Personal Liberties, Religiosity, and Effort

Joan Esteban
Gilat Levy
Laura Mayoral

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PERSONAL LIBERTIES, RELIGIOSITY, AND EFFORT[1]

JOAN ESTEBAN, GILAT LEVY, LAURA MAYORAL[2]

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ABSTRACT

In this paper we study the role of religiosity in influencing the choice of labor effort. Many religions promote restrictions on personal liberties such as divorce, abortion, gender parity, or gay marriage, often regulated by law. We assume that the higher the degree of religiosity of an individual, the less he enjoys such personal liberties, and the less he likes to be in a society which allows them, while seculars enjoy such liberties. By standard consumer theory, the differential valuation induced by religiosity influences individual decisions on other dimensions as well, notably labour supply. We show empirically that this nexus holds and that the size of the effect is large. Specifically, we construct an index of personal liberties and find solid evidence in support of the *joint* effect of religiosity and liberties on labor effort. Our empirical results indicate that religiosity interacted with the legal level of liberties has a significant and strong negative effect on labor supply and that increases in the cap on liberties have a negative effect on the labor supply of the religious individuals and positive for the secular.

JEL-Classification: Z12, J22

Key-words: Religiosity, Personal Liberties, Labor supply.

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[2]*Esteban*: Institut d'Anàlisi Económica, CSIC and Barcelona GSE; joan.esteban@iae.csic.es. *Levy*: London School of Economics; G.Levy1@lse.ac.uk. *Mayoral*: Institut d'Anàlisi Económica, CSIC, Barcelona GSE and University of Gothenburg; laura.mayoral@iae.csic.es.

1. INTRODUCTION

Religion shapes individual preferences, "men's involuntary beliefs, feelings and desires" (John Stuart Mill, *Utility of Religion*, 1874). As posited by Becker (1996, p225) ,*"Norms are those common values of a group which influence an individual's behavior through being internalized as preferences"*.[3] Indeed all religions define a set of norms of behaviour that affect the choices of their affiliates and that have been instilled through education and family transmission of values.[4] These norms include rules on how to dress, what to eat, what to drink, how to spend one's time, as well as the condemnation of some actions like divorce, abortion, gender parity, homosexual behaviour, euthanasia, and so on.

The boundaries over such kind of personal liberties have typically been set by laws that restrict the behaviour of both religious and non-religious individuals. Over the past fifty years however many governments have significantly changed such laws, giving rise to a *rights revolution* (Hitchcock et al, 2012) (see a quantitative measure of this process of liberalisation in Subsubsection 3.1.2): Women's rights for education or employment and the right over their bodies had expanded, along with gay rights and individuals' rights over ending their life. This may have potentially affected in a different way the restrictions faced by religious and secular individuals. While the former are possibly still constrained by their own religion's code of conduct, the latter face a more lax one.

In this paper we examine the effect of religious attitudes towards such personal liberties on economic choices. Our empirical results show that the relaxation of legal and social constraints has a differential impact on economic choices, specifically, on labor supply. We observe that while expanded personal liberties provide an incentive for seculars to supply more labor, they provide a *disincentive* for the religious.

The evidence that lifting restrictions on personal liberties can adversely affect the labour supply of those with a distaste for such liberties is strongly indicative of the presence of *negative externalities*. The great increase over the last decades of gender parity or LGBT rights does not force religious communities and individuals to exercise such rights. They are free not to use them. Providing lower labor supply when such rights are abundant attests that religious and conservative individuals also dislike to live in a society which allows such liberties or practices them. This is in line with the numerous political protests around the world against the relaxation of restrictions on such personal liberties, and sometimes violent conduct against individuals who practice them.[5]

To guide our empirical analysis, we construct a simple model to introduce the effect of personal liberties on economic choices. As in Iannaccone (1992), Benabou and Tirole (2006), and Benabou et al. (2015), we assume that religiosity affects the preferences of individuals. Specifically, it affects their attitude towards the "consumption" of liberties. While religions may directly

[3]Guiso et al (2006), and Benabou et al. (2015) also view religion as shaping individual preferences.

[4]See Bisin and Verdier (2000) and (2001).

[5]See Abramowitz (1995), Campbell and Monson (2007) and Layman (1997,2001) on how these issues have become a deep cleavage in the political debate.

affect individuals' ability to work (by having to spend time on religious rituals, or by restricting women's choices), the presence of negative externalities indicates that it may be better to incorporate attitudes to liberties in one's preferences. Thus, to a standard two-good model of individual choice on consumption and effort, we add a third (public) good: personal liberties. How much of these liberties can be used is established by law and social norms.

In addition to their earning capacity, individuals are endowed with a given degree of religiosity. We assume that the stronger the degree of religiosity the deeper is the commitment to the religious norm and hence the distaste for liberties. Assuming some complementarity between the three goods, this increased distaste towards personal liberties induces a fall in the marginal utility of consumption and in that of leisure. If the effect on consumption (leisure) dominates, we should observe a negative (positive) relationship between effort supply and religiosity that is larger –in absolute value– the higher the degree of liberties afforded.

In our empirical analysis we construct an index of personal liberties based on the legal evolution of certain personal liberties from 1960 to 2013 that are or have been controversial in the recent past. The data reflects 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. We take the evolution of legislation on these issues captured by this index as an indicator of the broader loosening of the social constraints on individual decisions. We use a lagged index taking into consideration that individuals' important choices in life such as education and family-related decisions are taken relatively early in life and are difficult to reverse.

The individual level data on religiosity and other individual controls are derived from the European Social Survey (ESS), where we use data from 6 waves (2002, 2004, 2006, 2008, 2010 and 2012) and 34 European countries. We regress the individual (and the desired) number of hours worked on individual measures of religious affiliation and religious intensity, their interaction with the index of liberties, as well as standard individual controls. To tackle endogeneity, as some unobservable traits may affect both religious intensity and labor outputs, we construct an instrument for religious intensity. Specifically, as religiosity is a cultural trait shared by people over and above national borders, our instrument for religious intensity is derived by computing the average religious intensity of people of the same sex, age bracket and religious denomination that live in neighbouring countries. We also conduct many robustness checks, as well as provide empirical support for the mechanism suggested by the theory.

Our empirical results show that labor supply is negatively associated to the interaction of individual religiosity and liberties. The result is statistically significant and the size of the effect is large. An increase of one standard deviation in the intensity of religious beliefs is associated with a decrease in the number of hours worked per week of 1.8 hours for individuals who live in a society with high level of allowed liberties.

This paper falls under the recent literature exploring the effect of culture on economic outcomes.[6] While the rejection of personal liberties is associated with more general conservative ideology, it is deeply rooted in religious prescriptions, and we therefore choose to focus on religion as the cultural trait.

Religion can affect individual choice through different channels. Religion influences individual preferences (as in Azzi and Ehrenberg 1975, Iannaccone 1992, and Becker 1996), beliefs (as in Levy and Razin 2012, Bénabou and Tirole 2006), or the constraints they are facing (as in Carvalho and Koyama 2016).

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, but positively to religious beliefs in heaven and hell. Campante and Yanagizawa-Drott (2013) show that longer Ramadan fasting has a negative effect on Muslims' relative preferences for work and as a result on output growth in Muslim countries.[7] What we show in this paper, and add to this literature, is that the interaction of religiosity with the availability of personal liberties is a key factor in explaining the different labor supply decisions of the religious and the secular, and that the religious suffer from negative externalities when such liberties are practiced or allowed.

Since Iannaccone (1992) it has been assumed in most of the literature that churches, through imposing strictness or sacrifices, impose on their affiliates a lower valuation for material, secular consumption. In our case, we model the influence of religiosity on the valuation of secular consumption in a different way. We assume that individuals also value the use of personal liberties. Individuals differ in their degree of religiosity and hence in their positive or negative valuation of personal liberties. The use of personal liberties is subject to a legal cap established by law.[8] This implies that the degree of enjoyment of liberties indirectly influences the appetite for secular consumption. The more religious one person is the less she enjoys liberties to the point that after a threshold in religiosity individuals start disliking personal liberties.

There have been other explanations in the literature on the channels through which different religions could influence output and effort levels of religious individuals. In a club good model, Carvalho and Koyama (2016) illustrate how religions choose their cultural restrictions strategically to induce labor and capital contributions in the face of exogenous changes to economic development. In their analysis there is a range of parameters for which an increase in economic

[6]See for example Fernandez and Fogli (2009) and Fernandez et al. (2004) who obtain that economic choices for second generation immigrants can be explained by the culture of their country of ancestry. Guiso, Sapienza and Zingales (2003, 2006) find that christian religions facilitate growth and that culture has a strong influence in economic performance. Becker and Woessman (2009) show how the Protestant religion had induced a higher level of education. Alesina, Giuliano and Nunn (2013) find that descendants of societies that traditionally practiced plough agriculture have less equal gender norms today, while Alesina and Giuliano (2015) review the relationship between culture and institutions.

[7]This suggests, in line with our paper, that changing beliefs and values can influence labor supply and occupational choices beyond the month of Ramadan itself.

[8]As we have already mentioned, religious organizations also set standards of behavior to their affiliates. But here we consider the religious cap on liberties as given and normalized to zero, leaving the case of a responsive change in the cap by the church for future research.

development implies a higher output for seculars and a lower one for the religious, similar to what we have with a relaxation of the cap on liberties. In their model this arises because economic development makes it too costly for the religious organization to attract all individuals and they then use religious restrictions to screen out the less devout. Benabou, Ticchi and Vindigni (2013, 2015) look at how religious censorship might affect innovation and scientific progress and hence total output. Benabou and Tirole (2006) argue that religions may affect differently belief manipulation and hence effort.

Below we start with the description of our model that allows individuals to differ in their preferences for personal liberties, and derive its implications for labor supply. Section 3 deals with the data and the empirical strategy and Section 4 provides the main empirical results. Section 5 examines alternative specifications of some of the independent variables and discusses the robustness of the IV estimation. Section 6 directly tests the empirical backing for our assumptions. Section 7 discusses possible alternative explanations of our results. One simple alternative model is to consider religion as directly blocking the labor supply of individuals. As our results are stronger for women (which also is the group most affected by the type of personal liberties we are considering), such a model could also fit the data. While such mechanism is clearly complementary, the fact that religious individuals *reduce* their labor supply in response to an increase of liberties in society attests that there is more at play -e.g., externalities in preferences- than pure constraints. We conclude in Section 8.

2. RELIGIOSITY, LIBERTIES AND LABOR SUPPLY

We now construct a simple model to guide our empirical analysis on the effect of attitudes towards liberties on labor supply. In the model we will interpret religiosity as affecting the preferences of individuals when "consuming" personal liberties and by knowing that they can be consumed by others, an externality.

In fact many of the previous economic models of religion mentioned above can generate a negative externality in the preferences of the religious when they consider the practice of liberties in society at large. For example, in a club good model, as in Iannaccone (1992), Berman (2000) or Carvalho and Koyama (2016), the level of liberties in society will affect the level of sacrifice needed by the religion to attract the devout members.[9] As Levy and Razin (2012) discuss, seculars practicing liberties may imply an erosion of beliefs among the religion as they learn that "sins" do not necessarily carry punishments.

As we focus on empirical analysis, we construct a simple ad hoc model that abstracts from the strategic features of religious organizations mentioned above, and just focus on a reduced form environment where the practice of liberties in society induces negative externalities for the religious. Moreover, in general there is no substantial difference, from a modelling point of view, whether such attitudes are incorporated in the preferences or as some moral constraints the individuals are facing.[10]

[9]For some parameters, as Carvalho and Koyama (2016) show, more economic development (which can be related to our parameter of liberties) will imply smaller religions with greater level of sacrifice and hence lower labour effort. For other parameters, the opposite arises.

[10]We discuss in Section 7 these other modelling possibilities.

Assume that there are three goods which individuals can potentially enjoy: two are private goods, consumption c and leisure $l \in [0,1]$. To obtain consumption individuals need to exert effort which is defined as $e = 1 - l$. There is also a public good, personal liberties $\ell \in [0, \ell_M]$. The maximum liberties accessible ℓ_M is determined by law and custom.[11] We assume that there are no constraints on the free practice of personal liberties within $[0, \ell_M]$. Modelling liberties as a costly good does not affect the results.

The cap on liberties has two effects. First, it establishes the limit to what is accessible to individuals. Second, it may produce an externality because individuals may dislike to be in a society where some liberties are permitted, independently of whether or not they will personally use them. We represent the effect of liberties on an individual as the combination of the personal use of them, ℓ, and the maximum legally permitted, ℓ_M, this being multiplied by the parameter $\alpha \in [0,1]$. This parameter indicates the weight assigned to the externality effect and can differ for religious and secular. Our analysis is robust to the externality arising instead from the actual practice of wider liberties by some individuals in society.

Individuals are endowed with a "religiosity" index $x \in [0,1]$. We parametrise the difference in the individual preferences over liberties by assuming that the utility function over consumption, liberties, and leisure, can be written as

$$u\Big(c, (\overline{x} - x)[\ell + \alpha \ell_M], 1 - e\Big), \tag{1}$$

where $u(\cdot,\cdot,\cdot)$ is common to all individuals and $\overline{x}$ is the threshold level of religiosity separating those that value liberties positively with $x \leq \overline{x}$ (we call them *secular*) from those that value them negatively, with $x > \overline{x}$ (the *religious*).[12]

Notice that the higher the degree of religiosity the lower the valuation of liberties. In addition, as we have already mentioned, we allow religious and secular to also differ in the importance attached to the externality effect of the legal cap, (α_R, α_S).

We assume the standard properties on $u(\cdot,\cdot,\cdot)$: the utility function increases in all arguments, satisfies concavity with respect to each argument, and has non-negative cross derivatives. Notice that these properties together with the adopted representation of preferences imply that the marginal utility of liberties can be positive or negative, depending on whether the individual is secular or religious.

Let us start with the choice of personal liberties $\ell \in [0, \ell_M]$. Since liberties are a free (public) good, it is immediate that the optimal individual choice will consist of selecting either $\ell = \ell_M$ if $x \leq \overline{x}$ or $\ell = 0$ if $x > \overline{x}$. Therefore, the individual liberties component will be either $(1+\alpha_S)\ell_M$ for secular individuals or $\alpha_R \ell_M$ for religious individuals. Given this, and in order to simplify on

[11] As we have already mentioned we shall use the evolution of law as an indicator of the parallel evolution on the associated social norms.

[12] We are taking the liberty of denoting as "secular" the individuals with $x \leq \overline{x}$ and as "religious" the ones with $x > \overline{x}$. One can as well interpret x as the level of conservatism of an individual. The correlation between religiosity and conservative attitudes has already been shown by Andersen and Fetner (2008), De La O and Rodden (2008), Inglehart and Baker (2000), and Kirkpatrick (1993). In the empirical part of this paper we consider this possible alternative interpretation of the results and use direct measures of conservatism rather than of religiosity. Both variables are indeed highly correlated, but in a horse race we obtain that religiosity explains the evidence better.

notation, we will from now on use ℓ for the legal cap ℓ_M. Taking this choice into account, we write $u\big(c, \Lambda_i, 1-e\big), \quad i = S, R$, where $\Lambda_S = (\overline{x} - x)(1 + \alpha_S)\ell$ and $\Lambda_R = (\overline{x} - x)\alpha_R\ell$ are the interaction of religiosity with the personal liberties component.

We can now address the choice of effort e. Recall that the u function is common to all and that $\Lambda_S > \Lambda_R$. Hence, if the cross derivatives of u are positive, religious individuals will have a lower marginal utility of consumption and of leisure, all equal.

Besides their level of religiosity, individuals are also characterised by their earning capacity w. Earned income we is entirely consumed, so that $c = we$. Plugging the budget equality in the utility function we have

$$u\big(we, \Lambda_i, 1-e\big), \quad i = S, R,$$

so that, given the unconditioned choice of liberties by each individual, utility depends on the choice of e only.

