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International Center for Public Policy
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The Determinants of Social Protection Expenditures and Labor Market Flexibility

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Abstract:

This paper examines the determinants of social protection expenditures empirically focusing on the influence of labor market flexibility. Using data on 55 developed and developing countries, and fixed and random effects models to account for country specific effects, the paper finds that the perception that labor market flexibility would increase demand for social expenditures is unfounded. Among the labor market flexibility indicators, linking pay to productivity reduces social protection expenditures. This result is robust to the inclusion of unemployment rate and the degree of income inequality as two social protection risks in the empirical model. It is also robust to the inclusion of more risks, proxied by the Human Development Index. Given the large country sample adopted, the paper improves our understanding of the most important determinants of social protection expenditures, and highlights the importance of labor market flexibility to government expenditure policy.

Keywords: Social protection; labor market flexibility; government expenditures; unemployment; income inequality.

JEL: H53; J28; J38; J58

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The Determinants of Social Protection Expenditures and Labor Market Flexibility

1. Introduction

Social protection consists of "policies and programmes that are designed to reduce the incidence of poverty; limit the exposure of risks such as unemployment, sickness, and disability; and smoothen consumption throughout the economic lifecycle" (Asher and Zen 2015, p1). It includes a) social insurance programs, which protect workers from income loss associated with unemployment, illness, accidents, disability or old age, b) income transfer programs, which protect families against poverty, and c) ear-marked transfers such as those provided by housing or health programs (Ganßmann 2000).

The degree of social protection influences labor market flexibility. Labor market flexibility encompasses wage, numerical, working times and skills flexibility (Ganßmann 2000; OECD 1994). Flexibility induces labor competition and productivity, and reduces unemployment. Ganßmann (2000) posits that by protecting workers from unemployment risks state-organized social protection reduces labor market flexibility. In particular, unemployment benefits, which are one aspect of social protection, may reduce wage flexibility and labor skills. The higher the level of unemployment benefits and the longer they last, the less flexible unemployed workers become and the less likely they will become employed. Thus state-organized social protection reduces labor market flexibility and increases unemployment.

It is possible however to have a reverse view of the social protection-labor market flexibility nexus, in which flexible labor markets reduce firing costs, increases unemployment, and the demand for social protection, in particular unemployment insurance. Besides reducing firing costs, labor market flexibility may reduce hiring costs, which increase labor force participation rates (Cook et al. 2008). However, because of the informal nature of jobs in developing countries in particular, workers get poorly paid and trapped in poverty. Therefore by lower hiring costs, in presence of segmented labor market structure, labor market flexibility may increase the demand for social protection. Labor market flexibility thus influences the degree of social protection.

This paper contributes to the literature on social protection by empirically examining its determinants focusing on the influence labor market flexibility exerts. This is the paper's first contribution. The influence of labor market flexibility on social protection has gone largely uninvestigated empirically in the scant social protection literature. To the best of our knowledge the literature has been mostly qualitative.

In the few empirical studies on social protection, Beblavy (2010) argues that structural factors and policy choices determine the level of social spending. Accordingly, he examines the drivers of social protection expenditures in 27 European Union member states in 2006 and finds that unemployment and employment rates, old age dependency ratio, and GDP per capita explain more than 50 percent of the variation in social expenditures. In East Asian countries, namely South Korea, Japan and Taiwan, Hong (2014) finds modernization and economic development to be determinants of social

expenditures growth. Explaining social services expenditures in Sri Lanka in the period 1970-2010, Sepalika et al. (2014) include per capita income, population growth, industrialization, trade openness, FDI, inequality, tax burden, direct tax revenue, budget deficit, and the behavior of bureaucrat. They find that inequality increases social services expenditures, while population growth, industrialization and tax revenues reduce them.

The second contribution of this paper is its examination of social protection determinants using a larger sample size than the (28) European Union member states of Beblavy (2010) and the (three) East Asian countries (South Korea, Japan and Taiwan) of Hong (2014). Our dataset covers 54 developed and developing countries from different regions on which social protection and labor market flexibility data are available.[3] The use of small samples in the literature does not allow for the degree of social protection heterogeneity among countries.

The paper proceeds as follows. Section 2 discusses the empirical model specification. Section 3 presents and discusses the empirical results. Section 4 discusses the robustness checks, while section 5 concludes.

2. Empirical model

Empirical model specification builds on the research by Sepalika et al. (2014), Hong (2014) and Beblavy (2010). Sepalika et al. (2014) distinguish between demand- and supply-side of government size, which is related to the level of government services. The demand side builds on Wagner's law and the compensation and median voter theories.[4] The supply side builds on fiscal illusion and bureaucratic theories.[5] In contrast Beblavy (2010) uses demand side determinants.[6] Hong (2014) examines the determinants of social expenditures building on the modernization, globalization and power resources theories.[7]

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[3] Sample countries include Albania, Australia, Austria, Azerbaijan, Belgium, Bolivia, Bulgaria, China (Mainland), China (Hong Kong), Croatia, Cyprus, Czech Republic, Denmark, Egypt, El Salvador, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Ireland, Israel, Italy, Japan, Kazakhstan, Korea, Kuwait, Latvia, Lithuania, Luxembourg, Malta, Mongolia, Netherlands, New Zealand, Norway, Poland, Portugal, Russia, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sweden, Switzerland, Thailand, Tunisia, Turkey, UAE, Ukraine, United Kingdom, and Yemen.

