

Ecuador



Multipliers of Social Protection

Product 3 - Drafting the country case studies

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Product 3

Country Case Study – Ecuador

1. Introduction

In the last two decades, Ecuador has improved its social protection system substantially, but there is still a long way to go to guarantee social protection for all and achieve the Sustainable Development Goals (SDGs). Along with some of its South American neighbours, Ecuador took advantage of the increased policy space created by the commodities boom to improve and expand redistributive policies and foster a process of inclusive growth (on the commodities boom see Erten and Ocampo 2013 and Reinhart, Reinhart, and Trebesch 2016; on redistributive policies see Cornia 2014). Between 2004 and 2014, the number of people living in poverty fell substantially, according to different measures (World Bank 2021) – the percentage of people living with under \$1.90 a day (2011 PPP), for instance, was reduced from 15.1 to 2.6 per cent –, and the Gini coefficient of household per capita income declined from 0.535 to 0.449 (Sedlac 2021). At the same time, GDP growth accelerated to 4.8 per cent per year (Cepal 2021). In the years, since 2014, despite the decline in growth rates – which averaged only 0.5 per cent annually between 2015 and 2019, before the steep decline of the GDP of almost 8 per cent brought about by the pandemic in 2020 (Cepal 2021) –, poverty and inequality indices remained stable – except for the poverty headcount at the national poverty line, which increased from 21.5 to 25 per cent between 2017 and 2019 (World Bank 2021).

In what concerns the social protection system, Ocampo and Gómez-Arteaga (2017: 8) argued that the period between 2003 and 2013 can be considered a ‘golden social decade’ in Latin America due to the adoption of ‘innovative programmes and stronger welfare States’ throughout the region (see also ILO 2017: 132-139). Also, in this regard, Ecuador is in line with the regional trend. The Ecuadorian government took advantage of the period of prosperity to increase expenditures on social protection, which rose from less than 2 per cent of GDP in 2004 to more than 5 per cent, in 2014, according to the estimates made for this report – rising even further in the following years as expenditures kept growing and GDP stagnated.^{1,2} In disaggregated terms, the trend of total expenditures on social protection as a share of GDP

¹ Expenditure on social protection is defined as social security benefits plus welfare expenditures, not including healthcare.

² For an attempt to explain the determinants of social spending in Latin America, see Huber and Stephens (2012).

follows closely the movement of its main component, social security benefits, which more than doubled between 2004 and 2014 (from 1.6 to 3.8 per cent) and kept increasing afterwards (reaching 5.5 per cent in 2019, before the pandemic). The other component, welfare expenditures, expanded more than sixfold from 2004 to 2014 (from 0.2 to 1.3 per cent), from a very low base, and oscillated around 1 per cent of GDP since then.

According to the latest available estimates from the *International Labour Organization's* (ILO) World Social Protection Data, it should be remarked that expenditures on social protection as a share of GDP in Ecuador is still less than half of the world average and about half of the average for Latin America and the Caribbean – expenditures in healthcare are also below, but closer to, the world and regional averages (ILO 2021a, ILO 2021b: 278). Such a relatively low level of expenditures is reflected in below-average effective coverage. The latest estimates from the ILO indicate that Ecuador's social protection system provides effective coverage for only 34.8 per cent of the population. In contrast, the world average stands at 46.9, and the average for Latin America and the Caribbean is 56.3 (ILO 2021a).

With the adoption of the ILO's Recommendation No. 202 on national social protection floors and the subsequent publication of the *World Social Protection Reports* (ILO, 2014, 2017, 2021b), it became possible to assess in greater detail the effective coverage of social protection systems of different countries, both overall and disaggregated in its numerous functions. The aggregate figure of effective coverage for Ecuador overcasts substantial heterogeneity of coverage regarding each social protection function. The main improvement observed in Ecuador in the recent period seems to have been achieved in the coverage of social protection for old age (above the retirement age of 65 years old), which more than tripled from less than 20 per cent in 2000 to 60.6 in 2020 (ILO 2021a). Such an increase was part of a more general trend, observed in many countries, of expanding coverage 'through the establishment or extension of non-contributory pension schemes which provide at least a basic level of protection for many older persons' (ILO 2017: 82). In the case of Ecuador, this non-contributory pension scheme is part of the conditional cash transfer programme called Human Development Grant (*Bono de Desarrollo Humano*), which was established in 2003 and, by 2013, covered 62.3 per cent of the population above 65 years – who received a monthly transfer of 50 dollars (representing 15.7 per cent of the minimum wage) (see Paxson and Schady 2010, Lavinás 2013, Lavinás 2015, Llerena Pinto et al. 2015: 5, ILO 2017: 348, Mideros and Gassmann 2021). It should be remarked that such an improvement in coverage for old age was characterised by a

gender bias, as only 53.9 per cent of the older women received a pension compared to 68.4 per cent of the older men (ILO 2021a, ILO 2021b: 177-9).

Regarding persons with severe disabilities, the Ecuadorian social protection system achieves effective coverage rates above the world average, but below the average for Latin America and the Caribbean: 37.3 per cent of the population with severe disabilities receive social protection benefits in Ecuador, compared to 57.7 per cent of the respective group in Latin America and the Caribbean (ILO 2021b: 268-71). A cash transfer programme focused on disabled persons was created in 2009 (Llerena Pinto et al., 2015: 5). The coverage of employed persons in the event of work injury, in its turn, is 43.1 per cent, in Ecuador, compared to a world average of 35.4 per cent and an average for Latin America and the Caribbean of 40.8 per cent (ILO 2021b: 268-71).

Substantially lower effective coverage rates are achieved for the unemployed, children, mothers with newborns, and vulnerable persons. For the first group, effective coverage stands at only 4.7 per cent, about a fourth of the average for the world as a whole and less than 40 per cent of the average for Latin America and the Caribbean (ILO 2021b: 268-71). According to the ILO's *World Social Protection Report 2017-2019*, 'the low coverage can be explained by the provision of unemployment protection through lump-sum benefits rather than periodic cash benefits.' (ILO, 2017: 134) Effective coverage for children is relatively deficient: the coverage of 8.6 was about a fifth of the average for Latin America and the Caribbean (ILO 2021b: 268-71)³. Besides, effective coverage for mothers with newborns was 6.8 per cent in 2020, even though mothers belonging to the poorest population quintile are covered by the Human Development Grant (ILO 2021a, Llerena Pinto et al., 2015: 5). Finally, effective coverage for vulnerable persons, at 10.7 per cent, represents just over a third of the average for Latin America and the Caribbean (ILO 2021b: 268-71).

This summary indicates that Ecuador seems to have, despite the improvements observed in the last two decades, an extreme version of the segmented and incomplete social protection system that is typical of Latin America (Lavinás 2013, Lavinás 2015, Ocampo and Gómez-Arteaga 2017) – an inheritance of the corporatist social protection systems historically restricted to the minority with formal relations of employment. Thus, by combining a contributory pension

³ There is evidence that effective coverage for children has expanded due to the pandemic response (Blofield et al. 2021).

system with more recent focalised conditional cash transfers, it can achieve high effective coverage for older persons. However, the Ecuadorian social protection system is still a long way from reaching universality, effectively protecting children, mothers with newborns, and the unemployed.

