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The Political Determinants of Social Expenditure in the European Countries

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ABSTRACT

The social expenditure in 30 European countries over the period 1970-2011 is examined, applying static and dynamic panel estimators in order to identify the determinants of social expenditure. After a brief introduction and a survey of the economic literature on this issue, we discuss the data and briefly introduce the applied methodologies. Empirical results, in line with previous researches, suggest that real per capita GDP growth, unemployment rate, general government consolidated gross debt, and openness to trade have a direct impact on real social expenditure. Moreover, some political factors, such as government fragmentation, political globalization, and democracy degree contribute to explain the variability of social expenditure. It is found that higher growth is associated with less expenditure: Granger causality analysis reveals mixed results, and only four countries of our sample exhibit a unidirectional flow running from economic growth rate to social expenditure.

1.   INTRODUCTION

Amongst the most extensively discussed explanatory factors of social expenditure are partisan politics and political institutions, as well as the dependency of the real impact of the former on the latter. While economic, technological, and demographic factors are not unimportant in shaping policy, the place of partisan politics is central. Deficit spending varies substantially between countries and within countries over time. Differences in fiscal performance may be partly due to economic circumstances. 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. 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).

Rising unemployment rates, increasing public debt, declining economic growth, globalization, and changing demographics and occupational structures have increased the pressure on the advanced welfare state and have prompted social policy reform in many countries (Kittel and Obinger, 2002). In the bargain, as a negative effect of the economic and financial crisis that has struck the world economy since 2007, EU invoked the theoretical construction of a European welfare state, which should harmonize the current very different national regimes. Notwithstanding, the fragile equilibria of public finance – which have inspired austerity measures to a loads of economists and politicians over the continent – suggest radical revisions of welfare policies, encapsulating this process in a more general strategy that should reach the objective of a government size reduction, via spending cuts. Thus, potential results of this strand of research might be combined to those coming from the literature on public intervention in the economy. The growth of government is also attributable to political factors, such as inheritance of policy programs (Rose and Davies, 1994) and the decision not to reject the heritage of the past. Wilenski's (1975) study of the welfare state came to the conclusions that the root cause of the level of welfare expenditure in a country is economic growth, and the mechanism that translates economic change into public policy seems to be demographic rather than political.

The specter of rapidly increasing ratios of people dependent on the state to those in work and paying taxes will certainly haunt welfare state planners in the coming decades (Garrett and Mitchell, 2001).

Moreover, austerity measures, which have been launched in several European countries to solve public finance troubles, have questioned the role and effectiveness of Welfare state, especially after spending cuts programs.

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 economic policy literature. Section III presents the empirical methodology applied, the data used and the empirical results. It introduces some methodological remarks on our method of estimation, specifies the empirical model and reports the estimation results obtained. Section IV provides some concluding remarks.

2. THE POLITICAL DETERMINANTS OF SOCIAL EXPENDITURE

Esping-Andersen's (1990) book entitled The three worlds of welfare capitalism famously produced a threefold typology of conservative, liberal, and social democratic welfare regimes. Powell and Barrientos (2004) conclude, like Esping-Andersen, that there are three clusters or worlds of welfare capitalism. Korpi (1989) indicates that as far as the development of social rights in sickness insurance is concerned, left party government participation clearly has been an important factor during both the prewar and the postwar periods. Moreover, the study supports the assumption of the significance of left government participation in the development of social policy. In the same direction, the analysis of Blais et al. (1993) shows that left parties spend a little more than parties of the right. Yet, an indication that it takes time for parties to affect total spending emerges.

Hicks and Swank (1992) suggest that electoral turnout and differences in the strengths and ideologies of parties matter for the share of national incomes spent by democracies on social welfare programs. Moreover, other key variables are represented by the strength of oppositional parties, dimensions of political institutions, state administrative and political capacities for cohesive policymaking, and heavily bureaucratic and traditionally hierarchical state institutions. According to the analysis due to Schmidt (1996), the growth of government has been influenced by political-economic factors, such as real economic growth or, conversely, economic recession, change in the rate of unemployment and inflationary or disinflationary outcomes. The role of party politics in framing budgetary policy-making has been investigated by Bräuninger (2005), whose results suggest that the actual spending preferences of parties matter whereas they do not indicate that parties of the left consistently differ from parties of the right in their spending behavior. Bawn and Rosenbluth (2006) examines the policy consequences of the number of parties in government in 17 European countries. They find that increasing the number of parties in government increases the fraction of GDP accounted for by government spending by close to half a percentage point, or more than one billion current dollars in the typical year.

Cusack (1997) underlines the distinction between the electorate's and the government's ideological preferences and the dominant role that the former plays. Moreover, contrary to conventional wisdom, partisan political influences have not been eliminated with the tightening of linkages to the international economy. In the same direction, Castles and Obinger (2007) find that both gross public and net private expenditures are strongly influenced by partisan incumbency, although in opposite directions, and that the more we net out the effect of taxes, the less politics matters and the more spending is shaped by socio-economic forces. Persson et al. (2007) show that the electoral rule affects government spending, but only indirectly: proportional elections induce a more fragmented party system and a larger incidence of coalition governments than do majoritarian elections.

An alternative to social rights of citizenship approach to comparing welfare states is to use disaggregated program expenditure data to identify the diverse spending priorities of different types of welfare state (Castles, 2008).