[4] On the demand side for social protection, they include per capita income, industrialization, population growth, globalization factors, income inequality and the demand for income redistribution.

[5] On the supply side, they include tax burden, direct tax revenue, and budget deficit to capture fiscal illusion and the size of bureaucrats.

[6] He uses economic and social determinants, including GDP per capita, old age dependency ratio, and the employment and unemployment rates.

[7] She explains public social expenditure (percentage of GDP) in terms of unemployment, GDP growth, agriculture employment, government expenditure, democracy indicator, the extent to which the executive branch and legislature is left, trade openness, and global crisis dummies.

Modernization theory posits that social expenditures are associated with informal unemployment, which in turn is related to economic backwardness and under-development (Williams 2014; Williams and Windebank 2015). The power resources theory asserts the importance of political organization, namely labor unions and political parties, to distributional outcomes (Korpi 1983; Moller et al. 2003).[8]

Our empirical model focuses on the economic determinants of social protection and is thus expressed as:

$$SP_{it} = B_0 + B_1\, PCGDP_{it} + B_2\, GROWTH_{it} + B_3\, DEPENDENCY_{it} + B_4\, GOVCONS_{it} + B_5\, TRADE_{it} + B_6\, LABOR_{it} + e_{it}$$

where *SP* is the degree of social protection expenditures (SPE). It is measured in terms of general government SPE as a percentage of gross domestic product. Government social protection expenditures, according to the International Monetary Fund's (2014) Government Finance Statistics manual, include a) expenditure on services and transfers provided to individual persons and households and b) expenditure on services provided on a collective basis.[9] The former are allocated to risks and needs, which include sickness and disability, old age, survivors of deceased people, family and children, unemployment, housing, and social exclusion. The latter include expenditures on research and experimental development related to social protection, and cash benefits and benefits in kind to victims of fires, floods, earthquakes, and other peacetime disasters; purchase and storage of food, equipment, and other supplies for emergency use in the case of peacetime disaster.

PCGDP is real per capita GDP (log) to account for the demand for social services similar to Sepalika et al. (2014) and Beblavy (2010). A higher real per capita GDP suggests a higher income on average, which reduces the demand for social protection.[10] *GROWTH* is the real GDP annual growth rate. A higher growth rate offers more employment and

[8] Kellermann (2007) reviews the role of power resources theory in income inequality. His literature review shows that the strength of labor unions and left political parties are associated with larger welfare states, generous public pensions, and lower inequality and poverty (Huber and Stephens 1993; Hicks and Swank 1984; Bradley et al. 2003; Moller et al. 2003).

[9] Eurostat defines social protection expenditure as the outlay for social protection interventions. SPE consists mainly of a) social benefits, or transfers in cash or in kind, to households and individuals with the aim to relieve them of the burden of a defined set of risks or needs; b) administration costs, or costs of managing or administering the social protection scheme; and c) other miscellaneous expenditure by social protection schemes (payment of property income and other). The defined risks and needs are associated with sickness/healthcare and invalidism, disability, old age, parental responsibilities, the loss of a spouse or parent, unemployment, housing, and social exclusion. Definition is available at http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Social_protection_expenditure.

[10] A higher real per capita GDP increases the ability to fund and supply social protection schemes, however.

income opportunities, which reduce the demand for social protection, unless growth is jobless. Accordingly we expect a negative relationship between each of *PCGDP* and *GROWTH* and the dependent variable. However, since a higher real per capita GDP and growth rate increases the ability of the government to fund and supply social protection services, a positive relationship is not ruled out.

DEPENDENCY is the age dependency of the elderly population. It is measured by the ratio of older dependents to the working-age population similar to Beblavy (2010). The higher the dependency ratio, the more is the demand for social protection.

GOVCONS is the national administrative capacity as measured by the general government final consumption expenditure as a percentage of GDP, similar to Hong (2014). The better the government's administrative capacity, the more social protection services it supplies.

TRADE is the degree of trade openness of the economy, as measured by the sum of exports and imports as a percentage of GDP, similar to Sepalika et al. (2014). While trade can enhance exports and generate job opportunities, it can also increase imports and displace low-skilled workers, generating demand for social protection. The expected coefficient sign is thus ambiguous.

