

# The Political Economy of Religion, Individual Liberties, and Redistribution<sup>1</sup>

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## Abstract

In this paper we study the role of religiosity in political choices such as redistribution and individual liberties. To a standard model with consumption and effort, we add a third good: civil liberties with a cap established by law. More liberties, like divorce, abortion, gender parity, or gay marriage, may be considered good by the secular and detrimental by the religious individuals. With standard assumptions on individual preferences, this implies that labor supply and income are lower for religious individuals in the presence of liberties. As a result there is a higher share of religious individuals among the poor, consistent with evidence that the poor care more about “moral values”. Still, we show that poor religious agents may prefer low taxes: such individuals also prefer that society restricts liberties, which suppresses income inequality and thus induces preferences for low taxes. We also show that restriction of liberties can arise as an equilibrium outcome of a simple political process when society is sufficiently religious. Moreover, if economic polarisation is lower than religious polarisation, such restriction of liberties results in lower taxation.

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

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## 1 Introduction

Religion shapes individual preferences, especially the preferences on civil liberties such as abortion or gay rights. Indeed all religions prohibit some or all forms of civil liberties and the fact that there are or have been legal caps on such liberties is consistent with a long history of political pressure from religious groups on these issues. In Esteban, Levy and Mayoral (2015) [ELM thereafter] we have studied theoretically and empirically the effect of religiosity on individual preferences over liberties and hence on labor supply. In this paper we study how this effect translates into individual political choices on redistribution and on the width of civil liberties. Specifically, we provide an explanation as to why religious poor individuals, in spite of their poverty, support conservative policies with relatively little income redistribution and why do we see that countries with high levels of religiosity are among the least redistributive.

Abortion, access to contraception, gender parity, divorce, LGBT rights, euthanasia and so on were and still are contentious political issues which are informed by religious views.<sup>3</sup> We have seen massive demonstrations against gay marriage, led by religious organizations, in Paris, Rome, Nairobi or NYC during the past two years. Interestingly, these demonstrations aimed not to persuade the citizens to abstain from these liberties, but to put pressure on the legislators to keep it illegal that other individuals could use them. Conservative [liberal] governments regularly include in their manifestos the tightening [broadening] of individual rights such as gender parity, abortion, or homosexual marriage, obviously as a response to demands by their respective constituencies. Since individuals are always free to refrain from using the civil rights, the insistence on regulating these actions by law of universal application clearly reveals the existence of a strong externality motive. This externality will play a key role in our model.

As a motivating observation about the relation between the religiosity of society and the legal caps on the access of individuals to these civil liberties, we provide the following graph showing a clear negative correlation between average religiosity and an index of afforded civil liberties, across European countries with 6 time points for each country.<sup>4</sup>

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<sup>3</sup>Carvalho and Koyama (2012) argue that religions strategically choose restrictions on individual liberties to induce labour and capital contributions towards the religious organization (rather than towards the rest of society).

<sup>4</sup>The average religiosity data is taken from the ESS surveys. We had constructed the country-date civil liberties index based on the legal evolution of civil liberties from 1960 to 2013. The data reflects legislation on abortion, divorce, women's rights, LGBT rights and Euthanasia, and is assembled from various

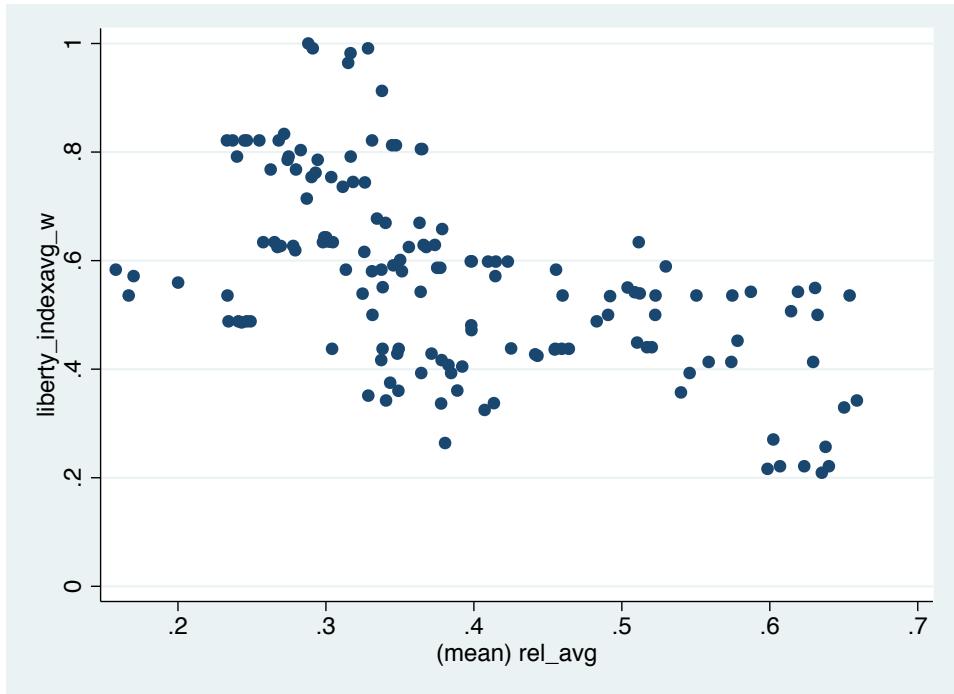


Figure 1: Legal civil liberties and religiosity, 1960-2013

We incorporate the effect of religiosity on the preferences for liberties using the same model as in ELM. To a standard model where individuals have preferences over consumption and effort, we add a third (public) good: civil liberties.<sup>5</sup> “Secular” individuals value liberties positively while “religious” individuals value them negatively. With standard assumptions on preferences we show that labor supply and hence income will decrease with religiosity, and that this effect is larger the more liberties are afforded. There is in fact a large literature that shows how religiosity adversely affects labour effort and income.<sup>6</sup> But in ELM we also

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sources such as the UN, the EU parliament, World Bank, the Human Rights project, Pew Research Center, Freedom to Marry, etc. For more details, see ELM (2015).

<sup>5</sup>Civil liberties is generally a wider concept than gay rights or women’s rights. With some abuse of language, we use this term to refer to all those issues over which the views of religious and secular are currently opposed and often very intensely so. In the remainder of the paper, when we speak of widening or repressing civil liberties we exclusively refer to the legal limitations on these issues.

<sup>6</sup>Becker and Woessman (2009), show that income increases when religious attendance decreases. Clark and Lelkes (2005) find that religiosity has a negative effect on labor supply —most specially for women— and that religious unemployed are less active in looking for a job. Similar results are obtained by Berman (2000) in his study of Orthodox Jews. Lehrer (1995) also finds a negative effect of religiosity on female labor participation. The results by Campante

show empirically that the interaction between civil liberties and religiosity is a quantitatively important determinant of this relation. Interestingly, the negative influence of religiosity on effort, through its adverse valuation of liberties, also implies that wider liberties increase income inequality, as they create different labour supply incentives for religious and secular individuals.

As liberties increase income inequality, there are two political variables of choice that may be directly or indirectly affected by the degree of one's religiosity or more generally of that of society: income redistribution, and the legal cap on liberties. We then study the role of religiosity in these two political choices. We show how redistribution and civil liberties are intertwined, so that religious views against civil liberties can lead to both repression of liberties and low levels of redistribution in society.

The valuation of liberties consists of two components: (i) the personal use of liberties and (ii) the social externality of liberties, that is, the fact that such liberties are accessible to all. How much weight do individuals assign to the valuation of the private use of liberties versus the valuation that such use is accessible to anyone is a fundamental characteristic of the religious culture of each society.<sup>7</sup> We show that, in the presence of the externality, the very religious individuals –even the very poor– turn to favour low taxation. This arises as the externality drives these individuals to prefer to restrict the legal cap on liberties to a minimum. Such restriction of liberties reduces the overall productivity in society (and hence the tax base) and represses income differences between seculars and religious and consequently income inequality. Both these effects imply that these religious individuals would combine their preferences for minimum liberties with preferences for relatively low taxation, compared with equally poor or even richer seculars who prefer wider liberties and higher taxation.

This result is consistent with the empirical data showing that religious individuals who are also poor often prefer low taxes compared with their secular counterparts, and vote accordingly to right-wing parties, who often offer platforms combining repression

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and Yanagizawa-Drott (2013) show that longer Ramadan fasting has a negative and persistent effect on output growth in Muslim countries.

<sup>7</sup>For the radical interpretation of Islam the main role of the state is to implement the religious norms. Also Catholicism, specifically at the time of the Inquisition, or Jewish beliefs that God may punish all even if only some have sinned, are examples of high concern for what the others do or can do. But some forms of Protestantism focusing on the personal relationship with god, independently of what others may do, or similarly Buddhism, seem obvious candidates for assigning a substantially lower weight to the possible externalities of exercising liberties.

of liberties and lower taxes.<sup>8</sup> The vote of poor religious individuals to such parties is considered by some to be a result of “forced choice”, that is, that such individuals trade-off moral values, which they like, for low taxes, which they do not like.<sup>9</sup> Our analysis shows that this is not necessarily the case. Religious poor individuals are not being subject to “forced choice”: Compared to secular or less religious individuals who are richer than them, they would actually prefer the combination of repression and lower taxes.<sup>10</sup>

In a simple sequential voting model with two religiosity levels and two productivity levels, we show that restriction of liberties along with relatively low taxation can also arise as a political outcome. This is the case when the externality aspect of liberties is sufficiently important, and when economic polarisation (e.g., inequality in productivities) is sufficiently low, so that the religious agents are not too divided by class. Thus more religious societies may induce lower taxation in our model both because (i) their income and aggregate output is lower; (ii) repression of liberties lowers income inequality and is thus bundled with lower taxes.

Our finding that religious societies may exhibit lower tax rates is consistent with recent empirical findings, showing that religious countries are characterised by lower levels of redistribution.<sup>11</sup> Several theoretical explanations have been suggested for such findings. In Scheve and Stasavage (2006), 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.<sup>12</sup> In Benabou and Tirole (2006) religion is a way of manipulating one’s beliefs in order to motivate continued effort and therefore religious agents will work harder and demand less taxes.<sup>13</sup> Roemer (1998) shows that if the salience of religion is large enough, both political parties offer platforms with low taxes even if the median voter is poor. Levy (2004)

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<sup>8</sup>De La O and Roden (2008) show that in every country, it is primarily the moral values dimension rather than the economic dimension that pulls religious voters away from the left.

