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Can investments in social protection contribute to subjective well-being? A cross-country analysis

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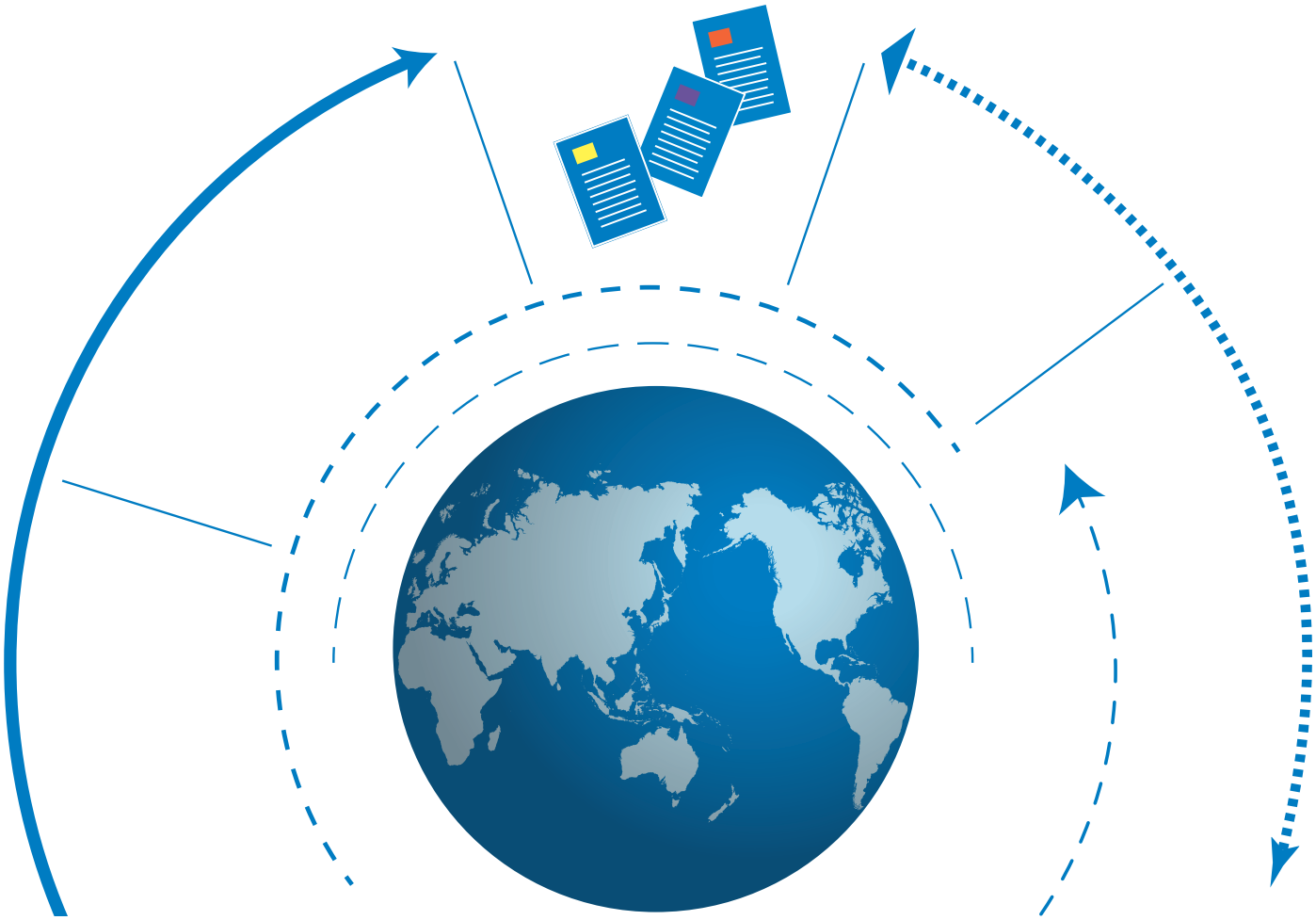

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PREFACE

The use of subjective well-being indicators to assess the effect of public policy is gaining increasing legitimacy. It is now widely acknowledged that subjective measures are an important complement to objective indicators of well-being that should be looked at by policy makers when trying to improve policy outcomes. This view has for instance been stressed within the OECD framework on well-being, as well as in recent proposals to adjust the OECD framework to specific economic, cultural and social contexts. However, research on subjective well-being and its relationship with public action is still in its infancy. The links between social protection and subjective well-being are, for instance, largely unsettled.

This paper explores the contribution of social protection investments on subjective well-being. It contributes to the literature on subjective well-being and public policy in three important ways. First, it provides new evidence on the relationship between social protection spending and subjective well-being based on a worldwide sample including 38 countries and covering low-, middle- and high-income countries. Second, two different dimensions of subjective well-being are studied, captured respectively through measures of life satisfaction and experienced well-being. Third, it studies the potential channels explaining this relationship by considering the effect on potential beneficiaries and non-beneficiaries and looking at distributional effects.

Overall, the evidence brought forward in this analysis suggests that social protection investments may affect positively individuals' subjective well-being and that such a relationship expands beyond potential beneficiaries to encompass broader groups in society, consistent with the idea that social protection can lead to higher subjective well-being for all, enhance the social contract and act as an engine for social cohesion.

This paper was produced as part of the research component of the EU Social Protection Programme implemented by the OECD Development Centre and the Government of Finland's National Institute for Health and Welfare (THL). We hope that it will enrich the evidence-based knowledge on the effectiveness of social protection in promoting social cohesion.

Mario Pezzini

Director

OECD Development Centre

May 2016

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RÉSUMÉ

Le bien être subjectif est depuis quelques années reconnu comme un but du développement qui permet de capturer les dimensions non-monétaires – ou subjectives – du bien-être. La littérature sur les déterminants du bien être au niveau individuel et sociétal s'est beaucoup enrichie. Cependant peu d'études se concentrent sur le rôle particulier de la protection sociale pour le bien être individuel, malgré leurs implications importantes en termes de politique. L'objectif de ce document est d'explorer la relation entre les investissements dans la protection sociale (en tant que proxy pour le niveau des services sociaux dont bénéficie la population) et le bien être individuel, évaluatif ainsi qu'émotionnel. Ce document présente de nouvelles estimations sur cette relation entre ces investissements et le bien être dans un échantillon global de 38 pays incluant des pays à bas, moyen, et haut revenu. Nous étudions également la question des dynamiques expliquant cette relation, notamment en évaluant cette relation pour les potentiels bénéficiaires et non-bénéficiaires de programmes de protection sociale ainsi qu'en estimant les effets distributionnels.

Classification JEL: I310, I380, H530.

Mots-clés: Bien être subjectif, Protection sociale, Cohésion sociale, Dépenses gouvernementales

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ABSTRACT

Subjective well-being has in recent years been recognised as a goal of development that captures non-monetary or subjective dimensions of well-being. The body of evidence on the individual and societal determinants of subjective well-being is growing, but the literature remains in its infancy as to the role of social protection despite important policy implications. The objective of this paper is to explore the relationship between investments in social protection (as a proxy for the level of social protection services received by the population) and individuals' evaluative and experienced well-being. This paper thus provides new evidence on the relationship between social protection investments and subjective well-being based on a worldwide sample including 38 countries and covering low-, middle- and high-income countries. Furthermore, we study potential channels explaining this relationship by considering the effect on potential beneficiaries and non-beneficiaries as well as distributional effects.

JEL classification: I310, I380, H530.

Keywords: Subjective Well-Being, Social Protection, Social Cohesion, Government Spending

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I. INTRODUCTION

Subjective well-being has in recent years increasingly been established as a reliable measure of individual well-being that provides complementary insights into the living conditions of individuals beyond the objective dimensions. A growing number of studies have focused on the determinants of individual subjective well-being in terms of individual-level characteristics (typically, gender, age, number of children or education) and life events (changes in marital status, in work status or health shocks). This line of research has been accompanied by a multitude of government initiatives both at the country level - for example through the Commission on the Measurement of Economic Performance and Social Progress in France (Stiglitz et al., 2009) or the Office of National Statistics' work in the UK (Dolan and Metcalfe, 2011) – and at the international level, with the OECD Better Life and Inclusive Growth Initiatives (OECD, 2013 and 2015).

