

# The Relationship Between Social Expenditure Schemes and Inequality, Poverty, Life-Expectancy and Economic Growth

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# Brief overview

- We study the relation between social expenditure schemes and poverty, inequality, life-expectancy and economic growth
- We employ OLS and 2SLS regression models with the social expenditure variables in period (t-2) as instruments
- Main findings:
  - A negative relation between total social expenditure and poverty and inequality, a positive relation with life-expectancy and no significant relation with growth
  - The relations differ substantially over expenditure types
- Policy implications
  - No trade-off between GDP growth on the one hand and poverty, inequality and life-expectancy on the other hand
  - It is possible to target more accurately

# Rationales for social protection

- Risk aversion and risk-taking
  - Risk averse nature of humans → protection creates value
  - Moral hazard
  - Positive effects of risk-taking
- Market failure by asymmetric information
  - Adverse selection
- Unrealized potential of the poor
  - Increase demand for health and education
  - Increase rationality (cognitive capacity)
- Positive externalities
  - Criminality
  - Interdependent utility curves

# Mechanisms

- Poverty and inequality
  - Largest part of social expenditure goes to the lower income
- Life expectancy
  - Inequality and poverty have a negative effect on life expectancy
- GDP growth
  - Capital accumulation
  - Human capital accumulation
  - Labor supply
  - Innovation
  - Aggregate demand
- The behavioral effects can be explained for a large part by the specific features of the social expenditure system.

# Empirical Literature

- Social expenditure and GDP growth (+/—)
  - Barro (1996), Baldacci et al (2008) and Cingano (2014)
- Social expenditure and inequality (—) and poverty (—)
  - Smeeding and Phillips (2001), Chen and Corak (2005), Caminda and Goudswaard (2009), Wang et al. (2012)
- Social expenditure and life-expectancy (+)
  - Wilkinson (1992)

# Endogeneity

- Possible problem: reverse causality/simultaneity
- Solution: social expenditure (t-1) / TSLS model with social expenditure (t-2) as instrument
- We expect conservative estimates for poverty, inequality and growth if:
  - Positive serial correlation between dependent variables in period t and period (t-1)
  - Positive effect of poverty and inequality on social expenditure
  - Negative effect of growth on social expenditure (denominator effect and business cycle effect)
- Overestimation of effect on life-expectancy if life-expectancy causes higher social expenditure

# Empirical specification

$$y_{it} = \alpha_t + \beta_i + X'_{it}\nu_x + \gamma_i SE_{it} + \epsilon_{it}. \quad (1)$$

$$SE_{it} = \alpha_t + \beta_i + \delta SE_{it-2} + X'_{it}\nu_x + \mu_{it} \quad (2)$$

- $y_{it}$  = growth, inequality, poverty and life-expectancy
- $\alpha_t$  = year fixed effects
- $\beta_i$  = country fixed effects
- $X'_{it}$  = economic and demographic controls
- $SE_{it}$  = social expenditure
- $SE_{it-2}$  = social expenditure in period t-2
- $\epsilon_{it}$  = error term

# Data

- 35 OECD countries from 1990-2012 (SOCX OECD)
- Dependent variables:
  - Poverty (50% PL), gini for inequality, life expectancy (at birth) , GDP growth
- Explanatory variables:
  - 1) public and mandatory private total social expenditure
  - 2) expenditure on old age, survivor, incapacity, ALMPs, unemployment, health, family, housing, others
- Control variables:
  - capital formaton growth, education (share population with tertiary education), GDP per capita, unemployment rate, export growth, inflation, old age dependency ratio, population 15-65



# Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max	Obs
Poverty	10.58	4.38	3.20	22.00	374
Gini	0.31	0.06	0.21	0.52	374
Life expectancy	77.36	3.20	66.80	83.20	791
GDP growth	2.07	3.30	-14.55	13.33	788
Total social expenditure	19.56	6.06	2.88	34.65	764
Old age	6.76	2.67	0.38	15.06	763
Survivor	0.99	0.72	0.01	2.88	763
Incapacity	2.49	1.44	0.02	6.92	763
ALMPs	0.53	0.46	0	2.71	767
Unemployment	0.96	0.83	0	4.64	740
Health	5.21	1.46	0	8.50	773
Family	1.91	1.03	0.03	4.45	764
Housing	0.33	0.34	0	1.67	726
Others	0.46	0.48	0	3.62	763

