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SOCIAL EXPENDITURE FUNCTIONS, INCLUSIVENESS AND WELL-BEING IN EUROPE: AN EXPLORATIVE ANALYSIS

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Abstract

We illustrate an empirical analysis carried out for 22 European countries over the period 2008-2019 of the relationships between a set of socio-economic indicators and social protection expenditure functions. The empirical evidence suggests that expenditure targeting is relevant in the implementation of social policy objectives. Furthermore, non-linear relationships emerge between expenditure functions and performance indicators. Finally, results might suggest the relevance of the socio-cultural dimension as a determinant of the effectiveness of social policies.

JEL Classification: I31, I38

Keywords: social protection systems, compensation policies, social investments, social expenditure functions, socioeconomic indicators

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1. Introduction

In the last decades, many European national welfare systems have experienced a change in the implementation of social policies moving from extensive passive (or compensatory) policies (such as redistributive and insurance schemes)[1] to active or social investment policies (Bouget et al., 2015, p. 4; Palier, 2013) in response to new economic and social needs (Hemerijck 2014). Specifically, at the European level, the monitoring scoreboard of the European Pillar of Social Rights places special emphasis on the role of social policies both in human capital formation and in contrasting social exclusion. Against this background, many empirical analyses investigate the relationship between social policies and socioeconomic outcomes as economic growth (Cammeraat, 2020; Arjona, Ladaique and Pearson, 2004), the reduction of poverty and inequality, (Moene and Wallerstein, 2001; Cammeraat, 2020), and inclusive development (Woldegiorgis, 2022). Furthermore, a large stream of literature analyses empirically the nexus between social policies and political and cultural aspects (Mewes, 2024); Bell et al., 2023).

Lying its foundations within this stream of literature, this paper empirically explores the relationship between social expenditure functions and a selection of socio-economic indicators of macroeconomic inclusiveness and of individual well-being. We proceed as follows. Section 2 presents data and methodology, section 3 illustrates the results of the analysis, and section 4 concludes the paper.

2. Data and methodology

We use Eurostat and OECD data covering 22 European countries over the time 2007-2019. Table 1A (see Appendix) provides a brief statistical description of the variables included in the empirical analysis. We consider the following dependent variables: the harmonized unemployment rate (HRU), the Gini coefficient (INQ), the AROP (POV), the household median income (MFI) and the life expectancy at birth (LEX). The explanatory variables are the social protection expenditure functions measured in percentage points of GDP. All variables have been rescaled and taken in logs. Tables A1, A2 and A3 present the description of all variables and the summary statistics (see Appendix).

We follow a two-stage approach. In the first step we identify through a backward selection the lagged expenditure chapters and their polynomial terms of higher order that produce significatively non-null effects on the dependent variables and that, therefore, will be used in the second step of the regression. Then, in the second step, the significance of socio-economic and demographic controls for

[1] Massive compensatory policies characterised above all the period 1945-1975.

each outcome is also identified.

This procedure allows us to estimate parsimonious models that, among other things, may limit the risk of multicollinearity. Furthermore, we cope with reverse causality and the risk of endogeneity by lagging the covariates. Also, we test for the most effective delays and for non-linearities in the effectiveness of social expenditure. Finally, in each model we use the lagged values of all the dependent variables but that one explained in the regression model to control for the heterogeneity of the national contexts.

Analytically, we estimate the following equations in the first step:

$$y_{it} = \alpha + \sum_{k=1}^{9} \beta_k socx_{k,\, i(t-1)} + \varepsilon_{it},$$

$$y_{it} = \alpha + \sum_{j=1}^{5} \beta_{kj}\, socx_{k,i(t-j)} + \varepsilon_{it},$$

$$y_{it} = \alpha + \sum_{m=1}^{3} \beta_{km}\, socx_{k,i(t-j)}^{m} + \varepsilon_{it},$$

and the following equations in the second step:

$$y_{it} = \alpha + \sum_{\bar{m}} \beta_{k\bar{m}} socx_{k,i(t-j)}^{\bar{m}} + \sum_{p=1}^{5} \gamma_p X_{p,\, i(t-1)} + \varepsilon_{it},$$

