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Multipliers of Social Protection

Product 3 - Drafting the country case studies

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1. Introduction

The Covid-19 crisis provoked economic and social shocks in Nepal, which were felt mainly by the poorest. The pandemic exacerbated inequalities in terms of health care access and the economic crisis generated financial instability that especially harmed informal workers. This situation was aggravated by the Russian-Ukrainian conflict.

Albeit the recent crisis, poverty in the country has decreased in the last decade. In 2010, 13.3% of the working population above 15 years of age was below the extreme poverty line. By 2022, that number had fallen by more than half (5.1%)[1]. According to the world inequality database, inequality has also decreased, from 0.56 in 1995 to 0.53 in 2022.

Another important measure, the Multidimensional Poverty Index (MPI), encompasses a series of indicators that are able to see beyond mere monetary values received, taking into consideration aspects such as access to nutrition, education, housing, infant mortality and wealth. The estimate for Nepal in 2019 was that 17.5% of the population was multidimensionally poor. (UNDP, 2022).

With a GDP growth of 6.7% in 2019, Nepal had a better performance than the average of the South Asia region. The Covid crisis led to a 2.4% fall of GDP in 2020 and even with a 4.2% growth in 2021, GDP per capita was still bellow its pre-crisis level then (World Bank, 2023). Declining employment rates have driven migrants to return to their original rural communities (UNDP, 2020). Estimates show that three out of five employees of micro, small and medium-sized companies have lost their jobs due to the pandemic and three out of ten families have lost income (UNDP, 2020; WFP, 2021). As a result, subsistence agriculture and consumption of forest products increased. The war also impacted the country by increasing global commodity prices that were passed on to customers, which led to an increase in inflation from 3.65% in 2020 to 7.87% in 2022 (Nepal Rastra Bank, 2022).

However, Nepal's economy is expected to grow in 2023, reaching 4.7%. The number is lower than the estimate for 2022, which was 5.8%, according to Asian Development Outlook (ADO)'s (2022). That's the result of a constrictive monetary policy, aimed at containing inflation pressure, keeping imports from increasing and foreign exchange reserves from declining. The policy measure consisted of raising the basic interest rate from 5% to 7% in February 2022 - in July it reached 8.5%. In addition, a more restrictive target was sought for credit. The cash reserve imposed on creditors was 4% (Central Banking, 2023).

As for social protection, 17% of the population is covered by at least one benefit (ILO, 2022). That is much lower than the 47% world average. Excluding universal health, the coverage is even smaller: only 13.8% of vulnerable people are protected by social assistance (ILO, 2022).

The Constitution of 2015 recognizes social security as a right to all citizens, explicitly stated in Article 43. This is further reinforced in Article 33 on the Right to Employment, Article 41 on the Rights of Senior Citizens, and Articles 37, 40, 42 highlight that women,

[1] Ilostat data

Dalit, vulnerable groups, and indigenous communities under threat of disappearing, respectively, should receive special attention to access social protection. To operationalize the right to social protection, several recent pieces of legislation include social protection provisions such as the Civil Service Act (Third Amendment, 2014), the Labour Act, 2017, the Contribution-based Social Security Act, 2017, the Health Insurance Act, 2017, and the Social Security Act, 2018.

Also, it should be noted that Nepal is the only country in South Asia that guarantees protection for children. In 2009, the government launched the Child Grant programme, which consists of a monthly transfer of Rs 532 per child for families with up to two children aged up to 5 years. According to a UNICEF report (2022), the benefit reduced the likelihood of child labor and allowed access to food and basic goods for families in extreme poverty. However, the program has low coverage: only a third of children up to 5 years old receive the benefit nowadays. The benefit expansion is even more urgent after Covid-19 due to the increase in poverty and the reversal of achievements in reducing child poverty UNICEF (2022).

Another important income transfer program in Nepal is old-age pensions. This type of social security assistance was introduced in 1995 and initially covered only 5 districts. Today, most elderly people above 68 years in Nepal receive old-age pensions worth Rs 4,000 per month (Universal Social Protection, 2022).

