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The multiplier effects of government expenditures on social protection: A multi-country study

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Abstract

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This article assembles a novel dataset covering 42 countries from 1985 to 2020 to explore the impact of public spending on social protection on gross domestic product (GDP). Our contribution to the empirical literature on social protection spending lies in conducting the largest multi-country study using the structural VAR approach. Our results highlight positive effects of social protection expenditures on GDP that surpass those of total government expenditures. These results vary considerably across countries, with impact multipliers ranging from 5 in Mexico to -0.71 in Paraguay. We detect that the cumulative multiplier exceeds 1 for 30 out of the 42 sample countries and tends to be higher overall, suggesting that the positive impact of social protection spending on GDP accumulates over time. We also find statistically significant and strong correlations between the cumulative and impact multipliers and inequality measures such as the Gini coefficient and the income shares of the poorest and the richest: the positive impact of public spending on social protection on GDP is especially pronounced in countries characterized by higher inequality. Taken together, our results hold significant policy implications, suggesting that the growth-enhancing potential of social protection policies is complementary to their ability to reduce inequality.

Key words

Social protection policies; fiscal multipliers; inclusive economic growth; income inequality; human development; structural VAR.

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1. Introduction

A well-designed and inclusive social protection system has a positive impact on several aspects of the economic and social life, thus being essential to the achievement and maintenance of inclusive economic growth, social progress, and human development (ILO, 2021; UNESCAP and ILO, 2021; Ortiz et al., 2019; Alderman and Yemtsov, 2012, 2014; Barrientos, 2012; Barrientos and Hulme, 2016; Gebregziabher and Niño- Zarazúa, 2014; Addison et al., 2015; Gough et al., 2004; Atkinson, 1999). In particular, there is considerable empirical evidence that public spending on social protection reduces poverty and inequality, thus contributing to greater political stability by reducing social tensions and conflicts, and promotes human development and productivity (see, e.g., Barrientos, 2013; ILO, 2021; Haile and Niño-Zarazúa, 2018; Barrientos and Malerba, 2020).

However, according to the latest edition of the *World Social Protection Report* (ILO, 2021), as of 2020, only 46.9% of the world population were covered by at least one social protection benefit (excepting healthcare and sickness benefits), whereas the other 53.1% (about 4.1 billion people) were completely unprotected. There were also large inequalities both across and within regions, with coverage rates in Europe and Central Asia (83.9%) and the Americas (64.3%) placed above the world average, whereas Asia and the Pacific (44.1%), the Arab States (40.0%) and Africa (17.4%) had lower or much lower coverage rates. Countries spent on average 12.9% of their gross domestic product (GDP), but high-income countries spent on average 16.4%, which is twice as much as upper-middle-income countries (which spend 8%), more than six times as much as lower-middle-income countries (2.5%), and 15 times as much as low-income countries (1.1%). Meanwhile, only 30.6% of the working-age population in the world were legally covered by comprehensive social security systems including a full set of benefits, from child and family benefits to old-age pensions, with the coverage for women lagging behind men's by 8 percentage points. And less than 20% of unemployed workers around the world receive some kind of unemployment benefit. Thus, the large majority of the working-age population worldwide (69.4%, or about 4 billion people) were only partially so protected or had no such protection whatsoever.

The recent pandemic highlighted the importance of inclusive social protection systems. In addition to attenuating the increase in poverty and inequality during the Covid-19 crisis, a few recent studies have shown that social protection expenditures also played a significant counter-cyclical role. Almeida et al. (2020), for instance, found that households' disposable income in the European Union would have fallen by 5.9% due to the COVID-19 crisis without discretionary policy measures. It fell instead 3.6% with the policy intervention. A study by Casado et al. (2020) suggested that the federal supplements to unemployment insurance (UI) in the United States have substantially attenuated the fall in consumer spending. In particular, the exercise based on data from the state of Illinois points towards a 5% decrease in consumer spending due to a reduction in $300 in UI benefits. Even if context specific, this microeconometric evidence adds to the existing (but scarce) macroeconomic literature that indicates that social protection has substantial fiscal multipliers.

There has been a considerable surge in the empirical literature on the size of fiscal multipliers in recent years. However, as pointed out by Gechert et al. (2021), social expenditures have not received nearly the same attention. While several papers have estimated the effects of federal and local public procurement, consumption and investment spending, and tax shocks on different measures of the level of economic activity, the impact of changes in social security contributions and benefits on such measures has only been explored by a few authors.

From a theoretical point of view the positive impacts of social protection expenditures on the level of GDP can be explained within a framework based on Keynes (1936). In macroeconomic models that incorporate the principle of effective demand, changes in aggregate demand impact output not only directly, but also indirectly through a multiplier effect. A positive change in demand results in an increase in production which leads to an increase in value added distributed as income which generates further demand for output production. Since not all income so generated is spent, this effect is higher than 1 but has an upper bound. The proportion of income that is consumed and not saved (called marginal propensity to consume) is therefore a key variable that explains the size of a multiplier effect.

Similarly in essence to Keynes (1936), Kalecki (1942) proposed a model where the marginal propensity to consume out of wage income is higher than the marginal propensity to consume out of profit income. In this context, an income redistribution from profit recipients to wage earners becomes a fundamental variable directly influencing consumption and investment. Since the size of the multiplier depends directly on the marginal propensity to consume and since social protection spending tends to be received by households with a higher propensity to consume, these expenditures boost consumption and raise sales expectations by firms and business investments (Sanches and Carvalho, 2023). In other words, social protection multiplier dynamics can be enhanced since people who receive these benefits tend to have a relatively high propensity to consume.

Significant evidence has been found that those at the bottom of the income distribution have a higher propensity to consume than those at the top (see Carvalho and Rezai, 2016). Thus, government expenditures that benefit those at the bottom would have a higher impact on GDP than expenditures aimed at the top. Furthermore, policies that promote the redistribution of income, even if they have no direct impact on total output could still impact on GDP by increasing the aggregate propensity to consume of the economy. From this theoretical perspective, social protection expenditure, even more so than total government expenditure can positively impact on GDP. This impact could be even higher for extremely unequal countries.

Against this theoretical and empirical backdrop, this article assembles a novel dataset covering 42 countries from 1985 to 2020 to explore the impact of public spending on social protection on the level of macroeconomic activity. This novel dataset combines information from different databases made available by international organizations with

official information provided by several of the sample countries themselves. Our contribution to the empirical literature on social protection spending lies in conducting the largest multi-country study using the structural VAR approach. Drawing upon the sizable existing literature on fiscal multipliers, we estimate the multiplier effects of public expenditure on social protection on GDP of a considerably heterogeneous sample including developing and developed countries. We detect positive effects of social protection expenditures on GDP that surpass those of total government expenditures, although these results vary considerably across countries. We also find that the cumulative multiplier exceeds 1 for most of the 42 sample countries and tends to be higher overall, suggesting that the positive impact of social protection spending on GDP accumulates over time. In addition to calculating country-specific multipliers for the entire dataset we engage in interpreting and analyzing the results and exploring whether the magnitude of the multipliers are in some way connected to other characteristics of the countries (such as inequality measures, share of social expenditure in gross domestic product and income per capita). As our results show, the impact and cumulative multipliers are significantly higher in more unequal countries and in those where the income share of the poorest half of the population is smaller. Taken together, our results hold significant policy implications, suggesting that the growth-enhancing potential of social protection policies is complementary to their ability to reduce inequality.

After this introduction, this article progresses as follows. In the next section, to suitably contextualize our contribution, we outline the related empirical literature on fiscal multipliers. The following section describes the assembled dataset and the methodology used to obtain the empirical estimates. The section that follows presents the results and discusses their implications. Finally, the last section draws the conclusions and suggests possibilities for future research.

2. Related literature

Especially since the recent Global Financial Crisis, there has been significant development in the empirical literature on fiscal multipliers. In country-specific studies, the use of linear VAR models (autoregressive vectors) to estimate the impact of an exogenous shock in public expenditures or government revenues on the level of economic activity has been the most common empirical approach, following Blanchard and Perotti (2002). When disaggregating different government expenditures, this literature usually finds a higher and more persistent multiplier effect on aggregate output in response to a change in public investment than in public consumption. In this context, only a few studies have focused on estimating the impacts of different social expenditures, namely income transfers (such as unemployment insurance or cash transfers) and social security, on economic growth. Blanchard and Perotti (2002) and Perotti (2004) treat transfers as a component that should be subtracted from total revenue, a strategy followed by several authors (see, e.g., Peres, 2006; Giordano et al., 2007; Peres and Ellery, 2009; Burriel et al., 2010; Tenhofen et al., 2010; Castro and Fernandez, 2011; Lozano and Rodriguez, 2011; Jemec et al., 2013; Borg, 2014; Skrbic and Simovic, 2015; Mendonça et al., 2016; Alves, 2017; Grudtner and Aragon, 2017;

Restrepo, 2020). Yet this strategy has been criticized in the recent literature (Baum and Koester, 2011; Gáldon, 2013; Pereira and Wemans, 2013; Gechert et al., 2021).

In that regard, Pereira and Wemans (2013) correctly underlined that the initial empirical studies applying the structural VAR methodology to fiscal policy used a very aggregate definition of budgetary variables, considering only taxes net of transfers, on the revenue side, and public expenditures (basically consumption and public investment), on the spending side. For these authors, however, it is plausible that changes in the various headings that comprise these aggregates exert different impacts on the level of economic activity.

The existing literature that started from the conventional VAR approach of Blanchard and Perotti (2002) finds conflicting results, as shown in Table 1 in the Appendix.Various studies have attempted to estimate the value of multipliers for different types of public spending. On the one hand, some estimate higher multipliers associated with government consumption, cuts in direct taxes, and, especially, public investments, than for social benefits (Sen and Kaya, 2017; Bova and Klyviene, 2019; Pereira and Wemans, 2013). In other cases, the multiplier for social transfers is large in absolute terms, but different types of expenditure feature a similar or a higher multiplier effect on aggregate output (Pereira and Wemans, 2013; Fatás and Mihov, 2001; Pereira and Sagalés, 2009).

