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Multipliers of Social Protection

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Multiplier effects of social protection in Vietnam: An empirical analysis

1. Introduction

Public expenditure on the social protection system is a crucial factor to ensure both inclusive and sustainable growth and human development. In addition to the direct effect of boosting aggregate demand through increases in household consumption levels, which is an effective factor in responding to recessions and economic crisis, besides promoting economic growth, the higher income security for households associated with investments in social protection can positively impact on the economy through several channels. There is considerable evidence in the related literature that a higher level of social protection investment is an effective instrument in reducing poverty and inequality, thus paving the way for ensuring political stability by reducing the social tensions and conflicts in the country. The available evidence also records 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 needed 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).

Focusing on the impacts for generating inclusive and sustainable economic growth, social protection – one of the four pillars of the decent work agenda[1] – generates access to full and productive employment and decent work for all, including women and young people.

[1] Promoting jobs and enterprise, guaranteeing rights at work, extending social protection, and promoting social dialogue are the four pillars of the ILO Decent Work Agenda, with gender as a cross-cutting theme. Source: *https://www.ilo.org/wcmsp5/groups/public/---europe/---ro-geneva/---ilo-lisbon/documents/event/wcms_667247.pdf,* Retrieved 2021-06-17.

Greater participation in the labor market, especially by women, is encouraged through cash transfers, active labor market measures, health insurance, and family support policies such as childcare and disability care. Besides, income security promotes a significant boost in entrepreneurship and other economic activities associated with higher risks and, therefore, higher returns. Unemployment benefits, especially unemployment insurance, provide unemployed individuals with time to find suitable jobs and thus helps adjustments in the labor force in the event of structural economic and labor market changes, which potentially increases the matching efficiency in the labor market. Also, social pension insurance plays an essential role as a productivity-enhancing mechanism by "taking over" (or "buying out") the increasingly unproductive older employees, thereby reducing the productivity gap between older persons and younger employees (Gongcheng and Scholz, 2018; Cichon et al., 2004; Barrientos et al., 2003). At the same time, it also serves the social purpose of providing a continuation of certain income levels to older persons. All in all, social protection can be seen as having a positive impact on productivity, local economic development, output growth, and aggregate demand, thus clearly supporting inclusive economic growth and social progress (Barrientos and Malerba, 2020).

In fact, coupled with the growing evidence regarding the benefits of increased investment in social protection, there is an increasing trend to support and encourage promotion of such investment by intergovernmental organizations and governments worldwide. As an elucidative and significant example, the 2030 Agenda for Sustainable Development recognizes the central role played by social protection in achieving several of its goals. For instance, it does so by contributing to ending poverty (Sustainable Development Growth – henceforth, SDG - target 1.3); achieving healthy lives and well-being (SDG target 3.8); gender equality (SDG target 5.4); decent work and economic growth (SDG target 8.5); and reducing inequality (SDG target 10.4). Thus, the need for increased investment in social protection is also largely recognized in the 2030 Agenda, as reflected, for example, in SDG target 1.a on resource mobilization, which calls for "adequate and predictable means" for developing countries, and SDG indicator 1.a.2 on monitoring the proportion of public spending on social protection, health and education, the ultimate aim of which is to "end poverty in all its dimensions".[2]

[2] See, for instance, the United Nations' E-Handbook on SDG Framework and Metadata, which is available at *https://www.unescwa.org/ehandbook-sdg-framework-metadata*. Accessed 06-17-2021.

More precisely, when addressing social protection, SDG target 1.3 advises countries to implement "nationally appropriate social protection systems and measures for all, including floors" (United Nations, 2021); or, in other words, achieving universal coverage and appropriate social protection for all. This is predicated on the international standard – the ILO's Social Protection Floors Recommendation, 2012 (No. 202) adopted by governments, employers, and workers at the 100th Session of the International Labour Conference in 2011.

In spite of the signs of progress made since the launch of the 2030 Agenda in 2015 (for instance, at least 23 low- and middle-income countries have achieved universal social protection coverage considering at least one social protection benefit, with acess toold-age pensions being an example), a significant gap exists in coverage and financing social protection worldwide. The ILO (2017) reports that, globally, the coverage gap is a real and daily threat to 4 billion (55 percent of the world's population) people's lives and well-being. On a deeper global analysis, only 35 percent of children receive benefits from child allowances that enable them to receive childcare, better education, and several forms of nutrition. Also, only 41 percent of women with newborns receive maternity cash benefits that provide them with income security during their children's critical first few months of life. Only approximately 22 percent of unemployed people receive unemployment benefits, and only 28 percent of people with severe disabilities receive disability benefits. Older persons appear to be relatively better off compared to the four groups mentioned, with 68 percent of all persons above retirement age receiving a pension; however, the levels of their benefits are, in many cases, largely inadequate.

The situation in Vietnam, the focus of the empirical analysis developed in this report, is also worrisome, despite it being close to the average for countries in the region where the country is located. In terms of the sub-region within the Asian continent, in South-East Asia, only 33 percent of the population is covered in at least one area of social protection (excluding health), compared to the average of 46 percent of the population for the whole ESCAP (United Nations' Economic and Social Commission for Asia and the Pacific) Region.[3] In fact, Vietnam is placed above the average of countries in its sub-region, with roughly 39 percent of the population covered by at least one social protection benefit in

[3] That includes East and North-East Asia, North and Central Asia, Pacific, South-East Asia, and South and South-West Asia (UNESCAP and ILO, 2021).