The weaknesses of such an incomplete social protection system – even relative to the regional pattern – were brought to the fore by the pandemic: the emergency response of the government in terms of social assistance reached only 54 per cent of the households in the poorest quintile, standing as one of the worst responses to the pandemic in Latin America (Busso et al. 2020, Blofield et al. 2021). Such low effectiveness seems to have been caused by the fact that the government did not allow households to apply for aid but restricted emergency assistance only to those included in the existing (and incomplete) databases (Blofield et al. 2020, see also Palacio, 2021). As recently suggested in a document published by the *Economic Commission for Latin American and the Caribbean* (ECLAC), the health crisis should be considered a renovated stimulus

‘to build a more permanent, universal social protection floor, for the medium and long term. A broad income protection floor is necessary for both intrinsic and instrumental reasons, and will ensure that countries are better equipped to meet the next pandemic or crisis.’
(Blofield et al. 2020: 11)

This report aims to show that such an expansion of the social protection system in Ecuador is not only crucial to guarantee the human right to social security but also may contribute to promote sustained and inclusive growth. The key contribution is to present estimates of the multiplier effects of social protection expenditures, that is, the impact that increases in social protection expenditures may have on aggregate economic activity (for an introduction to the concept of fiscal multipliers, see Batini et al. 2014). The main result is that one additional dollar spent on social security leads to an increase in three dollars of real GDP – the cumulative impact after two and a half years –, while increased expenditures on welfare have a lower multiplier effect. The findings for the multiplier effects of social security expenditures highlight one specific dimension of the interdependence between the SDGs: the interdependence between guaranteeing social security for all, promoting sustained and inclusive growth, ending poverty, and reducing inequalities.

The focus on such an interdependence links this report with a vast literature on the connections between social protection and economic development (for a recent review, see Gongcheng and Scholz 2019; see also Barrientos 2012, Atkinson 2015, ILO 2018, Barrientos and Malerba 2020, Bhalla et al. 2021, and Carraro and Marzi 2021). The potential connections between social protection and inclusive growth are varied, and the focus of the present report resides in one of these connections: how expenditures on social protection can boost aggregate demand, bringing along with better social protection, higher incomes, government revenues, and employment. In the specific case of Ecuador, the potential for unleashing inclusive growth through the expansion of social protection seems significant as its direct transfers and social spending are more progressive than in most Latin American countries, and their contribution to reducing inequality is only restricted by their relatively small size, as a share of GDP (Llerena Pinto et al. 2015, Ocampo and Gómez-Arteaga 2017). Thus, the progressive nature of its social expenditures not only helps to explain the strong multiplier effect that results from the estimates below but also indicates that the higher incomes generated by an improved social protection system would also be distributed in a way that reduces overall inequality – absent a profound change in the progressivity of social spending.

This report is organised in the following way. The next section presents the recent literature on fiscal multipliers to contextualize the empirical estimates made for the present study and contribute to understanding its significance. Then, the two following section presents the methodology and database used. In the fifth section, three sets of multipliers of expenditures on social protection are presented, considering total spending on social benefits and its two main components: social security and welfare benefits. Finally, the concluding section summarises the findings and discusses the policy implications.

2. Recent empirical literature on fiscal multipliers

Since the global crisis that erupted in 2008, there has been a considerable increase in the empirical literature on fiscal multipliers. In country-specific empirical studies, following Blanchard and Perotti (2002), the strategy of using 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 approach. When disaggregating different government expenditures, this literature usually finds that public investment has a

higher and more persistent multiplier effect on aggregate output than government consumption. However, only a few studies have focused on estimating the impacts of different social expenditures on economic growth. Blanchard and Perotti (2002) and Perotti (2004) treat transfers as a component that should be subtracted from total revenue, which is a strategy followed by several authors (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, among others). However, such an empirical strategy has been criticized in the recent literature both for not taking into consideration government expenditures and revenues in a disaggregated way and for seldom focusing on social spending (Baum and Koester 2011, Gáldon 2013, Pereira and Wemans 2013, Gechert et al. 2018). Pereira and Wemans (2013: 10), for instance, make a case for going beyond aggregate government expenditures and revenues, given the likelihood that their components have heterogeneous multipliers:

‘Initial studies applying the structural VAR methodology to fiscal policy adopted a very aggregate definition of budgetary variables, considering only taxes net of transfers, on the one hand, and public expenditure (fundamentally consumption and public investment), on the other. These definitions were used in a great deal of the subsequent work in this field. It is, however, plausible that the various headings that make up these aggregates have distinctive influences on economic activity.’

In their turn, Gechert et al. (2018) claim that social expenditures have not received enough attention despite the existence of numerous studies on fiscal multipliers. According to the authors, this fact represents a relative paradox in the face of the growing importance of social expenditures:

‘In recent years there has been a tremendous surge in the literature on the size of fiscal multipliers. While many papers have focused on the effects of federal and local public procurement, employment and investment spending, and tax shocks, the impact of changes in social security contributions and benefits has received only limited attention. This seems surprising given the fact that social security systems have grown substantially in OECD countries after the Second World War and account for about half of the overall budget in countries like Germany.’ (Gechert et al. 2018: 2)

While the implementation of the American Recovery and Reinvestment Act (ARRA) in the United States in the aftermath of the 2008 crisis has been partially justified in terms of more significant multiplier effects of income transfers by the Council of Economic Advisers (2009), only a few empirical studies have estimated the impact of this type of expenditure on aggregate output. Moreover, the set of these studies that adopt the conventional VAR approach of Blanchard and Perotti (2002) finds mixed results, as reported in Table 1 below.

Some of them find significant multiplier effects for social expenditures – impact multipliers close to one (Gáldon 2013, Adams and Wong 2018, Gechert et al. 2018) –, but, in some cases, the results suggest that the multiplier is non-persistent – the accumulated multiplier is close to zero (Adams and Wong 2018).⁴ In other cases, the impact multiplier for social transfers is close to one, and the effect remains above zero in accumulated terms (Pereira and Wemans 2013). In contrast, some studies have found a negative - although non-significant – accumulated effect (Claus et al. 2006, Bruckner and Tuladhar 2010).

Various studies estimate positive but very low multipliers for social transfers. These studies usually estimate higher multipliers associated with government consumption, cuts of direct taxes, and, especially, public investment (Pereira and Wemans 2013, Silva et al. 2013, Huseyin and Ayse 2017, Sarangi and Bonin 2017, Bova and Klyviene 2019). In other cases, the multiplier for social transfers is large in absolute terms, but different types of expenditure feature a similar or higher multiplier effect on aggregate output (Fatás and Mihov 2001, Pereira and Sagalés 2009, Pereira and Wemans 2013).

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 consumption. However, tax reductions seem to have the highest and most persistent multiplier effect, which could be explained, in the authors’ view, by a more significant 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 output than those that resort to spending cuts, whether from government consumption spending or transfers. Meanwhile, Gechert et al. (2018) employ a similar methodology for social spending in Germany and find a

⁴ The authors find lower multipliers in the long run (accumulated) and attribute the lower output responses to rising inflation and interest rates, proposing a kind of crowding-out effect.

higher and more persistent multiplier effect for social expenditures than for decreases in the social contributions that finance them.⁵ In general, according to Batini et al. (2014: 4), studies resorting to the ‘narrative approach’ tend to ‘find larger tax multipliers than conventional VAR models do.’