On the other hand, some studies have found that the multipliers associated with social protection expenditures are higher than those associated with other kinds of spending. Adam and Wong (2018), in a study for New Zealand, obtained impact multipliers of 1.53 and 0.43 for social expenditures and total government spending, respectively. In a panel for OECD economies between 1980 and 2005, the multiplier for unemployment insurance expenditures is 2.1, and for total government spending is 0.48 (Furceri and Zdziniecka 2012). In a meta-regression analysis including 98 studies, Gechert and Rannenberg (2014) estimate a cumulative multiplier for social protection between 2 and 3 (during recessions), while it ranges between 1 and 2 for total expenditure. In a panel for EU countries during 1995-2010, Reeves et al. (2013) estimate a total government expenditure multiplier of 1.28. The estimation for social protection spending, in turn, reaches 3. Orair et al. (2016), analyzing the Brazilian case in a sample from 2002 to 2016, obtained a cumulative multiplier (in four years) of expenditures on social protection that reaches 8 in periods of recession. For the total government spending, it is 2.2. Also for the Brazilian case, during 1997-2018, Sanches and Carvalho (2022) estimate a cumulative multiplier (in two years) of 0.6 for total government expenditure, while the accumulated multiplier for social benefits reaches 2.9.[1]

Also, Romer and Romer (2016), using a “narrative method” based on episodes of fiscal expansion in different countries, find that permanent increases in social expenditures exert significant and substantial impacts on aggregate consumption. However, tax reductions seem to have the highest and most persistent multiplier effect, which could be

[1] A summary of these studies is presented in Table A1 in the Appendix.

explained, in the authors' view, by a larger positive response of interest rates to an expansion in social expenditures. Similarly, Alesina et al. (2017) report results for a panel of OECD countries showing that fiscal consolidations based on higher taxes are more costly in terms of aggregate output than those based on spending cuts, whether from government consumption spending or transfers. Meanwhile, Gechert et al. (2021) employ a similar methodology for social spending in Germany and find a higher and more persistent multiplier effect for social spending than for decreases in the social contributions that finance these expenditures.

Moreover, some empirical studies have used panel techniques to estimate multipliers for a group of countries or states and regions within the same country via VAR or one-equation methods (Beetsma and Giuliodori, 2011; Furceri and Zdzienicka, 2012; Ilzetski et al., 2013; Reeves et al., 2013; Silva et al., 2013; Valencia, 2015; Carrière-Swallow, et al. 2018; Deleidi, et al. 2019; Izquierdo et al., 2019; Konstantinou and Partheniou, 2021). For social expenditures, Furceri and Zdzienicka (2012) find a positive accumulated multiplier (but smaller than one) for a group of OECD countries, emphasizing the central role of health expenditures and unemployment insurance as the components with greater impacts on output. Moreover, Reeves et al. (2013) estimate a positive social protection multiplier for a group of European countries, which reaches 3 (baseline scenario). In their estimations, health expenditures present an even higher multiplier (near 4.9).

Sanches and Carvalho (2023) use a Structural VAR approach to estimate fiscal multipliers for social benefits in Brazil for the 1997–2018 period. They find that social benefits have large multiplier effects, even when compared to public investment. More precisely, they find that one unit of public expenditure on social benefits generates a final change in aggregate output (as measured by GDP) almost three times higher after two years. The higher estimated multipliers in the full sample (which covers the full time period) appear in the response of household consumption and private investment to shocks in public expenditures on social benefits as a whole and for different types of social benefits (e.g., cash transfers, unemployment insurance, and pensions).

A very brief summary of the empirical literature on the multiplier effects of different types of expenditures (from aggregate government spending to several decompositions of transfers) in different countries (or panel of countries), distinct periods and using several empirical approaches or econometric techniques is presented in Table A1, in the Appendix.

Finally, as proposed, policies that impact income distribution and decrease inequality can impact the size of the fiscal multiplier. A sizable number of studies have discussed the distributional impact of fiscal policy. Wolff and Zacharias (2007) argue that expenditures even more than taxes have the potential to reduce income inequality. Many studies have also explored the impact that fiscal consolidation has on income distribution and found that a cut on government expenditures increases inequality (Agnelo and Sousa, 2014; Bertola, 2010; Smeeding and Grodner, 2000; Jalles, 2017; Heimberger, 2020; Cardoso and Carvalho, 2023).

3. Data and methodology

The first step of the current research consisted in building a novel dataset on social protection expenditures, GDP, tax revenues, and related variables for 42 countries, from 1985 to 2020 (see Table A2), to estimate the fiscal multipliers of social protection expenditures. The dataset includes a broad group of economies, from different continents and different income levels.[2] The diversity is also revealed in other dimensions. The level of social expenditure as a share of GDP in the dataset ranges from more than 18 per cent (in Austria) to less than 1 per cent (in Mexico and Pakistan). In terms of income inequality, our dataset includes extremely unequal countries of Latin America, like Brazil and Mexico, as well as low inequality countries from Eastern Europe and Scandinavia.[3] The data for the European countries was obtained from Eurostat, whereas the data for the US was obtained from the Federal Reserve Economic Data. The data for Brazil come from earlier research by Sanches and Carvalho (2023). Finally, the data for the remaining 12 countries was mainly provided by their governments in the context of two research projects funded by the International Labour Organization (ILO). For most countries, quarterly data was available and could be used in the estimations. For those that had only yearly data (Ecuador, Japan, Malawi, Mexico, Nepal, South Korea, Thailand and Vietnam), the latter was brought to a quarterly frequency by the 'Denton-Chollete' temporal disaggregation method, using the quarterly series for total government expenditures as an indicator. More details about data sources, model specifications, and data definitions are provided in Tables A2, A3 and A4, in the Appendix.

As described in the previous section, most attempts to estimate the multiplier effects of different types of government expenditures use a structural VAR (or SVAR) approach. It entails isolating the exogenous shocks, recovering their structural shape, so that the impact of a variable can be measured – in technical terms, to obtain a non-recursive orthogonalization of the error terms. First, the VAR is estimated in reduced form. The vector of endogenous variables is three-dimensional, including time series of social protection expenditures, tax revenues and output. It is a VAR model, as proposed by Sims (1980), where each variable is explained by lags of itself and the other variables of the model, capturing dynamic relationships. However, the shocks of the reduced form do not have economic significance (Castro and Hernandez de Cos, 2008). According to Perotti (2007), shocks of the reduced form (or 'surprise' movements) can be seen as linear combinations of three components: a) the automatic response of government spending and revenue to changes in output; b) the discretionary response due to changes in endogenous variables (Perotti gives the example of tax changes in response to a recession); c) random discretionary shocks, that is, structural shocks, which are uncorrelated and unobservable – the ones that need to be recovered. Formally:

[2] It includes 2 African, 5 American, 7 Asian and 28 European countries. The dataset also comprises countries from all income levels identified by the World Bank's standard classification: 30 high income, 6 upper middle income, 5 lower middle income and 1 low income countries.
[3] The Gini index numbers came from the World Inequality Database (https://wid.world/data/), since other data on inequality were also obtained from the same dataset (such as bottom50, top1, top10).

$$u_t^g = \alpha_{gy} u_t^y + \beta_{gt} e_t^t + e_t^g \quad (1)$$

$$u_t^t = \alpha_{ty} u_t^y + \beta_{tg} e_t^g + e_t^t \quad (2)$$

$$u_t^y = \gamma_{yt} u_t^t + \gamma_{yg} u_t^g + e_t^y \quad (3)$$

The unexpected movements in the expenditure, revenue, and output variables are, respectively, denoted by u_t^g, u_t^t, and u_t^y. These 'surprise' movements are the residuals in the reduced form, as it is the part of the data that the VAR does not explain. Also, e_t^g, e_t^t, and e_t^y are the structural shocks that are not correlated with each other by assumption and reflect the part of the surprise movements that is exogenous: it does not depend on policies and 'normal' economic evolution (Coudret, 2013). The coefficients α_{ij} reflect the response of variable i to variable j – the components (a) and (b) listed above are captured by the coefficients α (Jemec et al., 2013). While β_{ij} measures the contemporaneous response of variable i to a structural shock in variable j – that is, component (c) (Perotti, 2007).

As discussed by Vdovychenko (2018), coefficients α_{gy}, α_{ty}, γ_{yt} and γ_{yg} cannot be estimated without bias due to the instantaneous mutual relationship between output, expenditures, and revenues. Two steps are necessary to solve this. First, as it is plausible to assume that discretionary fiscal responses to an output shock take longer than a quarter to be decided upon and implemented (Perotti, 2007: 176), component (b) is removed, and coefficients α are made to reflect only the first component – the response of the automatic stabilizer. Following Perotti (2007), the second step is to use external information to the model to estimate the coefficients α_{gy} and α_{ty}.

Coefficient α_{gy} reflects the contemporary elasticity of expenditure to output, and α_{ty} is the contemporary elasticity of revenues to output. The latter was estimated based on the 'IMF method,' as in Andreis (2014) and Maciel (2006), which is a regression using dummy variables for periods, outliers, and a trend control. The case of the former is a bit more complex. In most of the literature that follows Blanchard and Perotti (2002), such an elasticity is assumed away, that is, α_{gy} is considered to be equal to zero. Focusing on government consumption instead of on social protection, there was no reason for these studies to assume automatic stabilizers. As Blanchard and Perotti (2002: 1334) themselves put it: '[w]e could not identify any automatic feedback from economic activity to government purchase of goods and services.' The same does not apply to the case of social protection expenditure. However, given the countercyclical nature of the automatic stabilizers, assuming them away in this context tends to bias estimates downwards, meaning that the 'true' multipliers could be even larger than the estimates presented below.

Since u_t^t and u_t^g are correlated, from these separate estimations of the exogenous elasticities, the cyclically adjusted residuals, $u_t^{g,ca}$ and $u_t^{t,ca}$, are obtained – which are the shocks without the effects of the cycle:

$$u_t^{g,ca} = u_t^g - \alpha_{gy} u_t^y = \beta_{gt} e_t^t + e_t^g \quad (5)$$

$$u_t^{t,ca} = u_t^t - \alpha_{ty} u_t^y = \beta_{tg} e_t^g + e_t^t \quad (6)$$

The structural shocks, e_t^g and e_t^t, can be obtained from the assumption of the ordering of the variables. Blanchard and Perotti (2002) claim that there is no reason to choose $\beta_{gt} = 0$ or $\beta_{tg} = 0$ *a priori*. Regarding shocks in spending and revenue, there is no theoretical or empirical basis to decide which variable will react first. As the correlation between adjusted residuals is small, Perotti (2007) points out that the order does not change the result. $\beta_{gt} = 0$ was then assumed, and the regression of the adjusted revenue residuals on the residuals of the structural form of expenditures was estimated by ordinary least squares (OLS) to obtain β_{tg} in equation (6) (Burriel et al., 2010).[4] We then obtain instrumental variables, the structural shocks e_t^t and e_t^g in equation 3, since the regressors (residuals of the reduced form) are correlated with the error term (structural shock). Those structural shocks of expenditure and revenue are used as instruments since the correlation between them and the structural shock of output, e_t^y, is low. The last step is estimating the impulse-response functions using the estimated coefficients.