Since the utility is strictly concave in e, the optimal choice can be obtained from the first order condition:

$$\frac{du}{de} = wu_c\big(we, \Lambda_i, 1-e\big) - u_l\big(we, \Lambda_i, 1-e\big) = 0, \quad i = S, R.$$

Given the above, it is clear that the influence of religiosity and the cap on liberties on the choice of e is through Λ_i only. Using the first order condition we totally differentiate e with respect to x and with respect to liberties ℓ to obtain

$$\frac{de}{d\Lambda_i}\frac{d\Lambda_i}{dx} = -\frac{\frac{d^2u}{dede\Lambda_i}}{\frac{d^2u}{de^2}}\frac{d\Lambda_i}{dx} \text{ and } \frac{de}{d\Lambda_i}\frac{d\Lambda_i}{d\ell} = -\frac{\frac{d^2u}{dede\Lambda_i}}{\frac{d^2u}{de^2}}\frac{d\Lambda_i}{d\ell}. \tag{2}$$

In order to establish the sign of $\frac{de}{d\Lambda_i}$, we start by observing that the denominator is negative $\frac{d^2u}{de^2} = u_{ll} < 0$. As for the numerator, we can easily obtain that

$$\frac{d^2u}{dede\Lambda_i} = u_l A,$$

where,

$$A = \left[\frac{u_{c\Lambda_i}}{u_c} - \frac{u_{l\Lambda_i}}{u_l}\right].$$

The sign of $\frac{de}{d\Lambda_i}$ depends on the sign of A, the difference of the relative change in the marginal utility of consumption and the relative change in the marginal utility of leisure induced by an increase in Λ_i. An increase in Λ_i, for instance from a decrease in religiosity x, increases the marginal utility of consumption –and this induces more effort–, but it also increases the marginal utility of leisure –which induces less effort. The net result from the two effects depends on which term is largest and this is an empirical matter.[13]

[13]Note that religious and secular individuals differ substantially in how they spend their leisure, and religions often prescribe very specific ways in which leisure time should be spent (e.g., performing rituals, reading the Bible,

As for the sign of the second term in (2),

$$\frac{d\Lambda_S}{dx} = -(1+\alpha_S)\ell < 0, \text{ and } \frac{d\Lambda_R}{dx} = -\alpha_R\ell < 0,$$

$$\frac{d\Lambda_S}{d\ell} = (\overline{x}-x)(1+\alpha_S) > 0, \text{ and } \frac{d\Lambda_R}{d\ell} = (\overline{x}-x)\alpha_R < 0.$$

The effect of religiosity on Λ_i is negative for both secular and religious individuals and the size of this negative effect is enhanced by the degree of liberties ℓ. Instead, the effect of an increase of liberties is positive for the secular and negative for the religious. Note that $\Lambda_S > 0$ and $\Lambda_R < 0$. Hence an increase in the cap on individual liberties will pull further apart the Λ of secular and of religious individuals, with the corresponding consequences on labor supply.

Proposition 1. *Let the utility function $u(.,.,.)$ satisfy the conditions above. The effects of religiosity and liberties on labor supply are as follows:*

(1) *If $A > 0$, then*
   (a) *Labor supply is strictly decreasing in religiosity x, and strictly increasing in Λ_i (that is, decreasing in the interaction of individual religiosity and liberties).*
   (b) *An increase in the legal cap on liberties ℓ, increases (decreases) the effort of secular (religious) individuals.*

(2) *If $A < 0$, then the opposite signs in (a) and (b) apply.*

Although the direction of the effect of religiosity and liberties on labor supply is theoretically ambiguous (as it depends on the sign of A), our simple model delivers several testable implications, which are as follows:

[1] The role of religiosity on effort is mediated by the degree of liberties afforded. In other words, the interaction of religiosity and liberties has a significant effect on labor supply.

[2] There is a threshold level in the degree of religiosity such that the effect of an increase in the cap on liberties on labor supply changes sign.

[3] The following facts go together: i) either labor supply is decreasing in the interaction of religiosity and liberties *and* the effect of liberties on labor supply is positive for secular and negative for religious [this is consistent with $A > 0$]; or ii) the same as above but with the signs of the latter relations reversed [this would be consistent with $A < 0$].

In the following sections, we explore whether [1]–[3] hold empirically. We first focus on the relationship among labor supply, individual religiosity and liberties. We estimate the direction of this relationship and check whether [1] and [2] hold in the data (see Sections 4 and 5). In addition, using [3], it's possible to determine the sign of A, which is the determined by the sign of the relationship between liberties, religiosity and effort. In Section 6, we provide a more direct evidence on the sign of A and check whether it is consistent with the implications of the results in Sections 4 and 5.

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not working on the Sabbath, etc.). As a result, it is not obvious what is the right assumption in terms of the marginal utility of leisure as a function of liberties and the degree of religiosity.

3. Empirical Analysis

In this section we introduce the data employed to investigate empirically the relationship among religiosity, personal liberties and effort, as well as our specific testable hypotheses and empirical strategy. The main results of this analysis are presented in Sections 4 and 5.

3.1. **Data and variables.**

3.1.1. *Individual-level data.* We use individual-level data from the European Social Surveys (ESS). We consider all rounds (2002, 2004, 2006, 2008, 2010 and 2012) and all countries available (at most 34). The surveys focus on European countries and also including Turkey and Israel.[14] This results in a large raw dataset of more than 200,000 observations. We have dropped from the sample full-time students, retired people and individuals with permanent disabilities. In addition, we've also dropped people being born abroad as they can have been exposed to a different legislation on liberties. In what follows we describe how we have used the information of the ESS to obtain proxies for our variables of interest. Detailed definitions as well as tables of summary statistics are provided in Appendix 9.

Religiosity. We construct measures of religious *affiliation* and religious *intensity*. REL_{AFF} is a dummy that measures current religious affiliation while REL_{EVER} is equal to 1 if the respondent currently belongs or has belonged in the past to a religion. The correlation between these two variables is, not surprisingly, very high (.82) as only 8% of the people in our sample declare not to belong to a religion but to have belonged in the past.[15]

Three variables in the ESS capture different dimensions of religious intensity. PRAY measures respondent's monthly frequency of praying, RELIGIOSITY is self-reported degree of religiosity, and RELIGIOUS ATTENDANCE reports respondent's monthly frequency of attendance to religious services. All variables have been renormalised so that they are all measured on a scale from 0 to 1. We construct an index of individual religiosity, REL_{INT}, by computing the simple average of the above-mentioned variables. Using principal components instead of a simple average delivers virtually identical results.

Effort. Our main dependent variable is the total amount of hours worked per week (in main job), including any paid or unpaid overtime (HOURSWORKED). We also look at alternative variables such as the number of contracted hours per week in main job, excluding overtime (CONTRACTHOURS). Notice, however, that both HOURSWORKED and CONTRACTHOURS are imperfect measures of the willingness to work, as they reflect *attitudes* towards effort *as well as* the characteristics of the environment (i.e., rigidity of the labor market). To address this issue,

[14]The countries in the sample 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 and United Kingdom.

[15]Among the 281,297 respondents of the ESS, 23,691 have changed their religious affiliation.

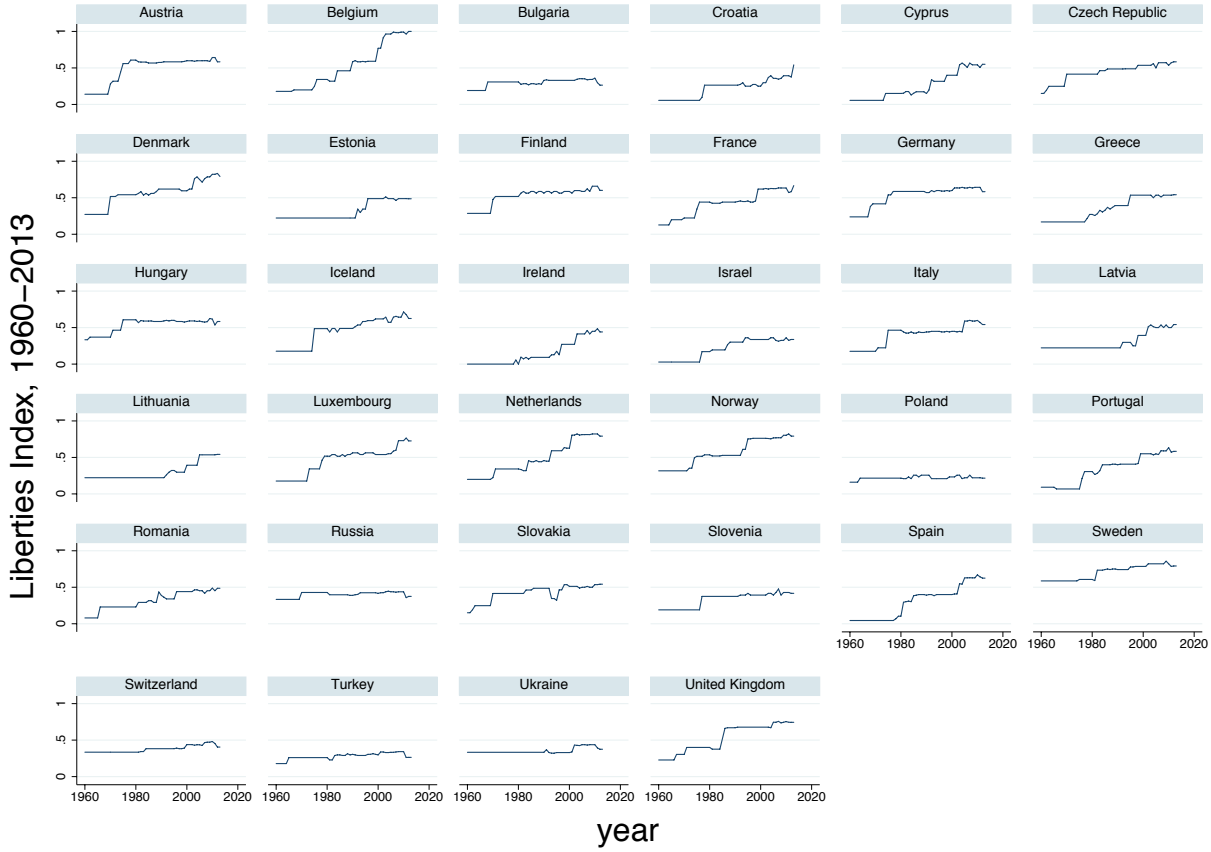

Figure 1. Legal evolution of the Personal Liberties index, 1960-2013

we also consider a variable that reports the number of hours that the respondent would *like* to work (DESIREDHOURS).[16]

Individual controls. We use a list of standard controls: age (AGE) and age squared (AGE^2), gender (GENDER), whether the respondent lives with a partner (COHAB), years of completed education (EDUYRS), a subjective measure of own's health (HEALTH), whether there are children in the household (CHILDREN), the size of the household (HHSIZE) and a measure of partner's education (EDU-PTNR).

3.1.2. *Personal Liberties.* Our goal is to construct an index that reflects the evolution of the width of *personal liberties* enjoyed in a society. To that effect we have collected data on the evolution of the legislation on abortion, divorce, women's rights, LGBT rights, and euthanasia

[16]Unfortunately, this variable is only contained in two of the rounds of the ESS so the sample size reduces considerably.

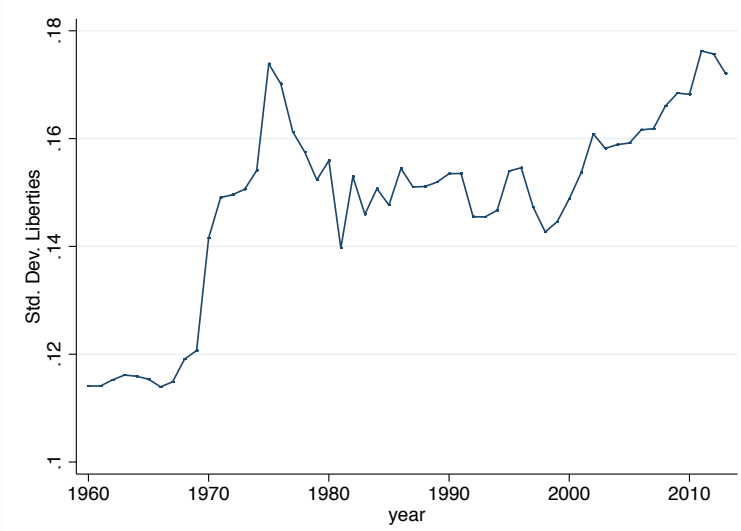

Figure 2. Cross-country std. deviation of the Personal Liberties index, 1960-2013

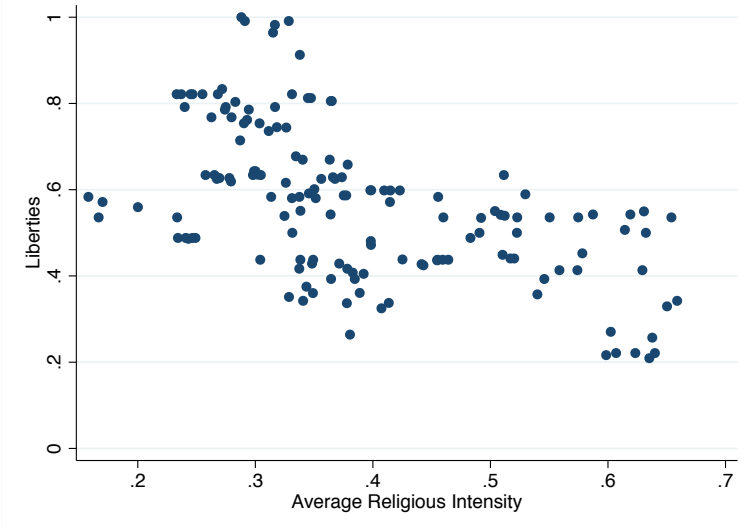

Figure 3. Personal Liberties index versus average religious intensity

from 1960 to 2013 for each of the countries in our dataset. Although these issues are only a subset within the broader class of personal liberties that someone might want to enjoy, they have interesting features. Firstly, it is possible to measure their evolution in an objective way by looking at changes in the legislation. And secondly, it is a very relevant subset, as all these issues are (or have been) highly controversial over this period. Thus, evolution on these contentious issues is likely to have been accompanied (or preceded) by changes in other *personal liberties* that are more difficult to observe. Some of these variables (such as abortion or divorce) are likely

to have a direct effect on labor supply while others (such as LGBT rights or euthanasia) are less likely to have such an effect. However, all reflect changes in social norms with respect to the degree of personal autonomy.

Data come from a number of sources such as the UN, the EU parliament, World Bank, Human Rights project, Pew Research Center, Freedom to Marry, etc. To elaborate the liberties index we proceed as follows. We first create an index for each individual issue and country at each point in time. To do that, we look at a number of dimensions. For instance, to elaborate the LGBT rights index we have coded for each year from 1960 to 2013 whether it is legal to maintain a sexual relationship with someone of the same sex, whether a same-sex union and/or marriage is legal and whether same-sex parents are allowed to adopt. We then calculate our index of liberties as the simple average of the individual indices. See Appendix 9.2 for additional details on its construction.

Figure 1 displays the evolution of the index of liberties in Europe from 1960 to the present while Figure 2 depicts its cross-country standard deviation for each of the years of the 1960-2013 period. Despite the fact that we focus exclusively on European countries, both figures reveal substantial variability both over time and across countries. The most conservative countries according to our index are Ireland (with an average value of the index of .15 across the period), Israel (.20) and Poland (.21). On the other side of the spectrum, the most liberal countries are Sweden at the top (.70 on average), followed by Norway and Denmark (.56). As for temporal evolution, the value of the index was relatively low and homogeneous across European states during the 60's. The 70's witnessed an important increase in the variability of the index, reflecting the legal changes occurring in some, but not all, of the countries in the dataset. During the 80's and 90's most of the countries in the sample kept introducing legal reforms so the variability of the index decreased as countries started to catch up. A new liberalisation wave in the 2000's has led the variability of the index to a new maximum.