Besides, 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 Giuliadori 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 2019). 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 benefits as the components with more substantial impacts on output. Moreover, Reeves et al. (2013) estimate a positive social protection multiplier for a group of European countries⁶, which reaches 3 in the baseline scenario. In their estimates, health expenditures present an even higher multiplier (near 4.9).

Table 1 presents a summary of the empirical literature on the multiplier effects of different types of expenditures – from aggregate government spending to several decompositions of it – in many countries (or panel of countries), different periods and using several alternative empirical approaches or econometric techniques.

⁵ The authors offer the following possible explanation: ‘Given that benefits are likely pro-poor while contributions are paid by middle- and upper-income classes, it seems plausible that benefit shocks have a stronger aggregate demand effect. Moreover, some benefits are in-kind and will have a direct GDP effect.’ (Gechert et al. 2018: 19).

⁶ In this article, the authors apply a panel model instead of the traditional VAR: ‘Vector autoregressive models have been applied to quarterly data for small numbers of countries, but for annual data with larger numbers of countries fixed effects models are more consistent.’ (Reeves et al. 2013)

Table 1 – Multiplier effects of different types of expenditures in the econometric literature for different countries and time periods

Study	Countries	Period	Type of Expenditure	Methodology	Multiplier Results
Adams and Wong (2018)	New Zealand	1990-2017	Transfers (social assistance and superannuation)	SVAR	1.53 (impact) and 0.76 (cumulative one year)
Auerbach and Gorodnichenko (2014)	Japan	1960-2012	Government spending	Direct projections (based on Auerbach and Gorodnichenko [2013])	1.74 (peak) and 2.3 (cumulative)
Auerbach and Gorodnichenko (2014)	Japan	1985-2012	Government spending	Direct projections (based on Auerbach and Gorodnichenko [2013])	0.5 (peak) and 0.44 (cumulative)
Bayoumi (2001)	Japan	1981-1998	Government spending	VAR	0.65 (short-term multiplier)
Bova and Klyviene (2019)	Portugal	1995-2017	Transfers (old age, unemployment, and disabilities transfers)	SVAR	-0.27 (impact) and 0.1 (cumulative)
Bruckner and Tuladhar (2010)	Japan	1990-2000	Local government expenditure on social assistance	One-equation methods	-0.25 (impact)
Dufrénot et al, 2016)	United States	1960-2012	Transfers (social security)	Non-linear methods (MS/TVTP)	It reaches 1.68 (in terms of consumption) and -0.02 (investment); recession
Fatas and Mihov (2001)	United States	1960-1996	Social security, other transfers, and subsidies	VAR (Choleski decomposition)	Do not estimate multipliers, but captures a positive and significant impact of transfers on GDP after eight quarters
Furceri and Zdzienicka (2012)	OECD	1980-2005	Social expenditure (old age, incapacity-related, unemployment benefits, and other expenditures)	One-equation method	Short-term multipliers: 0.6 (total expenditure), 0.9 (health), and 2.1 (unemployment benefits)

Gáldon (2013)	United States	1948-2012	Social security, unemployment benefits, and other	Non-linear methods (TVPSV-VAR)	>1 (impact and long run). Near 1.5-2 (long run) at the end of 2008/2009 crisis. Reaches almost 3 (long-run) at the end of 1950s and beginning of the 1960s
Gechert and Rannenberg (2014)	Meta-analysis (98 studies)	+1800 observations	Transfers	Meta-regression analysis	Between 2 and 3 (cumulative/recession)
Gechert et al (2018)	Germany	1974-2013	Social security	SVAR with narrative-identified shocks	0.5-1.5 (impact)
Hollmayr and Kuckuck (2018)	Germany	1993-2017	Social expenditures (pensions and unemployment)	SVAR	2 (impact), between 0.3 and 3.8 (after 5 years)
Huseyin and Ayse (2017)	Turkey	2002-2016	Transfers	SVAR	0.02-0.23 (impact)
Kanazawa (2018)	Japan	1980-2014	Public investment	Local projection (IV method)	4.95 (peak; 17 th period, quarterly data)
Konstantinou and Partheniou (2019)	OECD and non-OECD countries	1991-2015	Social expenditures	Non-linear one-equation methods	0.8 (OECD countries) and 0.076 (non-OECD); cumulative in two years; recession
Kuttner and Posen (2002)	Japan	1976-1999	Government spending	SVAR	1.06 (four-year cumulative multiplier)
Mahaphan (2013)	Thailand	1988-2009	Public investment and government consumption	VECM	0.6 (peak, 2 nd period) for public investment, 0.09 (peak, 1 st period) for government consumption
Miyamoto, Nguyen, and Sergeev (2017)	Japan	1980-2014	Government spending	Local projection method (based on Jordà [2005])	1.48 (impact; when the nominal interest rate is near the zero-lower bound) and 0.71 (impact; otherwise)

Orair et al (2016)	Brazil	2002-2016	Social expenditure (pensions, social programmes, and unemployment benefits)	Non-linear VAR (STVAR)	1.51 (peak) and 8 (cumulative in four years); recession
Park and Lee (2019)	South Korea	2000-2018	Government spending	VAR	1.09 (impact) and 1.68 (six-period, quarterly data, cumulative)
Pereira and Sagalés (2009)	Portugal	1980-2005	Public transfers	VAR	1.88 (impact) and 1.81 (cumulative)
Pereira and Wemans (2013)	Portugal	1995-2011	Social transfers in cash	SVAR	Near 1 (peak) and 0.6 (cumulative, one year)
Reeves et al (2013)	European Union	1995-2010	Social expenditure	One-equation method	3 for social protection, near 4.9 for health
Resende (2019)	Brazil	1997-2018	Social expenditure (pensions, social programmes, and unemployment benefits)	VAR	0.72 (impact) and 4.3 (cumulative, two years)
Romer and Romer (2016)	United States	1952-1991	Social security benefits	Narrative VAR	Significant and great response of consumption (mainly in the impact) – but tax revenues had a higher effect in the analysed period
Sanches and Carvalho (2019)	Brazil	1997-2018	Social expenditure (pensions, social programmes, and unemployment benefits)	SVAR	0.75 (impact), 1.2 (peak), and near 3 (cumulative, two years)
Sarangi and Bonin (2017)	Egypt	1990-2015	Social expenditure	SVAR	0.04 (impact) and 0.17 (peak)
Silva et al (2013)	Euro Area	1998-2008	Transfers – social expenditures in cash/in kind – plus subsidies and other expenditures	VAR	-0.118 (impact) and 0.82 (cumulative, ten quarters); recession
Tang, Liu, and Cheung (2013)	Thailand	1993-2019	Government spending	SVAR	-0.37 (impact)

To the best of our knowledge, there has been no attempt to estimate the multiplier of social protection expenditures in Ecuador. However, there are a few studies that have adopted the VAR approaches discussed above.⁷ They generally find low or non-significant multipliers both for government expenditures and for government revenues. Also, in the few cases where the estimated multiplier is significantly different from zero, it is non-persistent. Carrillo-Maldonado (2015), for instance, uses a structural VAR to estimate the fiscal multipliers for the period between 1993 and 2009 and finds a non-significant positive impact of government consumption on economic activity. Regarding indirect taxes, Carrillo-Maldonado (2015) finds a negative effect of an exogenous shock of these taxes on GDP after one quarter, but such an impact is not persistent. In another study, the same author adopts a Markov-switching VAR approach to investigate whether the multipliers change when the shock takes place in different stages of the business cycle, using data for the period between 2003 and 2013 (Carrillo-Maldonado, 2017). In line with the conclusions of similar empirical investigations, his results indicate that government expenditure multipliers are stronger during recessions than during expansions. However, in both phases, the impact of government expenditures on GDP is not significantly different from zero.

