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THE POLITICAL DETERMINANTS OF SOCIAL EXPENDITURE:
EMPIRICAL EVIDENCE FROM OECD COUNTRIES

MONICA AUTERI AND ANTONELLO MARUOTTI

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The political determinants of social expenditure: Empirical evidence from OECD countries

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Thursday 30th June, 2011, 08:08

Abstract

This paper aims to shed light on the role of party politics in shaping the evolution of the welfare state, and thus social expenditure, in selected developed democracies. To achieve greater purchase on recent social expenditures trends, we propose an econometric model to examine whether the distribution of public expenditure shows a tendency to cluster around a small number of poles of attraction (Ben David (1994), Quah (1996), and Galor (1996)), to identify groups with specific economic characteristics. The empirical analysis is based on a mixed effect model in a finite mixture framework. The EM algorithm for nonparametric maximum likelihood (NPML) discussed in Aitkin (1999) is readily applied (Aitkin and Alfó, 2003).

1   Introduction

Literature on social expenditure in Western nations has a consolidated tradition in academic studies. The topic has been analyzed in terms of its determinants and its effects (Castles, 2008). The socio-economic factors influencing social expenditure have been detected and the role of political factors[1] has been investigated to explain differences in welfare state institutions (see, among others, Garrett and Mitchell (2001); Huber and Stephens (2001b)) as well as the variety of national configurations (Amable, 2003).

Recent developments in political economy have been marked by two major debates. One concerning the direction and importance of changes in national welfare states, and the other related to the driving factors behind welfare states evolution.

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[1]One should note that, within the economic literature, the role of partisanship is widely acknowledged in theoretical and empirical contributions focusing on the determinants of fiscal policy over the business cycle (Alesina and Rosenthal, 1995; Persson and Tabellini, 2000)

From these studies it emerges that the evolution of modern welfare states have been radically modified by the growing of external and internal constraints (such as globalization, capital markets integration, and budget deficits) together with structural changes (i.e. biased technological change and rising inequalities, union decline, and demographic change). As a result, the welfare states entered a new phase experiencing a shift from expanding to defending social entitlements(Amable et al., 2010).

Since the seminal work of Pierson (1994), social scientists have tried to demonstrate whether the dismantling of the welfare state is heading toward convergence or resilience, suggesting that the globalisation process may lead countries to implement similar structures of government spending over time, producing therefore similar effects on public social expenditures. However as Esping-Andersen (1990) suggested, the welfare domain is a complex area and the analysis of its evolution over time requires focus on socio-economic pressures, political parties, political institutions and welfare state structures, and not only on the expenditure trends.

This paper aims to offer a theoretically and empirically consistent explanation for this puzzle to asses whether traditional ideological political perspectives (according to which left-wing governments do promote welfare policies more intensively than right-wing ones) still matter in the shaping of the welfare state. In an attempt to add empirical findings in this debate, we perform a statistical analysis on a sample of 23 OECD countries over the period 1980-2005, using the political indicators of the Comparative Political Data Set (Armingeon et al., 2010). The purpose of this analysis is two-fold: it shed light on the role of party politics in shaping the evolution of welfare policies (measured in terms of social expenditure) and, as a by product of the adopted statistical tools, it investigates similar county-specific long-run behaviors forming *convergence clubs* or *poles of attraction* (Ben David, 1994; Galor, 1996; Quah, 1996). To identify these poles of attraction, the presence of multiple modes in the country distribution of social expenditure, is detected, with each mode corresponding to a pole of attraction.

A finite mixture approach is proposed as an alternative tool to identify the effects of socio-economic factors on social expenditure and to test for the presence of poles of attraction. Mixture models express the density of a random variable as the weighted average of a finite number of component densities with specified functional form. The parameters estimated are the number of the mixture components and the parameters of the component densities. When used to describe the cross-country distribution of social expenditure, the components in a mixture model can be interpreted as corresponding to the poles of attraction. Multiple components, like multiple modes, can be indicative of multiple poles of attraction. The mixture approach is able to detect the presence of multiple components in a distribution even if that multiplicity does not manifest itself as multimodality.

The remaining of the paper proceeds as follows. Section II sets out the main questions emerging from the recent debate on the determinants of social expenditures within the political economy literature. Section III presents the data as well as some stylized facts on social expenditure in the selected OECD sample. Section

IV introduces some methodological remarks on our method of estimation, specifies the empirical model and reports the estimation results obtained via a finite mixture model. Section V comments on the empirical findings and provides some concluding remarks and prospects for future research.

2   Social expenditure and party politics

Many papers have investigated the influence of political factors on public spending (see, for instance, Persson and Tabellini (2003)). Ideology is one of these factors and the literature on this topic is abundant (see Boyne (1996) for a survey). In a nutshell, this theory states that left- and right-leaning parties differ not only in their macro-economic policies and fiscal outcomes, notably the trade-off between inflation and unemployment, but also in the level of public expenditure and in the size of budget deficits (Hibbs, 1977; Tufte, 1978). According to the basic hypothesis, of this so called partisan politics model, parties competing for votes promise to implement programs that best serve the groups they represent. As lower income groups are generally in favor of a large active and market-regulating state and tend to be more attached to parties on the left, socialist or social democratic parties are postulated to generate lower unemployment but higher transfers and higher levels of public expenditure and budget deficits with increased government employment, which has been overwhelmingly for welfare services like education, day care, health care, etc.

In the empirical literature, findings on the partisan politics approach are mixed. We account studies that dismiss the expected dependence of public spending on party preferences (Rose, 1984). Similar accounts find little evidence of this partisan effect since the late 1970s (Huber and Stephens, 2001b,a; Castles, 1998; Ross, 2000), a possible but modest impact (Blais et al., 1993; von Beyme, 1985) or a strong causal relationships (Comiskey, 1993; Roubini et al., 1989; Roubini and Sachs, 1989), suggesting that the political power of social democratic and christian democratic parties played an important role in the expansion of the welfare state (Shalev, 1983; Esping-Andersen, 1985; Korpi, 1989; Hicks and Swank, 1992; Western, 1991; van Kersbergen, 1995; Garrett, 1998; Hicks, 1999; Iversen and Cusack, 2000)

Recent cross-national studies, have empirically proved that partisan politics have ceased to play a decisive role in the evolution of the welfare state. One conclusion is that parties do not significantly differ in their macroeconomic policies and even if they did so in the past, international financial integration eliminates distinct partisan differences (Garrett and Lange, 1991). But even if the left-right ideological position of parties turns out to be (or have become) irrelevant, there is no reason to dismiss the notion of partisan politics from the wider theory of public finance. Parties may simply differ in their fiscal priorities or preferences in a way that is unrelated to, or, at least, does not fully coincide with, the seminal dichotomy of left versus right (Hibbs, 1977), the left-center-right trichotomy (Blais

et al., 1993), or even a fourfold classification of parties (Schmidt, 1996). In addition the partisan composition of governments may play a role in fiscal outcomes because of differences in the preferences of parties rather than differences in their ideological identity.

Other theoretical contributions link the size of government spending either to the degree of political fragmentation or to the degree of political polarization. The intuition on political fragmentation relies mostly on the common pool resource hypothesis. A politician belonging to a coalition of n politicians is supposed to defend the interest of his or her own constituency by, for instance, expanding a particular item of public spending. Since the cost of the expansion is divided among the voters of the n constituencies, a non cooperative politician sets an increase in public spending which is higher than the efficient one. This theory can be traced in Buchanan and Tullock (1962) and Olson (1965). Refinements are found in Weingast et al. (1981)) and more recently in Velasco (2000).

The paper of Weingast et al. (1981) is on pork barrel spending and their basic argument is that when geographically concentrated interests are represented in the legislature, and projects with local impact are funded from a common pool of resources, the size of the budget is larger than optimal. Moreover, the size of this inefficiency is increasing in the number of interests represented in the legislature. A similar result is obtained by Baron (1991) in the context of a minimal winning coalition (non-universal) setting. In general, the fact that a pool of common resources is used to finance public projects with concentrated benefits leads to a common property problem that implies overspending.

Based on this general argument, the model developed by Velasco (2000) relates the dynamics of fiscal deficits to the degree of fragmentation in the political system. In this dynamic context the common pool problem leads, again, to transfers that are increasing in the number of parties with a say in the choice of the governments budget. Political polarization has also been tied to the size of the government budget. Tabellini and Alesina (1990) present a model where incumbent politicians strategically raise spending and run deficits to tie the hands of their successors. The argument is based on the presence of heterogeneous preferences (across politicians) over the composition of government spending. If an incumbent politician is faced with a high risk of being replaced by someone from a different party, she may increase spending in her preferred goods. Since the cost of the resulting deficit will likely be paid by her successor, and thus fall disproportionately on the goods preferred by that successor, the long run pattern of government spending will be tilted toward the incumbents preferred items. Greater polarization increases the incumbents incentives to rise spending, as it implies a greater distance between her preferences and those of her challengers. More recently, Nupia (2007) uses a model of legislative bargaining to show that the effect of fragmentation (number of parties) on government spending may depend on the degree of ideological polarization. The basic argument is that if there is a large number of parties, but all represent the same interest, then the common pool problem should either not arise or be minor. In the absence of a common pool problem, only ideo-

logical polarization and not fragmentation affects government spending.

