

Optimal taxation, social contract, and the four worlds of welfare capitalism

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Abstract

Drawing from the formal setting of the optimal tax theory, the paper identifies the level of Rawlsianism (or aversion to poverty) of the European social planners starting from the observation of real data and redistribution systems and builds a metric that allows measuring the degree of (dis)similarity of the redistribution systems analyzed. The shape of the social welfare function implicit in tax-benefit systems is recovered by inverting the optimal taxation model on actual effective tax rates, assuming that existing systems are optimal for some Mirrleesian social planner. Actual distributions of incomes before and after redistribution are obtained using a European survey on incomes and living conditions of households (EU-SILC 2007). Results are discussed in the light of standard classifications of welfare regimes in Europe. There appears to be a clear coincidence of high decommodification willingness and high Rawlsianism in the *Scandinavian, social-democratically* influenced welfare states. There is an equally clear coincidence of low decommodification willingness and utilitarianism in the *Southern European* welfare states. The *Continental European* countries group closely together in the middle of the scale (except Germany that scores among the highest), as corporatist and etatist. *Anglo-Saxon liberal* welfare states score close to Continental European countries. Finally the group of *Eastern European* countries seems to split in two subgroups, one similar to the *Continental European* countries and one, mostly composed by Baltic countries, with scarce willingness to decommodify citizens, similar to the *Southern European* model.

Key Words: Optimal income taxation; tax-benefit policy; comparative social policy analysis; welfare state models.

JEL Classification: H11, H21, D63, C63

1. Introduction

This paper contributes to the debate regarding the typology of welfare states by offering a simple tool to derive social weights given by the social planner to the different income classes. These weights implicitly define the social aversion toward poverty, that is the degree of Rawlsianism of the social planner.¹ The theoretical framework draws from the optimal taxation literature (Mirrlees 1971) but inverts the problem: instead of seeking for the optimal tax schedule of a given distribution of marginal productivity, we assume that an observed tax schedule is optimal for the social planner and, given the productivity distribution we seek for the social weights corresponding to this optimal schedule. The proposed method allows for comparative research on the structure of the Welfare State since it takes explicitly into account the efficiency concerns of the redistribution policies.

A few years after his publication, the book of Esping Andersen (EA) (1990) “*Three Worlds of Welfare Capitalism*” becomes a modern classic and a reference for any researcher interested in the study of the welfare state (Offe, 1991; Cnaan, 1992; Hicks, 1991; Kohl, 1993). The main reason of this success was that, for a long time in both the theoretical and empirical literature, too little attention had been given to cross-national differences in welfare state structures; the book was a clear contribution towards filling this gap.² In his ‘seminal’ book EA constructs today’s most frequently used typology of welfare states, and tests empirically whether distinct welfare states that resemble his ideal-types can be observed.

Four closely parallel models – ideal-types – of regime-types are commonly referred to. Each of them is classified along several criteria including the degree of defamiliarization (i.e. the degree to which the market and/or the state play a role in providing services to individuals that were traditionally provided by the family), the level of social stratification promoted by social policies, and (most important for our purposes) the degree of decommodification, i.e. the degree to which a (social) service is rendered (by the state) as a matter of right, or, alternatively, the degree to which a person can maintain a livelihood without reliance on the (labor) market.³

First, there is the liberal type of welfare capitalism, which embodies individualism and the primacy of the market. The operation of the market is encouraged by the state, either actively – subsidizing private welfare schemes – or passively by keeping (often means tested) social benefits to a modest level for the demonstrably needy. This welfare regime is characterized by a low level of decommodification. The operation of the liberal principle of stratification leads to division in the population: on the one hand, a minority of low-income state dependants and, on the other hand, a majority of people able to afford private social insurance plans. In this type of welfare state, women are encouraged to participate in the labor force, particularly in the service sector.

Second, there is the social-democratic world of welfare capitalism. Here, the level of decommodification is high, and the social-democratic principle of stratification is directed towards achieving a system of generous universal and highly distributive benefits not dependent on any individual contributions. In contrast to the liberal type of welfare states, ‘this model crowds out the market and, consequently, constructs an essentially universal solidarity in favor of the welfare state’ (Esping-Andersen, 1990: 28). Social policy within this type of welfare state is aimed at a maximization of capacities for individual independence. Women in particular – regardless of whether they have children or not – are encouraged to participate in the labor market, especially in the public sector.

Third, there is a world of conservative corporatist welfare states, which is typified by a moderate level of decommodification. This regime type is shaped by the twin historical legacy of Catholic social

¹ A Rawlsian social planner only cares about the poorest citizens. The degree of Rawlsianism can be interpreted as how much a social planner resembles to a Rawlsian one: the higher the weight of the poorest income class, the higher the degree of Rawlsianism of the social planner.

² Theoretically, the work of Polanyi (1944), Marshall (1950, 1963, 1965, 1981) and Titmuss (1958, 1974) laid the foundations for Esping-Andersen’s typology (Boje, 1996). Empirically, some comparative research has been conducted, among others, by Wilensky (1975), Flora and Heidenheimer (1981), Mommsen (1981) and Flora (1983, 1986).

³ This definition of decommodification has been elaborated by EA on a previous similar concept of Karl Polanyi (1944).

policy, on the one side, and corporatism and etatism on the other side. This blend had some important consequences in terms of stratification. Income maintenance benefits are earnings-related, administered through the employer and geared towards existing social patterns. The state will only interfere when the family's capacity to service its members is exhausted (Esping-Andersen, 1990: 27).

Leibfried (1992) and several other successive studies (Katrougalos, 1996; Ferrera, 1996; Bonoli, 1997; Trifiletti, 1999) account for the Southern European model of social policy. This class of social protection systems is highly fragmented and, although there is no articulated set of minimum social protection, some benefits levels are very generous (such as old age pensions). Moreover, in these countries health care is institutionalized as a right of citizenship. However, in general, there is relatively little state intervention in the welfare sphere (a low level of de commodification). Another important feature is the high level of particularism with regards to cash benefits and financing, expressed in high levels of clientelism (Ferrera 1996).

This "standard" classification received various types of responses and constructive critiques. Amicable critics argue that his typology has merits but is neither exhaustive nor exclusive and therefore needs revising. Others refer to theoretical and methodological shortcomings (Lessenich and Ostner, 1998). The more hostile critics feel that typologies as such have no explanatory power and, therefore, that his scheme does not contribute to proper theorizing about what is happening across and within welfare states (Baldwin, 1996). Fall of communism block and consequent EU enlargement renewed the interest on Esping-Andersen's classification and on its validity in order to study welfare regimes of the Eastern European new market economies. Communist welfare policy and provision, similar in all Eastern European countries, were characterized by subsidies to food and rents, full employment, provision of universal access to health and education. After the first half of the 1990s characterized by huge economic crisis and emergency measures, governments of Eastern European countries started a process of restructuring social policies. The challenge of incorporating post-communist countries in the Esping-Andersen typology was undertaken by several authors. Deacon (1993), for example, found a new label for these countries; namely "post-communist conservative corporatist"⁴ with the expectation that, once transition to market economy was completed, they would have represented a distinct group in the welfare state typology. Esping-Andersen (1996) in a book over welfare state regimes in emerging economies rejected this idea of a new welfare state category and argued that the differences between these countries and the traditional welfare states were only of transitional nature. Ferger (2007) applied a hierarchical cluster analysis to analyze the post-communist welfare state typology in order to test if the Esping-Andersen's theory of the transitional stage was correct or if, on the contrary, the communist legacies imposed a distinct path of development. He concludes that, despite twenty years of transition and a process of European integration, there is a clear distinction between the traditional European welfare states that formed the subject of Esping-Andersen's famous typology and the countries of Central and Eastern Europe. The hierarchical cluster analysis suggests that Eastern European countries can be divided into two groups: (i) former USSR (Estonia, Latvia, and Lithuania in our sample) and (ii) post-communist European type (Czech Republic, Hungary, Poland, Slovakia, and Slovenia). Both classes are characterized by features of the conservative corporatist type; however the two groups are differentiated by living standard performance (weak in the first groups) and level of inequality which is higher in the former soviet countries. Transition toward European continental model is driven by negotiations with European Commission where the ideal-typical model of welfare state orienting negotiations was the European continental model. Neoliberal model adopted in the early stage of transition by some countries like Estonia or Latvia has been gradually drifted off by the enlargement process. A more recent work by Fuest et al. (2010) tested welfare state ideal-types using EU-SILC 2007 micro-data. They did not find, as opposed to the previous literature, Central and Eastern European countries to be a clear distinguished group according to the redistributive importance of tax benefits instruments. They group together with the traditional western European welfare states; however Baltic countries still shared similarities with Southern European. This would confirm the view of Esping-Andersen (1996) that differences between East and West are only of transitional nature.

⁴ This expression captures the commitment to socialist values, the maintenance in power of some of the old guard as well as the social deal focusing on labour. (Deacon, 1993).

Looking more closely at the level of decommodification, Menahem (2007) calculate an index, the decommodified security ratio (DSR), and ranks 20 European countries according to their level of decommodification. He substantially confirms the previous findings distinguishing four groups: the countries of the North with high DSR; the intermediate countries, basically the continental and Anglo-Saxons countries, with medium-high DSR; the countries of the South with small DSR and the central and eastern European countries with the smallest, but similar to southern countries, values of DSR.

Arts and Gelissen (2002) reconstruct several typologies of welfare states in order to establish, first, whether real welfare states are quite similar to others or whether they are rather unique specimens, and, second, whether there are three ideal-typical worlds of welfare capitalism or more. They conclude that “*real welfare states are hardly ever pure types and are usually hybrid cases; and that the issue of ideal-typical welfare states cannot be satisfactorily answered given the lack of formal theorizing and the still inconclusive outcomes of comparative research. In spite of this conclusion there is plenty of reasons to continue to work on and with the original or modified typologies*”. The Arts and Gelissen’ conclusions served as inspiration and motivation for this work, that pretends to contribute to the debate by providing an empirical tool drawn from the theory of optimal taxation.

Optimal taxation theory has been developed in economics in order to analyze the equity/efficiency trade off that a social planner faces when designing one of the pillars of the welfare state: the direct redistribution system (i.e. the function that transform individual gross income in disposable income). This pillar is, in our view, particularly related to the degree of decommodification achieved by a welfare regime.

A redistribution system allowing for a high level of subsidies directed to non-working people implies a high level of decommodification. It follows that *there is a strong analogy between a social planner aiming to “decommodify” individuals and the degree of Rawlsianism of the social planner in an optimal tax model*. In his task of determining the best redistribution policy, this Rawlsian social planner will guarantee a high level of subsidies directed to the poorest (normally non-working agent) by charging the financial cost to the richest. Of course, this social planner will account for the negative efficiency effects of taxation and also for the initial distribution of the economic and socio-demographic characteristics in the population. Assessing the degree of Rawlsianism of a redistribution system implies assessing his degree of willingness to decommodify citizens and vice versa, and is a direct measure of the social aversion to poverty.

What is proposed here is to use the formal setting of the optimal tax theory to identify the level of Rawlsianism of some European social planners starting from the observation of the real data and redistribution systems. The results are used to build a metrics that allows us to measure the (dis)similarity of the systems analyzed. The proposed setting can be also seen as a test of the standard classification and the following classification attempts.

The literature on optimal taxation has remained mostly theoretical for a long time following the seminal contributions of Mirrlees (1971). The main reason was the absence of reliable information on the ‘true’ distribution of individual abilities. In recent years, the use of micro data has allowed implementing optimal tax models, under some assumptions about social preferences, in order to question the optimality of actual tax-benefit systems. Notably, the U-shaped distribution of effective marginal tax rates, often encountered in industrialized countries, has been investigated by several authors (Diamond, 1998; Saez, 2001, for the US; Aaberge R., U. Colombino, 2008, for Italy; Piketty, 1997; Bourguignon and Spadaro, 2000; Choné and Laroque, 2005, for France, among others). Of particular interest were the conditions under which confiscatory levels of implicit taxation could be justified at the bottom of the distribution, or, inversely, how new programs of income maintenance could be grounded on the basis of optimal tax formulas.

A key element in such empirical applications of optimal tax models is the shape of social preferences. The curvature of the social welfare function in a continuous model à la Mirrless represents the social aversion to inequality. When the population is discretized, as in Saez (2002), it simply corresponds to the pattern of relative weights on different income groups. Given a country's set of characteristics (labor supply elasticity, distribution of household income, etc.), it is possible to

derive optimal tax schedules for different assumptions about social aversion to inequality⁵ and to identify the level for which optimal and actual tax rates coincide. This way, Laroque (2005) shows that an optimal schedule derived from rawlsian preferences is close to the actual schedule in France and concludes about the relatively rawlsian nature of social preferences in this country.⁶ Interestingly, it is possible to follow a somewhat dual approach and to focus on social preferences as the subject of investigation.⁷ Instead of producing optimal tax schedules under certain assumptions on social preferences, the optimal tax model can be inverted on actual effective tax rates to recover the implicit social welfare function that makes the observed system optimal.⁸ This approach was suggested by Bourguignon and Spadaro (2000, 2005, and 2012) using Mirrlees (1971) optimal tax model and applied on UK, Spanish, and French data. A well-known limitation of Mirrlees' model is the difficulty to consider non marginal changes in labor supply characterizing potential workers switching from non-activity to activity or vice versa (the so called participation effects). For this reason the present work adopts the optimal tax model suggested by Saez (2002), which allows incorporating labor supply responses at both the intensive and the extensive margin (Bourguignon and Spadaro, 2012).

The implicit social welfare functions is retrieved by inverting Saez' model on the national data of the 26 European countries present in the European Union Statistics on Income and Living Conditions (EU-SILC) dataset.⁹ For each country, the population is partitioned in several income groups and the inverse optimal tax model is implemented using actual effective average and marginal tax rates in order to retrieve social weights placed on the different groups.

This approach provides an original way of comparing social preferences across countries. Indeed, comparing social assistance expenditures or tax levels across countries does not provide a correct rendering of the tastes for redistribution, since the overall redistributive effect is not assessed jointly with the efficiency constraint (labor supply responses). The present approach precisely accounts for incentive constraints and allows reading standard information about redistributive systems directly in terms of social weights. In other words, social weights derived with this technique already account for differences in the labor markets and in the definition of income groups, and thus can therefore be interpreted more easily than standard Mirrlees utility weights, that depend on labor supply elasticities and the population share in each income group, and can be directly used to make international comparisons.¹⁰

⁵ It is widely recognized (see, for example, Blundell, 2012) that this is a discretionary variable when researchers apply optimal tax models. While labor supply and income distributions can be accurately measured, the shape of social preferences is often a discretionary choice of the researcher.

⁶ Similar conclusions are obtained by Spadaro (2005). Simulating the French and British tax-benefit systems on French data, he shows that the former system generates a higher level of social welfare for non-utilitarian values of the inequality aversion parameter, which conveys the idea that the concern for redistribution may be larger in France, or, alternatively, that labor supply elasticities are lower in this country.

⁷ The term "social preference" covers different concepts, often linked but studied independently by different branches of the economic literature. In political economy, some surveys attempt to directly measure people's attitude towards inequality, as in e.g. the International Social Survey Program, used for instance in Corneo and Grüner (2002) and Osberg and Smeeding (2006). In behavioral economics, experiments are often used to assess preferences of a group. With the well-known 'leaky bucket' experiment, respondents are able to transfer money from a rich individual to a poor one but incur a loss of money in the process, so that the equity-efficiency trade-off is taken into account in measuring tastes for redistribution (see for instance Amiel et al., 1999); in recent experiments, participants vote for alternative tax structures (e.g. Ackert et al., 2007). In the public economic literature, implicit value judgments may be drawn from inequality measures, assuming a natural rate of subjective inequality as suggested by Lambert et al. (2003); see also Duclos (2000).