Subjective well-being is an outcome of interest to get a better understanding, beyond monetary dimensions, of the effect of public policy on individuals' well-being. This has for instance been stressed within the OECD framework on well-being (OECD, 2013 and Boarini, Kolev and McGregor, 2014) through an emphasis on the *multidimensionality* of well-being, the recognition that public policy may have distinct effects on different dimensions of well-being and hence the need to address policy trade-offs based on political consensus. In that respect, exploring the macroeconomic determinants of subjective well-being appears particularly important in comparison with the inherent limitations of micro-level determinants. For instance, a common finding of the well-being literature is the positive influence of being married relative to being divorced or widowed (see for example Dolan, Peasgood and White, 2008). The extent to which policies may influence this type of threat to the well-being of individuals is however questionable.

Beyond the large body of evidence on micro-level determinants of subjective well-being, important findings on macro-level socio-economic indicators and their relationship with individuals' subjective well-being have also been produced. Evidence of such relationships has been documented in studies focusing for example on the unemployment rate, political, personal and economic freedom, the generosity of unemployment benefits, inflation, labour protection legislation or out-of-pocket health expenses (Frey and Stutzer, 2002; Veenhoven, 2000; Boarini et al., 2013; Preziosi, 2013; Di Tella, MacCulloch and Oswald, 2003). Others found a positive correlation between indicators of government quality, such as the rule of law, quality of public goods or low corruption, and subjective well-being (Helliwell, 2005). Macroeconomic determinants, such as rates of GDP growth, unemployment, or inflation, affect individuals' well-being in magnitudes similar to those related to serious life events (Di Tella, MacCulloch and Oswald, 2001; Welsch and Kuehling, 2015). Overall, the consensus shows that macroeconomic

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factors influence subjective well-being, for some authors, even more so than micro characteristics, thus making research in this area of utmost relevance. The World Happiness Report 2015 (Helliwell et al. (eds), 2015), for instance, underscores the fruitfulness of using happiness measurements for guiding policy making.

Little evidence exists, however, on the relationship between social protection at the macro-level and subjective well-being at the individual level. Rather, studies have focused either on subsets of social protection (for instance, unemployment benefits) or the size of the state as proxies to welfare policies. The former category found that more generous unemployment benefits are associated with higher national well-being (DiTella, MacCulloch and Oswald, 2003; Pacek and Radcliff, 2008), while the latter found a positive effect of indicators of the decommodification – a measure of emancipation from market dependency (Pacek and Radcliff, 2008) – or progressive taxation (Oishi et al., 2012) on life satisfaction. The effect of the size of government has been found to be either positive (Flavin et al., 2014) or negative (Bjørnskov et al., 2007. It is however worthwhile noticing that using indicators such as government consumption reflects a concept different than social protection, as those government expenditures include items such as road maintenance or defence spending.

Turning to the studies focusing on social protection expenditures, Veenhoven (2000) finds no correlations between the size of state welfare budgets and levels as well as equality in well-being among citizens between 1980 and 1990, such that countries with high social security expenditures do not show smaller dispersions of health and happiness than countries with lower social security expenditures. Similarly, Ouweneel (2002) finds a weak relation between well-being and social security expenditure for unemployed individuals. Beyond the sample restriction to unemployed individuals in OECD countries in Ouweneel (2002); empirical limitations in terms of control variables, most notably in terms of individual income, limit the comparability of these results. Hessami (2010) also finds social protection expenditures to have an inversely U-shaped relationship with well-being in a sample of 15 European countries between 1995 and 2005. Using measures of social welfare expenditures as a percentage of GDP in a sample of OECD countries, Flavin et al. (2014) find social welfare to positively contribute to life satisfaction.

While most of the above-mentioned evidence relies on evaluative measures of subjective well-being as an outcome, and in particular on life satisfaction, other measures of experienced well-being, capturing affect in terms of a range of emotions, are increasingly being considered. On the one hand, while life evaluation questions provide the advantage of being single item questions in an overall assessment, they require respondents to retrospectively judge their life, thus leading to potential bias through heuristics or moods (Kapteyn et al., 2014). Experienced well-being measures, on the other hand, provide an assessment of individuals' feelings at a specific point in time, for instance referring to the previous day in the Gallup World Poll.

Our goal in this paper is to explore the contribution of social protection investments on subjective well-being in countries at different stages of development. Studying the relationship between social protection and subjective well-being in countries with different income levels raises interesting questions. Several assumptions can be made regarding the sign of the

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relationship, for instance on the possible detrimental effect of social security contributions on subjective well-being through taxes and contributions, or in contrast, on a potential positive relationship associated with the benefits of social transfers in terms of reduced vulnerability, volatility and inequality. Whether social protection is linked to subjective well-being for beneficiaries only or whether the links persist for other members of society is also of great interest to shed some light on the altruistic or individualistic nature of the mechanisms behind this relationship, and the way social protection might contribute to social cohesion.

This paper's contribution to the literature is three-fold. First, it provides new evidence on the relationship between social protection spending and subjective well-being based on a worldwide sample including 38 countries and covering low-, middle- and high-income countries. Second, two different dimensions of subjective well-being are studied, captured respectively through measures of life satisfaction and experienced well-being. Third, we study potential channels explaining this relationship by considering the effect on potential beneficiaries and non-beneficiaries as well as distributional effects.

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II. DATA

The main data is gathered from three different sources and compiled to conduct the analysis.

Gallup World Poll

Gallup Worldwide Research continually surveys residents in more than 150 countries, representing more than 98% of the world's adult population, using randomly selected, nationally representative samples. Gallup typically surveys 1 000 individuals in each country, using a standard set of core questions that has been translated into the major languages of the respective country. In some regions, supplemental questions are asked in addition to core questions. In many countries, the survey is conducted once per year, and fieldwork is generally completed in two to four weeks. This analysis uses several individual characteristics (in particular, gender, marital status, age, employment, education level and whether children are living in the household), and three subjective well-being measures as follows:

(1) Life Satisfaction: *Please imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time?*

(2) The positive index is an index that combines survey answers related to the respondents' experienced well-being on the day before the survey, providing a real-time measure of the respondents' positive experiences. In particular, it combines the following questions:

- *Did you feel well-rested yesterday?*
- *Were you treated with respect all day yesterday?*
- *Did you smile or laugh a lot yesterday?*
- *Did you learn or do something interesting yesterday?*
- *Did you experience joy during a lot of the day yesterday? How about enjoyment?*

(3) The negative experience index in turn incorporates the following items:

- *Did you experience the following feelings during a lot of the day yesterday? How about physical pain? Worry? Sadness? Stress? Anger?*

In addition, we include two measures recommended by the World Happiness Report (2015) to capture social capital, which has been argued to be, despite its breath, a meaningful concept that describes the social support networks and extent of trust in society. In particular, we use indicators of whether individuals reported to have donated money to a charity in the past month (generosity), and whether, if they were in trouble, they could count on relatives and friends to help them (social support).

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International Labour Organization's (ILO) Social Security Expenditure Database

The ILO Social Security Expenditure Database together with the ILO Social Security Programmes and Mechanisms Database constitute the ILO Social Security Database. Its website provides statistics concerning expenditures on social security branches like health care, family allowances, sickness and unemployment. The data is available for 124 countries worldwide from 2000 to 2013.

To ensure as much consistency as possible, the data used in this paper extracted from the ILO Social Security Expenditure Database define total social spending as the sum of public social protection expenditure on old age and survivors benefits as a percentage of GDP, public social protection expenditure on benefits for children as a percentage of GDP and public social protection expenditure on benefits for the working age (including general assistance) as a percentage of GDP. These indicators are gathered from the International Monetary Fund (IMF), Economic Commission for Latin America and the Caribbean (ECLAC), Asian Development Bank (ADB), Organisation for Economic Co-operation and Development (OECD) Social Expenditure Database (SOCX), Ministries of Finances, Eurostat, the World Bank, the United Nations Children's Fund (UNICEF), and the United Nations Development Programme (UNDP), among others. These expenditures also cover spending on social housing, sickness cash benefits, as well as education benefits through subsidy programmes covering school fees, material and other social assistance programmes. Note, however, that many values are missing.