More recently, Paredes-Chancussi (2020) also employed a structural VAR to estimate fiscal multipliers, with data from 2000 to 2017, arriving at similar results: a significant – but not persistent – impact of exogenous government spending shocks is identified one quarter after the shock, whereas government revenues shocks have no significant effect on economic activity. Paredes-Chancussi (2020) goes beyond the estimates using aggregated variables, but the results obtained with disaggregated ones are similar: government consumption and investment have effects that are close to the one obtained for aggregate government spending (significant impact after one quarter) and the only component of government revenues that have a significant effect on GDP is income taxes (which has a negative impact two quarters after the shock). Last, García-Albán et al. (2021) estimate a structural VAR with Bayesian methods, using data from 2004 to 2019, and do not find significant impacts on GDP of shocks on government consumption, investment, and taxation policy. According to them, only oil revenue shocks have a significant, positive, and persistent impact on GDP – a result that may be related

⁷ IMF (2018) analyses the impact of fiscal consolidation in Latin America based on estimating fiscal multipliers for some of the region's countries, including Ecuador. They estimated the multipliers resorting to three different methods – VAR, 'narrative', and forecast errors – but results are only presented for the region as a whole, not for individual countries.

to the effect of rising oil prices on the policy space in a dollarized economy rich in oil, like Ecuador. However, they also make policy simulations that show that multipliers of oil-financed government investment, deficit-financed government investment, and fully-saved oil revenue shock are all significantly different from zero and persistent.

The estimates presented in the current report (see section 5, below) contrast with those obtained in these previous investigations focused on Ecuador. They indicate that social security expenditures have significant and persistent impacts on GDP – the accumulated multiplier for ten quarters being larger than 3. Such a contrast highlights the importance of estimating multipliers for different components of government expenditures and revenues, as Pereira and Wemans (2013) argued, going beyond the disaggregation between government consumption and investment to obtain more precise estimates that can inform policy decisions. Besides, the large multipliers reported below are not unprecedented, being similar to the results obtained by part of the literature reviewed above.

In addition, there is also evidence that estimates of multipliers for Latin America and the Caribbean obtained with VAR approaches could be underestimated due to endogeneity biases and measurement errors (Carrière-Swallow et al. 2018, IMF 2018). A meta-study undertaken by the *International Monetary Fund* (IMF), which reviewed 132 published estimates of multipliers for the region – most employing 'VARs or similar approaches to identify fiscal shocks' (IMF 2018: 84) –, concluded that fiscal multipliers in Latin America and the Caribbean appeared to be half as large as the average multiplier estimated for other emerging market economies and a third of the average for advanced economies. However, the IMF notes that studies focused on the region and employing the 'narrative approach' tended to find much larger multipliers, not significantly different from the average for advanced economies. This contrast indicates that the estimates reported below could be biased downwards, something that could be further investigated in future projects by comparing estimates for Ecuador based on VAR and on 'narrative' approaches. In other words, the effective multipliers of social protection expenditure may be even larger than reported below, reinforcing the contribution of this kind of expenditure for unleashing processes of inclusive growth.

3. Methodology

As seen in the previous section, most attempts to estimate the multiplier effects of different types of government expenditures use a structural VAR (or SVAR) approach. The SVAR became well known in the literature of fiscal multipliers through Blanchard and Perotti (2002). They argue that the VAR methodology is appropriate for analyzing the effects of fiscal policy due to *lags* in decision-making and implementation of government spending decisions. With high-frequency data (monthly or quarterly), they argue that the temporal coincidence of unexpected shocks in output and fiscal policy reaction to these shocks can plausibly be ruled out. In other words, output does not affect public spending contemporaneously because policymakers take longer than a quarter – and much longer than a month – to notice the output shock, decide the next steps in fiscal policy, and present them to the legislature.

The purpose of the identification strategy is to isolate 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 expenditures, 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:

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

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

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

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 . 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, considering the identification hypothesis discussed above, component (b) is removed, and coefficients α are made to reflect only the first component – the response of the automatic stabilizer. As Perotti (2007: 176) argues: ‘it typically takes longer than a quarter for discretionary fiscal policy to respond to, say, an output shock.’ 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. These coefficients measure both the discretionary and the automatic responses of fiscal variables to unexpected changes in economic activity (Jemec et al. 2013). Due to the identification hypothesis, the discretionary response of fiscal variables to output is disregarded so that these elasticities reflect only the automatic stabilizer. Consequently, the following elasticity is used:

$$\alpha_{gy} = 0 \tag{4}$$

The elasticity of revenue to output, in its turn, 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.

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 to eliminate the automatic stabilizer. Thus, component (a) is removed, guaranteeing exogeneity:

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

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

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).⁸ The purpose of this regression is to obtain the estimates of e_t^g and e_t^t . These shocks are ‘isolated’ from the influence of output because the automatic response component has been removed. It, therefore, becomes possible to make the shocks exogenous by removing the (a) and (b) components mentioned above.

From equation (5), it is possible to recover e_t^g , using it to estimate equation (6) by OLS (Burriel et al. 2010). 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.

⁸ Models were also estimated assuming $\beta_{tg} = 0$, 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.

The basic model is estimated using the vector of endogenous variables, in real terms: the logarithms of social expenditures, total primary revenue, and output.⁹ Dynamic effects of public spending can also be analyzed 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 report 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 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) 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 (Ilzetzi 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).

⁹ 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 (Matteo 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 provided in the appendix.

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):

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

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 $\rightarrow \infty$, but in practice is used the number of periods needed for the multiplier to stabilize at its long-run value.’ 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 report, the multiplier effects of social protection expenditures were estimated for Ecuador 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.

4. Data

Beginning with social protection expenditure, data from the *Ministerio de Finanzas*, collected by Ecuador’s ILO office and covering the period between 2000 and 2017, was used. The data from 2000 to 2007 was only available on an annual frequency, whereas the data for the more recent period was provided on a quarterly frequency. To transform the annual series into quarterly ones, the quarterly series for total government consumption was used as an indicator

in the Denton-Chollete temporal disaggregation method (available in the R Package ‘tempdisagg’). Such a series was obtained from the Quarterly National Accounts of Ecuador (published by the *Banco Central del Ecuador*). The series for social protection expenditures were provided in two categories: (a) welfare and (b) social security benefits. Both categories refer to expenditures as an accrued budget. For this report, the multipliers of both kinds of expenditures were estimated as well as the multiplier of total expenditure on social benefits – a series that combines the two other, (a) and (b).