In short according to this theory, the larger the size of the legislature, the higher the public expenditures. This result, sometimes termed the "weak government hypothesis" (Roubini et al., 1989) or "the law of 1/n" (Bradbury and Crain, 2001), is the starting point of many empirical studies beginning with Gilligan and Matsusaka (1995). Political fragmentation is measured by the number of parties in a coalition, the number of spending ministers or the number of representatives (see Kuster and Botero (2008) for a comparison of the different measures of political fragmentation). The empirical literature that has tested whether a greater number of parties in a governing coalition or legislature leads to larger public spending is mixed and therefore not conclusive. Mukherjee (2003) finds a positive effect of the effective number of parties in the legislature, while Bawn and Rosenbluth (2006) find a positive effect of the raw number of parties in the governing coalition (lagged one period). However, Bawn and Rosenbluth (2006) themselves find no effect of the effective number of parties in the legislature, while Roubini and Sachs (1989) find no effect of an index of fragmentation, and Volkerink and De Haan (2001a) and Perotti and Kontopoulos (2002a) find effects that are only marginally significant or not robust to changes in the specification. Some studies find effects of fragmentation on government debt rather than spending (Roubini et al., 1989; De Haan et al., 1999a). In short, results are not conclusive about the effects of fragmentation on spending. Moreover, results depend on the set of countries included in the analysis, and on whether the focus is on fragmentation in the governing coalition or in the legislature at large. Recently, there have been other attempts investigate the interaction of ideology with other variables. Particularly puzzling is the literature on the interaction of government ideology and globalization. Economic globalization has been interpreted either as a reason for the decline (Tanzi and Schuknecht, 2000) or rise (Rodrik, 1997) in welfare policies[2]. On an empirical ground Potrafke (2009) found that when globalization proceeded at an average pace, partisan politics has no effect on social expenditures. He also found that leftist governments increase social expenditures when globalization is proceeding rapidly. In addition, policies seems to differ in the 1980s and 1990s. Leftist governments pursued expansionary policies in the 1980s. Yet partisan politics disappeared in the 1990s, but not because of globalization.

As previously stated, political economic theory provides various arguments as to why left-wing governments and right-wing governments implement different policies- Down (1957)' fundamental convergence result notwithstanding. On an empirical ground the relationship between partisanship and social expenditure turn out to be puzzling. In this paper we move from these literature to test the effects of selected political and economic variables in shaping the welfare state.

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[2]Unfortunately in the empirical literature on the determinants of social expenditures, globalization and government ideology have been mainly analyzed separately. This is a serious shortcoming,because, as the partisan approach suggests, globalization-induced policy responses may well depend on political ideology.

3 Overview of the data and descriptive analysis

We consider a sample of 23 OECD countries including USA (often considered a trend-setter country in the economic policy domain), and we use the Comparative Political Data Set (Armingeon et al., 2010), a well-suited dataset where information on social expenditure, political ideology and other socio-economic variables are collected together. The time interval chosen, from 1980 to 2005, is of particular interest to study social expenditure as it is characterized by strong economic globalization.

Our dependent variable is the total social expenditure as a percentage of GDP. This variable has been selected because it fit well in our theoretical framework. First, social assistance represents the main element of government's operating expenditures. Social expenditure is composed of protection of the mother and infants (prevention, protection and aids to family), social assistance for handicapped persons (subsidies to homes, direct payments, modifications to their residences to provide them better access), assistance for pensioners and elderly people (direct payments and subsidies to homes) and for unemployed persons (health protection, and so on). Second, social assistance is a redistributive policy which lends itself well to testing the party ideology hypothesis that left-wing governments spend more than right-wing governments.

In the political process, the legislature is influenced not only by constitutional restrictions on the scope of its initiative and veto authority but also by its composition and the relative strength of government coalitions. Then the starting point of our analysis requires the identification of the preferences or the party identification of the decisionmakers. A five-level variable is identified: hegemony of right-wing and center parties, dominance of right-wing and center parties, balance of power between left and right, dominance of social-democratic and other left parties, hegemony of social-democratic and other left parties[3].

However for most political economy questions, the main concern is not only the policy preferences or ideological leanings of decisionmakers but also the structure of political decisionmaking. As suggested by (Bortolotti and Pinotti, 2008), in implementing economic policy the executive may be affected by the effective lawmaking power of the government , so that low legislative power may affect the executive's initiatives regardless of its political orientation. We cope with this issue by including legislature specific variable with six levels, accounting for differences in government: single party majority government, minimal winning coalition, surplus coalition, single party minority government, multi party minority government and caretaker government (temporarily). Finally, we consider the degree of fractionalization of the party system, measured by the index of Rae (1968), an effective political power index of legislative fractionalization of the party-system. This index defines fractionalization in term of distribution of seats in the parliament and it

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[3]Other institutional characteristics may influence welfare policy, the omission of which may lead to biased parameter estimates if such issue is not appropriately accounted for

is calculated as one minus the sum of each partys squared proportion of seats in the lower legislative chamber. A higher score indicates a larger number of small parties occupying legislative seats. Then the more the value of the Rae index comes closer to unit (its maximum value), the more fractionalized the system is.

Then, we account for the possibility that welfare policies depend on the executive's political motivation and law-making power as well as on country's specific socio-economic characteristics. The country-specific heterogeneity, in term of socio-economic factors, is investigated with a choice of control variables, in line with the existing literature that reflects standard assumptions about structural welfare-state determinants. To capture the effect of the size of groups that are likely to benefit from or depend on social protection, we include unemployment rates as a percentage of civilian labor force (unemployment) and the share of the population over 65 years of age (elderly). To take into account what is known as Wagners law, i.e. the positive link between GDP and public expenditure, we use the growth of GDP (GDP)as a control. Table 1 provides summary statistics of explanatory variables used.

Table 1: Summary statistics of the adopted variables

Variables	Min	First Quartile	Median	Third Quartile	Max	Mean	Std.Dev
Sociale expenditure as a % of GDP	10.24	16.96	20.76	25.34	36.27	21.16	5.26
GDP growth	-6.20	1.40	2.70	3.90	11.50	2.67	2.12
Elderly	9.10	12.35	14.33	15.84	22.10	14.18	2.35
Unemployment rate	0.18	3.96	6.54	9.16	24.17	6.91	3.99
Rae index	40.91	59.40	69.75	76.95	88.98	68.26	10.88

If we observe Figure 1, displaying the distribution of social expenditure with respect to political ideology within the considered sample of 23 OECD countries, at least two aspects should be remarked. First, right-wing governments, in some cases, deserve resources to welfare in the same vein as the left-wing; however, the multimodality of the social expenditure distribution by political governments is a sign of the presence of heterogeneity sources which may influence the choice toward a more-oriented welfare politics. Second, when left and right parties share the power, the social expenditure distribution, even though multimodal, seems to be positively skewed, reflecting the influence of left-wing parties on government behavior. Figure 2 offers an interesting insight into the evolution over time of the dependent variable for different government coalitions. There is a tendency towards an increase in resources allocated to welfare programs (as a percentage of GDP) over time. Furthermore, governments seem to behave differently over time. Then, the allocation of resources does not follow any specific trend under right-wing governments but the fraction of GDP deserved to welfare increases constantly under left-wing governments.

The evolution of total social expenditure by country is depicted in Table 2. It emerges a growth in the average social expenditure ratio as a percentage of GDP,