<sup>9</sup>Huber and Stanig (2007) show that forced choice on individual liberty issues (so that right-wing parties on economic issues also restrict liberties) leads to more right-wing voting among all income groups, but more so among the poor.

<sup>10</sup>This is also consistent with the empirical analysis in Stegmueller (2013), who finds that religious individuals have less liberal economic preferences.

<sup>11</sup>See Scheve and Stasavage (2006), Palani (2008) and Rees (2009). The causality may also go in the other direction. A more unequal society may cause agents to feel less secure which may lead them to turn to religion as a source of comfort (Rees 2009).

<sup>12</sup>See also Gill and Lansgaarde (2004) and Clark and Lelkes (2004).

<sup>13</sup>In Elkin, Goskel and Gurdal (2013), for the religious organizations to work, people need to make financial sacrifices. They would therefore prefer more disposable income (to make it voluntary so to signal better) and thus they prefer less taxes.

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 revenues to specific religious interests at the expense of general redistribution. In Huber and Stanig (2011), the rich and the religious poor form electoral coalitions in favor of low taxes where in return the rich provide directed side payments via charity to the religious poor. In Benabou, Ticchi and Vindigni (2013, 2015) religiosity blocks innovations and hence reduces output (religiosity also reduces output in our case but through a different channel) in order to preserve religious preferences and hence redistribution towards religious goods (versus general income redistribution). They show that a more religious society induces lower taxation as then the winning coalition forms along the religiosity cleavage instead of the class one. Our theory differs as it builds both on (i) the pressures of the seculars to redistribute less when there are more religious agents in society as these agents are less productive, and on (ii) the pressures of the religious agents to reduce liberties and as a result to decrease taxation when society becomes less productive but more equal.

The remainder of the paper is organized as follows. In the next Section we present the baseline model and some preliminary results. Section 3 considers the preferences of individuals over taxes and liberties. In Section 4 we analyze the political determination of these policies. We discuss the implications of our findings in Section 5.

## 2 The model and preliminary results

As in ELM, to a standard model where individuals have preferences over consumption  $c$  and leisure  $l$ , we add a third (public) good, civil liberties  $\ell$ . The use [“consumption”] of civil liberties is free, but it is subject to a cap  $\ell_M$  fixed by law. Besides limiting the maximum liberties accessible, the cap  $\ell_M$  may also have an externality effect on individuals as their utility might be affected by the fact that such level of liberties are accessible to the entire population. This effect on individual utility is independent of the amount of liberties each individual effectively uses. We assume that the importance attached to what is available to others is a culturally specific trait shared by all the members of society.

Religiosity shapes individual preferences for liberties. Individuals are each endowed with a degree of religiosity  $x \in [0, 2]$ , and we assume that the utility function over consumption  $c$ , liberties  $\ell$ , and effort  $e$ , can be written as

$$u(c, [1 + (1 - x)[(1 - \alpha)\ell + \alpha\ell_M]], e), \quad (1)$$

where  $u(\cdot, \cdot, \cdot)$  is common to all individuals. We represent therefore the effect of liberties on individual preferences as a convex linear combination of the personal use of them,  $\ell$ , and the maximum legally permitted  $\ell_M$ , that is  $[(1 - \alpha)\ell + \alpha\ell_M]$ . The parameter  $\alpha \in (0, 1)$  indicates the relative weight of the externality effect of liberties, how much individuals are concerned by what is accessible to the others, or “religious intolerance”.

In order to be able to obtain close form solutions, for the rest of the paper we will consider the following specific utility function:

$$u_x(c, \ell, e) = c[1 + (1 - x)[(1 - \alpha)\ell + \alpha\ell_M]] - \frac{1}{2}e^2. \quad (2)$$

Those with  $x \leq 1$  are termed *secular* and value liberties positively and those with  $x > 1$  are termed *religious* and value liberties negatively. Note that while  $u_{c\ell} > 0$  for seculars,  $u_{c\ell} < 0$  for the religious. This utility specification is also consistent with the fact that religiosity induces individuals to lower their appreciation for material pleasures and rewards, and the more so the higher the level of religiosity.<sup>14</sup>

Since  $\ell$  is a free good, it is immediate that the optimal individual choice will be either  $\ell = \ell_M$  if  $x \leq \bar{x}$  or  $\ell = 0$  if  $x > \bar{x}$ . For seculars, the liberties element of the indirect utility function equals  $1 + (1 - x)\ell_M$ , and for the religious, it equals  $1 + (1 - x)\alpha\ell_M$ . As from now on the relevant parameter becomes  $\ell_M$ , to economize on notation we denote  $\ell_M$  simply by  $\ell$ .

The religiosity parameter  $x$  is distributed in the population according to the cdf  $G(\cdot)$ . We denote by  $x_s$  and  $x_r$  the average religiosity among those with  $x \leq 1$  and  $x > 1$  respectively. Let  $\sigma$  be the proportion of seculars in society,  $\sigma = G(1)$ .

Individuals also differ in their earning capacity or productivity  $w$ , so that pre-tax income will be  $we$ . The individual productivity  $w$  is distributed according to the cdf  $F(w)$ , with expected value  $\bar{w}$  and second moment  $E(w^2)$ . We focus on the case where religiosity and productivity are independently distributed (we discuss the case of correlation in Section 5).

We assume that there is a purely redistributive linear income tax with a marginal rate  $t$  and a budget balancing per capita transfer  $T$ . Therefore,

$$c = (1 - t)we + T,$$

and thus the optimal labour supply will be

$$\begin{aligned} e &= (1 - t)w(1 + (1 - x)\ell) \text{ if } x \leq 1 \\ e &= (1 - t)w(1 + (1 - x)\alpha\ell) \text{ if } x > 1. \end{aligned}$$

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<sup>14</sup>See Iannaccone (1992), and Guiso, Sapienza and Zingales (2006).

The above implies that religious individuals would be on average poorer than the secular ones, everything else equal. Intuitively, since the marginal utility of consumption is lower for the religious individuals, they will have less of an incentive for working hard. Moreover, this effect is also larger the larger is the weight on the externality effect,  $\alpha$ . Finally, it is easy to see that income inequality would increase when liberties are allowed.

This result can be easily generalized to other utility functions. The key assumptions are that: (i) the valuation that individuals place on the personal use of civil liberties is lower the more religious they are, (ii) standard concavity and complementarities between goods (consumption and liberties, leisure and liberties), (iii) higher complementarities between consumption and liberties rather than leisure and liberties. We establish all these assumptions in our empirical analysis reported in ELM.

Moreover, note that while other papers have established that religiosity may affect labour supply and aggregate output through individuals investing in non productive activities such as rituals,<sup>15</sup> here we focus on the role of religious restrictions of individual liberties as reducing the incentives to supply effort. This is important as it may affect the political choices of liberties (as opposed to other productivity reducing activities). In ELM we show that indeed religiosity reduces labour supply through its interaction with liberties and that this effect is large.<sup>16</sup>

We now derive the indirect utility over the political variables: taxation  $t$  and the legal cap  $\ell$ . Note that the pre-tax market income  $y(w, x, t)$  will be

$$y(w, x, t, \ell) = (1 - t)w^2[1 + (1 - x)\ell(x)] \quad (3)$$

where  $\ell(x) = \ell$  if  $x \leq 1$  and  $\alpha\ell$  otherwise. Aggregating over  $w$  and  $x$ , we obtain the average per capita income

$$\bar{y}(t, \ell) = (1 - t)E(w^2)(1 + \rho\ell).$$

where

$$\rho \equiv \sigma(1 - x_s) + (1 - \sigma)(1 - x_r)\alpha. \quad (4)$$

The term  $\rho$  determines the sign of the effect of liberties on output. It can be interpreted as an aggregate index of social secularism;  $\rho$  can then be either positive or negative. Specifically, note that individual effort and hence aggregate output decrease

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<sup>15</sup>See Levy and Razin (2012), Iannaccone (1992), and the empirical evidence in Barro and McCleary (2003).

<sup>16</sup>While at first these results seem to be in conflict with the Weberian hypothesis, note that this hypothesis compares different types of religions. We are modelling different individual intensities of religiosity.

in  $\alpha$ , and religions could differ in the degree of the externality  $\alpha$ .<sup>17</sup> For the rest of the paper we focus on the case of  $\rho \geq 0$ . This is not important for the qualitative results but it is the more interesting case to focus on if we want to show that repression of liberties can arise.

The aggregate tax collection –equal to the per capita transfer  $T$ – is

$$T = t\bar{y} = t(1-t)E(w^2)(1+\rho\ell).$$

Therefore, the indirect utility over  $(t, \ell)$  can be written as:

$$\begin{aligned} v_{w,x}(t, \ell) &= \frac{1}{2}(1-t)^2 w^2 [1 + (1-x)\ell(x)]^2 + \\ &+ t(1-t)E(w^2)[1 + \rho\ell][1 + (1-x)\ell(x)]. \end{aligned} \quad (5)$$

Consider  $\frac{y(w,x,t,\ell)}{\bar{y}(t,\ell)} = \frac{w^2[1+(1-x)\ell(x)]}{E(w^2)[1+\rho\ell]}$  and note that this ratio is independent of  $t$ . Using (5) we easily characterize the tax rate  $t(w, x, \ell)$  preferred by individual  $(w, x)$ , given a fixed legal cap  $\ell$  as:<sup>18</sup>

**Proposition 1** For a fixed  $\ell$ ,  $t(w, x, \ell) = \max\{0, \frac{1 - \frac{y(w,x,t,\ell)}{\bar{y}(t,\ell)}}{2 - \frac{y(w,x,t,\ell)}{\bar{y}(t,\ell)}}\} \leq \frac{1}{2}$ .