2018.[4] As positive aspects to properly underline, almost 84 percent of persons with severe disabilities receive some type of disability benefits from the government, and almost 67 percent of unemployed citizens receive some type of unemployment benefit or insurance in the country. Moreover, the percentage of women with newborns who receive maternity benefits is close to the region's average, with 44 percent.

However, the lack of social protection coverage for some portions of the Vietnamese population is worrying, representing a remarkable indication that new governmental efforts must be followed in order to achieve social protection floors in the medium run. In particular, it is worth indicating that only 8.7 percent of children receive some type of benefit (child allowances) in the country, while just 41 percent of older persons receives pensions, which are indicators well below the regional average and, of course, of the desired coverage to effectively stimulate inclusive and sustainable growth in the country (UNESCAP and ILO, 2021).

The significant coverage gap worldwide is closely associated with low public investment in social protection, with more severe conditions in Africa, Asia, and the Pacific regions (ILO, 2017). Again, Vietnam is close to the average for the countries in its sub-region, with public expenditures on social protection corresponding to only 3.7 percent of the GDP (Gross Domestic Product), although quite far from the average of the macro-region; in fact, the average for countries in the ESCAP Region is roughly 7 percent of the GDP (UNESCAP and ILO, 2021).[5] It should be emphasized that this level of spending on social protection seems relatively inadequate, especially if we take into account the country's general socio-economic panorama (Kidd et al., 2016; Bonnet et al., 2012; Evans et al., 2012; World Bank, 2017)

Over the past 30 years, following the political reforms from the "Doi Moi", Vietnam has shown quite significant economic and social development – transitioning from being one of the poorest nations in the world to a lower middle-income country. According to the World Bank[6], GDP per capita increased by almost three times between 2002 and 2018 in Vietnam, and more than 45 million people were lifted out of poverty in that period. In

[4] Based on the most recent available data for Vietnam on ILO's World Social Protection Database. For a complete country profile, see *https://www.social-protection.org/gimi/WSPDB.action?id=13*.
[5] For a detailed discussion on the composition of revenues and expenditures in Vietnam, as well as the fiscal challenges that the Vietnamese government is facing and will potentially experience in the following years, see World Bank (2017).
[6] A recent overview of Vietnam's socio-economic performance, already considering the impacts of the Covid-19 pandemic, is available in *https://www.worldbank.org/en/country/vietnam/overview#1*.

effect, using an internationally defined poverty line measure, London (2014) shows that the poverty headcount in the country declined from roughly 60% in the early 1990s to nearly 16% in 2006. Nevertheless, as pointed by Long (2010), social protection policies in the country have not been well adapted to the enormous changes in socio-economic conditions in the recent decades.[7] Similarly, Kidd et al. (2016) point to the inadequacy of spending on social protection in the country compared to other middle-income countries, suggesting the need to accommodate the growing demand for better social services and integration of different socioeconomic classes in the country resulting from the process of economic growth (a point highlighted in World Bank (2017) as a fiscal challenge for the country). In particular, it is essential to emphasize the relative exclusion of minority ethnic groups from the country's economic development process, as well as the relatively low coverage of the social protection system for the growing share of the elderly in the country. In fact, analyses of the policies adopted recently by the Vietnamese government point to the need for a sequence of political actions aimed at closing the gap in child and old-age income security (Kidd et al., 2016; Bonnet et al., 2012; Evans et al., 2012). In that regard, Bonnet et al. (2012) consistently argue that such fiscal policy measures would not represent significant increases in the annual deficit, especially given the existence of some fiscal space for the neeeded expansion of social assistance programs, both due to the underestimation of revenues and the possibility of shifting expenditures to social protection over the years.

Moreover, it is worth indicating that, despite the intense modifications throughout the country's labor market in recent years, it is still the case that roughly 54 percent of the employed population are classified as informal workers.[8] This fact points to a problem that potentially exacerbates the difficulties associated with the lack of social security coverage in the country, which is its possible concentration in a minority of the population that works in formal sectors of the economy. In this sense, UNESCAP and ILO (2021) explore how the contributions to the social protection net are strongly increasing in income, with the percentage of workers contributing to social protection schemes being

[7] For a detailed description and discussions regarding the structure of the social security net in Vietnam, see, for instance, Long (2010) and Evans et al. (2011).

[8] The large presence of informality in the country's economy seems to represent a structural obstacle to the extension of the social protection system's coverage, as pointed out in Bonnet et al. (2012) and Kidd et al. (2016). Thus, it seems essential that new efforts to achieve social protection floors should be focused on guaranteeing income security for this large portion of the country's working age population.

substantially higher in the top income quintiles.[9] According to the study, even though coverage is growing among middle-class workers in Vietnam, there is still a long way to go for the country to reach universal coverage of its population or at least substantially expand coverage for the most vulnerable population in terms of income.