Figure 1: Social expenditure by political parties

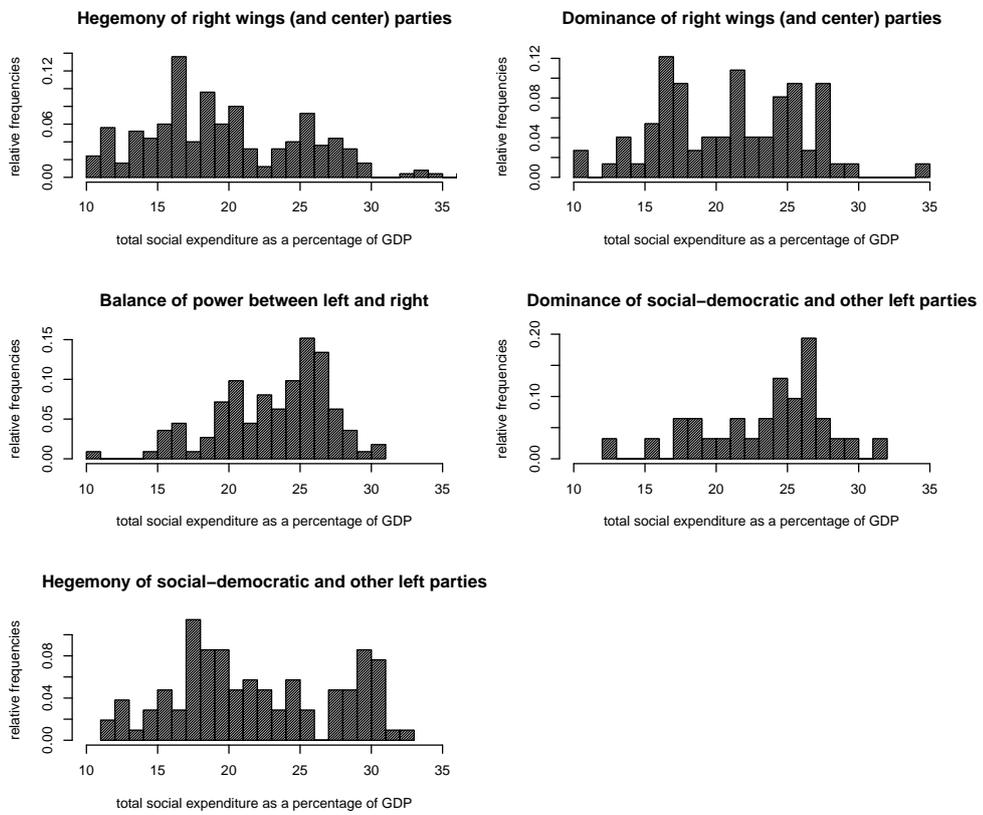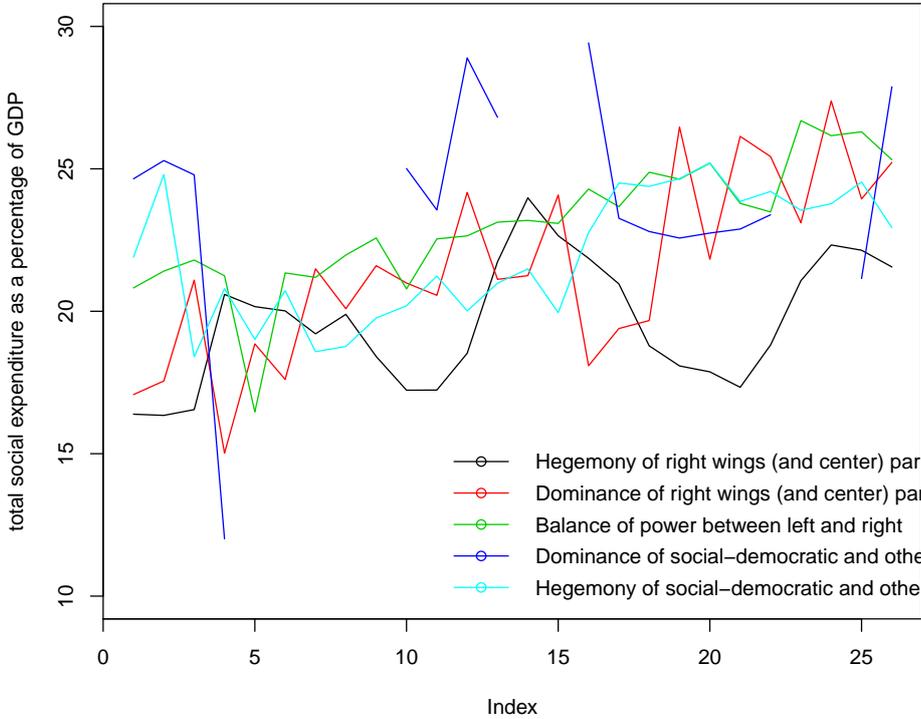**Hegemony of right wings (and center) parties**

Dominance of right wings (and center) parties

Balance of power between left and right

Dominance of social−democratic and other left parties

Hegemony of social−democratic and other left parties

Figure 2: Social expenditure by political parties over time (mean values plotted)

total social expenditure as a percentage of GDP

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Index

from 17.98 in 1980 to 22.94 in 2005. Even thought total social expenditure alone give little information about specific welfare policy, its increase reveals the attention of Governments to welfare programs, and place additional stress on welfare financing in particular during a bust period.

Table 2: Social expenditure as a percentage of GDP over time by country

Country	Mean 1980-2005	Std. 1980-2005	1980	1995	2005
Australia	15.42	3.25	10.63	18.38	18.16
Austria[4]	26.99	1.36	23.86	27.63	28.08
Belgium	25.83	0.72	23.61	26.29	26.41
Canada	17.35	1.74	13.66	18.89	16.49
Denmark	26.26	1.85	24.76	29.42	27.31
Finland	25.34	4.39	18.03	30.90	26.10
France	26.62	2.72	20.76	28.81	29.53
Germany	26.35	1.61	24.65	28.04	27.88
Greece	16.85	2.52	10.24	17.34	20.55
Iceland[5]	16.90	1.35	n.a.	16.49	18.39
Ireland	16.51	2.22	16.66	15.68	16.73
Italy	23.49	1.99	18.78	23.62	26.47
Japan	14.20	2.84	10.86	14.76	19.11
Luxemboug	20.82	1.37	20.63	20.76	23.45
Netherlands	24.22	2.23	25.25	24.49	21.58
New Zeland	19.17	1.44	17.20	18.89	18.55
Norway[6]	23.67	2.27	17.09	24.21	22.90
Portugal[7]	15.35	4.32	10.46	17.32	n.a.
Spain	19.55	2.04	15.55	21.41	21.24
Sweden	30.38	2.26	27.10	32.47	29.85
Switzerland	21.33	4.45	15.37	23.78	27.55
UK	19.84	1.37	16.93	20.76	22.12
USA	14.82	1.09	13.48	15.78	16.26

Descriptive statistics provide few insights but not exhaustive results. A first step towards a more comprehensive analysis of social expenditure may be provided by a convergence analysis, that highlight the tendency of countries to grow more alike, to develop similarities in structures, processes, and performances to change policies over time regardless of the causal process (Knill, 2005).

Comparative policy literature suggests several approaches for assessing convergence, which are referred to as β, σ, and γ convergence (Heichel et al., 2005, pp.831-834)[8]. The β-convergence it is associated with the growth coefficient. It detects whether poor countries or regions will catch up with rich ones and the rate at which countries are converging. It is useful in detecting the phenomenon of "catch-

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[8]These concepts were first introduced in (Sala-i Martin, 1990, p.946).

ing up". The σ, looks at income inequalities or differences among countries or regions, and it analyzes, in particular, whether the dispersion of income distribution shrinks or not. It measures similarities among policies and regulatory instruments. It occurs when there is a decrease in the variation of policies among the countries under consideration (Knill, 2005, p.769) or when there is an increase in the number of countries implementing the same instrument. It is indicated by a decrease in the range and standard variation. The mobility dimension of countries with regard to the speed of implementing regulatory instruments is captured by γ-convergence. It was formulated in response to an overemphasis on β-convergence criticized for not capturing sufficient aspects of cross-country dynamics. For instance, convergence trends resulting from rich countries falling back are not reflected in β-convergence but are in γ-convergence (Heichel et al., 2005, p.832).

The analysis of γ-convergence enriches the interpretation of σ-convergences as it allows to assess changes in country rankings over time. If a country in the first ranks fall behind or others catch up over time, convergence occurs (Heichel et al., 2005, p.832). Then a positive gamma-convergence implies that one or more countries with the least favorite instruments or measures start to implement the favorite instrument[9]. On the contrary when favorable instruments are replaced with less favored ones, a negative γ-convergence occurs.

The result of the adopted indexes in different periods for the selected countries, are summarized in Table 3.

Table 3: Convergence indexes

	β	γ	$\Delta \sigma$
$1980 - 1995$	$-0,025$	$0,822$	$+0,07$
$1980 - 2005$	$-0,021$	$0,698$	$-0,76$
$1995 - 2005$	$-0,024$	$0,851$	$-0,83$

Social expenditure as a percentage of GDP shows lack of absolute β-convergence but support both σ-convergence and rank correlation with the latter implying several changes in rankings. Convergence seems to be the norm. Nevertheless doubts arise as the homogeneity assumption of common growth pattern that lies behind equation **??**; thus if this homogeneity holds only for subsamples of countries we may expect to have different results by looking across those subsets (Henderson et al., 2008, p.607).

From a pure descriptive perspective, several changes in welfare efforts between 1980 and 2005 may be accounted. These differences in long-run behaviors, in term of a noticeable variations in social expenditure levels, may be interpreted as an (observed and unobserved) heterogeneity. This factor implies that countries may respond differently to economic stimuli. To detect the possible presence of *clubs* of countries, i.e group of countries that behave similarly, a mixture model

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[9]The definition of which instrument is favorite and less favorite instruments is given in the methodology (Haase, 2008)

approach is applied, as it groups countries such that the marginal economic effects (i.e., the regression coefficients) are similar within each group. Conceptually, we posit that the decision-making process is reflected in the estimated relationships between actual behavior and its explanatory determinants. To detect unobservable (i.e., latent) groups of countries, the modeling procedure groups together countries that share similar relationships between their behavior and the factors driving it (i.e., the estimated regression coefficients). Countries within each latent class share then the same regression function. In an econometric sense, each group will be characterized by a different structure, i.e., different coefficients that reflect the specific relationship between the dependent and the independent variables. From a conceptual perspective, this procedure permits the determinants of behavior to have a different influence on the actual behavior of each identified group. This generalized mixture model framework detects the groups and, at the same time, characterizes the link between the economic behavior and a set of variables within each unobserved group.