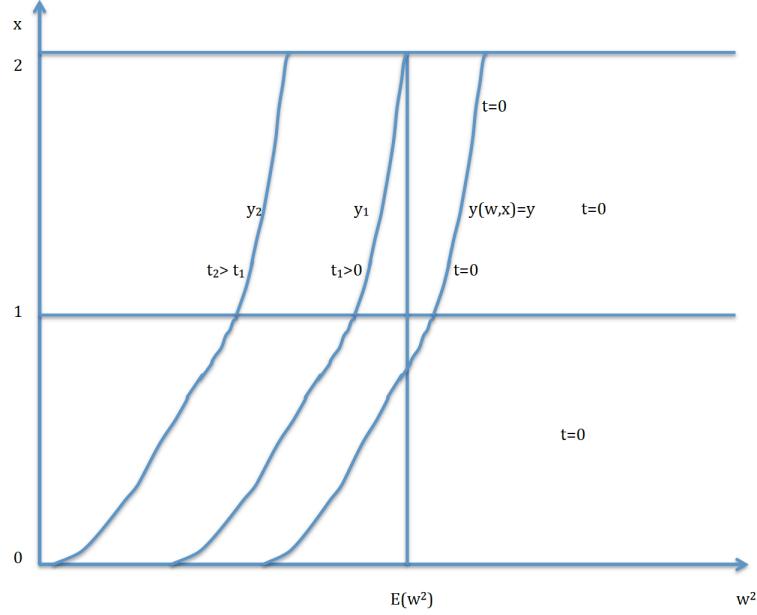
Note that for any *given*  $\ell$  all individuals with the same income will prefer the same tax rate, independently of their religiosity and of their productivity, as depicted in Figure 1 [notice that we have  $w^2$  in the abscissa]. Each depicted line corresponds to the pairs  $(w, x)$  earning the same income and hence preferring the same tax. Beyond the threshold line corresponding to the individual income equal to the per capita income all pairs prefer zero taxation. Taking any  $w$ , as we increase  $x$  income becomes lower [we cross iso-income/iso-tax curves] and the preferred tax is higher. Hence, for a *given*  $\ell$ , on average, the religious will demand higher redistribution as they are poorer. We will see below that this will change when we consider the joint preferences over liberties and redistribution.

Figure 1. Preferences for redistribution

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<sup>17</sup>Specifically, a key distinctive feature of Protestantism at the time of the Reformation was the personal, direct communication with god. It is therefore a much more individual religion compared with Catholicism. In the prism of our model, Catholics can be thought then of having a higher  $\alpha$  than Protestants. As in Weber (1904), the Reformation would in our model explain the higher economic performance of the protestant countries, but through a different channel.

<sup>18</sup>It is straightforward to derive the first order condition from the indirect utility with respect to  $t$  and to show that it is sufficient.



The next proposition tells us how the preferred tax rate varies with the level of liberties  $\ell$ .

**Proposition 2** Consider all pairs  $(w, x)$  such that  $\frac{y(w, x, t, 1)}{\bar{y}(t, 1)} < 1$ . Then there exists  $x^0 > 0$  such that the preferred  $t(w, x, \ell)$  increases with  $\ell$  for all  $x > x^0$ .

The Proposition implies that individuals with  $w^2 < E(w^2)$  and  $x > x^0 = 1 - \rho$ , and individuals with  $w^2 \in [E(w^2), E(w^2)(1 + \rho)]$  and  $x > 2 - \frac{E(w^2)(1+\rho)}{w^2}$ , are characterized by  $0 \leq t(w, x, 0) < t(w, x, 1)$ .

The intuition for Proposition 2 is as follows. An increase in liberties always enhances the incentives to secular individuals, and as a result increases their income. The effect will be bigger the more secular the individual is. But as  $\rho > 0$ , the aggregate income has also gone up. This implies that while the relative income of the very secular increases, the relative income of the religious and the very moderately secular decreases. Hence, the moderately secular will join the religious and favour higher redistribution as a response to more liberties.

We now proceed to analyze the joint preferences over  $\ell$  and  $t$ .

### 3 Preferences over redistribution and liberties

We now examine the joint preferences over liberties and taxes under the specification with externalities. We will show that the social externalities of liberties imply a preference of religious individuals for repression of liberties, which will also result in pref-

erences for lower taxation, compared with seculars with the same productivity and income.

The case of secular individuals is very simple. In view of their preferences, for any tax rate, secular individuals always prefer full liberties. This is because it increases both their own income and the aggregate income, contributing to higher gains from taxation. Hence, their preferred policy is  $(t(w, x, 1), 1)$ .

Let us now deal with the joint preferences of the religious individuals. Using (5) and Proposition (1), and after some manipulation we can write the utility of a religious individual  $(w, x)$  in the two scenarios as

$$v(w, x, t(w, x, 0), 0) = \begin{cases} \frac{1}{2}E(w^2)[1 - t(w, x, 0)] & \text{if } t(w, x, 0) > 0 \\ \frac{1}{2}w^2 & \text{otherwise.} \end{cases}$$

$$v(w, x, t(w, x, 1), 1) = \begin{cases} \frac{1}{2}E(w^2)[1 - t(w, x, 1)][1 + (1 - x)\alpha](1 + \rho) & \text{if } t(w, x, 1) > 0 \\ \frac{1}{2}w^2[1 + (1 - x)\alpha]^2 & \text{otherwise.} \end{cases}$$

The following Proposition characterizes the joint preferences over  $(t, \ell)$  by all individuals  $(w, x)$ . Recall that  $t(w, x, \ell)$  is the tax rate for an individual with  $(w, x)$  under the level of liberties is  $\ell$ , as derived in Proposition 1.

**Proposition 3** *The joint preferences over  $(t, \ell)$  are as follows:*

1. *Secular individuals: all prefer  $\ell = 1$  and  $t(w, x, 1)$ .*
2. *Religious individuals:*
  - (a) *Religious with  $w^2 \geq E(w^2)(1 + \rho)$ : all prefer  $\ell = 0$  and  $t(w, x, 0) = 0$ .*
  - (b) *Religious with  $w^2 < E(w^2)(1 + \rho)$ : there exists a function  $x(\alpha, w) > 1$ , with  $\frac{\partial x(\alpha, w)}{\partial w} < 0$ , such that:*
    - i. *If  $x > x(\alpha, w)$  they prefer  $\ell = 0$  and  $t(w, x, 0)$ .<sup>19</sup>*
    - ii. *If  $x \leq x(\alpha, w)$  they prefer  $\ell = 1$  and  $t(w, x, 1) > 0$ .*

**Proof:** See Appendix.

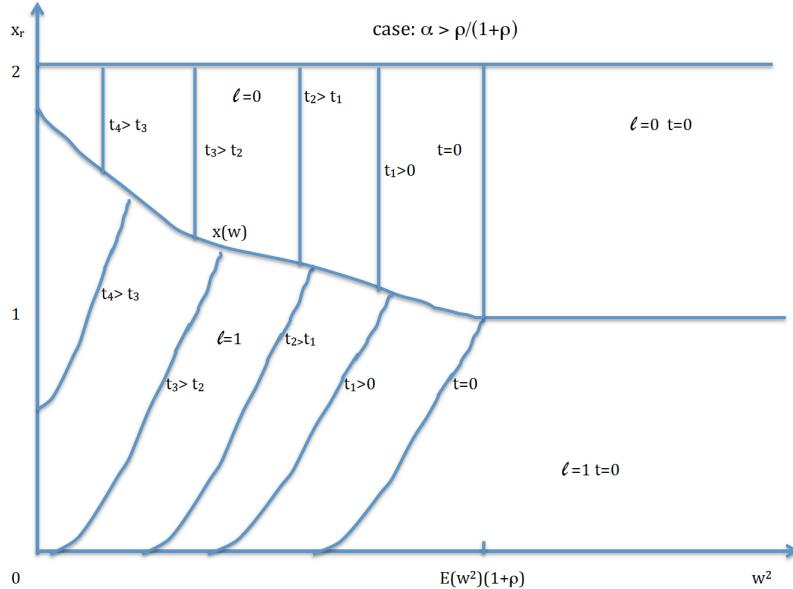
Figure 2 identifies the iso-tax curves for the optimal taxes and liberties in the  $(w^2, x)$  space. The iso-tax curve corresponding to  $t = 0$  separates to its right the individuals that prefer no taxation. Among these individuals the secular prefer full liberties and the religious their repression. Figure 2 also depicts the curve  $x(\alpha, w)$ , always above unity and ending at  $w^2 = E(w^2)(1 + \rho)$  and  $x = 1$ . This curve indicates the pairs  $(w^2, x)$  of religious individuals that

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<sup>19</sup>If  $w^2 \in [E(w^2), E(w^2)(1 + \rho)]$ , then  $t(w, x, 0) = 0$ .

are indifferent between full liberties and their repression, given their preferred tax in each case. The individuals below the curve support full liberties and those above are against. Above the curve the iso-tax curves become straight lines because without liberties religiosity stops influencing income. Furthermore, there is a jump towards the left because, as the individuals above the  $x(\alpha, w)$  curve prefer repression, the chosen tax will be smaller. Hence, under repression the same tax would be supported only by poorer religious individuals.

Figure 2. Joint preferences for redistribution and liberties



In general, for religious individuals, increased liberties have an ambivalent effect. Liberties increase transfers for two reasons: They increase the output of society but also these individuals prefer higher taxes when liberties are higher, as derived in Proposition 2. But this has to be weighed against the loss in own incentives because of the negative valuation of the social component of liberties. Those sufficiently rich to prefer no redistribution at all, and thus for them restricting liberties would not be costly but only beneficial. For the poorer individuals, our result says that there is a threshold level of religiosity  $x(\alpha, w)$ , such that for each given  $w$ , if they are not too religious (that is, when  $x < x(\alpha, w)$ ), the net effect of liberties will still be positive. But for the more religious the negative effect of liberties becomes sufficiently important and they prefer to ban them altogether.

Note that  $x(\alpha, w)$  decreases in  $w$  as the higher is the religiosity, the lower is the productivity level in which the individual will prefer

to switch to repression and hence the lower is the income at which the individual will prefer repression. We therefore predict that higher religiosity is associated with poorer individuals who support repression.