⁸ The effective marginal tax rate corresponds to the implicit tax on a marginal increment of income, which accounts for the payment of income taxes and social contribution but also for the withdrawal of means-tested benefits as earnings increase.

⁹ A similar exercise, focusing on single mothers, is conducted by Blundell et al. (2009) for a comparison between Germany and the UK.

¹⁰ The use of standard utility weights (or primitive weights) is possible in this settings, but in our opinion it somewhat affects international comparisons. An analysis of social preferences using primitive weights is reported in Appendix B.

Looking at the results, there appears to be a clear coincidence of high decommodification willingness and high Rawlsianism in the *Scandinavian, social-democratically* influenced welfare states. There is an equally clear coincidence of low decommodification willingness and utilitarianism in the *Southern European* welfare states. The *Continental European* countries (Finland, Germany, and France) group closely together in the middle of the scale (except Germany that scores among the highest), as corporatist and etatist. Finally the group of eastern European countries seems to split in two subgroups, one similar to the *Continental European* countries and a group with a smaller degree of Rawlsianism, more similar to the *Southern European* countries.

Of course, from the beginning of the exposition we want to make clear to the reader that the ambition of our analysis is somewhat limited: first, we do not pretend to assess the social preferences embedded in the design of the whole social protection system and even less in the welfare state. Income taxes and benefits are only a very small part of it. In this sense, our contributions should be considered as a first attempt to offer a consistent way to compare social preferences across countries with different welfare regimes and possibly different efficiency constraints. Second, in what follows we will focus on the dichotomy state versus market. In our analysis, the family dimension is missing. The role of the family, and in particular, the substitutability between state and families in providing protection against decommodification risks, is indeed important and is one of the pillars of the modern debate on the structure of the welfare state. Nevertheless, our contribution must be seen as a step towards a better understanding of the nature of welfare systems, made possible thanks to the extension of a well-established theoretical setting, and to help defining ideal-typical models starting from the analysis of real welfare state regimes.

The layout of the paper is as follows. Section 2 presents the national tax-benefit systems and a first look at their effects on redistribution and incentives. Section 3 describes the model and the inversion procedure. Section 4 presents the data and discusses the implementation of the model, drawing on previous results on labor supply elasticities. Empirical results are reported in Section 5, where the social weights that make European tax-benefit systems optimal are derived, and the results compared to previous qualitative analyses of European welfare states. Section 6 concludes.

2. National Tax-Benefit Systems: Structure, Equity, and Efficiency

2.1. Brief Overview of National Systems

In the description of the European National Systems we focus on the main instruments, as direct taxes, social contributions, and minimum income transfers affecting the disposable income of households in Europe.¹¹ An overview of the 2007 systems for the countries under investigation is provided in Tables 1a and 1b. It is accompanied by Fig. 1 which reports the share of market income, taxes, unemployment,¹² housing, and other benefits, as a proportion of income, on average and for bottom and top quintiles.

Benefits provide financial support to various groups and have different underlying policy objectives. Means-tested benefits correspond primarily to social transfers, i.e. social assistance and housing benefits, and clearly aim to alleviate poverty. However, minimum income schemes are often held responsible for work disincentives as withdrawal are high, most often imposing a 100% tapering that discourages participation of low-wage workers. This is especially the case in countries with

¹¹ Indirect taxes are an important source of public spending financing, however their proportional (to consumption) character jointly with the existence of a very small number of different rates, gives them a marginal role as redistributive device. This is the reason why we decided to exclude them from the analysis. For a detailed discussion on indirect taxes, notably VAT and excise taxes on specific goods, see Immervoll et al. (2005).

¹² Unfortunately EU-SILC 2007 does not distinguish clearly between social and unemployment benefits. Hence in Fig. 1 it is not possible to analyze these two aspects separately.

generous income support levels, characterized by high effective marginal tax rates for lower income groups. Southern countries are characterized by the absence, or scarce availability, of minimum income schemes, and families are regular substitutes to the state in supporting unemployed or low-income workers. Housing benefits sometimes play an important role in complementing social assistance to support low-income families, but are less subject to high withdrawal rates. However, it is possible that other restrictions to the benefit take place.

Non means-tested benefits have other objectives than pure redistribution, related for instance to demographic or employment motives (e.g. unemployment benefits). They are consequently less targeted to the poor but rather on specific groups such as families with children, disabled individuals (invalidity pensions), and people temporarily out of work (maternity and family pensions) or involuntarily out of work (unemployment benefits). Non means-tested benefits include contributory benefits, such as unemployment benefits. The importance of unemployment benefits in total expenditures explains the prevailing role of the non means-tested benefit category in. This is especially true in countries where means-tested benefits are limited (e.g. Spain and Italy). The inverse is true in the UK, where income support and in-work transfers play an important role compared to unemployment insurance; social expenditures then appear much more targeted in this country. After transition, a form of means-tested social assistance was introduced in Eastern European countries; however it was characterized by a mixed system where means-testing lived together with categorical criteria. Universal family allowances are at work in Hungary, Latvia, Slovakia, and Estonia.

Taxes display a progressive tax rate structure,¹³ with tax allowance or tax free brackets to exempt lowest incomes from tax. These exemptions may be important. For instance, in France all workers are subject to the 8% social security flat-rate tax (CSG + CRDS) but only half of the population is subject to the progressive income taxation. The redistributive effect of the income tax scheme is function of the tax level and the progressivity of the tax schedule. Couples are jointly (income) taxed in some countries, causing high marginal tax rates on secondary earners.

Social security contributions (SSC) are levied on earnings (Table 1a reports SSC paid by salaried workers) and sometimes on benefits. Often shared between employers and employees, they are generally designed as a flat-rate structure aimed to finance pensions, health, and unemployment insurance. They are not neutral, however, as zero payments below a threshold and a cap on the contribution base above an upper limit generate some discontinuities and necessarily have distributive effects. SSC are substantial - sometimes exceeding income tax rates - especially in countries with large public pensions and health insurance systems.

2.2. Redistributive and Incentive Effects

European systems provide a rich ground to implement the optimal tax framework and the inverse approach used in this paper. Firstly, a substantial redistributive system exists even for single individuals in several European systems, which can be exploited for vertical equity analysis. The variety of transfers is larger when looking at families (or, more generally, to other demographic groups than working age single individuals), and potentially allows interpreting social preferences for both vertical and horizontal equity.

Secondly, differences across countries can be analyzed finding significant divergences in social preferences, for example from a system without social assistance (such Italy or Greece) to one with highly generous income support (such as Denmark, Iceland or Luxembourg).

A first idea of the aversion to inequality can be derived from the overall redistributive effect of benefits and taxes, using Gini coefficient as a summary of total inequality. Figure 3 reports the decrease in the Gini coefficient on market gross income due to national tax/benefit systems for the selected sample.¹⁴ This corresponds simply to the move from the Gini on market incomes to the Gini on disposable incomes.

¹³ Very few countries, namely Iceland, Lithuania, Latvia, and Slovakia adopt a flat income tax.

¹⁴ As explained in Section 4.1 the article focus on working age singles without children, so results reported in Fig. 3 cannot be generalized to the whole populations.

There is a clear contrast between Nordic and Corporatist regimes on the one hand, with large redistributive effects due to both contributory and non-contributory benefits, and Eastern European countries on the other hand. Southern countries and the UK fall in between, with a moderate reduction of the Gini index). In the first group of countries, benefits achieve the most inequality reduction mainly due to contributory benefits, while means-testing benefits should play a small role (see Immervoll et al., 2007). Clearly the welfare state of most Eastern European countries is not mature enough to produce a relevant overall redistributive effect.

It is interesting to note that, the European countries that reduce more inequality are not those with high inequality in market incomes. This is as expected, in the sense that if a society is averse to inequality, this aversion will not be revealed only through its redistributive system but also through its gross income distribution.

3. The Inverse Optimal Tax Approach

3.1. The Model of Saez (2002)

The starting point of Saez (2002) is the standard optimal income tax model à la Mirrlees (1971). The government is assumed to maximize a social welfare function subject to an aggregate budget constraint. The social welfare function aggregates individual utility levels, which themselves depend on disposable household income (equivalent to consumption in a static framework) and leisure. The form of the social welfare function characterizes the government's taste for redistribution, ranging from Rawlsian preferences (maximization of the welfare of the poorest person) to utilitarian preferences (equal weights on all individuals). Actual productivities are not observed so that governments can only rely on second-best taxation based on incomes. Consequently, they must account for the efficiency constraint: agents modify their taxable income in function of effective taxation. Responses operate both at the extensive margin (participation decisions) and the intensive margin (effort or hours of work). In particular, high implicit taxes on the most (least) productive ones may reduce their effort (participation), thereby reducing the tax base.¹⁵

Only the intensive margin is considered in the original model of Mirrlees (1971), while empirical evidence points towards an important effect of participation decisions (see Heckman, 1993).

Saez (2002) sets up an optimal tax problem where there are $I+1$ discrete groups in the labor market: I groups of individuals who do work, ranked by increasing gross income levels Y_i indexed $i=1, \dots, I$, and a group consisting of those who do not work (group $i=0$).

Individuals choose whether or not to participate (extensive margin) and which group to choose (intensive margin). Formally, individuals are indexed by $m \in M$ being a set of measure one. The measure of individuals on M is denoted by $dv(m)$. Individual $m \in M$ has a utility function $u^m(C_i, i)$ defined on after-tax income $C_i \geq 0$ and job choice $i = 0, \dots, I$. Each individual chooses i to maximize $u^m(C_i, i)$, where $C_i = Y_i - T_i$ is the after-tax reward in occupation i . The labor supply decision of individual m is denoted by $i^* \in \{0, 1, \dots, I\}$. For a given tax and transfer schedule (C_0, \dots, C_I) , the set M is partitioned into $I+1$ subsets, M_0, \dots, M_I , defining the sets of individuals choosing, respectively, each of the occupations $0, \dots, I$. The fraction of individuals choosing occupation i , denoted by $h_i(C_0, \dots, C_I)$ is simply the measure of set M_i . It is assumed that the tastes for work embodied in the individual utilities are regularly distributed so that the aggregate functions h_i are differentiable.¹⁶

¹⁵ At the top of the skill distribution, high implicit tax rates are due to high marginal income tax rates. At the bottom, they are caused by high withdrawal (phase-out) rates of means-tested social assistance schemes.

¹⁶ Note that optimal income schedules must verify the property of agent monotonicity, according to which gross income increases with productivity (which is not necessarily the case of labor supply, as the labor supply curve may be backward bending). This is sometimes expressed as the Spence-Mirrlees (or single crossing) condition that a more productive agent will choose a higher consumption-income allocation, so that second best taxation

The government chooses (T_0, \dots, T_I) so as to maximize welfare:

$$W = \int_M \mu^m u^m(Y_i^* - T_i^*, i^*) dv(m)$$

subject to the budget constraint

$$\Phi = \sum_{j \geq 0}^I h_j T_j \quad (\text{b.c.})$$

where μ_m is the weight the government assigns to agent m . Φ is the exogenous government financial constraint.

In this framework, the optimal set of T_i is determined by a system of $I+1$ first order conditions of the following form (see Saez, 2002, for a formal derivation):

$$\frac{T_i - T_{i-1}}{C_i - C_{i-1}} = \frac{1}{\varsigma_i h_i} \sum_{j \geq i}^I h_j \left[1 - g_j - \eta_j \frac{T_j - T_0}{C_j - C_0} \right] \text{ for } i = 1, \dots, I \quad (1)$$

jointly with the constraint (b.c.)

The term on the left-hand side of (1) is the extra tax paid when moving from group $i-1$ to i divided by the gain in net income. Non-workers receive benefits $-T_0$, by definition identical to C_0 .

The intensive elasticity, ς_i , is defined as:

$$\varsigma_i = \frac{C_i - C_{i-1}}{h_i} \frac{dh_i}{d(C_i - C_{i-1})}$$

This mobility elasticity captures the percentage increase in supply of group i when $C_i - C_{i-1}$ is increased by 1%, and is defined under the assumption that individuals are restricted to adjust their labor supply to the neighboring choice.¹⁷

The extensive elasticity, η_i , is defined as the percentage of individuals in group i who stops working when the difference between the net household income out of work and at earnings point i is reduced by 1%:

$$\eta_i = \frac{C_i - C_0}{h_i} \frac{dh_i}{d(C_i - C_0)}. \quad (2)$$

The social welfare function is summarized by g_i , the marginal weight the government assigns to group i . This weight represents the value (expressed in terms of public funds) of giving an additional euro to an individual in group i . It is defined as follows:

$$g_i = \frac{1}{ph_i} \int_M \mu^m \frac{\partial u^m(C_i^*, i^*)}{\partial C_i} dv(m)$$

where p is the multiplier of the government budget constraint. An alternative interpretation of g_i is that the government is indifferent between giving one more Euro to an individual in occupation i and g_i more Euros of public funds. What is important is that g_i is a sufficient statistics to represent the taste for redistribution of a social planner. In fact, for a government that is in favor of redistribution, the marginal value of a euro given to a poor is greater than the marginal value of the same euro given to a rich. Moreover these weights already account for the efficiency constraints due to labor supply responses.

A special attention should be given to the weight given to the poorest, g_0 . This weight should be the largest,¹⁸ and in a cross country comparison a larger g_0 would mean a stronger willingness to decommodify citizens and a stronger aversion toward poverty, that is a high degree of Rawlsianism. Note that these weights g_i are perfectly consistent with utility weights μ^m but they avoid the need to

manages to separate types and guarantees incentive-compatibility. Here, the implicit assumption is that types 0 to I are ranked according to productivity levels so that Y_i increases with w .

¹⁷ This hypothesis can appear as restrictive given that, in principle, individuals can move outside their neighbor choice. Empirical evidence shows that the eventual error made is very small.

¹⁸ This may not be true for a conservative government considering the unemployed as lazy and the working poor as deserving a stronger commitment. In this case g_1 could be greater than g_0 . In our application this hypothetical situation is never observed.

specify the functional form of the utility function and already account for efficiency constraints and the actual tax schedule, so that their interpretation is immediate and does not depend on the aforementioned issues. In substance, social weights g_i directly summarize redistributive tastes of the social planner and this is why we concentrate our analysis on them rather than on μ^m .

It can be demonstrated (see Saez 2002) that, in the case where income effects are ruled out, $h_i(C_0+R, \dots, C_I+R) = h_i(C_0, \dots, C_I)$. In this case, increasing after tax income of all groups i by the same amount does not change the occupational choice decisions and, hence, the occupational distribution h_i . Thus, $\sum_{j=0}^I \partial h_j / \partial c_i = 0$, and therefore, an additional constraint normalizes weights as follows:

$$\sum_{i=0}^I h_i g_i = 1 \quad (3)$$

3.2. Inversion of the Model

The inversion of the preceding optimal tax problem is a very simple idea. It consists in recovering, starting from the observed distribution of income before (Y_i) and after redistribution (C_i) and corresponding tax rates (T_i), the social welfare function that would make the observed tax rate schedule optimal. In other words, the issue of the optimality of an existing tax-benefit system is transformed into the issue of the shape of the social welfare function associated with that system.

