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When the State Mirrors the Family

The Design of Pension Systems

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When the State Mirrors the Family: The Design of Pension Systems*

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Abstract

Family is a primal institution. Family organization (e.g. inheritance rules) can be transmitted over time, or even embedded into newly born economic institutions. We argue that when the family is substituted in one of its economic role by another, perhaps new, institution, the economic organization that was prevailing within the family is likely to be adopted by the new-born institution. To study this transmission mechanism from family culture (or organization) to economic institutions, we concentrate on the impact of the family structure on the design of the most widely spread welfare state program in the world: the public pension system. We first build a simple OLG model which predicts that, when pensions systems are introduced, in society with weak family ties they act as a safety net, while in societies with strong ties pensions replicate the tight link between generations and tend to provide benefits related to earnings. We turn turn to a historical perspective and we find that medieval family structures (based on Emmanuel Todd's classification) have influenced the design of pension systems since their introduction, shaping the fundamental characteristics that are still entailed in the current systems, and that differentiate them across countries. In particular, in societies dominated by absolute nuclear families, i.e. weak family ties (f.i. Anglo-saxon countries), we observe the emergence of a pension system which acts as a flat safety net entailing the largest within-cohort redistribution than societies dominated by any other type of family. This link between the type of families and the design of pension systems is robust to including several other variables, which may constitute alternative explanations of the introduction of the pension systems, such as legal origin, religion, urbanization and democratization of the country at the time of the introduction, and the current GDP, share of elderly in the population, electoral rules and forms of government. Interestingly, historical family types matter for explaining the design of the pension systems, which represents a persistent feature, but not their size, which have largely changed over time.

Keywords: culture; institutions; historical evidence.

JEL Classifications: Z10; Z13; N30; H10; H55.

1 Introduction

Institutions matter for economic development and growth.[1] A recent literature has emphasized the impact of pre-existing legal, political and economic institutions on economic development, income inequality, labor force participation of household members, living arrangements and even fertility decisions (see, among the others, Putnam, 1993, Tabellini, 2008 and 2009, Fernandez and Fogli, 2009, Guiso et al., 2006). Whether these historical institutions affect social-economic outcomes through their impact on current institutions or through a less tangible, cultural transmission process is instead less understood (Tabellini, 2009).

In this paper, we focus on the role of what is arguably the primal institution: the family. We emphasize the economic relevance of the historical patterns of the within family organization. The organization of the family structure includes the relation between parents and kids, from their childhood till their parents'old age; the relation among siblings, for instance vis-a-vis the inheritance from their parents; and the relation between the family as a unit and the society at large. These primal aspects of the family organization can be transmitted over time, or even embedded into newly born economic institutions. Our point of departure is that when the family is substituted in one of its economic roles by another, perhaps new, institution, the economic organization that was prevailing within the family is likely to be adopted by the new-born institution. To study this transmission mechanism from family culture (or organization) to economic institutions, we concentrate on the impact of the family structure on the design of the most widely spread welfare state program in the world: the public pension system.

Before the introduction of public pension systems, which largely occurred between the beginning of the XX century and the aftermath of world war II, families were the unique providers of old-age security for their elderly members. However, the organization of the within-family insurance system largely differed across regions and family types. For instance, while in some countries, such as England, kids had no legal obligation to support

[1] See, among the others, the seminal works by Acemoglu et al. (2001), North (1990), La Porta et al. (1997).

their parents, in France, they were morally, but also legally reliable for their elderly parents' health and economic situations (see Twigg and Grand, 1998). In the latter families, parents could hence rely on their offsprings for complete old age support, to an extent that of course depended on their own and on their kids' economic conditions. In the former case, instead, vertical support (from the kids to their parents) was less common, and worked more as a safety net, when parents fell into poverty. Our goal is thus to understand to what extent the principles governing family structures have influenced the design of pension systems since their introduction, shaping the fundamental characteristics that are still present in the current systems, and that differentiate them across countries. Did the initial design of pension systems mirror the within family organization? Did countries characterized by families providing strong vertical support in old age favor the emergence of earning-related insurance schemes that replace a large share of the workers' previous wage? And did countries characterized by weak children responsibility for the old age income of their parents endorse flat-rate pension schemes providing only a safety net to the elderly?

To provide an answer to these fundamental questions, we first build a simple two-periods OLG model to analyze the link between the structure of family and the design of pensions. We simplify the family structure in two types, strong and weak family ties, and we consider two scenarios, before and after what we call a "family break-up", which represents an exogenous shock to both types of pre-existing family structures, due for instance to industrialization, urbanization and similar processes, which induce nuclearization of the family. Our model shows that, before the break up, individuals in societies characterized by weak family ties are more likely to save than those in strong family ties and, after the break up, pensions are more likely to emerge under weak rather than under strong family ties. However, if they emerge, pension systems are more comprehensive and generous in societies with strong family ties, where they come to substitute the kids to old parents family transfers. In societies with weak family ties, pensions still reflect the pre-existing family organization and thus only provide a safety net.

Then, we consider a historical analysis of family structures. We use Emmanuel Todd's classification of medieval family types (Todd, 1983) to show how the different types of within family organizations may shape the fundamental characteristics of the initial design

of the different pension systems, which are still present in the current systems. We classify four family types - absolute nuclear, egalitarian nuclear, authoritarian, communitarian - delivering a complete picture of the family relationships in each region of the world since medieval era, which proved to be persistent over time[2]. In particular, absolute nuclear families (dominating in Anglo-Saxon countries, Holland and Denmark) replicate the dominance of weak family ties, as opposed to the other types of families.

Our empirical findings suggest that in countries where absolute nuclear families prevail, pension schemes act mainly as a flat safety net. To define the design of the pension system, we consider replacement rates, which measure the ratio between pension benefits and labor income prior to retirement, for different income levels. If a pension system replaces a constant proportion of the workers' income, these replacement rates will be roughly constant across income levels. On the other hand, they will widely differ - being higher for low-income workers, if the pension system acts as a safety net. [3]

This link between the type of families and the design of pension systems is robust to including several other variables, which may constitute alternative explanations of the introduction of the pension systems, such as legal origin, religion, urbanization and democratization of the country at the time of the introduction, the current GDP, share of elderly in the population, electoral rules and forms of government. Interestingly, historical family types matter for explaining the design of the pension systems, which represents a persistent feature, but not their size, which have largely changed over time.

A recent literature has analyzed the role of the family as a primal institution affecting economic outcomes, and its role of intergenerational transmission of culture. For instance, Alesina and Giuliano (2007) claim that the strength of family ties represents a fundamental cultural trait shaping economic behavior and attitudes. They elaborate a measure of cul-

[2] In particular, lack of cohabitation characterizes nuclear families, which were already the norm in western Europe before the Industrialization (see Goody, 2000).

[3] As we will explain in section 3.2, pension schemes with an earnings-related formula are typically referred to as "Bismarckian" systems, while flat-rate ones as "Beveridgean" systems. See Disney and Johnson (2001), Conde-Ruiz and Profeta (2007), OECD(2005) for a classification of current pension systems according to their redistributive design and Conde-Ruiz and Profeta (2007), Koethenburger et al. (2008) for political-economy explanations of their different nature.

ture based on family relationships and quantify its role in explaining important economic variables, such as the amount of home production versus market activities and the role of women. A previous argument by Reher (1998) also pointed out that family ties help explaining living arrangements and geographical mobility of young generations. Indeed, the link between family types and individual economic behavior dates back to Banfield (1958), who first used the term "amoral family" to describe the social and cultural environment that was shaping individual decisions in a small village in the south of Italy. More recently, Duranton et al. (2009) used Todd's (1983) medieval age family structures to explaining regional differences in economic outcomes. Algan and Cahuc (2007) shows that family culture is responsible for cross-country heterogeneity in employment rates. Alesina et al. (2010) show that in cultures with strong family ties individuals are less mobile and choose more regulated labor market while weak family ties are associated with more flexible labor markets which require geographic mobility of workers to be efficient. The impact of cultural factors on individual economic decisions is also analyzed in Guiso, Sapienza and Zingales (2006), who, after providing a definition of culture ("those customary beliefs and values that ethnic, religious, and social groups transmit fairly unchanged from generation to generation"), analyze as a specific example the impact of religion or ethnic origins on trust and on preferences for redistribution.[4]

The link between family relations and welfare systems has also received a recent attention, mainly by the sociologists. Focusing on Europe, Esping-Andersen (1999) argues that where family ties are stronger, social risks are more internalized in the family by pooling resources across generations. Other authors have stressed the impact of gender culture on the welfare state (Lewis, 1992) and the role of Christian religion in European welfare state (Daly, 1997). Coleman (1988) argues that family ties can strengthen the support received by young generations from the old while, at the same time, representing an obstacle for innovation and new ideas. A comprehensive theoretical framework for the analysis of the relationship between culture and welfare state policies is provided by Pfau-Effinger (2005), who first defines "welfare culture the relevant ideas in a given society surrounding

[4]See Fernandez (2007) for a survey of some of the recent empirical studies on the effects of culture on economic outcomes.

the welfare state and the way it is embedded in society" and then argues that "welfare state policies differ regarding to which cultural model of the family they chiefly relate and how much importance is attributed to the family for the production of welfare".

Finally, this paper is also related to a recent literature on the origin of welfare. According to several authors (for a discussion, see Caucutt, Cooley and Guner, 2007, and Cutler and Johnson,2004), social security systems that feature intergenerational transfers from workers to retirees were introduced in the western world around the period of urbanization. The rationale for the creation of a public transfer system was the rapid change from the existence of an extended family living in the same house to smaller families dislocated in many different places, due to the urbanization. In this new setup, kids were unable to look after their parents providing for their old age needs and new forms of insurance had to be introduced. Yet, this general theory has hard time matching the timing of the urbanization process with the introduction of social security systems (see e.g., Lindert, 1994, and Perotti and Schwienbacker, 2007). Our relation between family types and the initial design of the social security system does not rest on a specific date for the introduction of social security.

The paper is organized as follows: section 2 explains the model, section 3 introduces our historical perspective, describing first Todd's classification of family structures and their persistence over time and then the origins of pension systems and their design; section 4 describes our econometric analysis and results and section 5 concludes. Proofs are in the Appendix.

2 The Model

We introduce a simple two-periods OLG model to analyze the link between family structure and pension design. We consider two stylized family structures: strong and weak family ties. These two structures differ in the rules, which define within-family property rights, sharing of resources and degree of insurance. We also introduce two different scenarios. In an initial "old regime", family members and relatives tend to live close to one another. Hence, while family may feature weak or strong ties, the cost of looking

after a family member (i.e. the elderly) is relatively low. After a shock, due for instance to industrialization, urbanization and similar processes, which imposes an exogenous nuclearization of the family, a "new regime" arises, in which looking after the old becomes more costly for both weak and strong ties families.

The next section introduces a description of these two family structures. The main economic decisions taken within the family for these two family types in the "old regime", and the collective decision over pension systems are examined in the next section. An analysis of these decisions under the "new regime" follows.

2.1 Strong and weak family ties

At each time t two generations are alive: adult and old. We consider a simple utility function that is linear in consumption c. An individual born at time t has the following utility function

$$U\left(c_t^A, c_{t+1}^o\right) = c_t^A + c_{t+1}^o \tag{1}$$

where the superscripts indicate the generation (adult, old) and subscripts refer to the time period.

Adults earn a constant income y and may save to increase the (family or individual) resources in old age. During a fraction ρ of their old age, individuals enjoy high returns from savings, equal to $(1+\overline{R})$, while during a fraction $(1-\rho)$ the returns are low and equal to $(1+\underline{R})$, with $\overline{R} > \underline{R}$. It is convenient, but not crucial, to assume that $1+\underline{R}=0$. Thus, the average returns from savings are $(1+R) = \rho\left(1+\overline{R}\right)$.

Old individuals do not work. They may receive a pension, and the returns from their savings. Consumption in old age is given by $c_{t+1}^o = \rho c_{t+1,\overline{R}}^o + (1-\rho)c_{t+1,\underline{R}}^o$where $c_{t+1,\overline{R}}^o$ and $c_{t+1,\underline{R}}^o$ are old age consumption respectively in the high and low returns state.