Regarding government social spending, Nepal is the third country in South Asia that spends the most on health, education and social assistance. However, despite the fact that health expenditures have doubled from 2005 to 2019, financing is almost entirely carried out through direct expenditures. In education, the focus is on primary education - more than half of total spending - secondary and higher education have very low investments. This factor makes total spending on education per student the lowest among countries in South Asia (Franciscon and Arruda, 2021).

During covid-19 they had few emergency social protection measures. Employment program for workers who returned from abroad and for those unable to leave the country was implemented. Food aid was also allocated to informal workers and people in need without a caregiver, fee exemptions and postponement of utility bills. However, these programs were not enough to serve all affected workers, especially informal workers, who represent 84.6% of the country's workforce according to the latest Nepal Labor Survey.

Social protection is a universally accepted fundamental human right and a State responsibility. However, despite the existence of a contribution-based social protection fund, Nepal still faces many problems and needs to advance in promoting social justice.

Public expenditure on the social protection system is crucial to ensure inclusive growth and human development. It stimulates aggregate demand by increasing household consumption levels, an effective instrument to promote growth especially during recessions. There is also copious evidence in the literature that a higher level of social protection investment is an effective instrument in reducing poverty and inequality,

paving the way for ensuring political stability by reducing the social tensions and conflicts within the country.

Evidence also shows the positive impact of cash (or in-kind) transfer programs on human development and productivity by i) addressing the issue of hunger and nutrition – providing better access to food and enhanced nutritional status; ii) reducing the health system's dependence on out-of-pocket payments leading to better and more equitable health outcomes; and, iii) contributing to better educational attainments and reducing child labor through assistance to families with free tuition, learning materials, school feeding programs, and removing the reliance on children on income-earning and care work (ILO, 2014, 2016, 2017; UNESCAP and ILO, 2021; Ortiz et al., 2015; Ortiz et al., 2019; Alderman and Yemtsov, 2012, 2014; Barrientos, 2011, 2012, 2013; Barrientos and Hulme, 2016; Gebregziabher and Niño-Zarazúa, 2014; Addison et al., 2015; Haile and Niño-Zarazúa, 2018; Gough et al., 2004; Atkinson, 1989, 1999).

In the next sections we analyze how public expenditure in social protection can positively impact the Nepalese economy.

2. Recent empirical literature on fiscal multipliers

Since the 2008 global crisis there has been a considerable increase in the empirical literature on fiscal multipliers. In country-specific empirical studies, following Blanchard and Perotti (2002), the prevailing approach is 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. 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 considering 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.

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 shows a relative paradox considering 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)

The American Recovery and Reinvestment Act (ARRA) in the United States after the 2008 crisis was justified by the Council of Economic Advisers (2009) in terms of more significant multiplier effects of income transfers; only a few empirical studies have estimated the impact of this type of expenditure on aggregate output. Moreover, part of those studies that adopt the conventional VAR approach of Blanchard and Perotti (2002) find 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)[2]. 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 sparse multipliers for social transfers. These studies usually estimate higher multipliers associated with government consumption, direct tax cuts, 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)

[2] 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.

employ a similar methodology for social spending in Germany and find a higher and more persistent multiplier effect for social expenditures than for decreases in the social contributions that finance them[3]. 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 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 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 countries[4], reaching 3 in the baseline scenario. In their estimates, health expenditures present even higher multiplier effects (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 a panel of countries), different periods and using several alternative empirical approaches or econometric techniques.

[3] The authors offer a 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).