LABOR is labor market flexibility as measured by a number of labor market institutions indicators, including hiring and firing practices (HF), labor-employer cooperation (C), wage determination flexibility (WF), redundancy costs (R), the link between pay and productivity (PP), reliance on professional management (PM), and the participation of women in the labor force (WLF). Hiring and firing procedures refer to whether these procedures are flexibly determined by employers (7) or impeded by regulations (1). Cooperation in labor-employer relations refers to the nature of relation between the two whether it is cooperative (7) or confrontational (1). The flexibility of wage determination refers to the wage determination mechanism. Wages could be set at the company level (7) or through a centralized bargaining process (1). Redundancy costs estimate the cost of advance notice requirements, severance payments, and penalties due when terminating a redundant worker, expressed in weekly wages. Linking pay to productivity refers to the extent pay is related to productivity; they would be strongly related (7) or unrelated (1). Reliance on professional management refers to how senior management is selected. Positions can be selected based on merit and qualifications (7) or kinship and friendship (1). Women in the labor force refers to the ratio of women to men in the labor force. An overall labor market flexibility indicator is a summary measure, which ranges from flexible (7) to inflexible (1).

Labor market flexibility induces labor competition and productivity, reduces unemployment and the demand for social protection. Accordingly, we expect to find negative coefficient for labor-employer cooperation, wage determination flexibility, and professional management. It is also possible to have a negative coefficient for the link between pay and productivity indicator. However, this depends on the degree of skills of

labor. The more skilled and productive labor is, the less likely it is laid off, and the lower the demand for social protection will be. On the other hand, flexibility regarding hiring and firing practices may have an ambiguous impact on social protection. A reduction in firing (hiring) costs, holding other factors constant, may increase (decrease) unemployment and the demand for social protection.

We use panel data on 55 developed and developing countries over the period 2006-2015. Data on the dependent variable, *SP*, are obtained from the IMF's Government Finance Statistics. Data on *PCGDP*, *GROWTH*, *DEPENDENCY*, *GOVCONS*, and *TRADE* are obtained from the World Bank's World Development Indicators. Data on *LABOR* are obtained from the World Economic Forum's Global Competitiveness Report.

3. Empirical results

Table 1 presents descriptive statistics for the empirical model variables. Interestingly social protection expenditures vary widely over the cross-section time-series data used. *SP* range between 0.13 percent and 25.4 percent of GDP. A further inspection of *SP* by country shows that Indonesia and Singapore have the lowest degree of social protection (0.2 percent and 1.5 percent, respectively), whereas Scandinavian countries (Denmark, Finland and Sweden) as well as France have the highest degree of social protection (above 21 percent), as table 2 shows.

Table 1: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
SP	404	13.463	5.984	0.130	25.408
PCGDP	404	31,532.59	16,241.96	3,609.08	95,751.30
GROWTH	404	2.195	4.196	-14.814	17.291
DEPENDENCY	404	21.030	7.476	0.891	41.896
GOVCONS	404	18.040	4.605	8.418	28.064
TRADE	404	112.577	82.343	24.491	455.415
LABOR					
Overall flexibility	404	4.570	0.575	2.997	5.955
Hiring & firing	404	3.823	0.943	1.929	6.106
Labor-employer cooperation	404	4.722	0.768	2.517	6.322
Wage determination flexibility	404	4.775	1.017	2.288	6.417
Redundancy costs	393	28.775	30.497	0.000	186.300
Linking pay to productivity	404	4.290	0.609	2.612	6.040
Reliance on professional management	404	4.903	0.920	2.106	6.468
Women in labor force	404	0.801	0.141	0.276	0.979

Notes: F: Overall flexibility. HF: Hiring & firing. C: Labor-employer cooperation. WF: Wage determination flexibility. R. Redundancy costs. PP: Linking pay to productivity. PM: Reliance on professional management. WLF: Women in labor force.

Table 2: Degree of Social Protection (by country, in ascending order)
(General government social protection expenditures % GDP)

Country	Mean	Country	Mean
Indonesia	0.2	Czech Republic	12.3
Singapore	1.5	New Zealand	12.6
Thailand	2.5	Malta	13.7
China: Hong Kong	2.8	Ireland	13.9
UAE	3.0	Mongolia	14.6
El Salvador	4.2	Croatia	15.0
Kazakhstan	4.3	Spain	15.7
Bolivia	4.4	Netherlands	16.0
South Africa	4.9	Japan	16.0
Korea	5.6	Poland	16.2
China: Mainland	5.9	United Kingdom	16.2
Yemen	6.3	Norway	16.7
Tunisia	7.0	Portugal	16.9
Azerbaijan,	7.0	Hungary	17.1
Albania	8.4	Slovenia	17.4
Austria	9.3	Greece	18.5
Iceland	9.8	Belgium	18.6
Kuwait	10.1	Luxembourg	19.0
Cyprus	10.4	Slovak Republic	19.1
Russia	10.6	Germany	19.2
Israel	10.8	Italy	19.5
Latvia	11.2	Ukraine	20.1
Egypt	11.3	Australia	20.8
Turkey	11.9	Sweden	21.2
Estonia	12.0	Finland	22.3
Bulgaria	12.1	France	23.3
Switzerland	12.2	Denmark	23.7
Lithuania	12.3		

Table 3 presents the correlation coefficients matrix. *SP* is highly and positively correlated with the share of general government final consumption expenditure in GDP and the dependency ratio. Social protection is also negatively correlated with the growth rate, as well as a number of labor market indicators, such as the ease of hiring and firing practices, the flexibility of wage determination, and linking pay to productivity.[11] The matrix also shows that *GOVCONS* is strongly correlated with *DEPENDENCY* with a correlation coefficient of about 0.7 raising an issue of multicollinearity. The variance inflation factor following OLS regression of the empirical model is 1.43 compared to 1.18 when *GOVCONS* is excluded from the model. VIF in both specifications is less than 2 suggesting that multicollinearity is not a potential issue.