If a pension system is in place, adults pay a proportional tax τ_t on their income, and these revenues are used to provide pension benefits to the elderly. Pensions are distortionary, as captured by a parameter $\varepsilon > 0$. The PAYG pension system is budget-balanced:

$$P_t = (1-\varepsilon)\tau_t y \tag{2}$$

Economic decisions are taken within the family. We consider two different family types. In families with strong ties, all the resources obtained by the two generations of individuals are pooled within the family, under the direct control of the adults. Total resources of the two generations at time t are used to finance the family consumption and the savings:

$$y(1-\tau_t) + P_t + s_{t-1}(1+R) = c_t^A + c_t^o + s_t \tag{3}$$

Old individuals have no property rights on these resources, and thus also on the income that they contributed to provide. However, adults have a moral (or perhaps even legal) obligation to provide an adequate level of consumption to both young and old, irrespectively of their contribution to the family resources. We capture this moral (or sometime even legal) obligation by imposing a constraint on the old consumption:

$$c_{t,j}^o \geq \gamma y \qquad (j = \overline{R}, \underline{R}) \tag{4}$$

Hence, regardless of the state of the economy (that is, whether the returns on savings or the wages in youth are high or low), adults have to ensure a (large) percentage γ of their income to the old family members. This is to capture the idea that in family with strong ties, adults have to guarantee to their parents a standard of living that is similar to their own.

Families with weak ties feature a different structure. No pooling of resources takes place among family members and old have property rights on their savings and pensions. However, the adults still have a moral (or legal) obligation to keep each old family member above a subsistence consumption level, δy, with $\delta < 1$, if the old does not have enough resource. This limited degree of within family insurance is represented by the following constraint on the individuals' consumption:

$$c_{t,j}^o \geq \delta y \qquad (j = \overline{R}, \underline{R})$$

Finally, for both weak and strong family ties, we assume that adults have to provide themselves at least with a subsistence consumption level, $c_t^A \geq \theta y$, and thus have to refrain from saving all the available resources for future consumption. Notice that, in absence of this constraint, this extreme (saving) behavior may arise under some specifications, due to the linearity in the utility function.

To capture the idea that in families with weak ties the adults only provide a safety net, whereas in strong families, they share consumption more evenly among the family members, we assume that $\delta \leq \min(\gamma, \theta)$.

To characterize the emergence of a pension system, we consider that the introduction of the system is decided upon by the adult generation, and that the system has to be supported by all future generations of adults.

In the following sections, we analyze the economic decisions taken in families with strong and weak ties in the old and in the new regime. Then we examine the collective decisions over the pension system.

2.2 The "Old Regime"

2.2.1 Strong family ties

Adult individuals have control of the common pool of family resources, and decide how much to save, and how to share consumption across family members. Saving amounts to reduce the resource in the period when the adults have control over the consumption decision in order to increase the family pool of resources in the next period, when they are old and have no property rights. It is easy to see (see Proposition 1 below) that, regardless of the return on the savings, adults have no incentive to save, and hence $s_t = 0$. As all the current family resources are used to finance current consumption, the adults will maximize their own consumption given the constraint at eq. 4 that characterizes a strong family.

Proposition 1 *In absence of transaction costs in providing resources to the elderly (the "old regime"), a strong family features no savings, $s_t = 0$ and the adults oppose the introduction of a pension system, $P_t = \tau_t = 0$.*

In strong families, the existence of a common family pool of resources managed by the adults limits their incentive to save for the future. In this environment, a pension system is not supported. In fact, its introduction would amount to tax the adults by an amount $\tau_t y$ and to provide back resources to the old equal to $P_t = (1 - \varepsilon)\tau_t y$. For any positive level of distortion, $\varepsilon > 0$, pensions are thus opposed.

2.2.2 Weak family ties

When family ties are weak, there is no pooling of resources and every generation has property rights on its own income. Adults only have a moral obligation to keep every family member at a subsistence level of consumption equal to δy.

It is convenient to consider first what happens in absence of a pension system. Unlike in strong families, in this environment adults have more incentives to save for old consumption, since (i) they have property rights on their savings, and (ii) they will only be guaranteed a minimum subsistence level from their offsprings, if they reach old age with limited resources. Due to the linear utility function, their saving decision will be binary. If they choose to save, adults will transfer into old age all their disposable income, consisting of their adult income, y, net of the transfers to the old members of their family and of their own subsistence consumption. In old age, they will thus use their savings to consume, but will rely on the subsistence family transfers in bad times. If instead the adults prefer not to save, they will consume all their disposable income, and they will rely on the subsistence family transfers in old age. The following proposition characterizes the equilibrium of the economy.

Proposition 2 *In absence of transaction costs in providing resources to the elderly (the "old regime"), the following equilibria may arise:*

- *If* $R < \frac{\delta\rho}{1-\delta-\theta}$*, a weak family features no savings,* $s_t = 0$ *and the adults oppose the introduction of a pension system,* $P_t = \tau_t = 0$*.*
- *If* $R > \frac{\delta\rho}{1-\delta-\theta}$*, a weak family features positive savings,* $s_t > 0$ *and the adults still oppose the introduction of a pension system* $P_t = \tau_t = 0$

In weak families, for high values of the return rate R, the existence of within family property rights induces the adults to remain at subsistance consumption and to save. These savings increase their old age consumption in the good states. In the bad states, instead, the elderly have to rely on the transfers from their offsprings to reach the subsistence level of consumption. For low values of the return rate R, instead, the adults

will choose not to save, since few resources would be available for the savings after having provided subsistence level consumption to their family members.

In both cases, a pension system fails to be supported. In fact, not only the pension system is distortionary, but its introduction amounts for the adults to transfer resources to the elderly in every state of the world (rather than in the bad state only), and therefore either reduces the amount of resources available for the savings (when $s_t > 0$) or their consumption when adults (when $s_t = 0$). Once in their old age, while in the bad state, the elderly would have always been supported (by their offspring instead of by the pension transfer), in the good state they end up receiving a (low) pension, rather than a more substantial return on their savings. Hence, the pension system provides the same coverage (as the family) in the bad state, but it is less convenient in the good states, and is thus opposed by the adults.

2.3 The Transition to the "New Regime"

In the initial "old regime", families were assumed to be geographically concentrated, with family members living close to one another – if not together. Hence, the cost of looking after the old was relatively low, although in different families (weak or strong) adults were required to perform different roles.

In this section, we consider the impact on these two stable family environments of an unexpected exogenous shock, due for instance to industrialization, urbanization and similar processes, which imposed an exogenous nuclearization of the family. The demographic transition to a "new regime" is driven by two crucial elements: (i) an exogenous increase in the cost of providing resources to the elderly, due for instance to the increased geographical distance between the adults and their parents, so that every unit of consumption provided to the elderly costs $1+\phi$ to their offsprings; and (ii) the acquisition of property rights over their savings by the elderly in the strong families, due again to a possible geographical separation among family members. However, the moral obligation by the adults towards their parents remains unmodified.

2.3.1 Strong family ties

This demographic transition may cause large adjustments in the internal organization of strong families. On the one hand, strong families may continue with their organization, and just choose to pay the higher cost of providing resources to the elderly. On the other hand, adults may exploit the newly established property rights over their savings, and choose to save for old age. Even more importantly, this demographic transition may modify the adults' preferences over the introduction of a pension system, which may become a good substitute for private transfers to the elderly. The proposition below summarizes the economic decisions taken in a strong family during the "new regime", and the collective decision over the pension system.

Proposition 3 *In presence of transaction costs in providing resources to the elderly and of property rights of the elderly (the "new regime"), the following equilibria may arise:*

- *If* $R < \frac{\rho\gamma}{1-\theta-\gamma(1+\phi)}$, *a strong family features no savings,* $s_t = 0$. *Adults support the introduction of a pension system* $P_t = \tau_t y\,(1-\varepsilon)$, *with* $\tau_t = \frac{\gamma}{1-\varepsilon}$, *if and only if* $\phi > \frac{\varepsilon}{1-\varepsilon}$.

- *If* $R > \frac{\rho\gamma}{1-\theta-\gamma(1+\phi)}$, *a strong family features positive savings,* $s_t > 0$. *Adults support the introduction of a pension system* $P_t = \tau_t y\,(1-\varepsilon)$, *with* $\tau_t = \frac{\gamma}{1-\varepsilon}$, *if and only if* $\phi > \frac{\varepsilon}{1-\varepsilon} - \frac{\rho}{1+R}$

For low rate of returns R, although saving for old age consumption has now become an option for the adults, since they acquired property rights in old age, they choose not to save. In this case, the adults may just have to bear the higher transaction cost of providing resources to the elderly. Alternatively, if this cost is high and/or the pension system is sufficiently efficient, i.e., if $\phi\,(1-\varepsilon) > \varepsilon$, they prefer to delegate the support of the elderly to a pension system. In this case, the public pension system will completely resamble the family transfer as $P_t = \tau_t y\,(1-\varepsilon) = \gamma y$.

For high values of the return from savings, R, adults in strong families choose to remain at subsistance consumption when adult and to save to increase their old age consumption.

The adults will only provide this subsistance consumption to the elderly, or if the transaction cost is high and/or the pension system is not very inefficient, i.e., if $\phi > \frac{\varepsilon}{1-\varepsilon} - \frac{\rho}{1+R}$, they may choose to delegate even this minimal support of the elderly to a pension system, which would provide $P_t = \gamma y$. Notice that a pension system is more likely to be introduced when ssavings are positive.

2.3.2 Weak family ties

In weak families, this demographic transition has the effect of increasing the cost of providing consumption to the elderly, when their savings are not sufficient to reach the subsistence level. Hence, weak families may continue with their organization. Adults may save for old age consumption and pay the higher cost when they need to provide resources to the elderly. Alternatively, for low rate of return, they may choose not to save and to rely on their kids for subsistence level of old age consumption. However, this increase in the transaction cost may change the adults' preferences over a pension system, which now becomes a better substitute for private family transfers.

The next proposition summarizes the economic decisions taken in a weak family during the "new regime", and the collective decision over the pension system.

Proposition 4 *In presence of transaction costs in providing resources to the elderly and of property rights of the elderly (the "new regime"), the following equilibria may arise:*

- *If* $R < \frac{\delta\rho}{1-\theta-\delta(1+\phi)}$, *a strong family features no savings,* $s_t = 0$. *Adults support the introduction of a pension system* $P_t = \tau_t y\,(1-\varepsilon)$, *with* $\tau_t = \frac{\delta}{1-\varepsilon}$, *if and only if* $\phi > \frac{\varepsilon}{1-\varepsilon}$.
- *If* $R > \frac{\delta\rho}{1-\theta-\delta(1+\phi)}$, *a strong family features positive savings,* $s_t > 0$. *Adults support the introduction of a pension system* $P_t = \tau_t y\,(1-\varepsilon)$, *with* $\tau_t = \frac{\delta}{1-\varepsilon}$, *if and only if* $\phi > \frac{\varepsilon}{1-\varepsilon} - \frac{\rho}{1+R}$.

As before, for low values of the return rate R, the adults choose not to save, since savings will not provide enough resources in old age. They may thus have to bear the higher transaction cost of providing resources to the elderly. Alternatively, if this cost

is high and/or the pension system is sufficiently efficient, i.e., if $\phi(1-\varepsilon) > \varepsilon$, they will delegate the support of the elderly to a pension system.

For high values of the return rate R, the adults may prefer to remain at subsistance consumption, and to keep at this level their family members, but to save to increase their old age consumption. However, if the transaction cost is high and/or the pension system is not very inefficient, i.e., if $\phi > \frac{\varepsilon}{1-\varepsilon} - \frac{\rho}{1+R}$, they may choose to delegate even this minimal support of the elderly to a pension system. In both cases, the public pension system will completely resamble the subsistence level family transfer as $P_t = \tau_t y(1-\varepsilon) = \delta y$.

The analysis of the family organization in the "old" and "new" regime for the strong and weak families provides interesting insights. Not surprisingly, adults living in weak families are more likely to save, due mainly to the better property rights that they enjoy on their savings in old age. In both cases, no pension system emerges under the "old" regime. Pension schemes may instead be introduced after the transition to the "new" regime, in both family structure, due to the increased cost of looking after the elderly. Figure 1 summarizes the results for the new regime. For a given family type, pensions are more likely to emerge when adults choose to save for their old age consumption, thereby suggesting that pensions represent a good alternative to private savings. When comparing across family types, figure 1 shows that, for a given saving behavior, pensions are more likely to be introduced in weak families, but they are less generous. This is because in strong families, adults have a moral obligation to ensure a (large) share, γ, of their income to the elderly, whereas in countries with weak families the adults' obligations are limited to the subsistance level (δ).