With respect to  $\alpha$ , the comparative statics are straightforward: a higher  $\alpha$  decreases the utility from liberties to the religious and thus more individuals would prefer to repress them. For the limit case  $\alpha = 0$ , the religious individuals are not harmed by liberties and benefit from the higher incentives to work from the secular. Hence, they will all support  $\ell = 1$ . Thus, the externality effect is important for the derivation of preferences for repression.

An important implication of the above is that, due to their preferences for less liberties, religious individuals might also prefer lower taxes compared with their more secular counterparts with the same or lower income:

**Corollary 4** *Preferences over taxation are (weakly) non-monotonic in religiosity. Moreover, there always productivity levels at which the more religious and hence relatively poor individuals prefer lower taxes than do less religious and hence relatively rich individuals.*

The key point is that as individuals become more religious their preferences for liberties switch to full repression. But, by Proposition 2, this implies that their preference for taxation goes down. Repression reduces income inequality and improves their relative standing in the income distribution, and hence their preferences for taxation.

In order to see the non-monotonicity of the political position as religiosity increases, let us consider a fixed  $w$  with  $w^2 < E(w^2)(1 + \rho)$  in Figure 2. Starting with  $x = 0$  we have the most secular individuals with this productivity. They will support liberties and low taxation, because they are the ones with the highest incentives from liberties. As we consider higher levels of  $x$  the incentives will be reduced and with a lower income the will support more redistribution. Hence, increasing religiosity [but still in the secular region] makes individuals take positions more to the left. This drift to the left will continue even when religiosity has already taken us into the religious camp. However, beyond a threshold point in religiosity, as we have shown, this individual will turn more right-wing, demanding the suppression of liberties and a smaller tax. As we show in the appendix, such comparative statics would arise for some  $w$  in this region for all  $\alpha > 0$ ; for a high enough  $\alpha$ , it would arise for all  $w < E(w^2)(1 + \rho)$ . Note also that the discontinuity in the indifference curves that arises from the extreme form of liberties we consider is not important; even if we allow for all  $\ell \in [0, 1]$ , there would be parameters for which the very religious and poorer

individuals would choose lower taxation than richer ones, as they prefer very low liberties.

Our result is consistent with the empirical data 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 Roden (2008). The vote of poor religious individuals to right-wing parties, which often combine restrictions on liberties with lower taxes, is considered by some to be a result of “forced choice”. That is, such individuals are considered to trade-off moral values, which they like, for low taxes, which they do not like. Our analysis shows that this is not necessarily the case. Religious poor individuals are not being subject to “forced choice”. Compared to secular or less religious individuals who are richer than them, they would actually prefer the combination of repression and lower taxes.

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. That is, absent externalities, all individuals would prefer maximum liberties, while with large externalities, higher level of religiosity in society will result in repression and will be accompanied by lower taxes.

#### 4 Voting over redistribution and liberties

In this Section we examine the political choice over the two policies: liberties and taxation. We consider a simple political model with sequential voting, first on the cap on liberties  $\ell$  and then on  $t$ . The particular sequence of voting does not affect the results. It seems realistic though to think that decisions on individual liberties are taken less frequently and are more likely to be part of constitutions compared with the almost “daily” political conflict over redistribution.

In the previous section we have examined the ideal level of redistribution and liberties for each individual. In the political model the choice of liberties is more strategic because the chosen level of liberties will affect the income distribution, and will therefore influence preferences over taxation.

We will show that even in the presence of strategic considerations, effects as described in the previous Section continue to follow: high enough religiosity will result in repression and lower taxes. On the other hand, absent any externalities ( $\alpha = 0$ ), society will stick with full liberties.

In order to better capture the forces at work we shall 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,  $x_s = 0 < 1 < x_r$ , secular and religious.<sup>20</sup> 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  $\pi_w$  the “economic gap”,  $\pi_w \equiv \frac{w_h^2}{w_l^2}$  and by  $\pi_r$  the “religious gap”,  $\pi_r \equiv \frac{1+(1-x_s)}{1+(1-x_r)\alpha} = \frac{2}{1+(1-x_r)\alpha}$ .

#### 4.1 Voting over taxes

We start with the second stage, that is, voting over taxes when the cap on liberties is fixed. When  $\ell = 0$  religious differences have no effect on behaviour and hence only the economic gap matters. Therefore, being in a majority, the low productive individuals will be the pivotal voters when it comes to vote for redistribution. It follows that voting for  $\ell = 0$  in the first stage carries with it the choice of  $t_l(0)$ , the preferred tax by the majoritarian low skilled,

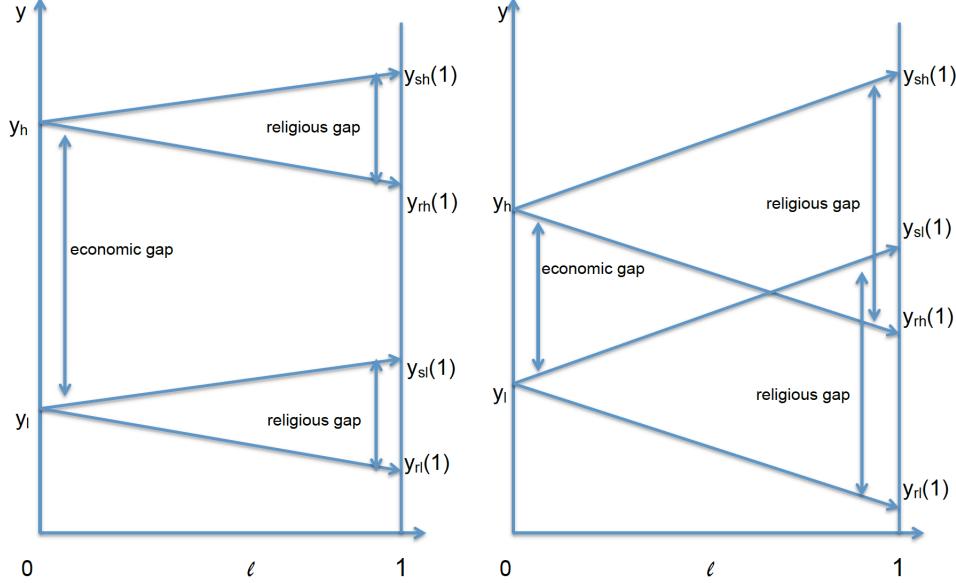
$$t_l(0) = \frac{E(w^2) - w_l^2}{2E(w^2) - w_l^2} = \frac{1 - \frac{1}{p+(1-p)\pi_w}}{2 - \frac{1}{(p+(1-p)\pi_w)}}. \quad (6)$$

Consider now what happens under full liberties,  $\ell = 1$ . Since the high-productive secular  $sh$  group is the richest, and the low-productive religious group  $rl$  is the poorest, the ideal policies of these groups will not be candidates for the median income voter. We therefore concentrate instead on the middle income groups  $sl$  and  $rh$ . Which income of the two is lower and consequently the tax demanded higher depends on the relative size of the two gaps,  $\pi_w$  and  $\pi_r$ . See Figure 3.

Figure 3. Pivotal voter: small and large religious gap

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<sup>20</sup>Making  $x_s = 0$  is just to save on parameters; this specification is favorable to liberties, as an increase in liberties gives the highest increase in aggregate output through  $\rho$ .



When the religious gap dominates the economic gap, then  $rh$  prefers a higher tax than  $sl$ . If the religious are in a majority the  $rh$  will be pivotal (and gaining the support of  $rl$ ), and the tax level would be at  $t_{rh}(1)$ . If the seculars are in a majority, then  $sl$  is pivotal (by gaining the support of  $sh$ ), and tax would be set at  $t_{sl}(1)$ . In the case the economic gap dominates the religious one, the low productivity groups will have the lowest incomes. Since they are assumed to be a majority the pivotal group will be  $sl$  and society will choose  $t_{sl}(1)$ .

Both  $t_{rh}(1)$  and  $t_{sl}(1)$ , computed accordingly with Proposition 1, are

$$t_{rh}(1) = \max\left\{0, \frac{1 - \frac{\pi_w}{p+(1-p)\pi_w} \frac{1}{\sigma\pi_r+(1-\sigma)}}{2 - \frac{\pi_w}{p+(1-p)\pi_w} \frac{1}{\sigma\pi_r+(1-\sigma)}}\right\} \quad (7)$$

and

$$t_{sl}(1) = \max\left\{0, \frac{1 - \frac{1}{p+(1-p)\pi_w} \frac{\pi_r}{\sigma\pi_r+(1-\sigma)}}{2 - \frac{1}{p+(1-p)\pi_w} \frac{\pi_r}{\sigma\pi_r+(1-\sigma)}}\right\} < t_l(0). \quad (8)$$

We can thus conclude that voting for liberties implies that the  $sl$  group will be pivotal in the second stage and choose  $t_{sl}(1)$ , unless  $\pi_r > \pi_w$  and  $\sigma < \frac{1}{2}$ . Note that  $t_{sl}(1) < t_l(0)$ , as the  $sl$  always become relatively richer when liberties are introduced, in line with Proposition 2, while  $t_{rh}(1)$  may be higher than  $t_l(0)$ , as the  $rh$  may become relatively poorer as a result of liberties. We summarise these results in the following Lemma.

**Lemma 5** *Under no liberties,  $\ell = 0$ , the median voter in the second stage will be the low skilled group and will choose  $t_l(0)$ . Under full*

*liberties*,  $\ell = 1$ , the pivotal voter will be the *sl* and will choose  $t_{sl}(1) < t_l(0)$ , unless both  $\pi_r > \pi_w$  and  $\sigma < \frac{1}{2}$ , in which case the *rh* is pivotal and chooses  $t_{rh}(1)$ .<sup>21</sup>

## 4.2 Voting over liberties

We now turn to the choice of liberties. Consider first the benchmark case of no externalities so that  $\alpha = 0$ . In this case the utility of *rh* increases with liberties for the same given tax  $t_l(0)$ . For  $\pi_r \leq \pi_w$  we have that  $t_l(0) > t_{sl}(1) \geq t_{rh}(1)$ . Hence for this range of values *rh* prefers  $\ell = 1$  as the chosen tax rate is closer to her ideal policy. For  $\pi_r > \pi_w$  and  $\sigma < \frac{1}{2}$ , the tax under liberties is precisely her utility maximising  $t_{rh}(1)$ , so that  $\ell = 1$  will continue to be preferred by *rh* to repression. By continuity, this must also hold for sufficiently low  $\alpha$  (or  $x_r$ ). Repression will then not arise; thus, the externality effect is important for our result that liberties can be repressed, even when political or strategic considerations are involved.