[11] These indicators are arranged in descending order by the correlation coefficient magnitude.

Table 3: Correlation Coefficients Matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	*SP*	1													
2	*PCGDP*	**0.212**	1												
3	*GROWTH*	**-0.370**	**-0.191**	1											
4	*DEPENDENCY*	**0.693**	**0.340**	**-0.324**	1										
5	*GOVCONS*	**0.726**	**0.288**	**-0.334**	**0.655**	1									
6	*TRADE*	**-0.245**	**0.486**	0.044	**0.088**	-0.066	1								
	LABOR														
7	F	**-0.112**	**0.497**	0.016	**0.187**	0.061	**0.407**	1							
8	HF	**-0.446**	0.010	**0.206**	**-0.275**	**-0.372**	**0.295**	**0.581**	1						
9	C	**-0.112**	**0.511**	0.019	**0.130**	0.031	**0.384**	**0.757**	**0.484**	1					
10	WF	**-0.388**	**-0.078**	**0.205**	**-0.271**	**-0.393**	**0.221**	**0.368**	**0.578**	**0.177**	1				
11	R	**-0.257**	**-0.220**	0.068	**-0.287**	**-0.265**	**-0.105**	**-0.340**	**-0.173**	**-0.145**	**-0.140**	1			
12	PP	**-0.377**	**0.264**	**0.136**	0.049	**-0.152**	**0.431**	**0.733**	**0.582**	**0.607**	**0.601**	**-0.154**	1		
13	PM	**0.191**	**0.526**	**-0.113**	**0.327**	**0.352**	**0.199**	**0.628**	-0.007	**0.631**	**-0.178**	-0.050	**0.397**	1	
14	WLF	**0.319**	**0.119**	-0.071	**0.478**	**0.368**	0.022	**0.468**	0.035	**0.149**	**-0.144**	**-0.215**	**0.106**	**0.314**	1

Notes: Pairwise correlation. Bond fonts indicates statistical significance at the 5 percent level. F: Overall flexibility. HF: Hiring & firing. C: Labor-employer cooperation. WF: Wage determination flexibility. R. Redundancy costs. PP: Linking pay to productivity. PM: Reliance on professional management. WLF: Women in labor force.

In estimating the influence of explanatory variables on *SP*, we take into account the heterogeneity arising from the country-specific effects. Hausman specification tests are used to examine the null hypothesis that the difference in fixed and random effects coefficients are systematic. If the null hypothesis can be rejected at the 5 percent significant level or above, we use fixed effects (FE) model. Otherwise we will use both FE and random effects (RE) models.

Table 4 presents the estimation results. The *F* and Wald test statistics indicate the joint significance of the explanatory variables at the 1 percent level for the fixed and random effects models, respectively. The empirical model explains more than half the variation of the dependent variable with an R-squared of 0.55. Column headings indicate the labor market flexibility indicator and the estimation methodology adopted.