World Bank

World Development Indicators (WDI) is the primary World Bank collection of development indicators, compiled from officially recognised international sources. It presents the most current and accurate global development data available, and includes national, regional and global estimates. This paper makes use of indicators related to Gross Domestic Product. In addition, the Atlas of Social Protection Indicator of Resilience and Equity (ASPIRE) data provides harmonised indicators describing the performance of social assistance, social insurance and labour market programmes based on nationally representative household survey data from 112 countries. In particular, the following indicators are available: adequacy of programmes; benefit incidence to poorest quintile and coverage for each of the four categories: social insurance programmes, all social protection and labour programmes, social safety net programmes and labour market programmes.

Sample

The Gallup World Poll covers the broadest sample – over 161 000 for example in 2011 in 141 countries. We restrict the Gallup sample to those observations including the measure of household income and do not include imputations, as those are based on a model including among others, food and shelter index, communications index, feelings about household income and life evaluation, with the latter being including as a dependent variable in our analysis. The World Development Indicators also cover a great range of countries, so that the overlapping sample with Gallup covers 124 countries. The most restrictive database is the ILO Social Security

Expenditure Database, which limits our overlapping sample between the three databases to 38 countries and 36 426 observations.

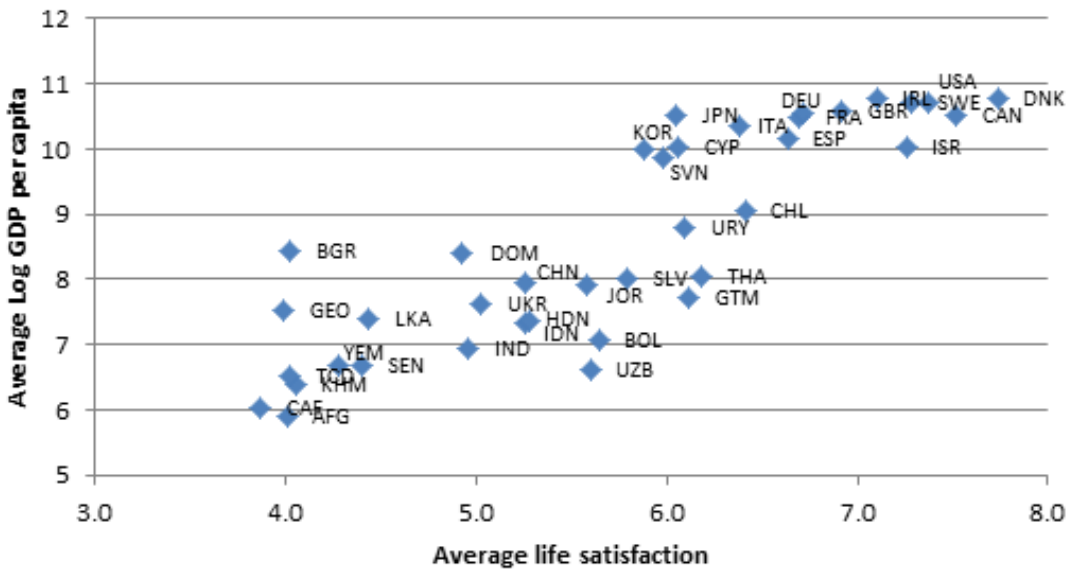
The full list of countries represented in the sample can be found in Annex 1. Due to data availability limitations across the various datasets, the sample is limited to the years 2009, 2010 and 2011, where not all years are available for all countries.

Table 1. **Descriptive statistics**

Variable	Mean	SD	Min	Max	N
Age (years)	36 426	42.78	17.74	15	100
Secondary education	36 426	2145.06	1695.77	225	10000
Tertiary education	36 426	0.47	0.50	0	1
With partner	36 426	0.16	0.36	0	1
Female	36 426	0.54	0.50	0	1
Household income (USD)	36 426	18498.04	27930.29	0	1200000
Employed	36 426	0.56	0.50	0	1
Life satisfaction	36 426	5.52	2.24	0	10
Positive Index	36 426	71.20	26.98	0	100
Negative Index	36 426	25.28	27.91	0	100
Log GDP per capita in constant 2005 USD	36 426	8.31	1.53	5.88	10.76
Primary school enrolment	36 426	105.87	11.33	83.4	129
Infant mortality (per 1 000 live births)	36 426	23.70	24.93	2.4	103
Public social protection expenditure (% GDP)	36 426	7.41	6.45	0.3	21.8
Public social protection expenditure on benefits for children (% of GDP)	36 426	0.85	1.02	0.01	4.15
Social support	36 426	0.81	0.39	0	1
Generosity	36 426	0.35	0.48	0	1

Source: Authors' calculations based on Gallup World Poll, ILO Social Security Expenditure Database and World Development Indicators.

Figure 1. **Average life satisfaction and average log GDP per capita**



Source: Authors' calculations based on Gallup World Poll and World Development Indicators.

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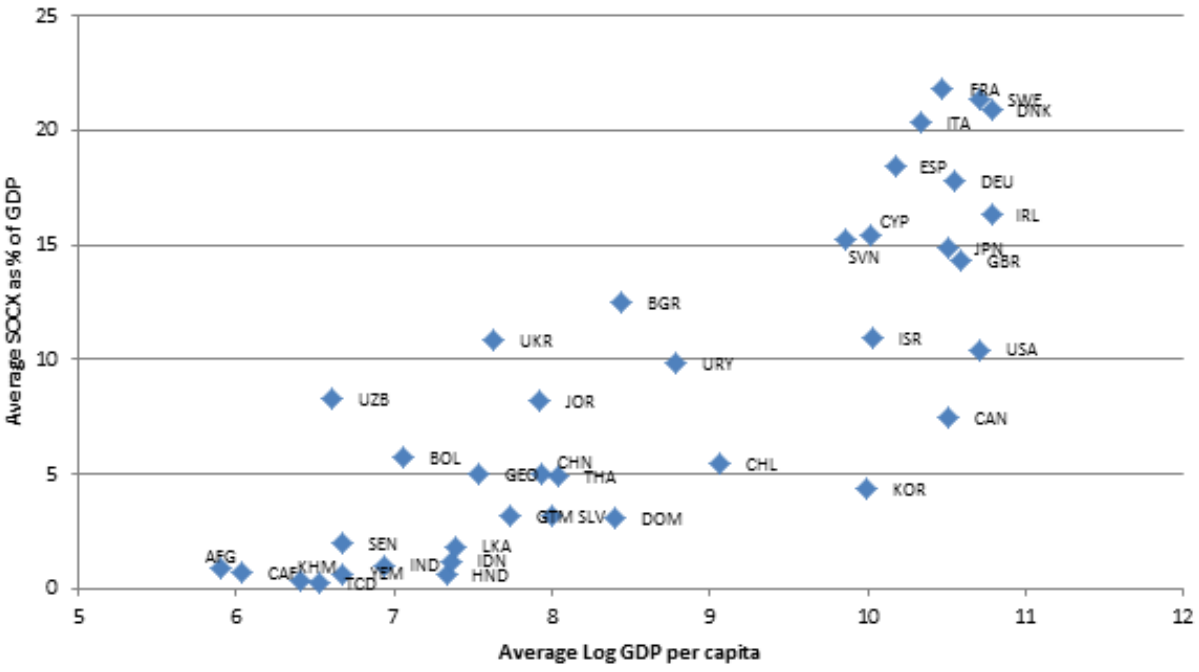
Figure 1 displays a plot of average log GDP per capita and average life satisfaction in our sample. A clear positive relationship can be identified, such that higher average life satisfaction levels can be found in higher income countries (with Denmark, Canada and Sweden for example) in comparison with poorer countries (Afghanistan or the Central African Republic). This is in line with the literature on subjective well-being, with previous findings of an elasticity around 0.8 between log average income and average national satisfaction in a large sample of 129 countries using the Gallup data (Deaton, 2008) and confirmed through the World Values Survey (Inglehart et al., 2008).

Figure 2. **Public social expenditure vs. GDP per capita**



Source: Authors' calculations based on World Development Indicators and ILO Social Security Expenditure Database.

Figure 2 provides a graphical overview of the distribution of average public social expenditures plotted against average log GDP per capita in constant 2005 USD. Two patterns can be identified. First, there is a positive relationship between level of wealth and public social expenditure, such that wealthy countries tend to spend the largest shares of GDP on social public expenditures (for instance, Scandinavian countries). Second, a few countries are outliers in this relationship, with the Ukraine for example spending almost twice as much in terms of percentage of GDP on social protection than Georgia despite very similar levels of GDP per capita.