Monthly data for tax revenues was obtained from *Banco Central del Ecuador* and aggregated to a quarterly frequency. In what concerns output, real GDP data at a quarterly frequency (in 2007 prices) was also obtained from the Quarterly National Accounts of Ecuador. All series were brought to real terms, using the consumer price index provided by the IMF as a deflator, and were seasonally adjusted, using the X13 Arima Method, available in Eviews. Figures 1 to 3, below, show the series for social protection expenditures, aggregated, disaggregated in the two mentioned categories, and as a share of GDP. As already stated in the introduction, the increase in spending is noteworthy, both in real terms and as a share of GDP. Such an increase is observable throughout the whole period for social security benefits, whereas the series for welfare expenditures peaks in 2013 and oscillates around 200 million dollars (in 2007 prices) since. Ecuador's social protection expenditure rose from a relatively very low base in the last two decades but remain substantially below the regional and world averages.

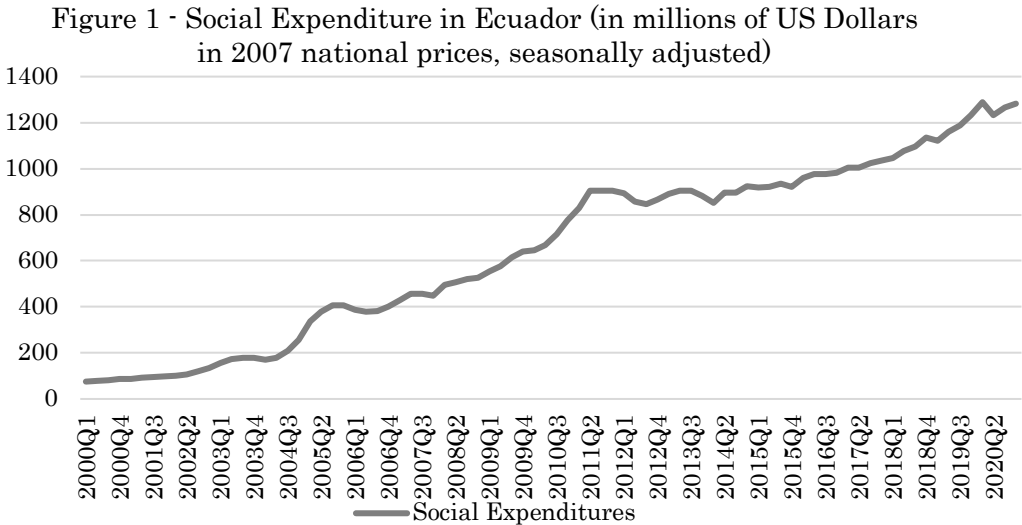


Figure 2 - Components of Social Expenditure in Ecuador (in millions of US Dollars in 2007 national prices, seasonally adjusted)

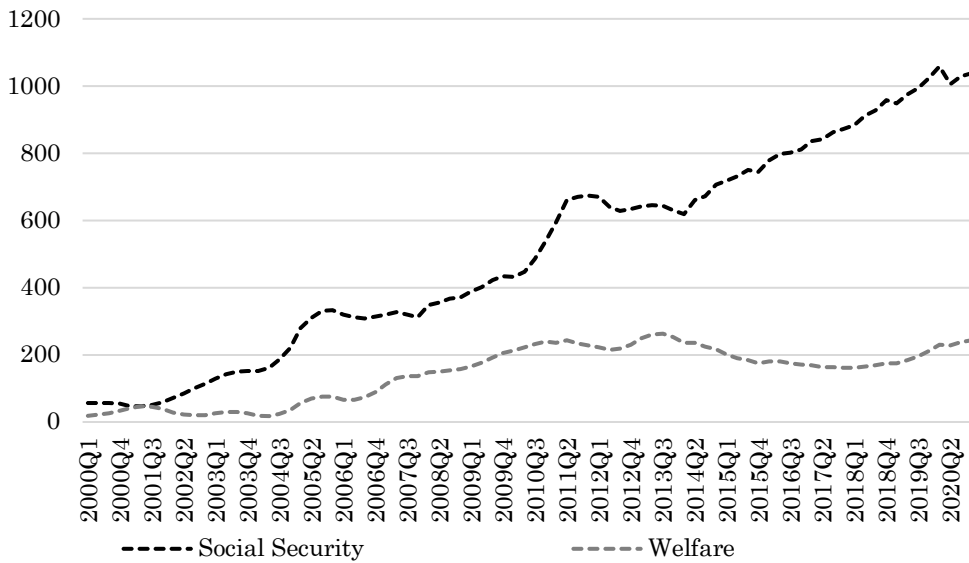
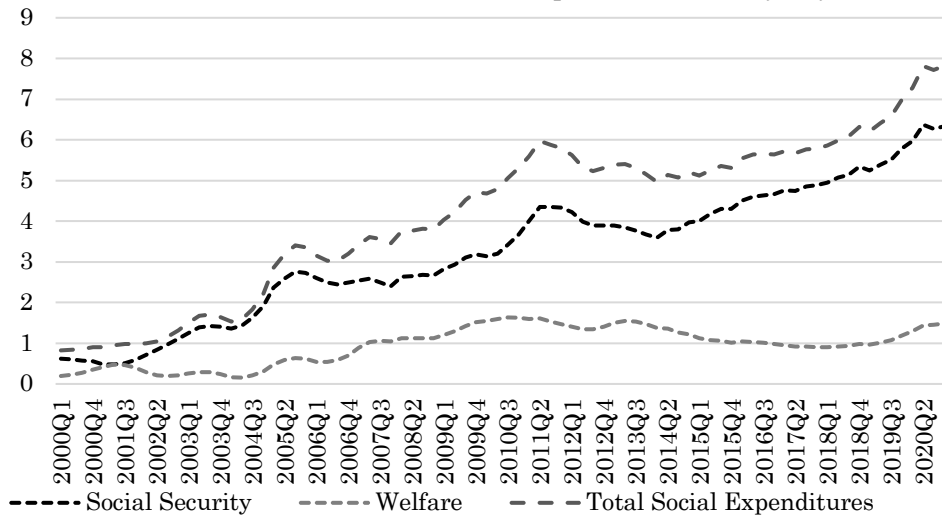


Figure 3 - Social Expenditure and its Components in Ecuador (as a share of GDP in constant 2007 national prices, seasonally adjusted)



5. Estimation results

Following the procedures described above, different VAR models were used for estimating the multipliers of total expenditures on social benefits (the combined series) and its two components (social security expenditures and welfare benefits). For each model, different specifications were tried, using different control variables and time dummies. The specification chosen in the end was the one that performed better in terms of significance and robustness

(free of heteroscedasticity, autocorrelation, and non-stability problems, according to LM and White tests).

Two control variables were used: the price of West Texas Intermediate (WTI) crude oil¹⁰ (in first difference of the log), obtained from the *Banco Central del Ecuador*, and a competitiveness index (*Indice de Tipo de Cambio Real* – ITCER)¹¹, also obtained from the central bank and specified in the first difference of the log. Both variables have monthly frequency but have been averaged to each quarter. These control variables were included if they showed significance: the first two models described below – for total expenditure on social benefits and for social security benefits – used the competitiveness index as a control variable, while the third model – for welfare benefits – used the oil price control. Besides, different time dummy variables were tested: dummy1 is included to control for domestic political crisis (2003Q1, 2005Q1), Global Financial Crisis (GFC) (2008Q1, 2009Q1) and COVID-19 crisis (2020Q2, 2020Q3); dummy2 controls for other quarters of the GFC (2008Q3, 2008Q4, 2009Q1); dummy3 is similar to dummy1, but controls for a more extended period of the domestic political crisis (2003Q1, 2003Q2, 2004Q4, 2005Q1, 2005Q2, 2008Q1, 2009Q1, 2020Q2, 2020Q3); finally, dummy4 controls for a shorter period of the domestic political crisis and the COVID-19 crisis (2005Q1, 2005Q2, 2020Q2, 2020Q3).