[4] 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)	Does not estimate multipliers, but captures a positive and significative 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; 17th 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, 2nd period) for public investment, 0.09 (peak, 1st period) for government consumption
Miyamoto, Nguyen, and Sergevev (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 analyzed 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)

Kharel (2012), Bhusal (2014) and Kunwar (2019) showed that expanding government spending positively contributes to economic growth. Chaudhary (2010) proved that large government spending has a negative impact on economic development. However, they did not specifically analyze the multipliers' effects. The only ones who looked at this specific topic were Bista and Shanhi (2022). They estimated the effects of public spending multipliers on economic growth for Nepal using the structural autoregressive vector (SVAR) model. The results indicate that the multiplier effects of recurrent expenditures and capital expenditures are positive for economic growth in the short and long term and their value is less than 1. Also, the multiplier effect is stronger in current expenditures than in capital expenditures.

3. Methodology

As mentioned in the previous section, most attempts to estimate multiplier effects of different types of government expenditures based on macroeconomic data 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 its reduced form. The vector of endogenous variables is three-dimensional, including a 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 reduced form shocks do not show economic significance (Castro and Hernandez de Cos 2008). According to Perotti (2007), reduced form shocks (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:

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

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

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

The unexpected movements in the expenditure, revenue, and output variables are denoted by u_t^g, u_t^t, and u_t^y respectively. 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: not dependent 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:

$$\alpha_{gy} = 0 \quad (4)$$

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, the cyclically adjusted residuals, $u_t^{g,ca}$ and $u_t^{t,ca}$ are obtained from these separate estimations of the exogenous elasticities, – 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 variables ordering. 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)[5]. 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. Therefore, it 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.

The basic model is estimated using the vector of endogenous variables, in real terms: the logarithms of social expenditures, total primary revenue, and output.[6] 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, $\frac{\sum_{i=1}^{n}\Delta Y(t+i)}{\sum_{i=1}^{n}\Delta G(t+i)}$.

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

[6] 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.

The importance of calculating the impact multiplier is that it assesses 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 (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):

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

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:

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

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 Nepal 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

We used quarterly data available in National Account Statistics (Central Bureau of Statistics) and Handbook of Government Finance Statistics & Quarterly Economic Bulletin (Nepal Rastra Bank). Current Government Expenditures and Current

Government Tax Revenues series were obtained from Nepal Rastra Bank, real GDP series was obtained from the Central Bureau of Statistics. We also utilized annual data available in the Red Book (Ministry of Finance) for Current Expenditure on Social Protection.

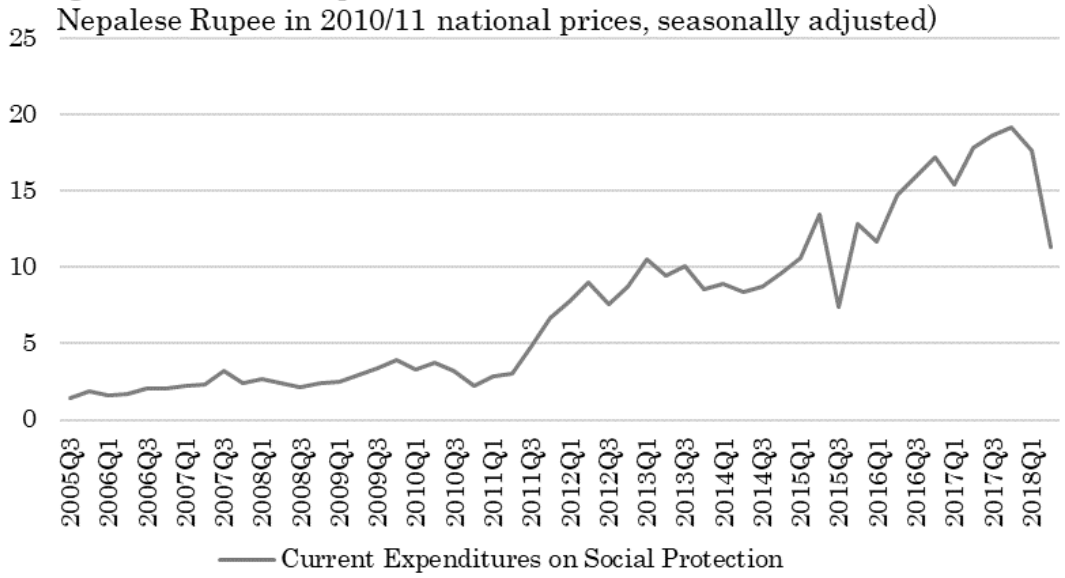
The CPI index, employed as a deflator to adjust the series to 2010/11 prices, was obtained from International Financial Statistics (IMF). Because part of the real GDP series (between 2005/06 and 2009/10) was at constant 2000/01 prices, we converted it to 2010/11 prices, making it compatible with the other part of this same series (between 2010/11 and 2017/18).