Thus, in this framework not only heterogeneity sources may be fully and correctly investigated but also correlation among repeated measurements on the same country will be accounted for as well as some fundamental explanatory variables not explicitly included in the model. The adopted approach in its general form is described in Section 4.

4 Empirical Analysis

4.1 Model specification

Finite mixtures distributions (Titterington et al., 1985) are an extremely flexible mathematical-based methods of modeling densities, that have continued to receive increasing attention over past years. Formally, let Y_{it} be a random variable and y_{it} its generic realization ($i = 1, \ldots, n; t = 1, \ldots, T$) for country i at time t. A mixture model assumes that each observation $\mathbf{y}_i$ is drawn from a mixture of K subpopulation (or groups), corresponding to mixture components densities, in some unknown mixing proportion $\pi_1, \ldots, \pi_K$. In other words, Y_{it} follows a normal distribution

$$Y_{it} \sim N(\mu_{itk}; \sigma_k^2)$$

where the group-conditional variance, σ_k^2, is taken not to depend on i and t.

Therefore, the density function can be defined as

$$f(\mathbf{y}_i; \phi) = \sum_{k=1}^{K} \pi_k f_k(\mathbf{y}_i; \mu_k, \sigma_k^2) = \sum_{k=1}^{K} \pi_k \prod_{t=1}^{T} f_k(y_{it}; \mu_{itk}, \sigma_k^2)$$

where $f_k(\mathbf{y}_i; \mu_k, \sigma_k^2)$ denoted the k-th component density with parameter vector (μ_k, σ_k^2), the π_ks represent mixing weights with $\pi_k \geq 0$, $\sum_{k=1}^{K} \pi_k = 1$, while $\phi = (\pi_1, \ldots, \pi_{K-1}, \mu_1, \ldots, \mu_K, \sigma_1^2, \ldots, \sigma_K^2)$ denotes the complete parameter vector.

The mixture model has also the capacity to handle the regression case, where the random variable Y_{it} is allowed to depend on a set of exogenous variables $\mathbf{x}_{it} = \{x_{it1}, x_{it2}, \ldots, x_{itp}\}$. Let us decompose the design vector as $\mathbf{x} = \{\mathbf{x}_1, \mathbf{x}_2\}$, where those effects that are assumed to be fixed across countries are collected in $\mathbf{x}_1$, while those which vary over groups are in $\mathbf{x}_2$. Within the framework of a mixture of generalized linear models, it is assumed that

$$\mu_{itk} = \gamma_{0k} + \sum_{h=1}^{H} \beta_h x_{1ith} + \sum_{l=1}^{L} \gamma_{lk} x_{2itl}.$$

where $\beta = \{\beta_1, \beta_2, \ldots, \beta_H\}$ is a vector of fixed (group-independent) parameters and $\gamma = \{\gamma_{11}, \gamma_{12}, \ldots, \gamma_{LK}\}$ is a group-specific set of parameters. If we set $K = 1$, then the well-known linear regression model is obtained. With such specification heterogeneity is modeled by assuming a finite number of unobservable categories of observations characterized by different regression parameters values. It can also be viewed as a mixed effect model (Demidenko, 2004), where the random part is assumed to follow a discrete distribution with a fixed number of location (for more insights on this topic see Aitkin (1999)). Hence, the mixture regression model, accounting for heterogeneity among countries, provides a better fit than the one-component (homogeneous) model.

4.2 Parameter estimates

In order to characterize the mixture model, i.e. to estimate its parameters, several approaches may be considered. As underlined by McLachlan and Peel (2000), the maximum likelihood (ML) is the commonly used approach to fit mixture models and its often preferred to the Bayesian methods. But when the model depend on unobserved latent variables, a more elaborate techniques for finding the maximum likelihood estimates need to be adopted such as the expectation-Maximization (EM) algorithm (Dempster et al., 1977). The EM is a fixed-point iterative method that locally maximizes the likelihood function. It considerably simplifies the ML approach to parameter estimation by assuming the existence of missing data and posing the mixture model into an incomplete-data problem.

Let us define $\mathbf{z}_i = (z_{i1}, \ldots, z_{iK})$ with $z_{ik} = 1$ or 0 according to whether $\mathbf{y}_i$ is drawn from the k-th mixture group or not. This algorithm assumes that observations are incomplete since we have no available information on the indicator vectors $(\mathbf{z}_1, \ldots, \mathbf{z}_n)$. We assume that $(\mathbf{z}_1, \ldots, \mathbf{z}_n)$ are drawn from a multinomial distribution with prior probabilities π_k. The log-likelihood function for the complete-data $(\mathbf{y}, \mathbf{z})$ is defined as

$$\log L_c(\phi) = \sum_{i=1}^{n} \sum_{k=1}^{K} \sum_{t=1}^{T} z_{ik} \log[\pi_k f_k(y_{it}; \mu_{itk}, \sigma_k^2)]$$

The EM algorithm is made up by two steps: in the $(r+1)$-th iteration of E-step, we compute the expected value of the complete-data log-likelihood function,

conditional on the observed data and the current parameter estimate $\phi^{(r)}$. Since the expected value is linear in the missing variables, the E-step reduces to the computation of terms

$$w_{ik}^{(r)} = \Pr(z_{ik=1} \mid \mathbf{y}; \phi^{(r)}) = \frac{\hat{\pi}_k^{(r)} \prod_{t=1}^T f_k(y_{it}; \mu_{itk}^{(r)}, \sigma_k^{2(r)})}{\sum_{k=1}^K \hat{\pi}_k^{(r)} \prod_{t=1}^T f_k(y_{it}; \mu_{itk}^{(r)}, \sigma_k^{2(r)})}$$

The $(r+1)$-th iteration of the M-step, instead, updates parameter estimates by maximizing the expected values of the complete-data log-likelihood given the weights $w_{ik}^{(r)}$. We obtain

$$\hat{\pi}_k^{(r)} = \frac{1}{n} \sum_{i=1}^n w_{ik}^{(r)}$$

which represents a well-known result from ML in finite mixture. Regression parameters can be obtained solving weighted, with weights $w_{ik}^{(r)}$, sums linear equations. From a computational perspective, the EM algorithm is quite simple to implement (for further details see McLachlan and Krishnan (1997).

As a by-product, the EM algorithm provides a (fuzzy) posterior matrix of group membership. Therefore, we can cluster countries according to posterior probabilities of group membership, using a maximum a posteriori approach.

4.3 The choice of K

When discussing the process of parameters estimation, we assume that the number K of mixture groups is fixed; in practice, however, it is unknown and, thus, need to be estimated together with other model parameters. Various authors have discussed algorithms for joint estimation of K and model parameters, such as VEM or VDM (Böhning, D., 2000); a possible solution is to update estimates for a fixed K and use a K-based solution to estimate model parameters as the number of components is increased to $K+1$ (Böhning and Seidel, 2003) .

Estimating the number of groups in a mixture model by analyzing the number of modes is one of the oldest methods, mainly based on intuition. The obvious drawback of this method is that if the group densities are not sufficiently far apart, the mixture distribution would still be unimodal and estimating the number of groups by the number of modes would fail. Therefore this methods is not widely used and the formal information criterion (as the Akaike information criterion, AIC, or the Bayesian information criterion, BIC) is used instead to estimate the number of groups. These methods are simple to be implemented since they are based on a penalization of the log-likelihood through a simple additive factor. The purpose is to select the model, i.e. the number of groups, which minimize an information criterion composed by a term measuring the lack of fit and another that accounts for model complexity (for further details see Titterington et al. (1985)).

4.4 Results

The empirical literature, focusing predominantly on cross-sectional evidence, has so far provided only partial justification for differences in social spending among countries. Our theoretical approach is empirically tested with the following model:

$$
\begin{aligned}
\mu_{itk} = \ & \gamma_{0k} + \gamma_{1k} \times GDPGR_{it} + \gamma_{2k} \times ELDERLY_{it} + \gamma_{3k} \times UNEMPL_{it} + \gamma_{4k} \times RAE_{it} + \gamma_{5k} \times SOCEXP_{it-1} \\
& + \ \beta_1 \times DR_{it} + \beta_2 \times BP_{it} + \beta_3 \times DL_{it} + \beta_4 \times HL_{it} + \beta_5 \times MWC_{it} + \beta_6 \times SC_{it} \\
& + \ \beta_7 \times SPMG_{it} + \beta_8 \times MPMG_{it} + \beta_9 \times CG_{it}
\end{aligned} \tag{1}
$$

where i stands for country and t for year t; $\beta = \{\beta_1, \ldots, \beta_9\}$ are fixed effects associated with political variable and $\gamma_k = \{\gamma_{0k}, \gamma_{1k}, \ldots, \gamma_{4k}\}$ soak up the country heterogeneity.