Finally, Figure 3 displays the value of the Liberties index versus average religious intensity by country and survey wave (i.e., there are 6 time points for each country). The graph shows that, not surprisingly, there is a strong negative correlation between religiosity and liberties (the correlation is equal to -0.56).

Operationalising the Liberties index

The next step is to construct a variable that summarises individual access to liberties. To construct an individual-specific index we exploit the following idea. Many education, work and family-related decisions are taken early in life and are difficult to overturn later on. For instance, a woman's decision on education and fertility is typically taken when she is in her 20's and 30's. This decision is difficult to overturn if the legal context affecting female participation in the labor market changes substantially 20 years later. Thus, as family and education decisions are taken early in life and are extremely persistent, we should expect that individuals are more responsive to the level of afforded liberties at the time when these decisions are made.

To implement this idea, we construct individual-specific indicators that reflect the level of liberties at different stages of the individual's life cycle. To that effect, we average the values of the

liberties index corresponding to the years when that individual was between 18 and G years of age, with G=$\{40, 50 \text{ and } 60\}$. We label the resulting index as LIB_G. In our baseline analysis we use LIB_{40}, and show that results are robust to using the other G as well.[17]

3.2. **Empirical strategy.** Estimating the economic impact of cultural factors is, in general, a difficult task and empirical work is often plagued by identification problems, see Guiso et al. (2003, 2006) for a summary of the main challenges faced by this literature. Some of these problems include the difficulty of controlling for all the relevant variables (which leads to omitted variable bias), the fact that causality is likely to work both ways –from culture to economics and from economics to culture–, and the fact that most studies focus on the relation between religiosity and economic *outcomes*, not *attitudes*.[18] To overcome these problems, our empirical strategy is constructed around the following points.

First, we control for country, survey and country-survey fixed effects in all our specifications. Introducing country-survey dummies allows us to eliminate the impact of country-level economic and institutional variables and reduce in this way the risk of omitted variable bias.[19] The drawback of this approach is that, as religiosity is at the very core of the nation's culture in many instances, these dummies can partially absorb the impact of religion. Thus, our estimates can be interpreted as a lower bound of the effect of religiosity on effort.

Second, we follow two approaches to overcome the potential endogeneity of religious beliefs. The first one introduces a new instrument for religious intensity, see Section 3.3 below for a detailed explanation. We examine extensively the validity of our IV strategy, including robustness checks to the violation of the exclusion restriction (see Appendix 10.3). The second approach consists of focusing on dimensions of religiosity that are inherited by an individual from previous generations, rather than voluntarily accumulated, such as religious affiliation (Guiso et al., 2006). Religious affiliation is largely inherited and this tends to mitigate reverse causality concerns. As mentioned earlier, only around 8% of the respondents in the ESS sample have changed their religious affiliation over their lifetime.

Third, we consider two types of dependent variables: the *effective* number of hours worked and the *desired* number of hours worked. The first one is an economic *outcome* and reflects both the willingness to work as well as country-specific labor market characteristics and personal constraints. The second variable reflects individual *attitudes* towards effort and it allows to identify in a cleaner way the effect of religious beliefs on people's preferences as it is less constrained by individual and labor market characteristics.

Fourth, we provide direct evidence on the model's assumptions as well as on the *conditions* employed in Proposition 1 (that is, on whether a change in the interaction of religiosity and liberties induces a larger change in the marginal utility of consumption or in the marginal utility of leisure), and check whether these results are consistent with those implied by the estimated relationship among effort, religiosity and liberties. More specifically, in our empirical exercise

[17] We have also checked $G = 30$ and the results are robust.

[18] Outcomes are the result of attitudes but also of the surrounding institutional and individual environment.

[19] The liberties index is obviously correlated with country-level institutional and economic variables so introducing country dummies is very important to reduce the risk of endogeneity of the former variable.

we will directly explore whether religious individuals: 1) dislike liberties; 2) value an increase in consumption less than seculars, with a gap that increases with the amount of liberties afforded and 3) value an increase in leisure less than seculars, with a gap that increases with the amount of liberties afforded.

3.3. **Instrumenting religious intensity.** As mentioned earlier, the intensity of religious beliefs is likely to be endogenous. Religious *intensity* is voluntarily accumulated by individuals rather than "inherited", as is the case of religious affiliation. Thus, variables that shape both intensity and effort, but that are not included in the regression, would lead to endogeneity of religious beliefs. Since we control for country-survey fixed effects, the risk of institutional-level omitted variables is small. This is not the case, however, when considering individual-level characteristics. We control for a number of these characteristics (see 3.1.1). However, unobserved individual traits are a concern. The theoretical model presented in the previous section highlights the importance of a variable that we don't observe: the potential wage, w. The higher w, the higher the effort. The potential wage is likely to depend on many factors, but mostly on education (that we observe) and on some measure of *productivity* or innate *ability* (that we don't observe). It follows that if *ability* and the intensity of religious beliefs are correlated, then the latter would be endogenous.

In the following we describe our instrument, which has been designed with this concern in mind. To construct an instrument for REL_{INT}, we exploit the fact that religiosity is a cultural trait that transcends national borders. That is, people belonging to a particular religious denomination share an important part of their culture with people of the same denomination living in other countries (but do not share the same institutional environment). In particular, they are likely to have similar beliefs and attitudes towards topics regulated by their religions. We construct an instrument for REL_{INT}, $\text{REL}^{\text{IV}}_{\text{INT}}$, as follows: for an individual i from country j with (current or past) religious denomination r, we consider the people of the same religious denomination, gender and age bracket living in the countries that share a border with country j.[20] We consider neighbouring countries so that similarities between national customs are more pronounced. Next, we compute the average value of REL_{INT} for those individuals. The resulting quantity is the value of $\text{REL}^{\text{IV}}_{\text{INT}}$ for individual i in country j.

As the instrument is the average of other people's religiosity, by construction it is uncorrelated with individual i's "*innate*" characteristics, such as ability.

As in any IV analysis, however, we cannot entirely exclude the possibility that our instrument violates the exclusion restriction. This would be the case, for instance, if religious affiliation is transmitted from parents to children (through education or genes) along with other factors that have a direct impact on ability. Appendix 10.3 examines the robustness of our empirical results to violations of the exclusion restriction and shows that our conclusions are quite robust to deviations from this hypothesis.

[20] We define three age brackets: from 18 to 35, from 36 to 60 and from 60 onwards. Results are robust to changes in the definition of the brackets.

3.4. **Empirical specification and hypotheses.** Our main goal is to test the implications of Proposition 1, namely, that labor supply depends on the interaction between religiosity and liberties and that liberties affect the labor effort of religious and seculars in opposite ways. It seems natural to use a linear specification to test these claims. In Appendix 10.1 we provide an example of a utility function that generates this type of relationship among the key variables of interest.

We estimate the following equation:

$$e_{i,j,s} = \beta_0 + \beta_1 Rel_{i,j,s} + \beta_2 Rel_{i,j,s} \times \ell_{i,j,s} + \beta_3 \ell_{i,j,s} + X'_{i,j,s}\beta + \gamma Z_j + \delta Y_s + \mu Z_j \times Y_s + \epsilon_{i,j,s}, \tag{3}$$

where i and j and s denote individual, country and survey year, respectively, ***Rel*** is a proxy of individual religiosity (x), ℓ is the individual-specific index of liberties (LIB_G), X contains individual controls, and Z and Y are country and survey dummies, respectively.

Differentiating this equation with respect to ℓ and Rel, we obtain

$$\partial e_{i,j,s}/\partial \ell_{i,j,s} = \beta_3 + \beta_2 Rel_{i,j,s} \tag{4}$$

$$\partial e_{i,j,s}/\partial Rel_{i,j,s} = \beta_1 + \beta_2 \ell_{i,j,s} \tag{5}$$

Proposition 1 implies that $\beta_2 \neq 0$ and that β_2 and β_3 have opposite signs. In addition, if $A > 0$, $\beta_2 < 0$ and $\beta_3 > 0$, that is, the marginal impact of an increase in the cap on liberties ℓ on effort is positive for low levels of religiosity but it becomes negative when religiosity is high.[21] The turning point of this equation allows us to identify $\overline{x}$, the threshold separating religious and seculars, which is given by $\overline{x} = -\beta_3/\beta_2$. We'll use the estimated coefficients to identify the value of $\overline{x}$. A final implication of our theory is that for positive levels of liberties expression (5) is smaller than zero, that is, the marginal effect of religiosity on effort is overall negative.

4. RESULTS

4.1. **Baseline.** This section presents our results relating effort, religiosity and liberties. We focus mostly on people that cohabit (which are around 70% of the sample) as the type of liberties used in the elaboration of the liberties index affect this group more. We show, however, that our conclusions are also valid when the whole population is considered. Table 1 contains our baseline results. For the sake of brevity, the explanations below focus on our key variables (religiosity, liberties and its interaction). Column 1 regresses HOURSWORKED on religious intensity (REL_{INT}), liberties (LIB_{40}), some exogenous individual characteristics (gender and age) and country, survey and country-survey dummies. The coefficient of REL_{INT} is negative but it is not significant (p-value .18). The effect of LIB_{40} on effort is not significantly different from zero either (p-vale .89), in accordance with our theory that predicts that liberties may foster or hinder effort depending on the degree of individual religiosity.

Column 2 adds the interaction of religiosity and liberties to a specification otherwise identical to that of column 1. The coefficient of the interacted term is highly significant, as our theory predicts, and is negative, suggesting that the negative effect of religiosity on effort is amplified by the availability of liberties. The coefficient associated with LIB_{40}, that now captures the effect of

[21] Conversely, if $A < 0$, then $\beta_2 > 0$ and $\beta_3 < 0$.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
REL_{INT}	-0.551	3.355***	3.794***	3.385***	-0.904	6.820**	7.089**	5.690**
	(0.185)	(0.007)	(0.004)	(0.002)	(0.398)	(0.013)	(0.014)	(0.019)
LIB_{40}	0.220	3.189**	3.414**	2.066	0.450	5.752***	5.788***	3.740*
	(0.887)	(0.036)	(0.030)	(0.268)	(0.767)	(0.004)	(0.005)	(0.071)
$\text{REL}_{\text{INT}} \times \text{LIB}_{40}$		-8.669***	-9.226***	-8.171***		-16.451**	-16.929**	-13.191**
		(0.002)	(0.002)	(0.000)		(0.011)	(0.013)	(0.014)
AGE^2	-0.001	-0.001	-0.002**	-0.002***	-0.001	-0.001	-0.002**	-0.002***
	(0.299)	(0.165)	(0.027)	(0.003)	(0.402)	(0.129)	(0.021)	(0.002)
AGE	0.063	0.082	0.131*	0.184***	0.051	0.089	0.131**	0.181***
	(0.377)	(0.230)	(0.050)	(0.003)	(0.487)	(0.196)	(0.046)	(0.002)
GENDER	-7.666***	-7.676***	-7.677***	-6.819***	-7.586***	-7.633***	-7.620***	-6.781***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CHILDREN			-0.555**	-0.170			-0.720***	-0.237
			(0.030)	(0.374)			(0.002)	(0.215)
EDUYRS			0.067	0.061			0.102*	0.096*
			(0.230)	(0.262)			(0.060)	(0.064)
HHSIZE			-0.063	-0.239***			0.033	-0.211***
			(0.568)	(0.003)			(0.716)	(0.008)
HEALTH			-0.019	-0.107			-0.010	-0.104
			(0.852)	(0.241)			(0.926)	(0.271)
EDU-PTNR			-0.060				-0.035	
			(0.258)				(0.470)	
COHABIT				-0.230				-0.152
				(0.114)				(0.274)
c	43.009***	41.219***	43.688***	39.795***	51.861***	47.708***	45.907***	53.360***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R^2	0.148	0.149	0.150	0.129	0.149	0.150	0.151	0.129
Obs	98200	98200	96448	142617	91055	91055	89418	132297
K-P test					499	272	270	313
Cragg-Donald					22815	15942	10687	16284
AR test					0.4052	0.028	0.031	0.033

Table 1. BASELINE: EFFORT, RELIGIOUS INTENSITY AND LIBERTIES, OLS AND 2SLS

Notes. Dependent variable is HOURSWORKED. All models contain country, survey and country-survey dummies. Columns 1-4 have been estimated by OLS while columns 5-8 by 2SLS. There are 34 countries. Robust standard errors clustered at the country level have been computed. p-values are in parentheses.

liberties on effort when REL_{INT} is close to zero, is significant at the 5% level and has the opposite sign as that of the interaction of religiosity and liberties, as predicted by Propostion 1, which means that liberties are an incentive for the secular. The signs of the the latter two coefficients imply, by proposition 1, that A is positive. On the other hand, the effect of REL_{INT} is now positive and significant suggesting that for moderate values of LIB_{40} the overall effect of REL_{INT} is ambiguous. We'll examine this point in detail below. Column 3 shows that the results continue

to hold when other individual controls are introduced in the regression. The results presented so far correspond to people that cohabit. Column 4 considers individuals independently of their cohabiting status (and introduces cohabitation as an additional control). The results remain very similar, except that the coefficient of LIB_{40} is not significant in this case.[22]

As there are good reasons to believe that REL_{INT} can be endogenous, we have reestimated columns 1–4 by 2SLS using the instrument introduced in Section 3.3.[23] The results, reported in columns 5-8 in Table 1, are very similar to the OLS results. For the sake of brevity, we focus on the results in column 7, our baseline specification henceforth, which reestimates column 3 in the same table. We start by analysing the first stage regression. There is a strong correlation between REL_{INT} and its instrument (around .5). At the bottom of Table 1 we report the value of the Cragg-Donald and the Kleibergen-Paap statistics for detecting weak instruments. Both statistics are much larger than their associated critical values.[24] However, one has to interpret this fact with caution as the large-sample validity of both tests has not being established when residuals are not i.i.d., something we cannot discard in our case.[25] To overcome this difficulty we also provide in Table 1 the p-value of the Anderson-Rubin (AR) statistic that is robust to weak instruments. This statistic tests the hypothesis that the coefficients of REL_{INT} and $\text{REL}_{\text{INT}} \times \text{LIB}_{50}$ are jointly equal to zero, which is rejected at conventional significance levels. Table 6 provides further robustness checks that confirm that weak instruments is not a problem in our case.

As for the second stage, column 7 shows that the interaction of religiosity and liberties has a negative and significant effect on labor supply while the coefficient of religiosity is positive and significant. As mentioned before, the overall effect of religiosity is then, ambiguous, especially for moderate values of LIB_{40}. To assess the overall effect, Figure 4 plots the estimate of the marginal effect of religiosity on effort as a function of LIB_{40} (together with its confidence bands at the 90% confidence level). The marginal effect of religious intensity on effort is positive and significant for people with very low values in the liberties index (more specifically, for those in the lower 20% of the distribution of LIB_{40}). However, as the liberties index gets larger, the marginal effect of religiosity becomes negative and significant. This is the case for individuals with a value of LIB_{40} larger than .54 (approximately 33% of the people in our sample). This result is in line with one of the key predictions of our theory: as liberties increase, the gap in the number of hours worked between religious and secular gets larger.

The magnitude of the effect of religiosity on effort is quite sizeable among individuals that have access to liberties. Focusing again on column 7 in Table 1, an increase in one standard deviation in the intensity of religious beliefs is associated with a decrease in the number of hours worked per week of 0.75, 1.39 or 1.8 hours for individuals with a value of LIB_{40} in the 75th, 95th and 99th percentile, respectively.