3 A historical perspective

3.1 Family types

Measuring the organization of the family, that is, the relations between parents and children, among children and between the family and the society at large, is a difficult task. Current relations within and across families are shaped by economic considerations, such as the existence of the welfare state, the labor market regulations and so on. To be able

to measure the primal effect of the family on the design of the welfare state, we thus need to recur to measurements of the family organization dating back to periods prior to the introduction of welfare state policies. We hence choose to use Emmanuel Todd's (1983) historical classification. Todd (1983) reviewed historical monographs dating back more than 500 years, to ensure that his classification of family types could be traced back to the medieval era.[5]

Following Todd, we can identify four family types (see figure 2), on which we will base our empirical analysis:

- *Absolute nuclear family.* This type of family is based on no cohabitation of parents and adult children: children leave their family after their adolescence, form their own family and become independent individuals. There are also no specified rules for inheritance and marriage relationships are exogamous. In this context individualism is taken to its extreme consequences and the culture of "indifference" dominates: the others are nor integrated nor refused, every individual is independent and he/she counts mainly according to his/her own efforts. This has clear implications also for the individual relations between parents and children. As argued by Todd (1990), absolute nuclear families affirm the total independency of children from their parents and viceversa. The choice of taking care of old-age parents becomes a subjective one and not a generalized value. In other words, as parents have no obligation to support their adult children, kids may in turn also choose whether to take care of old parents or not and to what extent. Anglo-Saxon countries, Holland and Denmark belong to this group;

- *Egalitarian nuclear family.* In this context, we still observe no cohabitation of parents and adult children, and exogamy, but the independence among generations is weaker than in the previous case. In fact more precise rules on inheritance are in place, based on the principle of equality among siblings. This context favors the emergence of ideologies of "universalism", which recognize the value of equality, even in contrast to individualism. The tension between these two principles may be a source of instability. Egalitarian families encourage the persistence of stronger relations between parents and children, and

[5] For instance the prevalence of stem families in French Brittany, North of Spain or Scotland coincides with the areas occupied by Celtic populations.

the fact that parents cannot choose to favour a kid over the others in their inheritance decisions make all children equally responsible for their old-age. France, Italy, Spain, Portugal, Greece, Romania, Poland, Latin America (apart from Cuba) and Ethiopia are in this group;

- *Stem family or authoritarian.* This type of family is based on cohabitation of parents and adult children. Sons remain in their parents' home and are subject to a vertical hierarchical structure. In this environment, rules and social norms are strongly transmitted from one generation to the other. This strenghten family ties. Yet, the principle of equality is not recognized in this type of family, and thus there is a tension toward individualism. Germany, Austria, Sweden, Norway, Czech Republic, Belgium, Luxembourg, Scotland, Ireland, Japan, Korea, Israel and Gitans populations are characterized by this structure;

- *Communitarian family.* These families are based on cohabitation, which makes family ties very strong. Moreover, they affirm equality among siblings, which again reduces individualism and reinforces family ties. This system was in place in Russia, Yugoslavia, Slovak, Bulgaria, Finland, Hungary, Albania, Baltic republics, Centre of Italy, China, Vietnam, Cuba, Indonesia and India.

This classification of family types is simple and, at the same time, very rich. It is simple enough to classify countries and be used in a quantitative analysis, while it is rich enough to cover several features which may be important for the transmission of cultural values and their impact on the design of the welfare state. To have a term of comparison of this classification with respect to the existing literature, it is interesting to consider the analysis of family ties in Alesina and Giuliano (2007). They use three individual questions to the World Value Survey: (i) How family is important in life? The answer ranges from 1, "very important", to 4, "not at all important"; (ii) Choose between A (corresponding to the score of 0): "Regardless of what the qualities and faults of one's parents are, one must always love and respect them" and B (score equals 1): "One does not have the duty to respect and love parents who have not earned it by their behavior and attitudes"; (iii) Choose between A (score equals 0) "Parents' duty is to do their best for their children even at the expense of their own well-being" and B (score equals 1) "Parents have a life of their own and should not be asked to sacrifice their own well-being for the sake of their

children". To compare their measures of family ties based on these questions with Todd (1983) we estimate this simple model:

$$y_i = \alpha + \beta_1 X_i + \beta_2 COMMUNITY + \beta_3 AUTHORITARIAN + \beta_4 EGALNUCLEAR + \varepsilon_i$$

where y_i is the score attributed to the answer that individual i gives to each of the three questions (respectively in column 1,2 and 3), X_i is a set of individual controls (age, age squared, income, education, political views) and absolute nuclear families is the excluded category of family types. Table 1 shows the correlation between Todd(1983) and Alesina and Giuliano (2007) classifications. While Todd (1983) classification plays no role in explaining current responses on the relevance of the family, when compared to absolute nuclear families, egalitarian nuclear and communitarian families are associated with stronger (current) kid-to-parents links. These vertical family ties are crucial in explaining upward intergenerational transfers. Column three describes instead the downward vertical ties from parents to kids, when authoritarian and communitarian families are characterized by the prominent role of the parents.

An important feature of Todd's classification is that these family organizations have persisted over time. This may be due to direct, within family transmissions of family values from parents to children. However, this persistence may also come from an indirect channel of these original family types, that have influenced the design of stable political and economic institutions, which then perpetuate over time the dominant family trait. Demographers have emphasized this constancy of family types (Smith, 1996) and their nature of original institution which reproduces itself although they have recognized that "changes of this past century have tended to make cultures and mentalities more uniform" (Reher, 1998). This view has however been challenged by several ideas, such as that social capital is a superseding institution with respect to family (Coleman, 1990) or that in the modernization process corporations substitute kinship-based institutions (Greif, 2006). The debate has concerned in particular the role of families in the industrial revolution: was the nuclear family the result or one of the causes of it? Several authors (Greif, 2006) have argued that nuclear families have spread rapidly as a result of the industrialization and they have become the prevailing homogeneous type across Europe, dominating all

other types of families. This may suggest a reverse causality problem when we address the role of family types on socio-economic outcomes. However if family types, as reconstructed by Todd (1983), date back to a time long before the economic developments in modern age, the reverse causality problem should not be so worrying. This is especially true when we analyze more recent socio-economic outcomes. We will return to this issue when presenting our results.

3.2 The design of pension systems

Pension systems were introduced in the western world around the period of urbanization, when nuclearization of families and the distance between places of living of the different generations made children unable to look after their parents and to take care of their old age needs, and new forms of insurance had to be introduced. Pension schemes were introduced with the main goal of transferring resources towards the old-age, either redistributing intragenerationally from young to old, as in PAYG, or moving resources from the youth to the old age, as in fully-funded systems.

Besides their financing method - PAYG, FF or mixed- ever since their introduction, pension systems have also largely differed in their design, generosity and coverage. The two polar cases are represented by the Bismarckian and the Beveridgean systems. A Bismarckian scheme covers the workers, who have contributed to the system throughout their working life, and provides a pension benefit that is strictly related to these contributions and replaces a large share of the workers' previous wage. The replacement rates, i.e. the ratio of post-retirement pension benefits to pre-retirement earnings- are thus largely constant across individuals of different incomes and the system entails no intragenerational redistribution. Beveridgean systems instead have more universal coverage, they still base their financing on social security contributions, but typically do not provide a pension benefit that replaces a good share of the worker's previous wage. In fact in Beveridgean systems contributions are proportional to earnings but benefits are almost flat. Hence, they largely represent a safety net that ensures enough retirement income to low-income workers to cover their pensions wage, while providing a low replacement of their pensions

wage to middle and high income workers; thus, intragenerational redistribution is large.

The names "Bismarckian" and "Beveridgean" date back to the origin of the social security system in Germany and to the alternative system proposed after some decades by the Beveridge report in the United Kingdom respectively. In the first social security system, created in Germany by Bismarck in 1881, benefits were earning-related. The Beveridge report, published in 1942 in the UK, introduced the alternative idea of a *minimum* system, i.e., a system with flat-rate benefits for qualified retirees. Different ideological and political contexts may be recognized behind the design of the two alternative systems (see Cutler and Johnson 2004). Bismarckian systems (including old age, sickness, disability) were introduced as a way to cement the alliance of popular groups with the Reich, in opposition to socialist forces, with the purpose of maintaining the order of the state and the society. We may recognize the link with a pre-existing hierarchical and vertical organization of the family based on the authoritarian principle. As we have already emphasized (see Todd, 1983), this authoritarian principle contains an intrinsic tension towards individualism, while never reaching its extreme expression represented by what we called the culture of "indifference". This may explain why the Bismarckian model spread out also in countries such as Italy or Spain, dominated by non-authoritarian relationships of the weaker type.

Britain, on the opposite, was characterized by a liberal and democratic tradition, influenced by leading political economists from Adam Smith to Ricardo, without a notion of supremacy of the state responsibility. The Beveridgean plan was created with the double intention of redistributing in favor of the poor and of limiting the state action, thus leaving the maximum freedom to individuals. Flat-rate benefits are meant to reduce the number of people in needs, while affirming individual freedom to provide for their additional needs.[6]

As family types are persistent over time (see the previous section), so is the design of pension systems. In fact, while the size of pensions changes rapidly over years, depending

[6] There are traces of an embryonic welfare state in the Beveridge tradition well before the Beveridge report: Smith (1996) refers the origin of the welfare state back to the Poor Laws of 1601, and he considers them a product of the pre-existing structure of the English nuclear family.

on the economic and political circumstances (see Galasso, 2006), the redistributive design has been proved to be much more stable: the United Kingdom is still an example of a flat-rate pension system, while Germany, Italy and France have remained earnings-related. For a sample of 20 OECD countries, Krieger and Traub (2008) find no significant evidence of a change in the intragenerational redistribution in PAYG systems. Some examples may also suggest that each scheme is even accentuating its original design: Bismarckian systems are becoming more Bismarckian and the same happens to Beveridgean ones. Italy for instance has implemented reforms which have accentuated the earning-related design, by shifting from a defined benefit formula of calculating pensions to a notional defined contribution one, which implies a full link of contributions and benefits, thus entailing the minimum amount of intragenerational redistribution. On the opposite, in the last few years the UK program has become even more redistributive: rich individuals may 'contract out' of the public system and enjoy a reduction of the contribution rate, while the State Second Pension (S2P) scheme introduced in 2002 implies a particular attention to the level of pension that represents a safety net.

3.3 Our mechanism and alternative determinants

We highlight the existence of a transmission mechanism from pre-existing family organizations, as described by Todd (1983) to the original, yet persistent design of pension systems. Our idea is that when pension systems were introduced as a way to provide old-age support which was previously provided within the family, they were designed to mirror the same organization that was prevailing within the family. The types of families presented by Todd (1983) provide a broad picture of the organization of the family, which may affect pension design. Absolute nuclear families were characterized by weak ties among generations and strong independence within the family. There were no specific rules on the amount of resources that had to be transferred by adult children to their old parents. This means that adult children may decide whether to provide old age support to their parents or not, and they may think that their unique obligation is to guarantee subsistence of the elderly. This organizational set-up of the family would translate into

a pension system that provides a basic safety net, but it is not compelled to ensure a complete provision of the elderly retirement income.

Besides family organizations, there may be alternative determinants of the origins and main features of the welfare state, and alternative mechanisms of transmission from pre-existing contexts to the welfare state. The literature has so far focused on the role of religion, democratization, urbanization and legal origins. Flora (1983, 1987) argues that the welfare state was born under the process of secularization, i.e. the decline of religion on human conduct, and the influence of Protestantism. When religion institutions lost their dominance over society and in non-religious roles and people reduced their religious practices and beliefs, the state replaced the church in the "public" spheres. Protestantism favored the development of the welfare state, in opposition to Catholicism since the first one encouraged the mobilization of lower income levels into mass politics and reduced the power of the church into the public sphere, while the second one continued to be dominated by the conflict between state and church.[7] This contrast between the Protestant and the Catholic countries is considered fundamental to explain the differences in timing and quality (such as the level of centralization and the degree of state intervention) of the welfare states.[8]Since the diffusion of religion has proved very persistent, this original effect may perpetuate in shaping currently different welfare state systems.