We now turn to the general case with externalities. In the Appendix we show an important preliminary result that both religious groups need to support repression for this to arise.<sup>22</sup> We can now derive our main result in this Section:

**Proposition 6** 1. When the seculars are a majority, society chooses full liberties,  $\ell = 1$ , and the tax level  $t_{sl}(1)$ .

2. When the religious are a majority,

- a. If the religious gap is low enough then society chooses  $\ell = 1$ , and taxes as in Lemma 5.
- b. If the economic gap is low enough, then there exist threshold levels  $\hat{\pi}_r, \check{\pi}_r$ , with  $\hat{\pi}_r \leq \check{\pi}_r$ ,<sup>23</sup> such that (i) if  $\pi_r \in [\hat{\pi}_r, \check{\pi}_r]$ , then society chooses  $\ell = 1$ , and the tax level is  $t_{rh}(1) > t_l(0)$ , and (ii) if  $\pi_r > \check{\pi}_r$ , society chooses  $\ell = 0$  liberties and the tax level is  $t_l(0)$ .

**Proof:** In Appendix.

When the seculars are a majority we know by Lemma 5 that the *sl* will always be the pivotal voters in the second stage. The *sl* prefer  $(\ell = 1, t_{sl}(1))$  to  $(\ell = 0, t_l(0))$  because for any given  $t_l(0)$  they

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<sup>21</sup>We have that  $t_{rh}(1) > (<)t_l(0)$  as  $\pi_w < (>)(1 - \sigma) + \sigma\pi_r$ .

<sup>22</sup>Note that this is not obvious as for example the *sh* may collude with *rl* to repress liberties, as *sh* will enjoy the reduction in taxes in the case in which  $t_{rh}(1) > t_l(0)$ .

<sup>23</sup>The threshold levels are increasing in the economic gap, and whenever  $\sigma$  is not too low, then also  $\hat{\pi}_r(\pi_w) < \check{\pi}_r(\pi_w)$ .

would prefer  $\ell = 1$  and given full liberties they prefer their optimal tax  $t_{sl}(1)$ . This also holds for  $sh$  because they obtain full liberties and lower taxation. Note that in this case, a higher religious gap implies a lower tax rate, as the  $sl$  become relatively richer and not willing to redistribute to the religious.

When the religious are a majority, the religious individuals face the following trade-off: liberties increase aggregate production but make them much poorer compared to the seculars. If the increase in aggregate production (driven by  $\rho$ ) and the transfers they receive can compensate them for their own reduction in pre-tax income (because of the disincentive effect of the externality side of liberties  $\alpha$ ), as well as for the direct “psychological” cost driven by  $\alpha$ , then they would also prefer full liberties. Otherwise, they prefer repression.

A large religious gap combined with a low economic gap creates an incentive to vote for repression for two reasons. First, a large religious gap obviously implies that religious individuals greatly dislike liberties. But second, it is also the case that a low economic gap together with a large religious gap implies that the preferences of the two religious groups are relatively close with respect to redistribution. Indeed, the  $rh$  will in this case have an income lower than the  $sl$ , will prefer more redistribution and will be pivotal in the vote over taxation. As the religious gap widens further the  $rh$  will vote for even higher taxation. However, beyond a point the dislike for liberties will dominate the benefits and the religious majority will choose the repression of liberties, which equalizes income between religious and secular and hence leads to lower taxation.

### 4.3 Repression and taxation

To conclude this Section, we discuss the implication of our the results of the effect of religiosity, on the repression of liberties, and on the level of taxation. We first summarize this relation in the following corollary of Proposition 6 and Lemma 5:

**Corollary 7** *The effect of an increase of religiosity on the chosen policies is as follows:*

1. *When the secular are in the majority, an increase in religiosity results in lower taxes and respect for liberties.*
2. *When the religious are in a majority, the effect of an increase in religiosity depends on its level:*
  - (a) *If the religious gap is less than the economic gap an increase in religiosity will lower taxation while respecting liberties;*

- (b) *If the religious gap is wider than the economic gap, but not too wide, an increase in religiosity will increase taxation with liberties still being respected; and*
- (c) *If the religious gap is sufficiently wide, a further increase in religiosity will make taxation fall [and remain constant thereafter] and liberties be suppressed.*

We therefore see that in line with empirical evidence, higher religiosity is causing lower taxes. In a society with low religiosity, in which either the secular are a majority or the religious are a majority but the religious gap is low enough, we have full liberties and the *sl* are the pivotal group over taxation. In this case, an increase in the religious gap induces the *sl* to demand less taxation because they become relatively richer.

This relation also holds -through a different mechanism- in a sufficiently religious society, in which the religious gap is sufficiently large compared with the economic gap. In this case the *rh* are the pivotal group over taxation. As long as the religious gap is not too high but still higher than the religious gap, the *rh* impose relatively high taxes while respecting liberties. More religiosity induces at first higher taxation as the *rh* become poorer, but when religiosity becomes sufficiently high the religious majority will opt for the suppression of liberties. In this case taxes will be determined only by the economic gap and hence become lower. Thus, if the religious gap is not too low, we will observe, globally, a negative relation between religiosity and taxes. The desire to suppress liberties will repress income inequality and will lead to lower taxes. Our model implies though that this relation between religiosity and taxation will, in a sufficiently religious society, be also accompanied with suppression of liberties.

## 5 Discussion

Our discussion of the implications of the previous results considers two questions. The first one is to underline the conditions under which a country will widen or restrict individual liberties. The second question focuses on whether the elite might benefit from an increase in religiosity.

### 5.1 Individual liberties: widening and restricting

Over the past decades we have witnessed a significant widening of individual liberties in most OECD countries, but we are also observing restriction of liberties in others. As we have seen in our model, there are several factors determining the emergence or not of full individual liberties: the religious relative to the economic

gap, as well as whether the secular or the religious are in a minority. By Proposition 6 liberties can be widened if the世俗s become a majority. However, it seems unrealistic to impute the movement towards more individual liberties to a majority turning secular. The International Social Survey Program (ISSP) religiosity module in the surveys 1991, 1998 and 2008 provides individual data on religious beliefs for 28 countries.<sup>24</sup> In none of these countries the share of the individuals declaring themselves non-religious exceeded 25 percent. Of course, this may not include all individuals that would see themselves more secular than religious. In the next subsection we deal with the effects of changing the size of secular population. Here, we focus on the factors influencing the religious gap.

We can think of changes in  $x_r$  and changes in  $\alpha$  as different ways of changing the depth of the religious cleavage. A wider distance between secular and religious values –an increase in  $x_r$ – and higher intolerance towards what the others can do –an increase in  $\alpha$ – both increase  $\pi_r$ . Each captures a different facet of religiosity. A more intense degree of personal religiosity with a higher  $x_r$  is compatible with tolerance with a low  $\alpha$ . For instance, as mentioned before, a key distinctive feature of Protestantism was the personal, direct communication with god, while in Catholicism such relation had to be mediated by the church. In the spirit of our model, Catholicism can be thought of as having a higher  $\alpha$  than the Protestant religion because the social component was stronger.<sup>25</sup>

As according to the surveys the degree of individual religiosity has not decreased, the modern deepening of the separation of state and religion in most western countries could be interpreted in the prism of our model as resulting from lower levels of  $\alpha$ . Suppose that we start with a society with a large religious gap and repression of liberties. Turning religiosity into a personal matter pertaining only to the private sphere –lowering  $\alpha$ – turns even the religious individuals sympathetic towards individual liberties as they value relatively less the psychological cost relative to the resulting increase in aggregate productivity. Moreover, if the change is large enough to induce societies to widen liberties, it may further increase output by enhancing the effort incentives to the secular population. Thus, our model provides a possible explanation

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<sup>24</sup>These countries are Australia, Austria, Chile, Cyprus, Czech Republic, Denmark, France, Germany, Hungary, Ireland, Israel, Italy, Japan, Latvia, Netherlands, New Zealand, Norway, Philippines, Poland, Portugal, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom and USA.

<sup>25</sup>In the same line, fundamentalist Islam would have a high  $\alpha$  as it wishes to turn every assertion in the Quran into a general law implemented by the state. In Judaism the view that even one deviant makes the entire community guilty seems to correspond to a high  $\alpha$ .

for the higher performance of Protestant countries but through a channel different from Weber's (1904): that of lowering  $\alpha$ .<sup>26</sup>

## 5.2 Divide and rule: who gains from religiosity?

We now address the comparative statics analysis of who benefits and who is hurt by changes in religiosity, continuing with our four-groups model. This is particularly pertinent because the level of religiosity or the concern for what others might be doing can be influenced by culture, education, media and so on.

While we have focused on the effect of religiosity on inequality, Solt et al (2011) and Solt (2014) argue the direction of causality is the reverse one: inequality breeds religiosity. These papers argue that as inequality becomes too high the elite has an interest in spreading religious values among the poor. Indeed, a natural question to address is whether the elite in society (the highly productive agents, or possibly the secular productive agents) can alter economic outcomes and in particular lower redistribution by affecting religiosity (e.g., by influencing the share of the secular population  $\sigma$  or the social dimension of liberties  $\alpha$ ). This question has a Marxist flavour in the sense that higher religiosity may translate into lower demands for redistribution by the low income population.

We examine here the strategy of influencing the actual religiosity of individuals. Specifically, in the present exercise we keep the levels of individual religiosity but change the population share of the secular  $\sigma$ .

Consider the case in which the secular are in a majority, and so we have full liberties and the tax  $t_{sl}(1)$ . As the share of secular  $\sigma$  increases, aggregate output increases, thus reducing the relative income of each  $sl$  individual. This induces  $sl$  to choose higher taxation. Clearly, the low income secular (as well as the low income religious) would benefit from increasing the size of the secular community (as aggregate productivity and taxation increase according to their preferences). But, is it also true of the high income secular? The rich secular will have an ambivalent valuation of the increase in secularism. They will share the positive effect of a larger tax base, but they will be hurt by higher taxation. We now formally examine whether the high income secular are interested in the extension of secularism.