Table 4: Social Protection Determinants
Dependent variable: General government social protection expenditures (% GDP)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	F/FE	HF/FE	HF/RE	C/FE	WF/FE	WF/RE	R/FE	R/RE	PP/FE	PP/RE	PM/FE	WLF/FE
PCGDP	**-2.755a**	**-2.795a**	**-1.244b**	**-2.807a**	**-3.034a**	**-1.374b**	**-2.452a**	**-1.185b**	**-2.633a**	**-1.066c**	**-2.650a**	**-2.797a**
	(0.787)	(0.808)	(0.571)	(0.784)	(0.805)	(0.571)	(0.794)	(0.565)	(0.776)	(0.556)	(0.791)	(0.785)
GROWTH	**-0.097a**	**-0.097a**	**-0.095a**	**-0.092a**	**-0.096a**	**-0.095a**	**-0.100a**	**-0.098a**	**-0.092a**	**-0.090a**	**-0.096a**	**-0.097a**
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
DEPENDENCY	**0.367a**	**0.367a**	**0.349a**	**0.354a**	**0.365a**	**0.348a**	**0.387a**	**0.366a**	**0.315a**	**0.311a**	**0.350a**	**0.349a**
	(0.043)	(0.042)	(0.037)	(0.043)	(0.042)	(0.037)	(0.046)	(0.040)	(0.044)	(0.038)	(0.044)	(0.044)
GOVCONS	**0.550a**	**0.550a**	**0.581a**	**0.546a**	**0.534a**	**0.569a**	**0.550a**	**0.572a**	**0.523a**	**0.557a**	**0.553a**	**0.541a**
	(0.063)	(0.063)	(0.058)	(0.062)	(0.063)	(0.059)	(0.064)	(0.059)	(0.062)	(0.057)	(0.062)	(0.063)
TRADE	0.004	0.004	0.003	0.004	0.004	0.003	0.007	0.005	0.006	0.004	0.004	0.005
	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)	(0.004)	(0.005)	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)
LABOR	0.199	-0.139	0.086	**-1.813c**	-1.212	-0.782	0.055	0.048	**-2.716a**	**-2.728a**	-1.058	2.210
	(1.310)	(0.615)	(0.597)	(0.979)	(0.781)	(0.752)	(0.104)	(0.101)	(0.834)	(0.811)	(0.928)	(1.563)
Constant	23.372a	24.266a	8.011	27.337a	28.699a	10.823c	19.640b	6.988	27.759a	11.273b	24.604a	25.093a
	(8.407)	(8.573)	(5.947)	(8.364)	(8.758)	(6.138)	(8.374)	(5.758)	(8.141)	(5.648)	(8.192)	(8.205)
Observations	404	404	404	404	404	404	380	380	404	404	404	404
R-squared	0.549	0.549		0.554	0.552		0.559		0.563		0.551	0.552
F-test	**69.66a**	**69.67a**		**70.92a**	**70.54a**		**67.67a**		**73.57a**		**70.13a**	**70.39a**
Wald test			**479.51a**			**481.80a**		**463.39a**		**504.42a**		
Countries	55	55	55	55	55	55	54	54	55	55	55	55

Notes: Standard errors in parentheses. a,b,c significant at 1%, 5%, 10% level, respectively. F: Overall flexibility. HF: Hiring & firing. C: Labor-employer cooperation. WF: Wage determination flexibility. R. Redundancy costs. PP: Linking pay to productivity. PM: Reliance on professional management. WLF: Women in labor force.

In all columns, both *PCGDP* and *GROWTH* have a negative influence on the degree of social protection. Statistical significance of the FE estimates of *PCGDP* is higher than the RE estimates. For *GROWTH*, coefficients are statistically significant at the 1 percent level.

In specification 9, which includes the link of pay to productivity, an increase in real per capita GDP by one percent reduces social protection expenditure by 2.6 percentage points. The *GROWTH* coefficient in the same specification suggests that an increase in the growth rate by 1 percent reduces SP by nearly 0.1 percentage point. In the RE estimates of specification 10, *PCGDP* has a lower magnitude both in coefficient and statistical significance compared to the FE estimates. The *GROWTH* coefficient is the same, however.

These results are consistent with the explanation above that a higher real per capita GDP suggests a higher income, which reduces the demand for social protection. Also a higher growth rate offers more employment and income opportunities, which reduce the demand for social protection.

Across all specifications and regardless of the estimation methodology, *DEPENDENCY* increases social protection expenditures. Its coefficient ranges between

0.311 in specification 10 to 0.387 in specification 7 and is statistically significant at the 1 percent level. In specification 9, an increase in the ratio of older dependents to the working-age population by 1 percentage point increases social protection expenditures (% GDP) by slightly more than 0.3 percentage points. This is consistent with our earlier conjecture that dependency increases the demand for social services.

Similar to *DEPENDENCY, GOVCONS* increases social protection expenditures across all specifications and regardless of the estimation methodology. This suggests that the government current expenditures for purchases of goods and services are positively associated with the expenditures on social protection. In other words, the better the government's administrative capacity, the more social protection services it supplies as explained above. The coefficient in specification 9 suggests that an increase in government final consumption (% GDP) by 1 percentage point increases social protection expenditures by slightly above 0.5 percentage point.

As for *LABOR*, linking pay to productivity, as specification 9 shows, reduces social protection expenditures.[12] The coefficient is both economically and statistically significant. A 1 percent improvement in the extent to which pay is linked to productivity results in a decrease in social protection expenditures by about 3 percentage points. RE coefficient estimate is almost the same. Specification 4 shows a similar negative influence of cooperation in labor-employer relations on social protection expenditures however with lower economic and statistical significance.

Finally *TRADE* is both economically and statistically insignificant across all specifications. Trade openness does not seem to directly influence social protection expenditures. Perhaps it indirectly influences social protection through growth and per capita GDP.

4. Robustness checks

Our strategy for undertaking robustness checks is to gradually account for the salient risks and needs that require social protection, mainly unemployment and income inequality. In the first robustness check, we account for the unemployment rate in the empirical model, while in the second robustness check we add income inequality, as measured by the Gini index. In the third robustness check, we control for more risks as proxied by the Human Development Index.

[12] For studies examining the relationship between performance pay and productivity, see for example Drago (1991), Gielen et al.(2009), Lazear (2000) and Pokorny (2008). See also Holmstrom (2017) for a discussion of the broader incentive system. Studies have also examined the relationship between performance pay and job satisfaction (Cornelissen et al. 2011; Green and Heywood 2008), wage inequality (Lemieux et al. 2009), and work cooperation (Burks et al. 2009).