Democratization may also represent an alternative mechanism. According to the modernization theory (Lipset, 1959), the introduction of the welfare state was due to the growing needs for social policy, social and economic equality and security, created by the industrialization. In urban richer societies the demand for welfare state increases.

[7]The relation between religion and in general socio-economic transformations was first identified by Weber (1905), who linked the Protestant Reform to the modern capitalism. Recently, Guiso et al (2003) find that religious beliefs, especially Christian religions, are associated with growth enhancing economic reforms. See also McCleary and Barro (2006).

[8]Recently, van Kersbergen and Manow (2009) reconsider the role of Protestantism, and show that Reformed Protestantism substantially delayed and restricted modern social policy, while the Lutheran state churches positively contributed to the introduction of social protection programs. They also argue that the interaction between religion and electoral rules produced the different political class coalitions sustaining different welfare regimes.

Moreover, the process of economic modernization also promotes the foundation and the consolidation of democracies.[9] In democracies poor groups take part in politics and, as a consequence, policies that favour such groups and tend to promote equality emerge, such as redistributive policies, which mainly take place through an enlarged welfare state (Acemoglu and Robinson, 2006; Boix, 2003). Thus more democratic countries tend to have a larger welfare state.

Legal origins may also shape the pre-existing context where pension systems were introduced. According to La Porta et al (1997) legal origins are a proxy for financial development. As argued by Pinotti (2009) more financial development implies less PAYG social security and viceversa, thus establishing a causal relationship from pre-existing legal origins and the size and features of the pension system (see also Perotti and Schwienbacher, 2007).

Finally, as argued by Persson and Tabellini (2004), the size of old age security may also depend on electoral rules (majoritarian/proportional) and forms of government (presidential/parliamentary). In particular, presidential regimes may induce smaller public sectors, and proportional elections lead to greater and less targeted government spending and larger budget deficits.

In our empirical strategy we will test the validity of the transmission mechanism running from family types to pension's design compared to these alternative channels.

4 The Empirical Analysis

4.1 Empirical strategy

We aim to test our idea that family types since the medieval times affected the design of pension schemes around the world. The association may be direct, through their persistence over time, or indirect, since family relationships shape the dominant cultural traits of a society. In the family people and values reproduce themselves. Each generation inter-

[9] Notice that the interaction between modernization and democratization is a two-way relation and it is difficult to know the correct direction of causality: economic development favors democracy, but also stable democracies would entail economic growth.

nalizes the values of the previous one almost automatically, though not always consciously.

We argue that since pensions largely substituted for old-age family support, they were shaped after the pre-existing family organization in the country. We use different measures to identify the initial design of the pension system. Since Bismarckian systems provided high replacement rates that are constant across income groups, while in Beveridgean systems the replacement rates vary widely across income, we identify the design of the pension scheme with the ratio between replacement rates (the ratio of post-retirement pension benefits to pre-retirement earnings) at different levels of income. Higher ratios imply different provision of pension to different retirees relative to their previous wage income, and are consistent with a safety net being provided to low-income, while little replacement being given to the others. We also use a direct measure of the current replacement rate for an individual with the average wage in the economy. Higher replacements of his income are associated with more generous pension for the retiree and indicate that the system provides more than just a safety net. Pension coverage, defined as the share of population between 15 and 64 years old that is covered by the pension system, captures the diffusion of the system among the population. A system providing only a safety net could have more coverage, and yet being associated to lower spending. Pension expenditure as a percentage of GDP is also considered as a dependent variable.

We estimate a simple least-squares model:

$$\begin{aligned} y_i &= \alpha + \beta_1 COMMUNITY + \beta_2 AUTHORITARIAN + \beta_3 EGALNUCLEAR + \\ &\quad \beta_4 OECD + \beta_5 LAAM + \beta_6 AFRICA + \beta_7 X_i + \varepsilon_i \end{aligned}$$

where y_i is our dependent variable measuring the redistributive design of pension schemes or the size of pension in country i; $COMMUNITY$ is a dummy variable equal to 1 if in country i there was a model of communitarian family and 0 otherwise; $AUTHORITARIAN$ is a dummy variable equal to 1 if in country i there was autoritharian family and 0 otherwise; $EGALNUCLEAR$ is a dummy variable equal to 1 if in country i there was egalitarian nuclear family and 0 otherwise; $OECD, LAAM$ and $AFRICA$ are geographical dummy variables equal to 1 if country i belongs to OECD, Latin America and Africa respectively and 0 otherwise; X_i is a set of control variables which include alternative legal,

cultural, political, economic and demographic determinants that could have affected the design and the size of the system and ε_i is the error term. The absolute nuclear family type is thus the omitted one and our reference family type.

For our dependent variables y_i we use different measures of design and size of the pensions: (i) the ratio between the replacement rates of a worker earning one-half of the average income and the one of a worker earning exactly the average income (repl50_1); (ii) the ratio between the replacement rate of a worker earning the 75% of the average income and the one of a worker earning 150% of the average income (repl75_150); (iii) the replacement rate of a worker earning the average income (replacem1); (iv) the pension coverage, i.e. the share of population between 15 and 64 years old that is covered by the pension system, and (v) the pension expenditure as a percentage of GDP.

Figures 3 and 4 show the distribution of our main measures of pensions design, (repl50_1) and (repl75_150) across the world, suggesting that they vary widely across geographic areas.

We run different sets of regressions including each of the following control variables X at a time: indicators of legal origin, religion, level of urbanization, level of democracy, GDP and the share of elderly.

Our unit of analysis is at country level, since pension design varies at country level but is homogeneous within country. Furthermore, since this design displays a strong persistence and we are considering the historical determinants of the current pension, it abstracts from the time component and have to rely on a cross-country analysis. Data availability limits the number of observations to 55 when we use the replacement rates (repl50_1) and to 78 when we measure the size of pension.

Data sources are described in the appendix, including the list of considered countries, and summary statistics are in table 2.

4.2 Results

Table 3 presents our baseline specification: we regress our measures of the design and size of pensions on the three types of pre-existing structures of families and on geographical

dummies. Communitarian and egalitarian nuclear families are less redistributive than absolute nuclear ones for our two measures of the replacement ratio. Using our second measure, also authoritarian families are less redistributive than absolute nuclear. This result is in line with the idea that absolute nuclear families capture weak and independent relations between parents and children in the family, which are reproduced in the design of a pension system which shows the minimum link between earnings and benefits, i.e. high redistribution. Where children do not expect to receive a part of their parents income, they are also not ready to provide support for their old-age parents. They just want to provide them if they are needy. This idea translates into pensions: individuals only expect to receive from the state a safety net. When instead children took good care of their elderly parents, the state has to provide a sufficient pension to replace the individual previous wage income, not just a safety net. The level of the replacement rate is also positively related with family ties: all family types have a higher level than absolute nuclear families, indicating that they offer something more than a safety net.

When we turn to the size of pension, as expected, absolute nuclear families are associated with a higher coverage: more broadly safety net schemes are more common in these societies. The current pension spending is instead unrelated to the types of families. OECD countries have larger pension systems and African smaller ones.

Table 3 suggests that long-term, persistent features of the pension design are associated with the type of families, while less stable characteristics, such as pension spending, are not. Existing literature (see Culter and Gruber for the case of health insurance, 1996) have also suggested a strong link between welfare state policies, individual behaviors and family organization (such as coresidence).

Our use of historical data may help to establish a causality link running from pre-existing family structures tracing back to the medieval periods, to the design of social security systems and to address reverse causality.[10] Furthermore, if a more redistributive

[10] Historical variables have been used in the literature as a way to measure cultural traits of populations. They solve the causality problem involved with the use of indicators built on survey-based evidence (such as the World Value Surveys), which measure culture directly, referring to the beliefs or attitudes expressed by individuals on a series of issues. See also the Schwartz cultural orientation scores (Licht et al. 2006).

pension scheme would have to have an impact on the family relationships, we would expect it to strengthen the link between parents and kids, since parents would search for more old-age support from their kids to complete the safety net provided by the state.[11] A more serious concern is the existence of omitted variables, such as industrialization or urbanization, which could be argued to explain the design (and the introduction) of the pension systems and to be correlated with the family structure (see Greif, 2006). We hence enrich our baseline scenario by introducing additional variables which may suggest alternative channels for the explanation of the original design of pension systems, or which may influence both the design of pensions and the family values.

We first introduce legal origins, which, following La Porta et al. (1997) are classified as Anglo-Saxon, Socialist, Germany and French. Figure 5 shows the distribution of these indicators across the world. By comparing figure 2 and 5 we do not see a clear association between the family types and the origin of the legal system, suggesting that family ties are capturing some inherent values different from what is expressed by the origin of the legal system. This is confirmed in table 4, where we include the four dummy variables referring to legal origins in our baseline specification. When compared to communitarian and egalitarian nuclear families, absolute nuclear families remain associated with less earnings-related schemes and larger coverage. Communitarian families have also a higher replacement rate. The anglo-Saxon legal origin is associated with less coverage and less pension spending, but it does not affect the design.[12]

We then turn to religion, which has also been considered a crucial determinant of economic and social outcomes and a persistent one (see section 2.3). We hence need to control whether religion, rather than the principles underlying family types, is the real responsible of different pension design across countries. Figure 6 suggests that the diffusion of the main religions, Catholic, Orthodox, Protestant, Islamic, around the world in 1900 is not directly associated with the design of pensions. Redistributive pensions are present

[11] On the relationship between pensions, children and savings as alternative sources of old-age support see Galasso et al (2009).

[12] This result is in line with the idea that private pensions may be substitute for public pensions when financial markets are well developed, which is in turn associated with English legal origin.

in many Protestant countries, but also in the catholic Argentina and Ireland. In table 5 we control for the relative share of the four religions in the different countries in 1900 (i.e. at the period around the introduction of the pension systems). We find that absolute nuclear family are again associated with more redistributive pension schemes than the other types of families, while religion seems to have no effect on the design of pensions,[13] but to be associated with small pension expenditure and coverage in the case of a large share of Muslims. Similarly, in table 6, an Herfindal index of religious homogeneity is not significantly associated with the design, while the types of family (absolute nuclear family as opposed to the others) remain crucial.

In table 7 we include a measure of the level of urbanization of the country at the beginning of the XX century. While this variable turns out to be associated with the size of the pensions system in the obvious direction (more urbanization implies more pensions), it is not significant to explain their design. The types of family instead remain significant.

In table 8 we introduce an indicator of the political environment in the different countries at 1900. Do the design of system or their size depend on whether countries were more democratic at the time of the introduction of the system? A higher level of democratization, as captured by the Polity2 indicator[14] has no impact on the design of pensions, while having an absolute nuclear family organization implies a significant different design than any other family type, in terms of a higher redistributive component.

In table 9 we control for current economic and demographic variables, namely the level of GDP and the share of elderly in the population. Richer countries have higher coverage, while more elderly are associated with both higher coverage and more pension spending.[15] Current income and aging however do not explain the design of pensions. The type of family remains significant in all specifications in the usual way.

[13] Unfortunately, the CIA factbook reports observations only for 49 countries, among those for which we have the pension data. The coefficient of the family types are less precisely estimated, but point estimates are in line with the estimates in the previous tables.

[14] This indicator is widely used in both the economic and political science literature on democracy. For details, see the appendix.

[15] There is a large literature on the link between aging and the size of social security (see Galasso and Profeta, 2004, Disney, 2007).

Finally in table 10 we control for the electoral rule and form of government. As expected, majoritarian have lower coverage and level of pension and lower replacement rates than proportional systems. However having a majoritarian or presidential electoral rule has no effect on the redistributive design of pensions, while family types show the same relationships found so far. The form of government, presidential versus parliamentary, turns out to play no role. Unfortunately, observations are drastically reduced due to data availability.

To sum up, we have found that the family organization plays a crucial role as primal determinant of the design of pension systems since their introduction. Legal origin and religion, instead, which have been extensively suggested to determine other socio-economic outcomes, play no role in this case. Similarly, other determinants of the context in which pensions were introduced, such as the level of urbanization or democratization of the country at that time, or current variables such as current GDP and the share of elderly in the population, have also little to say about the design of pensions. Interestingly, some of these variables turn out to be related to current features such as the size or the coverage of the pensions, but not to old, persistent characteristics, such as the design. A family organization based on absolute nuclear families represents the better correspondence to the design of redistributive pension systems.