De Haan et al. (1999) present new evidence on the hypothesis that coalition governments will find it more difficult to keep their budgets in line after an adverse economic shock than do one-party, majoritarian governments. Although the study does not find evidence that the type of government affects cross country variation in fiscal policy, however the number of political parties in government affects central government debt growth. Volkerink and de Haan (2001) find evidence that more fragmented government have higher deficits. Their results confirm that the number of ministers is significant, showing that the government's level of parliamentary support is also a determinant. Moreover, political fragmentation seems not affect government's budget deficit. Replicating Volkerink and de Haan's model on an OECD sample adding ten non-OECD countries, Elgie and McMenamin (2008) show that the effect of political fragmentation disappears. They argue that argue that the importance of political fragmentation varies according to the institutionalization of political systems. As for the effect of political fragmentation on government size, Mukherjee (2003) argues that an increase in the number of represented parties leads to higher central government expenditure. Conversely, as the size of the majority party grows from a bare-

minimum majority to above the supermajority level, it has a nonlinear, specifically cube effect on central government expenditure. Panel data analysis shows that an increase in the number of represented parties leads to higher government spending on subsidies and transfers, but to lower spending on public goods. The evidence in Kittel and Obinger (2002) tend to give most support to the "growth-to-limits" and the "new politics" perspectives, since social spending dynamics have been driven by rising dependency ratios as reflected in rising unemployment and population ageing. Whilst Amable et al. (2010) show that structural change is a major determinant of the extent of social protection, inasmuch as the results suggest that overall spending is driven up by structural change. On the other hand, strong structural change has a negative influence on welfare entitlements measured by the net rate of sickness insurance. Using the Dreher-KOF index of globalization, Potrafke (2009) shows that partisan politics had no effect on social expenditures, but leftist governments increased social expenditures when globalization was proceeding rapidly.

Bove et al. (2014), investigating how the timing of elections and government ideological motivations influence the dynamics of social and military expenditure in OECD countries, show that governments tend to bias outlays towards social expenditure and away from military expenditure at election times. Herwartz and Theilen (2014) find that partisan motives play an important role in the explanation of short-run dynamics in social spending. Left-wing parties are found to spend significantly more than their right-wing counterparts and parties spend more before elections. However, the partisan influence has changed over time. While ideology has lost some of its influence, the electoral cycle has become more important to explain changes in social expenditure

3. METHODOLOGY, DATA AND EMPIRICAL RESULTS

In this paper, static panel-type analyses were conducted through several estimators (POLS, POLS with Driscoll-Kraay Standard Errors, Prais-Winsten regression, POLS with Newey-West Standard Errors), while for the dynamic estimates we applied the Arellano-Hsiao and the GMM-Dif (Generalized Method of Moments) estimators. The empirical methodology used in this paper refers to the basic panel data models. In formal hypothesis testing, a variable is (not) included as an explanatory variable in the model if its coefficient is (not) significantly different from 0 by a t-test. More problematically, in large dimension problems two variables may be insignificant only because they are highly correlated. If insignificant variables are excluded sequentially (another practice in empirical studies), there is a problem of which one to exclude first. An alternative to the formal hypothesis testing is the model selection approach, which, based on information criteria, is more objective as it weighs in both model fit and complexity (relative to the sample size). Throughout the article, we focus on the application of Schwarz's (1978) Bayesian Information Criterion (BIC). In application, we minimize BIC over a domain of models with all possible combinations of explanatory variables. The model with the smallest loss is selected.

A proper estimation method should account for the possibility of country-specific characteristics that are relevant for the determination of the current account balance but omitted from the model. Therefore, the Fixed Effects model should be preferred to the Pooled OLS (POLS) and Random Effects. Moreover, it is customary to treat fiscal and monetary policy variables as exogenous. However, the real exchange rate and aggregate income are potentially endogenous and must be treated accordingly. The instrumental variables procedure here applied uses the first and second lag of the variables as their instruments.When such econometric problems exist, the traditional panel data estimators (POLS, Fixed Effects and Random Effects) do not yield consistent estimates. The GMM dynamic panel data methods, however, can simultaneously deal with the problem of persistence and endogeneity.

Granger causality tests (Granger, 1980) are statistical tests of causality in the sense of determining whether lagged observations of another variable have incremental forecasting power when added to a univariate autoregressive representation of a variable. Xt is Granger causal for yt if xt helps predict y_t at some stage in the future. It should be noticed, however, that Granger causality is not causality in a deep sense of the word. To detect the possible presence of clubs of countries, i.e group of countries that behave similarly, a mixture model 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 behaviour and its explanatory determinants. To detect unobservable (i.e., latent) groups of countries, the modelling procedure groups together countries that share similar relationships between their behaviour and the factors driving it (i.e., the estimated regression coefficients).

The empirical investigation in this study is carried out using a panel dataset for a sample of thirty European countries with annual frequency. The time interval chosen, from 1970 to 2011, is of particular interest to study

social expenditure as it is characterized by strong economic globalization, and the data were provided by several sources, listed in Table 1 .

Table 1: List of the variables

Variable	Description	Source
SE	Social expenditure (Percentage of GDP at market prices)	AMECO
PCGDP	GDP per capita in 1990 US$ (Converted at Geary Khamis PPPs)	TED
PCGDPGR	GDP per capita in 1990 US$ (Converted at Geary Khamis PPPs) growth rate	TED
UR	Unemployment rate (%)	AMECO
NWP	Not working population (=Population 0 to 14 years + Population: 65 years and over/Total population)	AMECO
GGCGD	General government consolidated gross debt (Percentage of GDP at market prices)	AMECO
OPEN	Total exports plus total imports, divided by GNP	AMECO
INFL	Annual percentage increase in the national consumer price index	AMECO
POL_GLOB	Political globalization	Dreher – KOF Index of Political Globalization
POL_CONSTR	Political Constraints Index V	Henisz – The Political Constraints Index
DEMOCRACY	Democracy Index	Freedom House/Imputed Polity
GOV_FRACT	Government fractionalization	Database of Political Institutions

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. We consider the following nine variables in explaining social expenditure, as a share of GDP (SE): per capita GDP (PCGDP), per capita real GDP growth rate (PCGDPGR), unemployment rate (UR), not working population (NWP), general government consolidated gross debt (GGCGD), openness to trade (OPEN), inflation (INFL), a political globalization index (POL_GLOB), a political constraints index (POL_CONSTR), a democracy index (DEMOCRACY), and a Government fractionalization index (GOV_FRACT).