A formal definition of the optimal inverse problem (as in Bourguignon and Spadaro 2008) is the following:

Find the set of g_i satisfying simultaneously (1a) and (3)¹⁹

Simple algebra makes possible to obtain the following analytical expressions:

$$g_I = 1 - \eta_I \frac{T_I - T_0}{C_I - C_0} - \zeta_I \frac{T_I - T_{I-1}}{C_I - C_{I-1}}$$

$$g_i = 1 - \eta_i \frac{T_i - T_0}{C_i - C_0} - \zeta_i \frac{T_i - T_{i-1}}{C_i - C_{i-1}} + \frac{h_{i+1}}{h_i} \zeta_{i+1} \frac{T_{i+1} - T_i}{C_{i+1} - C_i}$$

$$g_0 = \frac{1}{h_0} \left(1 - \sum_{i=1}^I h_i g_i \right),$$

where the expression for g_i is derived from

$$g_i = 1 - \eta_i \frac{T_i - T_0}{C_i - C_0} - \zeta_i \frac{T_i - T_{i-1}}{C_i - C_{i-1}} + \frac{1}{h_i} \sum_{j=i+1}^I h_j \left[1 - g_j - \eta_j \frac{T_j - T_0}{C_j - C_0} \right]$$

by substituting the value of g_j with the corresponding expression. This allows us to compute recursively the weights g_i using observed incomes Y_i , net taxes T_i , disposable incomes C_i , and a set of values for intensive and intensive elasticities.

¹⁹ This definition builds on the first order conditions of the social planner maximization problem. As Bourguignon and Spadaro (2012) show, it holds only if the maximization problem to be inverted is concave. In Bourguignon and Spadaro (2012) the set of “concavity tests” for an optimal inverse tax problem is given. These tests basically consist in checking that the revealed social welfare function is concave in their arguments. As we will show later, our empirical results are compatible with the hypothesis of concavity of the whole problem.

4. Data and Implementation

4.1. Data

The analysis performed in this article is produced using income information present in the European survey on incomes and living conditions of households (EU-SILC 2007) microeconomic dataset. With respect to the option of using microsimulation models, the use of survey data with information on net and gross incomes allows to save an impressive amount of work and to avoid the possible approximations introduced by microsimulation models when the available data do not meet the needed information required by the law.

EU-SILC 2007 covers 24 EU countries plus Iceland and Norway, and reports detailed income information, including gross income, net income, tax paid, and benefits received. Being European fiscal systems so diversified, data in EU-SILC is the result of a harmonization process aimed at making variables comparable between countries. This implies a certain level of approximation in classifying benefits into categories. This is especially true for complex fiscal system such as the French one, where, for example, the minimum income benefit RMI is included within the category “unemployment benefits”. Thus, unemployment benefit cannot be treated as a replacement income from work and unemployed cannot be considered in the same way as actual workers. This could be useful for short-time unemployed since in several countries they are covered with an unemployment benefit related to the wage, but, on the other hand, this instrument could always be considered as a redistributive tool.

The availability of gross and net income, together with the fiscal instruments that act for each family, gives the possibility of accounting for the net effect of the fiscal system for each household in the data. However, the treatment of the family composition in the optimal tax framework is a difficult task. We therefore focus on a sample of single men and women without children.²⁰

We select potential salary workers in the age range 18-65 (excluding pensioners, students, disables, and people in military services). To keep up with the logic of the optimal tax model, we exclude all individuals where capital income and intra-household transfers represents more than 10% of total gross income.²¹ Sample sizes, average gross and disposable income, and unemployment rates by country are reported in Table 2.

The definition of the $I + 1$ groups for which we calculate social weights necessarily bears some arbitrariness in the way population is partitioned.²² A large number of groups would probably be detrimental to the cross-country comparison and may not be much informative, given that our main interest is on the group of poor. Keeping this constraint in mind, we opt for a small number of groups ($I=5$) that are made somewhat comparable. Group 0 is identified as the population of the poor, and is defined using the unemployment rate as a boundary. The proportion of this group roughly matches the unemployment rate of the corresponding country. This translates in a cut-off point well below standard measures of poverty line (see Table 3). Group 1 is mostly characterized by the working poor population. Its cut-off point is at 70% of the median income. This group, defined around the poverty line, is likely to be the focus of several active welfare state interventions that allow bringing people out of poverty by increasing the incentive to work, so avoiding the typical negative efficiency effects of unconditional cash transfers. Moreover these individuals are less costly to bring out of poverty since they are closer to the poverty line. Nevertheless, this group of people is often affected by high effective marginal tax rates due to the withdrawal of benefits. A study of the social weight for this group may therefore be interesting.

²⁰ Immervoll et al. (2007) choose to include all working-age individuals in the population but this implies ignoring the joint decision in couple households. Bourguignon and Spadaro (2008) also ignore this dimension by treating families as providers of a common labor supply function and characterized by a household productivity.

²¹ Empirical evidence seems to show that there is a positive correlation among labor supply elasticity and level of capital (see Carbonnier for France, 2007). Thus, excluding “capitalists” implies a reduction of the labor supply elasticity for higher incomes. Nevertheless, the overall effects in term of social marginal weights are difficult to anticipate.

²² A sensitivity analysis to the group definition is presented in Appendix A.

The following groups of non-poor are defined consistently in reference to the median income of each country: the median for group 2, 130% of the median for group 3 and 220% of the median for group 4. Cut-off points (lower bounds), gross income, and disposable income for each income group in each country are reported in Table 3. The corresponding proportion of population (h_i) is reported in Table 4.

4.2. Labor Supply Elasticities

The analysis proposed in this article depends on the choice of labor supply elasticities. As shown in Section 3, the magnitude of disincentive effects due to effective taxation depends on the size of elasticities. However, the relative consensus which has emerged from the large literature on labor supply has not proved to be precise. It establishes that income-elasticity is usually negative while own wage-elasticity are positive, below one and larger for married women due to larger responsiveness at the extensive margin (cf. Blundell and MaCurdy, 1999; Heckman, 1993). Some authors have dealt with this issue by relying on the latest econometric techniques to estimate as accurately as possible elasticities of some of the countries under investigation (cf. Laroque, 2005, using empirical results of Laroque and Salanié, 2001). Other authors acknowledge both the limits of our empirical knowledge and the fact that responses in terms of hours and participation may not summarize all the possible effects. High incomes, in particular, may response via changes in effort or via tax evasion. These authors, in particular Saez (2002) for the US and Spadaro (2005), Bourguignon and Spadaro (2012) and Immervoll et al. (2007) for EU countries, then analyze results of the Mirrlees model in the light of several hypothesis (upper and lower bounds) on the elasticity level.

While there is a wide empirical literature on the labor supply of married women (see Blundell and MaCurdy, 1999), evidence about singles, and in particular childless singles, is limited. Table 5 summarizes some of the relevant studies. It appears that, for singles, there is no evidence of participation elasticity larger than 0.5 (in contrast to married women). Moreover, the formula describing participation elasticity, i.e. expression (2), is slightly different from the elasticity usually measured in the literature. The latter is obtained by 1% increase in Y_i rather than in $C_i - C_0 = Y_i - (T_i + C_0)$. In most cases, $T_i + C_0 > 0$ so that $C_i - C_0$ increases by more than 1%. Therefore η_i tends to be overstated by usual estimates. The inverse is true only when $T_i < -C_0$, that is when transfers to working poor are very large.

For the *intensive margin*, evidence for singles is also limited and points towards modest sized elasticities (cf Table 5). Yet, the classical labor supply elasticity (as in Mirrlees, 1971) is defined as the change in labor supply L in response to a marginal change in productivity:

$$\varepsilon = \frac{1-\tau}{Y} \frac{\partial Y}{\partial(1-\tau)} = \frac{1-\tau}{wL} \frac{\partial wL}{\partial L} \frac{\partial L}{\partial w(1-\tau)} \frac{\partial w(1-\tau)}{\partial(1-\tau)} = \frac{w(1-\tau)}{L} \frac{\partial L}{\partial w(1-\tau)},$$

that, using present notations, can be written as

$$\varepsilon_i = \frac{1-\tau_i}{Y_i} \frac{\partial Y_i}{\partial(1-\tau_i)},$$

with the effective marginal tax rate defined by $\tau_i = (T_i - T_{i-1}) / (Y_i - Y_{i-1})$.

As shown in Saez (2002), the classical labor supply elasticity, ε_i is then related to the intensive elasticity previously defined, ζ_i by the expression:

$$\zeta_i (Y_i - Y_{i-1}) = \varepsilon_i Y_i.$$

In the present article, it was not possible to estimate labor supply elasticities for each country, it would have implied an article by itself. Moreover, if this was the case, the assumption that each government knows and use correctly estimated labor supply elasticities correcting for the different specification of our modeling is rather implausible. The proposed solution is to rely on the tendencies extrapolated by the previous literature on labor supply in Europe and on available studies on labor market flexibility to propose some reasonable values for the various labor markets starting from a common baseline. In particular, referring to Table 5, we define the baseline extensive and intensive elasticities to be 0.3 and 0.1 respectively. The following step is to differentiate each market from the

baseline. One viable option is to refer to worker oriented labor market flexibility (Kerkhofs et al., 2008 and Chung 2012) to differentiate European countries.²³ We take the average value of the flexibility index for the workers and calculate the relative flexibility for each country. Finally, we use the relative flexibility of as a proxy for the relative elasticity and obtain the elasticities reported in Table 6. Again these elasticities derive from an arbitrary decision and thus a sensitivity analysis is reported in Appendix A.

5. Empirical Results

The first type of findings we are looking for is a characterization of the redistributive tastes of each country using the inverse optimal tax approach. In particular, we want to check if marginal social weights are decreasing, as expected from a social planner with aversion for inequalities. The assumption of optimality of actual system is interesting per se. What matters is not the dynamic process leading to a given system but the fact that different systems in neighbor countries may reflect, among other things, differences in social preferences. We also want to check if weights placed on the working poor (group 1), affected, in most countries by very high effective marginal tax rates.

About the “optimality concerns” we recover here similar qualitative results than Bourguignon and Spadaro (2000): Figure 3 shows almost flat redistributive tastes in Southern Europe (Cyprus, Greece, Italy, Portugal, and Spain), Baltic countries (Estonia, Latvia, and Lithuania) and Slovakia. In contrast, generous social assistance translates into high weights on group 0 in Nordic countries (Denmark, Finland, Iceland, the Netherlands, Norway, and Sweden) and Germany. In these countries, the social marginal weight of group 1, the “working poor” is often very small, and smaller than richer groups. This is certainly due to the high effective marginal tax rate that this group experience. It would be interesting to compare these results with more recent data in those countries where active welfare state policies have been implemented, such as the RSA for France. Continental countries (Austria, Belgium, France, and Luxembourg) are characterized by a relevant attention toward group 0, but without reaching the degree of Rawlsianism typical of Nordic countries, except Germany that scores among the top ones. Liberal countries (Ireland and the UK) show similar results than continental countries. Even though the policy instruments are different, it seems that “on real data” the attention towards the poor is evident. Finally, the non-Baltic Eastern European countries seem to be shaping up as continental type welfare states, even though the weights of group 0 do not reach the values of the continental countries. The other Eastern countries seem either in an earlier stage of development of their welfare states or to be developing a system more affine to the Southern countries. Possibly, since in the beginning of their transition toward market economies, the tendency was to establish a Liberal welfare state, they are now as the UK of the eighties was, with a high probability that as economic wellbeing increase also the aversion towards poverty and inequality will also rise. The depicted results are effectively summarized by Fig. 4, which ranks the countries under investigation according to their value of group 0.

For all the counties under analysis, weights on richer groups are relatively flat. In general, marginal social welfare is both positive and flat or decreasing throughout the range of individual incomes classes, which convey that these systems are not far from Rawlsian preferences. This result suggests that the redistribution systems in these countries are *consistent with the hypothesis of an optimizing redistribution authority*. Clearly, the basic optimization problem would not make sense if the objective function were not concave. This is an interesting result, which was certainly not guaranteed by the inversion methodology used in this paper. Moreover it acquires a strong relevance given the heterogeneity of the redistribution systems and the socio-demographic characteristics of the countries analyzed.

The results also show the importance of including in the whole analysis the efficiency concerns: Figure 3 shows that, in several countries the weight on group 1, representing the working poor, is smaller than the weight on group 0. This result rationalizes the fact that working poor are subject to

²³ These studies analyze 21 European countries. The remaining countries are allocated according to similarities in their welfare states and labor market characteristics.

very high distortions corresponding to the high phase-out rate of social assistance (especially in Nordic countries). As can be seen in Fig. A2 of Appendix A, the gap between weights on groups 0 and 1 is even larger when participation elasticity is large, which reinforces previous interpretation. In other words, higher responses at the extensive margin should motivate higher in-work transfers (and lower withdrawal rate) for the working poor; it does not occur, which can only be justified by even smaller weights on this group. Another important result from Fig. A2 is the fact that the weight patterns do not vary too much with alternative assumptions, apart from the absolute level of weights on group 0.²⁴

Concerning the main objective of our analysis (i.e. looking at the social value judgments regarding the role of personal responsibility in financial conditions and the way this affects institutional redistribution), results from Figs 3 and 4 are in line with the standard classification of the welfare regimes (Esping Andersen, 1990, 1999; Leibfried 1992; Pestieau 2006). Recall that our basic work hypothesis is that a high social marginal weight of group 0 is assimilated to a strong level of decommodification. It implies that on the x-axis of Fig. 4 we can read a metrics of the level of the “willingness to decommodify citizens” of each social planner.

There appears to be a clear coincidence of high willingness to decommodify and high Rawlsianism in the Scandinavian, social-democratically influenced welfare states. There is an equally clear coincidence of low willingness and utilitarianism in the Southern European and Baltic welfare states. Finally, the Continental European countries, the Liberal and some Eastern European countries group closely together in the middle of the scale, as corporatist and etatist.

This is the most relevant and striking result (which, again, was certainly not guaranteed by the methodology used in this paper). This result is robust to a certain level of sensitivity analysis. While changing the way of defining groups and choosing elasticities do actually changes the values of the weights, the ranking is rather consistent, even though small variations between countries with similar values may happen.

An important comment must be made here. The budget constraints of families living in a country²⁵ certainly provide a first idea on the “willingness to decommodify citizens” of each national system. The higher is the guaranteed minimum income (i.e. the intercept of each line) the higher will be the decommodification. However this is not enough to reveal the preferences of the social planner: it is extremely important to include efficiency (i.e. taking into account different behavioral responses) and distributional aspects (i.e. taking into account differences in the income / wages distributions of each national population).

The cases of Denmark and Luxembourg are illustrative: both are characterized by generous social assistance (the guaranteed minimum income is almost the same, see Table 1b) but the low incomes marginal tax rates are higher in the former country (see Table 1a). The results of the inversion of the optimal problem in the two countries give a different picture (as shown in Fig. 4): skipping the efficiency concerns would make one conclude that the two countries have very similar willingness to decommodify, while with our analysis the difference is evident, and such that several other countries with a smaller minimum income levels fall in-between the two.

The results obtained with the inversion methodology are in line with the “decommodification ranking” computed by Esping Andersen (1990 and 1999) and also with other attempts, based on aggregate indicators, to compute some decommodification index for European countries (for example Menahem, 2007).

6. Conclusions

The aim of this paper has been to contribute to the debate regarding the typology of welfare states by offering a formal theorizing drawing from the optimal taxation literature (Mirrlees 1971) and

²⁴ As expected, the tighter the efficiency constraint at the extensive margin, i.e. the larger participation elasticities, the less generous transfers to the idle poor must be.

²⁵ Budget constraints are lines that relate gross and disposable income for some household type. OECD’s Directorate for Employment, Labour and Social Affairs provides budget constraints for several households’ types for all the countries under analysis.

http://www.oecd.org/document/29/0,3746,en_2649_34637_39618653_1_1_1_1,00.html

allowing for comparative research on the structure of the Welfare State taking explicitly into account the efficiency concerns of the redistribution policies.