5 Conclusions

We have identified the types of family relationships as the ultimate cause of the design of pension systems and contribute to rationalize its persistence over time. Why family? Following Todd (1983), family does not depend on climate conditions, geological features, economic environment. It is impossible to associate it with geographic territories. The system of latent values embedded in the family has no link with religion or language. There is nothing pre-determined to the family relationships. In a world, behind the family there is only the "hazard".

We have found that absolute nuclear families, where the relations between parents and children are weak, leads to the emergence of a pension system with flat benefit formulas

and more redistribution across income levels, as compared with the other types of families, in particular communitarian and egalitarian nuclear. The link between the type of families and the design of pension systems is robust to the introduction of other historical pre-existing conditions, such as legal origin, religion, urbanization, democratization.

Besides having a strong historical component, our analysis may shed some light on the feasibility of today's pension reforms, by explaining how individuals' behavior as shaped by cultural/institutional elements influences the policymakers decision on which institution (e.g., pension system) to choose, how to design it (namely, earnings-related versus flat-rate) and how to implement the policy. This is a promising direction for future research.

6 Technical appendix

6.1 Proof of proposition 1

Suppose first that there are no pensions. In the old regime with strong family ties, if the adults do not save, they divide their resources (income and past savings, if positive) between their own consumption and consumption of the old:

$$y + s_{t-1}(1+R) = c_t^A + c_t^o$$

Since adults have to provide the elderly with at least $c_t^o = \gamma y$ (see Eq.4) we can write the consumption of the adults as follows:

$$y(1-\gamma) + s_{t-1}(1+R) = c_t^A$$

If instead the adults decide to save, we have:

$$y + s_{t-1}(1+R) = c_t^A + c_t^o + s_t$$

and, given $c_t^o = \gamma y$, the consumption of the adults decreases to:

$$y(1-\gamma) + s_{t-1}(1+R) - s_t = c_t^A$$

Since when the adults become old they will receive the same transfer γy from the next adults' generation, and they will not have property rights on their savings, their

consumption as old will always be the following, both in case they save or they do not:

$$c_{t+1}^{o} = \gamma y$$

Thus, the utility of an adult, expressed at Eq. 1, in case of zero or positive savings is, respectively:

$$U\left(s_t = 0, P = 0\right) = y + s_{t-1}(1 + R)$$

and

$$U\left(s_t > 0, P = 0\right) = y + s_{t-1}(1 + R) - s_t$$

Clearly, the utility decreases in presence of savings, and thus the adults choose not to save.

Suppose now that the adults have to decide upon the introduction of the pension system. The utility becomes

$$U\left(s_t = 0, P_t > 0\right) = y(1 - \tau_t) + s_{t-1}(1 + R) + P_t$$

Given Eq. 2, we have

$$U\left(s_t = 0, P_t > 0\right) = y(1 - \varepsilon\tau_t) + s_{t-1}(1 + R)$$

It is immediate to check that $\frac{\partial U}{\partial \tau_t} < 0$ and thus the adults will decide not to introduce pensions ($\tau_t = 0$).

6.2 Proof of proposition 2

In weak family ties the old have property rights and $c_t^o \geq \delta y$. We consider separately the case in which past savings are zero, i.e. $s_{t-1} = 0$ or past savings are positive $s_{t-1} > 0$.

Suppose first that $s_{t-1} = 0$. In absence of pensions, if the adults decide not to save, they divide their income between their consumption and the consumption of the old:

$$y = c_t^A + c_t^o$$

which, given the minimum level of consumption that has to be guaranteed to the old, i.e. $c_t^o = \delta y$, implies that

$$c_t^A = y(1 - \delta)$$

Since, in case of no savings, consumption when old is equal to

$$c_{t+1}^{o} = \delta y$$

the utility function for an adult who decides not to save is equal to:

$$U(s_t = 0, P_t = 0) = c_t^A + c_{t+1}^{o} = y \tag{5}$$

If instead the adults decide to save, they keep their consumption in adult age at the minimum level, $c_t^A = \theta y$, provide the elderly with the minimum amount of transfer, $c_t^o = \delta y$, and save the remaining of their income:

$$s_t = y(1 - \delta - \theta)$$

In old age they will receive savings and their returns and they will receive a transfer from the next generation of adults in case they do not have enough resources (in the state of the world that realizes with probability $1 - \rho$). Thus, their consumption in old age will be equal to:

$$c_{t+1}^{o} = (1 + R)s_t + (1 - \rho)\delta y$$

and the utility will be:

$$U\left(s_t > 0, P_t = 0\right) = c_t^A + c_{t+1}^{o} = \theta y + (1 + R)y(1 - \delta - \theta) + (1 - \rho)\delta y \tag{6}$$

Comparing the two utilities at Eq. 5 and Eq. 6 after simple algebra we find that, if $R < \frac{\delta\rho}{1-\delta-\theta}$,the utility obtained in absence of savings is larger than the one obtained in presence of savings and thus the adult choose not to save, and viceversa if $R > \frac{\delta\rho}{1-\delta-\theta}$.

If pensions were introduced, the utility function of an adult who decides not to save becomes:

$$U\left(s_t = 0, P_t > 0\right) = y(1 - \tau_t) + P_t \tag{7}$$

Given Eq. 2 this utility can be rewritten as

$$U\left(s_t = 0, P_t > 0\right) = y(1 - \varepsilon\tau_t) \tag{8}$$

Since $\frac{\partial U}{\partial \tau_t} < 0$ the adults want to keep pensions at the minimum level, i.e.:

$$P_t = (1 - \varepsilon)\tau_t y = \delta y$$

which implies that

$$\tau_t = \frac{\delta}{1-\varepsilon} \tag{9}$$

Using the above expression into 7 we can rewrite the utility function in case of positive pensions as follows:

$$U\left(s_t = 0, P_t > 0\right) = y(1 - \frac{\delta\varepsilon}{1-\varepsilon}) \tag{10}$$

which is clearly below the utility level in case of zero pensions, $U\left(s_t = 0, P_t = 0\right) = y$. Thus, the adults prefer zero pensions.

Similarly, in case past savings are positive, i.e. $s_{t-1} > 0$, the adults have to provide the old with the minimum level of consumption δy only in the case of a low rate of return (with probability $1-\rho$). If they decide not to save their consumption in adult age is equal to:

$$c_t^A = y\left[1 - \delta(1-\rho)\right]$$

while in old age they still get

$$c_{t+1}^o = \delta y$$

Thus, the utility of a young individual who decides not to save is equal to

$$U\left(s_t = 0, P_t = 0\right) = c_t^A + c_{t+1}^o = y(1 + \delta\rho) \tag{11}$$

If instead the adults decide to save, they keep their consumption in adult age at the minimum level, $c_t^A = \theta y$, they provide, only in case of low rate of return, the elderly with the minimum amount of transfer, $c_t^o = \delta y$, and save the remaining of their income:

$$s_t = y\left[1 - \delta(1-\rho) - \theta\right]$$

In old age they will receive savings and their returns and they will receive a transfer from the next generation of adults in case they do not have enough resources (with probability ρ). Thus, their consumption in old age will be equal to:

$$c_{t+1}^o = (1+R)s_t + (1-\rho)\delta y \tag{12}$$

and the utility will be:

$$U\left(s_t > 0, P_t = 0\right) = c_t^A + c_{t+1}^o = \theta y + (1+R)y\left[1 - \delta(1-\rho) - \theta\right] + (1-\rho)\delta y \tag{13}$$

Comparing the utility in case of positive or zero savings, we find that, if $R > \frac{\delta\rho}{1-\delta(1-\rho)-\theta}$ the adults decide to save and, if $R < \frac{\delta\rho}{1-\delta(1-\rho)-\theta}$, they decide not to save. Notice that, since $\frac{\delta\rho}{1-\delta(1-\rho)-\theta} < \frac{\delta\rho}{1-\delta-\theta}$,the threshold found in case of zero past savings applies, and we have that savings are positive if $R > \frac{\delta\rho}{1-\delta-\theta}$.

Finally, will pensions be introduced when adults decide to save? In case of pensions, savings of an adult become equal to:

$$s_t = y(1 - \theta - \tau_t)$$

given Eq. 9 and Eq.12, we can write the utility of an adult who saves as follows:

$$U\left(s_t > 0, P_t > 0\right) = \theta y + y(1 - \frac{\delta}{1-\varepsilon} - \theta)(1 + R) + (1 - \rho)\delta y$$

Comparing the above utility with the one obtained at Eq. 13 in absence of pensions, we can easily prove that the first one is always smaller than the second one and thus adults choose zero pensions.

6.3 Proof of proposition 3

Suppose first that past savings are zero, $s_{t-1} = 0$ and there are no pensions. In the new regime the adults still transfer γy to the old, but this involves a cost ϕ. If an adult decides not to save, his consumption when adult, when old and his utility are respectively:

$$c_t^A = y\left[1 - \gamma(1 + \phi)\right]$$

$$c_{t+1}^o = \gamma y$$

$$U\left(s_t = 0, P_t = 0\right) = c_t^A + c_{t+1}^o = y(1 - \gamma\phi)$$

In case instead the adult decides to save, he will keep his consumption as adult at the subsistence level θy:

$$c_t^A = \theta y$$

and save the part of his income that remains after providing the transfer to the old and after his consumption:

$$s_t = y\left[1 - \theta - \gamma(1 + \phi)\right]$$

In this new regime, the adult has property rights on his savings, that he will receive when old. Moreover, he will receive the transfer from the next generation only with probability $(1-\rho)$. Thus, the consumption when old becomes:

$$c_{t+1}^{o} = (1+R)s_t + (1-\rho)\gamma y$$

The utility of an adult who decides to save is thus

$$U\left(s_t > 0, P_t = 0\right) = \theta y + y\left[1-\theta-\gamma(1+\phi)\right](1+R) + (1-\rho)\gamma y$$

Comparing the two levels of utility in case of zero savings and positive savings we find that zero savings is a preferred choice if $R < \frac{\rho\gamma}{1-\theta-\gamma(1+\phi)}$ and viceversa.

If pensions were introduced, the utility function of an adult who decides not to save becomes:

$$U\left(s_t = 0, P_t > 0\right) = y(1-\tau_t) + P_t \tag{14}$$

As before, given Eq. 2, the utility above can be rewritten as:

$$U\left(s_t = 0, P_t > 0\right) = y(1-\tau_t\varepsilon) \tag{15}$$

Since $\frac{\partial U}{\partial \tau_t} < 0$,the adults will decide to keep τ at its minimum level, i.e. the one such that the pension equals the transfer that has to be guaranteed to the old:

$$P_t = (1-\varepsilon)\tau_t y = \gamma y$$

which implies that

$$\tau_t = \frac{\gamma}{1-\varepsilon} \tag{16}$$

and

$$U\left(s_t = 0, P_t > 0\right) = y(1-\frac{\gamma\varepsilon}{1-\varepsilon}) \tag{17}$$

which, for $\phi > \frac{\varepsilon}{1-\varepsilon}$ is larger than the utility reached in case of zero pensions ($U\left(s_t = 0, P_t = 0\right) = y(1-\gamma\phi)$).

Suppose instead that past savings were positive, $s_{t-1} > 0$, the adults have to transfer γy to the elderly only with probability $(1-\rho)$. Thus, if the adult decides not to save, his consumption when adult, when old and his utility become:

$$c_t^A = y\left[1-\gamma(1+\phi)(1-\rho)\right]$$

$$c_{t+1}^{o} = \gamma y$$

$$U\left(s_t = 0, P_t = 0\right) = y\left[1 - \gamma\phi(1-\rho) + \gamma\rho\right]$$

In case instead he decides to save, we have

$$c_t^A = \theta y$$

$$s_t = y\left[1 - \theta - \gamma(1+\phi)(1-\rho)\right]$$

$$c_{t+1}^{o} = (1+R)s_t + (1-\rho)\gamma y$$

$$U\left(s_t > 0, P_t = 0\right) = \theta y + y\left[1 - \theta - \gamma(1+\phi)(1-\rho)\right](1+R) + (1-\rho)\gamma y$$

Thus, the adult decides to save if $R > \frac{\rho\gamma}{1-\theta-\gamma(1+\phi)(1-\rho)}$ and viceversa. Since $\frac{\rho\gamma}{1-\theta-\gamma(1+\phi)(1-\rho)} < \frac{\rho\gamma}{1-\theta-\gamma(1+\phi)}$, the threshold found in case of zero past savings applies, and thus savings are positive if $R > \frac{\rho\gamma}{1-\theta-\gamma(1+\phi)}$.