Our dependent variable is the social expenditure/GDP ratio. The country-specific heterogeneity, in term of socio-economic factors, is investigated with a set of control variables, in line with the existing literature that reflects standard assumptions about structural welfare-state determinants. In order to capture the effect of the size of groups highly related to social protection, we include the unemployment rate and the share of the not working population over its total. Moreover, to capture an eventual Wagner's law effect (Wagner, 1883) – which states a positive link between GDP and public expenditure –, we use per capita real GDP growth rate as a control variable. As suggested by Bortolotti and Pinotti (2008), in implementing economic policy the executive may be affected by the effective law-making power of the government, so that low legislative power may affect the executive's initiatives regardless of its political orientation.

Since Cameron (1978) openness has often been shown to be associated with larger government, but there is disagreement as to whether it increases or decreases the deficit. Rodrik (1998) argues that the economic vulnerability associated with openness increases the demand for social insurance, thereby increasing the deficit. In contrast, Goode (1984) suggests that openness offers an opportunity for revenue generation through the taxing of trade, thereby decreasing the deficit. The degree of fractionalization of the Government, measured by World Bank's Database of Political Institutions (Beck et al., 2001), is measured via probability that two randomly chosen

deputies from among the government parties will be of different parties, so that it varies from 0 to 1. Political globalization, here represented by Dreher-KOF index (Dreher et al., 2008), is measured by the number of embassies and high commissions in a country, the number of international organizations of which the country is a member, the number of UN peace missions the country has participated in, and the number of international treaties that the country has signed since 1945. The political constraints index (Henisz, 2002) measures the feasibility of policy change, i.e. the extent to which a change in the preferences of any one political actor may lead to a change in government policy, varying within 0-1 range. Finally, we insert in regressors' set a democracy index constructed by Freedom House (Hadenius and Teorell, 2005). Scale ranges from 0-10 where 0 is least democratic and 10 most democratic. We expect democracy to be positively correlated with social expenditure because governments that are more democratic are more likely to appease the electorate with populist economic policies, which lead to higher expenditures (Mukherjee, 2003).

Table 2: Exploratory data analyses

Variable	Mean	Median	Standard Deviation	Skewness	Kurtosis	Range
SE	30.0660	30.1477	6.7270	0.0640	1.9724	31.8137
PCGDPGR	2.0200	2.3387	4.1190	-1.9304	15.4438	55.7739
UR	6.8089	6.3000	4.1750	0.8748	3.5741	20.7338
NWP	0.3383	0.3364	0.0242	-0.9163	19.6401	0.3692
GGCGD	48.5364	47.0865	28.8367	0.6954	3.2641	159.1490
OPEN	4.3735	4.3102	0.4711	0.2311	2.5966	2.5679
INFL	8.6885	4.0947	19.3216	8.0092	82.8968	251.0601
POL_GLOB	76.5395	82.2052	18.5401	-0.8323	2.9131	86.9318
POL_CONSTR	0.7467	0.7625	0.1144	-3.1305	14.2819	0.7866
DEMOCRACY	8.6434	10.0000	2.6774	-2.1802	6.2036	9.5000
GOV_FRACT	0.4914	0.4980	0.1787	-0.4363	2.6888	0.8193

Following Cameron (1978), Rodrik (1998), Elgie and McMenamin (2008), Volkerink and de Haan (2001) Garrett and Mitchell (2001) we consider the following explanatory variables in explaining social expenditures (SE):

$$SE_{i,t} = \beta_0 + \beta_1 PCGDP_{i,t} + \beta_2 PCGDPGR_{i,t} + \beta_3 UR_{i,t} + \beta_4 NWP_{i,t} + \beta_5 GGCGD_{i,t} + \beta_6 OPEN_{i,t} + \qquad [[1]$$
$$\beta_7 INFL_{i,t} + \beta_8 POL\_GLOB_{i,t} + \beta_9 POL\_CONSTR_{i,t} + \beta_{10} DEMOCRACY_{i,t} + \beta_{11} GOV\_FRACT$$
$$+ \varepsilon_{i,t}$$

It is hypothesized that, of these variables, changes in unemployment, not working population, public debt, openness to trade, democracy, political globalization and in government fractionalization will be positively associated with the dependent variable (*SE*); whereas a negative association between per capita real GDP growth rate and political constraints would exist. We derived the logarithmic series of some independent variables (*SE*, *GGCGD*, and *OPEN*), causing the coefficients to be elasticities. In addition, the logarithmic linear form reduces heteroskedasticity. Correlation coefficients summarized in Table 3 below indicate the absence of any particular strong association amongst our variables; moreover, the correlation between social expenditure and economic growth is negative (*r*=-0.26).

The results in Table 4 are consistent with the maintained hypotheses. We include a year trend through dummies. More specifically, our empirical findings suggest that higher growth is associated with less expenditure, betraying a classical counter-cyclical pattern (Garrett and Mitchell, 2001). Therefore, these results cast doubt on the validity of the Wagner's law (Magazzino, 2012a, 2012b). Economic growth clearly has an endogenous effect on social expenditure growth as the determinant of the denominator of the expenditure to GDP ratio. Rapid GDP growth necessarily leads, all other things being equal, to a decline in the spending ratio and low growth to an increase in measured spending. Further, unemployment and public debt increases push up social expenditure, via greater amount of stabilizers (subsidies).