$$y_{it} = \alpha + \sum_{\bar{m}} \beta_{k\bar{m}} socx_{k,\, i(t-j)}^{\bar{m}} + \sum_{\bar{p}} \gamma_{\bar{p}} X_{\bar{p},\, i(t-1)} + \varepsilon_{it},$$

where y_{it} is the dependent variable (alternatively, HRU_{it}, INQ_{it}, POV_{it}, MFI_{it}, LEX_{it}), $socx_{k,\, i(t-1)}$ is the vector of social expenditure chapters aggregated by function ($ALMP_{i(t-1)}$, $FAMI_{i(t-1)}$, $HEAL_{i(t-1)}$, $INCP_{i(t-1)}$, $OLDG_{i(t-1)}$, $REDS_{i(t-1)}$, $SURV_{i(t-1)}$, $UNMP_{i(t-1)}$) with i = 1, ..., 22 identifying the 22 European countries included in the panel, j = 1, ..., 5 identifying the lags, k = 1, ... , 9 identifying the social expenditure chapters by function, t = 2008, ... , 2017 identifying the years, m identifying the power of the polynomial term and X identifying a vector of p countries' socio-economic and demographics controls. The overmarked parameters indicate the selection used in subsequent regressions following the first exploration.

The second stage of our analysis is based on alternative econometric approaches to test the robustness of the estimates. First, we start by estimating a *pooled* OLS model with robust standard errors. Further robustness checks are implemented by estimating a variable coefficient model (VCM) to cope with the instability of the pooled regression coefficients and a feasible generalized least squares (FGLS) model to account for heteroskedasticity. Finally, we use the System-GMM model to assess whether the persistence of the dependent variable may crowd out the effects either of the social expenditure chapters, either of the controls on the macroeconomic and people-centered outcomes.

3. Results

In this section we briefly illustrate the results of the empirical analysis. We first comment the results of the standard models (OLS, VC, FGLS) focusing on the covariates representing policy variables (social expenditure chapters). Then, we briefly comment of SYS-GMM models.

The effects of social expenditure on the indicators of inclusiveness of the macroeconomic system are shown in tables 1, 2 and 3. The empirical strategy points out a quadratic relationship (negative, being most of the observations on the left branch of the parabola) between the harmonized rate of unemployment (HRU) and the lagged values of social expenditure for cash and in kind policies supporting households (FAMI) and a positive and significant relationship with lagged values of social expenditure to support income of the unemployed (UNMP), highlighting a potential disincentive effect to work of the subsidy (Table 1).

Table 1. Unemployment rate (dependent variable)

HRU	**Pooled**		**VC**		**FGLS**		**SYS-GMM**	
(Intercept)	-0.40527		-0.444946	**	-0.202609	**		
	(0.35449)		(0.202430)		(0.078834)			
$HRU_{(t-1)}$							0.936238	***
							(0.028813)	
$FAMI_{(t-1)}$	-8.73361	***	-7.969559	***	-6.695396	***	-1.764191	*
	(2.36409)		(2.066049)		(0.775920)		(1.028413)	
$FAMI_{(t-1)}$^2	186.03213	***	166.949243	***	141.789022	***	32.957273	*
	(45.38465)		(40.455516)		(16.444558)		(20.654690)	
$UNMP_{(t-1)}$	2.33604	***	2.009518	***	2.036045	***	0.250238	
	(0.71570)		(0.249050)		(0.190969)		(0.148659)	
$POV_{(t-1)}$	0.29263	***	0.293841	***	0.253193	***	0.065994	*
	(0.10860)		(0.063511)		(0.038972)		(0.036406)	
$MFI_{(t-1)}$	-0.57720	***	-0.537420	***	-0.414425	***	0.040819	
	(0.16929)		(0.073624)		(0.044962)		(0.037209)	
$LEB_{(t-1)}$	1.01739	*	1.065934	***	0.607701	***	-0.122630	
	(0.60574)		(0.347406)		(0.141858)		(0.123588)	
adj. R2	0.6183							
m-R2			0.99754		0.61755			
Wald β							< 2.22e-16	
obs	264		264		264		264	

Also, inequality (INQ) and poverty (POV) exhibit a quadratic relationship (negative, being most of the observations on the left branch of the parabola) with the purely redistributive (assistance) social expenditure (5 years lagged values of REDS)[2] (see Tables 2 and 3). The quadratic trend also highlights that after a certain level of redistributive spending, the correlation with inequality and poverty becomes positive rising risks of opportunistic behaviours and of a

[2] Given the long time it takes for a redistributive policy to contrast inequality and poverty, that is, from the moment of approval to the moment of implementation.

potential “welfare magnet phenomenon”.