In order to assess the degree of decommodification of 26 European welfare systems (Esping-Andersen, 1990), we have derived the shape of their social welfare functions by inverting the optimal tax model of Saez (2002) on actual average tax rate, under the (work) assumption that existing system are optimal for the government. Actual distributions of incomes before and after redistribution are obtained using EU-SILC 2007 microeconomic dataset.

The discussion of the results in the light of standard classifications of welfare regimes in Europe had shown that there appears to be a clear coincidence of high willingness to decommodify and high Rawlsianism in the *Scandinavian, social-democratically* influenced welfare states. There is an equally clear coincidence of low willingness and utilitarianism in the *Southern European* and *Baltic* welfare states. Finally, the *Continental European* countries, the *Liberal* and some *Eastern European* countries group closely together in the middle of the scale, as corporatist and etatist.

We have shown the potential usefulness of this approach: by using it, it is possible to build a metrics that allows measuring the willingness to decommodify and allowing to assess the degree of (dis)similarity of the redistribution systems analyzed. It means that we are able to compare, in a consistent way, social preferences across countries with different welfare regimes, different efficiency constraints and different distribution of wellbeing.

The sensitivity analysis highlights the importance of taking seriously into account the agent behavioral reactions in this type of analysis, and even more the choice and dimension of the income groups. In any case, what is more affected is the relative dimension of the social marginal weights within the countries. For example if elasticities are large g_0 can be much larger than the social marginal weights of the other income groups. However, this does not affect cross-country comparisons, since difference in elasticities is an element that actually enriches our analysis.²⁶ About this issue, it is important to emphasize that the economic empirical literature has pointed out towards larger elasticities at the extensive margin. If participation elasticities are large, then targeting the working poor through in-work transfers is preferable than generous social assistance schemes. This rationalizes the choice of a generous earned income tax credit in the US, as discussed by Saez (2002).

All European regimes investigated, with the exception of Southern countries, are, on the contrary, characterized by important redistribution towards the idle poor and the absence of in-work transfer to childless singles in almost all countries, which must be justified by either small participation elasticity and/or large redistributive tastes for this group. Our work purely explores the cross-country dimension but extensions to account for changes over time are desirable. In particular, recent trend towards earned income tax credit schemes in Europe (it was recently implemented, for example, in France and the UK) may translate a change in social preferences, or the recognition of the disincentive effects.

In the limit of our exercise on (childless) single individuals, cross-country differences are fairly robust to different assumptions on elasticity and income groups' definitions, and clearly distinguish welfare regimes in terms of social preferences. Future work should check the validity of these results and exploit the (even larger) heterogeneity across EU countries when it comes to single mothers (see Blundell et al. 2009 for a focus on this group in the case of the UK and Germany). Also, more attention should be paid to the role of unemployment benefits (distinguishing from minimum income schemes) and social contributions, but at the moment the available data do not permit to properly account for these elements singularly.

Another interesting line of research is to treat social preferences as endogenously determined. In particular, it would be interesting to question how social preferences are shaped by society's belief about fairness and luck (Alesina and Angeletos, 2005) or how they translate into the political process. Yet, this work could possibly be extended to account for the link between the design of redistributive policies and social choice.²⁷ Coggins and Perali (2000) suggest an exciting first attempt in this direction, revealing social preferences by connecting a social welfare function to a voting mechanism.

²⁶ A similar conclusion can be reached from the sensitivity analysis of income groups' definition. It can strongly affect the within country distribution of social marginal weights, but once a reasonable non-arbitrary common criterion is chosen, the cross-country analysis is enriched, not affected by this effect on social marginal weights.

²⁷ Systems in force may reflect to some extent the redistributive concern of the party or coalition in power, hence of only part of the electorate. This is fairly evident in periods following a change of majority; Oliver and Spadaro

Future work should be also directed to include in the analysis the dynamic dimension of the construction of the welfare state (that in our paper is missing). Given the importance of the issue of intergenerational solidarity and the role of welfare state in his enhancement (Masson 2007, 2004a, 2004b, 2002), it would be interesting, for example, to try to fix a link between the ideal typology proposed in the comparative welfare state literature (Esping Andersen, 1990, 1999; Leibfried, 1992; Pestieau 2006) and the theoretical literature on the optimal design of pensions system (see Cremer et al. 2008).

Our last remarks concern the limits of the suggested exercise. First and most important: we are aware that our analysis concentrate of childless singles in working age and conditions and mainly focuses on income taxes and benefits, that sums up to a very small part of the welfare state of a country. In this sense, our contribution must be seen as a step towards the construction of formal theorizing allowing for better understanding the nature of welfare system and, eventually, to better define (if possible) ideal-typical models starting from the analysis of real welfare state.

Second: it is natural to think that real world tax-benefit schedules result more from political economy forces than from the pursuit of some well-defined social objective. Even though, deriving and comparing social welfare functions implicit in each national system provide a new way to compare countries' tastes for redistribution as embodied in tax-benefit systems.

Third, the differences between countries are computed on the basis of the inversion of the tax model on single individuals. The family dimension is completely missing in our analysis. This is an important shortcoming given that the role of the family, and in particular, the substitutability between state and families in providing protection against decommodification risks, is one of the pillars of the standard debate.

While it is customary to compare systems in terms of (effective) average and marginal tax rates, degree of progressivity or degree redistribution (e.g. change in Gini due to the impact of tax-benefit systems), the present approach allows reading actual tax-benefit systems through the social preferences that they reveal, and proposes a comparable measure for the degree of Rawlsianism proper of a fiscal system, that can be also considered a measure of the willingness to decommodify citizens: the social marginal weight given to the poor.

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(2004) show for instance that the arrival of the right-wing Aznar government in Spain has been followed by a tax reform that can be interpreted in terms of changes in the redistributive concern of the State. Therefore, we should remain cautious with the term 'social' preference -- the reconciling political economy process is beyond our scope. Note, however, that the whole system does not change at each election and the alternance of majorities in Europe -- even if leading to some reshaping of redistributive systems -- may still leave room for significant differences 'on average' between countries. In particular, political spectrums in different countries are not perfectly overlapping. Overall, then, we argue that cross-country differences in underlying social preferences may be important and deserve characterization.

References

- Aaberge, R., and U. Colombino, (2008). "Designing Optimal Taxes with a Microeconomic Model of Household Labour Supply." CHILD Working Papers wp06_08, Centre for Household, Income, Labour and Demographic economics.
- Aaberge, R., U. Colombino, Steinar Strøm, and Tom Wennemo, (1998). "Evaluating Alternative Tax Reforms in Italy with a Model of Joint Labor Supply of Married Couples." *Structural Modeling and Economic Dynamics*, 9, 415-433.
- Ackert, L. F., J. Martinez-Vazquez, and M. Rider (2007). "Social preferences and tax policy design: some experimental evidence." *Economic Inquiry*, 45 (3), 487-501.
- Alesina, A., and G. M. Angeletos (2005). "Fairness and redistribution: US vs. Europe." *American Economic Review*, 95, 913-935.
- Amiel, Y., J. Creedy, and S. Hurn (1999). "Measuring attitudes towards inequality.", *Scandinavian Journal of Economics*, 101, 83-96.
- Arts, W., and J. Gelissen (2002). "Three worlds of welfare capitalism or more? A state-of-the-art report." *Journal of European Social Policy*, 12 (2), 137-158.
- Baldwin, P. (1996). "Can We Define a European Welfare State Model?" in B. Greve (ed.) *Comparative Welfare Systems: the Scandinavian Model in a Period of Change*, 29-44. London: Macmillan.
- Bargain, O., and K. Orsini (2006). "In-work policies in Europe: Killing two birds with one stone?" *Labour Economics*, 13(6), 667-697.
- Blundell, R. W. (2012). "Tax Policy Reform: The Role of Empirical Evidence." *Journal of the European Economic Association*, 10(1), 43-77.
- Blundell, R. W., and T. E. MaCurdy (1999). "Labor Supply: A Review of Alternative Approaches." in Ashenfelter and Card (eds), *Handbook of Labor Economics*, Elsevier North-Holland.
- Blundell, R. W., M. Brewer, P. Haan, and A. Shephard, (2009). "Optimal income taxation of lone mothers: an empirical comparison for Germany and the UK." *Economic Journal*, 119(535), 101-121.
- Boje, T. (1996). "Welfare State Models in Comparative Research: Do the Models Describe the Reality?" in B. Greve (ed.) *Comparative Welfare Systems: the Scandinavian Model in a Period of Change*, 13-27. London: Macmillan Press.
- Bonoli, G. (1997). "Classifying Welfare States: a Two-dimension Approach.", *Journal of Social Policy*, 26 (3): 351-72.
- Bourguignon, F., and A. Spadaro (2000). "Social Preferences Revealed through Effective Marginal Tax Rates." DELTA Working Paper n° 2000-29.
- Bourguignon, F., and A. Spadaro (2005). "Tax-Benefit Revealed Social Preferences", PSE Working Paper n° 2005-22.
- Bourguignon, F., and A. Spadaro (2012). "Tax-Benefit Reveal Social Preferences", *Journal of Economic Inequality*, 10(1), pp. 75--108.
- Carbonnier C. (2007). "L'impact de la fiscalité sur la participation des conjoints au marché du travail". DGTPE Working Paper n° 2007/05 – Paris
- Choné, P. and G. Laroque (2005). "Optimal incentives for labor force participation", *Journal of Public Economics*, 89 (2-3), pp. 395—425

- Cnaan, R. A. (1992). 'Three Worlds of Welfare Capitalism', *Acta Sociologica* 35 (1): pp. 69–71.
- Coggins, J. S. and F. Perali (2000). "Voting for equity: estimating society's preferences towards inequality", CHILD Working Papers wp04_00, Centre for Household, Income, Labour and Demographic economics.
- Corneo, G. and H.P. Grüner (2002). "Individual Preferences for political redistribution", *Journal of Public Economics*, 83, pp. 83--107.
- Cremer H., Lozachmeur J-M. and P. Pestieau (2008). "Social security and retirement decision: a positive and normative approach", *Journal of Economic Surveys*, 22(2), pp. 213--233.
- Chung, H. (2012). "Measuring Flexicurity: Precautionary Notes, a New Framework, and an Empirical Example", *Social Indicators Research*, 106(1), pp. 153--171.
- Deacon, B. (1993). "Developments in East European social policy", In *New Perspectives on the Welfare State in Europe*, edited by C. Jones. London: Routledge.
- Diamond, P. (1998). "Optimal income taxation: an example with U-shaped pattern of optimal marginal tax rates", *American Economic Review*, 88(1), pp.83--95.
- Duclos, J.-Y. (2000). "Gini Indices and the Redistribution of Income", *International Tax and Public Finance*, 7, pp. 141--162.
- Esping-Andersen, G. (1990). *The Three Worlds of Welfare Capitalism*. Oxford: Polity Press.
- Esping-Andersen, G. (1996). 'Welfare States without Work: the Impasse of Labour Shedding and Familialism in Continental European Social Policy', in G. Esping-Andersen (ed.) *Welfare States in Transition*, pp. 66–87. London: Sage.
- Esping-Andersen, G. (1999). *Social Foundations of Post-industrial Economies*. Oxford: Oxford University Press.
- Ferger, H.J.M. (2007). "Welfare regimes in Central and Eastern Europe: Incorporating post-communist countries in a welfare regime typology", *Contemporary Issues and Ideas in Social Sciences*, 3 (2).
- Ferrera, M. (1996). 'The "Southern" Model of Welfare in Social Europe', *Journal of European Social Policy* 6 (1): 17–37.
- Flora, P. (1983). *The Growth of Mass Democracies and Welfare States*, Vol. 1. Frankfurt am Main: Campus Verlag.
- Flora, P. (1986). *Growth to Limits: the Western European Welfare States since World War II*, 5 vols. Berlin: de Gruyter.
- Flora, P. and Heidenheimer, A. J. (1981). *The Development of Welfare States in Europe and America*. New Brunswick, NJ: Transaction Books.
- Fuest, C., Niehues, J and Peichl, A. (2010). "The Redistributive Effects of Tax Benefit Systems in the Enlarged EU", *Public Finance Review*, 38 (4), 473-500.
- Haan, P. and Steiner V. (2004). "Distributional and fiscal effects of the German tax reform 2000 - a behavioral microsimulation analysis", DIW discussion paper, 419, Berlin.
- Heckman, J. (1993). "What has be learned about the labor supply in the past twenty years", *American Economic Review, Papers and Proceedings*, 83, 116-121.
- Hicks, A. (1991). 'The Three Worlds of Welfare Capitalism', *Contemporary Sociology* 20 (3): 399–401.
- Immervoll, H., H. J. Kleven, C. T. Kreiner and E. Saez (2007). "Welfare reform in European countries: a microsimulation analysis", *Economic Journal*, 117(516), pp. 1-44.

- Immervoll H., H. Levy, C. Lietz, D. Mantovani, C. O'Donoghue, H. Sutherland and G. Verbist (2005). "Household Incomes and Redistribution in the European Union: Quantifying the Equalising Property of Taxes and benefits" EUROMOD Working Paper No. EM9/05
- Kerkhofs, M., Chung, H. and Ester, P. (2008). "Working time flexibility across Europe: a typology using firm-level data". *Industrial Relations Journal*, 39: 569–585.
- Katrougalos, G. S. (1996). 'The South European Welfare Model: the Greek Welfare State in Search of an Identity', *Journal of European Social Policy*, 6 (1): 39–60.
- Kleven, H.J. and C.T. Kreiner (2006a). "Arbejdsudbud, provenueffekter og Lafferkurve" Chapter 6 in (Tranæs, T. ed.), *Skat, Arbejde og Lighed*, København: Gyldendahl.
- Kleven, H.J. and C.T. Kreiner (2006b). "Beskatning af arbejdsindkomst i Danmark," Chapter 7 in (Tranæs, T. ed.), *Skat, Arbejde og Lighed*, København: Gyldendahl.
- Kohl, J. (1993). 'Der Wohlfahrtsstaat in vergleichender Perspektive', *Zeitschrift für Sozialreform* 39: 67–82.
- Labeaga J.M., Oliver X. and A. Spadaro (2008). "Discrete Choice Models of Labour Supply, Behavioural Microsimulation and the Spanish Tax Reforms". *Journal of Economic Inequality*, 6(3), pp. 274—273.
- Lambert, P.J., D.L. Millimet and D. Slottje, (2003). "Inequality aversion and the natural rate of subjective inequality" *Journal of Public Economics*, vol. 87, pp. 1061-1090.
- Laroque, G. (2005). "Income maintenance and labor force participation", *Econometrica*, 72(2), pp. 341-376.
- Laroque, G. and B. Salanié (2001). "Labor market, institutions and employment in France", *Journal of Applied Econometrics*, 17, pp. 25--48.
- Leibfried, S. (1992). 'Towards a European welfare state? On Integrating Poverty Regimes into the European Community', in Z. Ferge and J. E. Kolberg (eds) *Social Policy in a Changing Europe*. Frankfurt am Main: Campus Verlag.
- Lessenich, S. and Ostner, I. (1998). *Welten des Wohlfahrtskapitalismus: Der Sozialstaat in vergleichender Perspektive*. Frankfurt/Main: Campus Verlag.
- Marshall, T. H. (1950). *Citizenship and Social Class and other Essays*. Cambridge: Cambridge UP.
- Marshall, T. H. (1963). *Sociology at the Crossroads and other Essays*. London: Heinemann.
- Marshall, T. H. (1965). *Social Policy*. London: Hutchinson.
- Marshall, T. H. (1981). *The Right to Welfare and other Essays*. London: Heinemann.
- Masson, André (2002). "Économie des solidarités : Forces et faiblesses des solidarités comme anti-marché", in *Les solidarités familiales en questions*, D. Debordeaux et P. Strobel (eds.), LGDJ, Paris, (2002), pp. 143--182.
- Masson, André (2004a). "Etat-providence et familles : le lien intergénérationnel en question", *Cahiers français*, n° 322, "Familles et politiques familiales", pp. 81--87.
- Masson, André (2004b). "Economie du débat intergénérationnel : points de vue normatif, comptable, politique", in *Age, générations et contrat social*, J. Véron, S. Pennecc and J. Legaré (eds.), *Cahiers de l'Ined*, n° 153, pp. 15--58.
- Masson, André (2007). « Trois aperçus économiques du lien intergénérationnel » EHESS Editions, forthcoming.
- Menahem G., (2007). "The decommodified security ratio: A tool for assessing European social protection systems", *International Social Security Review*, Vol. 60, 4, pp. 69—103