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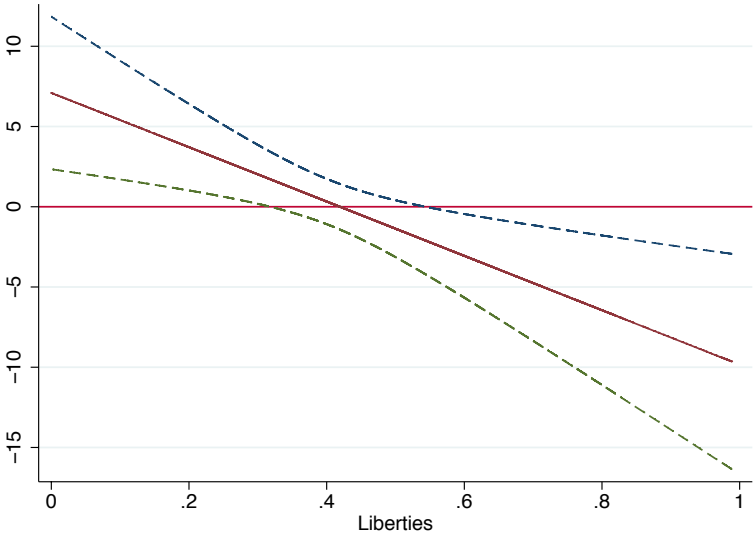
[22] Notice, however, that when this equation is reestimated by 2SLS (column 8 in Table 1), LIB_{40} is significant (p-value .071).

[23] We construct the instrument for the interaction term of religious intensity and liberties simply by replacing REL_{INT} by $\text{REL}_{\text{INT}}^{\text{IV}}$ in the product.

[24] The Stock and Yogo critical values corresponding to the 10% maximal size deviation is 7.04.

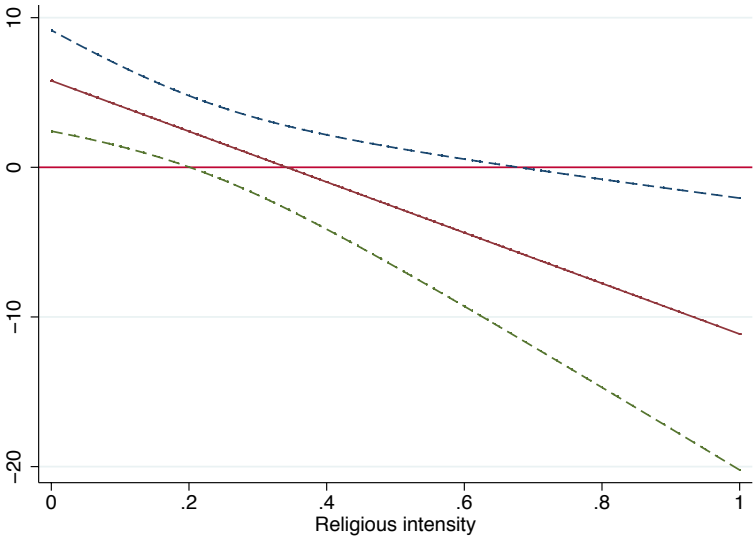
[25] In fact, the problem of testing for weak instruments when there are two potentially endogenous regressors and the errors are not i.i.d. is still an open question in the econometrics literature.

Figure 4. Mg effect of REL_{INT} on HOURSWORKED



This graph depicts the marginal effect of REL_{INT} on HOURSWORKED as a function of LIB_{40} using the estimates reported in column 7, Table 1. Confidence bands at the 90% confidence level are also depicted.

Figure 5. Mg effect of LIB_{40} on HOURSWORKED



This graph depicts the marginal effect of LIB_{40} on HOURSWORKED as a function of REL_{INT} using the estimates reported in column 7, Table 1. Confidence bands at the 90% confidence level are also depicted.

We now examine the second prediction of the model, which states that liberties provide differential incentives to religious and seculars. From equation (5), the value of $\overline{x}$, the threshold separating religious from seculars, is $\overline{x} = -\beta_3/\beta_2$, where β_2 and β_3 are the coefficients associated to $\text{REL}_{\text{INT}} \times \text{LIB}_{40}$ and LIB_{40} respectively. Using the values of these coefficients from column 7 of Table 1, we obtain a value for $\overline{x} = .34$. Figure 5 plots the marginal effect of LIB_{40} on HOURSWORKED as a function of religious intensity. This graph shows that the effect of an increase in liberties is positive and significant for people with a value of REL_{INT} smaller than .2 (35% of the sample) and negative and significant for very religious individuals, those with a value of REL_{INT} greater than .67, which amounts to 20% of the sample, approximately.

Finally, the magnitude of the effect of liberties on effort is large for both seculars and religious. We provide two examples, for individuals in the 20th and in the 80th percentile of the distribution of REL_{INT}. In the former case, an increase in one standard deviation in LIB_{40} increases by .72 hours per week the number of hours worked. In the latter, a similar increase reduces by .92 hours the weekly amount of hours worked.

To asses the robustness of our results, we consider next several alternative specifications. In the remaining of this section we look at two important variations. We first consider alternative ways of defining the dependent variable. Next, we present results for men and women separately. Section 5 examines further variations.

4.2. **Alternative dependent variables.** Our theory states that religious (secular) individuals would *like* to work less (more) in the presence of *personal liberties*. However, as noted above, the dependent variable employed in Table 1, HOURSWORKED, is an imperfect measure of the willingness to work, as it reflects *attitudes* towards effort *as well as* the characteristics of the environment (i.e., rigidity of the labor market and personal constraints). Table 2 addresses this issue by considering as dependent the number of hours that the respondent would *like* to work, (DESIREDHOURS). This measure has an important advantage over HOURSWORKED as it is not affected by personal or labor-market constraints. As a drawback, however, it can only be found in two of the six waves of the ESS so the sample is considerably smaller. Columns 1 to 4 in Table 2 present results using DESIREDHOURS as dependent variable. Columns 1 and 2 differ in the controls introduced in the regression (either only gender and age or all the controls in our baseline specification, respectively) and have been estimated by OLS. Columns 3 and 4 reestimate the same models by 2SLS. Results are qualitatively and quantitatively similar to those obtained in Table 1. Just to provide an example, using the estimates in column 4 of Table 2, we obtain that an increase in one standard deviation in the intensity of religious beliefs is associated with a decrease in the desired number of hours per week of 1.05 hours for individuals with a value of LIB_{40} in the 75th percentile.

Columns 5–8 in Table 2 have identical structure to the first four columns in the same table but use the number of contracted hours per week, CONTRACTHOURS, as dependent variable. The results are again very similar: an increase in one standard deviation in the intensity of religious beliefs is associated with a decrease in the contracted number of hours per week of .62 hours for individuals with a value of LIB_{40} in the 75th percentile (column 8).

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
REL_{INT}	2.771**	2.773**	3.471	3.802	3.191***	3.032***	4.840*	4.568
	(0.014)	(0.012)	(0.281)	(0.250)	(0.002)	(0.002)	(0.084)	(0.111)
LIB_{40}	7.077***	7.394***	8.102***	8.646***	3.245**	3.822**	4.730**	5.124**
	(0.001)	(0.000)	(0.002)	(0.001)	(0.044)	(0.019)	(0.038)	(0.027)
$\text{REL}_{\text{INT}} \times \text{LIB}_{40}$	-9.886***	-9.595***	-12.904*	-13.121*	-8.402***	-7.784***	-12.622**	-11.829*
	(0.000)	(0.000)	(0.053)	(0.058)	(0.001)	(0.002)	(0.045)	(0.068)
AGE^2	-0.001	-0.003***	-0.001	-0.003***	-0.000	-0.001	-0.000	-0.001
	(0.315)	(0.004)	(0.242)	(0.001)	(0.886)	(0.160)	(0.879)	(0.220)
AGE	0.030	0.186**	0.042	0.199***	0.007	0.068	0.009	0.065
	(0.654)	(0.020)	(0.534)	(0.007)	(0.909)	(0.215)	(0.888)	(0.272)
GENDER	-7.288***	-7.299***	-7.313***	-7.323***	-5.591***	-5.590***	-5.471***	-5.468***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CHILDREN		-1.186***		-1.219***		-0.449*		-0.566**
		(0.000)		(0.000)		(0.053)		(0.012)
EDUYRS		-0.015		-0.005		-0.082*		-0.056
		(0.670)		(0.881)		(0.062)		(0.176)
HHSIZE		-0.057		-0.049		-0.092		-0.022
		(0.524)		(0.595)		(0.342)		(0.800)
HEALTH		-0.204*		-0.261***		-0.117		-0.108
		(0.056)		(0.004)		(0.102)		(0.136)
EDU-PTNR		-0.248***		-0.236***		-0.135***		-0.122***
		(0.001)		(0.000)		(0.000)		(0.000)
c	39.17***	35.39***	41.26***	40.25***	40.48***	41.63***	46.48***	46.59***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Dep. var.	DESIRED	DESIRED	DESIRED	DESIRED	CONTRACT	CONTRACT	CONTRACT	CONTRACT
Estimation	OLS	OLS	2SLS	2SLS	OLS	OLS	2SLS	2SLS
R^2	0.264	0.269	0.275	0.279	0.158	0.160	0.161	0.163
Obs	32608	32094	30203	29716	98235	96446	90917	89252

Table 2. EFFORT, RELIGIOSITY AND LIBERTIES: ALTERNATIVE DEPENDENT VARIABLES
Notes. Dependent variable is DESIREDHOURS in columns 1–4, and CONTRACTHOURS in columns 5–8. All models contain country, survey and country-survey dummies. Estimation has been carried out by OLS (columns 1-2 and 5-6) and 2SLS (columns 3-4 and 7-8). There are 34 countries. Robust standard errors clustered at the country level have been computed. p-values are in parentheses. $^{*}p < 10, ^{**}p < .05, ^{***}p < .01$.

The results above show that, not surprisingly, the effect of religiosity on the willingness to work (DESIREDHOURS) is larger than on the effective number of hours worked, which highlights the importance of market/personal constraints faced by individuals.

4.3. **Women versus men.** There are obvious reasons to expect that the widening of personal liberties has a stronger effect on women than on men. Most of the traditional social norms and laws directly or indirectly essentially constrained the choices by women, so this group benefits much more from the lifting of those restrictions. The other side of the coin is that men traditionally

had full-time jobs and hence had been effectively constrained by labor market rigidities. These reasons are not explicitly contemplated in our theory but they are clearly complementary (see Section 7.1 below for further discussion on this issue). But even in the context of our theory it is reasonable to expect that results for men's labor supply are not as clearcut as those for women. Consider a religious couple facing an increase in the degree of personal liberties afforded. Under these circumstances both might be willing to consume less and, consequently, reduce their labor supply. But how this reduction is distributed between them will depend on a variety of factors and, given the role that religion assigns to women, the reduction is likely to affect the latter disproportionately. Unfortunately, the ESS do not provide data on household labor supply so we cannot directly test this conjecture. However, if the former hypothesis is correct we should observe that the widening of personal liberties has a negative effect on the *willingness* to work for *both* religious men and women but possibly more ambiguous results when effective labor supply is considered.

Table 3 presents our results dissagregated by gender. Columns 1–4 restrict the sample to women while columns 5–8 do the same for men. Columns 1–2 (5–6) have HOURSWORKED as dependent variable whereas 3–4 (7–8) use DESIREDHOURS and estimation has been carried out using 2SLS.[26] The results obtained when only women are considered are qualitatively very similar as those obtained for the whole population. Quantitatively, the effect is stronger, as expected.[27]

The results when only men are considered are as follows. When the effective number of hours worked (HOURSWORKED) is considered as dependent variable (columns 5 and 6), the interaction between religiosity and liberties has a negative coefficient but it is not significant, as we anticipated. However, as shown in Columns 7 and 8, when the dependent variable DESIREDHOURS is employed, a similar pattern as when the whole sample is considered is found again: the coefficient of religiosity is positive and significant and that of the interaction between religiosity and liberties is negative and significant. These results imply that when LIB_{40} is high, religious men would like to work less than secular.

The contrast between the results in columns 5 to 8 highlights the possibility that (religious) men's labor supply is highly inelastic: while religious men would like to work less when liberties are abundant, they might be unable to do so as their wives would also be more likely to stay at home.

Still, the results of the gender-segregated data may point to a story which is simpler than the one told in our model. It is possible that the legal restriction of liberties had prevented all women from working. When those were lifted, secular women had increased their labor supply while religious women were still bounded by the constraints imposed by religiosity (notice however that this story leaves unexplained the fact that religious men also *want* to work less in the presence of liberties). In Section 7 we discuss alternative models including one that implies that religiosity simply imposes a constraint on effort (instead of affecting preferences for liberties). We explain there why the data is less supportive of such a theory.

[26] OLS estimates are not reported to save space since they are very similar.

[27] Focusing on column 2 in Table 3, an increase in one standard deviation in the intensity of religious beliefs of women is associated with a decrease in the number of hours worked of 1.15 hours or 1.86 hours for LIB_{40} in the 75th or in 95th percentile, respectively.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
REL_{INT}	4.898**	6.433***	0.563	2.589	2.444	1.521	6.197***	4.953**
	(0.022)	(0.005)	(0.857)	(0.411)	(0.369)	(0.579)	(0.006)	(0.043)
LIB_{40}	9.126***	9.661***	13.675***	14.295***	0.276	-0.029	3.557	3.941
	(0.001)	(0.001)	(0.000)	(0.000)	(0.882)	(0.987)	(0.133)	(0.100)
$\text{REL}_{\text{INT}} \times \text{LIB}_{40}$	-16.011***	-18.397***	-12.384*	-15.002**	-4.729	-3.177	-13.217***	-11.026**
	(0.006)	(0.003)	(0.055)	(0.023)	(0.342)	(0.533)	(0.001)	(0.014)
AGE^2	0.002**	0.001	0.001	-0.002***	-0.005***	-0.004***	-0.003***	-0.003**
	(0.043)	(0.421)	(0.191)	(0.004)	(0.000)	(0.000)	(0.001)	(0.011)
AGE	-0.166*	-0.051	-0.090	0.196***	0.406***	0.349***	0.174**	0.162*
	(0.066)	(0.500)	(0.294)	(0.008)	(0.000)	(0.000)	(0.024)	(0.085)
CHILDREN		-1.251***		-1.958***		-0.083		-0.210
		(0.000)		(0.000)		(0.675)		(0.434)
EDUYRS		0.148**		0.064		-0.019		-0.137***
		(0.030)		(0.200)		(0.624)		(0.000)
HHSIZE		-0.263**		-0.341***		0.349***		0.211**
		(0.029)		(0.003)		(0.000)		(0.027)
HEALTH		0.018		-0.238		-0.169*		-0.329***
		(0.890)		(0.142)		(0.059)		(0.000)
EDU-PTNR		0.067	-0.102*	-0.164**		0.009		-0.147***
		(0.147)	(0.063)	(0.044)		(0.866)		(0.003)
c	51.71***	49.16***	35.08***	32.62***	42.19***	42.75***	39.86***	41.41***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Dep. var.	HWORKED	HWORKED	DESIRED	DESIRED	HWORKED	HWORKED	DESIRED	DESIRED
Sample	Women	Women	Women	Women	Men	Men	Men	Men
Estimation	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
R^2	0.142	0.147	0.293	0.304	0.036	0.037	0.144	0.148
Obs	47533	46677	15916	15813	43522	42741	14109	13903

Table 3. EFFORT, RELIGIOSITY AND LIBERTIES: DISAGGREGATE RESULTS FOR MEN AND WOMEN

Notes. Dependent variable is HOURSWORKED in columns 1–2 and 5–6 and DESIREDHOURS in columns 3–4 and 7–8. All models contain country, survey and country-survey dummies. Estimation has been carried out by 2SLS. There are 34 countries. Robust standard errors clustered at the country level have been computed. p-values are in parentheses. $^{*}p < 10, ^{**}p < .05, ^{***}p < .01$.

5. FURTHER VARIATIONS

5.1. **Religious Affiliation.** Table 4 uses religious affiliation, REL_{AFF}, as a proxy for religiosity.[28] We consider two dependent variables, reflecting both current and desired work hours (HOURSWORKED and DESIREDHOURS) and three different samples: the whole sample, one restricted to women and another restricted to men. Estimation has been carried by OLS throughout.