The basic model is estimated using the vector of endogenous variables, in real terms: the logarithms of social expenditures, total primary revenue, and output.[5] Dynamic effects of public spending can also be analysed using a three-dimensional SVAR by replacing total social expenditures with its different components and the aggregate GDP by household consumption and private investment (Burriel et al., 2010; Çebi 2015).

The key goal of this research is to estimate the multipliers of social protection expenditures. As framed by Spilimbergo et al. (2009), there are four types of multipliers: a) the impact multiplier, for the analysis of a short-run period, $\frac{\Delta Y(t)}{\Delta G(t)}$; b) the horizon multiplier, for calculating the multiplier for a specific period, $\frac{\Delta Y(t+n)}{\Delta G(t)}$; c) the peak multiplier, which represents the highest value in the period under analysis, $max \frac{\Delta Y(t+n)}{\Delta G(t)}$; d) the accumulated (or cumulative) multiplier, which adds the total effect over a more extended period, $\frac{\sum_{i=1}^{n} \Delta Y(t+i)}{\sum_{i=1}^{n} \Delta G(t+i)}$.

The importance of calculating the impact multiplier is that it provides an assessment of fiscal policy in terms of the immediate output response to a shock in the fiscal variable – when the government aims to deal with a crisis, for example. Accumulated (or cumulative)

[4] Models were also estimated assuming tg=0, that is, that decisions relating to revenue occur before those relating to expenditure. This procedure indicated the robustness of the results to different specifications, with minor variation in impulse response functions, as is usual in the literature.

[5] The variables used in this work are not stationary. Therefore, their first difference was used (they are integrated of order 1), including the control variables, as suggested by different tests (Dickey-Fuller, Phillips and Perron, KPSS). Thus, the exercises are performed in terms of growth rate. We used the cumulative impulse-response function to obtain the responses in terms of levels. The number of lags is chosen based on the information criteria and the autocorrelation LM test (Deleidi et al., 2018). When several information methods are used together, the literature recommends choosing that lag most methods point to as more appropriate (Lopes et al., 2012). Tests for autocorrelation (LM) and heteroscedasticity (White) pointed to the absence of these problems in most models. All models showed stability. The results of the tests are available upon request.

multipliers, in turn, are important to verify the impact of a random discretionary shock since the economy requires a certain amount of time to absorb the initial shock (Ilzetzki et al. 2013). The accumulated multiplier is equal to the ratio between the accumulated response of output and the accumulated response of the fiscal variable subject to the shock. It measures the cumulative change in economic activity after a cumulative change in the government spending over a given time horizon (Burriel et al., 2010; Tenhofen et al., 2010; Lozano and Rodriguez, 2011; Borg, 2014; Restrepo, 2020). Cumulative multipliers are also called integral multipliers, and they may offer a better depiction of the dynamic interaction 'when the effects of fiscal policy build over time.' (Restrepo, 2020; see also Spilimbergo et al., 2009).

To calculate multipliers, we need to divide the elasticity of the response by the average share of social expenditures in output (or its components). As the variables are in logarithmic form, impulse-response functions provide the elasticity of output (Y) to the fiscal variable (X):

$$\xi_{Y,X} = \frac{\frac{\Delta Y}{Y}}{\frac{\Delta X}{X}} = \frac{\Delta Y}{Y}\frac{X}{\Delta X} = \frac{\Delta Y}{\Delta X}\frac{X}{Y} \quad (7)$$

According to Pires (2014), since $\frac{\Delta Y}{\Delta X}$ is the definition of the multiplier, which reflects a change in output given an increase of one unit in the fiscal variable, we have that:

$$\frac{\Delta Y}{\Delta X} = \frac{\xi_{Y,X}}{\frac{X}{Y}} \quad (8)$$

To estimate the cumulative multiplier, we justify the number of periods based on Garcia et al. (2013: 11): 'The long-run multiplier is defined as the cumulative multiplier when $t \to \infty$, but in practice the number of periods needed for the multiplier to stabilize at its long-run value is used. When the impact of social expenditures on GDP is more persistent, the cumulative multiplier is calculated for a more extended period.

In summary, for this research, the multiplier effects of social protection expenditures were estimated for the 42 countries in the dataset through this three-dimensional structural linear VAR. Based on the estimations, cumulative impulse response functions were generated to obtain the dynamic impact of social protection expenditures on the level of real GDP. Then these functions were used to get the elasticities of GDP in response to a shock in social spending and, finally, the multipliers. Considering the sample of 28 European countries extracted from the Eurostat database, we also estimated the multiplier effects of total government expenditures. Table A5 indicates that the model specifications utilized are the same in both cases, except for the number of lags of the endogenous variables of the VAR models for some cases due to the indication of the lag length criteria.

4. Results and discussion

The estimates for social protection multipliers are presented below, in Table 1 and Figures 1 to 4, and in more detail in Table A2, in the Appendix. In line with part of the literature

reviewed in the second section, social protection expenditures have a positive impact on GDP, both immediately and through time. Cumulative multipliers are statistically different from zero in most cases, confirming that the multiplier is positive and persistent. The averages, however, obscure a large diversity. The peak multiplier – which ranges from 5 in Mexico to -0.71 in Paraguay – is larger than one for only 7 of the 42 economies. The cumulative multiplier, meanwhile, is generally larger, indicating that the positive impact of social protection expenditures on GDP builds up after some period. It reaches 7.4 in Mexico, but it is larger than 1 for 30 of the 42 countries in the dataset. It is noteworthy that the results presented appear to be robust, as estimates made with different data (available for some countries) or for specific components of social protection expenditures (for a few countries) led to similar results – which is available to interested readers upon request.

Also in line with part of the literature reviewed above, our estimates indicate that the cumulative multipliers of social protection expenditures are higher than those of total government expenditures. Figure 5 presents this comparison - in this case, only for the 28 European countries, due to data availability. In all but two cases (Ireland and Latvia), the estimated cumulative multiplier for social protection expenditure is larger than the one for total government expenditures. In addition, in more than a third of the European countries (that is, in 10 of the 28 countries in the sample), the estimated cumulative multiplier of social protection expenditure is significantly larger than the one for total government expenditures considering one standard deviation. As mentioned previously, this result is probably a consequence of the fact that social protection expenditures tend to be more targeted towards the poorer groups than the remainder of government spending. It channels, thus, income to groups with above-average propensities to consume, having a higher indirect impact on GDP.

Table 1. Social protection multipliers

	Average	Median	Max	Min
Impact	0.53	0.35	5.00 (Mexico)	0.71 (Paraguay)
Peak	2.43	1.59	11.90 (Sweden)	-0.5 (Ireland)
Cumulative	1.84	1.52	7.40 (Mexico)	-2.1 (Ireland)