III. EMPIRICAL STRATEGY

Studying the role of social protection in the context of individual well-being is challenging due to the multidimensionality underlying the latter. This analysis focuses on subjective well-being as an outcome of interest, with an empirical strategy similar to De Neve et al. (2015) in their analysis of the effect of GDP growth on subjective well-being. Capturing social protection as an indicator presents a similar challenge due to both conceptual and practical data constraints. It is difficult to capture the multidimensionality of social protection within an indicator, say for example of overall quality. While excellent initiatives have been led by the Asian Development Bank (ADB) and the World Bank to produce harmonised indicators through the Social Protection Index (SPI) and the ASPIRE database, respectively, the geographic limitations (Asia for the SPI) and overall limited availability make them unfit for the type of analysis we are conducting. Government expenditures are a more widely available indicator, thanks to the ILO Social Security Database.

To assess whether those expenditures may capture the social protection services received by the population, one can study the relationship between those expenditures and social protection indicators such as the ones mentioned above. Table 2 displays the correlation between social expenditures (SOCX) and various indicators, whether related to coverage, as provided by the ASPIRE database (distinguishing between social assistance, social insurance and all social protection and labour) or with the ADB's Social Protection Indicator. We observe very high correlations between expenditures on social protection and the Social Protection Index, which is intuitive since expenditures are a component of the ADB's Social Protection Index. Perhaps more interesting here is the high correlation between social protection expenditures and coverage levels, as well as with the benefits incidence in the poorest quintile. This suggests that social expenditures are thus reflected in social protection programme outcomes, which gives us some confidence to use those as proxy for the overall social protection services received by the population.

Table 2. **Correlation between SOCX and various social protection indicators**

	totSOCX	SPI	Breadth	Coverage SA	Coverage SI	Coverage SPL	Benefits Incidence
totSOCX	1.00						
SPI	0.98	1.00					
Breadth	0.61	0.67	1.00				
Coverage SA	0.50	0.68	0.42	1.00			
Coverage SI	0.76	0.65	0.65	0.31	1.00		
Coverage SPL	0.74	0.86	0.58	0.81	0.77	1.00	
Benefits Incidence	0.78	0.68	0.46	0.21	0.22	0.37	1.00

Notes: SA= Social Assistance, SI= Social Insurance, SP&L= All Social Protection & Labor, SPI= ADB Social Protection Index. The Social Protection Index is derived by dividing total expenditures on social protection by the total number of intended beneficiaries. Breadth refers to the total of beneficiaries divided by the total reference population (http://spi.adb.org/spidmz/index.jsp). Benefits incidence refers to social assistance in the poorest quintile.
Source: Authors' calculations based on ASPIRE World Development Indicators, the ILO Social Security Expenditure Database and the Asian Development Bank Social Protection Index.

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Based on those indicators of well-being and social protection, the next section provides an overview of the empirical strategy.

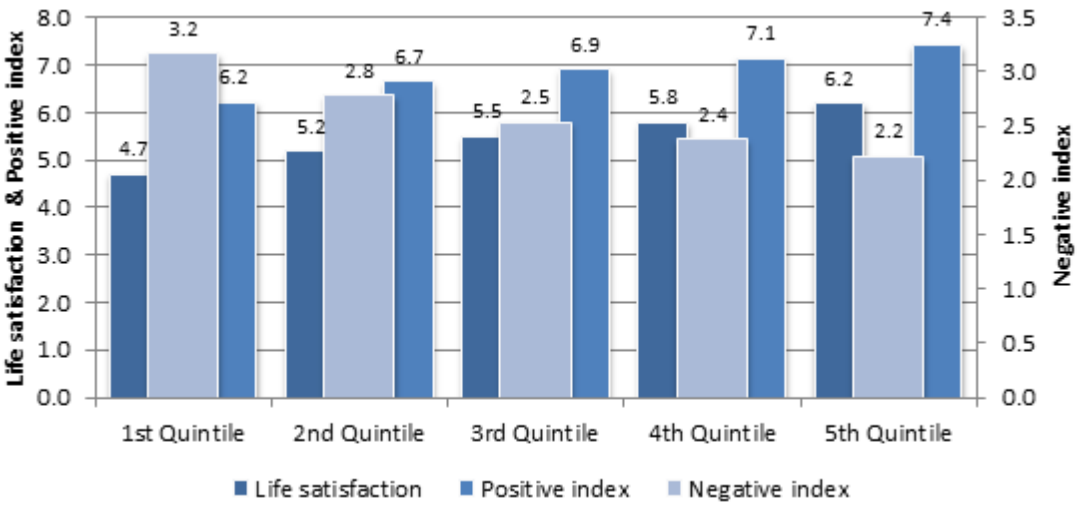
We consider a simple specification such as:

$$SWB_{ict} = \alpha + \beta\, SOCX_{ct} + \gamma Macro_{ct} + \theta Micro_{ict} + \delta_c + \rho_t + \mu_{ict} \qquad (1)$$

Where SWB_{ict} corresponds to the subjective well-being (standardised life satisfaction,[1] as well as the positive and negative index) of individual i in country c at time t. δ_c is a country fixed effect, while ρ_t is a year fixed effect. This allows us to control for time invariant cultural and institutional influences on subjective well-being within countries, as well as events that may affect all countries in each year.

The coefficient β shows the relationship between social protection expenditures (thereafter referred to as SOCX) in country c at time t and the level of subjective well-being of individuals. $Macro$ represents a vector of macroeconomic variables potentially mediating the effect of social protection on subjective well-being, while $Micro$ represents a vector of individual level characteristics, including the measures of social capital.

Figure 3. **Distributional disparities in subjective well-being**



Source: Authors' calculations based on Gallup World Poll.

For the distributional aspects of subjective well-being, it is of interest to explore several dimensions, in particular the distribution of life satisfaction across the income distribution. We observe a gradient in life satisfaction as well as in the positive and negative index with income

[1] While life satisfaction is not a continuous variable, Ferrer-i-Carbonell and Frijters (2004) show that assuming ordinality or cardinality of happiness scores makes little difference in modelling subjective well-being. The results for life satisfaction as an 11-point scale using an ordinal logit model confirm this, with the same statistical significance and sign of the coefficients (see Annex 2).

quintiles, with individuals in the highest quintile displaying lower negative index on average, as well as higher life satisfaction and positive experience than those in the lower quintiles (Figure 3).

This framework can be extended to consider several dimensions. First, the differential effects due to individual characteristics can be studied. In the interest of the *distribution* emphasis of the well-being framework, estimating the model with interactions representing different segments of the income distribution (defined within country and year) will allow us to observe whether the relationship between social protection and subjective well-being is non-linear, as it may, for instance, be stronger in the lower deciles in comparison with upper deciles. Second, the *multidimensionality* of subjective well-being can be studied, for instance, by including experienced subjective well-being dimensions as outcome variables in addition to evaluative measures such as life satisfaction.

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IV. RESULTS

Does social protection matter for subjective well-being?

The coefficients resulting from the estimation of model (1) are displayed in Table 3. The coefficient of interest here is primarily the one for social protection expenditures (shown in grey) for both evaluative (life satisfaction, columns 1 to 3) and experienced (positive and negative index, columns 4 to 9) measures of subjective well-being. As previously mentioned in the discussion of subjective well-being measures, looking beyond evaluative measures, in particular, satisfaction with life, and including experienced well-being, can provide further insights into the relationship between subjective well-being and social protection. As a first step, we include a vector of individual-level control variables, including age, education level, household composition, gender, household income and employment status.

We observe here a positive and statistically significant relationship between social expenditures and life satisfaction and the positive index, as well as a negative and statistically significant coefficient on the negative index (columns 1, 4 and 7).

While country-fixed effects account for all time invariant country-level characteristics that may influence our estimates of the relationship between subjective well-being and social protection expenditures, it is important to take into account potential time-varying mediators of this relationship. It is here essential to identify the relationship between subjective well-being and social protection net of the potential mediating effect of economic development. We thus include three dimensions of development that are for instance at the core of the Human Development Index: income, health and education. In particular, we include GDP per capita, the infant mortality rate (per 1 000 live births) and primary school enrolment rate; as well as the log of GDP per capita.