Since lack of social protection constitutes a significant obstacle to economic and social development, associated with high and persistent levels of poverty, inequality, and economic insecurity, there is an increasing global consensus on the fundamental idea that extending social protection to all is a priority (Ortiz et al., 2019; Durán-Valverde et al., 2019). Along these lines, and as discussed in the preceding paragraphs, it is worth noting that Vietnamese society has been seeking to expand the coverage of its social protection net, aiming, among other things, to continue reducing the level of poverty in the country, stimulating job creation and income maintenance for various groups of the Vietnam population (Long, 2010; Evans et al., 2011; Bonnet et al., 2012; Kidd et al., 2016).

Given the socio-economic situation described in the preceding paragraphs and the efforts from the Vietnamese government to expand social programs in the last decades, some crucial questions remain: can social expenditures, in fact, stimulate Vietnam's economy and effectively generate inclusive growth? Do different categories of governmental social expenditures present different responses regarding their impacts on promoting a higher level of economic activity (in terms of output and income) in Vietnam? What are the social expenditures with the most significant effect on the Vietnamese output growth rate considering an additional unit of investment (highest fiscal policy effectiveness)?

This report seeks to answer these questions by estimating the multiplier effects of four types of social expenditures in Vietnam. Although the literature on fiscal multipliers and the effectiveness of fiscal policy has grown significantly as of late (especially since the Global Financial Crisis), empirical studies investigating the effects of social expenditures on economic growth and output for Vietnam are quite scarce. In this regard, the current report contributes to the existing literature by arguing in favor of the importance of social protection in generating sustainable and inclusive economic growth. The study's key finding is that one additional unit of social expenditures generates more than one unit of expansion in real GDP, albeit in varying magnitudes depending on the specific social

[9] Evans et al. (2011) present an earlier evidence in that regard, suggesting the relative inability of various programs that compose the country's social protection network to reach the poorest population.

expenditure considered. In particular, increases in Social Security Expenditures can yield output responses up to approximately three times the initial investment over two and a half years. Clearly, these results have a fundamental policy implication not only in the short run, but it is also highly indicative of the importance of social protection in the building, in the long run, of a comprehensive, non-discriminatory, and gender-sensitive social protection system for inclusive and sustainable economic growth and potentially achieving the sustainable development goals of the 2030 Agenda.

The remainder of this report is structured as follows. In the second section, we carry out an analytical review of the related empirical literature on social spending multipliers, summarizing the existing arguments and results for different countries worldwide, and then focusing our analysis on the existing evidence for the Vietnamese economy. The third section offers a detailed discussion of the methodology adopted in the econometric part of this report, which grounds all the estimation results presented in what follows. The fourth section describes the sources of the data and the variables of interest used in the empirical estimations. In the fifth section, we report our results and discuss their relevance to the related literature, highlighting some policy implications of our findings. Finally, the sixth and last section offers concluding remarks.

2. Social benefits and government expenditure multiplier: an analytical review of the literature

Since the Global Financial Crisis, there has been 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 public consumption. In this context, only a few studies have focused on estimating the impacts of different social expenditures, namely income transfers (such as unemployment insurance or cash transfers) and social security, on economic growth. Blanchard and Perotti (2002) and Perotti (2004) treat transfers as a component that should be subtracted from total revenue, which is a strategy followed by several authors (Tenhofen et al., 2010; Lozano and Rodriguez, 2011; Peres, 2006; Peres and Ellery, 2009; Alves, 2017;

Mendonça et al., 2016; Grudtner e Aragon, 2017; Jemec et al., 2013; Castro and Fernandez, 2011; Burriel et al., 2010; Giordano et al., 2007; Borg, 2014; Skrbic and Simovic, 2015; among others). However, this strategy has been criticized in the recent literature (Gáldon, 2013; Gechert et al., 2018; Baum and Koester, 2011; Pereira and Wemans (2013)).

In that regard, Pereira and Wemans (2013) argue as follows: "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". (Pereira and Wemans, 2013, p.10).

Moreover, Gechert et al. (2018) claim that, despite the existence of numerous studies on fiscal multipliers, social expenditures have not received nearly the same attention. 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, p.2).

While the implementation of the American Recovery and Reinvestment Act (ARRA) in the United States during the Global Financial Crisis has been partially justified in terms of larger multiplier effects of income transfers by the Council of Economic Advisers (2009), only a few empirical studies have estimated the effect of this type of expenditures on aggregate output. Moreover, the existing literature that started from the conventional VAR approach of Blanchard and Perotti (2002) finds mixed results, as reported in Table 1.

Some studies find significant multiplier effects for social expenditures (impact multipliers close to one) (Gechert et al., 2018; Gáldon, 2013; Adams and Wong, 2018), but, in some

cases, the results suggest that the multiplier is non-persistent (accumulated multiplier is close to zero) (Adams and Wong, 2018).[10] 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). Besides, some studies have even found a negative non-significant accumulated effect (Claus et al., 2006; Bruckner and Tuladhar, 2010).