4.1 Accounting for the risk of unemployment

Since unemployment is perhaps the most salient risk requiring social protection, we start by accounting for it in the empirical model. We use the International Labor Organization estimated unemployment rate, as opposed to national authorities estimates, due to data availability.

Hausman specification tests failed to reject the null hypothesis of no systematic difference between FE and RE coefficient estimates across all specifications. Thus we adopt the RE model. Table 5 presents the estimation results.

Table 5: Social Protection Determinants – Robustness Checks
Dependent variable: General government social protection expenditures (% GDP)
(Unemployment rate included in the empirical model)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	F/RE	HF/RE	C/RE	WF/RE	R/RE	PP/RE	PM/FE	WLF/RE
PCGDP	**1.293b**	**1.259b**	**1.337b**	**1.279b**	**1.385b**	**1.314b**	1.203	**1.449b**
	(0.579)	(0.585)	(0.579)	(0.592)	(0.582)	(0.579)	(0.797)	(0.589)
GROWTH	**-0.050a**	**-0.051a**	**-0.051a**	**-0.051a**	**-0.057a**	**-0.051a**	**-0.052a**	**-0.049a**
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
DEPENDENCY	**0.216a**	**0.212a**	**0.213a**	**0.212a**	**0.240a**	**0.211a**	**0.208a**	**0.220a**
	(0.036)	(0.035)	(0.035)	(0.035)	(0.038)	(0.036)	(0.042)	(0.036)
GOVCONS	**0.587a**	**0.587a**	**0.590a**	**0.586a**	**0.585a**	**0.588a**	**0.589a**	**0.597a**
	(0.051)	(0.051)	(0.051)	(0.052)	(0.052)	(0.052)	(0.055)	(0.052)
TRADE	-0.004	-0.003	-0.004	-0.003	-0.001	-0.003	-0.002	-0.004
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
LABOR	0.674	-0.409	0.495	-0.230	0.144	-0.161	0.608	-1.297
	(1.114)	(0.524)	(0.856)	(0.664)	(0.089)	(0.766)	(0.834)	(1.214)
UNEMPLOYMENT	**0.222a**	**0.223a**	**0.225a**	**0.221a**	**0.219a**	**0.220a**	**0.226a**	**0.226a**
	(0.021)	(0.021)	(0.022)	(0.021)	(0.021)	(0.022)	(0.023)	(0.021)
Constant	-17.273a	-15.382b	-17.488a	-15.710b	-18.266a	-16.179a	-16.249c	-18.461a
	(5.906)	(6.000)	(6.034)	(6.286)	(5.922)	(6.057)	(8.298)	(6.056)
Observations	404	404	404	404	380	404	404	404
R-squared							0.652	
F-test							**91.65a**	
Wald test	**724.85a**	**725.99a**	**725.06a**	**724.52a**	**703.70a**	**724.01a**		**727.13a**
Number of countries	55	55	55	55	54	55	55	55

Notes: Standard errors in parentheses. a,b,c significant at 1%, 5%, 10% level, respectively. F: Overall flexibility. HF: Hiring & firing. C: Labor-employer cooperation. WF: Wage determination flexibility. R. Redundancy costs. PP: Linking pay to productivity. PM: Reliance on professional management. WLF: Women in labor force.

GROWTH, *DEPENDENCY*, and *GOVCONS* have the same coefficient signs as obtained in table 4. However, *GROWTH* and *DEPENDENCY* have smaller absolute coefficient values indicating less negative and positive influence on social protection expenditures, respectively. *GOVCONS* has bigger positive coefficients in contrast.

UNEMPLOYMENT has a statistically significant positive influence on social protection expenditure. A one percentage point increase in the unemployment rate results in an increase in social protection expenditures of slightly above 0.2 percentage points.

Therefore the two social protection risks of age dependency and unemployment contribute to the increase in social protection expenditures.

The inclusion of the unemployment rate in the empirical model influences *LABOR* and *PCGDP* coefficients. First, *LABOR* coefficients become statistically insignificant. In other words, once the unemployment rate *as a labor market outcome* is controlled for, labor market flexibility indicators become insignificant. Second, *PCGDP* coefficients become positive. This suggests that as long as the demand for social protection services associated with age dependency and unemployment risks is accounted for, *PCGDP* becomes more reflective of the ability to fund and *supply* social protection services.

The influence of *TRADE* continues to be statistically insignificant across all specifications, although it has become negative. As mentioned above once the social protection risks and arising demand are accounted for, trade openness can enhance exports, generate job opportunities, and therefore reduce the demand for social protection expenditures.

4.2 Accounting for income inequality

Besides unemployment, we account for income inequality as measured by the Gini index. Hausman specification tests failed to reject the null hypothesis of no systematic difference between FE and RE coefficient estimates in some but not all specifications. Thus we adopt RE and FE models as deemed necessary. Table 6 presents the estimation results.