Table 3: Correlation matrix

	1	2	3	4	5	6	7	8	9	10
1	1									
2	-0.2599	1								
3	0.0057	0.0488	1							
4	0.0811	0.0060	-0.2156	1						
5	0.3157	-0.2378	0.2761	0.0851	1					
6	-0.0232	0.1271	0.0312	-0.3333	-0.1579	1				
7	-0.1928	-0.3674	-0.0457	0.1025	-0.0959	-0.1185	1			
8	0.4462	0.0484	0.0917	-0.0104	0.4072	-0.2757	-0.2240	1		
9	0.2218	-0.0278	-0.0762	-0.0035	-0.0295	0.0848	-0.0776	0.2710	1	
10	0.0687	0.0577	0.0127	-0.1559	0.2397	0.2994	-0.1450	0.2839	0.1448	1
11	-0.0078	-0.0112	-0.0623	-0.1498	-0.1368	0.1622	0.0287	-0.1165	0.1828	0.1402

Notes: 1: SE, 2: PCGDPGR, 3: UR, 4: NWP, 5: GGCGD, 6: OPEN, 7: INFL; 8: POL_GLOB, 9: POL_CONSTR, 10: DEMOCRACY, 11: GOV_FRACT. Bonferroni's adjustment applied.

Hence, high economic growth and fiscal stress dampen the growth of social spending, confirming empirical findings shown in Kittel and Obinger (2002). Moreover, the dependent variable is also positively related to the openness to trade, as hypothesized by Cameron (1978), Hicks and Swank (1992), and Rodrik (1998), but in contrast with Goode (1984). The estimated impacts of the variables measuring socio-economic development are also largely in accordance with the conclusions of the recent literature on welfare state spending. Interestingly, for the sample period, political globalization and government fractionalization are statistically significant, confirming results provided by Elgie and McMenamin (2008), and Kittel and Obinger (2002). Thus, more fragmented party systems and larger government size cause a higher social expenditure, probably because of an extensive rent-seeking mechanism or the effect due to group of pressure and lobbies. In addition, the sign of democracy variable is in line with theory, confirming the logic in Mukherjee (2003): authoritarian regime do not need of consensus politics in order to gain electoral votes. In addition, political constraints influence the social expenditure.

Table 5 contains the results for the dynamic panel data estimates. In the second and third columns, we applied the two-stage least squares (2SLS) estimator suggested by Anderson and Hsiao (1981), with IVs in differences and in levels, respectively. While in the last two columns, we report the results based on Arellano and Bond (1991) Difference GMM estimator, and those on Blundell and Bond (1998) System GMM estimator. As shown in Table 5, the coefficient of the lagged dependent variable is now closer to unity percent, which is similar to the ones reported in previous research (i.e., Garrett and Mitchell, 2001; Kittel and Obinger, 2002).

Growth rate has a large effect on SE, ranging from -0.44 to -0.66, not far from previous estimates (0.36-0.59) based on static estimators. It is noteworthy that a significant percentage of variation in social expenditure (across countries and in time) may be explained by variations in real GDP. The magnitude of the elasticity also appears to be reasonable. In fact, it is comparable to Elgie and McMenamin's (2008) estimate of 0.30 based on OECD countries data, as well as to Iversen and Cusack (2000) of 0.36-0.42.

Table 4: Determinants of social expenditure in Europe: 1970-2011 (static panel estimation results)

Dependent variable: SE	POLS Driscoll-Kraay SEs	FE with AR(1) disturbances	Cross-sectional time-series FGLS	Prais-Winsten regression PCSEs	Newey-West SEs	GEE
Constant	2.3205 ***	0.0706 ***	1.1414 ***	0.9189 ***	2.3205 ***	2.2921 ***
	(0.5320)	(0.0113)	(0.2161)	(0.3620)	(0.4346)	(0.5583)
PCGDP	0.1795 ***	0.2885 ***	0.1987 ***	0.1824 ***	0.1795 ***	0.0490
	(0.0359)	(0.0230)	(0.0183)	(0.0236)	(0.0387)	(0.0407)
PCGDPGR	-0.6755 ***	-0.4096 ***	-0.4660 ***	-0.5865 ***	-0.6755 ***	-0.3642 ***
	(0.0424)	(0.0815)	(0.0741)	(0.1474)	(0.0483)	(0.1365)
UR	0.0052 *	0.0086 ***	0.0070 **	0.0046 **	0.0052 *	0.0055
	(0.0026)	(0.0018)	(0.0014)	(0.0023)	(0.0030)	(0.0044)
NWP	0.0755	1.3746 *	0.7411 *	0.5186	0.0755	1.4550 ***
	(0.6624)	(0.7465)	(0.3950)	(0.5333)	(0.6348)	(0.4974)
GGCGD	0.0942 ***	0.1408 **	0.1207 ***	0.0913 ***	0.0942 ***	0.1083 ***
	(0.0095)	(0.0191)	(0.0114)	(0.0141)	(0.0207)	(0.0378)
OPEN	0.0230	0.1139 ***	0.0602 ***	0.0592 **	0.0230	0.0690 *
	(0.0250)	(0.0313)	(0.0164)	(0.0293)	(0.0372)	(0.0364)
INFL	-0.0040 *	-0.0015 ***	-0.0009	-0.0016 *	-0.0040 **	-0.0049 **
	(0.0021)	(0.0004)	(0.0006)	(0.0008)	(0.0020)	(0.0024)
POL_GLOB	0.0046 ***	0.0017 ***	0.0014 ***	0.0045 ***	0.0046 ***	0.0013 *
	(0.0013)	(0.0006)	(.00005)	(0.0007)	(0.0013)	(0.0007)
POL_CONSTR	-1.1070 ***	-1.0265 **	0.0465	-0.1022	-1.1070 ***	0.0393
	(0.2371)	(0.4919)	(0.1138)	(0.3130)	(0.3830)	(0.1578)
DEMOCRACY	0.0673 ***	-0.0091	0.0097 *	0.0406 ***	0.0673 ***	0.0115
	(0.0124)	(0.0072)	(0.0057)	(0.0110)	(0.0148)	(0.0106)
GOV_FRACT	0.2186 ***	0.0349*	0.0132	0.0465	0.2186 **	0.0237
	(0.0555)	(0.0201)	(0.0136)	(0.0353)	(0.0963)	(0.0222)
Number of groups	30	30	30	30	30	30
N	404	404	404	404	404	404
F/Wald χ^2	181.50	226.06	724.82	380.18	32.28	189.57
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
RMSE	0.1669	0.0308		0.0623		
R^2	0.4755	0.8703[a]		0.9109		

Notes: a: R^2 within. Numbers in parentheses are heteroskedasticity-consistent SEs. $* p \leq .10$; $** p \leq .05$; $*** p \leq .01$. Hausman's test: χ^2=326.47 (0.0000).