Descriptive statistics: dependent and explanatory variables 1990-2012

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# Results: total social expenditure and poverty

	(1)	(2)	(3)	(4)	(5)
<b>Total social expenditure (t-1)</b>	<b>-0.216***</b> (0.035)	-0.215*** (0.040)	-0.330*** (0.054)	-0.334*** (0.048)	
Total Social expenditure					-0.425*** (0.062)
Capital formation growth (t-1)			-0.008 (0.007)		
Education (t-1)			-0.074*** (0.029)	-0.077*** (0.026)	-0.089*** (0.028)
Unemployment rate		0.053* (0.029)	0.081** (0.032)	0.061** (0.029)	0.065** (0.030)
GDP per capita		0.043 (0.032)	0.030 (0.049)		
Export growth			-0.001 (0.012)		
Inflation			0.030 (0.041)		
Left-wing government (t-1)			-0.003 (0.002)		
Population 15-65			-0.029 (0.135)		
Old age dependency ratio			0.086 (0.083)		
GDP growth			0.032 (0.030)	0.020 (0.024)	-0.049* (0.026)
Observations	355	346	264	298	297
R-squared	0.267	0.303	0.389	0.323	0.296
Number of countries	35	34	27	32	32
Method	OLS	OLS	2SLS	2SLS	2SLS

We controlled for country and year fixed effects in all empirical specifications. Total (t-2) is our instrument in the 2SLS models. \* denotes significant at the 10% level, \*\* at the 5% level and \*\*\* at the 1% level.

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Observations	355	346	264	298	297
R-squared	0.267	0.303	0.389	0.323	0.296
Number of countries	35	34	27	32	32
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# Results: total social expenditure and inequality

	(1)	(2)	(3)	(4)	(5)
Total social expenditure (t-1)	-0.0028*** (0.0004)	-0.0032*** (0.0005)	-0.0040*** (0.0007)	-0.0035*** (0.0005)	
<b>Total social expenditure</b>					<b>-0.0045*** (0.0007)</b>
Capital formation growth (t-1)			0.0002 (0.0001)	0.0002** (0.0001)	0.0002** (0.0001)
Education (t-1)			0.0001 (0.0004)		
Unemployment rate		0.0011*** (0.0004)	0.002*** (0.0004)	0.0018*** (0.0004)	0.0019*** (0.0004)
GDP per capita		0.0009** (0.0004)	-0.0007 (0.0006)		
Export growth			0.0001 (0.0002)		
Inflation			0.001* (0.0005)		
Left-wing government (t-1)			-0.0001** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)
Population 15-65			-0.0013 (0.0017)	-0.0016* (0.0008)	-0.0016* (0.0009)
Old age dependency ratio			-0.0001 (0.0011)		
GDP growth			0.0011*** (0.0004)	0.0006** (0.0003)	-0.0001 (0.0003)
Observations	355	346	264	305	305
R-squared	0.3375	0.3623	0.4730	0.4587	0.4252
Number of countries	35	34	27	29	29
Method	OLS	OLS	2SLS	2SLS	2SLS

We controlled for country and year fixed effects in all empirical specifications. Total (t-2) is our instrument in the 2SLS models. \* denotes significant at the 10% level, \*\* at the 5% level and \*\*\* at the 1% level.



# Results: total social expenditure and life expectancy

	(1)	(2)	(3)	(4)	(5)
Total social expenditure (t-1)	0.058*** (0.010)	0.061*** (0.011)	0.083*** (0.014)	0.101*** (0.014)	
<b>Total social expenditure</b>					<b>0.127*** (0.018)</b>
Time trend	0.235*** (0.006)	0.208*** (0.008)	0.017 (0.089)	-0.037 (0.089)	-0.030 (0.094)
Capital formation growth (t-1)			-0.001 (0.003)		
Education (t-1)			0.028*** (0.009)	0.059*** (0.008)	0.054*** (0.009)
Unemployment rate		0.021** (0.009)	-0.002 (0.010)		
GDP per capita		0.044*** (0.008)	0.073*** (0.014)	0.103*** (0.012)	0.110*** (0.013)
Export growth			-0.001 (0.004)		
Inflation			-0.015 (0.011)	-0.023*** (0.003)	-0.020*** (0.003)
Left-wing government (t-1)			0.001 (0.001)		
Population 15-65			-0.021 (0.036)		
Old age dependency ratio			0.041* (0.023)	0.101*** (0.016)	0.095*** (0.017)
GDP growth			-0.025** (0.010)	-0.030*** (0.008)	-0.009 (0.009)
Observations	724	708	415	475	474
R-squared	0.927	0.931	0.954	0.948	0.943
Number of countries	35	34	27	32	32
Method	OLS	OLS	2SLS	2SLS	2SLS