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

Also, Romer and Romer (2016), using a "narrative method" based on episodes of fiscal expansion in different countries, find that permanent increases in social expenditures exert significant and substantial impacts on consumption. However, tax reductions seem to have the highest and most persistent multiplier effect, which could be explained, in the authors' view, by a larger positive response of interest rates to an expansion in social expenditures. Similarly, Alesina et al. (2017) report results for a panel of OECD countries showing that fiscal consolidations based on higher taxes are more costly in terms of output than those based on 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 higher and more persistent multiplier effect for social spending than for decreases in the social contributions that finance these expenditures.[11]

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 (Silva et al., 2013; Furceri and Zdzienicka 2012; Reeves et al., 2013; Ilzetski et al., 2013; Beetsma and Giuliodori, 2011; Valencia, 2015; Izquierdo et al., 2019; Carrière-

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

[11] 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, p.19).

Swallow et al., 2018; Deleidi 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 insurance as the components with greater impacts on output. Moreover, Reeves et al. (2013) estimate a positive social protection multiplier for a group of European countries[12], which reaches 3 (baseline scenario). In their estimations, health expenditures present an even higher multiplier (near 4.9).

Table 1 reports a brief description of the empirical literature on the multiplier effects of social expenditures – from aggregate government spending to several decompositions of transfers – in different countries (or panel of countries), different periods and using several alternative empirical approaches or econometric techniques.

[12] 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 – SUMMARY OF RESULTS ON THE EMPIRICAL LITERATURE OF MULTIPLIER EFFECTS OF SOCIAL EXPENDITURES

Study	Country	Period	Social Expenditure	Methodology	Multiplier Results
Adam and Wong (2018)	New Zealand	1990-2017	Transfers (social assistance and superannuation)	SVAR	1.53 (impact) and 0.76 (cumulative over 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)
Dufrenot et al. (2016)	US	1960-2012	Transfers (Social Security)	Non-linear methods (MS/TVTP)	It reaches 1.68 (consumption) and 0.02 (investment); recession
Fatas and Mihov (2001)	US	1960-1996	Social security, other transfers and subsidies	VAR (Choleski decomposition)	Do not estimate multipliers directly but capture a positive and significant impact of transfers on GDP after eight quarters.
Furceri and Zdziniecka (2012)	OECD countries panel	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)	US	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 the 2008/2009 crisis. Reaches almost 3 (long-run) at the end of 1950's and beginning of 1960's
Gechert et al. (2018)	Germany	1974-2013	Social Security	SVAR with "narrative" identified shocks	0.5-1.5 (impact)
Gechert and Ranneberg (2014)	Meta-analysis 98 studies	+1800 observations	Transfers	Meta-regression analysis	Between 2 and 3 (cumulative/recession)
Hollmayr and Kuckuck (2018)	Germany	1993-2017	Social expenditures (pensions/unemployment)	SVAR	2 (impact); between 0.3 and 3.8 (after 5 years)
Hur (2007)	South Korea	1979-2000	Government spending	SVAR	Between 1.2 and 1.6 (ten-period cumulative)
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)
Kuttner and Posen (2002)	Japan	1976-1999	Government spending	SVAR	1.06 (four-year cumulative multiplier)
Konstantinou and Partheniou (2019)	Panel of OECD and non-OECD countries	1991-2015	Social expenditures	Non-linear one equation	0.8 (OECD countries) and 0.076 (non-OECD); cumulative in two years; recession
Mahaphan (2013)	Thailand	1988-2009	Public investments 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

					(ZLB)) and 0.71 (impact; other periods)
Orair et al. (2016)	Brazil	2002-2016	Social expenditures (pensions, social programs, and unemployment benefits)	Non-liner 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)	Panel of EU countries	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 programs, and unemployment benefits)	VAR	0.72 (impact); 4.3 (cumulative in two years)
Romer and Romer (2016)	US	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 programs, and unemployment benefits)	SVAR	0.75 (impact), 1.2 (peak) and near 3 (cumulative in two years)
Sarangi and Bonin (2017)	Egypt	1990-2015	Social expenditure	SVAR	0.04 (impact) and 0.17 (peak)
Silva et al. (2013)	Panel of Euro zone countries	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 scenario
Tang, Liu, and Cheung (2013)	Thailand	1993-2019	Government spending	SVAR	-0.37 (impact)

Focusing now on the empirical literature for Vietnam, first, it should be stressed that the specific literature on the computation of fiscal multipliers is relatively scarce, especially with respect to empirical studies using a disaggregation of social expenditures. That said, the existing general evidence indicates that aggregate government expenditure positively impacts on the level of economic activity in the country (Fan et al., 2004; Huy, 2013; Thành, 2014; Vu et al., 2016; Thi, 2017; Quy, 2017; Nguyen, 2019; Dao and Nguyen, 2020). However, Thành (2014) find evidence that, although real government expenditures per capita positively affect economic growth in the country, increases in government expenditure as a share of GDP (interpreted as a proxy for the "size" of the government) negatively impacts on economic growth.