**Proposition 8** *Let  $\sigma > \frac{1}{2}$ . When the economic gap is not too large, the secular elite (weakly) prefer the minimum share of sec-*

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<sup>26</sup>Becker and Woessmann (2009) offer a related theory that is also based on the direct relationship with god, as in order to be able to read the scripts personally, Protestants increased their level of education.

*ular. In contrast, the low income groups prefer the largest share of secular population.*

The intuition for this result is clear. Whenever there is religious homogeneity, either all secular or all religious, the only divide is class and the poor will impose high taxation. Hence, the elite will prefer the poor to be divided along religious lines so that their preferences for redistribution would be divided too. In this “divide and rule” way, the secular poor will demand less redistribution than in a situation with all poor being united, as the religious divide makes the pivotal secular poor relatively rich. Therefore, our model suggests that, at variance from Marx’s tenet, the best environment from the elite’s point of view is not that all poor become religious, but rather that religiosity splits the poor in a way that redistribution demands are minimised.

### 5.3 Correlation between religiosity and productivity

In our model we have assumed that there is independence between religiosity and productivity. Our analysis revealed though that religious agents —as long as there are some liberties— are poorer than the secular ones for the same level of productivity. If productivity is a result of an investment we should expect, in the long term, that religiosity would be correlated with low productivity levels.

To illustrate, consider now a model with just two groups of agents, low productivity religious agents and high productivity secular agents ( $rl$  and  $sh$ ). How will the results of the political model change?

Economic polarisation is larger for any  $\ell$ , which implies that the tax demanded is

$$t_{rl}(\ell) = \frac{(1 - \sigma) + \sigma \frac{w_h^2}{w_l^2} [1 + (1 - x_s)\ell] - [1 + (1 - x_r)\alpha\ell]}{2[(1 - \sigma) + \sigma \frac{w_h^2}{w_l^2} [1 + (1 - x_s)\ell]] - [1 + (1 - x_r)\alpha\ell]}.$$

which is higher than the tax demanded by  $rl$  when there are four groups, and thus higher than the tax determined by the political system in this case.

Note that there are therefore two effects when the distribution generally shifts from low productivity secular agents to low productivity religious agents. First, the output decreases as the religious agents have less incentive to work. Second, the political power (the median voter) shifts towards the low productivity religious agents. At the extreme, if indeed all low productivity agents are religious, they have the majority and hence they would determine the tax according to their will. In our model it implies

that when society shifts from having a few low productivity secular agents to none, then the incentives of the low productivity religious agents to reduce liberties is actually reduced, as the social output is hardly affected but they now determine the tax rate for any level of liberties. This “decision power” increases their utility. Thus, counterintuitively, there may be less pressure for the reduction of liberties, and taxes would be higher.

## 6 Conclusions

Building on the model by ELM 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 which gender is the dominant one. To the best of our knowledge, ours is the first formal analysis of individual religiosity and the legal regulation of individual liberties and the choice of taxation.

This framework allows us to analyze two important questions raised in the literature. One is the individual joint preferences over redistribution and liberties as depending on the personal characteristics of productivity and religiosity: Why religious people take right-wing positions in spite of being poor. The second is the level of liberties and redistribution that will obtain a majoritarian support conditional on the relative size of secular versus religious population and on the relative importance of the two relevant social gaps: religious and economic: Why and under what conditions do religious countries redistribute less.

With respect to the first point, we show that while all secular support liberties and more or less taxation depending of their income, the preferences of poor religious individuals for taxation does not follow directly from their income. Specifically, such individuals would prefer no liberties and as a result, taxes which are lower than those demanded by secular individuals with the same income. We can then rationalize the vote of the religious poor to right-wing parties. With respect to the second point, we show how this effect arises on the aggregate: religious societies may be associated with low level of liberties and with low level of taxation.

Both implications of the model seem to provide a new theoretical explanation for the existing empirical evidence on the preferences of religious individuals and of religious countries on liberties and redistribution.

## Appendix

### Proof of Proposition 3:

**Step 1:** All secular agents prefer  $\ell = 1$ , where all  $(w, x)$  such that  $x < 1$  and  $w^2 > E(w^2) \frac{1+\rho}{2-x}$  prefer  $t = 0$  and the rest prefer  $t > 0$ .

Proof: For all secular individuals,  $\ell = 1$  is optimal as  $\rho > 0$ . Thus taxation is then determined as in Proposition 1. Note that by Proposition 1, the set of types which prefer 0 taxation in the  $(w, x)$  space is defined by

$$x \leq \min\{1, 2 - \frac{E(w^2)}{w^2}(1 + \rho)\}.$$

Thus, whenever  $\rho > 0$ , there are always some individuals with wage above the average, specifically when  $w^2 \in [E(w^2), E(w^2)(1 + \rho)]$ , who prefer positive taxation as their  $x$  is parameter is sufficiently high (although still lower than 1).

**Step 2:** All religious agents with  $w > E(w^2) \frac{1+\rho}{1+(1-x)\alpha}$  prefer  $\ell = 0$  and  $t = 0$ .

Proof: For religious individuals with  $w^2 > E(w^2) \frac{1+\rho}{1+(1-x)\alpha}$ , we must have  $t = 0$  as they would prefer 0 taxation for all levels of liberties. As  $t = 0$ , then  $\ell = 0$  is optimal as well as it has no effect on proceeds from social output.

**Step 3:** Defining  $x_\alpha(w)$  and its properties.

Let us now define the following functions:

$$\begin{aligned} F(w, x) &\equiv v_{w,x}(\ell = 1, t_{w,x}(1)) - v_{w,x}(\ell = 1, 0) \\ &= \frac{1}{2}(1 - t_{w,x}(1))^2 w^2 [1 + (1 - x)\alpha]^2 \\ &\quad + t_{w,x}(1)(1 - t_{w,x}(1)) E(w^2) [1 + \rho] [1 + (1 - x)\alpha] - \frac{1}{2}w^2, \end{aligned}$$

$$\begin{aligned} G(w, x) &\equiv v_{w,x}(\ell = 1, t_{w,x}(1)) - v_{w,x}(\ell = 1, t_{w,x}(0)) \\ &= \frac{1}{2}(1 - t_{w,x}(1))^2 w^2 [1 + (1 - x)\alpha]^2 \\ &\quad + t_{w,x}(1)(1 - t_{w,x}(1)) E(w^2) [1 + \rho] [1 + (1 - x)\alpha] \\ &\quad - \frac{1}{2}(1 - t_{w,x}(0))^2 w^2 \\ &\quad + t_{w,x}(0)(1 - t_{w,x}(0)) E(w^2) [1 + \rho] \end{aligned}$$

$F(w, x)$  : describes the difference in utility for an individual between the full liberties and no liberties, given his respective ideal taxes, where his preferred tax under no liberties is 0. This is the

relevant choice for the set of types with  $w^2 \in [E(w^2), E(w^2)\frac{1+\rho}{1+(1-x)\alpha}]$ .  $G(w, x)$  describes the same difference where the preferred tax under no liberties is positive. This is the relevant choice for the set of religious types with  $w^2 < E(w^2)$ . Note that  $F(w, x_\alpha(w)) = 0$  will implicitly define a function or a correspondence  $x_\alpha(w)$  that will separate the types who prefer no liberties, and the same goes for  $G(w, x)$ .

We will now show that  $x_\alpha(w)$  is unique, hence a function, and its properties.

We will use the implicit function Theorem to identify  $x_\alpha(w)$  and its properties. It is straightforward to show that the higher is the level of religiosity (that is, when  $x > x_\alpha(w)$ ), the more attractive is  $\ell = 0, t = 0$ . To see why, note that  $\partial F/\partial t_{w,x}(1) = 0$  by the envelope theorem, and that  $\partial F/\partial x < 0$ . Thus there exists a unique  $x_\alpha(w)$  satisfying indifference.

We now show that  $\frac{dx_\alpha(w)}{dw} < 0$ . Using total differentiation, and using the envelope theorem which implies that the partial derivative with respect to the taxes is 0, we have that:

$$\frac{dx_\alpha(w)}{dw} = -\frac{\frac{\partial F}{\partial w}}{\frac{\partial F}{\partial x}}$$

Note that  $dF/dx < 0$ , and  $\partial F/\partial w = \frac{1}{2}(1-t(1))^2[1+(1-x)\alpha]^2 - \frac{1}{2} < 0$ . Thus,  $\frac{dx_\alpha(w)}{dw} < 0$ .

Now consider  $G$ . To see that the higher is the level of religiosity (that is, when  $x > x_\alpha(w)$ ), the more attractive is  $\ell = 0, t_{w,x}(0)$ , note that when we plug for  $t_{w,x}(0)$ , then:

$$\frac{1}{2}(1-t_{w,x}(0))^2w^2 + t_{w,x}(0)(1-t_{w,x}(0))E(w^2) = \frac{E^2(w^2)}{2E(w^2)-w^2}$$

and thus the second element in  $G$  does not depend on  $x$ , whereas the first element decreases in  $x$  as above.

Using total differentiation, and using the envelope theorem which implies that the partial derivative with respect to the taxes are 0, we have that:

$$\frac{dx_\alpha(w)}{dw} = -\frac{\frac{\partial G}{\partial w}}{\frac{\partial G}{\partial x}}$$

Note that  $\partial G/\partial x < 0$ , and  $\partial G/\partial w = \frac{1}{2}(1-t_{w,x}(1))^2[1+(1-x)\alpha]^2 - \frac{1}{2}(1-t_{w,x}(0))^2 < 0$  as  $t_{w,x}(1) > t_{w,x}(0)$ . Thus,  $\frac{dx_\alpha(w)}{dw} < 0$ .

Note that there is continuity so the individual at  $x_\alpha(w)$  and  $w^2 = E(w^2)$  is indifferent both under  $G$  and under  $F$ , and thus these two function define a unique continuous  $x_\alpha(w)$ .