- Mirrlees, J. A. (1971). "An Exploration in the Theory of Optimal Income Taxation", *Review of Economic Studies*, 38, pp. 175--208.
- Mommsen, W. J. (1981). *The Emergence of the Welfare State in Britain and Germany*. London: Croom Helm.
- Offe, C. (1991). 'The Three Worlds of Welfare Capitalism', *American Journal of Sociology* 96 (6): pp. 1555--1557.
- Oliver X. and A. Spadaro (2004). "Are Spanish Governments Really Averse to Inequality? A Normative Analysis using the 1999 Spanish Tax Reform", *Investigaciones Economicas*, vol.28 n° 3.
- Osberg, L. and T. Smeeding (2006). "Fair Inequality? An International Comparison of Attitudes to Pay Differentials", *American Sociological Review*, 71(3), pp. 450--473.
- Pestieau P. (2006). « The Welfare State in the European Union », Oxford University Press.
- Piketty T. (1997). "La redistribution fiscale face au chômage", *Revue française d'économie*, 12.
- Polanyi, K. (1944). "The Great Transformation". Boston, MA, Beacon Press.
- Saez, E. (2001). "Using elasticities to derive optimal income tax rates", *Review of Economic Studies*, 68, pp. 205--229.
- Saez, E. (2002). "Optimal income transfer programs: intensive versus extensive labor supply responses", *Quarterly Journal of Economics*, 117(3), 1039-1073.
- Spadaro, A. (2005). "Microsimulation and normative policy evaluation: an application to some EU tax-benefit systems", *Journal of Public Economic Theory*, 7. n° 4, pag. 593-622.
- Titmuss, R. (1958). *Essays on the Welfare State*. London: Allen & Unwin.
- Titmuss, R. (1974). *Social Policy*. London: Allen & Unwin.
- Trifiletti, R. (1999). 'Southern European Welfare Regimes and the Worsening Position of Women', *Journal of European Social Policy*, 9 (1): 49--64.
- Wilensky, H. L. (1975). "The Welfare State and Equality: Structural and Ideological Roots of Public Expenditures", Berkeley/Los Angeles: University of California Press.

Table 1a. European Tax systems in 2007 (source: OECD country chapters - Benefits and Wages)

	<i>Income Tax System</i>					<i>Social Contributions</i>	
	<i>Tax bands</i>	<i>Lowest/highest tax band limit (*)</i>	<i>Lowest/highest tax rate (%)</i>	<i>Main tax credit(**)</i>	<i>Tax unit</i>	<i>Starting/finishing rate (%)</i>	<i>Tax deductible</i>
AT	4	29/146	38.3/50	0.14	Individual	18.06	yes
BE	5	18/82	25/50	2	Individual	13.07	yes
CY	4	82/158	0/30	-	Individual	6.3	yes
CZ	4	17/167	12/32	2.86	Family	12.5	yes
DE	Count.	21/127	13.16/47.5	-	Family	28.8/13	yes
DK	3	12/100	49/59	2.5	Individual	8+lump sum (2.3% of AW)	yes
EE	1	21	24/24		Individual	2.6	yes
ES	4	78/238	15(+8 reg.1)/27(+15 reg.)	3.5	Individual	6.35	yes
FI	4	35/175	9/lump sum (28% of AW)+32	1.15	Individual	5.63/6.90	yes
FR	5	17/210	0/40	2.9	Family (opt.)	17.8	yes
GR	4	72/453	0/40	-	Individual	16	yes
HU	2	79	18/36	0.4	Individual	17	No
IE	2	86	20/41	4.5	Family	6	Partially
IS	1	-	35.72	10.2	Individual	4 + 0.16% of AW	yes
IT	5	55/278	23/43	6.8	individual	9.49/10.49	yes
LT	1	-	27	-	individual	3	no
LU	17	22/76	0/38	-	Family	13.3/15.55	yes
LV	1	-	25	-	Individual	9	yes
NL	4	41/126	2.5/52	3.3	Individual	31.5/0	no
NO	4	95/154	28/40	-	Family (opt.)	0/7.8	no
PL	3	134/264	19/59	1.8	Family (opt.)	24.7	Partially
PT	7	28/381	10.5/42	1.4	Family	11	yes
SE	3	94/141	0/25 + 31.55	-	Individual	7	(through a tax credit)
SI	3	46/93	16/41	-	Individual	22.1	yes
SK	1	-	19	-	Individual	13.4	yes
UK	3	7/104	10/40	5.2	Individual	11/1	NO

(*) % of the Average Worker Wage estimated by OECD

(**) Tax credit given to all employees, % of the Average Worker Wage estimated by OECD

Table 1b. European main benefits in 2007 (source: OECD country chapters - Benefits and Wages)

	Social Assistance			Housing benefits		Unemployment benefits	
	Max amount (*)	Disregard	Withdrawal rate (% of net income)	Max amount (*)	Withdrawal rate	rate or amount	ceiling (*)
AT	17.2	family benefits	100	7.9 (Vienna)	by municipality	55%	10.1
BE	20	10 (*)	100	-	-	60%	39.6
CY	20.4	4.6 (*)	100	10.2	0	60%	34.5
CZ	14.9	-	100	15.9 (Prague)	26	50%	58
DE	10.3	3(*)	80	10.7	40.9	60%	93.8
DK	31	13 DKK per hour of work	85	10.3	16	90%	51.3
EE	7.7	-	100	6.9	0	50%	-
ES	18.6	-	100	-	-	70%	55.6
FI	13.5	20% - max 5.2 (*)	100	11.2	29.7	17.9 (*) + 45%	90% salary
FR	16.7	100% for 3 months	0 - 50 - 100	9.9	39.6	75% / 57.4%	20
GR	-	-	-	12.5 (pub. houses)	0	50% (of unskilled worker salary)	26.6
HU	13.6		lose almost everything when work	1.4	0	60%	43.7
IE	24.5	family benefits	100	15.4	Reduces by income thresholds	24.5 (*) no work, reduces by income thresholds	24.5
IS	30.2	-	100	4	1	36.1 (*) reduces if work < 40 hours	36.1
IT	-	-	-	-	-	60%	46
LT	10.1	-	90	-	-	11.3 (*) + 40%	52.2
LU	29.7	30% + family benefits	90	3.3	10	80%	37.8
LV	6.9	-	100	8.7	68	up to 65%	
NL	31.1	-	100	9.1	35	75%	108
NO	13.1	-	100	12.1	38.6	62.40%	59.4
PL	17.7	-	100	15.4	15	20 (*)	20
PT	13.2	housing + family benefits	50	7	-	65%	89
SE	12.4	social contributions	100	20	up to 61.8	80%	52.5
SI	16.9	-	100	max 80% of rent	0 - 45.8	70%	58.5
SK	8.2	25%	100	7.3	30	50% of assessment basis	50
UK	9.3	-	100	20	65	9.3 (*)	9.3

(*) % of the Average Worker Wage estimated by OECD

Table 2: Data Description

Country	Sample size	Population in the sample	Average gross income	Average disp. income	Unemployment rate
AT	755	502 633	31 247	21 973	4.4%
BE	601	525 656	31 017	20 947	7.5%
CY	155	16 421	23 055	20 170	4.0%
CZ	746	312 382	9 116	6 990	5.3%
DE	1 555	5 883 893	32 365	21 715	8.4%
DK	454	485 139	36 593	23 748	3.8%
EE	323	75 158	7 572	6 060	4.7%
ES	639	1 061 133	20 265	16 142	8.3%
FI	936	371 690	26 777	19 938	6.9%
FR	1 002	3 364 834	24 014	18 696	8.4%
GR	255	209 790	21 369	14 418	8.3%
HU	476	220 812	7 352	5 027	7.4%
IE	318	86 116	37 727	29 566	4.6%
IS	187	16 631	45 230	30 984	3.2%
IT	1 753	2 392 891	28 782	20 731	6.1%
LT	295	100 532	5 857	4 506	4.3%
LU	485	24 252	51 234	36 868	4.2%
LV	321	60 309	5 574	4 409	6.0%
NL	1 007	906 598	31 737	21 188	3.2%
NO	739	420 148	42 139	29 768	2.5%
PL	464	692 803	8 046	5 592	9.6%
PT	149	148 243	16 592	12 079	8.1%
SE	691	690 891	27 281	19 482	6.1%
SI	182	34 058	16 493	11 381	4.9%
SK	233	115 471	6 432	5 018	11.1%
UK	783	2 681 425	42 848	29 464	5.3%

Table 3: Cut-off points, gross income, disposable income and population of the income groups (source: EU-SILC, thousands of Euros and thousands of individuals)

Groups	0	1	2	3	4	5
AT Cut off point	0.0	6.5	19.6	27.9	36.3	61.5
Gross inc.	3.5	14.2	23.9	31.5	45.6	91.6
Disp.inc.	6.3	12.7	17.9	21.9	29.8	56.8
Population	21.9	107.9	121.2	112.5	110.8	28.4
BE Cut off point	0.0	10.6	20.6	29.4	38.2	64.7
Gross inc.	6.3	16.3	25.4	33.1	46.9	86.3
Disp.inc.	8.7	13.4	18.1	21.5	29.0	53.1
Population	39.1	82.9	140.8	137.4	107.9	17.5
CY Cut off point	0.0	5.1	14.5	20.7	26.9	45.5
Gross inc.	3.5	10.2	17.9	23.2	31.0	67.4
Disp.inc.	3.0	9.6	15.9	20.8	27.0	55.0
Population	0.6	4.2	3.3	3.4	3.7	1.2
CZ Cut off point	0.0	3.3	5.5	7.9	10.2	17.3
Gross inc.	1.9	4.5	6.6	9.0	12.5	25.1
Disp.inc.	2.3	3.8	5.3	7.0	9.3	17.9
Population	19.5	53.9	82.4	61.5	72.8	22.2
DE Cut off point	0.0	7.9	21.2	30.3	39.4	66.7
Gross inc.	3.9	15.2	26.2	34.6	48.4	95.5
Disp.inc.	8.9	12.0	18.3	22.8	30.0	55.5
Population	491.8	1254.0	1194.2	1281.8	1374.5	287.5
DK Cut off point	0.0	2.5	24.9	35.6	46.2	78.2
Gross inc.	0.3	15.7	30.7	40.2	55.0	175.3
Disp.inc.	7.5	13.9	20.6	25.6	32.8	86.6
Population	23.0	105.0	114.0	132.5	100.8	9.8
EE Cut off point	0.0	2.1	4.2	6.1	7.9	13.3
Gross inc.	1.3	3.3	5.2	7.0	10.6	17.5
Disp.inc.	1.2	3.0	4.3	5.5	8.4	13.5
Population	3.5	17.4	16.6	11.2	17.6	8.9
ES Cut off point	0.0	6.2	12.4	17.7	23.1	39.0
Gross inc.	3.8	10.1	15.1	20.0	29.2	53.6
Disp.inc.	4.1	9.2	12.5	16.3	22.8	37.6
Population	87.9	205.9	233.0	221.5	230.3	82.6
FI Cut off point	0.0	4.7	17.9	25.5	33.2	56.2
Gross inc.	1.9	11.3	22.2	28.8	40.4	75.5
Disp.inc.	8.1	11.7	17.1	21.1	27.4	44.9
Population	25.4	70.4	90.0	88.2	80.2	17.5
FR Cut off point	0.0	7.2	15.0	21.5	27.9	47.3
Gross inc.	4.0	11.8	18.6	24.5	35.0	62.8
Disp.inc.	8.2	11.6	14.9	18.8	25.3	42.6
Population	231.2	559.0	888.4	760.1	718.9	207.2
GR Cut off point	0.0	6.4	12.9	18.4	23.9	40.4
Gross inc.	4.2	10.0	15.4	20.9	30.1	64.3
Disp.inc.	2.9	8.0	11.9	15.2	19.3	35.7
Population	17.1	45.9	41.4	47.2	41.5	16.7
HU Cut off point	0.0	2.1	4.3	6.1	8.0	13.5
Gross inc.	1.1	3.2	5.1	6.9	10.3	18.2
Disp.inc.	1.3	2.6	4.0	4.9	6.7	10.8
Population	16.3	49.2	43.9	35.0	51.7	24.7
IE Cut off point	0.0	4.7	24.1	34.5	44.8	75.8
Gross inc.	2.8	16.5	29.7	39.8	56.2	97.8
Disp.inc.	7.2	16.4	25.3	31.9	40.0	66.1
Population	3.8	25.3	14.0	15.5	21.8	5.8

Table 3: Continued from previous page.