Columns 2, 5 and 8 display the result including those three additional macro-level controls. This addition to the model does not substantially change the results: the coefficients on social protection expenditures, albeit smaller, remain statistically significant and positive, while the magnitude of a positive relationship in terms of positive and negative affect increases, indicating that beyond individual and macro levels of income, social protection matters.

Next, we account for potentially mediating effects related to social capital, by including generosity and the availability of a support network as control variables (columns 3, 6 and 9).

Here again, we find the effects to hold when including additional controls.

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Table 3. **A Positive and significant relationship between SOCX and SWB**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Life satisfaction			*Positive Index*			*Negative Index*		
Age	-	-	-	-	-0.554***	-0.495***	0.544***	0.544***	0.481***
	0.019***	0.019***	0.017***	0.554***					
	(0.005)	(0.005)	(0.004)	(0.078)	(0.078)	(0.066)	(0.088)	(0.088)	(0.078)
Age²	0.000***	0.000***	0.000***	0.004***	0.004***	0.004***	-0.005***	-0.005***	-0.004***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Secondary	0.256***	0.256***	0.222***	4.437***	4.437***	3.329***	-3.080***	-3.080***	-2.300***
education	(0.018)	(0.018)	(0.018)	(0.647)	(0.647)	(0.638)	(0.602)	(0.602)	(0.562)
Tertiary	0.409***	0.409***	0.360***	7.194***	7.194***	5.619***	-4.164***	-4.164***	-3.135***
education	(0.026)	(0.026)	(0.024)	(0.955)	(0.955)	(0.932)	(0.899)	(0.899)	(0.844)
With partner	0.072***	0.072***	0.068***	1.366**	1.366**	1.249**	-1.591**	-1.591**	-1.544**
	(0.018)	(0.018)	(0.017)	(0.591)	(0.591)	(0.552)	(0.610)	(0.610)	(0.586)
Female	0.055***	0.055***	0.046***	-	-1.478***	-1.759***	4.049***	4.049***	4.214***
				1.478***					
	(0.017)	(0.017)	(0.015)	(0.401)	(0.401)	(0.389)	(0.590)	(0.590)	(0.591)
HH income	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Employed	0.019	0.019	0.011	0.374	0.374	0.103	0.216	0.216	0.339
	(0.021)	(0.021)	(0.020)	(0.636)	(0.636)	(0.606)	(0.513)	(0.513)	(0.478)
SOCX	0.083***	0.055***	0.043***	1.560***	3.465***	3.083***	-0.691***	-4.158***	-3.862***
	(0.005)	(0.003)	(0.003)	(0.092)	(0.088)	(0.081)	(0.084)	(0.077)	(0.079)
Log GDP p.c.		0.512***	0.447***		20.014***	17.890***		-11.355***	-10.155***
		(0.035)	(0.031)		(0.658)	(0.596)		(0.548)	(0.553)
School		0.047***	0.043***		1.986***	1.853***		-1.248***	-1.136***
enrolment		(0.001)	(0.001)		(0.020)	(0.020)		(0.018)	(0.020)
Infant		0.053***	0.046***		2.853***	2.606***		-2.236***	-2.070***
mortality		(0.003)	(0.003)		(0.070)	(0.065)		(0.059)	(0.060)
Social support			0.313***			9.649***			-8.950***
			(0.024)			(0.871)			(0.606)
Generosity			0.141***			4.747***			-1.303**
			(0.013)			(0.607)			(0.545)
Obs.	36 426	36 426	36 426	36 426	36 426	36 426	36 426	36 426	36 426
R²	0.306	0.306	0.324	0.097	0.097	0.121	0.066	0.066	0.080

Notes: Linear regression, subjective well-being as measured with the standardised Cantril ladder, the positive and negative index. Constant term, country and wave fixed-effects are included. Robust standard errors have been corrected for clustering within countries. *** p<0.01, ** p<0.05, * p<0.1
Source: Authors' analysis based on different waves of the Gallup World Poll and ILO Social Security Expenditure Database.

Does the relationship between social protection and subjective well-being hold equally true for the rich and the poor?

Next, we explore whether the effect found above holds or varies across different income groups. In particular, we are interested in studying two groups, with the first representing the bottom 40% and the second the top 60% of the income distribution (defined by country and year). In Table 3, we estimate a model with interaction terms as follows:

$$SWB_{ict} = \alpha + \beta_1\, SOCX_{ct} + \beta_2 Top60\%_{ict} + \beta_3 SOCX_{ct} * Top60\%_{ict} + \gamma Macro_{ct} + \theta Micro_{ict} + \delta_c + \rho_t + \mu_{ict} \quad (2)$$

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Where the coefficient β_1 represents the effect of social protection expenditures on the bottom 40%, β_2 the difference between the two income groups in terms of subjective well-being, and the effect of social protection expenditures on the subjective well-being of the top 40% is given by $\beta_1 + \beta_3$. The difference between the effect of social protection expenditures for the top 60% and bottom 40% is thus given by β_3 (shown in grey in Table 4).

Table 4. **Does social protection affect individuals equally across the income distribution?**

	(1) *Life satisfaction*	(1) *Positive Index*	(1) *Negative Index*
SOCX	0.061***	3.499***	-4.267***
	(0.003)	(0.069)	(0.090)
Top60*SOCX	-0.002	-0.202***	0.176**
	(0.003)	(0.070)	(0.072)
Top60	0.258***	5.764***	-5.641***
	(0.033)	(0.680)	(0.616)
Age	-0.016***	-0.485***	0.470***
	(0.004)	(0.062)	(0.076)
Age^2	0.000***	0.004***	-0.004***
	(0.000)	(0.001)	(0.001)
Secondary education	0.165***	2.213***	-1.187**
	(0.015)	(0.564)	(0.547)
Tertiary education	0.281***	4.169***	-1.673**
	(0.022)	(0.839)	(0.800)
With partner	0.049***	1.024**	-1.296**
	(0.015)	(0.500)	(0.535)
Female	0.049***	-1.719***	4.171***
	(0.016)	(0.384)	(0.590)
HH income	0.000***	0.000	-0.000
	(0.000)	(0.000)	(0.000)
Employed	0.003	0.025	0.430
	(0.017)	(0.576)	(0.433)
Social support	0.289***	9.172***	-8.476***
	(0.025)	(0.898)	(0.616)
Generosity	0.128***	4.503***	-1.059*
	(0.013)	(0.601)	(0.557)
Log GDP p.c.	0.573***	19.915***	-12.241***
	(0.024)	(0.529)	(0.583)
School enrolment	0.047***	1.923***	-1.207***
	(0.001)	(0.020)	(0.023)
Infant mortality	0.059***	2.826***	-2.297***
	(0.002)	(0.058)	(0.064)
Observations	36,426	36,426	36,426
R-squared	0.335	0.126	0.085

Notes: Linear regression, subjective well-being as measured with the standardised Cantril ladder, the positive and negative index. Constant term, country and wave fixed-effects are included. Robust standard errors have been corrected for clustering within countries. *** p<0.01, ** p<0.05, * p<0.1
Source: Authors' analysis based on different waves of the Gallup World Poll and ILO Social Security Expenditure Database.

As expected, the coefficient for the effect of social protection expenditures is positive and statistically significant for the bottom 40%. Interestingly, we find a statistically significant difference between the rich and the poor in the effect of social protection expenditures on experienced well-being, with larger coefficients in magnitude for the bottom 40% sample, indicating a stronger relationship between SWB and SOCX for the poorest (columns 2 and 3). This difference, however, does not seem to hold when explaining life satisfaction (column 1).

Does the relationship between social protection and subjective well-being hold equally true for beneficiaries and non-beneficiaries?

A first set of results above indicates a positive relationship between subjective well-being and social protection expenditures, particularly so for the poorest.

Next, we would like to better understand this relationship, and in particular see if this relationship is primarily driven by individuals being recipients of those social protection expenditures In theory, individuals may be influenced by social protection without being direct recipients, to the extent that it affects them through its effects on society as a whole, or even through a somewhat altruistic mechanism. Identifying whether individuals are direct beneficiaries of social protection programmes is not directly feasible with our data. We can, however, assess if the relationships found above holds true for potential beneficiaries and non-beneficiaries by focusing, for instance, on child social protection expenditures and explore the relationship with the subjective well-being of individuals with and without children.