**Step 4:** All religious individuals with  $w^2 \geq E(w^2)(1+\rho)$ , prefer 0 liberties.

To see this, we consider the type at  $x = 1$  and  $w^2 = E(w^2)(1 + \rho)$ . For this type,  $t(1) = 0$ . Hence  $F = 0$ , implying that  $x_\alpha(E(w^2)(1 + \rho)) = 1$ . Thus for all  $x > 1$  and  $w^2 = E(w^2)(1 + \rho)$ , we have that they support no liberties. Moreover, as we have shown that  $\frac{dx_\alpha(w)}{dw} < 0$ , it must be that all individuals with  $x \geq 1$  and  $w^2 \geq E(w^2)(1 + \rho)$  support no liberties.

**Step 5:** All religious agents with  $w^2 \in [E(w^2), E(w^2)\frac{1+\rho}{1+(1-x)\alpha}]$  and  $x > x_\alpha(w)$  prefer  $\ell = 0$  and  $t = 0$  and otherwise they prefer  $\ell = 1$  and  $t_{w,x}(1) > 0$ .

Proof: This follows from Step 3.

**Step 6:** All religious agents with  $w^2 < E(w^2)$  and  $x > x_\alpha(w)$  prefer  $\ell = 0$  and  $t_{w,x}(0) > 0$  and otherwise they prefer  $\ell = 1$  and  $t_{w,x}(1) > t_{w,x}(0)$ .

Proof: This follows from Step 3.

**Step 7:** Comparative statics with respect to  $\alpha$  and non-monotonicity.

Let us now consider comparative statics with respect to  $\alpha$ . We go back to the  $F$  and  $G$  functions defined in Step 3. Note that we have  $\frac{dx_\alpha(w)}{d\alpha} = -\frac{\frac{\partial F}{\partial \alpha}}{\frac{\partial F}{\partial x}}$ . Note that  $\frac{\partial F}{\partial \alpha} = \frac{1}{2}(1 - t_{w,x}(1))^2 w^2 2[1 + (1 - x)\alpha](1 - x) + t_{w,x}(1)(1 - t_{w,x}(1))E(w^2)[1 + \rho](1 - x) < 0$ . Also note that  $\frac{\partial F}{\partial x} < 0$ . Thus,  $\frac{dx_\alpha(w)}{d\alpha} < 0$ . The exact same analysis holds for  $G$ , as  $\alpha$  does not affect the utility from no liberties.

Let us now consider the extreme cases of  $\alpha$ .

We know that  $\frac{dx_\alpha(w)}{dw} < 0$ . Consider then the highest  $w^2$  in the relevant interval  $(0, E(w^2)(1 + \rho)]$ , which satisfies  $w^2 = E(w^2)(1 + \rho)$ . For the individual at  $x = 2$ , it is easy to compute that

$$F(E(w^2)(1 + \rho), 2) = \frac{1}{2} \left( \frac{1 - \alpha}{1 + \alpha} - 1 \right)$$

And therefore, at  $\alpha = 0$ , we have  $x_0(E(w^2)(1 + \rho)) = 2$ . By  $\frac{dx_\alpha(w)}{dw} < 0$  and continuity, this implies that  $\lim_{\alpha \rightarrow 0} x_\alpha(w) \geq 2$  for all  $w^2 < E(w^2)(1 + \rho)$ .

This implies that for all  $\alpha > 0$ , we can always find some  $w$  (in particular,  $w^2 \approx E(w^2)(1 + \rho)$ ), such that the most religious individuals prefer no liberties and lower taxes than high liberties and high taxes, as for all  $\alpha > 0$ , as small as it may be, we have that  $F(E(w^2)(1 + \rho), 2) < 0$ , and hence  $x_\alpha(w) < 2$  for all  $\alpha > 0$  and  $w^2 \rightarrow E(w^2)(1 + \rho)$ .

This also implies that we have nonmonotonicity: consider individuals with  $w^2 \lesssim E(w^2)(1 + \rho)$ . If they have  $x = 0$ , they want 0 taxation. If they have  $x = 1$ , they want small but positive taxation. On the other hand, once  $x > x_\alpha(w)$ , they go back to 0 taxation.

By  $\frac{dx_\alpha(w)}{d\alpha} < 0$  and  $\frac{dx_\alpha(w)}{dw} < 0$ , we have that for all  $w^2 < E(w^2)(1 + \rho)$ , we would have some religious individuals who prefer no liberties if the individual with  $w^2 \rightarrow 0$  prefers to do so. For this individual,  $\lim_{w^2 \rightarrow 0} t_{w,x}(1) = \lim_{w^2 \rightarrow 0} t_{w,x}(0) = \frac{1}{2}$ . We therefore have that  $G < 0$  iff  $(1 + \rho)(1 - \alpha) < 1$ . Thus, this is a sufficient condition, defining  $\alpha^0$ , for which for any level of productivity, there are religious individuals who prefer no liberties. Thus whenever  $\alpha > \alpha^0$ , the non-monotonicity arises for all levels of productivities, as those below  $x_\alpha(w)$  would want taxes that increase in the level of  $x$ , once they want positive taxation (which some always do), but once they cross  $x_\alpha(w)$  they would reduce the desired tax level.

Let us conclude by looking at  $\alpha_{\max}$  for which  $\rho = 0$ . In this case all religious individuals want no liberties, and thus  $\lim_{\alpha \rightarrow \alpha_{\max}} x_\alpha(w) \rightarrow 1$ . Again we have non-monotonicity, as for all  $w < E(w^2)$  we would have secular individuals with desired taxes that increase in  $x$ , while once we move to  $x > 1$ , the desired tax would be lower as the level of liberties desired would be lower. Thus the nonmonotonicity would hold for all values of  $\alpha$  up to  $\alpha_{\max}$ . ■

### Proof of Proposition 6

The case where the世俗s are in a majority and the case of  $\alpha = 0$  are covered in the text. We now consider the case of a religious majority. We first establish that both religious groups need to support repression for this to arise.<sup>27</sup>

**Lemma 9** When  $\sigma < \frac{1}{2}$ , whenever  $\ell = 0$  obtains majoritarian support it must be that the two religious groups vote for repression.

**Proof of Lemma 9:** It is easy to see that both secular groups vote for full liberties when  $t(1) < t_l(0)$  for  $t(1) = \max\{t_{sl}(1), t_{rh}(1)\}$ . In this case the two secular groups vote for  $\ell = 1$  because  $(\ell = 1, t(1))$  is preferred by both to  $(\ell = 1, t_l(0))$  (as either *sl* is pivotal over  $t(1)$  so that this is its optimal tax under full liberties, or *rh* is pivotal over  $t(1)$  in which case *sl* prefers an even lower tax). Finally,  $(\ell = 1, t_l(0))$  is preferred by both to  $(\ell = 0, t_l(0))$ . Thus we have established that the Lemma is correct for  $t(1) < t_l(0)$ .

Now we need to consider  $t(1) > t_l(0)$ . Note that to vote for  $\ell = 0$ , we need for the religious groups that  $v_{ri}(\ell = 0, t_l(0)) > v_{ri}(\ell = 1, t(1))$  which holds iff:

$$(1 - t(1))^2(1 + (1 - x_r)\alpha)^2 - (1 - t_l(0))^2 + \\ 2\frac{E(w^2)}{w_i^2}[(1 + \rho)(1 + (1 - x_r)\alpha)t(1)(1 - t(1)) - t_l(0)(1 - t_l(0))] < 0$$

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<sup>27</sup>Note that this is not obvious as for example the *sh* may collude with *rl* to repress liberties, as *sh* will enjoy the reduction in taxes in the case in which  $t_{rh}(1) > t(0)$ .

and similarly for the secular groups that:

$$(1 - t(1))^2(1 + (1 - x_s))^2 - (1 - t_l(0))^2 + 2\frac{E(w^2)}{w_i^2}[(1 + \rho)(1 + (1 - x_s))t(1)(1 - t(1)) - t_l(0)(1 - t_l(0))] < 0$$

It is therefore obvious that whenever a secular group  $si$ ,  $i \in \{l, h\}$ , votes for  $\ell = 0$ , so will a religious group. Moreover, note that if  $sl$  votes for  $\ell = 0$ , so must  $sh$  as the expression in the square brackets is positive and  $w_h^2 > w_l^2$ . Therefore, if  $\ell = 0$  is chosen by society, then: (i) if  $sl$  votes for  $\ell = 0$ , then so must  $sh$  and hence both religious groups will vote for it as well; (ii) if  $sl$  does not vote for repression, then if both religious groups do not vote for repression,  $sh$  must do so for it to win. But if this is the case, then so will  $rh$ . But these two high productivity groups will not constitute a majority, a contradiction. This implies that if  $\ell = 0$  is chosen, then the two religious groups must vote for it.  $\square$

Given the above, the case of  $\alpha = 0$  is covered in the text. Note that it holds more generally consider the case of the lowest religious gap so that  $(1 - x_r)\alpha = 0$ . In this case  $rh$  would support full liberties.

We now prove two lemmata showing that for a high religious gap, society chooses repression, and that there exist an interval of religious gaps for which society chooses high liberties and high taxes.

**Lemma** When  $\sigma < \frac{1}{2}$ , society chooses  $\ell = 0$  whenever  $\pi_r > \max\{2\sigma + 2\sqrt{\sigma^2 - \sigma + 1}, \frac{\pi_w - (1 - \sigma)}{\sigma}\}$ .