[28]Recall that REL_{AFF} reports current religious affiliation. Table A3 in Appendix 10.2 reproduces Table 4 using REL_{EVER} instead, a dummy capturing whether the respondent has ever been religious. Results are very similar.

	[1]	[2]	[3]	[4]	[5]	[6]
REL_{AFF}	1.613***	1.969***	1.461**	1.336	1.267**	2.394***
	(0.001)	(0.002)	(0.031)	(0.174)	(0.042)	(0.001)
LIB_{40}	2.093	6.838***	4.955**	11.615***	0.094	2.596
	(0.168)	(0.001)	(0.042)	(0.000)	(0.962)	(0.318)
$REL_{AFF} \times LIB_{40}$	-3.583***	-4.931***	-4.289**	-4.713**	-1.913*	-4.682***
	(0.003)	(0.001)	(0.011)	(0.032)	(0.092)	(0.001)
AGE^2	-0.002**	-0.003***	0.001	-0.003***	-0.004***	-0.003**
	(0.039)	(0.004)	(0.467)	(0.005)	(0.000)	(0.019)
AGE	0.122*	0.197**	-0.050	0.207**	0.342***	0.159
	(0.071)	(0.019)	(0.507)	(0.011)	(0.000)	(0.103)
GENDER	-7.719***	-7.512***				
	(0.000)	(0.000)				
CHILDREN	-0.557**	-1.143***	-1.027***	-1.846***	0.001	-0.217
	(0.028)	(0.000)	(0.009)	(0.000)	(0.997)	(0.427)
EDUYRS	0.065	-0.010	0.117*	0.063	-0.040	-0.133***
	(0.246)	(0.777)	(0.096)	(0.229)	(0.336)	(0.000)
HHSIZE	-0.076	-0.104	-0.383***	-0.438***	0.240**	0.223**
	(0.480)	(0.256)	(0.008)	(0.000)	(0.031)	(0.032)
HEALTH	-0.011	-0.194*	0.014	-0.154	-0.181**	-0.325***
	(0.914)	(0.076)	(0.911)	(0.357)	(0.047)	(0.004)
EDU-PTNR	-0.062	-0.252***	0.020	-0.196*	0.001	-0.148***
	(0.239)	(0.001)	(0.718)	(0.051)	(0.991)	(0.005)
c	40.75***	37.74***	37.78***	22.16***	40.55***	38.81***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Dep. var.	HWORKED	DESIRED	HWORKED	DESIRED	HWORKED	DESIRED
Sample	All	All	Women	Women	Men	Men
R^2	0.150	0.272	0.142	0.292	0.042	0.143
Obs	95211	31006	49802	16666	45409	14340

Table 4. EFFORT, RELIGIOSITY AND LIBERTIES: RELIGIOUS AFFILIATION

Notes. Dependent variable is HOURSWORKED (columns 1, 3 and 5) and DESIREDHOURS (columns 2, 4 and 6). Columns 3 and 4 (5 and 6) restrict the sample to women (men). All models have been estimated by OLS and contain country, survey and country-survey dummies. There are 34 countries. Robust standard errors clustered at the country level have been computed. p-values are in parentheses.

Results are similar to those described in Tables 1 and 2. The interaction of liberties and religious affiliation has a negative and significant effect everywhere (even when the sample is restricted to men). The coefficient of LIB_{40} is in general larger (and more significant) in the regressions that have desired work hours as dependent variable, which suggests that the secular would like to increase their labor supply when liberties increase more than they actually are able to do. The magnitude of the coefficients of LIB_{40} also reveal that the impact of liberties on labor supply for secular women is in general larger than that for men.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
REL_{INT}	6.562**	8.536**		-0.775	3.739*	0.745	13.676*
	(0.025)	(0.022)		(0.323)	(0.060)	(0.790)	(0.087)
LIB_{40}	5.611***	6.885*	6.207	6.136	7.226	2.591	7.821**
	(0.007)	(0.094)	(0.231)	(0.239)	(0.168)	(0.143)	(0.021)
$REL_{INT} \times LIB_{40}$	-16.936**	-22.334***			-10.019**	-7.417**	-21.396**
	(0.016)	(0.003)			(0.011)	(0.043)	(0.031)
TRADITIONALISM	0.279***						
	(0.002)						
CONSERVATISM		-0.096	0.934	1.010*	0.605		
		(0.731)	(0.123)	(0.090)	(0.320)		
$CONSERVATISM \times LIB_{40}$			-2.720*	-2.750*	-1.825		
			(0.053)	(0.050)	(0.185)		
$REL_{INT} \times AGE$						0.050	-0.101
						(0.116)	(0.241)
AGE^2	-0.002**	-0.001	-0.001	-0.001	-0.001	-0.002**	-0.001*
	(0.016)	(0.303)	(0.409)	(0.444)	(0.272)	(0.018)	(0.051)
AGE	0.129**	0.057	0.037	0.033	0.057	0.124*	0.144**
	(0.045)	(0.457)	(0.610)	(0.646)	(0.435)	(0.063)	(0.035)
GENDER	-7.629***	-8.200***	-8.324***	-8.244***	-8.247***	-7.680***	-7.623***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CHILDREN	-0.751***	-0.792***	-0.634**	-0.632**	-0.667**	-0.566**	-0.702***
	(0.002)	(0.008)	(0.050)	(0.049)	(0.036)	(0.026)	(0.003)
EDUYRS	0.113**	0.030	-0.036	-0.034	-0.026	0.068	0.100*
	(0.043)	(0.652)	(0.626)	(0.648)	(0.733)	(0.221)	(0.062)
HHSIZE	0.045	0.175	0.101	0.116	0.124	-0.058	0.024
	(0.609)	(0.168)	(0.429)	(0.349)	(0.316)	(0.595)	(0.796)
HEALTH	0.009	-0.070	-0.081	-0.083	-0.084	-0.021	-0.009
	(0.933)	(0.686)	(0.674)	(0.665)	(0.665)	(0.838)	(0.932)
EDU-PTNR	-0.032	-0.029	-0.051	-0.049	-0.047	-0.060	-0.033
	(0.527)	(0.601)	(0.488)	(0.503)	(0.509)	(0.253)	(0.497)
c	48.041***	48.128***	50.005***	50.255***	48.873***	44.671***	43.785***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R^2	0.153	0.163	0.161	0.161	0.162	0.150	0.150
Obs	86165	13888	14651	14646	14646	96448	89418

Table 5. EFFORT, RELIGIOSITY AND LIBERTIES: CONSERVATISM AND AGE EFFECTS
Notes. Dependent variable is HOURSWORKED. Columns 1, 2 and 7 have been estimated by 2SLS and columns 3 to 6 by OLS. All models contain country, survey and country-survey dummies. All models contain country and survey and country-survey dummies. Robust standard errors clustered at the country level have been computed. p-values are in parentheses.

5.2. **Conservatism and Age.** Religiosity is a very complex phenomenon and this paper focuses exclusively on one of its features: the dislike of both the personal and the societal use of certain liberties. Although rejection of liberties is a key aspect of most religions, it is clear that not

all religious are conservative and that not all conservative are religious. Thus, one potential concern is that it is conservatism, and not religiosity, what is driving the results. Disentangling this is not straightforward since, as documented in Section 6.1 below, the correlation between religiosity and conservatism is strong. Table 5 shows that our results are robust to explicitly controlling by measures of traditionalism/conservatism. Column 1 in Table 5 adds to our baseline specification the variable TRADITIONALISM, that measures (in a increasing scale) the extent to which individuals like to follow traditions. Column 2 is similar but considers a more direct proxy of dislike of liberties, CONSERVATISM, which is constructed as the average of 4 variables that reflect rejection of liberties such as gay rights, divorce and women's role in the job market, see Appendix 9.1 for a description of this variable. Our main conclusions are robust to including these variables.

Columns 3 to 5 use CONSERVATISM in place of religiosity. That is, we introduce in the regression CONSERVATISM and its interaction with LIB_{40}.[29] If the theory we postulate is true, we should find that the sign of this interaction is negative and significant. Column 3 shows that this is the case in a regression where religiosity (and its interaction) have been omitted. Column 4 adds REL_{INT} to the specification and the results do not change. Column 5 introduces as well the interaction of religiosity and liberties. When we do this, the significance of the interaction between conservatism and liberties disappears while that of religiosity and liberties does not.

Summarising, our results are robust to controlling by conservatism/traditionalism. Furthermore, the negative and significant coefficient of $\text{CONSERVATISM}\times\text{LIB}_{40}$ found in columns 3 and 4 is consistent with the channel we postulate in this paper. Finally, the fact that in a horse race between religiosity and conservatism (column 5) the former keeps its significance while the latter does not, suggests that religiosity is a better proxy for the type of mechanism we are postulating.

An additional concern is that the LIB variable can be quite correlated with age, as older people have been exposed to less liberties throughout their lifetime. Thus, those measures can be capturing some age effects rather than the effect of liberties. Column 6 adds to the baseline specification the interaction of religiosity and age and the estimation has been carried out by OLS. The coefficient of the interaction of age and religiosity is very small and not significantly different from zero and, otherwise, results remain similar as before. Column 7 shows that when 2SLS is employed, similar results are found.

5.3. **Robustness of the IV estimation.** Despite its popularity 2SLS is known to perform poorly in several situations, especially when instruments are weakly correlated with the endogenous variables. In these situations, other estimation methods, such as limited information maximum likelihood (LIML) and Fuller methods, have been shown to be more robust than 2SLS (see Andrews and Stock, 2007). For the sake of robustness, we have reestimated our baseline specification (column 7 in Table 1) using these two estimation procedures. Results are reported in columns 1 and 2 of Table 6, respectively.[30] Results are virtually identical, showing that weak instruments is not a problem in our case.

[29] As we don't have a good instrument for CONSERVATISM, columns 3 to 6 are estimated by OLS.

[30] The value of the parameter α needed in the implementation of Fuller's method is set equal to 1.

	[1]	[2]	[3]	[4]	[5]	[6]
REL_{INT}	7.089**	7.089**	7.746**	8.373***	8.483**	9.275**
	(0.014)	(0.014)	(0.017)	(0.006)	(0.011)	(0.012)
LIB_{40}	5.788***	5.788***	6.389***	6.195***		
	(0.005)	(0.005)	(0.006)	(0.000)		
LIB_{50}					6.583**	
					(0.011)	
LIB_{60}						5.031**
						(0.046)
$\text{REL}_{\text{INT}} \times \text{LIB}_{40}$	-16.929**	-16.929**	-17.899**	-17.705**		
	(0.013)	(0.013)	(0.021)	(0.012)		
$\text{REL}_{\text{INT}} \times \text{LIB}_{50}$					-19.170***	
					(0.009)	
$\text{REL}_{\text{INT}} \times \text{LIB}_{60}$						-20.470***
						(0.009)
AGE^2	-0.002**	-0.002**	-0.001*	-0.002**	-0.002**	-0.002**
	(0.021)	(0.021)	(0.097)	(0.042)	(0.016)	(0.015)
AGE	0.131**	0.131**	0.085	0.135*	0.131**	0.131**
	(0.046)	(0.046)	(0.181)	(0.070)	(0.039)	(0.047)
GENDER	-7.620***	-7.620***	-8.075***	-7.512***	-7.624***	-7.626***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CHILDREN	-0.720***	-0.720***	-0.817***	-0.761***	-0.718***	-0.716***
	(0.002)	(0.002)	(0.002)	(0.005)	(0.002)	(0.002)
EDUYRS	0.102*	0.102*	0.095*	0.080	0.102*	0.103*
	(0.060)	(0.060)	(0.096)	(0.155)	(0.059)	(0.059)
HHSIZE	0.033	0.033	0.064	0.082	0.030	0.024
	(0.716)	(0.716)	(0.514)	(0.399)	(0.740)	(0.794)
HEALTH	-0.010	-0.010	0.039	-0.019	-0.010	-0.006
	(0.926)	(0.926)	(0.741)	(0.867)	(0.925)	(0.958)
EDU-PTNR	-0.035	-0.035	-0.035	-0.044	-0.034	-0.032
	(0.470)	(0.470)	(0.482)	(0.349)	(0.496)	(0.522)
c	46.238***	45.907***	52.929***	50.934***	45.205***	46.020***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R^2	0.151	0.151	0.156	0.143	0.151	0.150
Obs	89418	89418	77698	68344	89418	89418

Table 6. EFFORT, RELIGIOSITY AND LIBERTIES: IV ESTIMATION

Notes. Dependent variable is HOURSWORKED. Columns 1 and 2 have been estimated by LIML and Fuller methods, respectively, while columns 3 to 6 by 2SLS. Column 3 drops from the sample the least religious countries while column 4 excludes individuals from non-dominant religions. Columns 5 and 6 consider alternative definitions of personal liberties. See the main text for more detailed explanations. All models contain country and survey and country-survey dummies. Robust standard errors clustered at the country level have been computed. p-values are in parentheses.

Columns 3 and 4 in Table 6 present further robustness checks to the IV estimation strategy. Column 3 drops the least religious countries from the sample (those with a share of religious individuals smaller than 50%).[31] Since these societies are nowadays eminently secular, individuals

[31] These countries are Sweden, Latvia, Estonia and Czech Republic.

that have remained religious through the secularisation process might differ significantly from non-religious individuals for reasons other than their religiosity. Column 4 excludes from the sample religious individuals whose religious denomination is not the dominant in the country. By doing this, we want to exclude minority groups (like muslims in most European countries) whose (unobserved) individual characteristics and access to the job market can differ substantially from individuals belonging to the dominant religion for reasons other than their religiosity. Results remain robust to these variations.

Finally, as in any IV analysis, we cannot entirely exclude the possibility that our instruments violate the exclusion restriction. As mentioned earlier, this would be the case, for instance, if religious affiliation is transmitted from parents to children (through education or genes) along with other factors that have a direct impact on *ability*. To examine the robustness of our IV estimates to violation of this hypothesis, we use the method proposed by Conley, Hansen and Rossi (2012). In this way, we can examine the consequences of a possible direct effect on our instruments on individual effort. Appendix 10.3 summarises this analysis. It shows that our results are very robust to violations of the exclusion restriction.

5.4. **Alternative measures of liberties.** Finally, columns 5 and 6 in Table 6 reestimate our baseline specification using alternative measures of personal liberties: LIB_{50} and LIB_{60}. Our conclusions remain robust to using these measures.

6. Testing the model's assumptions

Our theoretical model's main assumption is that religiosity directly affects individual preferences through the valuation of personal liberties. We have then predicted that when the complementarity between liberties and consumption is higher than that of leisure and liberties, religiosity would have an adverse influence on the choice of effort. Our empirical results are in line with this prediction, where we find that religiosity interacted with liberties has a significant and sizeable negative effect on labor supply.

The empirical results could have been caused however by channels that might be different from the one postulated in our model. In the next section we discuss potential alternative channels. In this section we directly test the assumptions of the model. We explore whether there is independent evidence supporting each of the steps in our chain of reasoning. Our basic assumption is that religious individuals dislike liberties. Section 6.1 explores whether religious people tend to be more conservative than the secular in their appreciation for individual rights. In addition, Proposition 1 and the results in Section 4 imply that $A > 0$, which means that an increase in the interaction of religiosity and liberties reduces the marginal utility of consumption more than the marginal utility of leisure.[32] We explore this issue in Section 6.2.