Groups	0	1	2	3	4	5	
IS	Cut off point	0.0	9.1	29.2	41.7	54.2	91.8
	Gross inc.	5.1	21.6	35.7	46.6	66.5	113.5
	Disp.inc.	6.6	16.9	24.6	31.2	44.3	75.5
	Population	0.5	3.5	4.3	3.7	3.8	0.8
IT	Cut off point	0.0	8.4	16.7	23.9	31.1	52.6
	Gross inc.	5.7	12.9	20.4	27.3	38.5	80.7
	Disp.inc.	5.2	10.5	15.8	20.3	27.7	50.6
	Population	145.4	449.3	598.3	463.9	520.8	215.1
LT	Cut off point	0.0	0.5	3.2	4.6	6.0	10.2
	Gross inc.	0.2	2.0	3.9	5.2	7.5	15.1
	Disp.inc.	0.2	1.7	3.3	4.1	5.7	11.0
	Population	4.3	25.7	20.1	14.6	21.1	14.7
LU	Cut off point	0.0	14.9	30.1	43.0	55.9	94.6
	Gross inc.	8.2	23.4	36.3	50.5	69.3	125.0
	Disp.inc.	10.4	18.6	28.2	36.3	47.9	84.2
	Population	1.0	5.7	5.4	3.5	6.5	2.3
LV	Cut off point	0.0	0.5	3.4	4.9	6.4	10.8
	Gross inc.	0.2	2.2	4.2	5.7	7.9	16.9
	Disp.inc.	0.3	1.8	3.2	4.5	6.2	13.2
	Population	3.2	17.1	9.8	11.6	13.7	4.9
NL	Cut off point	0.0	4.5	20.6	29.5	38.3	64.8
	Gross inc.	2.5	13.9	25.2	33.4	46.6	81.6
	Disp.inc.	6.8	13.6	17.7	21.7	28.3	45.3
	Population	27.5	180.0	244.2	202.6	208.7	43.6
NO	Cut off point	0.0	5.1	28.4	40.5	52.7	89.2
	Gross inc.	3.0	17.1	35.3	45.9	64.7	151.2
	Disp.inc.	7.3	15.2	25.6	32.5	43.2	85.5
	Population	10.1	75.6	123.9	131.6	68.9	10.0
PL	Cut off point	0.0	2.5	4.6	6.5	8.5	14.4
	Gross inc.	1.2	3.6	5.4	7.4	10.9	21.7
	Disp.inc.	1.3	2.6	3.8	5.2	7.5	14.7
	Population	64.7	152.9	124.0	122.3	149.0	80.0
PT	Cut off point	0.0	4.6	8.0	11.4	14.9	25.2
	Gross inc.	2.4	6.3	9.2	13.3	18.7	41.4
	Disp.inc.	3.3	5.5	7.3	10.4	13.6	27.5
	Population	11.7	31.7	28.9	18.4	29.3	28.3
SE	Cut off point	0.0	6.0	19.0	27.1	35.2	59.6
	Gross inc.	3.3	12.8	23.8	30.7	41.9	83.8
	Disp.inc.	6.7	11.8	17.4	21.5	27.8	46.4
	Population	42.0	144.1	158.6	189.2	140.2	16.8
SI	Cut off point	0.0	3.1	9.7	13.8	18.0	30.4
	Gross inc.	1.8	6.9	11.9	15.6	23.3	41.0
	Disp.inc.	2.9	6.0	9.0	10.9	15.4	24.0
	Population	1.7	6.1	9.3	5.7	8.4	3.0
SK	Cut off point	0.0	3.2	3.9	5.6	7.3	12.4
	Gross inc.	2.2	3.6	4.7	6.5	9.2	19.8
	Disp.inc.	2.1	3.0	3.7	5.0	7.0	14.7
	Population	12.6	9.9	35.0	33.6	17.3	7.0
UK	Cut off point	0.0	12.7	24.7	35.2	45.8	77.5
	Gross inc.	8.1	20.1	29.9	40.5	57.4	121.9
	Disp.inc.	8.3	15.6	21.6	28.2	39.6	73.1
	Population	147.1	530.9	660.3	469.5	654.5	219.2

Table 4: Distribution of singles between different income groups (h_i)

Groups	0	1	2	3	4	5
AT	0.04	0.21	0.24	0.22	0.22	0.06
BE	0.07	0.16	0.27	0.26	0.21	0.03
CY	0.04	0.26	0.20	0.20	0.22	0.07
CZ	0.06	0.17	0.26	0.20	0.23	0.07
DE	0.08	0.21	0.20	0.22	0.23	0.05
DK	0.05	0.22	0.24	0.27	0.21	0.02
EE	0.05	0.23	0.22	0.15	0.23	0.12
ES	0.08	0.19	0.22	0.21	0.22	0.08
FI	0.07	0.19	0.24	0.24	0.22	0.05
FR	0.07	0.17	0.26	0.23	0.21	0.06
GR	0.08	0.22	0.20	0.23	0.20	0.08
HU	0.07	0.22	0.20	0.16	0.23	0.11
IE	0.04	0.29	0.16	0.18	0.25	0.07
IS	0.03	0.21	0.26	0.22	0.23	0.05
IT	0.06	0.19	0.25	0.19	0.22	0.09
LT	0.04	0.26	0.20	0.15	0.21	0.15
LU	0.04	0.23	0.22	0.14	0.27	0.09
LV	0.05	0.28	0.16	0.19	0.23	0.08
NL	0.03	0.20	0.27	0.22	0.23	0.05
NO	0.02	0.18	0.29	0.31	0.16	0.02
PL	0.09	0.22	0.18	0.18	0.22	0.12
PT	0.08	0.21	0.19	0.12	0.20	0.19
SE	0.06	0.21	0.23	0.27	0.20	0.02
SI	0.05	0.18	0.27	0.17	0.25	0.09
SK	0.11	0.09	0.30	0.29	0.15	0.06
UK	0.05	0.20	0.25	0.18	0.24	0.08

Table 5: Labour supply elasticities of signles: a brief review

	<i>Country</i>	<i>Data</i>	<i>Selection</i>	<i>Extensive elasticity</i>	<i>Intensive elasticity</i>
Kleven and Kreiner (2006a, 2006b)	Denmark	ECHP 97-98	singles	0.35	0.2
Bargain and Orsini (2006)	Finland	IDS 97	single women	0.18 - 0.33	0.18 - 0.34
Bargain and Orsini (2006)	France	HBS 95	single women	0.04 - 0.07	0.08 - 0.14
Laroque and Salanie (2001)	France	Tax revenue 97	single women	0.36	
Bargain and Orsini (2006)	Germany	GSOEP 98	single women	0.08 - 0.15	0.09 - 0.18
Haan and Steiner (2005)	Germany	GSOEP 02	single women	0.01 - 0.09	0.02 - 0.24
			single men	0.06 - 0.19	0.09 - 0.28
Aaberge et al. (1998)	Italy	SHIW 1993	single women	0.06	0.10
			single men	0.08	0.11
Labeaga, Oliver and Spadaro (2008)	Spain	ECHP 95	singles	0.2	0.1
Blundell and MaCurdy (1999)	UK	FES 1980	singles	0.24	

Table 6: Relative labour supply elasticity magnitudes

	relative market flexibility ¹	extensive elasticity	intensive elasticity
AT	0.9	0.27	0.09
BE	1.1	0.33	0.11
CY	0.6	0.18	0.06
CZ	1.1	0.33	0.11
DE	1	0.3	0.1
DK	1.4	0.42	0.14
EE	1	0.3	0.1
ES	0.7	0.21	0.07
FI	1.5	0.45	0.15
FR	1	0.3	0.1
GR	0.6	0.18	0.06
HU	0.9	0.27	0.09
IE	1.1	0.33	0.11
IS	1.3	0.39	0.13
IT	0.8	0.24	0.08
LT	1	0.3	0.1
LU	0.9	0.27	0.09
LV	1	0.3	0.1
NL	1.2	0.36	0.12
NO	1.3	0.39	0.13
PL	1.3	0.39	0.13
PT	0.6	0.18	0.06
SE	1.3	0.39	0.13
SI	0.9	0.27	0.09
SK	1.1	0.33	0.11
UK	1.1	0.33	0.11

1. Index computed from labour market flexibility indices.

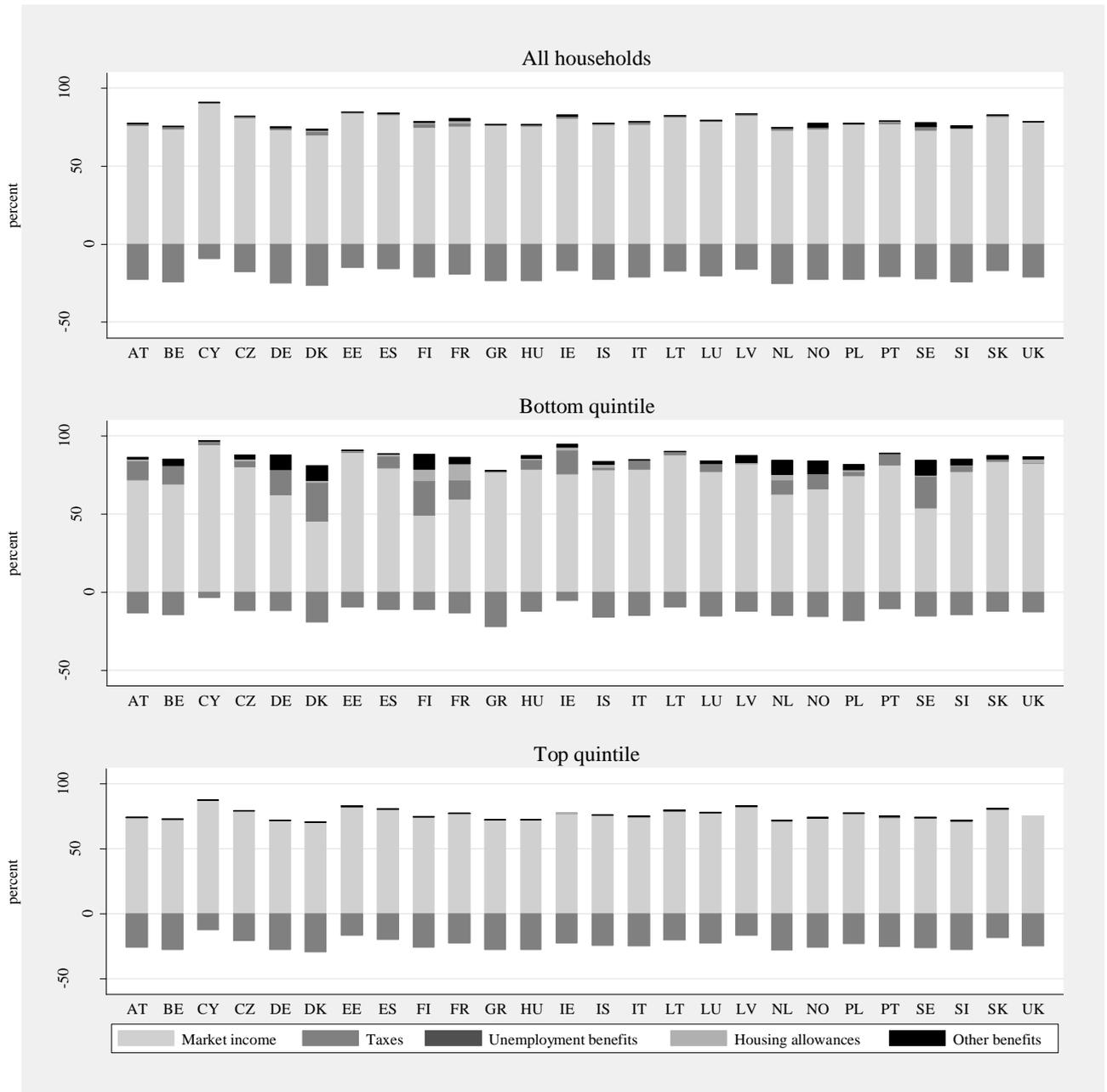


Figure 1: Market income, Taxes and benefits for singles in Europe (EU-SILC 2007)

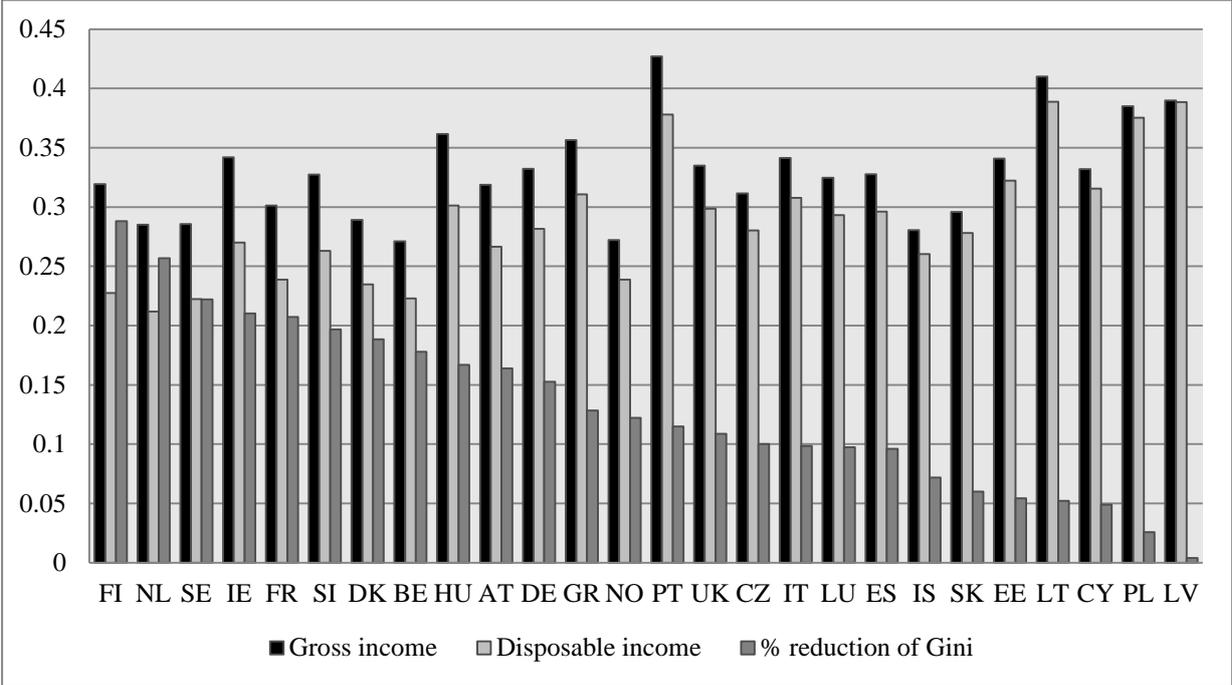


Figure 2: Change in Gini of market income due to the fiscal system. Countries are ranked according to the difference between gross and disposable income Gini indices, from the largest to the smallest.