The impact, peak, and accumulated multipliers were obtained. Both the impulse response functions and the corresponding multipliers are presented in the following three subsections. In their turn, diagnostic tests and estimated coefficients are reported in the appendix.

5.1. Effects of total expenditure in social benefits on output

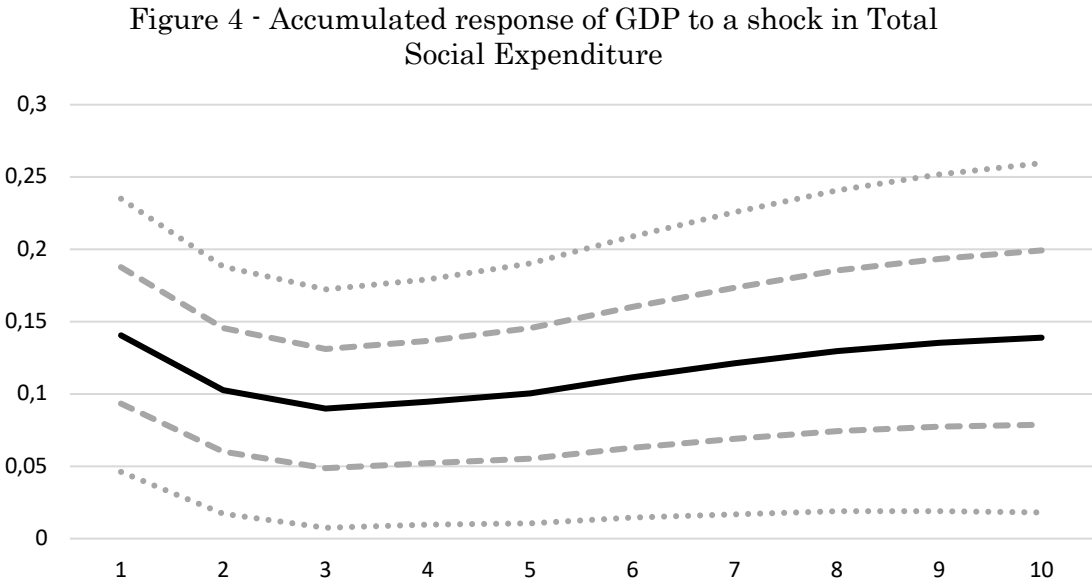
The first model (VAR 1) was estimated using the aggregate series of total expenditure on social benefits, GDP, and tax revenues from 2000 to 2020. As mentioned before, all these series were brought to real terms (2007 prices), using the CPI, and seasonally adjusted. The specification chosen included three lags (following LR and FPE lag length criteria), dummy1 and dummy2, and controlled for competitiveness (ITCER variable). It presented the best estimation in terms

¹⁰ Monitoring the WTI crude oil price is vital for the Ecuadorian economy, considering that the most relevant information and analysis of specialized oil markets are mainly focused on this type of crude oil, and it has become the benchmark for determining oil prices. It is listed on the New York Stock Exchange.

¹¹ It is specified by the ratio between the price of foreign goods in local currency and the local price level.

of significance and of its ability to eliminate serial autocorrelation. The LM test did not detect autocorrelation, and the White test did not detect heteroscedasticity.

Figure 4 shows the accumulated impulse-response function of GDP to a shock in expenditures on social benefits. Dotted lines represent a confidence interval of 95 per cent (two standard deviations), and dashed lines show a confidence interval of 68 per cent (one standard deviation). The exercise points to a positive effect of social expenditure on GDP at a 5 per cent level of significance.



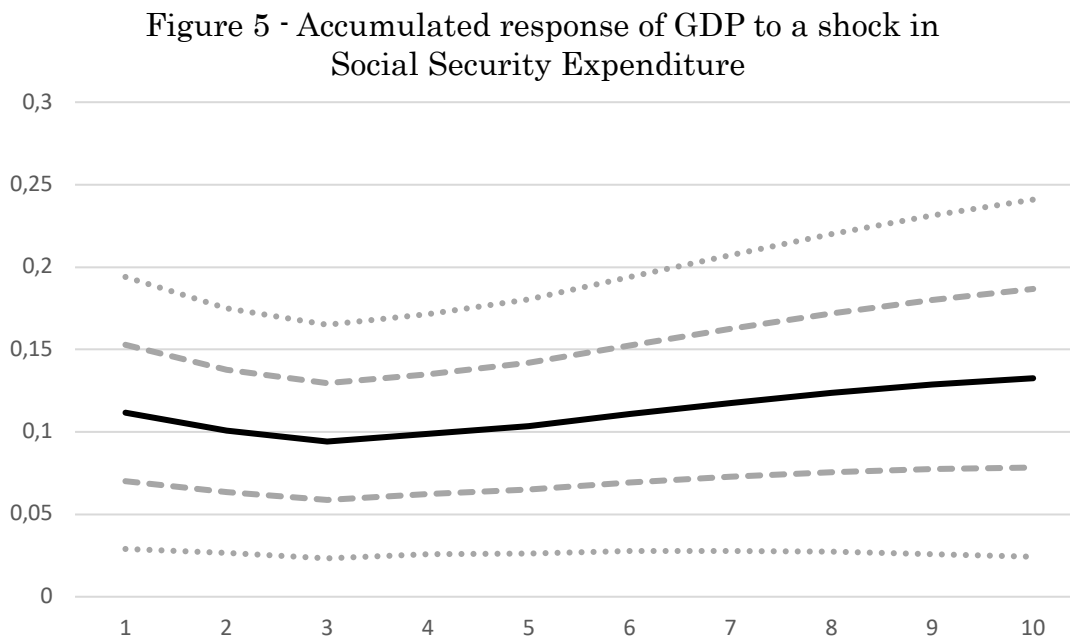
Dotted lines represent a confidence interval of 95% (two standard deviations). Dashed lines show a confidence interval of 68% (one standard deviation). The accumulated response of GDP was divided by the accumulated shock in social expenditure.

After a strong immediate impact on output, the expansionary effect of increased social expenditure is reduced for a couple of quarters but resumes growing subsequently. The effect is so persistent that the multiplier reaches its peak value only at the beginning of the third year after the shock, that is, in the ninth quarter. The estimated size of the impact multiplier is 3.37, meaning that, for each additional dollar of social expenditure, real GDP becomes more than 3 dollars larger. The estimated size of the peak multiplier is 9.05, attained in the ninth quarter. Finally, the accumulated multiplier after two years and a half (ten quarters) is 3.33: each additional dollar spent in social benefits has a persistent expansionary impact of more than 3 dollars on GDP.

5.2. Effects of social security expenditure on output

The second model (VAR 2) was estimated using the larger component of the social expenditure, that is, social security expenditure. Following the LR lag length criteria, three lags were included, as well as dummy2 and dummy3, and the competitiveness index (ITCER) as a control. Such a specification presented the best estimation in terms of significance. Despite that, the LM test detected autocorrelation for lag 3, but the White test did not detect heteroscedasticity.