6.1. **Do religious people dislike liberties?** At the core of our analysis is the assumption that religious people dislike liberties. There is empirical evidence supporting this conjecture (see for instance Guiso et al. 2003 and Inglehart and Norris, 2003). We shall show that these results

[32]Notice that the interaction of religiosity and liberties enters the definition of Λ_i with a negative sign.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
REL_{INT}	1.391***		0.986***		0.966***		0.761***	
	(0.000)		(0.000)		(0.000)		(0.000)	
REL_{EVER}		0.331***		0.194***		0.243***		0.148***
		(0.000)		(0.000)		(0.000)		(0.000)
LIB_{40}	0.376	0.188	0.005	-0.079	-0.113	-0.226	-0.346	-0.437
	(0.216)	(0.573)	(0.990)	(0.855)	(0.804)	(0.640)	(0.504)	(0.414)
AGE^2	0.000***	0.000***	0.001***	0.001***	0.000***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
AGE	-0.015***	-0.018***	-0.050***	-0.051***	-0.038***	-0.041***	-0.038***	-0.038***
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GENDER	-0.514***	-0.396***	-0.731***	-0.637***	-0.205***	-0.126***	-0.567***	-0.491***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)
COHAB	-0.025	-0.026	-0.264***	-0.271***	-0.097***	-0.101***	-0.161***	-0.163***
	(0.124)	(0.138)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CHILDREN	-0.017	-0.019	-0.159***	-0.160***	0.024	0.028	-0.106***	-0.109***
	(0.471)	(0.461)	(0.000)	(0.000)	(0.304)	(0.217)	(0.003)	(0.004)
EDUYRS	-0.065***	-0.068***	-0.039***	-0.040***	-0.064***	-0.066***	-0.123***	-0.122***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
HHSIZE	0.062***	0.082***	0.103***	0.111***	0.053***	0.065***	0.067***	0.079***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
HEALTH	0.080***	0.083***	0.021	0.023	0.027	0.028	0.092***	0.090***
	(0.000)	(0.000)	(0.293)	(0.286)	(0.166)	(0.150)	(0.000)	(0.000)
Dep. var.	GAYRIGHTS	GAYRIGHTS	DIVORCE	DIVORCE	WOMEN-DROPJOB	WOMEN-DROPJOB	WOMEN-LESSRIGHT	WOMEN-LESSRIGHT
Pseudo R^2	0.102	0.094	0.076	0.072	0.069	0.064	0.098	0.093
Obs	157109	155350	26706	25404	55081	53673	27036	25726

Table 7. RELIGIOSITY AND LIBERTIES

Notes. Dependent variables ares GAYRIGHTS (columns 1-2), DIVORCE (columns 3-4), WOMEN-DROPJOB (column 5-6) and WOMEN-LESSRIGHT (column 7-8). All models contain country, survey and country-survey dummies and have been estimated by maximum likelihood in an ordinal logit specification. There are 34 countries. Robust standard errors clustered at the country level have been computed. p-values are in parentheses.

are corroborated in our sample. The ESS contain a few questions that allow us to examine this conjecture. We consider variables related to attitudes towards divorce (DIVORCE) and towards the role of women in the job market: WOMEN-DROPJOB and WOMEN-LESSRIGHT. The two latter variables reflect beliefs about whether women should be prepared to cut down on paid work for the sake of family and about whether men should have more right to jobs when jobs are scarce, respectively. We have also included intolerance towards gay rights, GAYRIGHTS. All variables have been normalised so that higher values (in a scale from 1 to 5) reveal a higher degree of intolerance, see Appendix A for exact definitions of these variables.

Table 7 reports the output of regressing each of these variables on a measure of religiosity (either affiliation or intensity), a list of standard individual controls (the same ones we use in our main specifications), and country, survey and country-survey fixed effects. The results show that both religious affiliation and religious intensity are strongly associated with more intolerant attitudes towards gay rights (column 1-2), divorce (columns 3-4) and women's role in the job market (columns 5-8).

6.2. **Do religiosity and liberties jointly affect the valuation of consumption and leisure?** The results in Section 4 together with Proposition 1 imply that $A > 0$, that is, that the effect of an increase in the interaction of religiosity and liberties reduces the relative marginal utility of

	[1]	[2]	[3]	[4]	[5]	[6]
REL_{INT}	-0.221***	0.002	0.007	0.022	-0.005	
	(0.000)	(0.988)	(0.961)	(0.880)	(0.949)	
REL_{EVER}						0.170**
						(0.030)
LIB_{40}	-0.176	-0.003			-0.014	0.075
	(0.471)	(0.990)			(0.931)	(0.734)
LIB_{50}			0.067			
			(0.799)			
LIB_{60}				0.103		
				(0.720)		
$\text{REL}_{\text{INT}} \times \text{LIB}_{40}$		-0.501**			-0.317**	
		(0.023)			(0.036)	
$\text{REL}_{\text{INT}} \times \text{LIB}_{50}$			-0.489**			
			(0.043)			
$\text{REL}_{\text{INT}} \times \text{LIB}_{60}$				-0.512**		
				(0.047)		
$\text{REL}_{\text{EVER}} \times \text{LIB}_{40}$						-0.291**
						(0.016)
AGE^2	0.000***	0.000***	0.000***	0.000***	0.000***	0.000**
	(0.003)	(0.007)	(0.007)	(0.005)	(0.001)	(0.011)
AGE	-0.038***	-0.037***	-0.037***	-0.037***	-0.028***	-0.036***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GENDER	-0.445***	-0.446***	-0.446***	-0.446***	-0.297***	-0.465***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CHILDREN	-0.037*	-0.039*	-0.040**	-0.040**	-0.025*	-0.038*
	(0.077)	(0.057)	(0.046)	(0.037)	(0.056)	(0.065)
EDUYRS	0.004	0.004	0.004	0.004	0.001	0.004
	(0.428)	(0.360)	(0.380)	(0.388)	(0.824)	(0.398)
HHSIZE	-0.018**	-0.018**	-0.018**	-0.018**	-0.013**	-0.023***
	(0.037)	(0.039)	(0.038)	(0.037)	(0.029)	(0.010)
HEALTH	-0.086***	-0.086***	-0.086***	-0.087***	-0.057***	-0.088***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
COHAB	-0.069***	-0.069***	-0.069***	-0.069***	-0.036***	-0.066***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)
c					3.637***	
					(0.000)	
(Pseudo) R^2	0.054	0.054	0.054	0.054		0.054
Obs	156704	156704	156704	156704	156704	155070

Table 8. VALUATION OF CONSUMPTION

Notes. Dependent variable is VALUE-CONSUMP. All models contain country, survey and country-survey dummies and have been estimated by maximum likelihood in an ordinal logit specification, except column 5 that has been estimated by OLS. There are 33 countries. Robust standard errors clustered at the country level have been computed. p-values are in parentheses.

	[1]	[2]	[3]	[4]	[5]	[6]
REL_{INT}	-0.382***	-0.462**	-0.493**	-0.513**	-0.299**	
	(0.000)	(0.012)	(0.017)	(0.021)	(0.020)	
REL_{EVER}						-0.198**
						(0.020)
LIB_{40}	0.046	-0.017			0.039	-0.030
	(0.893)	(0.961)			(0.877)	(0.931)
LIB_{50}			0.096			
			(0.834)			
LIB_{60}				0.064		
				(0.904)		
$\text{REL}_{\text{INT}} \times \text{LIB}_{40}$		0.182			0.108	
		(0.583)			(0.632)	
$\text{REL}_{\text{INT}} \times \text{LIB}_{50}$			0.245			
			(0.508)			
$\text{REL}_{\text{INT}} \times \text{LIB}_{60}$				0.281		
				(0.478)		
$\text{REL}_{\text{EVER}} \times \text{LIB}_{40}$						0.184
						(0.211)
AGE^2	0.000**	0.000***	0.000***	0.000***	0.000**	0.000**
	(0.012)	(0.007)	(0.004)	(0.004)	(0.022)	(0.023)
AGE	-0.040***	-0.041***	-0.041***	-0.041***	-0.025***	-0.039***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GENDER	-0.113***	-0.113***	-0.113***	-0.113***	-0.076***	-0.146***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.000)
GENDER	-0.133***	-0.133***	-0.132***	-0.131***	-0.083***	-0.133***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
EDUYRS	0.016***	0.016***	0.015***	0.015***	0.012***	0.017***
	(0.004)	(0.005)	(0.005)	(0.005)	(0.003)	(0.003)
HHSIZE	-0.056***	-0.056***	-0.056***	-0.056***	-0.040***	-0.061***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
HEALTH	-0.170***	-0.170***	-0.170***	-0.170***	-0.114***	-0.171***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
COHAB	0.047***	0.047***	0.047***	0.047***	0.024**	0.048***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.032)	(0.002)
(Pseudo) R^2	0.049	0.049	0.049	0.049		0.049
Obs	155910	155910	155910	155910	155910	154279

Table 9. VALUATION OF LEISURE

Notes. Dependent variable is VALUE-LEISURE. All models contain country and survey dummies and have been estimated by maximum likelihood in an ordinal logit specification except for column 5 that has been estimated by OLS. There are 33 countries. Robust standard errors clustered at the country level have been computed. p-values are in parentheses.

consumption more than the relative marginal utility of leisure. While testing this exact condition is difficult due to data limitations, in the following we provide some evidence that suggests that this can be the relevant empirical case.

The ESS contain a question that explicitly addresses how individuals value an increase of consumption and wealth (VALUE-CONSUMP). More specifically, (VALUE-CONSUMP) measures *the importance of being rich, having money and expensive goods*. It takes 6 values, ranging from not at all important to very important. Table 8 explores whether there is a joint effect of religiosity and liberties on VALUE-CONSUMP. All columns are estimated by maximum likelihood in an ordinal logit specification with the exception of column 5 that has been estimated by OLS. Column 1 regresses VALUE-CONSUMP on religious intensity, REL_{INT}, a measure of liberties (LIB_{40}), a list of individual controls similar to the one employed in Section 4.1 and country and survey fixed effects. The sign of REL_{INT} is negative, confirming the common wisdom that religious people value less material wealth. Column 2 introduces the interaction of religious beliefs and liberties. We are primarily interested in the sign of this interaction that we postulate to be negative. Column 2 shows that the coefficient of the interaction is negative and significant (p-value .023). On the other hand, the significance of REL_{INT} vanishes once the interaction of religiosity and liberties is introduced in the regression. Columns 3 and 4 use alternative definitions of liberties (LIB_{50} and LIB_{60}, respectively) and a similar result is found. Column 5 reestimates column 2 using a linear specification, rather than an ordinal logit one, in order to facilitate the interpretation of the interacted terms. The product of religiosity and liberties has a negative and significant coefficient at the 5% significance level also in this case. Finally, column 6 replicates once more column 2 considering this time religious affiliation (REL_{EVER}) instead of religious intensity and similar results are also obtained. In sum, results in Table 8 indicate that the interaction of religiosity and liberties has a significant effect on the valuation of consumption.

To complete our argument we need to show that the effect of such interacted term on the valuation of leisure is smaller (in absolute value) than the effect on the valuation of consumption. To this effect we also run similar regressions as those presented in Table 8 using a proxy for the valuation of leisure as dependent variable. VALUE-LEISURE reflects *the importance of having a good time*, measured on a 1 to 6 scale where 6 reflects maximum valuation. Table 9 is identical to Table 8 except that the dependent variable is VALUE-LEISURE. Column 1 shows that religious intensity is negatively associated with VALUE-LEISURE. In contrast to Table 8, columns 2 to 6 show that the interaction between religiosity and liberties is not significantly different from zero. The results in Tables 8 and 9 suggest that an increase in the interaction of religiosity and liberties reduces more the utility of consumption than that of leisure, in line with the implications of Section 4.

7. Other potential channels

We have proposed, tested and verified empirically the results of the model, as well as its assumptions. There may be other, perhaps even simpler, models that can complement our explanations and generate similar results. We now discuss such possible models. Our discussion highlights the observation that negative externalities in the valuation of liberties plays an important role in explaining our empirical results.

7.1. **Religiosity as a direct constraint on (female) effort.** One possible alternative model is that religiosity implies a direct constraint on the choice of effort, with no influence on preferences. Given that our liberties index has many laws pertaining to women rights, let us consider a model in which all women are directly constrained due to social or legal norms in terms of their effort choice by some level e_M, with religious women being more constrained and thus $e_R < e_M$. In such a model preferences are only defined over consumption and effort (with no liberties). Religiosity does not affect preferences, but the level of religiosity implies how much an individual feels bound by the constraints on effort. It is straightforward that in such a model we have the following predictions. First, labor supply would decrease in religiosity. Second, when e_M is relaxed -as follows from our liberties index- this would increase the effort of secular women, but would have no effect on the effort of the religious. For singles, this also has no implication for the effort of secular man, while for couples this may decrease the effort (actual or desired) of secular man. For religious men, relaxing e_M would not affect their labour supply (under the assumption that family members are either both religious or both secular).

Our empirical findings illustrate, somewhat in contrast, that (i) religiosity is not associated with labor supply (unless the interaction of religiosity and liberties is introduced in the regression, see column 1 in Table 1), (ii) an increase in liberties, here modelled as relaxing e_M, increases the actual effort of secular women but reduces the effort of religious women, and that (iii) relaxing e_M increases the desired hours of work for secular men and decreases them for religious men. Given that we are controlling for many features such as education, the third observation is at odds with a model that looks at family labor considerations under the assumed direct constraints.

It is also possible to consider a related model in which, instead of direct constraints on effort, religiosity affects constraints indirectly. That is, religious individuals and particularly religious women would find effort more costly, or would perceive the returns to effort to be lower. Again, liberties are not part of the utility function. Such a model would generate similar results to the model with direct constraints.

While some of the effects described above are surely at play when looking at the raw effect of religiosity on effort, and can complement our model, it is also clear that the relation between an increase in liberties and the reduction of actual or desired effort by religious individuals indicates the presence of negative externalities that such liberties cause. We next discuss different modelling approaches for such externalities.

7.2. **Other specifications of the externalities.** The empirical evidence indicates that liberties generate externalities for religious individuals. In our model we have introduced this externality in the valuation of the cap on personal liberties. The importance of this externality depends of a parameter α that we take as exogenous and specific of the culture of each religious affiliation. But there are other ways of specifying the role of externalities.

One possible line is to endogenise the value of α as in Lindbeck et al. (2003). There, the unemployed individuals suffer a moral pressure that is decreasing in the number of unemployed. In our case, the equivalent assumption would be that the negative weight given by religious to liberties depends on the behaviour of the secular. The externality is stronger the more individuals in society actually consume a higher level of liberties compared with the religious ideal. For the

specific model we have discussed above in which religiosity imposes a direct or indirect constraint on exerting effort, we would have the following implication. If because of an increase in e_M religious individuals see the secular working harder, they would be less negative on working beyond the religious norm e_R. But in this case, an increase in the labor effort of secular women would induce religious women to increase their effort, which is not what we observe.

Of course one can also think of the opposite externality effect: the higher is the legal cap, so that seculars work more, the more the religious tightens its grip, possibly given the loosening of norms in the rest of society. This type of externality can come from a religious theology that links God's punishment with some average behaviour in society.[33] While such direct restriction on effort would be tantamount to assuming the result and seems less natural than assuming an externality via preferences, it may be an avenue for future empirical research. Specifically, it would be interesting to examine how religious organisations have responded to the legal relaxation of personal liberties in the last fifty years.

8. Concluding Remarks

We have shown that religious negative views on liberties reduce labor effort and that this effect is stronger the higher is the legal cap on liberties. This negative relationship between individual effort and the interaction of religiosity with liberties is robust. A key implication of the results is that negative externalities play an important role in the attitudes of religious individuals to the width or practice of liberties in society.

Our contribution has a number of interesting implications for research. First, at the aggregate level, our results imply that per capita income is positively related to secularism. This is in line with the findings of Barro and McCleary (2003) who show that religious societies (with higher participation in rituals) exhibit lower GDP, although they also show that beliefs in heaven and hell increase output.[34] But, in addition, our results also imply that the availability of personal liberties will increase inequality (as seculars have more incentives to work but religious don't). Testing these predictions on aggregate output and income inequality is in our research agenda.

A second set of associated questions is examined in Esteban, Levy and Mayoral (2015) where we study the role of religiosity in the political choices over redistribution and personal liberties. As negative externalities play an important role, it is not surprising that religious groups advocate restrictions of personal liberties. We show how political pressures for the restriction of liberties are intertwined with the politics of redistribution, and that religious views against personal liberties can lead to both repression of liberties and low levels of redistribution in society.