Table 6: Social Protection Determinants – Robustness Checks
Dependent variable: General government social protection expenditures (% GDP)
(Gini Index included in the empirical model)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	F/RE	HF/RE	C/FE	WF/FE	WF/RE	R/RE	PP/RE	PM/RE	WLF/RE
PCGDP	1.144	1.029	1.430	1.357	1.039	1.170	1.203	1.301	1.214
	(0.811)	(0.835)	(1.303)	(1.298)	(0.821)	(1.083)	(0.800)	(0.826)	(0.809)
GROWTH	**-0.062a**	**-0.061a**	**-0.056a**	**-0.058a**	**-0.062a**	**-0.066a**	**-0.062a**	**-0.062a**	**-0.062a**
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.018)	(0.016)	(0.016)	(0.016)
DEPENDENCY	**0.239a**	**0.242a**	**0.255a**	**0.257a**	**0.239a**	**0.239a**	**0.219a**	**0.230a**	**0.243a**
	(0.047)	(0.047)	(0.055)	(0.055)	(0.047)	(0.083)	(0.048)	(0.048)	(0.047)
GOVCONS	**0.552a**	**0.552a**	**0.570a**	**0.561a**	**0.546a**	**0.545a**	**0.536a**	**0.554a**	**0.556a**
	(0.058)	(0.057)	(0.062)	(0.063)	(0.058)	(0.094)	(0.058)	(0.057)	(0.058)
TRADE	-0.004	-0.004	-0.009	-0.008	-0.004	-0.003	-0.004	-0.005	-0.004
	(0.006)	(0.006)	(0.007)	(0.007)	(0.006)	(0.008)	(0.006)	(0.006)	(0.006)
LABOR	0.166	-0.402	-0.822	-0.897	-0.700	0.078	**-1.689c**	-0.824	-1.099
	(1.385)	(0.625)	(1.153)	(0.784)	(0.757)	(0.138)	(0.960)	(0.949)	(1.682)
UNEMPLOYMENT	**0.228a**	**0.229a**	**0.228a**	**0.230a**	**0.226a**	**0.228a**	**0.215a**	**0.226a**	**0.231a**
	(0.025)	(0.025)	(0.029)	(0.028)	(0.025)	(0.033)	(0.026)	(0.025)	(0.025)
GINI	**-3.019b**	**-3.009b**	-1.877	-1.709	**-2.893b**	**-3.168c**	**-3.087b**	**-2.963b**	**-2.995b**
	(1.349)	(1.348)	(1.479)	(1.484)	(1.350)	(1.633)	(1.342)	(1.347)	(1.350)
Constant	-3.951	-2.157	-9.611	-9.321	-1.941	-3.668	-0.909	-3.968	-4.952
	(9.849)	(10.181)	(14.759)	(14.423)	(10.036)	(11.563)	(9.816)	(9.780)	(9.936)
Observations	302	302	302	302	302	291	302	302	302
R-squared			0.710	0.711					
F-test			75.62a	75.96a					
Wald test	**664.2a**	**664.42a**			**668.04a**	**555.74a**	**673.24a**	**667.2a**	**664.33a**
Number of countries	47	47	47	47	47	47	47	47	47

Notes: Standard errors in parentheses except for redundancy costs where robust standard errors are reported . a,b,c significant at 1%, 5%, 10% level, respectively. F: Overall flexibility. HF: Hiring & firing. C: Labor-employer cooperation. WF: Wage determination flexibility. R. Redundancy costs. PP: Linking pay to productivity. PM: Reliance on professional management. WLF: Women in labor force.

GROWTH, *DEPENDENCY*, *GOVCONS* and *UNEMPLOYMENT* have the same positive coefficient signs as obtained in table 5. Coefficients of *PCGDP* are now statistically insignificant. *GINI* coefficients are negative and statistically significant at the 5 and 10 percent levels. At first glance this result seems surprising. However, there a couple of possible explanations. First, with the increase in income inequality, the relatively better-off may demand less social protection and thus social protection expenditures decrease. Second, since income inequality is related in principle to the distribution role of government, the increase in income inequality reflects a weaker distribution role and less social protection.

As for *LABOR* all but the coefficient of linking pay to productivity (specification 7) is statistically insignificant, largely similar to the results of table 4. However, the magnitude and the statistical significance of the PP coefficient is less than that of table 4.

4.3 Accounting for more social protection risks

Since it is difficult to account for all social protection risks and needs in the empirical model, we proxy for these risks together using UNDP's Human Development Index (HDI) in log form. HDI addresses three development dimensions: long and healthy life; knowledge; and the standard of living. The first dimension relates to the risks of sickness, disability and old age.[13] The second relates to risks arising from responsibilities that family and children face as well as unemployment risks.[14] The third relates to most of the remaining social protection risks.[15] Because of the high correlation that each of the HDI dimensions has with *DEPENDENCY*, *UNEMPLOYMENT*, and *PCGDP*, we drop them from the empirical model.[16]

Based on the Hausman specification tests, we reject the null hypothesis of no systematic difference between the FE and RE effects coefficient estimates across all specifications. Thus we adopt the FE model.[17] Table 7 presents the estimation results.