Figure 5 shows the accumulated impulse-response function of GDP to a shock in social security expenditures. Similar to Figure 4, in the previous subsection, dotted lines represent a confidence interval of 95 per cent (two standard deviations) and dashed lines show a confidence interval of 68 per cent (one standard deviation). The exercise shows a positive effect of social expenditures on GDP at a 5 per cent level of significance.



Dotted lines represent a confidence interval of 95% (two standard deviations). Dashed lines show a confidence interval of 68% (one standard deviation). The accumulated response of GDP was divided by the accumulated shock in social expenditure.

The result is very similar to the one obtained in the previous subsection, both in terms of the trajectory of the multiplier and in terms of the estimated size of the three multipliers. Such a similarity is not surprising, given that social security expenditure represents a large share of total expenditure on social benefits: the average for the whole period (2000-2020) is 76.4 per

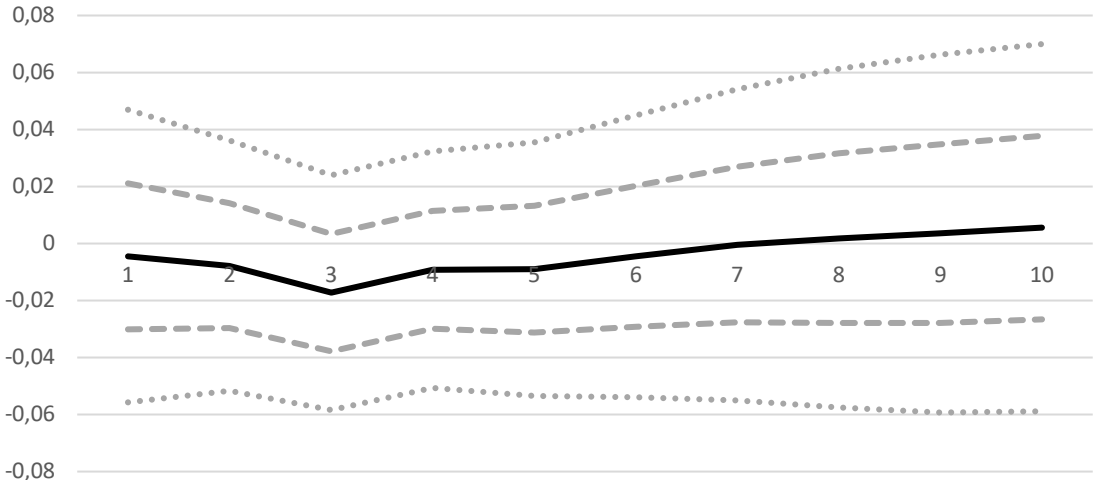
cent. An increase of 1 dollar in social security expenditure has an immediate impact of 2.67 dollars in GDP (impact multiplier). Again, the expansionary effect falls for a couple of quarters but then resume growing, with the multiplier peaking, at 9.91, only two years and a half after the shock, in the tenth quarter. Such a persistent positive impact is also shown by the accumulated multiplier for ten quarters, the size of which was estimated as 3.18.

5.3. Effects of welfare expenditure on output

The third model (VAR 3) was estimated using the expenditure on welfare benefits. Following LR, FPE, AIC, and HQ lag length criteria, five lags were included, as well as dummy2 and dummy4, and the WTI crude oil price as a control variable. Such a specification presented the best estimations in terms of autocorrelation and heteroscedasticity. The LM test did not detect autocorrelation, and the White test did not detect heteroscedasticity.

Figure 6 shows the accumulated impulse-response function of GDP to a shock in welfare expenditure. As in the two previous figures, dotted lines represent a confidence interval of 95 per cent (two standard deviations) and dashed lines show a confidence interval of 68 per cent (one standard deviation). In contrast to the results obtained with the two previous models, this exercise did not show an effect of welfare expenditures on GDP at any level of significance.

Figure 5 - Accumulated response of GDP to a shock in Welfare Expenditure



Dotted lines represent a confidence interval of 95% (two standard deviations). Dashed lines show a confidence interval of 68% (one standard deviation). The accumulated response of GDP was divided by the accumulated shock in social expenditure.

The temporal trajectory of the multipliers is very similar to the one obtained with the two previous models. Still, their estimated size is much smaller – so much so that it cannot be considered significantly different from zero. The immediate impact of an increase of welfare expenditure of 1 dollar is a decline in GDP of 0.11 dollars. The negative impact rises in the second and third quarters, but the trajectory is reversed afterwards, and the peak multiplier is obtained in the tenth quarter - when the increase in welfare expenditure in 1 dollar increases GDP by 1.53 dollars. This peak does not compensate for the persistent negative (although statistically not significant) multiplier, and the accumulated multiplier for ten quarters was estimated as 0.13.

5.4. Summary of results and implications

Table 2, below, summarises all the multipliers estimated for the current report. Beginning with the first two models, given the similarity of the results obtained, their contrast with the results found with VAR 3, and the fact that social security expenditure represents a large share of total expenditure on social benefits, it is plausible to conclude that the results obtained for the aggregate series (in the first model) are mainly driven by the multipliers of social security expenditure. Besides, it is also possible to claim, based on these results, that increases in social security expenditure have both short- and medium-run expansionary impacts on output, leading to more than proportional increases in real GDP. The immediate expansionary impact, which leads to increases in real GDP of about three times as high as the increase in expenditure, is persistent: two and a half years after the shock, real GDP is more than 3 guaraníes higher than it was initially for every additional guaraní spent on social security. It should be remarked also that accumulated multiplier may be even larger for periods longer than ten quarters, as the accumulated multiplier shows in the impulse-response functions grows towards the end of the period and the peak multiplier is attained in one of the two last quarters (depending on the model, VAR 1 or 2).

Table 2: Social protection expenditure multipliers for each model

Model	Category of expenditure	Impact Multiplier	Peak Multiplier (quarter)	Accumulated Multiplier (over ten quarters)
VAR 1	Total expenditure on social benefits	3.37	9.05 (ninth quarter)	3.33

VAR 2	Social security expenditure	2.674	9.907 (tenth quarter)	3.178
VAR 3	Welfare expenditure	-0.106	1.528 (tenth quarter)	0.133

These results have several implications. First, as argued before, they point toward a crucial dimension of the interdependence of the SDGs, as expansion of social protection expenditure not only contributes to guaranteeing the human right of social security for all but also is instrumental to sustaining processes of inclusive growth and, in this way, reducing poverty and inequality. The persistent positive multiplier of social security expenditure indicates that growth and redistribution can be combined by resorting to increases in this specific component of government expenditure. Second, it confirms the importance of estimating fiscal multipliers in a disaggregate way, as argued by Pereira and Wemans (2013), given that these findings contrast with those generally reported by previous empirical efforts to estimate fiscal multipliers for Ecuador – most of them, as described in section 2 above, has found that higher government spending has no statistically significant impact on GDP.

Finally, regarding the multiplier of welfare expenditure, obtained in model VAR 3, further research is needed to understand its contrast with the multiplier found for social security expenditure. Given that it is a much smaller component of total expenditure on social benefits, it is not likely that its lack of impact on GDP could be explained by counteracting changes in interest rates, for instance. A more plausible hypothesis seems to be that the progressivity of this expenditure is lower than that of social security benefits, reducing the expansionary impact brought about by shifts in the average propensity to consume. Independently of a proper investigation of this result, it may still be useful for policymakers to be aware of heterogeneous multipliers, so that they can predict, with a higher degree of precision, the potential impacts of different policy choices.