To understand whether in case of positive savings the adults would like to introduce pensions, we compare the above utility with the one that can be obtained in case of positive pensions. Knowing that, in case of positive pensions

$$c_t^A = \theta y$$

$$s_t = y\left[1 - \theta - \tau_t\right]$$

$$c_{t+1}^{o} = (1+R)s_t + P_t$$

with pensions kept at the minimum level (as before, this is true since $\frac{\partial U}{\partial \tau_t} < 0$),

$$P = \tau y(1-\varepsilon) = \gamma y$$

and

$$\tau = \frac{\gamma}{1-\varepsilon}$$

and thus

$$U\left(s_t > 0, P_t > 0\right) = \theta y + y\left[1 - \theta - \tau\right](1+R) + \tau(1-\varepsilon)y$$

Comparing the utility in case of zero and positive pensions, it is easy to check that an adult prefers a positive pension iif $\phi > \frac{\varepsilon}{1-\varepsilon} - \frac{\rho}{1+R}$.

6.4 Proof of proposition 4

It follows from the same steps as proposition 3 but with $c^o_{t+1} = \delta y$ instead of $c^o_{t+1} = \gamma y$.

7 Data appendix

We here describe the variables used in the empirical analysis and their sources.

- Replacement rates of the pension system at 50%, 75%, 100% and 150% of average labor income are built on Whitehouse (2007) "Pension Panorama" The World Bank and OECD (2009) "Pension at a Glance. Special Edition: Asia/Pacific. From these data we calculate repl50_1: the ratio between the replacement rate of a worker earning one-half of the average income and the one of a worker earning exactly the average income; repl75_150: the ratio between the replacement rate of a worker earning the 75% of the average income and the one of a worker earning 150% of the average income and replacem1: the replacement rate of a worker earning the average income. Data on repl75_150 are available for the following countries: Algeria, Argentina, Australia, Austria, Bahrain, Belgium, Bulgaria, Canada, Chile, Colombia, Costa Rica, Croatia, Czech Republic, Denmark, Dominican Republic, Egypt, El Salvador, Estonia, Finland, France, Germany, Greece, Hungary , Iran, Ireland, Italy, Japan, Jordan, Latvia, Libya, Lithuania, Luxembourg, Mexico, Morocco, Netherlands, New Zealand, Norway, Peru, Poland, Portugal, Slovak Republic, South Korea, Spain, Sweden, Tunisia, Turkey, United Kingdom, United States, Uruguay, Yemen. Data on replacemen1 and repl50_1 include also China, India, Indonesia, Pakistan, Vietnam.

- Coverage1564 is the share of population between 15 and 64 years old that is covered by the pension system. It is constructed as the mean of different observations over time. Source: World Bank (2007). HDNSP pension database. With respect to the previous variable, the sample includes some additional countries, Afghanistan, Albania, Bangladesh, Bolivia, Brazil, Dominica, Ecuador, Jamaica, Kazakhstan, Kyrgyzstan, Lebanon, Nicaragua, Paraguay, Syria, Venezuela, Yugoslavia, but excludes

Bulgaria, Dominican Republic, New Zealand.

- Pengdp_91_2006: this variable indicates how much pensions count as a share of GDP. The data were collected in different time periods, in particular between 1991 and 2006. However most of them come from a period around the 2000. Source: World Bank (2007), HDNSP pension database. The sample includes the same countries as coverage 1564 with the addition of Azerbaijan, Belize, Cuba, Dominican Republic, Ethiopia, Guatemala, Honduras, Israel, Kuwait, New Zealand, Panama, Russia, Slovenia, Trinidad & Tobago, Turkmenistan, Uzbekistan and the exclusion of Bahrain, Dominica, India, Indonesia, Kazakhstan, South Korea.

- Family types variables:

  - AbsoluteEgal: this variable is equal to one if the family is absolute nuclear and zero otherwise. Source: Todd (1983).

  - Community: this variable is equal to one if the family is communitarian and zero otherwise. Source: Todd (1983).

  - Authoritarian: this variable is equal to zero if there are authoritarian families and zero otherwise. Source: Todd (1983).

  - Egal Nuclear: this variable is equal to zero if there areegalitarian nuclear families and zero otherwise. Source: Todd (1983).

- Legal origins variables: the origin of the legal system in a country is indicated by a set of dummy variables l_eng l_soc l_ger l_fra. Each dummy is equal to one if the country has the particular legal origin of interest and zero otherwise. In general we do not have overlapping among the dummies. More precisley: l_eng refers to an Anglo-Saxon legal origin; l_soc refers to a socialist legal origin; l_ger to a Germany legal origin; l_fra to a French legal origin. Source: La Porta et al. (1998).

- Religion variables:

  - Cath1900, Orth1900, Prot1900, Mus1900 contain the percentage in 1900 over the entire population of Catholic, Orthodox, Protestant and Muslin people respectively.

Source: CIA factbook.

- Herfrel1900: this variable is a proxy for the level of religious heterogeneity is a country in 1900. It has been constructed computing the Hirschman-Herfindahl index using the religion data. In particular we have data on the following religions: catholic, protestant, orthodox, Muslim, Jewish, Buddhism, East Religions;

- Urban: this variable contains the share of population living in an urban area in the early XX century. Source: World Bank, World Development Indicators (WDI).

- Polity2_1900: This data presents an evaluation of the political situation in the different countries. The ranking goes from -10 (hereditary monarchy) to +10 (consolidated democracy). The score is computed by subtracting the AUTOC score from the DEMOC score, where these indicators are derived from coding of the competitiveness of political participation, the openness and competitiveness of executive recruitment and constraints on the chief executive using different weights. Source: Center of Systemic peace, the Policy IV Project (http://www.systemicpeace.org/polity/polity4.htm). Data refers to the year 1900.

- Lngdppc2000: logarithm of the GDP per capita in the 2000. Source: World Bank, World Development Indicators

- Pop_65_2000: share of people older than 65 years old over the entire population in 2000. Source: World Bank, World Development Indicators

- Geographic dummy variables:

  - Oecd: dummy variable equal to one if the country of interest is an OECD country and zero otherwise;

  - Laam: dummy variable that is equal to one if the country of interest is a Latin America country and zero otherwise;

  - Africa: dummy variable that is equal to one if the country of interest is an African country and zero otherwise;

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Table 1: Family ties and family types

VARIABLES	(1) fam_imp	(2) pare_respect	(3) pare_respon
age	-0.00689***	-0.000724	-0.00412***
	(0.000976)	(0.000891)	(0.00106)
agesq	7.74e-05***	-2.91e-06	2.74e-05***
	(1.24e-05)	(1.06e-05)	(1.00e-05)
income	-0.00885***	0.00602***	0.000759
	(0.00220)	(0.00199)	(0.00266)
educ	0.00388	0.00875***	0.0150***
	(0.00234)	(0.00250)	(0.00318)
polviews	0.00303	0.0146***	0.00801**
	(0.00427)	(0.00269)	(0.00350)
community	**0.0392**	**-0.135****	**0.0857*****
	(0.0397)	**(0.0647)**	**(0.0313)**
aut	**0.0187**	**0.0120**	**0.163*****
	(0.0328)	**(0.0883)**	**(0.0486)**
egalnucl	**0.0177**	**-0.142****	**0.0136**
	(0.0354)	**(0.0647)**	**(0.0253)**
Constant	1.259***	0.219***	0.180***
	(0.0411)	(0.0642)	(0.0393)
Observations	101169	94631	89011
R-squared	0.007	0.037	0.028

Table 2: Summary statistics

Summary Statistics					
Variable	Obs	Mean	Std. Dev.	Min	Max
community	85	0.4470588	0.50014	0	1
aut	85	0.1294118	0.3376472	0	1
egalnucl	85	0.3411765	0.4769182	0	1
absonucl	85	0.0823529	0.2765332	0	1
africa	85	0.0705882	0.2576559	0	1
asia	85	0.0588235	0.2366905	0	1
laam	85	0.2705882	0.4469003	0	1
oecd	85	0.2823529	0.4528157	0	1
l_eng	85	0.1764706	0.3834825	0	1
l_soc	85	0.2470588	0.4338609	0	1
l_fra	85	0.4823529	0.502654	0	1
l_ger	85	0.0470588	0.2130215	0	1
cath1900	49	0.4662041	0.4243819	0	1
prot1900	49	0.2058776	0.3351906	0	0.992
orth1900	49	0.0683224	0.1434626	0	0.839
mus1900	49	0.189102	0.3724387	0	0.997
herfrel1900	49	0.7779092	0.1950197	0.338706	1
urban	79	63383.54	19569.98	15400	97000
polity2_1900	46	-0.2391304	6.147031	-10	10
pop_65_2000	83	8.96701	5.089319	1.373369	18.23579
lngdppc	82	8.115943	1.393526	4.706893	10.47798
maj	55	0.2363636	0.4287638	0	1
pres	55	0.3818182	0.4903101	0	1

Table 3: Baseline specification

VARIABLES	(1) repl50_1	(2) repl75_150	(3) replacem1	(4) coverage1564	(5) pengdp_91_2006
community	**-0.470*** **	**-0.512*** **	**29.54*** **	**-31.96*** **	**0.743**
	(0.150)	**(0.120)**	**(10.45)**	**(8.560)**	**(2.267)**
aut	**-0.218**	**-0.237* **	**12.81**	**-1.228**	**1.819**
	(0.149)	**(0.139)**	**(8.514)**	**(3.452)**	**(1.444)**
egalnucl	**-0.359** **	**-0.461*** **	**28.50*** **	**-8.203*** **	**2.379**
	(0.162)	**(0.116)**	**(7.285)**	**(2.602)**	**(1.848)**
oecd	-0.0516	-0.0509	10.17	13.18*	4.176**
	(0.0896)	(0.0561)	(9.138)	(7.785)	(2.045)
laam	0.205	0.173	-8.536	-27.69***	-3.114
	(0.172)	(0.116)	(12.97)	(7.115)	(3.145)
africa	-0.104**	-0.00697	14.89	-1.353	-2.718**
	(0.0445)	(0.0354)	(10.05)	(5.787)	(1.087)
Constant	1.564***	1.529***	44.94***	58.53***	4.453*
	(0.153)	(0.122)	(10.53)	(7.820)	(2.311)
Observations	55	50	55	68	78
R-squared	0.314	0.378	0.185	0.661	0.360

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4: Legal origin

VARIABLES	(1) repl50_1	(2) repl75_150	(3) replacem1	(4) coverage1564	(5) pengdp_91_2006
community	**-0.348***	**-0.387****	**17.43***	**-36.96*****	**-3.094**
	(0.180)	**(0.166)**	**(10.12)**	**(7.908)**	**(2.136)**
aut	**-0.0100**	**-0.0291**	**3.132**	**-7.160**	**-1.034**
	(0.156)	**(0.156)**	**(9.235)**	**(8.077)**	**(1.526)**
egalnucl	**-0.143**	**-0.282***	**9.865**	**-10.13***	**0.332**
	(0.192)	**(0.161)**	**(11.44)**	**(5.277)**	**(1.758)**
l_eng	0.0831	0.197	-10.69	-16.87**	-5.185***
	(0.161)	(0.165)	(8.109)	(7.913)	(1.384)
l_soc	-0.190	0.0239	-0.893	7.020	1.667
	(0.146)	(0.144)	(9.834)	(10.45)	(1.913)
l_ger	-0.329*	-0.213	4.562	-8.339	0.610
	(0.175)	(0.162)	(10.84)	(6.569)	(1.801)
l_fra	-0.193	-0.0607	14.87	-14.46	-2.507**
	(0.127)	(0.121)	(10.38)	(8.994)	(1.246)
oecd	-0.102	-0.0481	4.883	18.29**	4.378*
	(0.120)	(0.103)	(12.41)	(7.116)	(2.290)
laam	0.169	0.189	-14.98	-19.88**	-2.289
	(0.187)	(0.138)	(15.47)	(7.878)	(2.846)
africa	-0.0512	0.0635	1.342	9.558*	-0.533
	(0.0646)	(0.0702)	(17.74)	(5.222)	(1.430)
Constant	1.582***	1.395***	55.74***	67.09***	8.313**
	(0.239)	(0.217)	(16.10)	(10.54)	(3.169)
Observations	55	50	55	68	78
R-squared	0.410	0.465	0.274	0.759	0.529