Table 2. Gini Coefficient (dependent variable)

INQ	Pooled		VC		FGLS		SYS-GMM	
(Intercept)	-0.11339	**	-0.2991	***	-0.04233			
	(-0.04927)		(0.081457)		(0.064745)			
$INQ_{(t-1)}$							0.91598	***
							(0.016339)	
$REDS_{(t-5)}$	-13.0527	***	-12.313	***	-7.71363	***	-1.26857	**
	(1.072935)		(1.286108)		(0.956569)		(0.437033)	
$REDS_{(t-5)}$^2	749.677	***	670.56	***	390.7739	***	87.3269	**
	(88.84315)		(108.8399)		(68.764)		(30.00087)	
$HRU_{(t-1)}$	0.176104	***	0.2405	***	0.145961	***	0.010562	
	(0.026619)		(0.046455)		(0.020464)		(0.011423)	
$LEB_{(t-1)}$	0.654867	***	0.7724	***	0.520709	***	0.06778	*
	(0.085448)		(0.141638)		(0.111073)		(0.030769)	
adj. R2	0.600171							
m-R2			0.99863		0.54125			
Wald β							< 2.22e-16	
obs	264		264		264		264	

Table 3. At-risk-of-poverty (AROP) rate (dependent variable)

POV	Pooled		VC		FGLS		SYS-GMM	
(Intercept)	-0.2638	*	-0.2991	***	-0.1099	*		
	(0.054058)		(0.075198)		(0.056982)			
$POV_{(t-1)}$							0.97161	***
							(0.015135)	
$REDS_{(t-5)}$	-11.451	***	-12.313	***	-7.4681	***	-0.5324	
	(1.177125)		(1.784252)		(1.027048)		(0.379024)	
$REDS_{(t-5)}$^2	570.788	***	670.564	***	383.606	***	42.42	*
	(97.47052)		(173.9484)		(77.61943)		(23.40353)	
$HRU_{(t-1)}$	0.224	***	0.24053	***	0.18778	***	-0.0062	
	(0.029204)		(0.042287)		(0.025128)		(0.015522)	
$LEB_{(t-1)}$	0.71371	***	0.77239	***	0.4371	***	0.0358	
	(0.093746)		(0.128424)		(0.09776)		(0.025854)	
adj. R2	0.58959							
m-R2			0.99863		0.53701			
Wald β							< 2.22e-16	
obs	264		264		264		264	

As regard the median household income, the estimated coefficients of all social expenditure functions are significant and of the expected sign (except spending on active labour market policies). In particular, social policies implemented through cash or in-kind benefits (FAMI, HEAL, INCP, REDS, SURV) have a significant positive effect on the median household’s income. However, more generous policies for the elderly (OLDG) comes at a cost (in terms of lower income) to households, probably due to the prevalence of pay-as-you-go pension systems in Europe (see Table 4). Finally, as expected, the individual well-being

proxied by the life expectancy at birth, is positively and significatively affected by health and old-age expenditure (lagged five years values of HEAL and OLDG) and – in two models – (surprisingly) negatively affected by incapacity-related expenditure (lagged three years values of INCP) (see Table 5).