On the one hand equation (4) describes the relationship between the social expenditure as a percentage of GDP and the exogenous variables; on the other hand it provides an adequate definition of the association structure shown by repeated measures on the same country, as we are able to distinguish between *true* and *apparent* association. The inclusion of a lagged term in (4) implies true contagion, i.e. actual and future observations are directly influenced by past values causing a substantial change over time. The apparent contagion arises when countries are *drawn* from heterogeneous populations, with different propensity to spend for welfare state with respect to socio-economic and demographic variables. We account for this feature by introducing group-specific parameters, with a mixed-effects regression model.

Of course other approaches can be considered. For example, we may assume that countries are independent of each others and that they have the same set of parameters, i.e. the regression coefficients (βs) are common to all countries.

A completely different approach involves collecting n individual models specific for each countries, each with its own set of parameters and assumes independence between countries.

In between these two approach there is the one selected for this empirical analysis that assumes that some, but not all, of the parameters listed are common to the n countries. This approach is flexible enough and parsimonious in terms of the number of parameters needed in the empirical analysis.

The estimation results are reported in Table 5. Several model specifications, progressively accounting for all data features are accounted. Among the different model specification, using a penalized-likelihood criterion as AIC or BIC the finite mixture regression model is preferred. Our starting point is the fixed effect model where countries' heterogeneity is captured with country-specific dummies. We use then the random intercept model to solve the omitted-variable bias (biased and inconsistent estimates). In this setting several distributional assumption can be assumed for the random terms, and the Gaussian distribution, often taken for granted, may be too restrictive and lead to inconsistent parameter estimates. The

resulting likelihood function can be maximized via Gaussian quadrature methods but nevertheless, nothing can be said with respect to the true random effects distribution. Using the results of Lindsey (1983a,b), an alternative approach can be pursued. It consists on leaving the random effect distribution unspecified and to estimate it in a non parametric maximum likelihood framework (see e.g. Aitkin (1999)). The random effects distribution is approximated through a discrete distribution with a fixed number of support points. The result is a finite mixture of regression models, where only the intercept is group-specific. However, countries may differ not only in the intercept; then this latter model specification may fail in capturing differences in the covariates effects on the response variable. Thus our model is specified as in (4), where some regression coefficients are allowed to vary across finite mixture groups.

We fit all these models (with and without including political variables) to verify if the obtained parameter estimates are consistent with respect to different model specifications.

5 Estimation strategy

As a baseline model, we estimate first a simple form of the model that account only the effects of selected economic variables on welfare spending, including dummies for countries heterogeneity.

$$
\begin{aligned}
\mu_{it} &= \beta_0 + \beta_1 \times GDPGR_{it} + \beta_2 \times ELDERLY_{it} + \beta_3 \times UNEMPL_{it} + \beta_4 \times Rae_{it} + \beta_5 \times SOCEXP_{it-1} \\
&+ \sum_{p=5}^{26} \beta_p I(country)
\end{aligned}
$$

(2)

Equation 2 accounts for the panel structure of the data and the possibility that important latent variables may have been omitted. The estimation of 2 is depicted in the first column of Table 5, labeled *specification 1*.

As a final result, six clusters of countries occurred, revealing the presence of heterogeneity among them. It is interesting to notice that the true association driven by the inclusion of the lagged response variable is estimated and it emerge a correlation (0.182)with the dependent variable. It appears that the relevant explanatory variables are the socio-economics ones, especially the variable ELDERLY. Contrary to a first intuition, it seems that favorable economic development does not automatically lead to higher welfare spending (Table 5). The sizes of groups of potential claimants are important factors of welfare-state evolution. The share of elderly people in the population is significantly and positively linked to welfare spending. This seem to suggest that the welfare system of the selected country is skewed in favor of the over-65 and partly of those unemployed. We do not find clear evidence for an effect of economic growth on social spending. Two explanations should be considered. Elderly people are usually claimants of welfare-state

16

entitlement in more than one branch of social security (retirement, health care). First, with a rising share of elderly people in the population welfare spending automatically goes up. Second, as the elderly rely more heavily on social insurance income, they are more likely to vote for politics favoring welfare-state expansion. In a second specification of our model the additional effects of political variables are included:

$$
\begin{aligned}
\mu_{it} = \ & \beta_0 + \beta_1 \times GDPGR_{it} + \beta_2 \times ELDERLY_{it} + \beta_3 \times UNEMPL_{it} + \beta_4 \times Rae_{it} + \beta_5 \times SOCEXP_{it-1} \\
+ \ & \beta_5 \times DR_{it} + \beta_6 \times BP_{it} + \beta_7 \times DL_{it} + \beta_8 \times HL_{it} + \beta_9 \times MWC_{it} + \beta_{10} \times SC_{it} \\
+ \ & \beta_{11} \times SPMG_{it} + \beta_{12} \times MPMG_{it} + \beta_{13} \times CG_{it} + \sum_{p=14}^{35} \beta_p I(country)
\end{aligned}
\tag{3}
$$

Column labeled Specification 2 of Table 5 display the results obtained from estimating equation 3.

With respect to the government orientation the reference category is *Right-center hegemony*. According to the estimates there are no significant changes compared with Specification 1. More specifically, the coefficients of the socio-economic variables are still significant with the expected signs, as previously found. The newly included political variables add interesting insights. It emerges that under a balance of power between left and right (*gov_party*3), a tendency to reduce the fraction of spending for welfare purpose is observed. According to the Partisan hypothesis Left-wing governments should advocate a general increase in public expenditure compared to right-wing governments. We found, that with a Left-wing dominance the propensity to increase welfare expenditure is higher (0,574) then with a Left-wing hegemony. In addition, the effect of the Left-wing hegemony on welfare expenditure is no significantly different then the Right-wing hegemony. Therefore we cannot conclude that there is a partisan effects. In addition it is important to notice that total social expenditure alone reveals barely anything of the contents of welfare policies although it is taken in the literature as a measure of welfare generosity. As pointed out by Potrafke (2009, 119) "if we thus observe that left-wing governments spent more on welfare [...] than right-wing governments did, this does not imply that right-wing governments reduced social expenditures; it implies that left-wing governments increased social expenditures more than right-wing governments." Then the historical background need to be carefully investigated to explain expansionary social policies is usually observed under leftist dominance rather then under leftist hegemony governments in the selected countries.

With respect to the Government composition the benchmark is the single party majority government. It emerges from the empirical analysis that caretaker government type register the higher propensity to spend as GDP increases, followed by the surplus coalition and the minimal winning coalition. While having a minority government, single or multi party, do not seems to be relevant in terms of the effects on welfare spending although a multi party government has a greater and

significant coefficient compare to the single party one. The *raelog* shows a very small positive effect suggesting a small contribution of fractionalization, or party system competition in explaining variation in welfare spending. This result raises the question of whether these measure is useful for explaining anything important about government and politics.

These empirical results confirm the joint influence of political and economic variables on welfare policies.

> The inclusion of fixed effects allows for unobserved heterogeneity. Instead of a single intercept, each cross-sectional unit is assigned its own intercept. Since our estimated fixed effects are always large and clearly significant, not including them in the model would result in a presumably serious omitted variable bias. However, it is worth to notice that while including fixed effects we accounted the possibility that countries differ only with respect to the constant term (i.e. intercept) we limit our interest to the causes of intra-country variation of welfare state generosity. Hence, the previous equations are rearranged and a less restrictive specification, Specification 3, is tested.

Specifications 3, account the possibilities that countries' difference in socioeconomic structures are reflected in the coefficient variation of the selected variables. To shed same light on this point we estimate the following equation:

$$
\begin{aligned}
\mu_{itk} \quad = \quad & \gamma_{0k} + \gamma_{1k} \times GDPGR_{it} + \gamma_{2k} \times ELDERLY_{it} + \gamma_{3k} \times UNEMPL_{it} + \gamma_{4k} \times Rae_{it} + \gamma_{5k} \times SOCEXP_{it-1} \\
+ \quad & \beta_1 \times DR_{it} + \beta_2 \times BP_{it} + \beta_3 \times DL_{it} + \beta_4 \times HL_{it} + \beta_5 \times MWC_{it} + \beta_6 \times SC_{it} \\
+ \quad & \beta_7 \times SPMG_{it} + \beta_8 \times MPMG_{it} + \beta_9 \times CG_{it}
\end{aligned}
\tag{4}
$$

The fixed effect, i.e the political variables show the same behavior previously described. The only exception is represented by single party minority government which is now negatively correlated with the dependent variable. In addition if we account for the difference in countries socioeconomic characteristics the effects of the political variables decrease in magnitude. The data processing detected 6 clusters summarized in Table 6. In the first two groups (**a** and **b**) we do not find clear evidence for an effect of economic growth on social spending. Contrary to a first intuition, it seems that favorable economic development does not automatically lead to higher welfare spending.