To transform annual series into quarterly data, we used Current Government Expenditures available at a quarterly frequency as an indicator in the "Denton-Chollete" temporal disaggregation method (available in the R Package "tempdisagg").

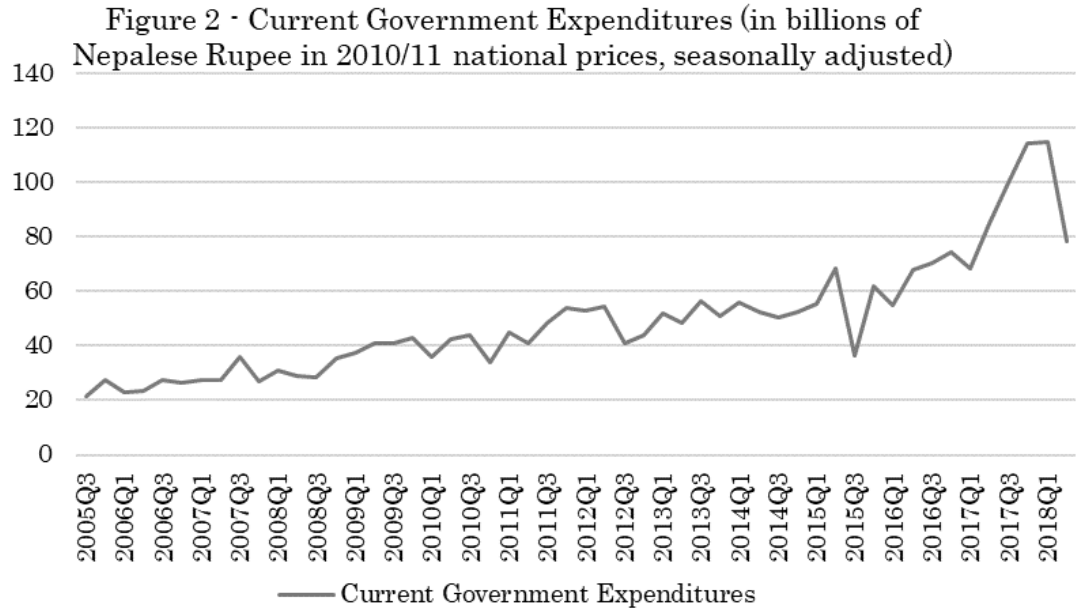
All series employed in the VAR model were seasonally adjusted using the X12 and X13 Arima Methods, available in Eviews.

Figures 1 and 2 show the Current Expenditures on Social Protection and Current Government Expenditures series.

Figure 1 - Current Expenditures on Social Protection (in billions of Nepalese Rupee in 2010/11 national prices, seasonally adjusted)



Source: International Financial Statistics (IMF)



Source:International Financial Statistics (IMF)

5. Estimation results

Based on the Structural VAR approach followed in Blanchard and Perotti (2002), all the structural VARs were estimated using the three-dimensional vectors of the following variables in logarithmic form: expenditures on social protection, tax revenues and GDP. The first difference of each variable was used to avoid spurious relationships as all series are integrated of first order according to stationary tests (ADF, PP, and KPSS). We chose the specification that appeared to be better in terms of significance and robustness (free of heteroscedasticity, autocorrelation, and non-stability problems, according to LM and White tests).