**Proof of Lemma 6:** Note that  $v_{rh}(1, t_{rh}(1)) > v_{rh}(1, t_{rl}(1)) > v_{rl}(1, t_{rl}(1))$ , where the second inequality follows from the fact that a higher wage always increases utility. Similarly we have that  $v_{rh}(0, t_l(0)) > v_{rl}(0, t_l(0))$ . Thus if  $v_{rl}(0, t_l(0)) > v_{rh}(1, t_{rh}(1))$ , then both  $rl$  and  $rh$  vote for repression. Note that  $2v_{rl}(0, t_l(0)) = \frac{E(w^2)^2}{2E(w^2) - w_l^2}$ , once we plug for the optimal tax, and similarly,  $2v_{rh}(1, t_{rh}(1)) = \frac{E(w^2)^2(1 + \rho)^2(1 + (1 - x_r)\alpha)}{2E(w^2)(1 + \rho) - w_h^2(1 + (1 - x_r)\alpha)}$ . Thus we have that

$$\begin{aligned} \frac{E(w^2)^2}{2E(w^2) - w_l^2} &> \frac{E(w^2)^2(1 + \rho)^2(1 + (1 - x_r)\alpha)}{2E(w^2)(1 + \rho) - w_h^2(1 + (1 - x_r)\alpha)} \Leftrightarrow \\ \frac{1}{2E(w^2) - w_l^2} &> \frac{(1 + \rho)(1 + (1 - x_r)\alpha)}{2E(w^2) - w_h^2 \frac{(1 + (1 - x_r)\alpha)}{1 + \rho}} \end{aligned}$$

But as  $\pi_w \leq \sigma\pi_r + 1 - \sigma$  or in other words  $w_h^2 \frac{(1 + (1 - x_r)\alpha)}{1 + \rho} < w_l^2$ , and

thus the above holds if

$$\frac{1}{2E(w^2) - w_l^2} > \frac{(1 + \rho)(1 + (1 - x_r)\alpha)}{2E(w^2) - w_l^2}$$

which holds with the condition that  $(1 + \rho)(1 + (1 - x_r)\alpha) < 1$ , or written differently,  $(\sigma\pi_r + 1 - \sigma)(1 + (1 - x_r)\alpha)^2 = (\sigma\pi_r + 1 - \sigma)\frac{(2-x_s)^2}{\pi_r^2} < 1$ . Note that this holds whenever  $(\sigma\pi_r + 1 - \sigma)\frac{4}{\pi_r^2} < 1$ , which holds if  $\pi_r > 2\sigma + \sqrt{\sigma^2 - \sigma + 1}$ .  $\square$

**Lemma 10** When  $\sigma < \frac{1}{2}$ , society chooses  $\ell = 1$  and  $t_{rh}(1) > t_l(0)$  whenever  $\pi_r$  is small enough,  $\sigma$  not too small, and  $\pi_r$  is not too large.

**Proof of Lemma 10:** Note that  $t_{rh}(1) \geq t_l(0)$  whenever  $\pi_w \leq \sigma\pi_r + (1 - \sigma)$ . Consider the limit case when  $\pi_w = \sigma\pi_r + (1 - \sigma)$  and hence  $t_{rh}(1) = t_l(0)$ . Note that in this case,  $rl$  gains more from liberties as the tax rate is the same but tax revenues are higher. We therefore consider under what circumstances  $rl$  prefers liberties, as by Lemma 9 this implies that society chooses  $\ell = 1$ .

We therefore find when (let  $r \equiv (1 - x_r)\alpha < 0$ , and recall  $\lambda_l = \frac{E(w^2)}{w_l^2}$ ):

$$\begin{aligned} \frac{1}{2}(1 - t_l(0))^2 w_l^2 + (1 - t_l(0))t_l(0)E(w^2) &\leq \\ \frac{1}{2}(1 - t_l(0))^2 w_l^2 (1 + r)^2 + (1 - t_l(0))t_l(0)E(w^2)(1 + \rho)(1 + r). \end{aligned}$$

This holds iff

$$\begin{aligned} (1 - t_l(0))w_l^2(1 - (1 + r)^2) &\leq \\ 2t_l(0)E(w^2)((1 + \rho)(1 + r) - 1) &\Leftrightarrow \\ (1 - (1 + r)^2) &\leq 2(\lambda_l - 1)((1 + \rho)(1 + r) - 1) \Leftrightarrow \\ (1 - (1 + r)^2) &\leq 2(\lambda_l - 1)((1 + \sigma + (1 - \sigma)r)(1 + r) - 1) \Leftrightarrow \\ -r(2 + r) &\leq 2(\lambda_l - 1)(r(2 + r) + \sigma(1 - r^2)) \Leftrightarrow \\ -\frac{r(2+r)}{1-r^2} &\leq \frac{2(\lambda_l-1)\sigma}{2(\lambda_l-1)+1} \Leftrightarrow \\ \frac{\pi_r^2-4}{4(\pi_r-1)} &\leq \frac{2(\lambda_l-1)\sigma}{2(\lambda_l-1)+1} \end{aligned}$$

Solving, we find that we need  $\pi_r \leq \frac{4(\lambda_l-1)\sigma}{2(\lambda_l-1)+1} + 2\sqrt{\frac{2(\lambda_l-1)\sigma^2}{2(\lambda_l-1)+1} - \frac{2(\lambda_l-1)\sigma}{2(\lambda_l-1)+1} + 1}$ .

Note that in the previous Lemma we had required:  $\pi_r > 2\sigma + \sqrt{\sigma^2 - \sigma + 1}$ .

Here we require  $\pi_r < 2\sigma k + 2\sqrt{k^2\sigma^2 - k\sigma + 1}$  for  $k = \frac{2(\lambda_l-1)}{2(\lambda_l-1)+1} < 1$ . Thus the conditions are mutually exclusive.

Note that the *rhs* is greater than 2, so we can always find such values. Thus, for any parameters  $\lambda_l$  and  $\sigma$ , will be a cutoff, so that the above is satisfied if  $\pi_r$  is less than this cutoff. We need to show however that the above is feasible, as we also need  $\lambda_l = \lambda_h\sigma\pi_r + \lambda_h(1 - \sigma)$ . In other words, given  $\lambda_l$  and  $\sigma$ , we also have

$\frac{\lambda_l}{\lambda_h \sigma} - \frac{(1-\sigma)}{\sigma} = \pi_r$ , so as we need  $\pi_r$  to be less than the cutoff above, the condition becomes  $\frac{\lambda_l}{\frac{4(\lambda_l-1)\sigma^2}{2(\lambda_l-1)+1} + 2\sigma \sqrt{\frac{2(\lambda_l-1)\sigma^2}{2(\lambda_l-1)+1} - \frac{2(\lambda_l-1)\sigma}{2(\lambda_l-1)+1} + 1} + (1-\sigma)} < \lambda_h$ .

The *lhs* is increasing in  $\lambda_l$ , and as  $\lambda_l > 1 > \lambda_h$ , this can be satisfied only for a small  $\lambda_l$  and a high  $\lambda_h$ .

Consider now  $\lambda_l = \lambda_h = 1$ . In this case the expression is satisfied for all  $\sigma$ , and is easier to satisfy for higher  $\sigma$ . We therefore know that for a low enough  $\pi_w$ , and a high enough  $\sigma$ , the condition above is satisfied.

We have therefore established that for a low enough economic polarisation, and sufficient religious polarisation in  $\sigma$  and not too high in  $\pi_r$ , society chooses  $\ell = 1$  and  $t_{rh}(1) > t_l(0)$ . We can then set  $\hat{\pi}_r = \frac{\pi_w - (1-\sigma)}{\sigma}$  and  $\check{\pi}_r = \frac{4(\lambda_l-1)\sigma}{2(\lambda_l-1)+1} + 2\sqrt{\frac{2(\lambda_l-1)\sigma^2}{2(\lambda_l-1)+1} - \frac{2(\lambda_l-1)\sigma}{2(\lambda_l-1)+1} + 1}$ .  $\square$

This completes the Proof of Proposition 6. ■

**Proof of Proposition 8:** Differentiating the indirect utility with respect to  $\sigma$  we obtain

$$\frac{dv_{si}}{d\sigma} = \frac{dv_{si}}{d\rho} \frac{d\rho}{d\sigma} + \frac{dv_{si}}{dt} \frac{dt}{d\sigma}, i = l, h.$$

For the *sl*, by an envelop argument  $\frac{dv_{si}}{dt} = 0$  and it is clear that  $\frac{dv_{si}}{d\rho} \frac{d\rho}{d\sigma} > 0$  for  $i = l, h$ . Hence, the *sl* always prefer to increase  $\sigma$ .

For the *sh* the two terms have different sign. Developing the second term we can write

$$\frac{dv_{si}}{d\sigma} = \left\{ \frac{dv_{si}}{d\rho} + \frac{dv_{si}}{dt} \frac{dt}{d\rho} \right\} \frac{d\rho}{d\sigma}.$$

Note that  $\frac{d\rho}{d\sigma} > 0$ , and thus we want to know when  $\frac{dv_{si}}{d\rho} + \frac{dv_{si}}{dt} \frac{dt}{d\rho} < 0$ . This arises when

$$\begin{aligned} & \frac{dv_{si}}{d\rho} + \frac{dv_{si}}{dt} \frac{dt}{d\rho} \\ &= 2t_{sl}(1)(1 - t_{sl}(1))E(w^2) \\ &+ (- (1 - t_{sl}(1))4w_h^2 + (1 - 2t_{sl}(1))E(w^2)(1 + \rho)) \frac{2E(w^2)w_l^2}{(2E(w^2)(1 + \rho) - 2w_l^2)^2} \\ &< 0 \end{aligned}$$

Plugging for  $t_{sl}(1)$ , this simplifies to

$$E(w^2)(1 + \rho) - 2w_l^2 + \frac{w_l^2(w_l^2 - 2w_h^2)}{E(w^2)(1 + \rho) - w_l^2} < 0$$

which holds whenever (letting  $\rho$  be at its maximum level of 1):

$$\frac{2(E(w^2) - w_l^2)}{w_l^2} < \frac{2w_h^2 - w_l^2}{2E(w^2) - w_l^2}$$

for which  $2E(w^2) < 3w_l^2$  or  $\pi_w < \frac{1}{2p} + 1$  is a sufficient condition. Note that if the tax imposed is 0, then the *sh* are indifferent in terms of changing  $\sigma$  as long as  $t_{sl}(1)$  remains 0, but if the increase in  $\sigma$  is sufficient to cross the threshold to make  $t_{sl}(1) > 0$ , then it lowers the utility of the *sh* as before the change they were at their ideal policy. Thus whenever  $\pi_w < \frac{1}{2p} + 1$ , the *sh* at least weakly and sometimes strictly (when  $\pi_h$  is not too small so that taxes are positive or right before the threshold), prefer to decrease  $\sigma$ . ■

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