Unemployment rate has the expected (positive) sign, since negative effects due to a deterioration of economic scenario push up social expenditures via transfers. As in the previous static panel estimates findings, the not working population does not exert a significant effect on SE. The elasticity of public debt is positive, meaning that a greater stock of debt induces a pressure upon social expenditure. In line with previous estimates in Table 4, the openness degree seems to be significant and has the expected (positive) sign, even if its relevance is questioned by GMM-Dif results. Finally, government fractionalization, political globalization and political constraints significantly affect social expenditure, despite their low coefficients, confirming static estimates results. While democracy index seems not affect the dependent variable.

Regarding the diagnostic checks, as shown in Arellano and Bond (1991), only for a homoskedastic error term the Sargan's test has an asymptotic chi-square distribution. Here, we cannot reject the null hypothesis that the overidentifying restrictions are valid (at a 5% significance level). When the idiosyncratic errors are independently and identically distributed (i.i.d.), the first-differenced errors are first-order serially correlated. Therefore, as expected, we find strong evidence against the null hypothesis of zero autocorrelation in the first-differenced errors at order 1. Serial correlation in the first-differenced errors at an order higher than 1 implies that the moment conditions used by GMM are not valid. Yet, the Arellano and Bond's test for second order serial correlation does

not reject H0 (Table 5a). In Table 5b, we estimated the previous model for three different sub-groups: Post-communist, Euroarea and OECD countries.

Yet, not significant differences emerges in the results. As supplementary analysis, we inspect the nexus between per capita GDP growth rate and social expenditure. Granger causality tests support the Wagner's law – which states a unidirectional flow from income to expenditure – for four countries; the Keynesian hypothesis – according to which the unidirectional causality runs from expenditure to GDP – received empirical support for ten countries; the feedback mechanism is confirmed in five cases. Finally, for the remaining eleven countries neutrality hypothesis holds (see Tables 6 and 7). Therefore, our Granger causality analyses are mixed. Notwithstanding, the Keynesian view according to which public expenditure might promote economic growth received a stronger support by data in respect of Wagnerian law.

Table 5a: Dynamic panel data estimates (Europe: 1970-2011)

Dependent variable: SE	Estimation method			
	A-H with IV in differences	A-H with IV in levels	GMM-Dif (AB)	GMM-Sys (BB)
$SE_{i,t-1}$	0.8471 *** (0.1245)	0.3230 ** (0.1322)	0.7690 *** (0.0769)	1.0013 *** (0.0610)
$SE_{i,t-2}$	-0.2225 *** (0.0791)	-0.0636 (0.0615)	-0.0851 * (0.0501)	-0.0829 (0.0517)
$PCGDP_{i,t}$	0.6826 *** (0.2400)	0.6086 *** (0.2260)	0.4941 * (0.2603)	0.4675 ** (0.2096)
$PCGDP_{i,t-1}$	0.6338 ** (0.2488)	0.5054 ** (0.2217)	0.5150 ** (0.2547)	0.4759 ** (0.2055)
$PCGDPGR_{i,t}$	-0.6599 ** (0.2415)	-0.4378 ** (0.1876)	-0.4856 ** (0.2090)	-0.4919 ** (0.2060)
$PCGDPGR_{i,t-1}$	-0.2350 (0.1769)	-0.0165 (0.1221)	-0.0179 (0.1352)	0.2607 ** (0.1309)
$UR_{i,t}$	0.0064 *** (0.0024)	0.0050 ** (0.0023)	0.0031 (0.0041)	0.0038 (0.0027)
$UR_{i,t-1}$	0.0061 *** (0.0014)	0.0014 (0.0017)	-0.0065 * (0.0039)	0.0047 (.0030)
$NWP_{i,t}$	0.8605 (1.1260)	0.6375 (1.6573)	0.3103 (1.8571)	1.1422 (0.9778)
$NWP_{i,t-1}$	-0.4496 (1.2757)	0.5144 (1.4651)	0.4566 (1.7255)	-0.8016 (1.0317)
$GGCGD_{i,t}$	0.0209 (0.0409)	0.0439 (0.0392)	-0.1918 *** (0.0417)	-0.1256 *** (0.0414)
$GGCGD_{i,t-1}$	-0.0167 (0.0383)	0.0470 * (0.0242)	-0.1505 *** (0.0403)	-0.1241 *** (0.0397)
$OPEN_{i,t}$	0.1716 ** (0.1017)	0.0797 ** (0.0379)	0.0847 ** (0.0478)	0.0679 (0.0466)
$OPEN_{i,t-1}$	0.1380 ** (0.0744)	0.0343 (0.0430)	0.0461 (0.0304)	0.0783 * (0.0424)
$INFL_{i,t}$	-0.0050 *** (0.0016)	-0.0036 *** (0.0010)	-0.0024 *** (0.0009)	-0.0013 *** (0.0004)
$INFL_{i,t-1}$	-0.0004 (0.0010)	-0.0033 *** (0.0012)	-0.0000 (0.0010)	0.0004 (.0007)
$POL\_GLOB_{i,t}$	0.0023 *** (0.0007)	0.0024 *** (0.0009)	0.0004 (0.0005)	0.0009 ** (0.0004)
$POL\_CONSTR_{i,t}$	-0.1176 (0.1134)	-0.1109 (0.0980)	-0.2314 ** (0.1161)	0.0298 (0.0966)
$DEMOCRACY_{i,t}$	0.0216 ** (0.0092)	0.0004 (0.0073)	0.0049 (0.0051)	0.0041 (0.0042)
$GOV\_FRACT_{i,t}$	0.0065 (0.0184)	0.0053 (0.0207)	0.0023 (0.0185)	0.0143 * (0.0080)
F/Wald	2970.53 (0.0000)	1023.56 (0.0000)	33202.16 (0.0000)	2.19e+07 (0.0000)
A.-Bond AR(1)	-2.31 (0.021)	-0.57 (0.566)	-3.15 (0.002)	-3.48 (0.000)
A.-Bond AR(2)	-1.55 (0.121)	-1.08 (0.280)	-1.77 (0.076)	-1.91 (0.056)

Notes: Number of groups=30. Asymptotic standard errors in parentheses. For the diagnostic tests P-Values are shown. $* \; p \leq .10; \; ** \; p \leq .05; \; *** \; p \leq .01$.