Following a model to the one in the previous section, we now evaluate the following models:

$$SWB_{ict} = \alpha + \beta_1\, SOCX_{ct} + \beta_2 With\ children_{ict} + \beta_3 SOCX_{ct} * With\ children_{ict} + \gamma Macro_{ct} + \theta Micro_{ict} + \delta_c + \rho_t + \mu_{ict} \quad (3)$$

Where, again, the coefficient β_1 represents the effect of social protection expenditures on the individuals living in households without children, β_2 the difference between the households with and without children in terms of subjective well-being, and the effect of social protection expenditures on the subjective well-being of the households with children being given by $\beta_1 + \beta_3$. The difference between the effect of social protection expenditures for the households with and without children is thus given by β_3 (in dark grey in Table 5).

We can use a similar model but now using social expenditures on children in particular instead of general social expenditures, such that:

$$SWB_{ict} = \alpha + \beta_1\, SOCX\ Children_{ct} + \beta_2 With\ children_{ict} + \beta_3 SOCX\ Children_{ct} * With\ children_{ict} + \gamma Macro_{ct} + \theta Micro_{ict} + \delta_c + \rho_t + \mu_{ict} \quad (4)$$

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Table 5 summarises the results when distinguishing between those two categories (households with and without children), for the three measures of well-being, looking at the total social expenditures (columns 1, 4 and 7), and expenditures on children in particular (columns 2, 5 and 8) as a share of GDP and expenditures on children per child – defined by the population aged 14 and under in columns 3, 6 and 9. The interaction of the indicator for having children under 15 in the household and the amount of social expenditures is shown in dark grey, while the interaction with social expenditures on children is shown in medium grey, and the interaction with social expenditure per child in light grey.

The effect of total social expenditures is stronger in households with children when looking at the decrease in negative affect (column 7). We also observe a stronger positive relationship between social protection expenditure focused on children and subjective well-being for individuals living in households with children in terms of positive and negative affect (columns 5, 6, 8 and 9). Overall, however, while there is a slightly stronger effect of both total social expenditures and expenditures on children for households with children, there is no difference in terms of life satisfaction. Moreover, the magnitude of the difference between households with and without children is rather small in comparison with the overall positive effect of social protection expenditures. This suggests that social protection investments may affect positively individuals' subjective well-being and that such a relationship expands beyond potential beneficiaries to encompass broader groups in society, consistent with the idea that social protection can lead to higher subjective well-being for all, enhance the social contract and act as an engine for social cohesion.

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Table 5. **Do we only care about social protection when it affects us? The case of children**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Life satisfaction			*Positive Index*			*Negative Index*		
Age	-0.017***	-0.017***	-0.017***	-0.501***	-0.500***	-0.500***	0.488***	0.488***	0.487***
	(0.004)	(0.004)	(0.004)	(0.065)	(0.064)	(0.064)	(0.073)	(0.073)	(0.073)
Age²	0.000***	0.000***	0.000***	0.004***	0.004***	0.004***	-0.004***	-0.004***	-0.004***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Secondary education	0.219***	0.219***	0.220***	3.291***	3.294***	3.291***	-2.266***	-2.253***	-2.250***
	(0.018)	(0.018)	(0.018)	(0.639)	(0.641)	(0.643)	(0.564)	(0.564)	(0.564)
Tertiary education	0.357***	0.357***	0.358***	5.562***	5.569***	5.571***	-3.076***	-3.070***	-3.072***
	(0.024)	(0.024)	(0.024)	(0.935)	(0.936)	(0.937)	(0.847)	(0.844)	(0.845)
With partner	0.079***	0.080***	0.080***	1.554***	1.564***	1.568***	-1.935***	-1.928***	-1.931***
	(0.017)	(0.017)	(0.017)	(0.564)	(0.565)	(0.566)	(0.576)	(0.577)	(0.577)
Female	0.048***	0.048***	0.048***	-1.699***	-1.697***	-1.695***	4.137***	4.139***	4.137***
	(0.015)	(0.015)	(0.015)	(0.386)	(0.385)	(0.384)	(0.580)	(0.580)	(0.580)
HH income	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Employed	0.011	0.012	0.012	0.146	0.160	0.175	0.269	0.274	0.259
	(0.020)	(0.020)	(0.020)	(0.601)	(0.598)	(0.597)	(0.471)	(0.469)	(0.468)
With at least 1child	0.073***	0.055***	0.050***	0.779	0.517	0.585	-0.399	-0.755	-0.857
	(0.018)	(0.016)	(0.014)	(0.601)	(0.533)	(0.462)	(0.917)	(0.682)	(0.578)
SOCX	0.042***			3.090***			-3.887***		
	(0.003)			(0.083)			(0.078)		
Child*	-0.003*			0.063			-0.153**		
SOCX %GDP	(0.002)			(0.063)			(0.069)		
Child SOCX		0.101***			6.949***			-8.745***	
		(0.008)			(0.217)			(0.207)	
Child*Child		-0.007			0.856**			-0.916**	
SOCX %GDP		(0.015)			(0.420)			(0.364)	
Child SOCX per			0.001***			0.038***			-0.047***
child			(0.000)			(0.001)			(0.001)
Child* Child			-0.000			0.001***			-0.001***
SOCX per child			(0.000)			(0.000)			(0.000)
Social support	0.312***	0.312***	0.312***	9.626***	9.626***	9.618***	-8.917***	-8.922***	-8.915***
	(0.024)	(0.024)	(0.024)	(0.869)	(0.870)	(0.868)	(0.603)	(0.605)	(0.603)
Generosity	0.141***	0.140***	0.140***	4.736***	4.735***	4.724***	-1.280**	-1.290**	-1.278**
	(0.013)	(0.013)	(0.013)	(0.607)	(0.607)	(0.603)	(0.546)	(0.548)	(0.547)
Log GDP p.c.	0.437***	0.312***	-0.070***	18.084***	8.031***	-19.437***	-10.629***	2.180***	36.574***
	(0.031)	(0.022)	(0.016)	(0.677)	(0.405)	(0.558)	(0.574)	(0.362)	(0.544)
School enrolment	0.042***	0.032***	0.036***	1.880***	1.045***	1.373***	-1.196***	-0.124***	-0.534***
	(0.001)	(0.000)	(0.000)	(0.030)	(0.008)	(0.009)	(0.028)	(0.008)	(0.010)
Infant mortality	0.044***	0.022***	0.003***	2.650***	0.835***	-0.489***	-2.164***	0.146***	1.802***
	(0.003)	(0.001)	(0.001)	(0.080)	(0.033)	(0.038)	(0.066)	(0.028)	(0.035)
	(0.426)	(0.239)	(0.197)	(10.814)	(4.539)	(5.558)	(8.844)	(4.411)	(5.722)
Observations	36 426	36 426	36 426	36 426	36 426	36 426	36 426	36 426	36 426
R-squared	0.324	0.324	0.324	0.121	0.121	0.121	0.081	0.081	0.081

Notes: Linear regression, subjective well-being as measured with the standardised Cantril ladder, the positive and negative index. Constant term, country and wave fixed-effects are included. Robust standard errors have been corrected for clustering within countries. *** p<0.01, ** p<0.05, * p<0.1

Source: Authors' analysis based on different waves of the Gallup World Poll and ILO Social Security Expenditure Database. The population aged 14 and under is based on the UNESCO Institute for Statistics database.

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Testing the robustness of our findings

As previously mentioned, the availability of data on social protection is restricted, leading us to use social protection expenditures as a proxy for the level of development of social protection systems. We thus conducted a robustness analysis addressing this issue to test our previous findings.