We tested time different dummies variables: dummy1 controls for a strong break in Real GDP series in 2010Q3; dummy2 (2008Q3; 2008Q4; 2009Q1; 2009Q2) and dummy 3 (2008Q4; 2009Q1; 2009Q3) control for the Great Financial Crisis.

We obtain three different multipliers from each VAR, where Y is GDP and G, expenditure:

- Impact - instantaneous effect: $\frac{\Delta Y(t)}{\Delta G(t)}$.
- Peak - represents the highest value in the period under analysis: $max\ [\frac{\Delta Y(t+n)}{\Delta G(t)}]$.
- Accumulated - measures the total effect of higher expenditures over time (n periods): $\frac{\sum_{i=1}^{n} \Delta Y(t+i)}{\sum_{i=1}^{n} \Delta G(t+i)}$.

The impact, peak, and accumulated multipliers were obtained. Both the impulse response function and the corresponding multipliers are presented in the following subsections. Diagnostic tests and estimated coefficients are reported in the appendix.

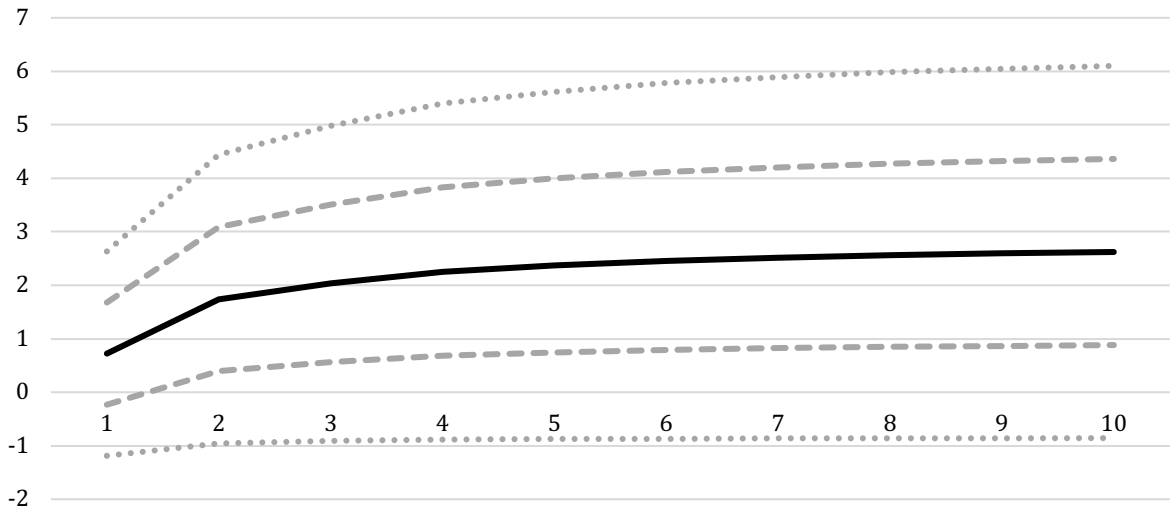
5.1 *Effects of social protection expenditure on output*

This model was estimated using real Current Expenditures on Social Protection from the Ministry of Finance, real Current Tax Revenues from Nepal Rastra Bank, and real GDP from Central Bureau of Statistics for the period 2005Q3-2018Q2. All these series were displayed in 2010/11 prices from CPI.

We included one lag (according to LR, FPE, AIC, and HQ lag length criteria) and controlled with dummy1 and dummy2, which presented the best estimations in terms of significance and eliminated serial autocorrelation and heteroscedasticity. The LM test did not detect autocorrelation and the White test including cross terms did not detect heteroscedasticity.

Figure 3 shows the accumulated impulse-response function of GDP to a shock in Current Expenditures on Social Protection. Dotted lines represent a confidence interval of 95% (two standard deviations). Dashed lines show a confidence interval of 68% (one standard deviation). As we can see, the exercise shows a positive effect on GDP at 95% significance.