Finally, we show the results of mixture models estimations. The model selection criteria suggest the choice of four clusters, insomuch as the information criteria (AIC, BIC, and sample adjusted BIC) assume the lowest values with four components, and, at the same time, the likelihood is maximized with a four-group clusterization; nevertheless,

the entropy measure is minimized when two groups are established. Moreover, with five components, one of these groups would include only somewhere around 2 per cent of observations. Regression mixture models are a tool to investigate population heterogeneity.

Table 5b: Dynamic panel data estimates (Post-communist, Euroarea and OECD countries: 1970-2011)

Dependent variable: SE	Post-communist countries	Euroarea	OECD
$SE_{i,t-1}$	0.5562 *** (0.1165)	1.0027 *** (0.0493)	1.0814 *** (0.0530)
$SE_{i,t-2}$	-0.3604 *** (0.1318)	-0.1056 * (0.0590)	-0.1470 *** (0.0543)
$PCGDP_{i,t}$	0.3445 (0.4888)	0.0181 * (0.0099)	0.0124 * (0.0076)
$PCGDP_{i,t-1}$	0.4131 (0.4908)	0.2023 ** (0.0965)	0.5150 ** (0.2547)
$PCGDPGR_{i,t}$	-0.0033 (0.0025)	-0.0046 (0.0030)	-0.0049 * (0.0027)
$PCGDPGR_{i,t-1}$	-0.1843 * (0.0895)	-0.0016 * (0.0009)	-0.023 ** (0.0009)
$UR_{i,t}$	0.0033 (0.0039)	0.0008 (0.0051)	0.0023 (0.0039)
$UR_{i,t-1}$	0.0005 (0.0048)	0.0026 (0.0056)	-0.0030 (0.0042)
$NWP_{i,t}$	5.1994 * (2.8816)	0.1187 (1.4265)	1.3928 (1.0860)
$NWP_{i,t-1}$	4.9815 (3.2858)	0.1316 (1.4918)	1.2110 (1.1328)
$GGCGD_{i,t}$	0.1642 ** (0.0768)	0.1021** (0.0478)	-0.0859 ** (0.0386)
$GGCGD_{i,t-1}$	-0.1511 * (0.0803)	0.1044 ** (0.0468)	-0.0844 ** (0.0371)
$OPEN_{i,t}$	0.0204 (0.0253)	0.0687 (0.0570)	0.0986 ** (0.0458)
$OPEN_{i,t-1}$	0.0304 (0.0318)	0.0601 (0.0494)	0.1070 *** (0.0411)
$INFL_{i,t}$	-0.0016 *** (0.0006)	-0.0057 * (0.0030)	-0.0032 (0.0026)
$INFL_{i,t-1}$	-0.0011 (0.0009)	-0.0041 (0.0034)	-0.0043 * (0.0025)
$POL\_GLOB_{i,t}$	0.0031 *** (0.0011)	0.0008 ** (0.0004)	0.0007 ** (0.0003)
$POL\_CONSTR_{i,t}$	-0.4166 (0.4225)	-0.1328 *** (0.0495)	-0.0003 (0.0811)
$DEMOCRACY_{i,t}$	0.0938 *** (0.0338)	0.0006 (0.0046)	0.0040 (0.0039)
$GOV\_FRACT_{i,t}$	0.0122 (0.0731)	0.0078 (0.0152)	0.0105 (0.0131)
F/Wald	236.83 (0.0000)	189507.45 (0.0000)	504863.96 (0.0000)
A.-Bond AR(1)	-1.02 (0.308)	-2.59 (0.010)	-3.16 (0.002)
A.-Bond AR(2)	-1.35 (0.176)	-1.33 (0.183)	-1.71 (0.087)

Notes: Number of groups=30. Asymptotic standard errors in parentheses. For the diagnostic tests P-Values are shown. $* p \leq .10$; $** p \leq .05$; $*** p \leq .01$.

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. With regard to the four clusters, they seem to form homogeneous groups, considering government size, welfare state, monetary regime, as well as historical and geographical aspects. In the bargain, as summarized in Table 10, the first group includes Eastern and Mediterranean countries, the second one is formed by the Nordic, the third group is constituted by Central European states, while the last group is the Benelux. More in detail, in the first group we do not find clear evidence for an effect of unemployment rate, general government debt and openness on social expenditure, whilst political constraints index do not affect the dependent variable in the second group. Social expenditure in groups 2 and 4 seems to be driven by per capita GDP (0.16 and 0.17, respectively) and government debt (0.14 and 0.12, respectively). Indeed, groups 1 and 3 seems to be particularly sensitive toward NWP (1.35 and 1.27, respectively).