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[13] The correlation coefficient between *DEPENDENCY* and *HDI* in the sample countries is about 0.7.

[14] The correlation coefficient between *UNEMPLOYMENT* and *HDI* in the sample countries is -0.07.

[15] The correlation coefficient between *PCGDP* and *HDI* in the sample countries is 0.95.

[16] The inclusion of HDI to the empirical model of table 6 would increase the variance inflation factor to 4.1 from 1.54.

[17] In examining the presence of homoscedasticity following OLS regressions, we reject the null hypothesis of homeskedasticity. Robust standard errors are reported.

Table 7: Social Protection Determinants – Robustness Checks
Dependent variable: General government social protection expenditures (% GDP)
(HDI included in the empirical model)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	F/FE	HF/FE	C/FE	WF/FE	R/FE	PP/FE	PM/FE	WLF/FE
GROWTH	**-0.101a**	**-0.101a**	**-0.099a**	**-0.101a**	**-0.105a**	**-0.096a**	**-0.099a**	**-0.103a**
	(0.026)	(0.025)	(0.027)	(0.026)	(0.026)	(0.025)	(0.026)	(0.026)
GOVCONS	**0.591a**	**0.592a**	**0.590a**	**0.596a**	**0.579a**	**0.559a**	**0.590a**	**0.578a**
	(0.125)	(0.121)	(0.125)	(0.121)	(0.129)	(0.127)	(0.126)	(0.126)
TRADE	**0.016b**	**0.015b**	**0.016b**	**0.016b**	**0.019b**	**0.017b**	**0.015b**	**0.017b**
	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.007)	(0.007)	(0.007)
HDI	**15.663b**	**16.046b**	**14.548b**	**16.132b**	**16.209b**	10.376	**13.132c**	**12.534c**
	(7.087)	(7.276)	(6.746)	(7.263)	(7.430)	(6.621)	(7.013)	(7.273)
LABOR	0.142	1.116	-0.954	0.550	0.036	**-3.325b**	-2.377	2.839
	(2.085)	(1.169)	(1.705)	(1.385)	(0.179)	(1.526)	(1.782)	(3.329)
Constant	3.791	2.735	5.294	3.179	3.957	8.350c	7.454	4.307
	(4.058)	(2.938)	(4.175)	(3.375)	(3.204)	(4.299)	(4.719)	(3.203)
Observations	435	435	435	435	410	435	435	435
R-squared	0.427	0.432	0.429	0.428	0.430	0.448	0.436	0.432
F-test	43.38a	47.05a	43.33a	43.03a	40.38a	45.43a	44.79a	45.48a
Number of countries	56	56	56	56	55	56	56	56

Notes: Robust standard errors in parentheses. a,b,c significant at 1%, 5%, 10% level, respectively. F: Overall flexibility. HF: Hiring & firing. C: Labor-employer cooperation. WF: Wage determination flexibility. R. Redundancy costs. PP: Linking pay to productivity. PM: Reliance on professional management. WLF: Women in labor force.

GROWTH and *GOVCONS* have the same coefficient signs as obtained in tables 4-6. However, *TRADE* has a positive and statistically significant influence across all specifications. *HDI* has a positive influence on social protection expenditures with a one percent improvement in the index resulting in an increase in social expenditures between 12.5-16.2 percentage points. This suggests that social protection can be costly if most risks are to be covered.

Similar to the results of tables 4 and 6, linking pay to productivity reduces social protection expenditures but by more than 3 percentage points. The bigger coefficient magnitude highlights the importance of paying wages commensurate to productivity to the distributive role of the government.[18] As more social protection risks are controlled for, rewarding productivity can relieve the fiscal burden off the government shoulder.

[18] In the short run, labor is paid a wage equals to its marginal revenue product if the product seller is imperfectly competitive. If the product seller is competitive, labor is paid a wage equals its value of marginal product.

5. Conclusion

In this paper we empirically examined the determinants of social protection expenditures focusing on the influence of labor market flexibility. Given the large cross-section dimension of the panel data used, the results of the paper can improve our understanding of the most important determinants of social protection expenditures, namely per capita GDP, growth, national administration capacity, dependency, and unemployment. Results also highlighted the importance of commensurate reward to productivity for the reduction of the fiscal burden of social protection.

Linking pay to productivity, Gielen et al. (2010) posit, induces workers to exert the right amount of effort and raises productivity. In addition, they argue that raising productivity reduces marginal costs of production and encourages hiring additional workers.

Indeed what Gielen et al. (2010) proposed provides conceptual support to the findings of our paper. By raising worker and firm productivity, linking pay to productivity helps generate growth in the economy. Also by hiring additional workers, the unemployment rate can be reduced. The results of this paper show that paying wages commensurate to productivity reduce social protection expenditures. It also shows that higher growth and lower unemployment rate reduce social protection expenditures.

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