[33] Levy and Razin (2012) provide an informational justification for the externalities: religious organisations that are concerned about maintaining beliefs that sins are punished, would prefer individuals not to observe others who sin and are possibly not punished.

[34] This negative relationship also arises in other models of religion as for example in Iannacconne (1992) or Levy and Razin (2012) where religious agents devote time to non-productive religious activity such as rituals. Benabou et al (2013) show a negative relationship between religiosity and output or growth through the negative religious attitudes on scientific innovations and technological progress.

Our last remark concerns the significant role of externalities in shaping individual preferences and behaviour, accordingly with our empirical results. The externality effect of liberties can be viewed as a cultural factor specific to each religion. At one extreme we may have for instance interpretations of Islam for which the main role of the state is to implement the religious norms, Catholicism at the time of the Inquisition, or Jewish beliefs that God may punish all even if only some have sinned. At the other end there are the forms of Protestantism that focus on the personal relationship with god, independently of what the others might be doing. In our model, religions that are more individualistic could induce a less negative effect of wider liberties on labor effort. Hence, differences across religions in the weight assigned to the externality of liberties could explain differences in individual and aggregate labor effort. This would provide an explanation complementary to Weber's (1904) as to why Protestantism became more conducive to economic growth than Catholicism. We leave for future research the precise identification and measurement of this externality factor across different cultures and religious affiliations.

REFERENCES

[1] Abramowitz, Alan I. (1995). "It's Abortion Stupid: Policy Voting in the 1992 Presidential Election." *Journal of Politics* 57, 176-188.

[2] Alesina, A., P. Giuliano and N. Nunn (2013). "On the Origins of Gender Roles: Women and the Plough", *The Quarterly Journal of Economics* 128, 469-530.

[3] Alesina, A. and P. Giuliano (2015). "Culture and Institutions." *Journal of Economic Literature* 53, 898-944.

[4] Andersen, Robert, and Tina Fetner (2008). 'Economic Inequality and Intolerance: Attitudes toward Homosexuality in 35 Democracies." *American Journal of Political Science* 52, 942–58.

[5] Andrews, Donald and James Stock (2007). "Inference with weak instruments", *Advances in Economics and Econometrics*, Vol III, Blundel, Newey and Persson (eds.), 122-173.

[6] Azzi, C. and R. Ehrenberg (1975), "Household Allocation of Time and Church Attendance", *Journal of Political Economy*, 83, 27-56.

[7] Barro, Robert and Rachel McCleary (2003). "Religion and Economic Growth across Countries", *American Sociological Review*. 68, 760-81.

[8] Becker, Gary (1996) "Norms and the Formation of Preferences" in G. Becker *Accounting for Tastes*, University of Chicago Press.

[9] Becker, Sasha and Ludger (2009). "Was Weber Wrong? A Human Capital Theory of Protestant Economic History." *Quarterly Journal of Economics*. 124, 531-596.

[10] Bénabou Roland, Davide Ticchi and Andrea Vindigni (2013), "Forbidden Fruits: The Political Economy of Science, Religion, and Growth", working paper.

[11] Bénabou, Roland, Davide Ticchi, and Andrea Vindigni (2015). "Religion and Innovation." *American Economic Review*, 105(5), 346-51.

[12] Berman, Eli (2000). "Sect, Subsidy and Sacrifice: An Economist's View of Ultra-Orthodox Jews. *Quarterly Journal of Economics.* 115, 905-953.

[13] Bisin, Alberto and Thierry Verdier (2000) "Beyond the Melting Pot: Cultural Transmission, Marriage, and the Evolution of Ethnic and Religious Traits," *Quarterly Journal of Economics* 115, 955-988.

[14] Bisin, Alberto and Thierry Verdier (2001) "The Economics of Cultural Transmission and the Dynamics of Preferences," *Journal of Economic Theory*, 97, 298-319.

[15] Boele-Woelki, Katharina et al., eds (2003) *European Family Law in Action. Volume 1: Grounds for Divorce*. Intersentia, Antwerp-Oxford-New York.

[16] Boele-Woelki, Katharina (2005). "The principles of European family law: its aims and prospects." *Utrecht Law Review* 1(2): 160-168.

[17] Boele-Woelki, K., F. Ferrand, C. Gonzalez Beilfuss, M. Junteru-Jareborg, N. Lowe, D. Martiny, and W. Pintens (2004). *Principles of European Family Law Regarding Divorce and Maintenance Between Former Spouses*. Intersentia, Antwerp-Oxford.

[18] Campante, Filipe, and David Yanagizawa-Drott (2013), "Does Religion Affect Economic Growth and Happiness? Evidence from Ramadan", *Quarterly Journal of Economics* 130, 615-658.

[19] Campbell, David E., and J. Quin Monson (2007). "The Case of Bush's Reelection: Did Gay Marriage Do It?" In *A Matter of Faith: Religion in the 2004 Presidential Election*, ed. David E. Campbell. Washington DC: Brookings Institution Press, 120-141.

[20] Carvalho, Jean-Paul and Mark Koyama (2016), "Development and Religious polarisation: The Emergence of Reform and Ultra-Orthodox Judaism.", *Journal of Comparative Economics* 44, 562-584.

[21] Clark, A., and O. Lelkes, (2005). "Deliver Us From Evil: Religion as Insurance". Mimeo, DELTA, Paris.

[22] Conley, T. C. Hansen and P. Rossi (2012), "Plausibly Exogenous", *Review of Economics and Statistics*, 94(1), 260-272.

[23] Darnell, Alfred and Darren E. Sherkat. (1997). "The Impact of Protestant Fundamentalism on Educational Attainment." *American Sociological Review* 62, 306-316.

[24] De La O, Ana, and Jonathan Rodden (2008). "Does Religion Distract the Poor? Income and Issue Voting Around the World." *Comparative Political Studies* 41, 437-76.

[25] Dilmaghani, Maryam (2012), "Religiosity, human capital return and earnings in Canada", *International Journal of Social Economics* 39, 55-80.

[26] Esteban Joan, Gilat Levy and Laura Mayoral (2015), "The Political Economy of Religion, Individual Liberties, and Redistribution", mimeo.

[27] Faggio, G. and S. Nickel (2007), "Patterns of Work Across the OECD", *The Economic Journal,* vol. 117, 416-440.

[28] Fernandez, R. and A. Fogli (2009), "Culture: An Empirical Investigation of Beliefs, Work, and Fertility", *American Economic Journal: Macroeconomics* 1, 146-77.

[29] Fernandez, R, A. Fogli, and C. Olivetti (2004), "Mothers and Sons: Preference Formation and Female Labor Force Dynamics", *Quarterly Journal of Economics*, 119, 1249-1299.

[30] Gonzalez, Libertad and Tarja Viitanen (2009) "The Effect of Divorce Laws on Divorce Rates in Europe?" *European Economic Review* 53, 127-138.

[31] Guiso, Luigi, Paola Sapienza, and Luigi Zingales (2006). "Does Culture Affect Economic Outcomes?" *Journal of Economic Perspectives* 20, 23-48.

[32] Guiso, Luigi, Paola Sapienza, and Luigi Zingales (2003). "People's opium? Religion and economic attitudes." *Journal of Monetary Economics*, 50, 225-282.

[33] Hitchcock, William, Akira Iriye, and Petra Goedde (2012). The Human Rights Revolution: An International History, New York: Oxford University Press,

[34] Iannaccone, Laurence (1992). "Sacrifice and stigma: reducing free-riding in cults, communes and other collectives," *Journal of Political Economy*. 100, 271-291.

[35] Inglehart, Ronald, and Wayne E. Baker (2000). "Modernization, Cultural Change, and the Persistance of Traditional Values." *American Sociological Review* 65, 19-51.

[36] Inglehart, R. and P. Norris (2003), *Rising Tide: Gender Equality and Cultural Change Around the World*, Cambridge University Press.

[37] Kirkpatrick, Lee A. (1993). "Fundamentalism, Christian Orthodoxy, and Intrinsic Religious Orientation as Predictors of Discriminatory Attitudes." *Journal for the Scientific Study of Religion* 32, 256-68.

[38] Layman, Geoffrey (1997). "Religion and Political Behavior in the United States: The Impact of Beliefs, Affiliations, and Commitment from 1980 to 1994." *Public Opinion Quarterly* 61, 228-316.

[39] Layman, Geoffrey (2001). *The Great Divide: Religious and Cultural Conflict in American Party Politics*. New York: Columbia University Press.

[40] Lehrer, E.L. (1995). "The Effects of Religion on the Labor Supply of Married Women". *Social Science Research*, 24, 281-301.

[41] Levy, Gilat and Ronny Razin (2012). "Religious Beliefs, Religious Participation and Cooperation.", *American Economic Journals: Micoreconomics*, 4, 121-151.

[42] Lindbeck, Assar, Sten Nyberg and Jörgen W. Weibull (2003). "Social Norms and Welfare State Dynamics," *Journal of the European Economic Association*, 1, 533-542.

[43] Lipford, Jody W. and Robert Tollison (2003) "Religious participation and income" *Journal of Economic Behavior & Organization*, 51, 249-260.
[44] McBride, Michael (2010) "Religious Market Competition in a Richer World," *Economica* 77, 148-171.
[45] Smith, I. (2002) "European divorce laws, divorce rates and their consequences ", in *The Law and Economics of Marriage and Divorce*, ed. by A.W. Dnes and R. Rowthorn, Cambridge University Press, Cambridge.
[46] Stuart Mill, John (1874), *Utility of Religion* Kessinger Publishing.
[47] Weber, Max (1904). *The Protestant Ethic and the Spirit of Capitalism*. New York: Scribners.

9. APPENDIX

9.1. **Variable definition.** This section presents detailed definitions for the variables employed in the empirical analysis.

REL_{AFF}. Dummy variable based on the question: *Do you consider yourself as belonging to any particular religion or denomination?*

REL_{EVER}: Dummy variable based on the question: *Have you ever considered yourself as belonging to any particular religion or denomination, either currently or in the past?*

REL_{INT}: 0-1 index computed as the simple average of RELIGIOSITY, PRAY and ATTENDANCE.

RELIGIOSITY: *Regardless of whether you belong to a particular religion, how religious would you say you are?*. Answers range from "not at all religious" (0) to "very religious" (10). The index has been renormalised to be between 0 and 1.

PRAY: *Apart from when you are at religious services, how often, if at all, do you pray?* Answers range from never (1) to everyday (7). The index has been renormalised to be between 0 and 1.

ATTENDANCE: *Apart from special occasions such as weddings and funerals, about how often do you attend religious services nowadays?* Answers range from never (1) to everyday (7). The index has been renormalised to be between 0 and 1.

$\text{REL}_{\text{INT}}^{\text{IV}}$: Instrument for REL_{INT}, see Section 3.3 for a description of how it has been computed.

CONTRACTHOURS: Number of hours worked, obtained from the question *What are/were your total "basic" or contracted hours each week (in your main job), excluding any paid and unpaid overtime?*

HOURSWORKED: Number of hours worked, obtained from the question *Regardless of your basic or contracted hours, how many hours do/did you normally work a week (in your main job), including any paid or unpaid overtime?*

DESIREDHOURS: Number of desired hours worked, based on the question *How many hours a week, if any, would you choose to work, bearing in mind that your earnings would go up or down according to how many hours you work?*

LIB_G: Individual-specific liberties variable, computed as the average of the (country-level) liberties index corresponding to the years when the individual was between 18 and G years of age, with G=$\{40, 50 \text{ and } 60\}$. See Section 9.2 for details on the construction of the liberties index.

AGE: Age of respondent, calculated from year of birth.

COHAB: Dummy variable equal to 1 if respondent lives with husband/wife/partner.

CHILDREN: Dummy variable if respondent lives with children.

EDUYRS: Years of full-time education completed.

EDU-PTNR: Highest level of education successfully completed of husband/wife/partner.

HHSIZE: Number of people living regularly as member of household

HEALTH: Subjective measure of own's health ranging from 1 (very good) to 5 (very bad).

VALUE-CONSUMPTION. *It is important to be rich, have a lot of money and expensive things*. Answers range from 1 (not at all important) to 6 (very important).

VALUE-LEISURE. *It is important to have a good time*. Answers range from 1 (not at all important) to 6 (very important).

GAYRIGHTS: *Gay men and lesbians should be free to live their own life as they wish*. Answers range from 1 (strongly agree) to 5 (strongly disagree).

WOMEN-DROPJOB: *Women should be prepared to cut down on paid work for sake of family?* Answers range from 1 (strongly disagree) to 5 (strongly agree).

WOMEN-LESSRIGHT: *Men should have more right to job than women when jobs are scarce*. Answers range from 1 (strongly disagree) to 5 (strongly agree).

DIVORCE: *Children in home, parents should stay together even if don't get along.* Answers range from 1 (strongly disagree) to 5 (strongly agree).

CONSERVATISM: It is computed as the simple average of DIVORCE, WOMEN-LESSRIGHT, WOMEN-DROPJOB and GAYRIGHTS.

TRADITIONALISM: *Tradition is important to her/him. She/he tries to follow the customs handed down by her/his religion or her/his family.*. Answers range from 1 (not at all like me) to 6 (very much me).

9.2. **Construction of the personal liberties index.** The personal liberties index reflects the evolution of the legislation on abortion, divorce, women's rights, LGBT rights, and euthanasia from 1960 to 2013. To elaborate the index, we have first constructed individual indices for each of these categories as follows.

- Abortion index: We consider whether abortion is allowed in the following situations: 1) to save mother's life, 2) to preserve physical health, 3) to preserve mental health, 4) if pregnancy is due to rape or incest, 5) in case of fetal impairment, 6) for economic or social reasons and 7) on request. For each country and year, a value of 1 is assigned if abortion is allowed in each of the above mentioned scenarios and zero otherwise. The abortion index for that country/year is the average of the assigned quantities. Sources: UN Population Division. Abortion Policies: A Global Review, Volume 3 (2002), data updated with information from national pages.
- LGBT rights index: We have coded whether the following items are legal: 1) same-sex sexual activities, 2) same-sex unions, 3) adoption by same-sex couples, and 4) same-sex marriage. For each country and year, a value of 1 is assigned is assigned to each of these categories in case it is legal and zero otherwise. The LGBT rights index is computed as the average of the resulting quantities. Sources: Wikipedia (https://en.wikipedia.org/wiki/LGBT_rights_in_Europe, Pew Research Center.

- Divorce index: For each country and year we've coded whether 1) divorce is legal, 2) no-fault divorce is legal (i.e. if divorce is allowed on grounds other than fault, such as mutual consent) and 3) unilateral divorce is legal. The divorce index is computed as the previous cases. Sources: Boele-Woelki et al. (2003, 2004 and 2005), Smith (2002), and Gonzalez and Viitanen (2009).
- Euthanasia index: a 1 is assigned to country/years where euthanasia is legal. Sources: www.euthanasia.com and http://www.wisegeek.com/which-countries-have-legalize htm.
- Women's rights index: The extent of gender parity has been captured through 17 different indicators related to property ownership, marital regimes, inheritance laws, status and capacity, access to judicial system and Constitutional rights. Data has been obtained from the the World Bank, 50 Years of Women's Legal Rights, http://wbl.worldbank.org/data/timeseries. See that webpage for more details on the categories included in the index.

To elaborate the personal liberties index, we have computed the simple average of the above-defined indicators for each country and year. We have also used principal components to aggregate the indices and the results were virtually identical.

9.3. **Summary Statistics.** Tables A1 and A2 present summary statistics of the variables employed in the empirical analysis. Table A1 presents country-by-country averages of the key variables in our empirical analysis: effort, religiosity and the liberties. Table A2 presents more statistics related to all the variables considered in the empirical section.

10. Appendix: Additional results

Appendix 10 contains additional results not included in the main text. Section 10.1 considers a particular example of utility function that yields a specification similar to the one employed in the empirical analysis. Sections 10.2 and 10.3 present further robustness checks.