6. Concluding remarks

The current report presented estimates of fiscal multipliers for Ecuador, resorting to the SVAR approach pioneered by Blanchard and Perotti (2002). Using data on social protection expenditure from *Ministerio de Finanzas*, ranging from 2000 to 2017, it estimated the fiscal

multipliers of both the aggregate expenditure on social protection and its two components (social security and welfare expenditures). A positive and persistent impact of shocks in social security expenditure on GDP was found: over ten quarters, the accumulated multiplier is statistically significant and larger than three. This result means that each additional dollar spent on social security leads to an increase in real GDP, two and half years after the shock, of more than three dollars.

The present empirical investigation contributes to the existing research in some dimensions. First, it takes forward the extant effort to estimate fiscal multipliers in a more disaggregate way, the importance of which has been maintained by Pereira and Wemans (2013). Also, it helps filling the gap in this empirical literature regarding social protection expenditures – which, as Gechert et al. (2018) argued, represent a substantial share of government spending in several countries but has seldom been investigated by the literature on fiscal multipliers. The findings here reported confirm the need to study fiscal multipliers in a disaggregate way to provide a more precise estimate of the consequences of different policy options, given that social security expenditure and welfare expenditure were found to have different multipliers. In addition, these findings also highlight the expansionary potential of social security expenditure, as they indicate that its accumulated multiplier is positive and persistent, in contrast to the more common findings by earlier literature on fiscal multipliers in Ecuador.

A second dimension of the contribution of the research done for this report is emphasising the interdependence of several SDGs. Improving social protection systems are an end in itself and play a crucial part in ending poverty and reducing inequality. In the specific case of Ecuador, the scope for such an improvement is vast, despite the positive changes observed in the last two decades. But this interdependence of the SDGs can be taken further. Such an improvement in social protection should not be thought of as a policy disconnected from the more general development strategy of the country and the prospects of sustaining inclusive growth. In fact, the multipliers estimated for the present report suggest that building more robust social protection systems also has a potential to unleash a virtuous economic dynamic, in which higher expenditure in social protection leads to higher incomes, employment, and tax revenues. Besides, a growth process sustained by improvements in the social protection system has a higher likelihood of distributing its fruits more evenly than one that disregards the importance of social protection.

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APPENDIX

**** 1% / *** 5% (two standard-deviation bands) / **10% / *30% (one standard- deviation bands)

VAR 1

	Social Expenditure	Revenue variable	GDP
Social Expenditure (0)			-0.111204****
Social Expenditure (-1)	0.624632****	-0.0260	0.0039
Social Expenditure (-2)	0.054047	0.235081	-0.036805
Social Expenditure (-3)	-0.29662****	0.13141	0.074518*
Revenue (0)			-0.028604****
Revenue (-1)	-0.049014*	-3.62E-01****	-0.006645
Revenue (-2)	-0.014573	0.072427	0.029295*
Revenue (-3)	0.02134	0.20352*	0.042828****
GDP (-1)	0.166783	-1.66E-01	-0.079834
GDP (-2)	0.471736*	9.04E-01	0.207097*
GDP (-3)	0.681762*	-0.749361	0.008538
C	0.009438*	0.018906	0.005968****
Dummy1	0.052474****	-1.50E-01****	-0.019585****
Dummy2	-0.003534	-0.096829	0.007847
TCER Index	0.466615****	2.009303****	0.259992****

(0) In the Table refers to the SVAR's contemporaneous response of GDP to social benefits and to revenues (if negative, the impact is positive due to matrix algebra).

White test (p-value): 0.2023 (with cross terms)

LM (p-values):

0.2248
 0.9776
 0.1925
 0.7859
 0.6415
 0.5061
 0.3088
 0.5481

VAR Roots (Modulus)

0.819110
 0.819110
 0.748721
 0.670022
 0.670022
 0.658031
 0.536703
 0.536703
 0.415323

VAR 2

	Social Security Expenditure	Revenue variable	GDP
Social Security (0)			-0.090985***
Social Security (-1)	0.707076****	0.2693	0.061709*
Social Security (-2)	0.11812	0.26886	-0.03795
Social Security (-3)	-0.282751***	-0.113912	0.02962
Revenue (0)			-0.032068***
Revenue (-1)	-0.087637**	-3.91E-01****	-0.009979
Revenue (-2)	-0.035654	0.082783	0.033393**
Revenue (-3)	0.023833	0.231952**	0.046521****
GDP (-1)	0.191842	-0.115867	-0.084951
GDP (-2)	0.389125*	0.753039	0.182398*
GDP (-3)	0.298833	-4.49E-01	0.037321
C	0.010405*	0.017088	0.006217***
Dummy2	0.002873	-0.109309*	0.007615
Dummy3	0.024904*	-0.12707****	-0.019823****
TCER Index	0.400936**	2.027983****	0.265394****

(0) In the Table refers to the SVAR's contemporaneous response of GDP to social benefits and to revenues (if negative, the impact is positive due to matrix algebra).

White test p-value: 0.2898 (with cross terms)

LM test p-values:

0.1253
0.8701
0.0150
0.4578
0.5492
0.6378
0.2393
0.6376

VAR roots (Modulus):

0.737879
0.737879
0.717830
0.671264
0.671264
0.580153
0.503633
0.503633
0.471059

VAR 3

	Welfare	Revenue variable	GDP
Welfare (0)			0.00561
Welfare (-1)	0.934497****	-0.0817	-0.0133
Welfare (-2)	-0.101686	0.280607	-0.045841*
Welfare (-3)	-0.17013	0.589795***	0.151659****
Welfare (-4)	-0.38219****	-0.89425****	-0.133718****
Welfare (-5)	0.399424****	0.631153****	0.047085**
Revenue variable (0)			-0.022646
Revenue variable (-1)	-0.018958	-0.433441****	-0.011574
Revenue variable (-2)	0.035985	3.58E-02	0.036578***
Revenue variable (-3)	0.00543	-0.005916	0.039659***
Revenue variable (-4)	0.030695	-0.443141****	-0.014129
Revenue variable (-5)	-0.008017	-0.038195	-0.002933
GDP (-1)	-0.656991*	1.086049*	0.036339
GDP (-2)	0.278995	0.420634	0.09324
GDP (-3)	2.239024***	0.760995	-0.025365
GDP (-4)	-0.789638	3.524935***	0.224235*
GDP (-5)	-1.501623*	-4.841946****	-0.090227
Constant	0.010028	0.007179	0.004886**
Dummy2	0.004897	-0.066988	0.009423
Dummy4	0.007015	-0.156638***	-0.023346****
Oil WTI	0.040723	0.3428****	0.053641****

(0) In the Table refers to the SVAR's contemporaneous response of GDP to social benefits and to revenues (if negative, the impact is positive due to matrix algebra).

White test p-value: 0.1139 (no cross terms)

LM Test p-value:

0.7869
0.6927
0.7197
0.3613
0.5704
0.3778
0.9156
0.4622

AR Roots (Modulus):

0.962053
0.962053
0.923185
0.923185
0.861031
0.861031
0.806603
0.806603

0.774083
0.774083
0.771312
0.771312
0.538341
0.538341
0.072389