Table 6: Results for Granger causality tests

Country	Granger causality	χ^2	P-Value	Country	Granger causality	χ^2	P-Value
Austria	PCGDPGR→SE	2.13	0.3452	Latvia	PCGDPGR→SE	0.26	0.8778
	SE→PCGDPGR	0.09	0.9564		SE→PCGDPGR	12.95	0.0015***
Belgium	PCGDPGR→SE	3.37	0.1851	Lithuania	PCGDPGR→SE	10.66	0.0049***
	SE→PCGDPGR	3.28	0.1945		SE→PCGDPGR	6.87	0.0323**
Bulgaria	PCGDPGR→SE	4.74	0.0936*	Luxembourg	PCGDPGR→SE	3.02	0.2210
	SE→PCGDPGR	3.73	0.1548		SE→PCGDPGR	7.68	0.0215**
Cyprus	PCGDPGR→SE	16.35	0.0003***	Malta	PCGDPGR→SE	0.10	0.9523
	SE→PCGDPGR	76.02	0.0000***		SE→PCGDPGR	3.00	0.2236
Czech	PCGDPGR→SE	2.52	0.2838	the	PCGDPGR→SE	3.41	0.1821
Republic	SE→PCGDPGR	8.73	0.0127**	Netherlands	SE→PCGDPGR	0.54	0.7619
Denmark	PCGDPGR→SE	8.84	0.0121**	Norway	PCGDPGR→SE	0.34	0.8455
	SE→PCGDPGR	1.21	0.5454		SE→PCGDPGR	23.13	0.0000***
Estonia	PCGDPGR→SE	0.74	0.6910	Poland	PCGDPGR→SE	21.59	0.0000***
	SE→PCGDPGR	5.12	0.0774*		SE→PCGDPGR	1.09	0.5806
Finland	PCGDPGR→SE	6.61	0.0366**	Portugal	PCGDPGR→SE	1.46	0.4824
	SE→PCGDPGR	6.72	0.0347**		SE→PCGDPGR	5.90	0.0523*
France	PCGDPGR→SE	6.38	0.0413**	Romania	PCGDPGR→SE	0.04	0.9805
	SE→PCGDPGR	0.49	0.7841		SE→PCGDPGR	0.48	0.7859
Germany	PCGDPGR→SE	0.83	0.6618	Slovakia	PCGDPGR→SE	1.02	0.5994
	SE→PCGDPGR	0.49	0.7818		SE→PCGDPGR	3.82	0.1479
Greece	PCGDPGR→SE	2.43	0.2968	Slovenia	PCGDPGR→SE	2.70	0.2598
	SE→PCGDPGR	6.42	0.0403**		SE→PCGDPGR	12.64	0.0018***
Hungary	PCGDPGR→SE	3.87	0.1445	Spain	PCGDPGR→SE	0.61	0.7376
	SE→PCGDPGR	3.88	0.1437		SE→PCGDPGR	1.40	0.4968
Iceland	PCGDPGR→SE	3.40	0.1830	Sweden	PCGDPGR→SE	2.14	0.3430
	SE→PCGDPGR	0.98	0.6140		SE→PCGDPGR	8.76	0.0125**
Ireland	PCGDPGR→SE	6.14	0.0464**	Switzerland	PCGDPGR→SE	0.26	0.8775
	SE→PCGDPGR	12.11	0.0023***		SE→PCGDPGR	13.21	0.0014***
Italy	PCGDPGR→SE	6.87	0.0322**	United	PCGDPGR→SE	1.53	0.4644
	SE→PCGDPGR	9.76	0.0076***	Kingdom	SE→PCGDPGR	1.72	0.4240

Notes: 5% Critical Values in parentheses.

Table 7: Summary of Granger causality tests

Hypothesis	Causality flow	Countries
Feedback mechanism	SE↔PCGDPGR	5: Cyprus, Finland, Ireland, Italy, Lithuania
Keynesian hypothesis	SE→PCGDPGR	10: Czech Republic, Estonia, Greece, Latvia, Luxembourg, Norway, Portugal, Slovenia, Sweden, Switzerland
Wagner's law	PCGDPGR→SE	4: Bulgaria, Denmark, France, Poland
Neutrality	-	11: Austria, Belgium, Germany, Hungary, Iceland, Malta, the Netherlands, Romania, Slovakia, Spain, UK

Table 8: Finite Mixture Model

Dependent variable: CAB	Coef. (SE)
Component 1	
Constant	5.8514 ** (0.0386)
PCGDP	0.0804 ** (0.0386)
PCGDPGR	-0.0283 *** (0.0031)
UR	0.0067 (0.0050)
NWP	1.3501 ** (0.5470)
GGCGD	0.0175 (0.0222)
OPEN	0.0751 (0.0549)
INFL	0.0233 *** (0.0024)
POL_GLOB	-0.0050 *** (0.0012)
POL_CONSTR	-4.6811 *** (0.5161)
DEMOCRACY	0.0543 * (0.0284)
GOV_FRACT	0.6678 *** (0.1037)
Component 2	
Constant	2.8321 *** (0.0016)
PCGDP	0.1610 *** (0.0001)
PCGDPGR	-0.0096 *** (0.0000)
UR	0.0023 *** (0.0000)
NWP	0.0710 *** (0.0013)
GGCGD	0.1428 *** (0.0000)
OPEN	0.1007 *** (0.0000)
INFL	0.0002 *** (0.0000)
POL_GLOB	-0.0035 *** (0.0000)
POL_CONSTR	-0.9511 *** (0.0008)
DEMOCRACY	0.0188 *** (0.0000)
GOV_FRACT	0.0889 *** (0.0002)
Component 3	
Constant	1.8658 *** (0.3284)
PCGDP	0.1193 *** (0.0331)
PCGDPGR	-0.0110 *** (0.0034)
UR	0.0089 *** (0.0025)
NWP	1.2667 *** (0.2707)
GGCGD	0.1018 *** (0.0092)
OPEN	0.0489 *** (0.0159)
INFL	0.0038 *** (0.0010)
POL_GLOB	-0.0013 ** (0.0006)
POL_CONSTR	-0.0927 (0.1597)
DEMOCRACY	0.0207 *** (0.0061)
GOV_FRACT	0.1347 *** (0.0402)
Component 4	
Constant	1.5019 *** (0.0468)
PCGDP	0.1721 *** (0.0054)
PCGDPGR	-0.0051 *** (0.0005)
UR	0.0022 *** (0.0004)
NWP	1.0221 *** (0.0870)
GGCGD	0.1162 *** (0.0026)
OPEN	0.0217 *** (0.0017)
INFL	0.0040 *** (0.0003)
POL_GLOB	-0.0004 *** (0.0001)
POL_CONSTR	-0.3773 *** (0.0294)
DEMOCRACY	0.0160 *** (0.0006)
GOV_FRACT	0.1703 *** (0.0048)