Figure 3 - Accumulated multiplier (response of GDP to a shock in Current Expenditures on Social Protection)



Source:International Financial Statistics (IMF)

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

After a moderate immediate impact on output, the expansionary effect of increased social expenditures is raised for a couple of quarters and stabilizes subsequently. The multiplier reaches its peak value in the sixth quarter. As shown in Table 2, the estimated size of the impact (instantaneous) multiplier is 0.72, meaning that, for each additional Nepalese rupee of social expenditure, real GDP becomes 0.72 Nepalese rupee larger. The estimated size of the peak multiplier is 2.56, attained in the sixth quarter. Finally, the

accumulated multiplier after ten quarters is 2.62: each additional Nepalese rupee spent in social protection expenditure has a persistent expansionary impact of 2.62 Nepalese rupee on GDP. This behavior is suggestive that the cumulative effects of increases in Current Expenditures on Social Protection on Nepal's level of economic activity are not only quite substantial in the short-run but also in the medium-run.

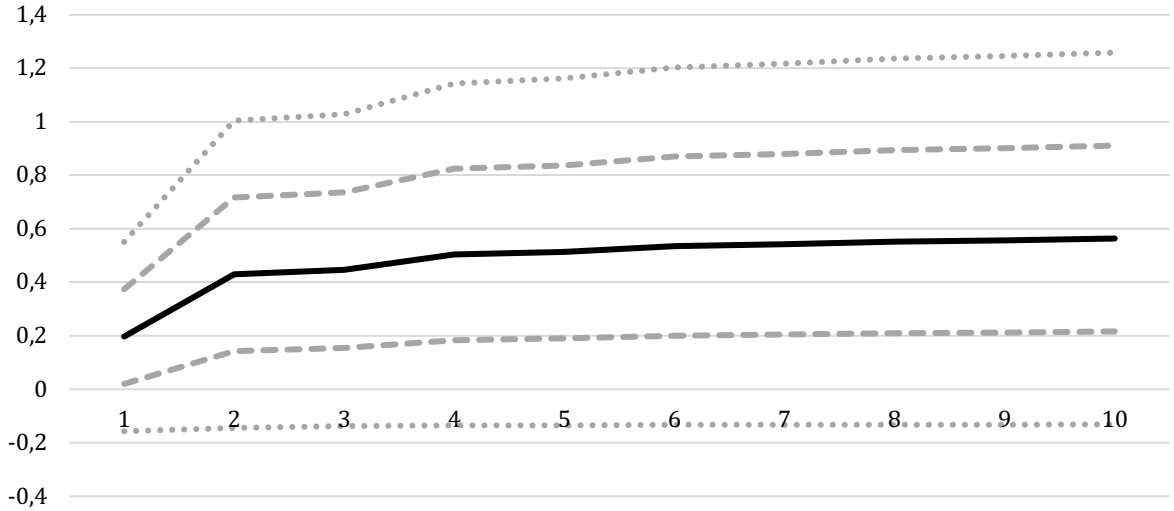
5.2 *Effects of current government expenditures on output*

We now explore the effects of Current Government Expenditures shocks on the Nepalese economic activity level using the described data for the period of 2005Q3-2018Q2. It is worth noting that all the series were displayed in 2010/11 prices using the CPI.

We included in this model's estimation one lag and two binary variables – "dummy1" and "dummy3". This specification presents the best estimations in terms of significance and residual diagnostics. In that regard, it is worth underlining that this model does not present either autocorrelation problems or heteroskedasticity using LM test and White test including cross terms.

Figure 4 shows the accumulated impulse-response function of GDP to a shock in Current Government Expenditures.