Welfare spending in Group **c** seems to be driven by a the share of elderly as in group **e** (1.583). This last coefficient imply a strong effect of the share of elderly on the welfare spending

Group **d** seems to be particularly sensitive toward welfare spending as reflected by the intercept (3.8), this resources seems to be equally distributed among the selected group of citizen. Finally the last group, **f**, include only Austria and welfare spending seems to be driven by the unemployed and elderly. Clustering fails to

produce a clear view of the three well known welfare regimes identified in Esping-Andersen (1990). Both conservative and social democratic welfare regime countries are not lumped each in a specific cluster. We do however have the core of a liberal regime (United States, United Kingdom) in a cluster but the Southern Mediterranean countries (such as Portugal, Spain, Greece) are in the same cluster with some northern European country. The identified clusters highlight that faced with rising unemployment (as in the 1990s), OECD countries have responded with policy interventions that strengthen their welfare mix, rather than adopting a common strategy. In addition with respect to the other control variable, Elderly, it is worth to notice that nearly one-half of OECD member countries have mandatory or quasi-mandatory (Netherlands and Sweden) funded pension systems. Voluntary occupational pension plans have long had broad coverage in English- speaking countries, such as Canada, Ireland, the UK and the US, where it currently reaches 40 per cent or more of employees. Belgium, Germany, Japan and Norway also achieve this degree of coverage. At the other end of the spectrum, 10 per cent or fewer workers are covered by voluntary, occupational, private pensions in Finland, France, Italy, Portugal and Spain. Not surprisingly, mandatory personal or occupational schemes usually cover a much higher percentage of the workforce, particularly mandatory occupational schemes, where coverage exceeds 90 per cent in most countries using this approach (but 80 per cent in Denmark). Coverage of mandatory personal schemes also exceeds 90 per cent in Sweden and Denmark, but is lower in other countries, possibly reflecting differences in the structure of their labor markets. Again, this difference and analogies among countries do not seem to explain the cluster distribution founded that may only be explained by the countries similar willingness to undertake public social expenditure.

6   Conclusion

This paper aimed at investigating the determinant of public welfare expenditures for a large group of countries, mostly European, over a time span of twenty years (from 1980 to 2005). The main purpose has been to go beyond the existing notions of the effect of party politics on welfare spending. Previous studies have largely focused on ideological differences or the party identity as expressed in the nominal label of parties. The contention often explored is that left and right-wing parties differ in their public policies and fiscal priorities; more specifically, left-party dominated governments are expected to spend more and run larger deficits. On the empirical side, findings have been encouraging but sometimes mixed; on the theoretical level, the partisan politics approach has come under attack by scholars pointing to the increasing role of international financial integration that leads to the expectation that distinct partisan differences in public policy are diminishing or even have been eliminated.

Our empirical approach starts with a convergence analysis and convergence seems to be the norm. While absolute $\beta-$convergence is frequently rejected for

Table 4: Estimation Results

Variables	Specification 1 Coeff.	Specification 1 Std. Err.	Specification 2 Coeff.	Specification 2 Std. Err.
$SOCEXP_{t-1}$	0,1753	0,0144	0,1782	0,0141
GDPGR	-0,2266	0,0333	-0,1935	0,0326
UNEMPL	0,2815	0,0302	0,2672	0,0301
ELDERLY	0,6819	0,0579	0,7024	0,0600
RAE			-0,0485	0,0166
DR			-0,0659	0,2583
BP			-0,8766	0,2203
DL			0,6106	0,3383
HL			0,0402	0,2353
MWC			1,2924	0,3625
SC			0,2801	0,3786
SPMG			-0,3157	0,3676
MPMG			0,1579	0,4120
CG			2,3562	1,5086
Intercept	3,7127	0,7280	5,6931	1,1250
Countries Dummy	Yes		Yes	

Table 5: Estimation Results

	Group a Coeff.	Group a Std. Err.	Group b Coeff.	Group b Std. Err.	Group c Coeff.	Group c Std. Err.	Group d Coeff.	Group d Std. Err.	Group e Coeff.	Group e Std. Err.	Group f Coeff.	Group f Std. Err.
Group-specfic effects												
Variables												
$SOCEXP_{t-1}$	0,1188	0,0353	0,5675	0,0244	0,1599	0,0215	0,1130	0,0199	0,1316	0,0246	0,0375	0,0181
GDPGR	-0,0272	0,1352	-0,0519	0,1329	-0,2210	0,1305	-0,3301	0,1298	-0,3239	0,1394	-0,2690	0,1288
UNEMPL	0,8205	0,2503	0,1158	0,2482	0,1929	0,2482	0,4906	0,2482	0,3448	0,2498	0,4278	0,2476
ELDERLY	0,4218	0,4115	0,3903	0,4107	0,9531	0,4095	0,5870	0,4100	1,5933	0,4133	0,8462	0,4090
Intercept	-1,8930	0,5878	-4,0409	0,4705	-3,7557	0,3807	3,8117	0,3961	-8,7108	1,0835	5,3033	5,9974
Fixed effects												
RAE	0,0900	0,0043										
DR	0,1932	0,0954										
BP	-0,3365	0,0839										
DL	0,8192	0,1269										
HL	-0,0508	0,0871										
MWC	0,9826	0,1136										
SC	0,2636	0,1238										
SPMG	-0,3085	0,1310										
MPMG	-0,0216	0,1392										
CG	0,7661	0,5706										

Table 6: Clusters

Cluster	Countries
a	Canada, Japan
b	Australia, Greece, Portugal, Spain, Switzerland
c	Belgium, Iceland, Ireland, UK, USA
d	Denmark, Finland, Germany, Luxembourg, Netherlands, New Zealand, Norway
e	France, Sweden
f	Austria

large samples of countries and regions, it is usually accepted for more restricted samples of economies belonging to the same geographical area (Sala-I-Martin, 1996). This observation can be linked to the presence of convergence clubs. In other words, there is not only one steady state to which all economies converge. Rather, there may be multiple, locally stable, steady-state equilibria (Durlauf and Johnson, 1995). Therefore, a convergence club is a group of economies whose initial conditions are near enough to converge toward the same long-term equilibrium. The main problem is to determine those clubs.

Regression mixture models are a tool to investigate population heterogeneity. As anticipated, this application of regression mixture modeling to an actual data set indicated that multiple latent classes might be embedded with the single regression functional form. Compared to conventional regression analysis that assumes one equation would fit all countries, a regression mixture analysis can provide a detailed description of subpopulations of countries within a sample.

Thus, regression mixture models may improve predictability because the countries differences are systematically classified to form homogeneous groups. The regression mixture analysis resulted in subgroups with specific patterns of regression function. It should be pointed out that regression mixture modeling is a different analytical technique for studying heterogeneity than multiple group modeling. The purpose of regression mixture analysis is to identify differing regression functions across latent classes, and such an approach is appropriate if the interest is in detecting and characterizing the relationships among variables according to subgroups of countries. The mixed effect model is used to cluster countries and it showed that the countries generally retained their expenditure choices, as the majority of them fall into the same cluster over time despite considerable movements inside each cluster. Overall our results suggest that overall spending is driven up by demographic factors. Partisan influence do not seems to play an important role in the dynamics of the welfare state.

A further effort is to investigate specific cluster of nation with very different welfare State.

Data Appendix

This appendix lists the variables used in this study, their definitions and the sources from which we took them. Our sample consists of 23 democratic countries for the period 1960-2007, drawn from a new data set compiled by Armingeon et al. (2010). This Comparative Political Data Set, is a collection of political and institutional data which have been assembled in the context of the research projects "Die Handlungsspielrume des Nationalstaates" and "Critical junctures. An international comparison" directed by Klaus Armingeon and funded by the Swiss National Science Foundation.

Our dependent variable is the total social expenditure as a percentage of GDP. The dependent variables are:

1. *SocExp*: total public social expenditure as a percentage of GDP;

2. *Unemployment*: standardized rate of unemployment;

3. *OldAge*: share of the elderly (65+) as a percentage of total population;

4. *govparty* is the Cabinet composition. Specifically:

    - Right-Center hegemony: hegemony of right-wing (and centre) is defined as $GovLeft = 0$;
    - Right-Center Dominance: when $GovLeft < 33.3$;
    - Balanced of Power between Parties: balance of power between left and right or $33.3 < GovLeft < 66.6$;
    - Left hegemony: hegemony of social-democratic and other left parties $GovLeft = 100$;
    - Left Dominance: dominance of social-democratic and other left parties $GovLeft > 66.6$

5. Fractional is the fractionalization of the party system is given by the index of legislative fractionalization of the party-system according to the formula proposed by Rae (1968).

$$Fractional = 1 - \sum_{i=1}^{m} s_i^2$$

    where s_i is the share of seats for party i and m the number of parties.

6. *govtype* is the Type of Government classified as:

    (1) single party majority government
    (2) minimal winning coalition
    (3) surplus coalition
    (4) single party minority government
    (5) multi party minority government
    (6) caretaker government (temporarily)

References

Aitkin, M. (1999) "A general maximum likelihood analysis of variance components in generalized linear models," *Biometrics*, Vol. 55, No. 1, pp. 117–128.

Aitkin, M. and M. Alfó (1998) "Regression models for binary longitudinal responses," *Statistics and Computing*, Vol. 8, No. 4, pp. 289–307.

———— (2003) "Longitudinal Analysis of Repeated Binary Data Using Autoregressive and Random Effect Modelling," *Statistical Modelling, 3 (4), pagg. 291-303.*, Vol. 3, No. 4, pp. 291–303.