10.1. **An example of a utility function generating a linear specification.** For the sake of simplicity, in our empirical analysis we've used a linear specification to test the implications of our Remark in Section 2. To provide further intuition on the type of preferences that generate a linear relationship between the key variables of interest, consider the following specification,

$$u(c, \Lambda_i, l) = c\Big[1 + \Lambda_i\Big] - \frac{1}{2}e^2.$$

Since leisure is additively separable from liberties and consumption, this specification of the preferences satisfies the conditions of our Remark. To simplify further the empirical specification, we assume that α_R=1 and α_S=0. This is a particular way of capturing the fact that the externality effect is likely to be larger for religious than for secular. Secular are favourable to liberties because they will make use of them and hence do not need to attach a huge value to the externality of the legal cap as such. In contrast, although religious individuals are free not to use whatever liberties are afforded, they are often intensely engaged in active [sometimes even

country	HOURSWORKED	DESIREDHOURS	REL_{INT}	REL_{EVER}	REL_{AFF}	LIB_{50}	LIB_{40}	LIB_{60}
Austria	34.74	34.24	0.41	0.89	0.71	0.57	0.56	0.57
Belgium	34.80	34.61	0.27	0.56	0.38	0.65	0.61	0.66
Bulgaria	41.03	42.18	0.34	0.79	0.78	0.32	0.32	0.32
Croatia	41.40	39.74	0.53	0.84	0.79	0.29	0.28	0.30
Cyprus	39.09	36.06	0.59	0.99	0.99	0.36	0.33	0.37
Czech Republic	40.85	42.93	0.15	0.21	0.18	0.50	0.49	0.50
Denmark	35.69	35.29	0.26	0.65	0.58	0.60	0.58	0.61
Estonia	39.20	43.94	0.21	0.21	0.17	0.39	0.37	0.40
Finland	38.45	37.08	0.35	0.68	0.58	0.57	0.56	0.57
France	34.76	36.28	0.21	0.54	0.40	0.50	0.48	0.51
Germany	35.53	33.72	0.28	0.65	0.52	0.58	0.57	0.59
Greece	41.19	38.99	0.58	0.93	0.92	0.42	0.40	0.43
Hungary	39.69	44.41	0.30	0.61	0.54	0.58	0.57	0.58
Iceland	38.70	36.58	0.38	0.60	0.46	0.53	0.51	0.54
Ireland	36.27	32.63	0.55	0.91	0.81	0.20	0.18	0.22
Israel	38.35	36.86	0.43	0.95	0.94	0.30	0.29	0.31
Italy	38.97	.	0.51	0.81	0.76	0.41	0.40	0.42
Latvia	39.12	.	0.29	0.47	0.43	0.37	0.35	0.38
Lithuania	38.67	40.14	0.39	0.86	0.83	0.37	0.35	0.38
Luxembourg	37.24	34.21	0.31	0.85	0.74	0.49	0.47	0.50
Netherlands	31.16	30.13	0.32	0.59	0.38	0.55	0.51	0.57
Norway	35.51	36.44	0.26	0.61	0.51	0.64	0.61	0.65
Poland	41.57	48.36	0.60	0.95	0.91	0.23	0.23	0.23
Portugal	38.22	41.06	0.47	0.90	0.83	0.41	0.38	0.42
Romania	40.86	.	0.55	0.94	0.93	0.40	0.38	0.40
Russia	40.39	39.33	0.31	0.53	0.52	0.42	0.42	0.42
Slovakia	40.42	42.74	0.47	0.81	0.75	0.42	0.40	0.43
Slovenia	40.07	39.49	0.35	0.57	0.52	0.38	0.37	0.38
Spain	38.00	35.28	0.34	0.85	0.69	0.38	0.35	0.39
Sweden	37.72	35.91	0.21	0.35	0.27	0.75	0.73	0.75
Switzerland	36.14	33.21	0.40	0.81	0.64	0.39	0.39	0.40
Turkey	47.25	41.58	0.65	0.98	0.97	0.31	0.30	0.31
Ukraine	39.77	39.42	0.44	0.73	0.71	0.37	0.36	0.37
United Kingdom	33.67	31.81	0.26	0.53	0.39	0.62	0.60	0.63
Average	37.62	37.57	0.36	0.69	0.60	0.47	0.45	0.47
Std. Dev	37.62	37.57	0.36	0.69	0.60	0.47	0.45	0.47

Table A1. SUMMARY STATISTICS

*Notes.*This table presents country-by-country averages of the key variables of the empirical analysis: the number of hours worked (HOURSWORKED), the desired number of hours worked (DESIREDHOURS), religious intensity and affiliation (REL_{INT}, REL_{EVER} and REL_{AFF}) and the liberties variables (LIB_{50}, LIB_{40} and LIB_{60}). See Appendix A for definitions.

violent] lobbying against such liberties. This can only be rationalised by a very large weight on the externality effect of the legal cap on liberties. This assumption implies that $\Lambda_i = (\overline{x} - x)\ell$, the same expression for religious or secular (but with different signs), obviously depending on x.

Under these assumptions, it is easy to show that optimal effort is given by

$$e = w[1 + (\overline{x} - x)\ell].$$

Taking logs and using the approximation $log(1 + (\overline{x} - x)\ell) \approx (\overline{x} - x)\ell$, which is valid if x is in a neighbourhood of $\overline{x}$, it follows that[35]

[35]Since the range where x moves is arbitrary it is possible to renormalise it so that this approximation can be applied.

variable	Obs.	Mean	Std. Dev.	Min	Max
HOURSWORKED	145492	40.79	12.63	1.00	100.00
CONTRACTHOURS	145723	37.62	10.47	1.00	100.00
DESIREDHOURS	48498	37.57	11.62	1.00	150.00
REL_{INT}	167583	0.36	0.27	0.00	1.00
REL_{AFF}	165495	0.60	0.49	0.00	1.00
REL_{EVER}	165699	0.69	0.46	0.00	1.00
$\text{REL}_{\text{INT}}^{\text{IV}}$	154357	0.36	0.16	0.00	0.94
LIB_{40}	167818	0.45	0.17	0.00	1.00
LIB_{50}	167818	0.47	0.16	0.00	1.00
LIB_{60}	167818	0.47	0.16	0.00	1.00
AGE	165684	42.63	13.19	19.00	100
GENDER	167651	0.54	0.50	0.00	1.00
COHAB	166682	1.32	0.47	1.00	2.00
CHILDREN	167235	0.51	0.50	0.00	1.00
EDUYRS	166297	12.73	3.93	0.00	56.00
HHSIZE	167691	3.00	1.50	1.00	77.00
HEALTH	167651	2.07	0.83	1.00	9.00
EDU-PTNR	112238	3.25	1.63	0.00	55.00
VALUE-LEISURE	160248	4.11	1.30	1.00	6.00
VALUE-CONSUMPTION	161072	3.06	1.34	1.00	6.00
GAYRIGHTS	161569	2.20	1.16	1.00	5.00
DIVORCE	27501	2.58	1.14	1.00	5.00
WOMEN-LESSRIGHT	56470	3.13	1.16	1.00	5.00
WOMEN-DROPJOB	27847	2.59	1.23	1.00	5.00
CONSERVATISM	25181	2.73	0.77	1.00	5.00
TRADITIONALISM	160926	4.25	1.33	1.00	6.00

Table A2. SUMMARY STATISTICS

*Notes.*This table presents summary statistics for the variables considered in the empirical analysis, see Appendix A for definitions.

$$log(e) = log(w) + \overline{x}\ell - x\ell. \tag{6}$$

Expression (6) establishes a linear relationship between (the log of) effort, liberties and the interaction of religiosity and liberties. This equation is very similar to the ones we've estimated in our empirical analysis, with the exception that the dependent variable is in logs. Using effort in levels or in logs is conceptually very similar. We've reestimated our regressions using effort in logs, obtaining identical conclusions as in our main analysis.[36]

[36]For the sake of brevity, we don't report these results but they are available upon request.

	[1]	[2]	[3]	[4]	[5]	[6]
REL_{EVER}	1.180***	1.123**	1.137*	0.750	0.387	1.025
	(0.008)	(0.041)	(0.075)	(0.470)	(0.574)	(0.115)
LIB_{40}	2.074	6.364***	5.037**	11.202***	-0.480	1.767
	(0.164)	(0.002)	(0.045)	(0.000)	(0.813)	(0.495)
$\text{REL}_{\text{EVER}} \times \text{LIB}_{40}$	-2.608**	-3.143***	-3.263**	-3.175	-0.550	-2.273*
	(0.012)	(0.007)	(0.040)	(0.123)	(0.635)	(0.060)
AGE^2	-0.002**	-0.003***	0.001	-0.003***	-0.004***	-0.002**
	(0.050)	(0.007)	(0.463)	(0.008)	(0.000)	(0.043)
AGE	0.119*	0.183**	-0.049	0.202**	0.330***	0.129
	(0.082)	(0.031)	(0.522)	(0.016)	(0.000)	(0.192)
GENDER	-7.725***	-7.509***				
	(0.000)	(0.000)				
CHILDREN	-0.552**	-1.176***	-1.029***	-1.869***	0.009	-0.260
	(0.029)	(0.000)	(0.009)	(0.000)	(0.962)	(0.349)
EDUYRS	0.064	-0.014	0.118*	0.061	-0.041	-0.139***
	(0.257)	(0.692)	(0.096)	(0.247)	(0.318)	(0.000)
HHSIZE	-0.076	-0.102	-0.391***	-0.441***	0.253**	0.238**
	(0.484)	(0.280)	(0.008)	(0.001)	(0.023)	(0.024)
HEALTH	-0.009	-0.196*	0.024	-0.143	-0.181**	-0.339***
	(0.932)	(0.072)	(0.852)	(0.383)	(0.045)	(0.003)
EDU-PTNR	-0.064	-0.252***	0.019	-0.195*	-0.003	-0.152***
	(0.226)	(0.001)	(0.721)	(0.052)	(0.960)	(0.005)
c	40.906***	38.579***	37.578***	29.796***	35.271***	40.519***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Dep. var.	HOURSWORKED	DESIREDHOURS	HOURSWORKED	DESIREDHOURS	HOURSWORKED	DESIREDHOURS
Sample	All	All	Women	Women	Men	Men
R^2	0.150	0.271	0.142	0.291	0.042	0.141
Obs	95296	31127	49829	16721	45467	14406

Table A3. EFFORT, RELIGIOSITY AND LIBERTIES: (PAST) RELIGIOUS AFFILIATION
Notes. Dependent variable is HOURSWORKED (columns 1, 3 and 5) and DESIREDHOURS (columns 2, 4 and 6). Columns 3 and 4 (5 and 6) restrict the sample to women (men). All models have been estimated by OLS and contain country, survey and country-survey dummies. There are 34 countries. Robust standard errors clustered at the country level have been computed. p-values are in parentheses.

10.2. **Results using REL_{EVER}.** Table A3 replicates Table 4 in the main text using past religious affiliation (REL_{EVER}) in place of current affiliation (REL_{AFF}). Results are very similar as those presented in the main text, with the exception of column 4, where the sample is restricted to women and the dependent variable is DESIREDHOURS. In this case, the coefficient of the interaction of religious affiliation and liberties is less precisely estimated (p-value is .12).

10.3. **Appendix: Relaxing instrument exogeneity.** In this appendix we describe our implementation of the approach proposed by Conley, Hansen and Rossi (2012), which allows to examine the robustness of 2SLS estimates to violations of the exclusion restriction. This assumption is violated whenever the instrument is correlated with the residuals, leading to a bias in the 2SLS estimator. Nevertheless, as the magnitude of this bias is inversely related to the strength of the instrument, it follows that it can be large or small, depending on the strength/weakness of the instrument. In the following we examine this issue and evaluate the robustness of our conclusions to departures from the exclusion restriction.

Consider the following model:

$$Y = X\beta + Z\gamma + \epsilon,$$

where X is a matrix of (endogenous) regressors and Z is a matrix of instruments (uncorrelated with ϵ). The exclusion restriction is satisfied if $\gamma = 0$. Conley et al. consider violations of this assumption by allowing γ to follow a distribution F. Assuming that this distribution is given by $F = N(\mu_\gamma, \Omega_\gamma)$, it follows that

$$\hat{\beta} \sim N(\beta + A\mu_\gamma, \Omega_{2sls} + A\Omega_\gamma A'), \tag{7}$$

$$A = (X'Z(Z'Z)^{-1}Z'X)^{-1}(X'Z), \tag{8}$$

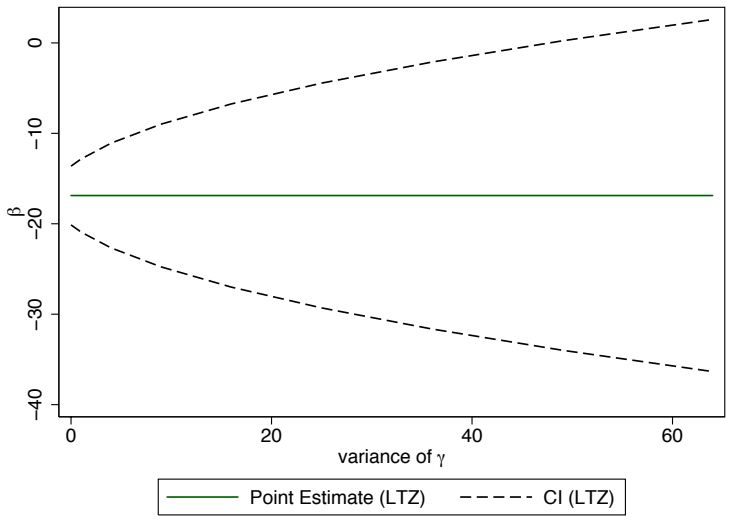
where $N(\beta, \Omega_{2sls})$ is the usual 2SLS asymptotic distribution. Expression (7) is useful as it allows to compute valid confidence bands for $\hat{\beta}$ when the exclusion restriction is violated. In the following, consider that X contains our potentially endogenous regressors (i.e., REL_{INT} and $\text{REL}_{\text{INT}} \times \text{LIB}_{40}$) and Z the corresponding instruments ($\text{REL}^{\text{IV}}_{\text{INT}}$ and $\text{REL}^{\text{IV}}_{\text{INT}} \times \text{LIB}_{40}$). Values of γ different from zero imply that the instruments have a direct effect on the dependent variable. We assume that γ follows a zero-mean bivariate Normal distribution with variance-covariance matrix

$$\Sigma_\gamma = \begin{pmatrix} \delta & 0 \\ 0 & \delta \end{pmatrix}, \text{ with } \delta \geq 0.$$

By considering different values for δ we are able to identify the threshold at which the second-stage coefficient on (instrumented) $\text{REL}_{\text{INT}} \times \text{LIB}_{40}$ becomes insignificant at the 10% level. The higher the value of δ, the higher the probability of observing a large direct impact of the instrument on the dependent variable is large. Figure 6 presents our results. The solid line in Figure 6 depicts the point estimate of β_2 (the coefficient associated to $\text{REL}_{\text{INT}} \times \text{LIB}_{40}$) corresponding to column 7, Table 1. The dashed lines report the confidence bounds (at the 10% confidence level) of $\hat{\beta}_2$ computed for different values of δ. The picture shows that increasing the value of δ increases the width of the confidence interval of $\hat{\beta}_2$. Still, the estimate remains significant for considerably large values of δ. We identify a threshold for δ equal to 52.3, below which our conclusions are not overturned. Given the observed size of the coefficients (recall, for instance, that the coefficient of $\hat{\beta}_2$ is -16.9), it seems implausible that the instrument has such a large direct impact on the dependent variable.

Summarising, the results above imply that, given the strength of the instrument, our conclusions are very robust to moderate violations of the exclusion restriction.

Figure 6. Relaxing the exclusion restriction



This graph depicts the confidence interval associated to $\hat{\beta}_2$ (column 7, Table 1) for different values of δ, the variance of γ, see equation (10.3). The local to zero method has been employed in the calculation, see Conley et al. (2012) for details.