As regards the effectiveness of fiscal policy, Kim (2016) uses ARDL estimations to explore whether government spending reinforces the business cycle in Vietnam, finding evidence of a pro-cyclical bias of fiscal management in the country. Along similar lines, Nguyen (2017) finds evidence that discretionary government spending followed a pro-cyclical trend until the Global Financial Crisis, although there has been a significant reverse in that trend since 2009. These results are important to assess the impact of fiscal policy in the country, as it can be argued that fiscal multipliers would then be relatively understated for the 2008-2009 period, given the pro-cyclical nature of the fiscal regime in Vietnam. This argument could be based on the literature results around the world, with extensive evidence, as discussed earlier in this section, of the greater magnitude of fiscal multipliers in periods of crisis or in the downturn of business cycles, reinforcing the key anti-cyclical role played by fiscal policy.

In addition, another topic of interest in the literature on fiscal policy in Vietnam is the effectiveness of fiscal decentralization, a consistent trend since the economic reforms following the "Doi Moi" and boosted by the tax reforms of the last decade. In a detailed empirical study on the impacts of decentralization, Bjornestad (2009) finds evidence that the experience of fiscal decentralization since the 1990s has been quite positive for the country. In particular, according to the author, the several strategies aimed at reducing poverty developed in the early 2000s were quite significant for the social development in Vietnam.

Moreover, in studies focused on the decentralized effects of fiscal policy, Thi (2017) finds evidence that fiscal policy is a determining factor in the economic growth of the country's provinces, which shows the positive impacts of this instrument on the development of the

country. Following an initial disaggregation of government spending, Quy (2017) reports evidence that increases in development investment and social and economic services (that, it is worth saying, encompasses spending on social protection) contribute positively and significantly to the economic development of provinces and cities in the country.

Following a more disaggregated approach, dividing aggregate government expenditures into further components, Fan et al. (2004) find that public investments in agricultural research and development and infrastructure[13] in general have a strong positive impact on economic growth in Vietnam, also suggesting the positive impacts on poverty reduction over the whole country. The authors also point out that public spending on education is significant for the country's economic and social development. Along similar lines, Dao and Nguyen (2020) report new evidence that public investments in education positively impact the country's GDP per capita. Besides, Nguyen (2019) finds evidence that aggregate government spending positively affects Vietnamese economic activity, and that each major spending component has quite distinct effects on output. In particular, current expenditures positively and significantly affect aggregate output, whereas the results are non-significant for development investment.

Finally, to the best of our knowledge, the only empirical studies more directly focused on government spending multipliers – primarily based on Blanchard and Perotti (2002) – are Huy (2013) and Vu et al. (2016), which use structural VAR (SVAR) to analyze the fiscal policy effectiveness in the Vietnamese economy. Vu et al. (2016) offer further evidence that government expenditure plays an important role in the stabilization of the Vietnamese economy, suggesting that both real GDP and private consumption increase following a government spending shock. Meanwhile, also exploring the different impacts of the current and capital expenditures of the government (public investment and expenditures on state-own enterprises) on aggregate output, Huy (2013) reports results that government expenditures positively impact on output. However, these impacts are somewhat limited to the short run. In particular, capital spending has an oscillating small negative and positive effects on both the short and medium run, whiereas current expenditures has a positive impact on output limited to the short run and a negative impact in further periods (from a year after the initial shock onwards).

[13] It is worth mentioning that Thành (2014) also finds empirical evidence that expenditures on infrastructure development positively impact on the economic growth of provinces in Vietnam.

In general, the empirical literature dealing specifically with Vietnam lacks studies with a detailed estimation of the impact of social expenditure and the associated multipliers for disaggregated categories of government spending. This report tries to fill this important gap in the literature, and our results indicate that, in fact, increases in social expenditures positively impact on the level of economic activity in Vietnam, although the estimated multipliers associated with specific types of expenditures vary in magnitude and temporality. In particular, Social Security Expenditures and Social Insurance Expenditures (which is a component of the former) have the highest impacts on real GDP in the short and medium run, surpassing the effects of other social expenditures. These results partially differ from earlier findings in the literature.

3. Methodology

As seen in the preceding section, most studies that estimate multipliers for different types of government expenditures employ a structural VAR (or SVAR) approach.

The SVAR became well known in the literature on fiscal multipliers especially through the study carried out by Blanchard and Perotti (2002). The authors argue that the VAR methodology is appropriate for analyzing the effects of fiscal policy because of to its consideration of lags that are characteristic of decision-making and implementation of government spending decisions. When dealing with relatively high-frequency data (monthly or quarterly), there is very little or no response of fiscal policy to concomitant unexpected shocks in output. In other words, GDP does not affect public spending contemporaneously because policymakers take more time than a quarter (or a month) to perceive the output shock and decide the next steps in fiscal policy, as well as to present them to the legislature. The purpose of the identification strategy is to isolate the exogenous shocks, recovering the structural shape of the shocks; that is, to obtain a non-recursive orthogonalization of the error terms.

The first step in the econometric procedure is to estimate the vector autoregression in reduced form. In all the estimations described in this report, the vector of endogenous variables is three-dimensional, including time series of expenditures, revenues, and output. As proposed by Sims (1980), it is a VAR model, where each variable is explained by lags of itself and the other variables of the model, it therefore being able to capture dynamic relationships. Yet the reduced form shocks 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: structural shocks, which are uncorrelated and unobservable (we need to recover them). Formally:

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

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

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

where u_t^g, u_t^t, u_t^y are the unexpected movements in the expenditure, revenue and output variables, respectively. These "surprise" movements are the residuals in the reduced form, as they are the part of the data that is not explained by the VAR model. Moreover, 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). Moreover, 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. On the other hand, β_{ij} measures the contemporaneous response of variable i to a structural shock in variable *j* – that is, the component (c) in the previous list (Perotti, 2007).