Fig. 1 - Cumulative Multipliers

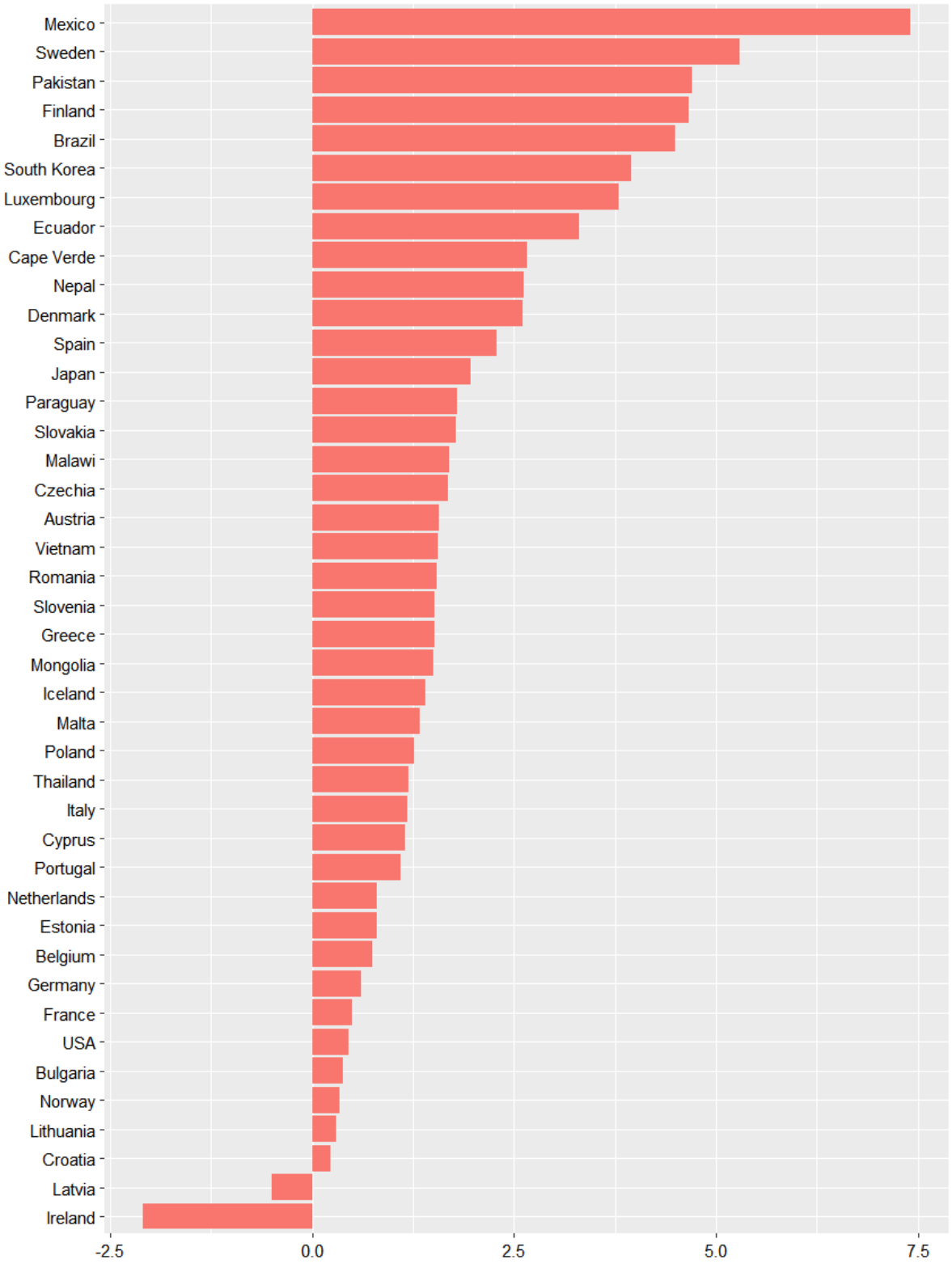


Fig. 2 - Impact Multipliers

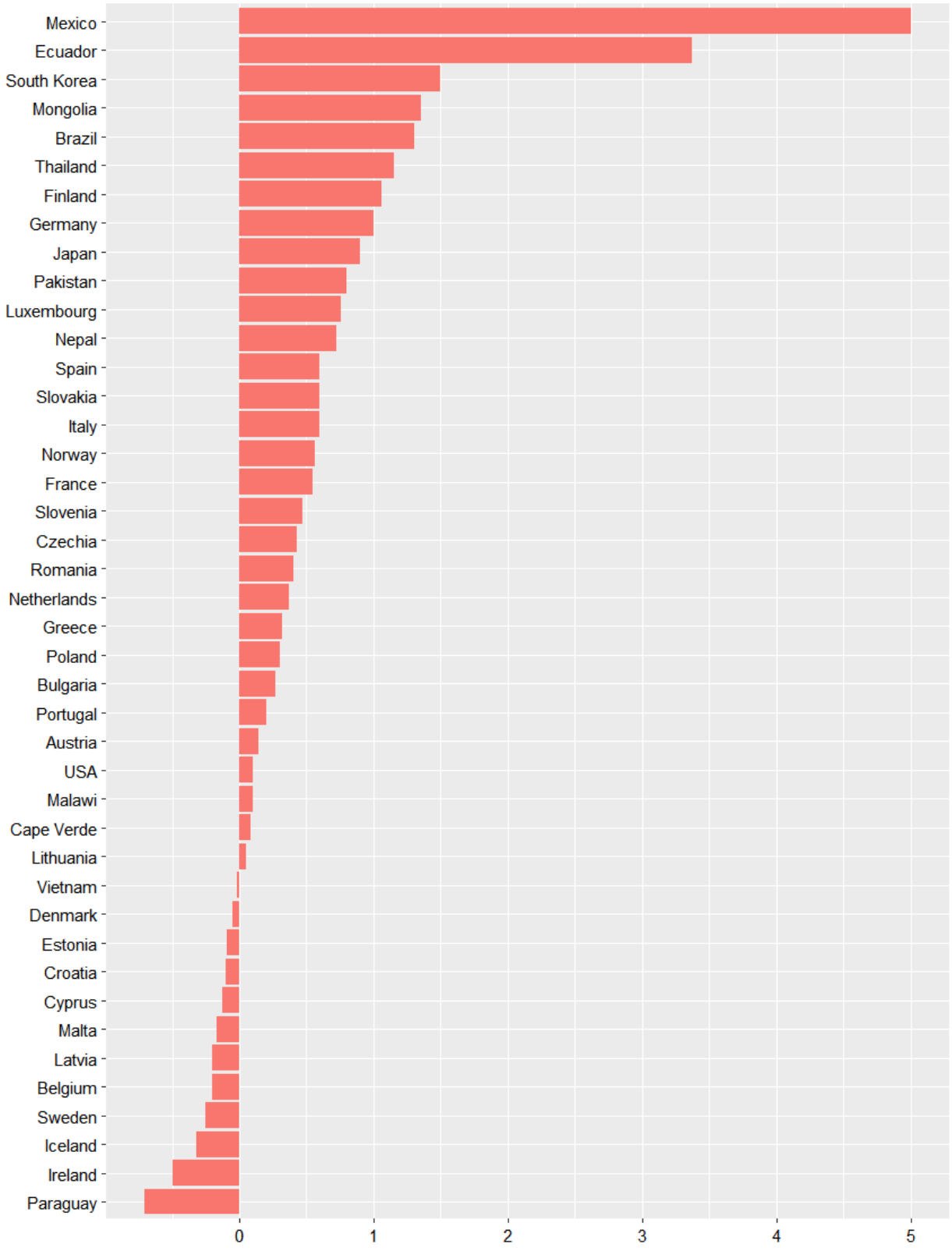


Fig. 3 - Peak Multipliers

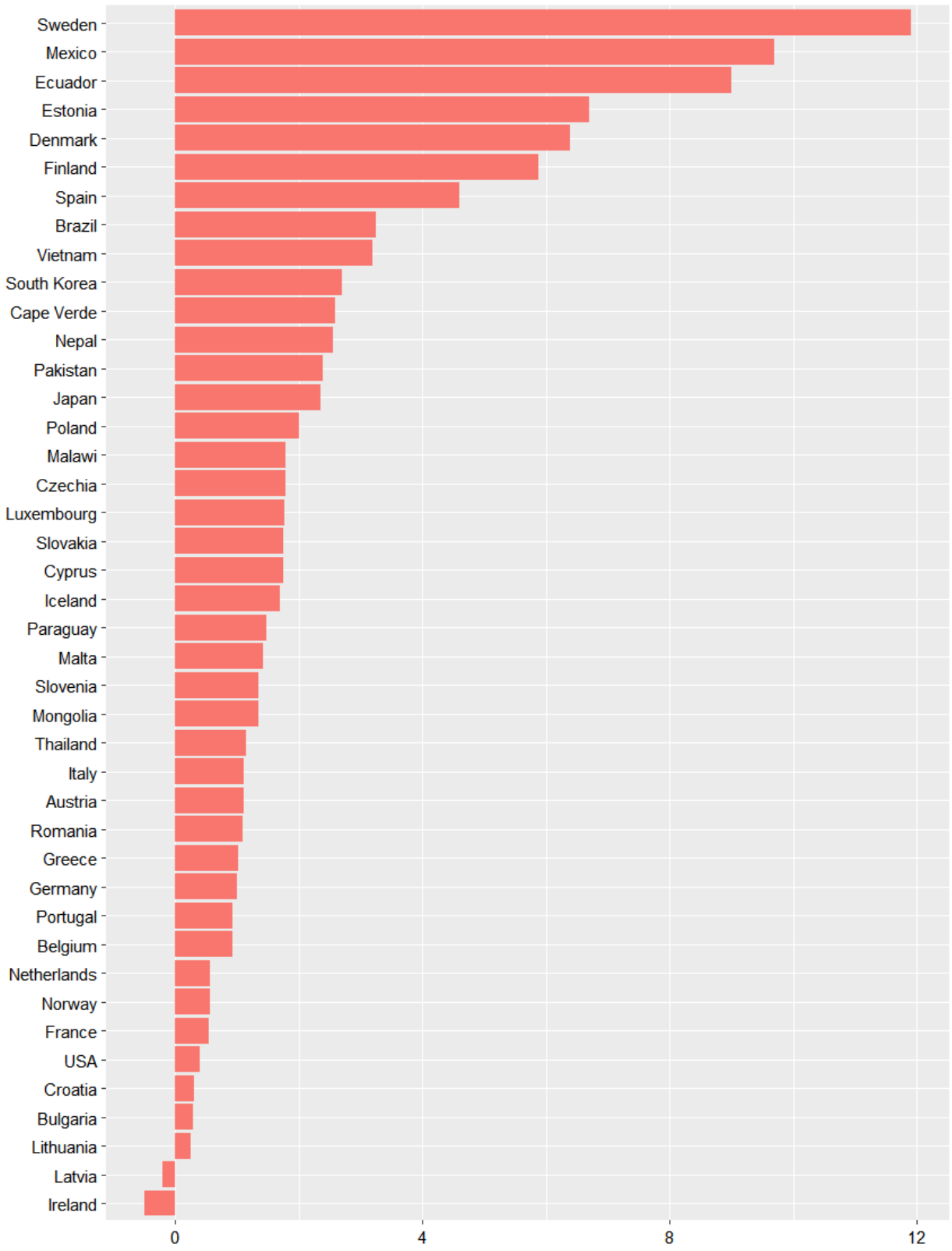


Fig. 4 - Multipliers

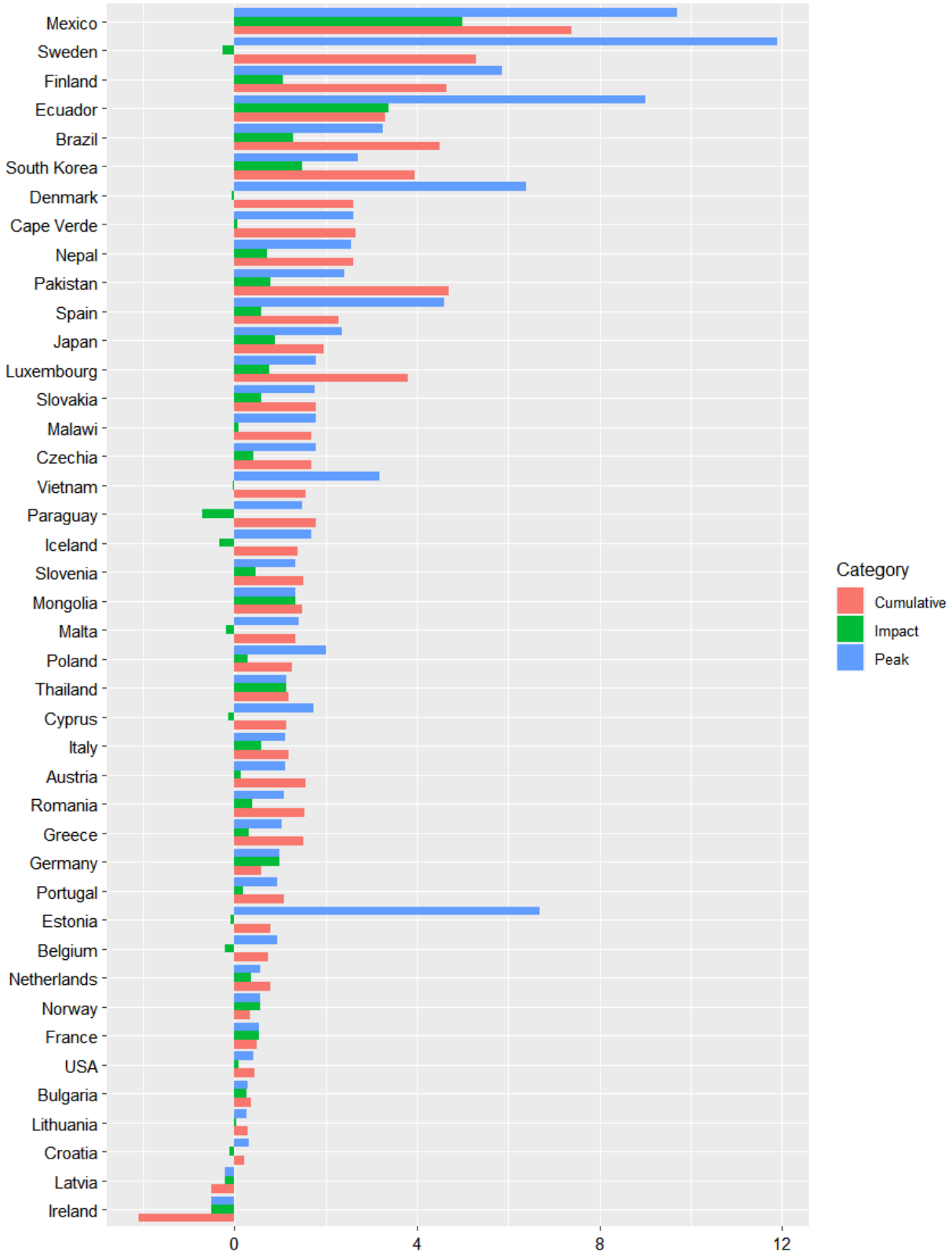
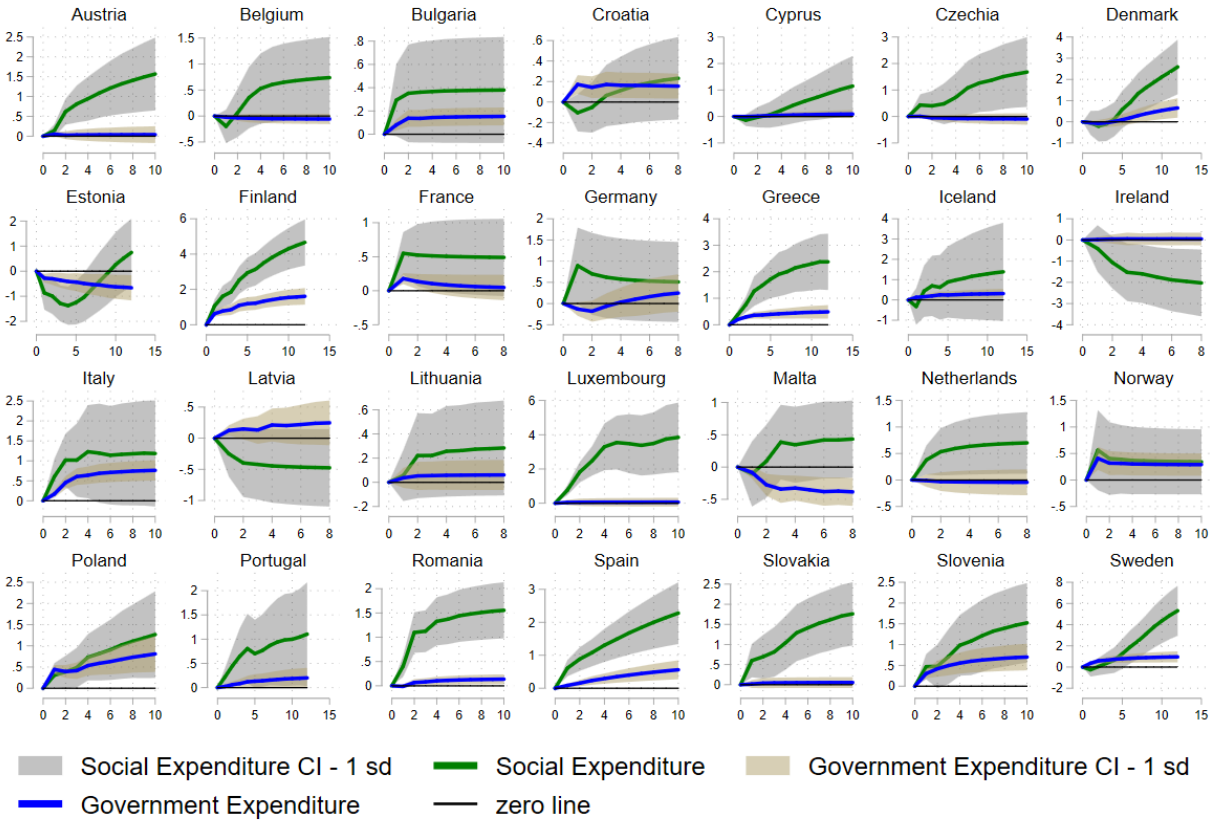


Fig.5 - Impulse Response Functions



Note: grey areas represent one standard error bands around the coefficients.

Given our large set of countries, it is interesting to investigate how certain economic characteristics correlate with the size of the multipliers estimated in our models. This can shed some light on the channels and mechanisms through which social protection spending can impact GDP. Table 2 presents the correlation between the cumulative, impact and peak multipliers and GDP per capita, the share of social expenditure in GDP as well as a few inequality measures. We used inequality measures for the first (t=0) and last (t=1) years of observation and calculated the mean between those two. We observe that in more unequal countries social protection expenditure exert a larger impact on GDP. This result is statistically significant for both the cumulative and impact multiplier but not for the peak multiplier. It is interesting to notice that the correlation coefficient is larger and more significant when we consider inequality measured in the last year of the sample. Indeed, in the case of the income share of the richest 1% of the population the correlation is only significant for the last year.

Table 2. Correlation between each multiplier and countries' selected economic statistics

	Correlation and T test p value		
	Impact	**Peak**	**Cumulative**
Ratio social benefits - GDP	-5.77188	-8.51871	-9.99144
	0.041	0.282	0.041

Gini_0	3.30477	5.29522	5.23278
	0.027	0.207	0.045
Bottom50_0	-6.98597	-9.34801	-9.58880
	0.019	0.268	0.068
Top10_0	2.94612	5.55165	5.28823
	0.038	0.162	0.032
Top1_0	1.32258	4.22631	3.82819
	0.444	0.374	0.199
Gini_1	5.16682	4.55092	7.14001
	0.005	0.389	0.028
Bottom50_1	-9.45822	-7.56616	-11.64607
	0.008	0.46	0.066
Top10_1	5.17954	5.02422	7.92187
	0.004	0.328	0.011
Top1_1	8.36990	11.36147	13.26908
	0.005	0.184	0.011
Gini_average	4.37462	5.43363	6.48668
	0.01	0.262	0.03
Bottom50_average	-8.57647	-9.25352	-11.18843
	0.01	0.332	0.059
Top10_average	4.17165	5.89736	6.91781
	0.011	0.206	0.016
Top1_average	3.69658	7.33659	7.51184
	0.117	0.263	0.065
GDPpercapita_2019	-0.00001	-0.00002	-0.00002
	0.126	0.381	0.162

0: Correlation between each multiplier and variable of interest in the first year available for each countries' sample
1: Correlation between each multiplier and variable of interest in the last year available for each countries' sample
average: Correlation between each multiplier and the average of the variable of interest in the first year and last year available for each countries' sample
GDP per Capita is measured at 2017 purchasing power parity

