies that either RL or RH must win at least with some positive probability in equilibrium. As when $\delta > \delta_L$ the ideal policy of each involves repression, we have that repression arises with a positive probability.[24]

Finally, let δ be large enough, so that both the ideal policy of RL is $(\ell, t_{RL}(\ell))$ and, crucially, RH prefers $(\ell, t_{RL}(\ell))$ to $(1, t_{SL}(1))$. From the claim above also RL prefers the ideal policy of RH to that of SL so that each religious group prefers the ideal policy of the other religious group to that of SL. This means that whoever is preferred by SL is then the median voter and can run and win. For example, if SL prefers $(\ell, t_{RL}(\ell))$ to $(\ell, t_{RH}(\ell))$ then RL wins against RH as well as against SL. If on the other hand SL prefers $(\ell, t_{RH}(\ell))$ to $(\ell, t_{RL}(\ell))$ then RH will win as it wins against RL as well as against SL. Thus one of the religious candidates runs alone and wins, and repression arises with probability 1.$\square$

Proof of Lemma 4

A sufficiently high productivity gap will imply: (i) when $\delta < \delta_L$, then RL prefer the ideal policy of SL to $(\ell, t_{RH}(\ell))$. (ii) SL prefers $\ell, t_{RL}(\ell)$ to $\ell, t_{RH}(\ell)$; (iii) RH prefers $1, t_{SL}(1)$ to $1, t_{RL}(1)$. Fix w_L, and consider a sequence of high productivity w_H, satisfying $w_H \to \infty$. In that case, $t_{SL}(1) \to \frac{1}{2}, t_{RL}(1) \to \frac{1}{2}, t_{SL}(\ell) \to \frac{1}{2}, t_{RL}(\ell) \to \frac{1}{2}$, with $t_{RL}(\ell) > t_{SL}(\ell), t_{RL}(1) > t_{SL}(1), t_{RH}(\ell) = t_{RH}(1) = 0$, and $t_{RL}(\ell) > t_{SL}(\ell) > t_{SL}(1)$ along the sequence. In this limit case it is easy to see that (i)-(iii) are satisfied. We can therefore find a sufficiently high level of the (finite) productivity gap so that the above is satisfied. As a result, when $\delta < \delta_L$, from the above (i) to (iii), SL is the median voter and wins, for any type of majority, secular or religious.

What δ is sufficiently high on the other hand, we have that a religious majority will choose RL as SL prefers it to RH given the high productivity gap, and RH prefers it to SL given the high intolerance. Specifically, for each fixed large π, one can find δ large enough so that RH prefers $(\ell, t_{RL}(\ell))$ to $(1, t_{SL}(1))$.$\square$

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[24]For RH to win with probability 1, it must be that SL prefers her to RL. For RL to win with probablity 1, it must be that SL prefers her to RH and that RH prefers her to SL. If none of these cases arises, then we will have a mixed strategy equilibrium with possibly RL, RH and SL all running with some positive probability.

APPENDIX B

This Appendix presents some correlations aiming to illustrate empirically the aggregate implications of our model. As mentioned in the main text, our results imply that market income inequality and redistribution negatively depend on religiosity. Figure 2 depicts the within-country correlation (i.e., net of country fixed effects) between average religious intensity and market Gini (panel a) and redistribution (panel b). Inequality data comes from Solt (2009, 2014), who provides standardized data on market and disposable Gini coefficients. The degree of redistribution, R, is defined as $R = 1 - \frac{G_d}{G_m}$, where G_d and G_m are Gini of disposable and market incomes, respectively. Data on religiosity comes from the European Social Surveys (ESS) and it is measured using the country average of an index of individual religious intensity, see Esteban, Levy and Mayoral (2017) for details.[25] We consider the 6 waves of the ESS, i.e., 2002, 2004, 2006, 2008, 2010, and 2012. Despite the fact that the time span is quite limited and that these variables are likely to move slowly over time, we still observe a within-country correlation that is negative and around -.2 in both cases. Not surprisingly, cross-sectional correlations are considerably higher, particularly that between religious intensity and redistibution, which equals -.47.

Our model also implies that there exists a positive association between liberties and income inequality and redistribution, as liberties have an opposite effect on the willingness to work for secular and religious individuals, which in turn leads to higher income inequality and redistributive pressures. Figure 3 displays the (within-country) association between an index that captures the cap of legal liberties and inequality (panel a) and redistribution (panel b). Countries included are the same as in Figure 2 and the time period now is 1960-2013.[26] As predicted by our model, we observe a positive and strong correlation between these pairs of variables.