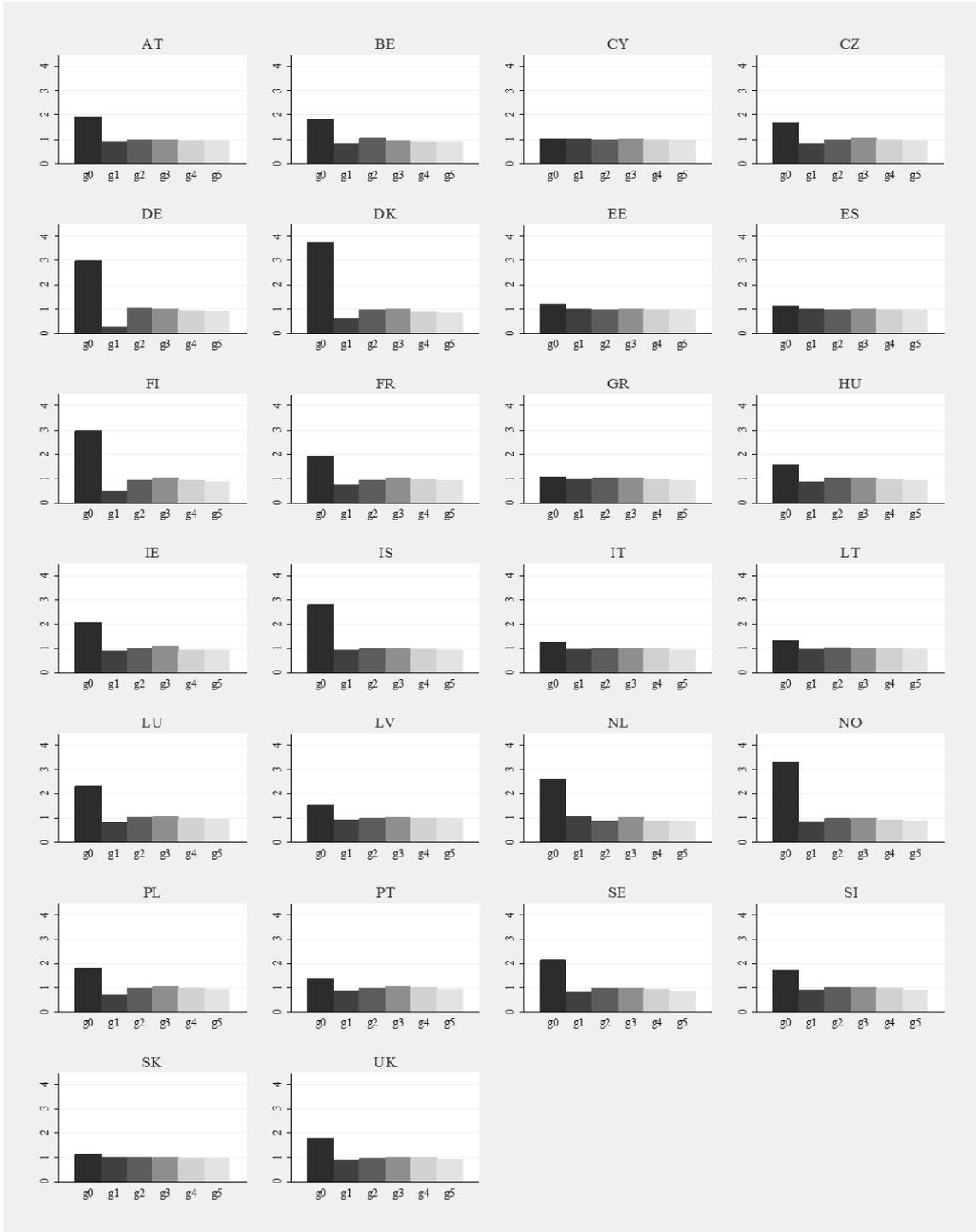


Figure 3: Social marginal weights

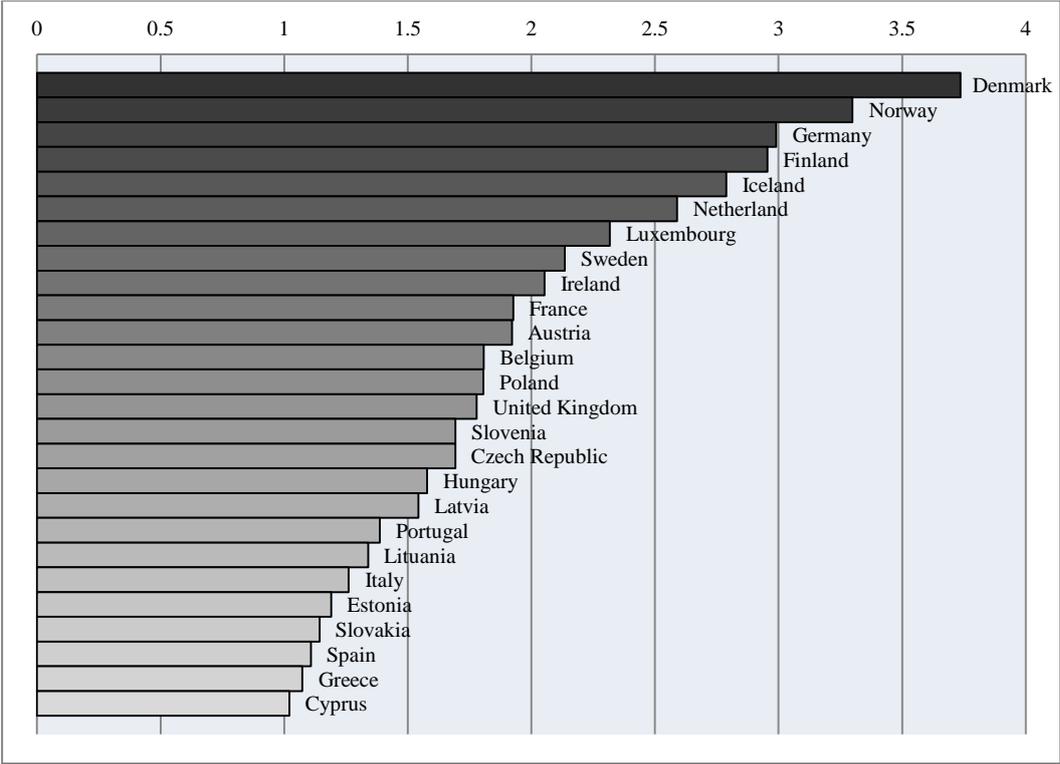


Figure 4: Ranking of the social marginal weitht for group 0

Appendix A: Sensitivity analyses

This appendix reports a sensitivity analysis with respect to different values of elasticities and different criteria to choose income groups. Within a country choosing larger elasticities just imply larger differences in weights. In particular, large changes in g_0 are associated with participation elasticity for all groups, and the intensive elasticity for group 0. Figure A1 shows that changing the participation elasticity from 0.3 to 0.1 and the intensive elasticity from 0.1 to 0.05, flattens the distribution of weights. So, countries with large values for g_0 get smaller values, but the ranking of countries does not change.

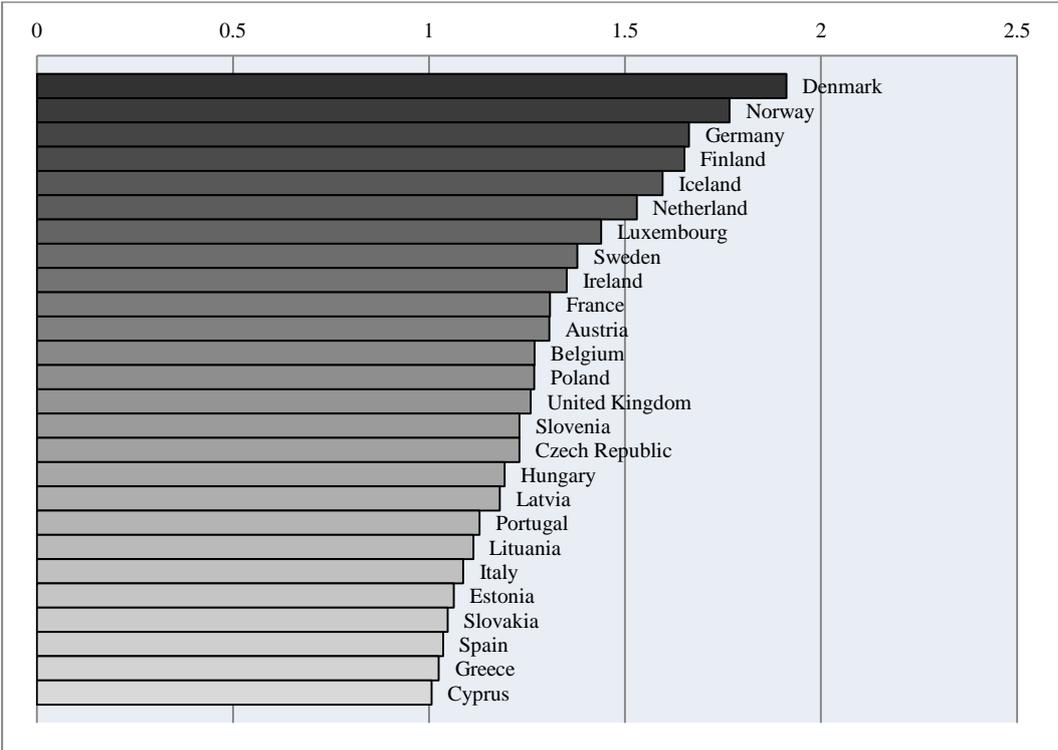


Figure A1: Ranking of the social marginal weight for group 0 – small elasticities

This evidence, also implies that choosing different elasticities do have an effect on the ranking of g_0 , so a choice of an arbitrary value for a particular country may have important effects for the ranking. In this article we tried to reduce the level of arbitrariness by referring to the flexibility of labour markets as a relative measure of the elasticity of workers. The more a market is flexible with respect to the average flexibility in Europe, the larger is its elasticity with respect to the chosen baseline values. As can be seen in Fig. A2, the gap between weights on groups 0 and 1 is larger when participation elasticity is large, which reinforce the idea that working poor are subject to very high distortions corresponding to the high phase-out rate of social assistance.

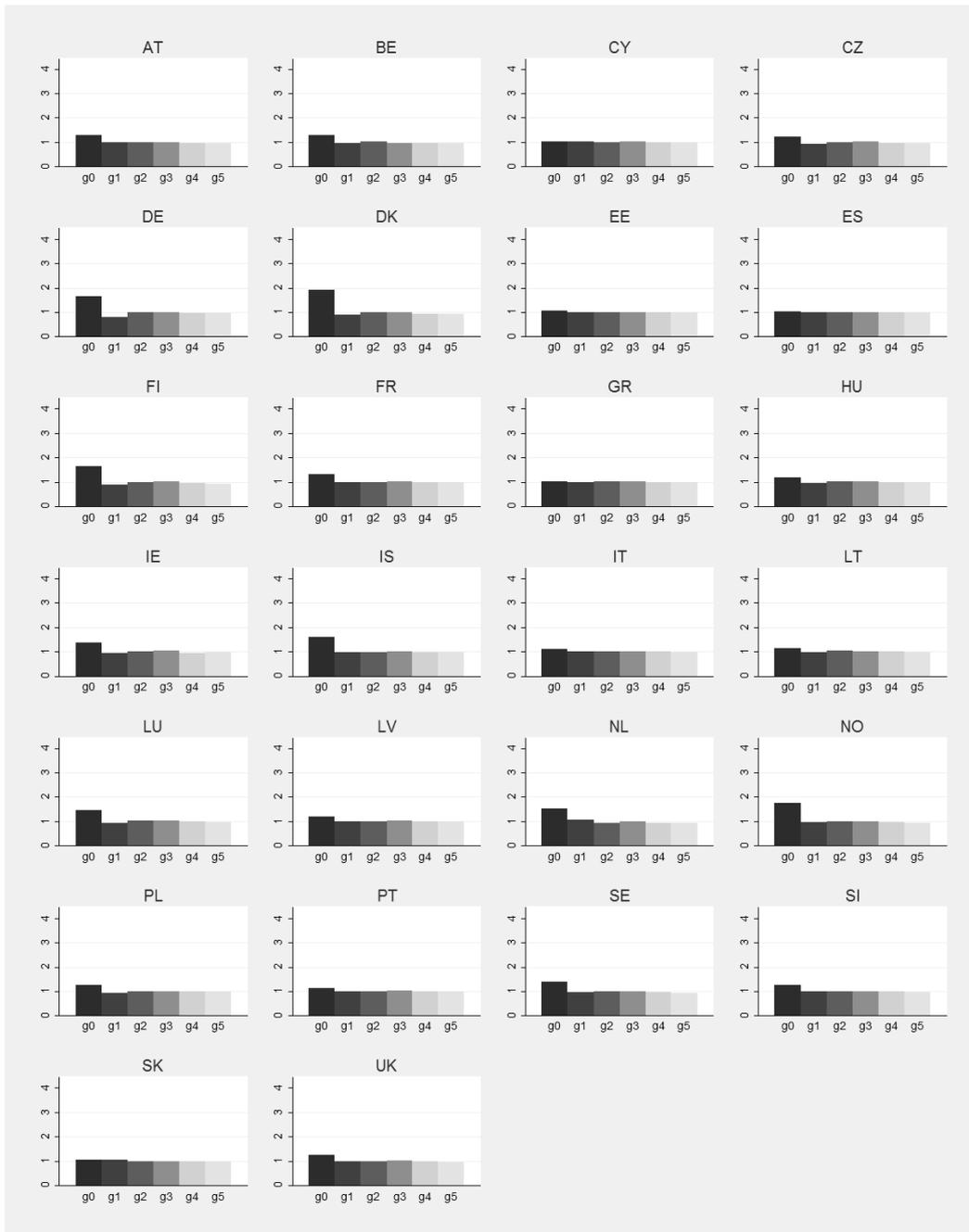


Figure A2: Social marginal weights – small elasticities

Another possible robustness check is to consider that all countries have the same elasticities. This is not really plausible, but being the elasticities so small for singles, variations between countries can be assumed to be very small as well.

Figure A3 shows the ranking of g_0 when all countries have the same elasticities. As expected, the countries that are especially affected from this choice are those ranked at the top, for which there is a change in the ranking. However those that are at the top stay at the top, and the bottom part of the ranking is almost the same.

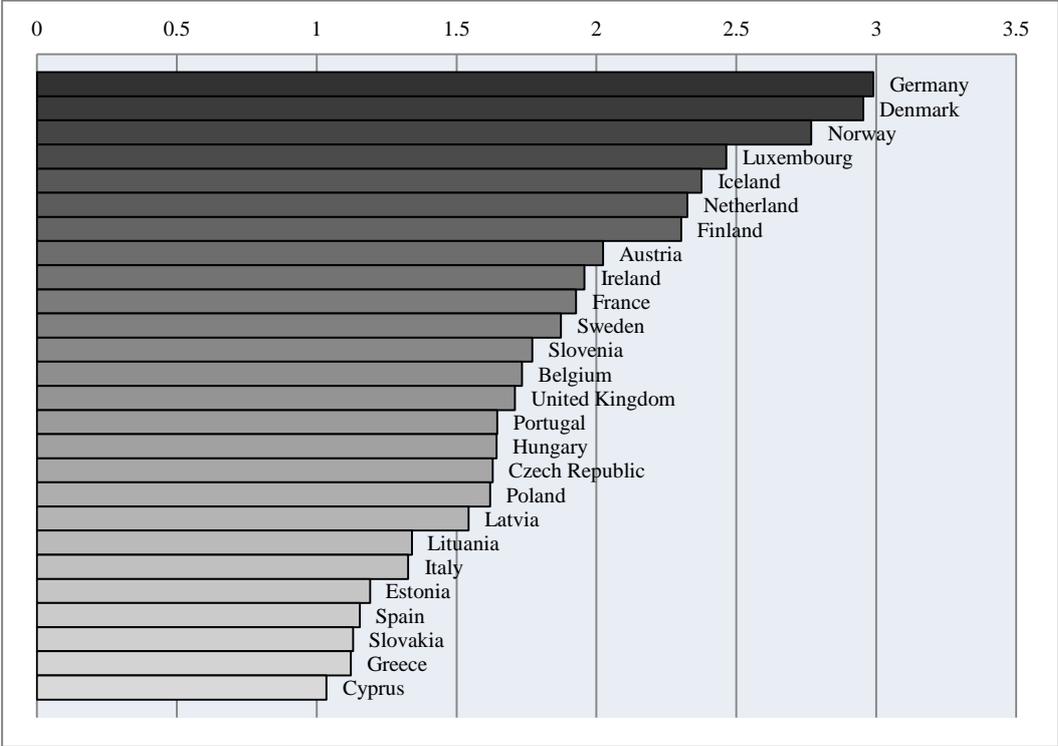


Figure A3: Ranking of the social marginal weitht for group 0 – same elasticities

This analysis suggests that the choice of elasticities is not particularly important as long as no arbitrary, very different, values are chosen. Choosing large elasticities can imply to have a greater difference between g_0 and the other groups’ weights. However, even with modest values of elasticities, the difference between countries remains clear.

The other possible source of arbitrariness that can affect the proposed analysis is the choice of income groups. The criteria that can be adopted may be numerous, and it may be questionable whether all countries should have the same number of groups or not. Nevertheless, the focus of our analysis is on the magnitude of the social marginal weight for g_0 , a group that is quite clearly identified.

The proposed definition was to define group 0 consider the importance that politics usually give to the unemployment rate, and try to translate it in an income criteria to define g_0 . The other possibilities that we take into consideration are to use the standard poverty line for the definition of the poverty headcount ratio and the use of percentiles of the income distribution as the discriminants.

The first, considers 60% of the median income as the threshold for the definition of the group of poor. The results, presented in Fig. A4, show that this decision has more effects on the ranking respect to the choice of elasticities. For instance, Germany and Luxembourg fall behind in the middle of the ranking, while France and Belgium raise almost to the top. The bottom part of the distribution, again, is very similar to the other cases.

The second alternative criterion analyzed here is to choose groups according to their relative position in the distribution of gross income. Group 0 corresponds to the first decile, g_1 up to the 25th percentile, g_2 up to the 50th, g_3 up to the 70th and g_4 up to the 90th. The ranking, reported in Fig. A5 show again a

slight variation in the top positions, with Norway and Luxembourg going down, while France and Belgium going up, but the remaining part of the distribution is quite similar to Fig. 4 in the main text of the article.