Notes: Robust SE in parentheses. For the diagnostic tests, P-Values are reported. $*** p < 0.01$, $** p < 0.05$, and $* p < 0.1$

Table 8: Finite Mixture Model (Continued)

N	404
Wald	101090.31 (0.0000)
σ_1	0.0916 (0.0094)
σ_2	0.0001 (0.0000)
σ_3	0.0404 (0.0045)
σ_4	0.0044 (0.0006)

Average posterior probabilities				
Mean	Location 1	Location 2	Location 3	Location 4
Probability 1	0.970	0.000	0.030	0.000
Probability 2	0.003	0.962	0.028	0.007
Probability 3	0.076	0.000	0.908	0.016
Probability 4	0.040	0.000	0.167	0.793

Notes: Robust SE in parentheses. For the diagnostic tests, P-Values are reported. $*** p < 0.01$, $** p < 0.05$, and $* p < 0.1$

Table 9: Penalized likelihood criteria

K	2	3	4
l	229.356	378.714	450.062
AIC	-404.712	-675.428	-790.123
BIC	-296.674	-511.370	-570.045
Sample size adjusted BIC	-382.348	-641.468	-744.567
Entropy	0.715	0.772	0.858

Notes: K: number of components; l: log-likelihood.

Table 10 – Countries clusters: FMM panel estimates

Group 1	Group 2	Group 3	Group 4
Bulgaria, Cyprus, Estonia, Greece, Italy, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia, Spain	Iceland, Ireland, Norway, Sweden, UK	Austria, Czech Republic, Denmark, Finland, Germany, Hungary, Slovenia, Switzerland	Belgium, France, Luxembourg, the Netherlands

Figure 1: Social expenditure and per capita GDP growth rate in Europe (2011)
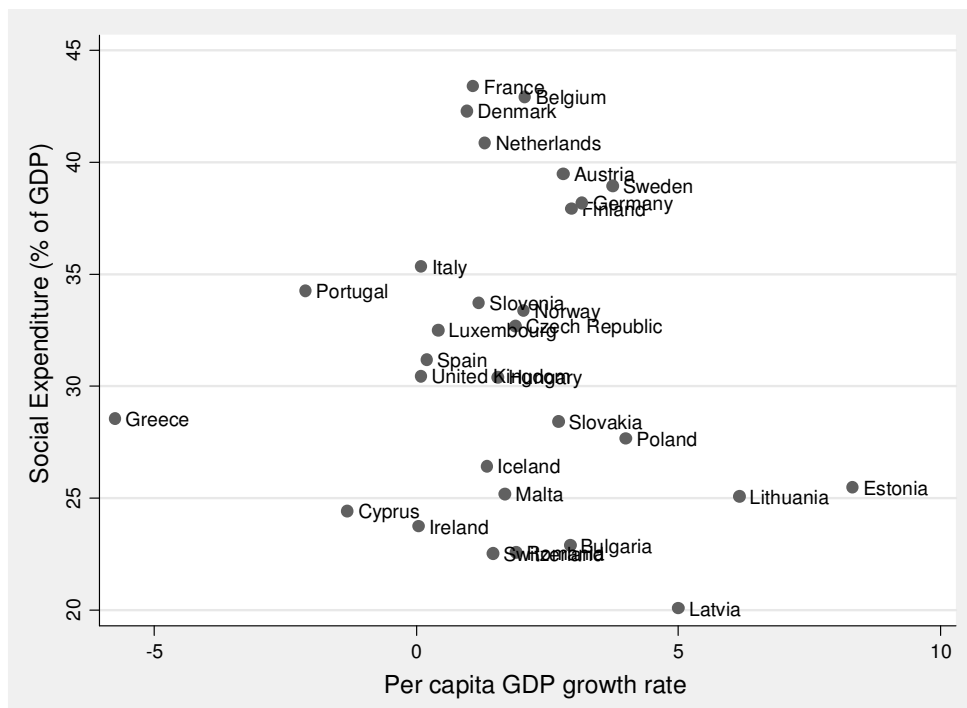
4. CONCLUSIONS AND POLICY IMPLICATIONS

In this paper, we used panel methodologies to estimate the impact of several political variables on social expenditure in 30 European countries during the years 1970-2011. Empirical results show that a relatively simple model focusing on a key group of variables can explain the dynamic of real social expenditure. With both static and dynamic panel data methods, it was found that the real per capita GDP growth, unemployment rate, general government consolidated gross debt, and openness to trade have a direct impact on real social expenditure. Moreover, the fragmentation of party systems as well as the political globalization significantly affects the social expenditure/GDP ratio, while the effect of democracy is questionable, since this variable is statistically significant only when static estimators are applied.

The income elasticity is of -0.44 to -0.66 as for the dynamic models, in line with previous researches. More specifically, our empirical results suggest that higher growth is associated with less expenditure, casting doubt on the validity of the Wagner's law. In fact, Granger causality analysis reveals mixed results, and only four countries of our sample exhibit a unidirectional flow running from economic growth rate to social expenditure (Magazzino, 2012a, 2012b).

Finally, mixture models highlighted the presence of four different clusters in our sample on the basis of government size, welfare state, monetary regime, as well as historical and geographical factors. Overall, we contribute to the existing literature by demonstrating that political factors have a considerable effect on social expenditure. Never the less, like previous studies, our findings are sensitive to sample composition.

Suggestions for future research

Future research may investigate the convergence process amongst cluster of countries. In particular, β and σ-convergence measures might be tested, making comparisons with analogous studies for this area.

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