Furthermore, the 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 (Vdovychenko, 2018). In order to solve this problem, we follow a two-step procedure. First, we start from the identification hypothesis that we have already discussed in this section, thus removing component (b) and making the coefficients reflect only the first component – the response of the automatic stabilizer: "it typically takes longer than a quarter for discretionary fiscal policy to respond to, say, an output shock" (Perotti, 2007, p.176). The second step is, as suggested by Perotti (2007), using external information to the model to estimate the coefficients α_{gy} and α_{ty}.

In that regard, we know that α_{gy} reflects the contemporary elasticity of expenditure with respect to output and α_{ty} is the contemporary elasticity of revenues with respect to output.

Besides, we also know that the α coefficients measure the discretionary response of fiscal variables to unexpected changes in output, as well as the automatic response (Jemec et al., 2013). Given the identification hypothesis, there is no discretionary response of fiscal variables to output so that these elasticities reflect only the automatic stabilizer responses, as the use of quarterly data eliminates the discretionary component. Consequently, the hypothesis of identification uses the following elasticity:

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

The elasticity of revenue with respect to output 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.

Besides, since u_t^g and u_t^t are correlated, from these separate estimations of the exogenous elasticities, we obtain the cyclically adjusted residuals $u_t^{g,ca}$ and $u_t^{t,ca}$ – which are the shocks without the effects of the cycle, in order to eliminate the automatic stabilizer responses. Thus, the component (a) is removed, so that we have exogeneity:

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

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

The structural shocks e_t^g and e_t^t can be obtained from the assumption of ordering the variables – that is, structural decompositions.

In that regard, Blanchard and Perotti (2002) claim that there is no reason to choose $\beta_{gt} = 0$ or $\beta_{tg} = 0$ a priori; that is, from a shock in spending and revenue, there is no theoretical or empirical justification to sustain which of the variables will react first. Perotti (2007) points out that, as the correlation between adjusted residuals is small, the order does not change the result. In this report, we used $\beta_{gt} = 0$ and estimated the regression by OLS of the adjusted revenue residuals on the residuals of the structural form of expenditures, to obtain β_{tg} following Equation (6), as done, for instance, in Burriel at al. (2010). The purpose of this regression is to obtain the estimates of the structural shocks, that is, e_t^g and e_t^t. Such shocks are "isolated" from the influence of output because the automatic response component has been removed. It therefore becomes possible to turn the shocks exogenous by removing the (a) and (b) components mentioned above.

Moreover, 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 the expenditure and revenue are used as instruments since the correlation between them and the structural shock of output, e_t^y, is low. The instruments are estimated using Equations (5) and (6) and assuming $\alpha_{gy} = 0 = \beta_{gt}$. The last step consists in estimating the impulse-response functions using the estimated coefficients.

The basic model is estimated using the vector of endogenous variables, in real terms: [14] logarithm of social expenditures, logarithm of total primary revenue and the logarithm of output. Note that dynamic effects of public spending can also be analyzed using a three-dimensional SVAR by replacing total social expenditures by its different components and the aggregate GDP by household consumption and private investment (Çebi, 2015; Burriel et al., 2010).

Furthermore, regarding our main interest in this report, which is the estimation of the multipliers associated with the social expenditures, Spilimbergo et al. (2009) indicate there are four main approaches to calculate expenditure multipliers, namely: i) the impact multiplier, for the analysis of a short-run period, given by $\frac{\Delta Y(t)}{\Delta G(t)}$; ii) the horizon multiplier, for calculating the multiplier in a specific period of time, given by $\frac{\Delta Y(t+n)}{\Delta G(t)}$; iii) the peak multiplier, which represents the highest value in the period under analysis, given by $max\,\frac{\Delta Y(t+n)}{\Delta G(t)}$; iv) the accumulated multiplier, that takes into account the total effect over a longer period of time, given by $\frac{\sum_{i=1}^{n}\Delta Y(t+i)}{\sum_{i=1}^{n}\Delta G(t+i)}$.

Basically, the importance of calculating the impact multiplier is that it provides an assessment of fiscal policy in terms of immediate output response to a shock in the fiscal

[14] The variables used in this study are not stationary and, therefore, their first difference are used (they are integrated of order 1), including the control variables, as showed by respective tests (Dickey-Fuller, Phillips and Perron, KPSS). Thus, the exercises are performed in terms of growth rate. We used the cumulative impulse-response function in order 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 that most methods point to as being the most appropriate one (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 all diagnostic tests are shown in Appendix A.

variable when the government aims to deal with a crisis, for example. Accumulated (or cumulative) multipliers, in turn, are essential in order 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 of the accumulated response of output to the accumulated response of the fiscal variable subject to the shock. Thus, it measures the cumulative change in output after a cumulative change in the government spending over a given time horizon (Lozano and Rodriguez, 2011; Borg, 2014; Burriel et al., 2010; Tenhofen et al., 2010; Restrepo, 2020). Cumulative multipliers are also called integral multipliers, and their importance is emphasized by Restrepo (2020), who claim as follows: "The cumulative multiplier, according to Ramey and Zubairy (2018), may be a better representation when the effects of fiscal policy build over time". (Spilimbergo et al. (2009), Restrepo (2020)).