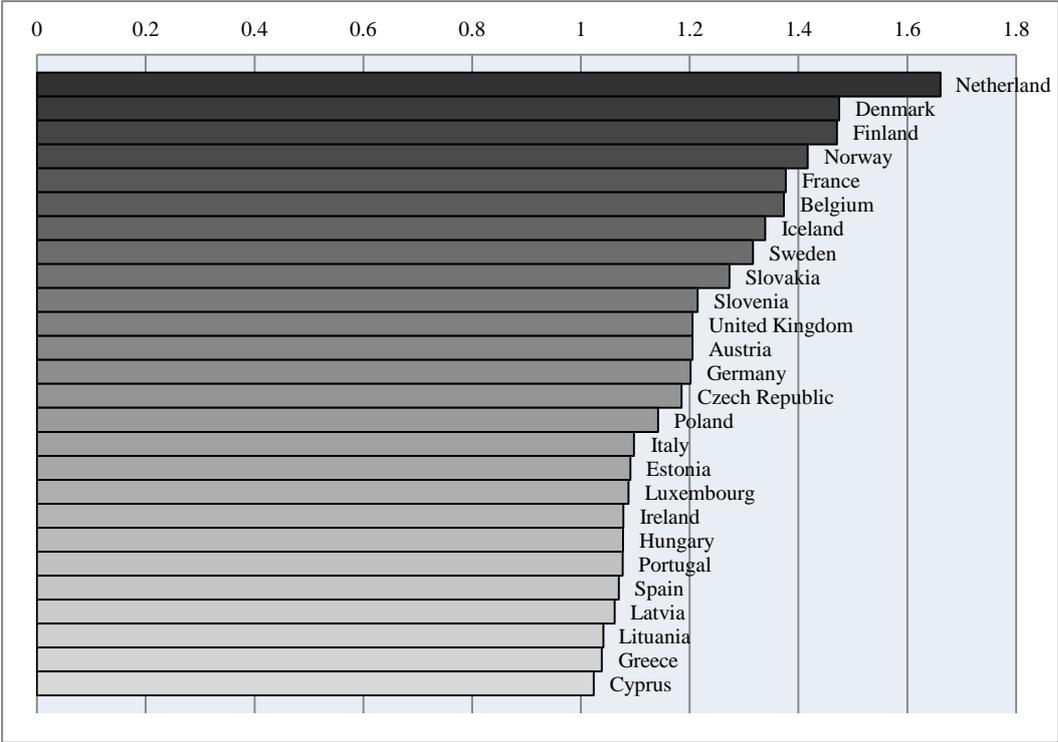


Figure A4: Ranking of the social marginal weight for group 0 – poverty line

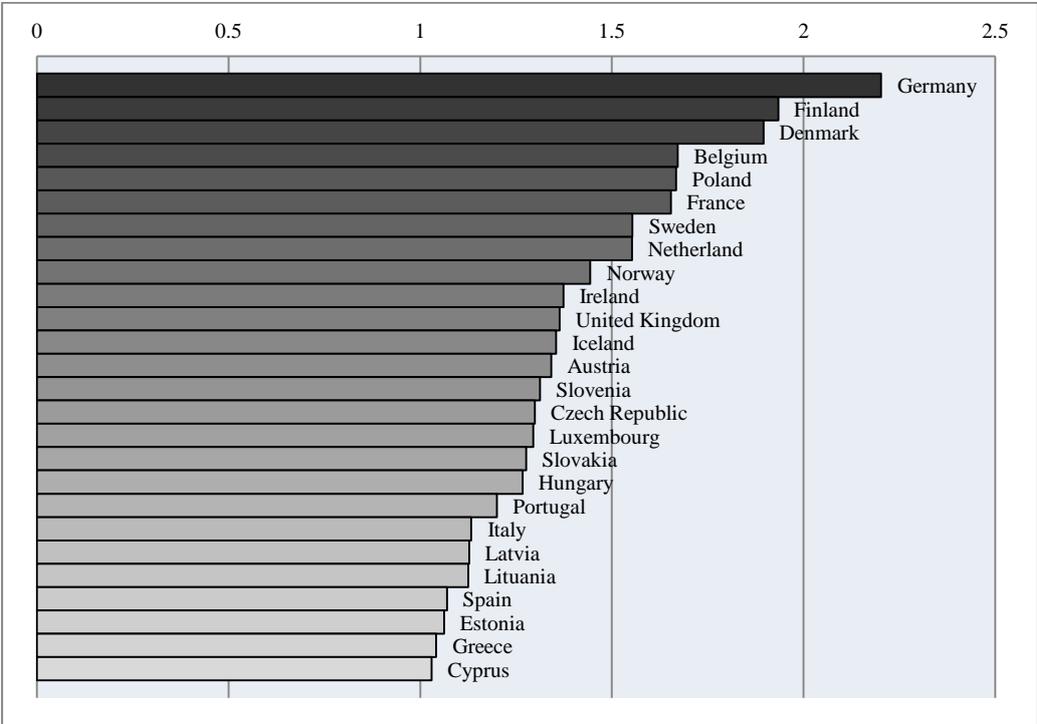


Figure A5: Ranking of the social marginal weight for group 0 – percentiles

Appendix B: Primitive weights

The main objective of this appendix is to replicate the analysis performed on social marginal weights g_i using primitive weights μ_i .

Equation (4) establishes a clear relation between g , μ and the marginal utility of consumption. The social marginal weight can be interpreted as the group i average product between the primitive weights and the marginal utilities of each individuals of group i . It is clearly senseless to compute the primitive weights for each individual and it seems sufficiently safe to assume that within each group all individuals share the same primitive weight μ_i . In this way, equation (4) can be rewritten as

$$g_i = \frac{\mu_i}{ph_i} \int_{M_i} \frac{\partial u^m(C_i^*, i^*)}{\partial C_i} dv(m)$$

that is, the social marginal weight is equal to the product between the primitive weight and the average marginal utility of group i , \bar{u}'_i , i.e.

$$g_i = \mu_i \bar{u}'_i.$$

Now, it is straightforward to calculate the values of μ_i given any functional form for the utility function. For example, assuming a CRRA utility function with $\alpha = 0.5$, the marginal utility is $\bar{u}'_i = C^{-0.5}$, thus the primitive weight for group i is

$$\mu_i = g_i \bar{C}_i^{0.5}. \quad (B1)$$

Knowing g_i and \bar{C}_i for all groups, it is possible to replicate the ranking provided by Fig. 4 using primitive weights. Since primitive weights are sensitive to the structural parameters of the utility function, in the above example α , we provide three rankings, for increasing values of α . When α is very small (in Fig. B1 it is set to 0.05), the marginal utility of consumption is nearly constant and close to 1, so the ranking do not change significantly respect to the marginal weights rankings, since $\mu_i \cong g_i$.

As α increases (Figure B2 reports the ranking for $\alpha = 0.5$) primitive weights depend more and more on the marginal utility of consumption of groups i . The result is that the ranking does not change substantially in the top half of the distribution. The richer countries are also those that have the most important anti-poverty measures. On the other hand, in the bottom half of the ranking, the increasing incidence of average consumption of group 0 brings the relatively richer countries (for example Italy) to higher positions and the poorer (as Latvia and Lithuania) to the bottom. Further increasing the value of α to 0.95 (Fig. B3), sharpens this tendency, with Eastern European countries that fall behind the Mediterraneans.

Our interpretation is that the use of social marginal weights do respect better the idea of aversion to poverty, especially in an international comparison setting. The independence of marginal weights from the shape of the utility function, and thus on the average consumption of groups is an attractive feature when comparing countries with such a different income distribution and richness. For example, several Eastern European countries have political instruments to protect against poverty (even though they have limited resources devoted), while mediterranean countries not, meaning that the latter should have a lower aversion to poverty, or degree of Rawlsianism. The increasing importance assumed by the consumption level of group 0 in the primitive weights analysis make up for this difference, giving results that may be somewhat misleading.

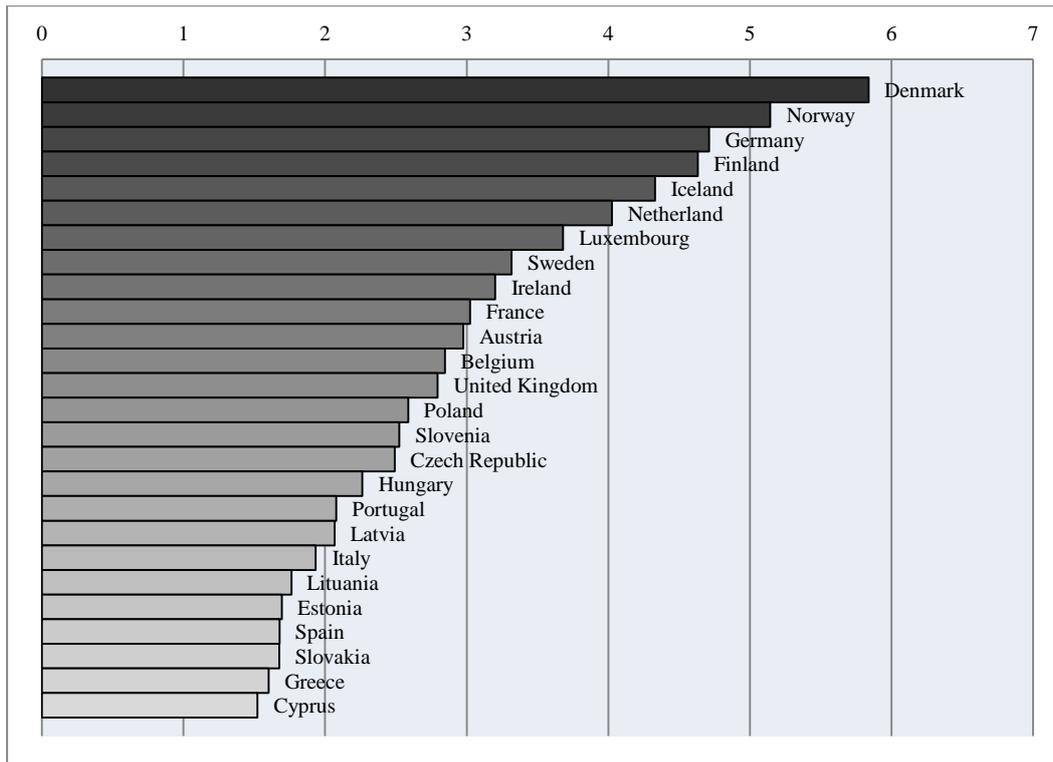


Figure B1: Ranking of the primitive weight for group 0, $\alpha = 0.05$

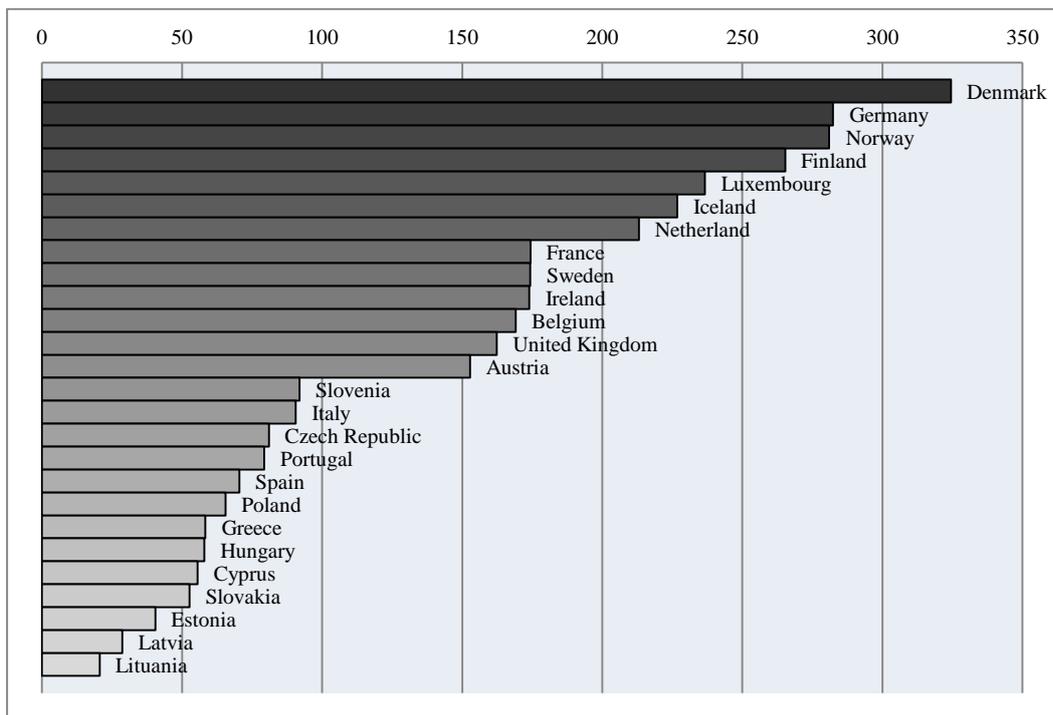


Figure B2: Ranking of the primitive weight for group 0, $\alpha = 0.5$

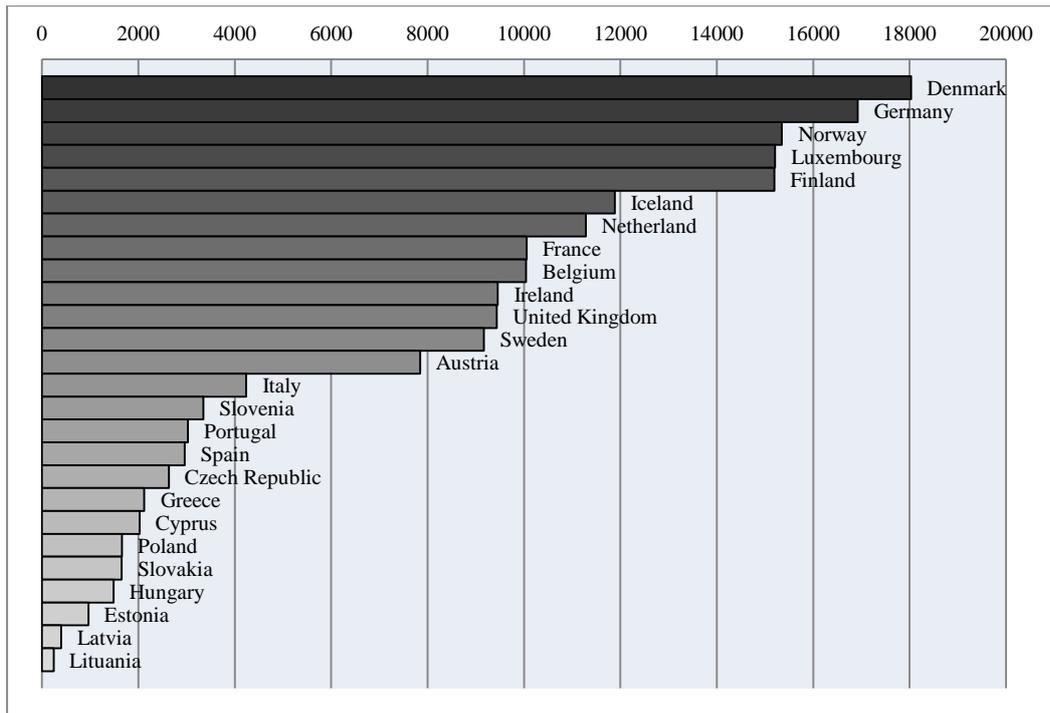


Figure B3: Ranking of the primitive weitht for group 0, $\alpha = 0.95$