Alesina, A. and R. Perotti (1995) "The political economy of budget deficits," *Staff Papers-International Monetary Fund*, Vol. 42, No. 1, pp. 1–31.

Alesina, A. and H. Rosenthal (1995) *Partisan politics, divided government, and the economy*: Cambridge University Press.

Amable, B. (2003) *The diversity of modern capitalism*: Oxford University Press, USA.

Amable, B., D. Gatti, and J. Schumacher (2006) "Welfare-State Retrenchment: The Partisan Effect Revisited," *Oxford Review of Economic Policy*, Vol. 22, No. 3, pp. 426–444.

Amable, Bruno, Donatella Gatti, and Jan Schumacher (2010) "Welfare-State Retrenchment: The Partisan Effect Revisited," *Oxford Review of Economic Policy*, Vol. 22, No. 3, pp. 426–444.

Armingeon, K., P. Potolidis, M. Gerber, and P. Leimgruber (2010) *Comparative Political Data Set 1960-2007,*: Institute of Political Science, University of Berne.

Baron, D.P. (1991) "Majoritarian incentives, pork barrel programs, and procedural control," *American Journal of Political Science*, Vol. 35, No. 1, pp. 57–90.

Barro, R. (1990) "Government spending in a simple model of endogeneous growth,," *Journal of Political Economy*, Vol. 98, No. 5, pp. 103–112.

Barro, R. J. (1991) "Economic growth in a cross section of countries," *The Quarterly Journal of Economics*, Vol. 106, No. 2, pp. 407–443.

Barro, R.J. and X. Sala-i Martin (1995) *Economic Growth*: MIT Press, Cambridge.

Bawn, K. and F. Rosenbluth (2006) "Short versus Long Coalitions: Electoral Accountability and the Size of the Public Sector," *American Journal of Political Science*, Vol. 50, No. 2, pp. 251–265.

Ben David, D. (1994) "Convergence Clubs and Diverging Economies," *CEPR working paper*, Vol. 922.

Blais, A., D. Blake, and S. Dion (1993) "Do parties make a difference? Parties and the size of government in liberal democracies," *American Journal of Political Science*, Vol. 37, No. 1, pp. 40–62.

Böhning, D. and W. Seidel (2003) "Editorial: recent developments in mixture models," *Computational Statistics & Data Analysis*, Vol. 41, No. 3-4, pp. 349–357.

Böhning, D. (2000) *Computer-Assisted Analysis of Mixtures and Applications. Meta-Analysis, Disease Mapping and Others*: Chapman & Hall/CRC.

Bortolotti, Bernardo and Paolo Pinotti (2008) "Delayed privatization," *Public Choice*, Vol. 136, pp. 331–351. 10.1007/s11127-008-9299-5.

Boyne, G. A. (1996) *Constraints, choices and public policies*: Greenwich: JAI.

Bradbury, J.C. and W.M. Crain (2001) "Legislative organization and government spending: Cross-country evidence," *Journal of Public Economics*, Vol. 82, No. 3, pp. 309–325.

Bruninger, T. (2005) "A partisan model of government expenditure," *Public Choice*, Vol. 125, No. 3, pp. 409–429, December.

Buchanan, J.M. and G. Tullock (1962) *The calculus of consent*: Ann Arbor: University of Michigan Press.

Busch, A. (2002) "Divergence or convergence? State regulation of the banking system in Western Europe and the United States," in *Workshop on Theories of Regulation, Nuffield College, Oxford*, pp. 25–26.

Canova, F. (2004) "Testing for convergence clubs in income per capita: a predictive density approach," *International Economic Review*, Vol. 45, No. 1.

Castles, F. (1998) "When Politics Matters: Public Expenditures Development in an Era of Economic and Institutional Constraints," *Paper presented at the European Forum, Center for Advanced Studies, European University Institute*.

Castles, Francis G. (2008) "What Welfare States Do: A Disaggregated Expenditure Approach," *Journal of Social Policy*, Vol. 38, No. 1, pp. 45–62.

Castles, F.G. and H. Obinger (2007) "Social expenditure and the politics of redistribution," *Journal of European Social Policy*, Vol. 17, No. 3, p. 206.

Comiskey, M. (1993) "Electoral competition and the growth of public spending in 13 industrial democracies, 1950 to 1983," *Comparative Political Studies*, Vol. 26, No. 3, p. 350374.

Crain, W. (2003) *Volatile states: Institutions, policy, and the performance of American state economies*: Ann Arbor: University of Michigan Press.

De Haan, J. and J.E. Sturm (1994) "Political and institutional determinants of fiscal policy in the European Community," *Public Choice*, Vol. 80, No. 1, pp. 157–172.

——— (1997) "Political and economic determinants of OECD budget deficits and government expenditures: A reinvestigation," *European Journal of Political Economy*, Vol. 13, No. 4, pp. 739–750.

De Haan, J., J.E. Sturm, and G. Beekhuis (1999a) "The weak government thesis: Some new evidence," *Public Choice*, Vol. 101, No. 3, pp. 163–176.

——— (1999b) "The weak government thesis: Some new evidence," *Public Choice*, Vol. 101, No. 3, pp. 163–176.

Demidenko, E. (2004) *Mixed models: theory and applications*: LibreDigital.

Dempster, A.P., N.M. Laird, and D.B. Rubin (1977) "Maximum likelihood from incomplete data via the EM algorithm," *Journal of the Royal Statistical Society. Series B (Methodological)*, Vol. 39, No. 1, pp. 1–38.

Down, A. (1957) *An economic theory of democracy*: Harper and Row.

Edin, P.A. and H. Ohlsson (1991) "Political determinants of budget deficits: Coalition effects versus minority effects," *European Economic Review*, Vol. 35, No. 8, pp. 1597–1603.

Elgie, R. and I. McMenamin (2008) "Political fragmentation, fiscal deficits and political institutionalisation," *Public Choice*, Vol. 136, No. 3, pp. 255–267.

Epple, Dennis and Richard E Romano (1996) "Public Provision of Private Goods," *Journal of Political Economy*, Vol. 104, No. 1, pp. 57–84, February.

Esping-Andersen, G (1985) *Politics Against Markets*: Princeton: Princeton University Press.

Esping-Andersen, G. (1990) *The Three Worlds of Welfare Capitalism*: Princeton University Press.

Fotouhi, A.R. and R. B. Davies (1997) "Modelling repeated durations: the initial conditions problem."

Galor, O. (1996) "Convergence? Inference from Theoretical Models," *Economic Journal*, Vol. 106, pp. 1056–69.

Garrett, G. (1998) *Partisan Politics in the Global Economy*: Cambridge: Cambridge University Press.

Garrett, G. and P Lange (1991) "Political responses to interdependence: What's "Left" for the Left?" *International Organization*, Vol. 45, p. 539564.

Garrett, G. and D. Mitchell (2001) "Globalization, government spending and taxation in the OECD," *European Journal of Political Research*, Vol. 39, No. 2, pp. 145–177.

Gilligan, T.W. and J.G. Matsusaka (1995) "Deviations from constituent interests: The role of legislative structure and political parties in the states," *Economic Inquiry*, Vol. 33, No. 3, pp. 383–401.

Green-Pedersen, C. (2004) "The Dependent Variable Problem within the Study of Welfare State Retrenchment: Defining the problem and looking for solutions," *Journal of Comparative Policy Analysis: Research and Practice*, Vol. 6, No. 1, pp. 3–14.

Heichel, S., J. Pape, and T. Sommerer (2005) "Is there convergence in convergence research? An overview of empirical studies on policy convergence," *Journal of European Public Policy*, Vol. 12, No. 5, pp. 817–840.

Henderson, Daniel J., Christopher F. Parmeter, and R. Robert Russell (2008) "Modes, weighted modes, and calibrated modes: evidence of clustering using modality tests," *Journal of Applied Econometrics*, Vol. 23, No. 5, pp. 607–638.

Hibbs, D. A. (1977) "Political parties and macroeconomic policy," *American Political Science Review*, Vol. 71, pp. 1467–1497.

Hicks, A. (1999) *Social Democracy and Welfare Capitalism*: Ithaca: Cornell University Press.

Hicks, A. and D. Swank (1992) "Politics, Institutions, and Welfare Spending in Industrialized Democracies," *American Political Science Review*, Vol. 86, pp. 658–74.

Holzinger, K. and C. Knill (2005) "Causes and conditions of cross-national policy convergence," *Journal of European Public Policy*, Vol. 12, No. 5, pp. 775–796.

Huber, E. and J. Stephens (2001a) "Welfare State and Production Regimes in the Era of Retrenchment," in P. Pierson ed. *The New Politics of the Welfare State*: Oxford: Oxford University Press.

Huber, E. and J.D. Stephens (2001b) *Development and crisis of the welfare state: parties and policies in global markets*: University of Chicago Press.

Iversen, T. and T. R. Cusack (2000) "The Causes of Welfare State Expansion: Deindustrialization or Globalization?" *World Politics*, Vol. 52, pp. 313–349.

Jordan, A. (2005) "Policy convergence: a passing fad or a new integrating focus in European Union studies?," *Journal of European Public Policy*, Vol. 12, No. 5, pp. 944–953.