The negative, strong and significant correlation between the cumulative and impact multipliers and the income share of the poorest half of the population indicate a large macroeconomic benefit of increasing social expenditure in countries with high poverty levels. This indicates that social policies aimed at vulnerable groups not only enhance their wellbeing but can also be used as a tool to promote inclusive growth, corroborating evidence presented by OECD (2019).

A symmetrical result is that in countries where the share of the richest population is higher, the estimated multipliers tend to be larger. Taking together all of the correlations between such inequalities measures and the estimated multipliers we have an indication that by

redistributing wellbeing social expenditure can impact GDP, i.e. the decrease in inequality promoted by social protection policies is also growth-enhancing.

Finally, our estimates show that the correlations between the multipliers and GDP per capita are not statistically different from zero. Also, we find a negative correlation between all estimated multipliers and the ratio of social benefits to GDP. These results certainly deserve further investigation.

5. Concluding remarks

In Kalecki's (1943) well-known article "Political aspects of full employment", there is an explicit defense of two types of public expenditure in order to foster a fiscal policy focused on increasing employment and income levels: public investments and spending related to the subsidization of mass consumption (which can be related to the social protection public spending). Note that Kalecki (1943) highlights the indirect effects generated by these two types of government expenditures, referring to their income multiplier effects:

> If the Government undertakes public investment (e.g. builds schools, hospitals, and highways) or subsidises mass consumption (by family allowances, reduction of indirect taxation, or subsidies to keep down the prices of necessities), if, moreover, this expenditure is financed by borrowing and not by taxation (which could affect adversely private investment and consumption), the effective demand for goods and services may be increased up to a point where full employment is achieved. Such Government expenditure increases employment, be it noted, not only directly but indirectly as well, since the higher incomes caused by it result in a secondary increase in demand for consumption and investment goods" (Kalecki, 1943, p.322).

Social protection in this theoretical framework is thus a very effective tool in achieving multiple economic targets at once. Indeed it can affect growth through different levels. At the micro level, by providing support to vulnerable populations, social expenditure can increase household consumption, productivity and employment. At the macro level social expenditure can affect GDP directly, especially during economic downturns as an important countercyclical tool, but also indirectly through different channels such as enhancing human capital and decreasing inequality.