First, we cannot test as part of a natural experiment whether specific policy interventions such as enrolment into social protection programmes or increases in benefit generosity have effects on the subjective well-being of individuals. Instead, we have to rely on a large cross-country and cross-sectional survey in combination with policy variables for each country and wave. This approach is therefore at greater risk of confounding factors affecting the results. In particular, as we study a period of high economic volatility caused by the Great Recession that has witnessed both expansionary and austerity measures that varied across countries and over time, there is a possibility that changes in social spending may be driven by changes in economic circumstances in a way that could affect the interpretation of the link between social protection spending as a percentage of GDP and subjective well-being. However, it is of interest to note that increases in social spending in terms of share of GDP in response to the Great Recession occurred between 2007 and 2009 across OECD countries (OECD, 2014) and thereafter remained on average at their elevated levels (i.e. in the years we study). Moreover, the responsiveness of social spending to elevated levels of vulnerability during the crisis was not straightforward, as some of the biggest increases in expenditures between 2007/08 and 2012/13 occurred in countries with relatively strong GDP growth and not in those where deep downturns resulted in greater needs (OECD, 2014). This lack of relationship can also be seen in our broader sample of countries in Annex 3, with a plot of the changes in overall social spending versus the changes in GDP per capita. It is also important to note that much of the increase in social spending early in the crisis was concentrated on out-of-work benefits, at least in OECD countries. We tested whether the relationship is different in OECD and non-OECD countries, and find that the relationship holds in both samples (see Annex 4, where the first three columns display the coefficients for the OECD countries, and the last three columns the coefficients for non-OECD countries). To address concerns regarding changes in social expenditures being driven by changes in GDP and changes in the demand for social protection, rather than changes in breadth or coverage, we also use social expenditures per capita instead of social protection expenditures as a percentage of GDP. All the above displayed results hold.

Second, whether social protection expenditures are a good proxy for the level of development of social protection systems is an issue. To address this issue, we use as alternative data sources and as a robustness test the beneficiaries data from the World Bank's ASPIRE and the subjective well-being data from the Latinobarómetro. The sample here only includes Latin

American countries (in particular: Argentina, Brazil, Colombia, Ecuador, Honduras, Mexico, Peru, Uruguay), but will cover a broader range of years (2001 and then 2003 to 2010[2]).

The Latinobarómetro is an annual public opinion survey that involves some 20 000 interviews in 18 Latin American countries, representing more than 600 million inhabitants. The subjective well-being question in the Latinobarómetro is formulated as follows: "In general, would you say that you are satisfied with your life? Would you say that you are: *very satisfied, fairly satisfied, not very satisfied or not at all satisfied.*"

The beneficiaries data drawn from the ASPIRE database represents the percentage of the population enrolled in social protection programmes based on administrative data. Due to data constraints for certain types of programmes, we will focus on conditional cash transfers (CCT), as those are best documented on an annual basis and represent an important pillar of social protection in Latin America.

We here follow an empirical strategy similar to the one implemented in Table 3, but given the ordinal four-point scale, we will here use an ordinal logit model. Column 1 of Table 6 displays the results when including the number of beneficiaries (as a percentage of the population) as an explanatory variable in additional to individual level demographic and socio-economic controls. Column 2 displays the coefficients with additional macro-level control included in the specification, in particular, primary school enrolment, infant mortality and GDP per capita. Again, the purpose of these additional controls is to capture the potentially confounding effects of the level of economic development. Column 3 displays the results using the same specification, now adding the level of expenditure on conditional cash transfers as a control.

These three coefficients in the first three columns confirm our previous findings: evidence exists of a positive and statistically significant relationship between subjective well-being (here measured through life satisfaction) and social protection (here measured through the percentage of the population enrolled in conditional cash transfer programmes).

Overall, the variation in policy responses in terms of social spending following changes in GDP as well as our results when focusing on non-working age benefits (Table 5) and the use of a different time period and social protection indicator reinforce our belief that using social expenditures as a share of GDP should not present strong confounding issues in terms of responsiveness to needs in the context of the Great Recession.

[2] The life satisfaction questions in 2000 and 2002 were either unavailable or offering response scales that were not comparable with other survey years.

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Table 6. **Robustness of social protection proxies: The case of CCT beneficiaries in LAC**

	(1)	(2)	(3)
		Life satisfaction	
Age	-0.004***	-0.005***	-0.005***
	(0.001)	(0.002)	(0.002)
Gender	-0.069**	-0.050*	-0.049*
	(0.029)	(0.026)	(0.026)
Marital status	-0.065***	-0.053***	-0.053***
	(0.015)	(0.015)	(0.015)
Education	0.029***	0.032***	0.032***
	(0.006)	(0.007)	(0.007)
Occupation	0.017***	0.015**	0.015**
	(0.005)	(0.007)	(0.006)
CCT beneficiaries	0.024**	0.027**	0.035*
	(0.010)	(0.014)	(0.019)
Individual wealth		0.168***	0.169***
		(0.023)	(0.023)
Log GDP per capita		-0.601	-0.831
		(1.210)	(1.268)
CCT expenditures			-0.556
			(0.483)
School enrolment		0.034	0.042
		(0.022)	(0.028)
Infant mortality		-0.018	-0.022
		(0.122)	(0.129)
cut1			
Constant	-2.879***	-4.366	-5.369
	(0.229)	(8.771)	(8.988)
cut2			
Constant	-0.469*	-1.956	-2.958
	(0.262)	(8.791)	(8.999)
cut3			
Constant	1.521***	-0.214	-1.217
	(0.312)	(8.776)	(8.987)
Observations	59,174	45,020	45,020

Notes: Ordinal logit regression, subjective well-being through life satisfaction. Constant term, country and wave fixed-effects are included. Robust standard errors have been corrected for clustering within countries. Estimations include the following individual-level controls: age, gender, marital status, proxy for wealth[3], employment status, education, and the following macro-level controls: Primary school enrolment, infant mortality rate, GDP per capita. *** p<0.01, ** p<0.05, * p<0.1
Source: Authors' analysis based on different waves of the World Bank's Atlas of Social Protection Index of Resilience and Equity and the Latinobarómetro.

[3] The Latinobarometro does not include a direct measure of respondents' income. We here use a composite wealth index used by Graham and Markowitz (2011), based on the presence of three households goods: hot running water, a washing machine, and a home telephone.

V. CONCLUSION

This paper studied the relationship between social protection expenditures and subjective well-being in a sample of 38 OECD and non-OECD countries. Our objective was to uncover a possible link between social protection investments and measures of both life satisfaction and experienced well-being, and explore further whether the possible links vary between direct and non-direct potential beneficiaries and level of income.

Our results indicate first of all that there is a positive and significant relationship between expenditures on social protection and individuals' subjective well-being when measured through both life satisfaction and positive as well as negative emotions. We find this positive relationship to hold not only when controlling for individual characteristics (in particular, gender, household composition, employment status, age, education, and income) but also for the level of development (GDP per capita, infant mortality, and primary school enrolment) while using both country and wave fixed effects as well as social capital (generosity and existence of a support network). Second, while the link between social protection and subjective well-being seems to be to a small extent partially driven by the direct effect of social protection on potential beneficiaries, an "altruistic" mechanism and general benefit effect on the overall population is also likely to operate as suggested by the fact that investments in child social protection remain positively associated with the level of subjective well-being for families without children. Finally, we find evidence supporting a greater positive relationship between subjective well-being and social expenditures in the bottom 40% of the population.

This positive relationship between subjective well-being and social protection is robust to the use of a different proxy for social protection (beneficiaries instead of expenditures), when studying it in Latin American countries based on the Latinobarómetro and to the use of expenditures per capita instead of share of GDP.

Caution should be applied to consider a few caveats, however. First, despite the use of a fixed effects model controlling for country and wave effects as well as a set of control variables for individual characteristics and the level of development, we cannot exclude reverse causality or endogeneity issues. Second, the use of social protection expenditures as a proxy for the quantity and quality of social protection services enjoyed by the population is obviously not exempt of problems. In this respect, it would be useful to explore in future work, when more comprehensive and internationally comparable data on social protection become available, whether using other indicators for social protection confirm our findings. Finally, we cannot assert whether the channels through which social spending are positively associated with subjective well-being are the results of higher generosity in benefits or broader coverage,

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although our results in the Latin American sample indicate that the latter might be driving the results.

Notwithstanding the above, the evidence brought forward in this analysis suggests that social protection investments may affect positively individuals' subjective well-being and that such a relationship expands beyond potential beneficiaries to encompass broader groups in society, consistent with the idea that social protection can lead to higher subjective well-being for all, enhance the social contract and act as an engine for social cohesion.

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ANNEXES

Annex 1. **Sample**

1	Afghanistan
2	Bolivia
3	Bulgaria
4	Cambodia
5	Canada
6	Central African Republic
7	Sri Lanka
8	Chad
9	Chile
10	China
11	Cyprus*
12	Denmark
13	Dominican Republic
14	El Salvador
15	France
16	Georgia
17	Germany
18	Guatemala
19	Honduras
20	India
21	Indonesia
22	Ireland
23	Israel
24	Italy
25	Japan
26	Jordan
27	Republic of Korea
28	Senegal
29	Slovenia
30	Spain
31	Sweden
32	Thailand
33	Ukraine
34	UK
35	United States of America
36	Uruguay
37	Uzbekistan
38	Yemen

* Note by Turkey
The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".