Kerr, C. (1983) *The future of industrial societies: Convergence or continuing diversity?*: Cambridge: Harvard University Press.

Kitschelt, H. (2001) "Partisan Competition and Retrenchment," in P. Pierson ed. *The New Politics of the Welfare State*: Oxford University Press, pp. 265–302.

Kittel, B. and H. Obinger (2003) "Political parties, institutions, and the dynamics of social expenditure in times of austerity," *Journal of European Public Policy*, Vol. 10, No. 1, pp. 20–45.

Knill, C. (2005) "Introduction: Cross-national policy convergence: concepts, approaches and explanatory factors," *Journal of European Public Policy*, Vol. 12, No. 5, pp. 764–774.

Korpi, W. (1989) "Power, Politics, and State Autonomy in the Development of Social Citizenship: Social Rights during Sickness in Eighteen OECD Countries since 1930," *American Sociological Review*, Vol. 54, pp. 309–329.

Korpi, W. and J. Palme (2003) "New politics and class politics in the context of austerity and globalization: welfare state regress in 18 countries, 1975–95," *American Political Science Review*, Vol. 97, No. 03, pp. 425–446.

Kuster, S. and F. Botero (2008) "How many is too many? Assessment of party system fragmentation measurements with data from Latin America," *Prepared for the 2008 APSA Annual Meeting*.

Lambetini, L. (2009) "Are Budget Deficits Used Strategically," *Economics and Politics, forthcoming*.

Lindsey, J.K. (1983a) "The Geometry of Mixture Likelihoods: A General Theory," *Annals of Statistics*, Vol. 11, pp. 86–94.

——— (1983b) "The Geometry of Mixture Likelihoods, Part II," *Annals of Statistics*, Vol. 11, p. 783792.

Lizzeri, Alessandro and Nicola Persico (2001) "The Provision of Public Goods under Alternative Electoral Incentives," *American Economic Review*, Vol. 91, No. 1, pp. 225–239, March.

McLachlan, GJ and T. Krishnan (1997) *The EM Algorithm and Extensions*: Wiley, New York.

McLachlan, GJ and D. Peel (2000) *Finite Mixture Models*: Wiley, New York.

Mukherjee, B. (2003) "Political Parties and the Size of Government in Multiparty Legislatures: Examining Cross-Country and Panel Data Evidence," *Comparative Political Studies*, Vol. 36, No. 6, pp. 699–728.

Navarro, V., C. Muntaner, C. Borrell, J. Benach, Á. Quiroga, M. Rodríguez-Sanz, N. Vergés, and M.I. Pasarín (2006) "Politics and health outcomes," *The Lancet*, Vol. 368, No. 9540, pp. 1033–1037.

Nupia, O. (2007) "Bargaining in Legislature: Does the Number of Parties Matter?". mimeo.

Olson, M. (1965) *The logic of collective action*: Cambridge, MA: Harvard University Press.

Oorschot, W.J.H., W.A. van Arts, and J.P.T.M. Gelissen (2006) "Social capital in Europe. Measurement and regional distribution of a multi-faceted phenomenon," *Acta Sociologica*, Vol. 49, No. 2, pp. 149–167.

Perotti, R. and Y. Kontopoulos (2002a) "Fragmented fiscal policy," *Journal of Public Economics*, Vol. 86, No. 2, pp. 191–222.

———— (2002b) "Fragmented fiscal policy," *Journal of Public Economics*, Vol. 86, No. 2, pp. 191–222.

Persson, Torsten and Guido Tabellini (1998) "The size and scope of government: Comparative politics with rational politicians," Seminar Papers 658, Stockholm University, Institute for International Economic Studies.

Persson, T. and G.E. Tabellini (2000) *Political economics*: MIT press.

Persson, T. and G. Tabellini (2003) *The economic effects of constitutions*: The MIT Press.

Pierson, P. (1994) *Dismantling the Welfare State. Reagan, Thatcher, and the Politics of Retrenchment*: Cambridge University Press.

———— (1996) "Introduction," in P. Pierson ed. *Dismantling the Welfare State? Reagan, Thatcher and the Politics of Retrenchment,*: Cambridge: Cambridge University Press.

———— (2000) "Path Dependence. Increasing Returns and the Study of Politics," *American Political Science Review*, Vol. 94, pp. 251–267.

Potrafke, N. (2009) "Did globalization restrict partisan politics? An empirical evaluation of social expenditures in a panel of OECD countries," *Public Choice*, Vol. 140, No. 1, pp. 105–124.

Powell, Martin and Armando Barrientos (2004) "Welfare regimes and the welfare mix," *European Journal of Political Research*, Vol. 43, No. 1, pp. 83–105.

Quah, D. (1996) "Convergence Empirics across Economies with Some Capital Mobility," *LSE. Center for Economic Performance*, Vol. 257.

Queisser, Monika, Edward Whitehouse, and Peter Whiteford (2007) "The public-private pension mix inOECD countries," *Industrial Relations Journal*, Vol. 38, No. 6, pp. 542–568.

Rae, D. W. (1968) "A note on the Fractionalization of Some European Party Systems," *Comparative Political Studies*, Vol. 1, pp. 413–418.

Ricciuti, R. (2004) "Political fragmentation and fiscal outcomes," *Public choice*, Vol. 118, No. 3, pp. 365–388.

Rodrik, D. (1997) *Has globalization gone too far?*: Peterson Institute.

Rose, R. (1984) *Do parties make a difference?*, 2nd edition.

Ross, F. (2000) "Beyond Left and Right: The New Partisan Politics of Welfare," *Governance*, Vol. 13, pp. 155–183.

Roubini, N. and J.D. Sachs (1988) "Political and Economic Determinants of Budget Deficits in the Industrial Democracies."

Roubini, N. and J. D. Sachs (1989) "Political and economic determinants of budget deficits in the industrial democracies," *European Economic Review*, Vol. 33, p. 903938.

Roubini, N., J. Sachs, S. Honkapohja, and D. Cohen (1989) "Government spending and budget deficits in the industrial countries," *Economic Policy*, Vol. 4, No. 8, pp. 99–132.

Sala-i Martin, X. (1990) "On Growth and States," Ph.D. dissertation, Harvard University.

Sala-i Martin, X (1996) "Regional cohesion: evidence and theories of regional growth and convergence," *European Economic Review*, Vol. 40, No. 6, pp. 1325–1352.

Schmidt, M. G. (1996) "When Parties Matter: A Review of the Possibilities and Limits of Partisan Influence on Public Policy," *European Journal of Political Research*, Vol. 30, pp. 155–83.

Schmidt, M. G. et al. (2000) *Die parteipolitische Zusammensetzung von Regierungen in 23 OECD Demokratien 19452000. Unpublished data set.*: Bremen: Universitt Bremen, Zentrum fr Sozialpolitik.

Shalev, M. (1983) "The Social Democratic Model and Beyond: Two Generations of Comparative Research on the Welfare State," *Comparative Social Research*, Vol. 6, pp. 315–351.

Swank, D. (2001) "Political Institutions and Welfare State Restructuring. In: Paul Pierson (ed.), The New Politics of the Welfare State. Oxford: Oxford University Press, 197237.," in P. Pierson ed. *The New Politics of the Welfare State*: Oxford University Press.

Tabellini, G. and A. Alesina (1990) "Voting on the budget deficit," *The American Economic Review*, pp. 37–49.

Tanzi, V. and L. Schuknecht (2000) *Public spending in the 20th century: A global perspective*: Cambridge University Press.

Titterington, D.M., A.F.M. Smith, and U.E. Makov (1985) "Statistical analysis of finite mixture distributions."

Tsuyoshi, A. and N. Yasuhiko (2008) "A Theory of Civil Conflict and Democracy in Unequal Societies," *Economics Bulletin*, Vol. 8, No. 2, pp. 1–11.

Tufte, E. R. (1978) *Political control of the economy*: Princeton, NJ: Princeton University Press.

van Kersbergen, K. (1995) *Social Capitalism*: London: Routledge.

Velasco, A. (2000) "Debts and Deficits with Fragmented Fiscal Policymaking," *Journal of Public Economics*, Vol. 76, No. 1, pp. 105–125.

Volkerink, B. and J. De Haan (2001a) "Fragmented government effects on fiscal policy: New evidence," *Public choice*, Vol. 109, No. 3, pp. 221–242.

——— (2001b) "Fragmented government effects on fiscal policy: New evidence," *Public choice*, Vol. 109, No. 3, pp. 221–242.

von Beyme, K. (1985) *Political parties in Western democracies*: Aldershot, UK: Gower.

Weingast, B. R., K. A. Shepsle, and C. Johnsen (1981) "The Political Economy of Benefits and Costs: A Neoclassical Approach to Distributive Politics.," *The Journal of Political Economy*, Vol. 89, No. 4, pp. 642–664.

Western, B. (1991) "A Comparative Study of Corporatist Development," *American Sociological Review*, Vol. 56, pp. 283–294.

Williamson, O.E. (1998) "Transaction cost economics: how it works; where it is headed," *De Economist*, Vol. 146, No. 1, pp. 23–58.