This article provides evidence to the fact that social expenditure has a strong positive macroeconomic effect. By producing a comprehensive dataset of 42 countries, we investigated the multiplier effect of government social expenditure on GDP. We find (i) that social protection expenditures have positive and persistent multiplier effects; (ii) that the magnitude of the multiplier tends to be larger than that for other categories of government expenditure, given that it tends to be more targeted and, thus, redistribute income to groups with higher-than-average (or considerably higher) propensities to consume; and (iii) that the magnitude of the social protection multiplier tends to be specially large in poorer and/or more unequal countries. Therefore, our results suggest that government social expenditure can be used to progress towards several of the Sustainable Development Goals (SDGs) advocated by the United Nations at the same time.

Furthermore, we also find that the multiplier of social protection expenditure is positively correlated to inequality, indicating that extremely unequal countries would have an even higher indirect benefit of increasing such expenditures. This is because the propensity to consume of those households at the bottom of distribution are found to be higher than those at the top (Carvalho and Rezai, 2016) and a redistribution of income would then increase the aggregate propensity to consume in the economy.

Our findings have important implications for policy makers. Besides being an important mechanism to redistribute wellbeing in unequal societies, to fight against multidimensional poverty (Kabeer, 2010) and to provide protection to vulnerable population especially in times of crisis (Roelen et al, 2016), public spending on social protection is also a macroeconomic tool that positively impact aggregate income and therefore can be used to promote inclusive growth especially in unequal economies.

APPENDIX

Table A1. Summary of results from the empirical literature on multiplier effects of social and other expenditures by the government

Study	Country	Period	Methodology	Social Protection Multiplier Results	Government expenditure (total) Multiplier Results	Government expenditure (consumption) Multiplier Results	Government expenditure (investment) Multiplier Results	Government taxes (total) Multiplier Results	Government taxes (direct) Multiplier Results	Government taxes (indirect) Multiplier Results
Adams and Wong (2018)	New Zealand	1990-2017	SVAR	1.53* (impact) and 0.76 (cumulative over one year)	0.43* (impact) and 0.24 (cumulative over one year)	0.59* (impact) and 0.82 (cumulative over one year)	0.33* (impact) and -0.59 (cumulative over one year)	Net taxes: 0.24 (impact) and -0.1 (cumulative over one year) Revenue taxes: 1.27* (impact) and 1.29* (cumulative over one year)		
Bova and Klyviene (2019)	Portugal	1995-2017	SVAR	-0.27* (impact) and 0.1 (cumulative over one year)		0.84* (impact) and 1.52* (cumulative over one year)	0.08* (impact) and 0.14 (cumulative over one year)		-0.08* (impact) and -0.12 (cumulative over one year)	0.12* (impact) and -0.05 (cumulative over one year)
Bruckner and Tuladhar (2010)	Japan	1990-2000	One-equation methods	-0.25 (impact)	0.26* (impact)	-0.28 (impact) (government personnel)	0.76* (impact) (ordinary construction) / 3.46* (impact)			

							(transfers to firms)	
Dufrenot et al. (2016)	US	1960-2012	Non-linear methods (MS/TVTP)	It reaches 1.68 (consumption) and 0.02 (investment); recession				
Fatas and Mihov (2001)	US	1960-1996	VAR (Cholesky decomposition)	Do not estimate multipliers directly but capture a positive and significant impact of transfers on GDP after eight quarters.	Positive, strong and significant impact of total government spending on GDP.	(Government wage payments): positive, strong and significant impact on GDP.	Positive and significant effect on GDP until the fourth quarter.	Negative and significant effect on GDP after four quarters.
Furceri and Zdzinieck a (2012)	OECD countries panel	1980-2005	One-equation method	Short-term multipliers: 0.6* (total social expenditure), 0.9* (health) and 2.1* (unemployment benefits)	0.48*			

Gáldon (2013)	US	1948-2012	Non-linear methods (TVPSV-VAR)	>1 (impact and long-run). Near 1.5-2 (long-run) at the end of the 2008/2009 crisis. Reaches almost 3* (long-run) at the end of 1950's and beginning of 1960's	Impact: between 0.5 and 1.5. The long run multiplier reaches -3* around 2008/2009 crisis. Reaches 2* in the Middle of the 2000's and beginning of the 1980's.					
Gechert et al. (2021)	Germany	1974-2013	SVAR with "narrative" identified shocks	0.5-1.5* (impact)						
Gechert and Rannenberg (2014)	Meta-analysis 98 studies	+1800 observa-tions	Meta-regression analysis	Between 2 and 3 (cumulative /recession)	Between 1 and 2 (cumulative/ recession)	Between 1.5 and 2 (cumulative/recession)	Around 2 (cumulative/recession)	Around 0.5 (cumulative/ recession)		
Hollmayr and Kuckuck (2018)	Germany	1993-2017	SVAR	2* (impact); between 0.3* and 3.8 (after 5 years)		0.8 (impact); between 1.1* and 2.3 (after 5 years)	3.5* (impact); between 4.5* and 6.4* (after 5 years)	0.5* (impact); between -0.1* and 0.6 (after 5 years)	(Social contributions): 4.6* (impact); between 1.2 and 4.6* (after 5 years)	
Sen and Kaya (2017)	Turkey	2002-2016	SVAR	Between 0.02 and 0.23 (impact)	Between 0.98 and 1.05				Between -0.27 and -0.19 (personal income tax)	Between -0.54 and -0.35 (consumption tax) / Between -0.83 and -0.57 (value added tax)

Konstantinou and Partheniou (2021)	Panel of OECD and non-OECD countries	1991-2015	Non-linear one equation	0.8* (OECD countries) and 0.076 (non-OECD); cumulative in two years; recession		Compensation employees: 1.47* (OECD countries) and -0.034 (non-OECD); cumulative in two years; recession Goods and services: 1 (OECD countries) and -0.17 (non-OECD); cumulative in two years; recession	1.3* (OECD countries) and -0.001(non-OECD); cumulative in two years; recession
Orair et al. (2016)	Brazil	2002-2016	Non-linear VAR (STVAR)	1.51* (peak) and 8* (cumulative in four years); recession	0.54* (peak) and 2.2* (cumulative in four years); recession	Compensation (wages): 1.32* (peak) and 5.1* (cumulative in four years); recession Other expenditure: 0.26 (peak) and 1.8 (cumulative in four years); recession Subsidies: 0.59 (peak) and -9 (cumulative in four years); recession	1.68* (peak) and 6.8* (cumulative in four years); recession

Pereira and Sagalés (2009)	Portugal	1980-2005	VAR	1.88* (impact) and 1.81 (cumulative)	1.68* (impact) and 1.21 (cumulative)	0.27* (impact) and 0.62 (cumulative)	2.4* (impact) and 4.7* (cumulative)	0 (impact) and –1.83* (cumulative)	-0.1 (impact) and -2.7* (cumulative)	-0.06 (impact) and -0.18 (cumulative)
Pereira and Wemans (2013)	Portugal	1995-2011	SVAR	Near 1 (peak) and 0.6 (cumulative one year)		Consumption: 0.5* (peak) and 0.2 (cumulative one year) Compensation employees: 2.5* (peak) and 1.7* (cumulative one year) Good and services: -0.3* (peak) and -0.3 (cumulative one year)			-0.7* (peak) and -1.2* (cumulative one year)	-0.3 (peak) and -0.2 (cumulative one year)
Reeves et al. (2013)	Panel of EU countries	1995-2010	One-equation method	3* for social protection, near 4.9* for health.	1.28* (defense: -5.6; Community: -2.3; eco. Affairs: 0.45; general public services: 1.57; culture: 14.1*; education: 9.3*; environment: 9; health: 4.9*)					
Resende (2019)	Brazil	1997-2018	VAR	0.72* (impact); 4.3* (cumulative		(wages/ compensation): 0.81 (impact); 2.4	2.37* (impact); 3.3 (cumulativ			

				in two years)		(cumulative in two years)	e in two years)			
Sanches and Carvalho (2022)	Brazil	1997-2018	SVAR	0.75* (impact), 2.9* (accumulated in two years)	0.37* (impact), 0.6 (accumulated in two Years)	(wages/compensation): 0.1 (impact), -1 (accumulated in two Years). (subsidies): 0.14 (impact), 0.05 (accumulated in two Years)	1.4* (impact), 3.6* (accumulated in two Years)	-0.37* (impact), -0.18 (accumulated in two Years)		
Sarangi and Bonin (2017)	Egypt	1990-2015	SVAR	0.04 (impact) and 0.17 (peak)	0.02 (impact) and 0.02 (peak)	0.01 (impact) and 0.01 (peak)	0.16 (impact) and 0.34 (peak)			
Silva et al. (2013)	Panel of Eurozone countries	1998-2008	VAR	-0.35 (impact) and 0.049 (cumulative ten quarters)	-0.07 (impact) and 0.05 (cumulative ten quarters)	(Intermediate consumption): 0.25 (impact) and 0.74 (cumulative ten quarters) (wages): -0.6 (impact) and -0.07 (cumulative ten quarters)	1.6* (impact) and 2.3(cumulative ten quarters)	0 (impact) and -0.29 (cumulative ten quarters)	0 (impact) and -1.06 (cumulative ten quarters)	0 (impact) and -0.7 (cumulative ten quarters)

*Statistically significant at 10%.