Note by all the European Union Member States of the OECD and the European Union
The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

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Annex 2. **Ordinal logit results**

	(1)	(2)	(3)
		Life satisfaction	
Age	-0.040***	-0.040***	-0.036***
	(0.009)	(0.009)	(0.009)
Age^2	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
Secondary education	0.548***	0.548***	0.482***
	(0.040)	(0.040)	(0.042)
Tertiary education	0.852***	0.852***	0.761***
	(0.056)	(0.056)	(0.054)
With partner	0.159***	0.159***	0.154***
	(0.039)	(0.039)	(0.037)
Female	0.113***	0.113***	0.095***
	(0.035)	(0.035)	(0.033)
HH income	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
Employed	0.025	0.025	0.010
	(0.047)	(0.047)	(0.044)
SOCX	0.181***	0.099***	0.077***
	(0.012)	(0.008)	(0.008)
Log GDP p.c.		1.155***	1.037***
		(0.091)	(0.084)
School enrolment		0.103***	0.097***
		(0.004)	(0.004)
Infant mortality		0.115***	0.101***
		(0.009)	(0.008)
Social support			0.656***
			(0.046)
Generosity			0.297***
			(0.031)
cut1	-3.939***	18.565***	16.998***
	(0.228)	(1.287)	(1.214)
cut2	-3.131***	19.373***	17.812***
	(0.175)	(1.303)	(1.231)
cut3	-2.270***	20.234***	18.685***
	(0.162)	(1.322)	(1.252)
cut4	-1.375***	21.129***	19.596***
	(0.157)	(1.330)	(1.262)
Cut5	-0.634***	21.870***	20.351***
	(0.169)	(1.337)	(1.270)
Cut6	0.696***	23.200***	21.702***
	(0.188)	(1.346)	(1.280)
Cut7	1.427***	23.931***	22.442***
	(0.212)	(1.354)	(1.291)
Cut8	2.320***	24.824***	23.342***
	(0.223)	(1.375)	(1.311)
Constant	3.599***	26.103***	24.628***
	(0.254)	(1.417)	(1.354)
Constant	4.464***	26.968***	25.496***
	(0.288)	(1.466)	(1.405)
Observations	36 426	36 426	36 426

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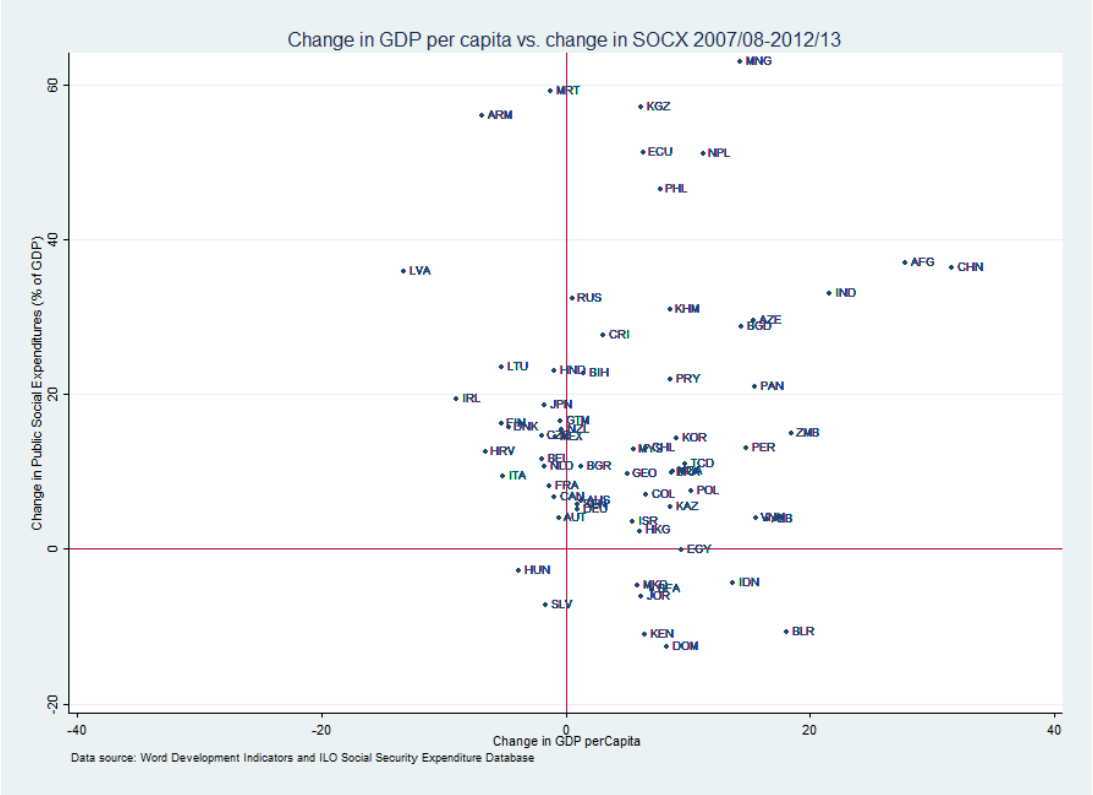
Annex 3. **Policy response to changes in GDP in terms of social spending**



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Annex 4. Relationship between social expenditures and subjective well-being in OECD and non-OECD countries

	(1)	(2)	(3)	(4)	(5)	(6)
		OECD			*Non-OECD*	
	Life satisfaction	Positive Index	Negative Index	Life satisfaction	Positive Index	Negative Index
Age	-0.026***	-0.547***	0.400***	-0.012**	-0.413***	0.413***
	(0.005)	(0.122)	(0.111)	(0.005)	(0.059)	(0.072)
Age^2	0.000***	0.005***	-0.005***	0.000*	0.003***	-0.003***
	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)
Secondary education	0.221***	3.323***	-2.843**	0.198***	3.036***	-2.017***
	(0.034)	(0.868)	(1.023)	(0.024)	(0.753)	(0.685)
Tertiary education	0.323***	5.451***	-3.885**	0.352***	5.256***	-2.325*
	(0.048)	(1.001)	(1.293)	(0.033)	(1.297)	(1.200)
With partner	0.150***	1.713***	-1.330*	0.030	0.883	-1.419*
	(0.021)	(0.465)	(0.740)	(0.018)	(0.752)	(0.755)
Female	0.070**	-1.350	4.440***	0.032*	-1.988***	4.247***
	(0.029)	(0.839)	(0.664)	(0.017)	(0.425)	(0.784)
HH income	0.000***	0.000**	-0.000**	0.000***	0.000**	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Employed	0.066**	-0.048	-1.203*	-0.011	0.328	0.584
	(0.027)	(0.550)	(0.595)	(0.022)	(0.777)	(0.545)
SOCX	0.133***	2.658***	-2.625***	0.011***	1.586***	-3.365***
	(0.004)	(0.089)	(0.110)	(0.002)	(0.067)	(0.063)
Log GDP p.c.	-0.821***	-16.703***	-15.446***	0.074***	0.695	-3.671***
	(0.037)	(0.524)	(0.843)	(0.014)	(0.467)	(0.547)
School enrolment	-0.198***	-3.713***	-3.281***	0.031***	1.115***	-0.875***
	(0.004)	(0.093)	(0.110)	(0.002)	(0.058)	(0.047)
Infant mortality	-0.195***	-2.357***	-0.770***	0.009***	0.759***	-1.371***
	(0.006)	(0.099)	(0.142)	(0.002)	(0.060)	(0.057)
Social support	0.441***	14.368***	-13.313***	0.280***	8.595***	-8.036***
	(0.027)	(1.861)	(1.278)	(0.025)	(0.831)	(0.583)
Generosity	0.169***	4.796***	-1.330	0.118***	4.419***	-0.914
	(0.018)	(0.669)	(0.824)	(0.015)	(0.815)	(0.681)
Const.	28.550***	605.640***	508.357***	-4.243***	-78.678***	201.570***
	(0.752)	(14.608)	(18.283)	(0.343)	(10.298)	(9.705)
Obs.	10 628	10 628	10 628	25 798	25 798	25 798
R^2	0.179	0.090	0.088	0.229	0.128	0.083

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