Table 4 – Median family income (dependent variable)

MFI	**Pooled**		**VC**		**FGLS**		**SYS-GMM**	
(Intercept)	-0.03485		-0.04761	*	0.02506	*		
	(0.034713)		(0.025797)		(0.013764)			
$MFI_{(t-1)}$							0.96807	***
							(0.014466)	
$ALMP_{(t-1)}$	-3.72622	**	-5.19126	***	-1.89136	***	0.109902	
	(1.555217)							
			(1.005768)		(0.417119)		(0.104955)	
$FAMI_{(t-1)}$	2.293089	***	2.69772	***	1.518092	***	0.000134	
	(0.623616)		(0.412912)		(0.266844)		(0.05739)	
$HEAL_{(t-1)}$	1.062556	***	1.405234	***	0.626285	***	-0.02973	
	(0.385910)		(0.274771)		(0.151935)		(0.029977)	
$INCP_{(t-1)}$	1.776097	***	2.308369	***	1.461987	***	0.020832	
	(0.554426)		(0.31253)		(0.224886)		(0.047249)	
$OLDG_{(t-1)}$	-0.58986	**	-0.75941	***	-0.29075	***	-0.03397	**
	(0.250751)		(0.133249)		(0.10486)		(0.016314)	
$REDS_{(t-1)}$	6.236314	***	5.921025	***	3.122819	***	0.179573	
	(0.901449)		(0.828234)		(0.57872)		(0.127498)	
$SURV_{(t-1)}$	2.760703	***	3.356771	***	1.66046	***	0.101874	
	(0.298616)		(0.328175)		(0.372331)		(0.069395)	
$HRU_{(t-1)}$	-0.30182	***	-0.20912	*	-0.26443	***	-0.04219	***
	(0.082463)		(0.107128)		(0.033481)		(0.009153)	
$POV_{(t-1)}$	0.382433	**	0.223824	**	0.246765	***	0.007925	
	(0.154840)		(0.097232)		(0.053621)		(0.017888)	
adj. R2	0.706539							
m-R2			0.97841		0.64657			
Wald β							< 2.22e-16	
obs	264		264		264		264	

Table 5. Life expectancy at birth (dependent variable

LEB	Pooled		VC		FGLS		SYS-GMM	
(Intercept)	0.476244	***	0.468014	***	0.4984729	***		
	(0.014648)		(0.010019)		(0.0052166)			
$LEB_{(t-1)}$							0.9565772	***
							(0.0137079)	
$HEAL_{(t-5)}$	1.566726	***	1.832499	***	1.2462050	***	0.0093172	
	(0.327161)		(0.292292)		(0.1121041)		(0.0676034)	
$HEAL_{(t-5)}^2$	-11.087550	***	-13.315031	***	-8.4977934	***	-0.1026253	
	(2.694337)		(2.295605)		(0.9126922)		(0.5058844)	
$INCP_{(t-3)}$	-0.084546		-0.073966	*	-0.0688881	**	0.0045358	
	(0.109477)		(0.040157)		(0.0281605)		(0.0049673)	
$OLDG_{(t-5)}^2$	0.593641	***	0.518994	***	0.5409940	***	-0.0031240	
	(0.182140)		(0.151106)		(0.0692127)		(0.0138101)	
$HRU_{(t-1)}$	0.077072	***	0.089356	***	0.0636362	***	0.0044985	***
	(0.018825)		(0.014407)		(0.0050590)		(0.0018161)	
$INQ_{(t-1)}$	0.080152	**	0.082824	***	0.0554357	***	0.0042844	**
	(0.035454)		(0.016307)		(0.0067983)		(0.0036878)	
$MFI_{(t-1)}$	0.214142	***	0.211158	***	0.1845486	***	0.0062053	**
	(0.031071)		(0.011811)		(0.0083706)		(0.0031244)	
adj. R2	0.83262							
m-R2			0.99991		0.81491			
Wald β							< 2.22e-16	
obs	264		264		264		264	

Finally, all the SYS-GMM models run point out a marked persistence of the values assumed by the dependent variables (the coefficient of their lagged values is always statistically significant and close to one). Moreover, results point out that the persistence may attenuate the explicative power of social expenditure functions (as in the case of LEB), the relevance of the context (as in the case of HRU and INQ), or both (as in the case of MFI and POV).

4. Concluding remarks

The empirical analysis suggests, albeit within a highly differentiated framework, the existence of a European welfare model, whose effectiveness can be compared with that of national welfare systems, to identify the most appropriate scale and expenditure functions to meet citizens' needs and manage social risks. Also, it seems that at the European level social expenditure is associated with an increase in individual well-being (proxied by MFI and LEB).