Table A2. Social protection multipliers

	Type	Social benefits Data source	Period	Impact multiplier	Peak multiplier ("t" indicates the period)	Cumulative multiplier	Ratio social benefits - GDP
Austria	general	Eurostat	2001-2019	0.14	1.11 (t=10)	1.57 (over ten quarters)	0.1848
	central	Eurostat	2001-2019	0.18	6.86 (t=10)	6.67 (over ten quarters)	0.0549
Belgium	general	Eurostat	1995-2019	-0.2	0.93 (t=4)	0.74 (over ten quarters)	0.159
Brazil	central	Gobetti and Orair (2017)	1997-2018	1.3	3.25 (t=7)	4.5 (over ten quarters)	0.073
Bulgaria	general	Eurostat	1999-2019	0.27	0.3 (t=2)	0.38 (over ten quarters)	0.11
Cape Verde		Ministério das Finanças	2007-2020	0.08	2.6 (t=2)	2.66 (over ten quarters)	0.0286
Croatia	general	Eurostat	1999-2019	-0.1	0.31 (t=7)	0.23 (over ten quarters)	0.134
Cyprus	general	Eurostat	1995-2019	-0.13	1.75 (t=10)	1.15 (over ten quarters)	0.109
Czechia	general	Eurostat	1999-2019	0.43	1.79 (t=8)	1.68 (over ten quarters)	0.1253
	central	Eurostat	2003-2019	0.66	7.2 (t=12)	3.6 (over twelve quarters)	0.1218
Denmark	general	Eurostat	1999-2019	-0.05	6.4 (t=12)	2.6 (over twelve quarters)	0.1643
Ecuador		Ministerio de Finanzas	2000-2020	3.37	9 (t=9)	3.3 (over ten quarters)	0.0417
Estonia	general	Eurostat	2002-2019	-0.09	6.7 (t=12)	0.8 (over twelve quarters)	0.11
Finland	general	Eurostat	1999-2019	1.06	5.88 (t=12)	4.66 (over twelve quarters)	0.1706
France	general	Eurostat	1985-2019	0.55	0.55 (t=1)	0.5 (over eight quarters)	0.179
Germany	general	Eurostat	2002-2019	1	1 (t=1)	0.6 (over eight quarters)	0.165
	central	Eurostat	2002-2019	-3.5	6.3 (t=8)	1.5 (over ten quarters)	0.021
Greece	general	Eurostat	1999-2019	0.32	1.03 (t=10)	1.52 (over twelve quarters)	0.16
	central	Eurostat	2009-2019	-0.35	-0.27 (t=2)	-0.3 (over twelve quarters)	0.03
Iceland	general	Eurostat	2002-2019	-0.32	1.7 (t=11)	1.4 (over twelve quarters)	0.065
	central	Eurostat	2002-2019	-3	2.3 (t=2)	-2.99 (over twelve quarters)	0.01
Italy	general	Eurostat	1999-2019	0.6	1.12 (t=2)	1.18 (over ten quarters)	0.178

Ireland	general	Eurostat	2002-2019	-0.5	-0.5 (t=1)	-2.1 (over ten quarters)	0.102
Japan		Japanese National Institute	1994-2017	0.9	2.35 (t=4)	1.97 (over ten quarters)	0.1768
Latvia	general	Eurostat	1999-2019	-0.2	-0.2 (t=1)	-0.5 (over eight quarters)	0.103
Lithuania	general	Eurostat	1999-2019	0.05	0.26 (t=2)	0.3 (over eight quarters)	0.113
	central	Eurostat	2005-2019	0.45	0.53 (t=4)	0.7 (over eight quarters)	0.028
Luxembourg	general	Eurostat	2002-2019	0.76	1.78 (t=3)	3.8 (over ten quarters)	0.15
	central	Eurostat	2002-2019	-0.6	4.1 (t=4)	3.7 (over ten quarters)	0.029
Malawi		Reserve Bank of Malawi	1990-2020	0.1	1.76 (t=4)	1.6 (over ten quarters)	0.0183
Malta	general	Eurostat	2000-2019	-0.17	1.42 (t=3)	1.34 (over twelve quarters)	0.104
Mexico		OECD Data	1985-2019	5	9.7 (t=3)	7.4 (over eight quarters)	0.01
	central	ECLAC	1999-2018	3.4	6 (t=2)	7.2 (over eight quarters)	0.0064
Mongolia		IMF	2001-2019	1.47	1.47 (t=1)	1.6 (over eight quarters)	0.0838
Nepal		Ministry of Finance	2005-2018	0.72	2.56 (t=6)	2.62 (over ten quarters)	0.0188
Netherlands	general	Eurostat	1991-2019	0.37	0.57 (t=3)	0.8 (over eight quarters)	0.108
	central	Eurostat	1991-2019	1.45	3 (t=7)	2.4 (over eight quarters)	0.023
Norway	general	Eurostat	2002-2019	0.56	0.56 (t=1)	0.34 (over ten quarters)	0.1375
Paraguay		Ministerio de Hacienda	2000-2020	-0.71	1.48 (t=8)	1.8 (over twelve quarters)	0.0445
	central	ECLAC	2000-2020	-1.3	4.7 (t=5)	3.1 (over ten quarters)	0.027
Pakistan		CT Data	2002-2019	0.99	2.9 (t=7)	5.1 (over twelve quarters)	0.0084
		Ministry of Finance	2002-2019	0.2	4.2 (t=3)	1.5 (over eight quarters)	0.0035
Poland	general	Eurostat	1999-2019	0.3	2 (t=10)	1.27 (over ten quarters)	0.1525
Portugal	general	Eurostat	1999-2019	0.2	0.93 (t=11)	1.1 (over twelve quarters)	0.1515
	central	Eurostat	2008-2019	0.6	1.35 (t=12)	2.14 (over twelve quarters)	0.055
Romania	general	Eurostat	1995-2019	0.4	1.1 (t=4)	1.55 (over ten quarters)	0.1026
	central	Eurostat	1995-2019	-0.19	0.35 (t=2)	0.41 (over ten quarters)	0.02
Slovakia	general	Eurostat	1999-2019	0.6	1.76 (t=9)	1.78 (over ten quarters)	0.132

Slovenia	general	Eurostat	1999-2019	0.47	1.35 (t=10)	1.52 (over ten quarters)	0.166
South Korea		OECD Data	2000-2019	1.5	2.71 (t=3)	3.95 (over ten quarters)	0.0425
Spain	general	Eurostat	1995-2019	0.6	4.6 (t=12)	2.28 (over twelve quarters)	0.135
Sweden	general	Eurostat	1995-2019	-0.25	11.9 (t=12)	5.3 (over twelve quarters)	0.143
	central	Eurostat	1995-2019	-0.52	4.8 (t=10)	2.39 (over twelve quarters)	0.075
Thailand		Bank of Thailand / ADB	2002-2019	1.15	1.15 (t=1)	1.12 (over eight quarters)	0.019
United States	general	FRED	1985-2019	0.1	0.41 (t=2)	0.45 (over eight quarters)	0.12
	central	FRED	1985-2019	0.12	0.57 (t=2)	0.5 (over eight quarters)	0.091
Vietnam		Ministry of Finance	2005-2020	-0.02	3.19 (t=5)	1.56 (over ten quarters)	0.042

Table A3. Data description

Brazil

Social protection series: Gobetti, S., and R. Orair 2017. "Resultado Primário e Contabilidade Criativa: Reconstruindo as Estatísticas Fiscais Acima da Linha Do Governo Geral." Texto Para Discussão – IPEA, n. 2288. It comprises cash transfers programs (Programa Bolsa Família and Benefício de Prestação Continuada), unemployment insurance, and pensions.
Government tax revenues: Gobetti and Orair (2017).
Real GDP and its implicit deflator: Instituto Brasileiro de Geografia e Estatística.
CPI (IPCA): Instituto Brasileiro de Geografia e Estatística.

Cape Verde

Social protection series: Ministério das Finanças.
Government tax revenues and total expenditure series: Ministério das Finanças.
Real GDP and its implicit deflator: Instituto Nacional de Pesquisas.
CPI: Instituto Nacional de Pesquisas.

Ecuador

Social protection series: Ministerio de Finanzas *(*annual transformed into quarterly using total government consumption was used as an indicator). The series for social protection expenditures were provided in two categories: welfare and social security benefits.

Government tax revenues and total expenditure series: Banco Central del Ecuador.
Real GDP and its implicit deflator: Quarterly National Accounts of Ecuador.
CPI: IMF

European countries
Social protection series: Quarterly non-financial accounts for general government - Eurostat - Social benefits other than social transfers in kind, payable. It includes pensions and social security funds (e.g. cash benefits to persons unable to work due to sickness or injury, retired and survival pensions, unemployment benefits and family allowances).
Government tax revenues: Quarterly non-financial accounts for general government - Eurostat - Total general government revenue.
Real GDP and its implicit deflator: Eurostat.

Japan
Social protection series: Japanese National Institute of Population and Social Security Research. The data includes eight functional categories: old age; survivors; invalidity benefits; employment injury; sickness and health; family benefits; unemployment; housing; and other social policy areas. We transformed the aggregate annual series into quarterly data using quarterly government expenditures as an indicator.
Total government expenditures: National Accounts of Japan (Department of National Accounts, Economic and Social Research Institute).
Government tax revenues: CEIC (in dollar). We converted it to Yens using a nominal monthly exchange rate from the Federal Reserve Economic Data.
Real GDP and its implicit deflator: National Accounts of Japan (Department of National Accounts, Economic and Social Research Institute).
CPI: IMF

Malawi
Social protection series: Reserve Bank of Malawi (annual, transformed into quarterly using the total government expenditure as an indicator series). It includes pension and gratuities, government contribution to pension schemes, social cash transfers, farm input subsidy, maize purchases (market intervention subsidy) and university students' loans.
Government tax revenues and total expenditure series: Reserve Bank of Malawi.

Real GDP and its implicit deflator: Reserve Bank of Malawi (annual). In order to transform the annual GDP series into quarterly data, we used quarterly GDP for Uganda as an indicator, another African country with a similar trend, available in Tahir et al (2018) from 1990 to 2016. For 2017-2020 we obtained a quarterly GDP series from Uganda Bureau of Statistics.
Exchange rates/ real effective exchange rate (index): Reserve Bank of Malawi/ IMF
CPI: IMF

Mexico
Social protection series: 1) OECD Data (public social expenditure, annual, transformed into quarterly using the total government expenditure as an indicator series). It includes old age, survivors, incapacity-related benefits, family, active labour market programs, unemployment, housing, and other social policy areas. It refers to both types of social benefits, in kind and in cash; 2) ECLAC (social protection annual, transformed into quarterly using the total government expenditure as an indicator series).
Government tax revenues and total expenditure series: Banco de México.
Real GDP and its implicit deflator: Sistema de Cuentas Nacionales de México.
CPI: IMF

Mongolia
Social protection series: International Monetary Fund (social benefits in cash series at quarterly frequency from 2001-2015); and the Mongolian Statistical Information Service ("current transfers" series at quarterly frequency for 2016-2019). To increase the sample, we combined both series, which are very similar. The series comprises social security payments and social assistance.
Government tax revenues: Mongolian Statistical Information Service.
Real GDP and its implicit deflator: Mongolian Statistical Information Service (quarterly data on GDP for the period 2005-2019); and CEIC (GDP data before 2005, in US dollars and converted to national currency using the nominal exchange rate from the Bank of Mongolia).
CPI: IMF

Nepal
Social protection series: National Account Statistics (Central Bureau of Statistics) and Handbook of Government Finance Statistics & Quarterly Economic Bulletin (Nepal Rastra Bank).
Government tax revenues and total expenditure series: Nepal Rastra Bank.