Table 5: Religion (1)

VARIABLES	(1) repl50_1	(2) repl75_150	(3) replacem1	(4) coverage1564	(5) pengdp_91_2006
community	**-0.441*** **	**-0.518*** **	**21.36** **	**-7.959***	**1.493**
	(0.154)	**(0.140)**	**(9.763)**	**(4.632)**	**(1.688)**
aut	**-0.230**	**-0.272***	**13.34**	**1.290**	**2.484**
	(0.167)	**(0.158)**	**(8.382)**	**(3.109)**	**(1.543)**
egalnucl	**-0.301**	**-0.515*** **	**25.55** **	**-4.183**	**6.068*** **
	(0.184)	**(0.158)**	**(10.06)**	**(4.161)**	**(1.816)**
oecd	-0.0218	-0.0340	5.801	5.675	0.437
	(0.103)	(0.0709)	(8.630)	(4.024)	(1.522)
laam	0.185	0.182	-9.600	-30.53***	-8.789***
	(0.187)	(0.124)	(13.43)	(5.612)	(1.860)
africa	-0.0804**	0.00311	-6.112	6.929	0.527
	(0.0349)	(0.0369)	(12.83)	(4.947)	(0.999)
cath1900	-0.0822	-0.00204	4.545	-0.0206	-3.221
	(0.178)	(0.141)	(19.39)	(9.672)	(5.294)
prot1900	-0.0303	-0.0872	3.023	7.061	-0.560
	(0.168)	(0.134)	(14.39)	(7.986)	(4.874)
orth1900	-0.347	-0.0142	13.50	5.183	-4.111
	(0.248)	(0.200)	(23.51)	(11.43)	(5.753)
mus1900	-0.0858	-0.0544	31.85	-38.94***	-9.189*
	(0.171)	(0.129)	(20.44)	(10.11)	(5.187)
Constant	1.603***	1.575***	45.09***	60.75***	9.572*
	(0.201)	(0.162)	(16.55)	(8.267)	(5.190)
Observations	49	49	49	47	47
R-squared	0.355	0.379	0.332	0.862	0.637

Table 6: Religion (2) Herfindal index of religious homogeneity

VARIABLES	(1) repl50_1	(2) repl75_150	(3) replacem1	(4) coverage1564	(5) pengdp_91_2006
community	**-0.580*** **	**-0.538*** **	**34.76*** **	**-20.71***	**-0.715**
	(0.141)	**(0.122)**	**(10.75)**	**(11.71)**	**(2.385)**
aut	**-0.310** **	**-0.264***	**13.42**	**2.792**	**3.120**
	(0.146)	**(0.145)**	**(9.662)**	**(6.131)**	**(2.070)**
egalnucl	**-0.472*** **	**-0.494*** **	**29.09*** **	**-3.586**	**5.555*** **
	(0.148)	**(0.112)**	**(9.577)**	**(6.288)**	**(1.983)**
oecd	-0.0835	-0.0648	7.344	9.304	1.044
	(0.0915)	(0.0654)	(9.667)	(9.180)	(1.875)
laam	0.198	0.168	-10.74	-28.73***	-8.126***
	(0.166)	(0.115)	(13.26)	(8.080)	(2.102)
africa	-0.107**	-0.0183	7.653	-12.48*	-2.683**
	(0.0419)	(0.0441)	(11.00)	(7.367)	(1.322)
herfrel1900	0.370*	0.108	-3.673	-17.92	-4.881
	(0.188)	(0.152)	(20.11)	(14.03)	(3.655)
Constant	1.378***	1.480***	49.93***	72.88***	10.46***
	(0.174)	(0.145)	(14.02)	(10.21)	(2.958)
Observations	49	49	49	47	47
R-squared	0.381	0.378	0.252	0.684	0.534

Table 7: Urban

VARIABLES	(1) repl50_1	(2) repl75_150	(3) replacem1	(4) coverage1564	(5) pengdp_91_2006
community	**-0.546*** **	**-0.535*** **	**35.11*** **	**-19.13***	**1.135**
	(0.156)	**(0.129)**	**(10.79)**	**(10.26)**	**(1.799)**
aut	**-0.233**	**-0.243***	**13.95**	**0.871**	**1.949**
	(0.148)	**(0.137)**	**(8.367)**	**(4.002)**	**(1.350)**
egalnucl	**-0.413** **	**-0.483*** **	**32.40*** **	**-0.495**	**5.495*** **
	(0.167)	**(0.125)**	**(8.414)**	**(4.155)**	**(1.514)**
oecd	-0.0288	-0.0474	8.495	8.510	1.602
	(0.0942)	(0.0574)	(9.107)	(7.970)	(1.639)
laam	0.235	0.181	-10.72	-32.89***	-7.427***
	(0.175)	(0.123)	(12.95)	(7.230)	(1.766)
africa	-0.0827*	-0.0112	13.30	-7.366	-3.295***
	(0.0433)	(0.0337)	(10.62)	(5.661)	(1.136)
urban	-3.24e-06	-1.30e-06	0.000238	0.000491***	9.14e-05***
	(2.39e-06)	(2.54e-06)	(0.000236)	(0.000140)	(2.74e-05)
Constant	1.813***	1.634***	26.66	22.22*	-0.626
	(0.240)	(0.239)	(21.14)	(13.23)	(2.448)
Observations	55	50	55	64	73
R-squared	0.338	0.382	0.208	0.753	0.541

Table 8: Democracy

VARIABLES	(1) repl50_1	(2) repl75_150	(3) replacem1	(4) coverage1564	(5) pengdp_91_2006
community	**-0.663****	**-0.543****	**44.77****	**-37.60*****	**-3.729**
	(0.306)	**(0.248)**	**(21.40)**	**(8.632)**	**(2.636)**
aut	**-0.337***	**-0.349****	**17.42**	**0.712**	**2.239***
	(0.186)	**(0.150)**	**(11.17)**	**(4.693)**	**(1.193)**
egalnucl	**-0.330**	**-0.453*****	**28.93*****	**-9.371****	**2.441***
	(0.200)	**(0.139)**	**(9.305)**	**(3.658)**	**(1.370)**
oecd	-0.217*	-0.114	6.885	9.592	0.297
	(0.119)	(0.106)	(15.08)	(5.673)	(2.228)
laam	0.00230	0.115	-11.75	-28.30***	-8.212***
	(0.198)	(0.132)	(18.20)	(7.620)	(2.429)
africa	-0.134	-0.0609	-18.07*	-7.621	-7.392**
	(0.0894)	(0.0560)	(10.46)	(5.094)	(3.025)
polity2_1900	-0.00357	0.00299	0.114	0.444	-0.0918
	(0.0127)	(0.00972)	(0.955)	(0.366)	(0.0900)
Constant	1.755***	1.587***	48.09**	60.68***	9.344***
	(0.237)	(0.194)	(18.91)	(6.762)	(2.574)
Observations	34	33	34	39	45
R-squared	0.265	0.355	0.275	0.863	0.535

Table 9: GDP and Share of elderly

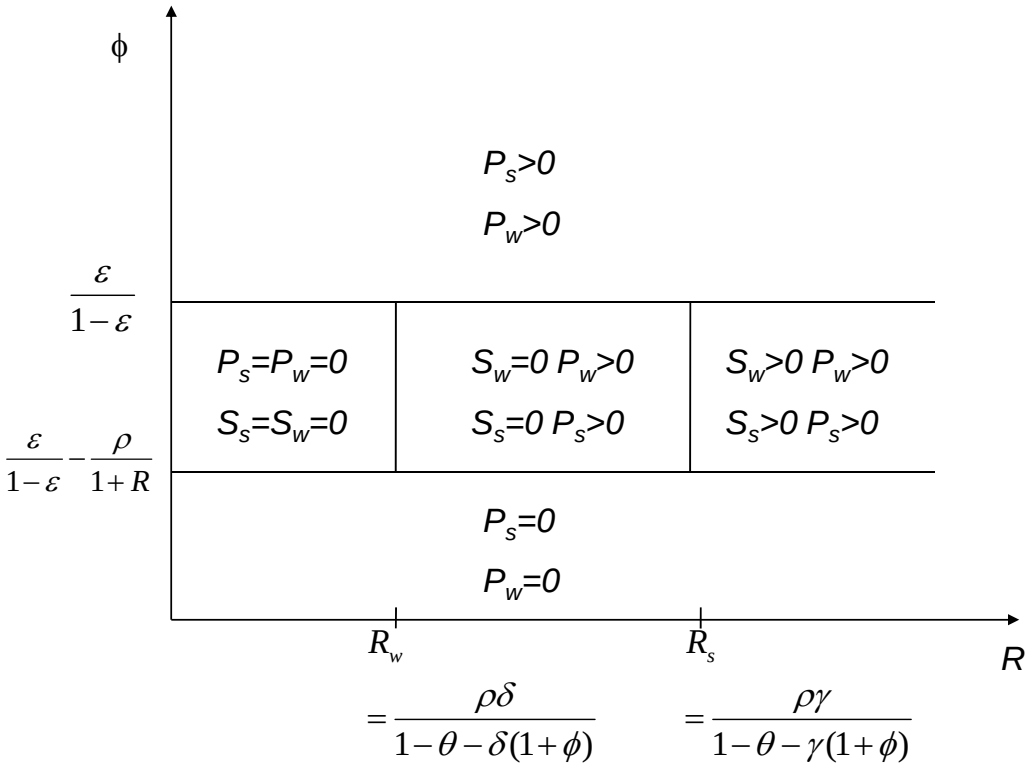
VARIABLES	(1) repl50_1	(2) repl75_150	(3) replacem1	(4) coverage1564	(5) pengdp_91_2006
community	**-0.583*** **	**-0.591*** **	**38.07*** **	**-14.76*** **	**0.915**
	(0.179)	**(0.146)**	**(11.53)**	**(4.596)**	**(1.435)**
aut	**-0.203**	**-0.232***	**12.51**	**-4.331**	**0.467**
	(0.148)	**(0.136)**	**(8.791)**	**(3.898)**	**(1.138)**
egalnucl	**-0.365** **	**-0.487*** **	**31.28*** **	**-13.02*** **	**2.243**
	(0.173)	**(0.127)**	**(8.843)**	**(4.157)**	**(1.359)**
oecd	0.0453	0.0142	3.427	-2.484	0.00698
	(0.118)	(0.0812)	(10.89)	(3.541)	(1.410)
laam	0.118	0.122	-6.369	-5.984	-1.292
	(0.190)	(0.121)	(15.89)	(5.345)	(1.813)
africa	-0.142**	-0.0459	15.26	1.682	0.422
	(0.0552)	(0.0646)	(13.47)	(3.230)	(0.707)
pop_65_2000	-0.00870	-0.00274	0.0504	2.655***	0.670***
	(0.00703)	(0.00570)	(0.978)	(0.424)	(0.106)
lngdppc	-0.0652	-0.0636	5.812*	5.650***	0.418
	(0.0494)	(0.0571)	(3.419)	(1.837)	(0.323)
Constant	2.230***	2.132***	-6.655	-18.35	-4.454*
	(0.481)	(0.545)	(33.20)	(15.49)	(2.509)
Observations	54	49	54	65	75
R-squared	0.350	0.393	0.204	0.885	0.742

Table 10: Electoral rules and forms of government

VARIABLES	(1) repl50_1	(2) repl75_150	(3) replacem1	(4) coverage1564	(5) pengdp_91_2006
community	**-0.399***	**-0.495****	**18.85**	**-36.62*****	**-3.310***
	(0.197)	**(0.192)**	**(11.57)**	**(10.75)**	**(1.669)**
aut	**-0.0943**	**-0.182**	**0.359**	**-12.96***	**-1.372**
	(0.220)	**(0.201)**	**(10.05)**	**(7.552)**	**(1.426)**
egalnucl	**-0.287**	**-0.438****	**19.11****	**-18.71****	**1.906**
	(0.194)	**(0.162)**	**(7.290)**	**(7.114)**	**(1.545)**
maj	0.188	0.0906	-17.50***	-15.60**	-3.830***
	(0.198)	(0.175)	(6.152)	(7.456)	(1.006)
pres	-0.176	-0.149	1.665	-8.651	-1.001
	(0.167)	(0.152)	(9.593)	(6.410)	(0.667)
oecd	-0.0865	-0.0836	9.918	5.619	1.052
	(0.113)	(0.0712)	(10.62)	(7.794)	(1.424)
laam	0.366	0.303	-11.36	-26.83***	-7.564***
	(0.252)	(0.195)	(14.30)	(7.382)	(1.632)
Constant	1.489***	1.519***	57.46***	77.94***	10.46***
	(0.223)	(0.195)	(13.24)	(10.69)	(1.790)
Observations	41	39	41	46	52
R-squared	0.257	0.339	0.255	0.736	0.584