Finally, at least two issues deserve further comments. First, none of the expenditure functions influences all the dependent variables included in the analysis (indeed, expenditure on housing does not directly influence any of them), and many expenditure chapters generate a mix of positive (effects of the same sign as the polarity of the index) and negative effects (effects of the

opposite sign with respect to the polarity of the index) on a subset of the dependent variables included in the analysis. Therefore, beyond a generic distinction between compensation policies and social investments, a more accurate targeting of social policies should be elaborated, as suggested also by Cammeraat (2020).

Second, empirical evidence suggests the existence of quadratic relationships among the social expenditure functions and the dependent variables. It seems that social expenditure (in its two dimensions of compensation policies and social investments) alone might not be fully effective in matching the welfare demand, due to saturation effects that might depend either on the opportunity cost related to the use of (public) financial resources, either on the implicit risk of rewarding opportunistic behaviours among the beneficiaries. This confirms the interest for other dimensions (e.g. the demographic and the socio-cultural) in order to identify additional explanatory variables or mediating/moderating factors that may amplify or complement the effectiveness of the social expenditure functions.

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Appendix

Table A1. Socioeconomic indicators (dependent variables)

Var.	Label	Description	UM	Source	P	VM
MFI	Net household income	Equivalised median net income	PPS	EUROSTAT	+	N
LEB	Life expectancy at birth	Life expectancy at birth (how long, on average, an infant can expect to live, if current mortality rates do not change)	Years	OECD Data	+	N
HUR	Unemployment rate	Harmonised unemployment rate (seasonally adjusted number of unemployed as a percentage of the labour force)	%	OECD Data	-	N
POV	Hoseholds at risk of poverty	Households at risk of poverty (threshold: 60% of median equivalised income after social transfers)	%	EUROSTAT	-	N
INQ	Gini index calculated on disposable income after taxes and transfers	Gini coefficient based on equivalent disposable income	0-100	EUROSTAT	-	No

Table A2. Social expenditure functions

Variable	Label	Description
ALMP	Active Labour Market Policies	expenditure on employment services, training, employment incentives, integration of people with disabilities, direct job creation and start-up incentives.
FAMI	Family	child allowances and credits, childcare support, income support during leave, payments for single parents
HEAL	Health	expenditure on hospital and outpatient care, medical products, prevention
HOUS	Housing	subsistence allowances and rent subsidies
INCP	Incapacity-related benefits	care services, disability benefits, benefits under occupational accident legislation, employee sickness benefits
OLDG	Old Age	pensions, early retirement, home and residential care services for the elderly
REDS	Other Social Policy	unclassified cash benefits for low-income households, and/or other social services
SURV	Survivors	pensions and funeral payments
UNMP	Unemployment	unemployment benefits, early retirement due to labour market needs

N.B. Data extracted from the OECD SOCX database and measured in percentage points of GDP

Table A3. Summary statistics

	n	mean	sd	median	min	max	skew	kurt
ALMP	264	0.64	0.39	0.59	0.07	2.04	1.46	2.99
FAMI	264	2.41	0.83	2.54	0.86	4.06	-0.04	-1.30
HEAL	264	6.38	1.33	6.32	4.21	9.52	0.39	-0.54
HOUS	264	0.33	0.36	0.16	0.00	1.71	1.62	2.80
INCP	264	2.79	1.18	2.34	1.27	6.30	1.18	0.67
OLDG	264	9.06	2.57	8.94	3.12	14.79	0.20	-0.52
REDS	264	0.47	0.38	0.38	0.00	1.64	0.92	0.11
SURV	264	1.21	0.82	1.29	0.03	2.82	0.08	-1.28
UNMP	264	0.98	0.78	0.83	0.00	3.58	1.33	1.61
MFI	264	16352.03	5554.73	16997.50	6597.00	29600.00	0.13	-0.63
LEB	264	80.25	2.22	80.98	73.70	83.83	-1.05	0.30
HRU	264	8.64	4.76	7.53	2.02	27.82	1.79	3.49
POV	264	15.27	3.30	14.95	8.60	23.10	0.33	-0.59
INQ	264	28.66	3.40	28.20	20.90	35.80	0.18	-1.05

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