Table 1 further explores these relationships in a regression framework. The dependent variable is market Gini in columns 1–3 and redistribution in columns 4–6. All regressions contain country and year dummies. Columns 1 and 2 show that religiosity has a negative and a very significant effect on inequality while the effect of Liberties is positive and significant. Column 3 introduces the interaction between liberties and religiosity. Our model predicts that the impact of liberties on inequality is mediated by religiosity: it will be small in a secular society and large in a society where part of its members are highly religious. Thus, our results predict the coefficient of the interaction term to be positive. Column 3 shows that, as expected, the coefficient of the interaction term is positive and significant. Interestingly, the coefficient of the Liberties index losses part of its significance and its sign flips once the interaction term is in the regression, consistent with the prediction that the impact of liberties on inequality is mediated by religiosity. Columns 4 to 6 provide a very similar picture of the relation between religiosity, liberties and redistribution.

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[25]Countries included are: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom.

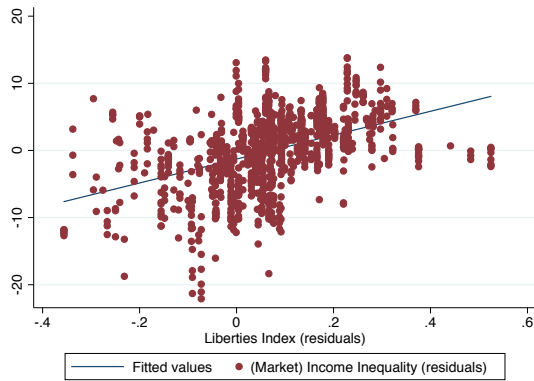[26]See ELM for details about the exact definition and construction of the index.
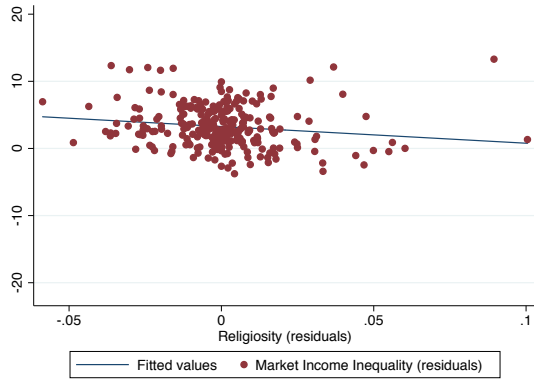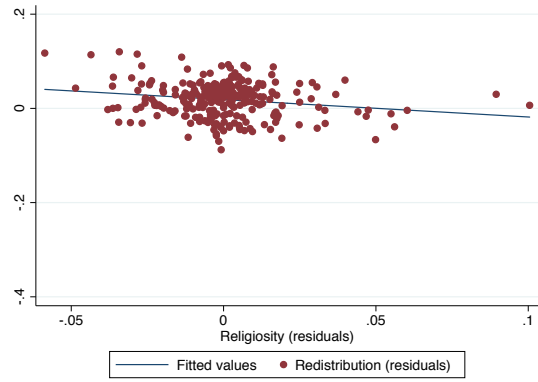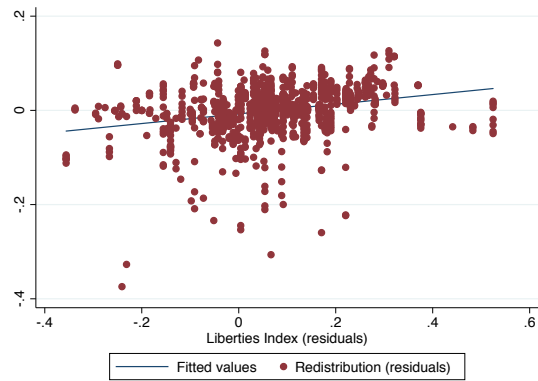
(a) Market Gini versus Religiosity   (b) Redistribution versus Religiosity

Figure 2. INEQUALITY, REDISTRIBUTION AND RELIGIOSITY

(a) Market Gini versus Religiosity   (b) Redistribution versus Liberties

Figure 3. INEQUALITY, REDISTRIBUTION AND LIBERTIES

	[1]	[2]	[3]	[4]	[5]	[6]
Religiosity	-28.152***	-27.316***	-53.424***	-0.477***	-0.450***	-0.902***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Liberties		6.603*	-16.055*		0.217***	-0.176
		(0.066)	(0.051)		(0.000)	(0.126)
Religiosity× Liberties			55.932***			0.969***
			(0.002)			(0.000)
c	60.927***	56.164***	67.723***	0.512***	0.356***	0.556***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R^2	0.912	0.913	0.916	0.946	0.950	0.953
Obs	271	271	271	271	271	271

Table 1. RELIGIOSITY, INEQUALITY AND LIBERTIES. This table regresses Market Gini (columns 1-3) and Redistribution (columns 4–6) on religious intensity, the Liberties index and the interaction of the two. See the text for details on the construction of the variables. All regressions contain country fixed effects and year dummies. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.