Real GDP and its implicit deflator: Central Bureau of Statistics.
CPI: IMF

Pakistan
Social protection series: Ministry of Finance (social security and welfare/ social protection – both annual; social public investment - quarterly), CT Data (pensions and allowance- quarterly). We transformed the annual series into quarterly frequency using a consolidated quarterly expenditure series from the government as an indicator.
Government tax revenues and total expenditure series: CT Data.
Real GDP and its implicit deflator: SBP Working Paper Series 97.
CPI: IMF

Paraguay
Social protection series: 1) Ministerio de Hacienda (quarterly). It includes 'social promotion and action' and social security. The first category comprises expenditure on assistance to persons with special needs, social action services, state and municipal-level social services, and social services for agrarian reform, among other items. The social security component, in its turn, includes varied benefits (old age, survivors, sickness, etc.). 2) ECLAC (annual, transformed into quarterly using the total government expenditure as an indicator series). It includes social protection (central government).
Government tax revenues and total expenditure series: Ministerio de Hacienda.
Real GDP and its implicit deflator: Banco Central del Paraguay.
CPI: IMF

South Korea
Social protection series: OECD "social benefits in cash" at an annual frequency. In order to transform the annual series into quarterly frequency, we used the series "transfers to households" (from Bank of Korea) at a quarterly frequency, as an indicator. Social benefits in cash include two key components: pension benefits and non-pensions benefits. The latter consists of cash transfers made by the government or by non-profit institutions to households to meet their financial needs in case of unexpected events (such as unemployment).
Government tax revenues: Bank of Korea.
Real GDP and its implicit deflator: Bank of Korea.
CPI: IMF

Thailand

Social protection series: Bank of Thailand (social protection expenditure quarterly, from 2009 to 2019); and Asian Development Bank (ADB) (from 2002 to 2008, we interpolated the annual data for social protection from ADB – with the quarterly total government expenditure -obtained from Bank of Thailand - as an indicator). We combined the series since they are very similar. The series comprises social security benefits, social assistance benefits, and employer social expenditures.

Total government expenditure: Bank of Thailand.

Government tax revenues: CEIC database. As the series was given in US dollars, we had to convert it to bahts (the national currency) using the nominal exchange rate available at the Bank of Thailand's statistics.

Real GDP and its implicit deflator: Bank of Thailand.

CPI: IMF

United States

Social protection series: Federal Reserve Economic Data. Federal government current transfer payments: Government social benefits (central government). Government current transfer payments: Government social benefits (general government).

Government tax revenues: Federal Reserve Economic Data.

Real GDP and its implicit deflator: Federal Reserve Economic Data.

Vietnam

Social protection series: General Statistics Office of Vietnam/ The Ministry of Finance of the Socialist Republic of Vietnam. Annual series were transformed into quarterly data, using the total government expenditure as an indicator series. It includes social security: pensions and social insurance benefits, premiums to the voluntary social insurance and support for the unemployment insurance fund (social insurance), and funding for implementing the policy on preferential treatment and housing supports for the national devotees who participated in the National Defense War.

Government tax revenues and total expenditure series: The Ministry of Finance of the Socialist Republic of Vietnam.

Real GDP and its implicit deflator: General Statistics Office of Vietnam.

CPI: IMF

Table A4. Country case studies that investigate the multipliers effects of total social expenditures on GDP

Country	**Frequency of social expenditure data**	**Control variables – in parentheses, the quarters in which the dummy assumes a value equal to 1**
Cape Verde	Quarterly data available	dummy1 (2015Q4): sharp break in social benefits series. dummy2 (2020Q2): Covid-19 crisis. Constant.
Ecuador	Government consumption as an indicator in Denton-Chollete temporal disaggregation method	dummy1 (2003Q1, 2005Q1): internal political crisis that culminated in the removal of Lucio Gutiérrez from the presidency in 2005. dummy2 (2008Q3 – 2009Q1): Global Financial Crisis. ITCER variable: *Indice de Tipo de Cambio Real*. (*) Constant.
Korea	Quarterly Transfers to households series as an indicator in Denton-Chollete temporal disaggregation method	Constant.
Japan	Total government expenditure as an indicator in Denton-Chollete temporal disaggregation method	dummy1 (1995Q1, 2009Q3, 2009Q4): sharp break in GDP series. Real Effective Exchange Rate (CEIC). Real interest rate (OECDStat).
Malawi	Total government expenditure as an indicator in Denton-Chollete temporal disaggregation method	dummy1 (1994Q1-Q4): a drop in real GDP series. dummy2 (2013Q1-Q4) and dummy 3 (2014Q1-Q4): sharp fall in the social protection series. Index of effective exchange rate (IMF). Real interest rate (Malawi's Central Bank) Constant.
Mexico	Total government expenditure as an indicator in Denton-Chollete temporal disaggregation method	dummy1 (2009Q1-Q4): sharp fall in GDP due to global financial crisis; dummy2 (2010Q1-Q4): economic recovery after the crisis. Constant.
Mongolia	Quarterly data available	dummy 1 (2008Q3-2009Q4): Global Financial Crisis. dummy2 (2014Q4-2016Q1): to control for a drop in revenues. dummy3 (2011Q1-2013Q1): peak and a drop that we observe in the expenditure series. Constant.
Nepal	Current government expenditures as an indicator in Denton-Chollete temporal disaggregation method	dummy1 (2010Q3): sharp break in real GDP series. dummy2 (2008Q3 – 2009Q2): Global Financial Crisis.
Pakistan	Quarterly data available	dummy1 (2014Q1-2015Q4): different pattern of seasonality in social expenditure series.

		Constant.
Paraguay	Quarterly data available	dummy1 (2020Q2-Q3): COVID pandemic. Constant.
Thailand	Quarterly total government expenditure as an indicator in Denton-Chollete temporal disaggregation method	Constant.
Vietnam	Current government expenditures as an indicator in Denton-Chollete temporal disaggregation method	dummy1 (2008Q2 – 2009Q1): Global Financial Crisis. Constant.

(*) Ratio between the price of foreign goods in local currency and the local price level.

Table A5. VAR models for Eurostat countries

Country	Lags utilized in VAR[b]		Control variables – in parentheses, the quarters in which the dummy assumes a value equal to 1
	Social Expenditure	Government Expenditure	
Austria	3	2	dum0809 (2008Q3 – 2009Q2): Global Financial Crisis. REER: Real Effective Exchange Rate.
Belgium	2	2	dum0809 (2008Q3 – 2009Q2): Global Financial Crisis. Constant.
Bulgaria	1	1	dum0809 (2009Q2, 2009Q3): Global Financial Crisis. Constant.
Croatia	2	2	dum0809 (2008Q4-2009Q1): Global Financial Crisis. Constant.
Cyprus	6	2	dum0809 (2008Q4, 2009Q1): Global Financial Crisis. dum13 (2012Q2, 2012Q3): Cypriot Financial Crisis. REER: Real Effective Exchange Rate.
Czechia	4	4	dum0809 (2008Q3 – 2009Q3): Global Financial Crisis. dumeurocrisis (2013Q1 – 2013Q3): eurozone crisis. REER: Real Effective Exchange Rate. Constant.
Denmark[a]	7	7	dum0809 (2008Q3 – 2009Q2): Global Financial Crisis.
Estonia	6	5	dum0809 (2008Q4-2009Q3): Global Financial Crisis. Constant.
Finland	6	6	dum0809 (2008Q3 – 2009Q3): Global Financial Crisis. dumeurocrisis (2012Q2 – 2013Q1): eurozone crisis.
France	1	1	dum0809 (2008Q4-2009Q3): Global Financial Crisis. Constant.
Germany	1	6	dum0809 (2008Q3-2009Q3): Global Financial Crisis. Constant.
Greece	5	5	dum0809 (2008Q2 – 2009Q1): Global Financial Crisis. dumeurocrisis (2010Q1 – 2013Q1): eurozone crisis.
Iceland	3	3	dum0809 (2008Q2 – 2009Q2): Global Financial Crisis.
Ireland	3	2	dum0809 (2008Q4-2009Q3): Global Financial Crisis. Constant.
Italy	3	2	dum0809 (2008Q3 – 2009Q2): Global Financial Crisis.

			dumeurocrisis (2012Q2): eurozone crisis. REER: Real Effective Exchange Rate. Constant.
Latvia	1	3	dum0809 (2008Q4-2009Q3): Global Financial Crisis. Constant.
Lithuania	1	1	dum0809 (2008Q4-2009Q4): Global Financial Crisis. REER: Real Effective Exchange Rate. Constant.
Luxembourg	6	1	Constant.
Malta	2	1	Constant.
Netherlands	1	1	dum0809 (2008Q2-2009Q4): Global Financial Crisis. Constant.
Norway	1	1	dum0809 (2008Q3 – 2009Q2): Global Financial Crisis.
Poland	4	4	dum0809 (2007Q4, 2008Q1, 2009Q1): Global Financial Crisis. REER: Real Effective Exchange Rate.
Portugal	7	4	dum0809 (2008Q4, 2009Q1): Global Financial Crisis. dumeurocrisis (2010Q4 – 2011Q4): eurozone crisis. dumport (2012Q2 – 2012Q3): Portuguese recession.
Romania	1	1	dum0809 (2008Q4, 2009Q1): Global Financial Crisis.
Spain	2	2	dum0809 (2008Q3 – 2009Q1): Global Financial Crisis. REER: Real Effective Exchange Rate. dum12 (2012Q4): break in government expenditure series (this control variable was utilized only in "government expenditure VAR").
Slovakia	4	1	dum0809 (2008Q4-2009Q3): Global Financial Crisis. Constant.
Slovenia	3	3	dum0809 (2008Q4-2009Q2): Global Financial Crisis. Constant.
Sweden	8	2	dum0809 (2008Q3 – 2009Q3): Global Financial Crisis. dumeurocrisis (2013Q1 – 2013Q3): eurozone crisis. REER: Real Effective Exchange Rate.

Notes: (a) Because interest receivable data was unavailable, we utilized total revenue in VAR (not primary revenue); (b) In some cases, lag length criteria indicated different lags for government expenditure and social expenditure VAR models.

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