We controlled for country and year fixed effects in all empirical specifications. Total (t-2) is our instrument in the 2SLS models. \* denotes significant at the 10% level, \*\* at the 5% level and \*\*\* at the 1% level.

# Results: total social expenditure and economic growth

	(1)	(2)	(3)	(4)	(5)
Total social expenditure (t-1)	-0.058 (0.051)	0.051 (0.067)	0.073 (0.068)	0.086 (0.065)	
<b>Total social expenditure</b>					<b>0.108</b> (0.084)
Capital formation growth (t-1)		0.08*** (0.013)	0.093*** (0.012)	0.055*** (0.009)	0.057*** (0.010)
Education (t-1)		-0.062 (0.046)	0.028 (0.043)		
Unemployment rate		-0.125** (0.052)	-0.16*** (0.049)	-0.228*** (0.044)	-0.232*** (0.047)
GDP per capita			0.096 (0.068)		
Export growth			0.169*** (0.018)	0.167*** (0.016)	0.169*** (0.016)
Inflation			-0.201*** (0.053)	-0.091*** (0.025)	-0.092*** (0.025)
Left-wing government (t-1)			-0.001 (0.003)		
Population 15-65			-0.115 (0.174)	0.178* (0.103)	0.163 (0.106)
Old age dependency ratio			0.137 (0.112)	0.167** (0.071)	0.157** (0.073)
Observations	730	478	417	640	639
R-squared	0.418	0.601	0.729	0.625	0.613
Number of countries	35	32	27	32	32
Method	OLS	OLS	2SLS	2SLS	2SLS

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# Results: different expenditure types

	Poverty	Gini	Life expectancy	GDP growth
Total social expenditure	-0.425*** (0.062)	-0.0045*** (0.0007)	0.127*** (0.018)	0.108 (0.084)
Old age expenditure	-0.514** (0.206)	-0.0032 (0.0019)	0.278*** (0.048)	0.216 (0.140)
Survivor expenditure	0.495* (0.294)	-0.0038 (0.0034)	0.026 (0.088)	-0.869*** (0.320)
Incapacity expenditure	-0.765*** (0.263)	-0.0034 (0.0029)	0.233*** (0.061)	0.353 (0.237)
Health expenditure	-1.056*** (0.213)	-0.0086*** (0.0022)	0.244*** (0.069)	-0.114 (0.235)
Family expenditure	-2.631*** (0.433)	-0.0215*** (0.0038)	0.340*** (0.108)	-0.110 (0.323)
ALMPs expenditure	-2.989*** (0.581)	-0.0277*** (0.0070)	0.743*** (0.162)	-0.318 (0.585)
Unemployment expenditure	-1.773*** (0.323)	-0.0139*** (0.0037)	0.469*** (0.089)	1.812*** (0.456)
Housing expenditure	-1.580*** (0.575)	-0.0222*** (0.0078)	-0.637*** (0.227)	1.379** (0.673)
Other social expenditure	-1.710*** (0.599)	-0.0144** (0.0068)	0.288 (0.189)	0.787 (0.723)
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Family expenditure	-2.631*** (0.433)	-0.0215*** (0.0038)	0.340*** (0.108)	-0.110 (0.323)
ALMPs expenditure	-2.989*** (0.581)	-0.0277*** (0.0070)	0.743*** (0.162)	-0.318 (0.585)
<b>Unemployment expenditure</b>	-1.773*** (0.323)	-0.0139*** (0.0037)	0.469*** (0.089)	<b>1.812***</b> (0.456)
<b>Housing expenditure</b>	-1.580*** (0.575)	-0.0222*** (0.0078)	-0.637*** (0.227)	<b>1.379**</b> (0.673)
Other social expenditure	-1.710*** (0.599)	-0.0144** (0.0068)	0.288 (0.189)	0.787 (0.723)
Method	2SLS	2SLS	2SLS	2SLS
Number of countries	32	29	32	32

We controlled for country and year fixed effects in all empirical specifications. Total (t-2) is our instrument in the 2SLS models. \* denotes significant at the 10% level, \*\* at the 5% level and \*\*\* at the 1% level.