In order to calculate the 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 (natural) logarithmic form, impulse-response functions provide the elasticity of output or income (Y) with respect to the fiscal variable (X):

$$\xi_{Y,X} = \frac{\frac{\Delta Y}{Y}}{\frac{\Delta X}{X}} = \frac{\Delta Y}{Y}\frac{X}{\Delta X} = \frac{\Delta Y}{\Delta X}\frac{X}{Y} \tag{7}$$

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

$$\frac{\Delta Y}{\Delta X} = \frac{\xi_{Y,X}}{\frac{X}{Y}} \tag{8}$$

To estimate the cumulative multiplier, we justify the number of periods based on Garcia et al. (2013, p. 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 longer period.

In this report, we estimate multiplier effects of social protection for Vietnam through several three-dimensional structural linear VAR. In all the estimations carried out we

follow the Blanchard and Perotti (2002) strategy and include three endogenous variables: logarithm of social expenditures (or its components), logarithm of total government revenues and logarithm of GDP (or its components). Based on the resulting estimations, we generate cumulative impulse response functions in order to obtain the dynamic responses of social expenditures on the level of real GDP. As detailed above, we use these functions to obtain the elasticities of GDP in response to a shock in social expenditures and then calculate the multipliers.

4. Database and data description

We use quarterly data available in the "General Statistics Office of Vietnam" and in "The Ministry of Finance of the Socialist Republic of Vietnam". Social expenditures are classified into the following categories: a) Total Social Expenditures; b) Social Security (one of the components of (a)); c) Social Insurance (a subcategory of (b) including pensions and social insurance benefits, premiums to the voluntary social insurance and supports for the unemployment insurance fund); and d) Social Security for ND (a subcategory of (b) including funding for implementing the policy on preferential treatment and housing supports for the national devotees who participated in the National Defence War).[15]

Figures 1 and 2 show the series described above at quarterly frequency. In order to convert annual series into quarterly data, we employed Total Government Current Expenditures available at quarterly frequency as an indicator in the "Denton-Chollete" temporal disaggregation method (available in the R Package "tempdisagg"). Total Government Current Expenditures was obtained from "The Ministry of Finance of the Socialist Republic of Vietnam". We also used Current Government Tax Revenues in VAR models, available in quarterly series from "The Ministry of Finance of the Socialist Republic of Vietnam".

GDP data at quarterly frequency was obtained from the "General Statistics Office of Vietnam". The CPI index, used as deflator, was obtained from the IMF. All series were

[15] It should be clarified that the disaggregated expenditures (c) and (d) add up to Total Social Security expenditures or, in other words, (b) = (c) + (d).

seasonally adjusted using the X12 Arima Method, available in EViews, and displayed in 2010 prices from CPI index.

Figure 1 - Total Social Expenditures in Vietnam (in Billions of Dongs in 2010 national prices, seasonally adjusted)

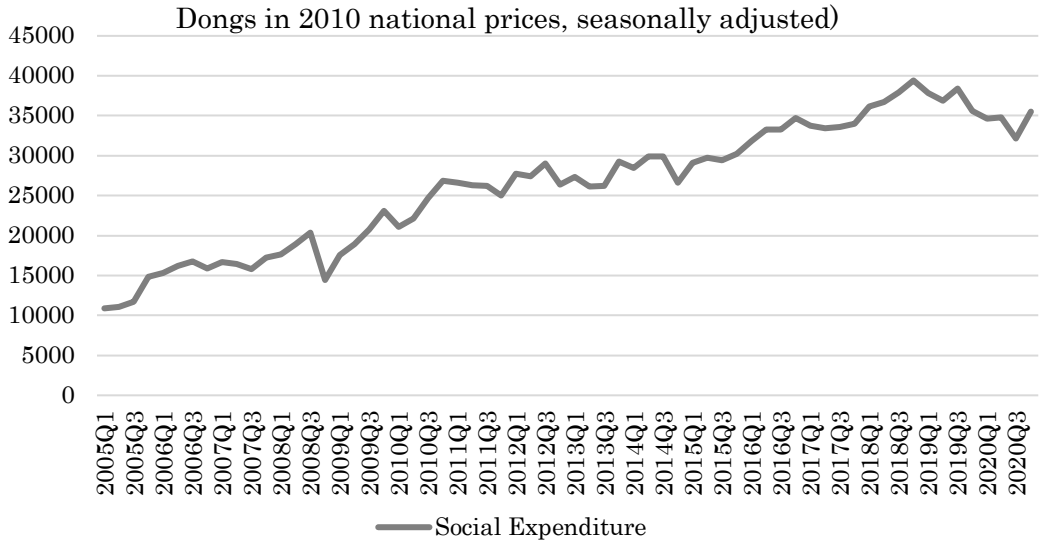
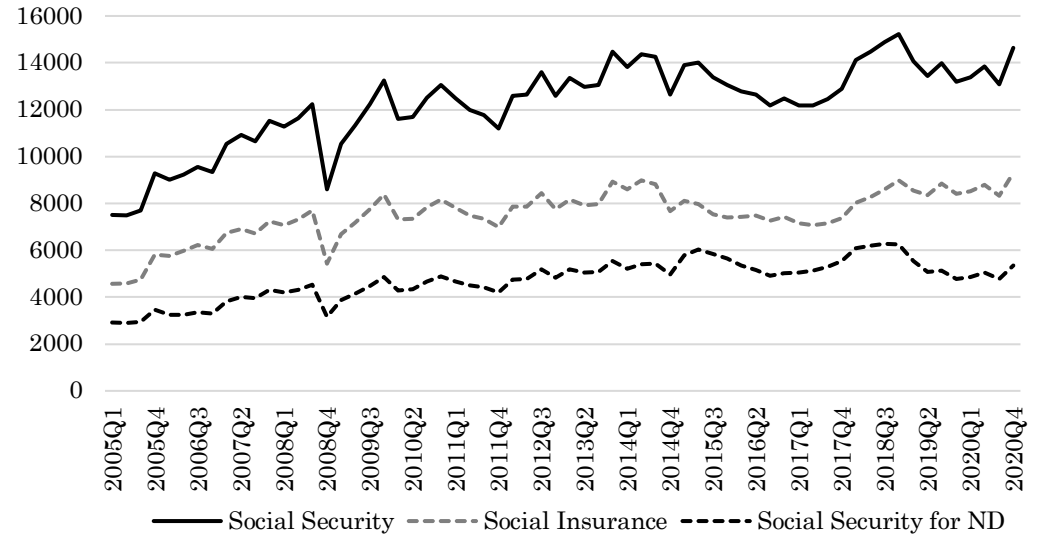