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 1. The New Regime: Summary of the results



S_s *(P_s)* are savings (Pensions) in strong family types
S_w *(P_w)* are savings (Pensions) in weak family types

figure 2: The four groups

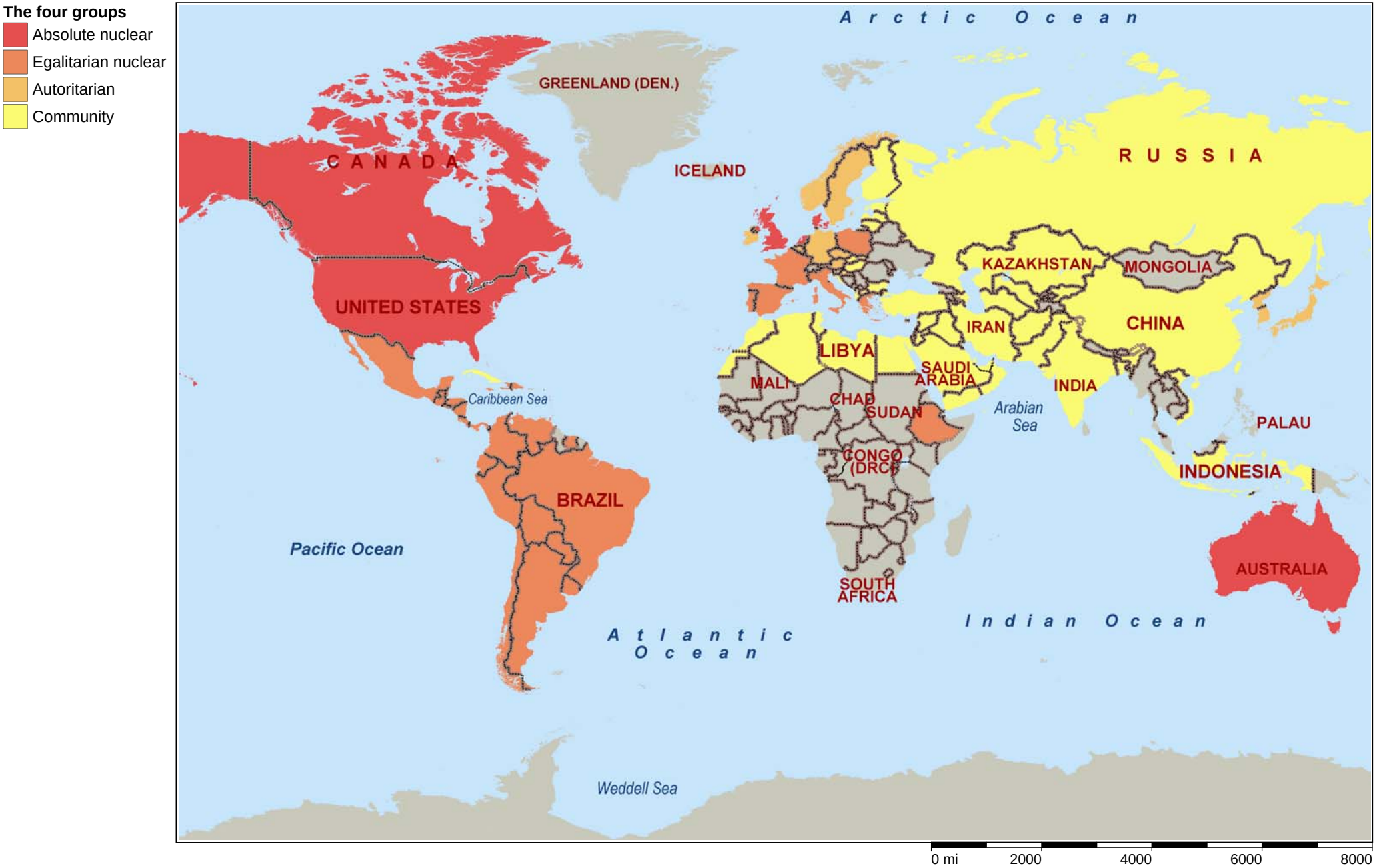


figure 3: The redistributive design of pensions: repl50_1

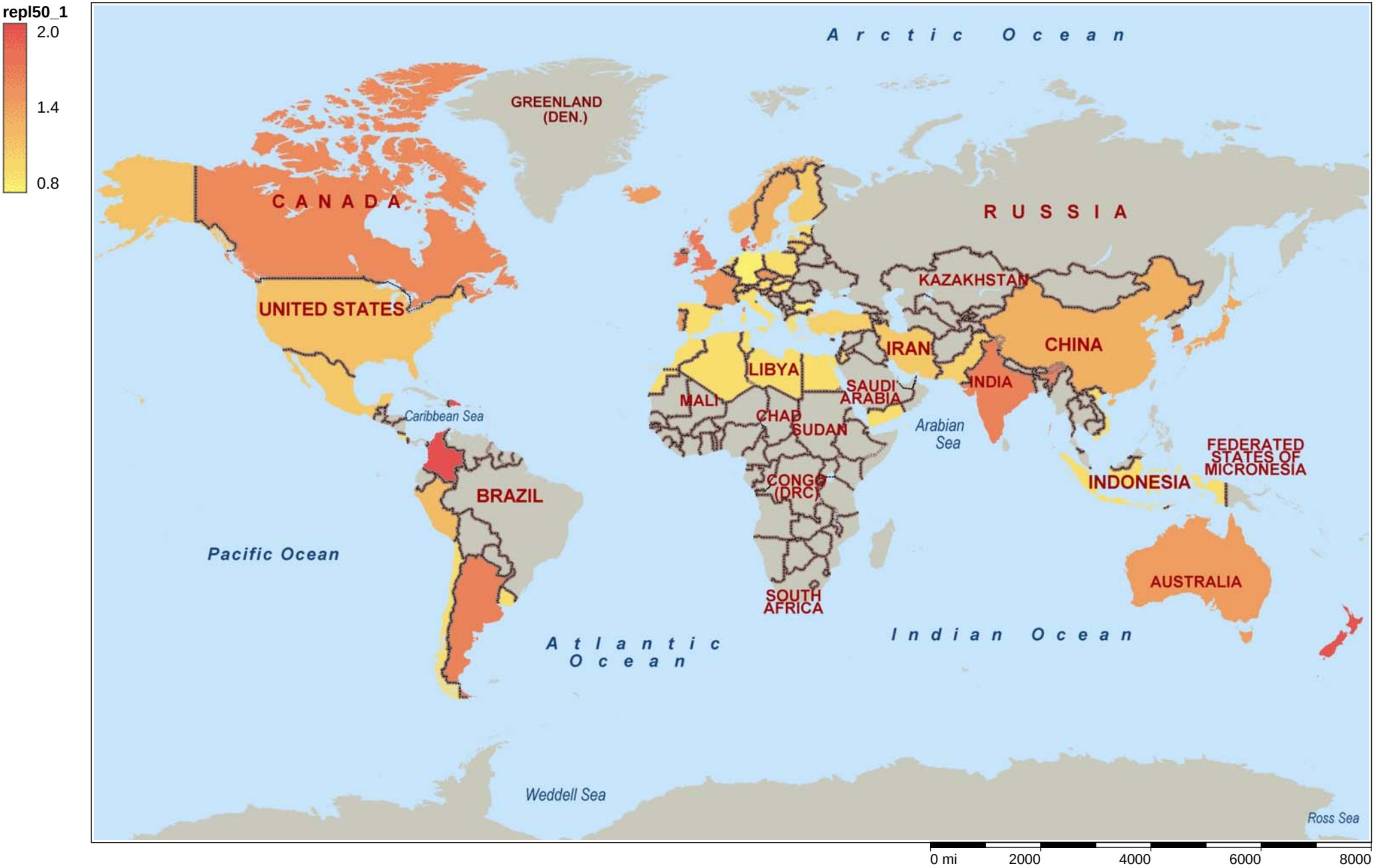


figure 4: The redistributive design of pensions: repl75_150

figure 5: Legal origins

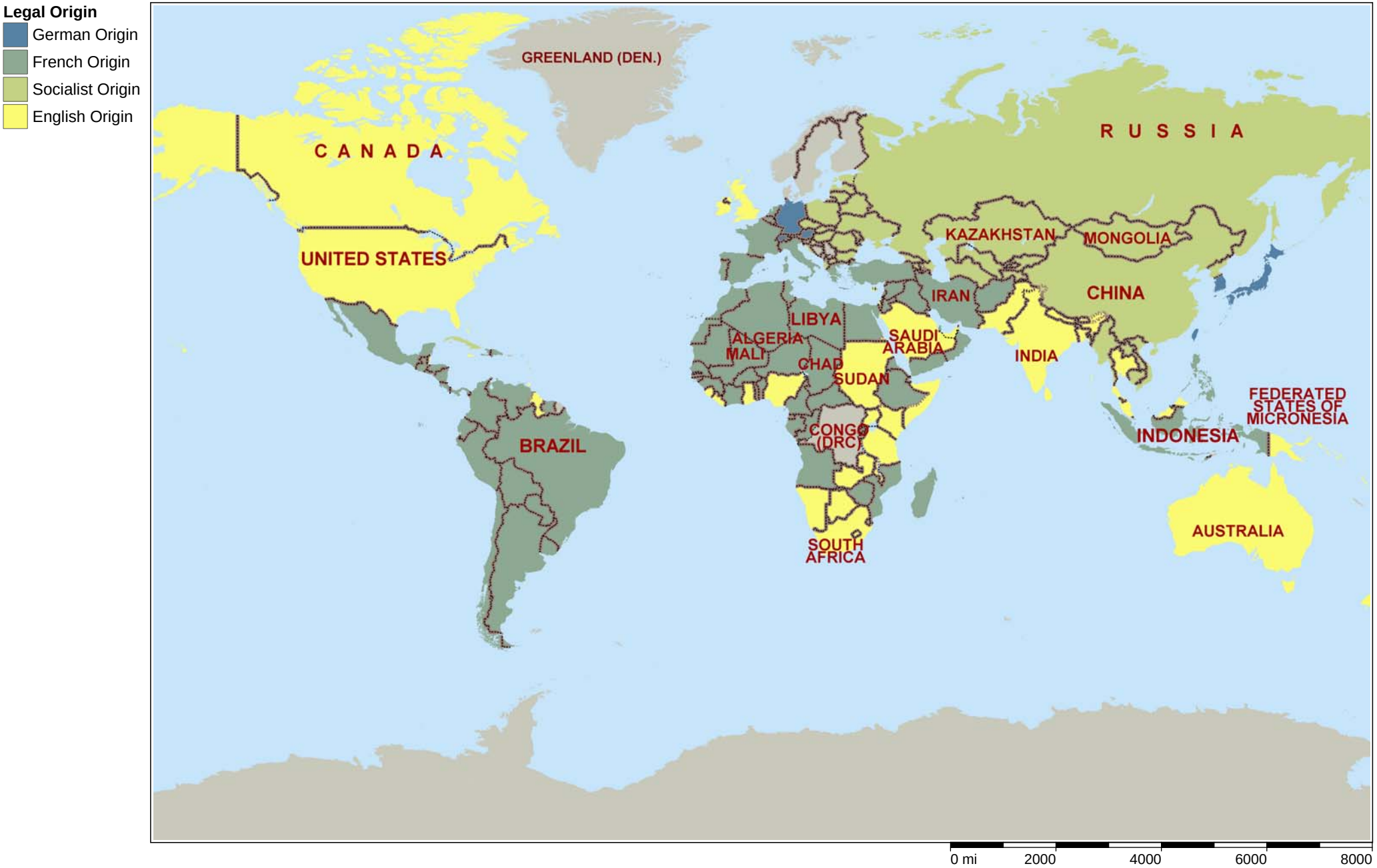


figure 6: Religion