# Robustness Checks

- Net total social expenditure
- Different expenditure types in one model

# Results: Net total social expenditure

	Poverty	Gini	Life expectancy	GDP growth
<b>Net total social expenditure</b>	<b>-0.477***</b>	<b>-0.0050***</b>	<b>0.092**</b>	<b>0.187</b>
	(0.144)	(0.0018)	(0.037)	(0.209)
Capital formation growth (t-1)		0.0004*		0.026
		(0.0002)		(0.019)
Education (t-1)	-0.113**		0.107***	
	(0.045)		(0.015)	
GDP per capita			0.070***	
			(0.024)	
Unemployment rate	0.075	0.0032***		-0.187*
	(0.063)	(0.0009)		(0.101)
Export growth				0.172***
				(0.026)
Inflation			-0.009	-0.290***
			(0.023)	(0.101)
Left-wing government (t-1)		-0.0000		
		(0.0000)		
Population 15-65		-0.0016		0.114
		(0.0017)		(0.267)
Old age dependency ratio			0.183***	0.267*
			(0.030)	(0.151)
GDP growth	-0.051	-0.0002	-0.017	
	(0.040)	(0.0006)	(0.017)	
time trend			0.070***	
			(0.021)	
Observations	102	107	142	176
R-squared	0.456	0.4310	0.947	0.801
Number of countries	23	23	25	25
Method	2SLS	2SLS	2SLS	2SLS

We controlled for country and year fixed effects in all empirical specifications. Total (t-2) is our instrument in the 2SLS models. \* denotes significant at the 10% level, \*\* at the 5% level and \*\*\* at the 1% level.



# Results: different expenditure types in one model

	Poverty	Gini	Life expectancy	GDP growth
Oldage (t-1)	-0.102 (0.101)	-0.003** (0.001)	0.143*** (0.030)	0.084 (0.110)
Survivor (t-1)	0.611*** (0.185)	-0.004 (0.003)	-0.093 (0.061)	<b>-0.522*</b> (0.282)
Incapacity (t-1)	-0.245 (0.229)	0.004 (0.003)	0.068 (0.044)	0.181 (0.201)
Health (t-1)	-0.417** (0.165)	-0.004** (0.002)	-0.113** (0.048)	-0.370** (0.187)
Family (t-1)	<b>-0.820***</b> (0.241)	<b>-0.013***</b> (0.003)	0.115* (0.069)	-0.426 (0.271)
ALMPS (t-1)	<b>-0.451</b> (0.374)	<b>0.003</b> (0.004)	<b>0.279***</b> (0.103)	-0.582 (0.448)
Unemployment (t-1)	<b>-0.500**</b> (0.213)	-0.006** (0.002)	<b>0.080</b> (0.059)	<b>0.636**</b> (0.275)
Housing (t-1)	-0.383 (0.509)	<b>-0.011*</b> (0.007)	<b>-0.078</b> (0.175)	<b>1.535**</b> (0.619)
Others (t-1)	-0.432 (0.343)	-0.003 (0.004)	0.014 (0.119)	0.717 (0.548)
Observations	284	311	442	603
R-squared	0.461	0.542	0.960	0.682
Number of countries	30	29	30	30
Method	OLS	OLS	OLS	OLS

We controlled for country and year fixed effects in all empirical specifications. Total (t-2) is our instrument in the 2SLS models. \* denotes significant at the 10% level, \*\* at the 5% level and \*\*\* at the 1% level.

# Conclusions

- Main findings:
  - A negative relation between total social expenditure and poverty and inequality, a positive relation with life-expectancy and no significant relation with growth
  - The relations differ substantially over expenditure types
- Policy implications
  - No trade-off between GDP growth and poverty, inequality and life-expectancy
  - More accurate targeting possible:
    - Poverty: family and unemployment
    - Inequality: family and housing
    - Life expectancy: ALMPs
    - Growth: unemployment and housing