Figure 4 - Accumulated multiplier (response of GDP to a shock in Current Government Expenditures)



Source: International Financial Statistics (IMF)

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

After a moderate immediate impact on output, the expansionary effect of increased current government expenditures grows for a couple of quarters and stabilizes

subsequently. The multiplier reaches its peak value in the second quarter. As shown in Table 2, the estimated size of the impact (instantaneous) multiplier is 0.20 meaning that, for each additional Nepalese rupee of current government expenditures, real GDP becomes 0.20 Nepalese rupee larger. The estimated size of the peak multiplier is 0.45, attained in the sixth quarter. Finally, the accumulated multiplier after ten quarters is 0.56: each additional Nepalese rupee spent in current government expenditures has a persistent expansionary impact of 0.56 Nepalese rupee on GDP.

5.3 *Results and implications summary*

After discussing the detailed results for both categories of government expenditures analyzed in this paper, it is worth, by way of conclusion, to briefly summarize the main results arising from our estimations (see table 2), as well as to explore policy implications of these results.

Table 2: Social protection expenditure multipliers for each model

Category of expenditure	Impact Multiplier	Peak Multiplier (quarter)	Accumulated Multiplier (over ten quarters)
Total expenditure on social protection	0.72	2.57	2.62
Current government expenditures	0.20	0.45	0.56

By disaggregating total government spending and examining the effects of current social protection expenditures on Nepal's economic activity, our results suggest that this component of the country's social protection system has highly significant positive effects on the economic activity levels, both in statistical and economic terms. For almost all periods under analysis, output responses to a shock in such expenditure are statistically significant, in particular after the first year from the initial shock. It is also essential to emphasize that multipliers associated with such expenditures are substantially higher than the average for current government expenditures, reaching 2.62 after two and a half years of the initial shock.

These results have several implications. First, as previously argued, they point toward a crucial dimension of the interdependence of the SDGs, since expansion of social protection expenditure not only contributes to guaranteeing the human right of social security for all but is also instrumental to sustaining processes of inclusive growth. The persistent positive multiplier of social protection expenditure indicates that growth and redistribution can be combined by increasing this specific component of government expenditure.

6. Concluding remarks

The current report estimated fiscal multipliers for Nepal, resorting to the SVAR approach pioneered by Blanchard and Perotti (2002), using social protection expenditure data ranging from 1990 to 2020. We found a positive and persistent impact of shocks on social protection spending on GDP: over ten quarters, the accumulated multiplier is statistically significant and larger than 1,5. This result means that each additional Nepalese rupee spent on social protection leads, two and a half years after the shock, to an increase in real GDP of 2,62 Nepalese rupee.

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 fill the gap in the 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 reported confirm the need to study fiscal multipliers in a disaggregated way to provide a more precise estimate of the consequences of different policy options. These findings also highlight the expansionary potential of social protection expenditure, as they indicate that its accumulated multiplier is positive and persistent.

A second dimension of the research contribution for this report is emphasizing the interdependence of several SDGs. Improving social protection systems is an end in itself that has a crucial role in fighting poverty and reducing inequality. In the specific case of Nepal, the scope for such an improvement is vast, but this interdependence of the SDGs can be taken further. Such an improvement in social protection should not be thought of as a disconnected policy from the general development strategy and the prospects of sustaining inclusive growth. In fact, the multipliers estimated for the present report suggest that building vigorous social protection systems also has a potential to unleash a virtuous economic dynamic, in which higher expenditure in social protection leads to higher income, employment rates and tax revenues. A growth process that reduces inequalities has to be sustained by a social protection system.

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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 (-1)	-0.2464**	0.142694**	0.0297**
Revenue (-1)	0.66948****	-0.1225	-0.0016
GDP (-1)	-0.7528*	0.534943*	0.175198***
Dummy1	-0.1389	-0.0343	0.29732****
Dummy2	-0.0163	0.064781*	0.014681*

White test (p-value): 0.1477 (with cross terms); 0.08 (no cross terms).

LM (p-values):
0.449
1
0.794
7
0.578
3
0.208
5
0.391
6
0.846
1
0.780
1

0.133
9

VAR Roots (Modulus)
0.449134
0.218944
0.036524