Figure 2 - Components of Social Expenditures in Vietnam (in Billions of Dongs in 2010 national prices, seasonally adjusted)



It is worth highlighting that, for all periods analyzed in this report, we can immediately notice a substantial increase in government spending in social expenditures – a trend described, for instance, in London (2014), Long (2010) and Kidd et al. (2016). In fact, Total Social Expenditures in 2018 reached almost four times the spending level of 2005, the initial year of our sample. This behavior is also observed for one of the components of those social expenditures – Social Security Expenditures. Nevertheless, the average

growth rate of this component of Total Social Expenditures in the analyzed period is lower than of the total expenditures. In 2005, social security spending represented approximately 70% of total social spending, while in 2020 this component accounted for approximately 40% of total social spending.

Moreover, focusing on the disaggregation of the Total Social Security Expenditures, it is interesting to note that both components – Social Insurance and Social Security for ND – show a similar behavior, with consistent increases in spending over the period under analysis. Regarding relative shares, it is important to point out that the share of Social Insurance Expenditures in Total Social Security Expenditures varied between 55% and 65% from 2005 to 2020.

5. Estimation results

Based on the Structural VAR approach employed in Blanchard and Perotti (2002), we estimated fiscal multipliers for different series of social expenditures in Vietnam. All the structural VARs were estimated using the three-dimensional vectors of the following variables in logarithmic form: government social expenditures, government tax revenues and real GDP. The first difference of the log of each variable was used to avoid spurious relationships, as all series are integrated of first order according to standard stationarity tests (ADF, PP, and KPSS). We estimated different exercises using different expenditures series as described above, control variables and time dummies. We chose the specification that seemed to be better in terms of significance and robustness (free of heteroscedasticity, autocorrelation, and non-stability problems, according to LM and White tests).

We should mention that we tested one control variable: Real Effective Exchange Rate (REER) (in first difference of the log), which was obtained from the World Bank Global Economic Monitor.[16] Although this variable is available in monthly frequency, it was averaged to each quarter. We included this control variable if it showed significance.

We should add that also tested different time dummies variables: dummy1 is included to control for quarters 2008Q2, 2008Q3, 2008Q4 and 2009Q1 of the Global Financial Crisis (GFC); dummy2 controls for intense breaks in “Social Security” and “Social Insurance”

[16] REER is a weighted average of a country’s currency in relation to an index or basket of other major currencies. The weights are determined by comparing the relative trade balance of a country’s currency against that of each country in the index.

series (2007Q1, 2009Q1, 2012Q1, 2013Q4); dummy3 controls two quarters of the GFC (2008Q4, 2010Q1) and for a break in the "Government Tax Revenues" series (2014Q4) dummy4 controls for a different period of the GFC (2008Q3, 2008Q4, 2009Q1, 2009Q2); dummy5 also controls for the year 2008 due to the GFC (2008Q1, 2008Q2, 2008Q3, 2008Q4); and finally, dummy6 is included to control for intense breaks in the "Social Security" and "Social Insurance" series, but excluding 2009Q1 (i.e., 2007Q1, 2012Q1, 2013Q4).

As a result, we obtained 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: $\max\left[\frac{\Delta Y(t+n)}{\Delta G(t)}\right]$.
- 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 impulse response functions and corresponding multipliers are shown in the next section. Diagnostic tests and estimated coefficients are properly reported in the Appendix.

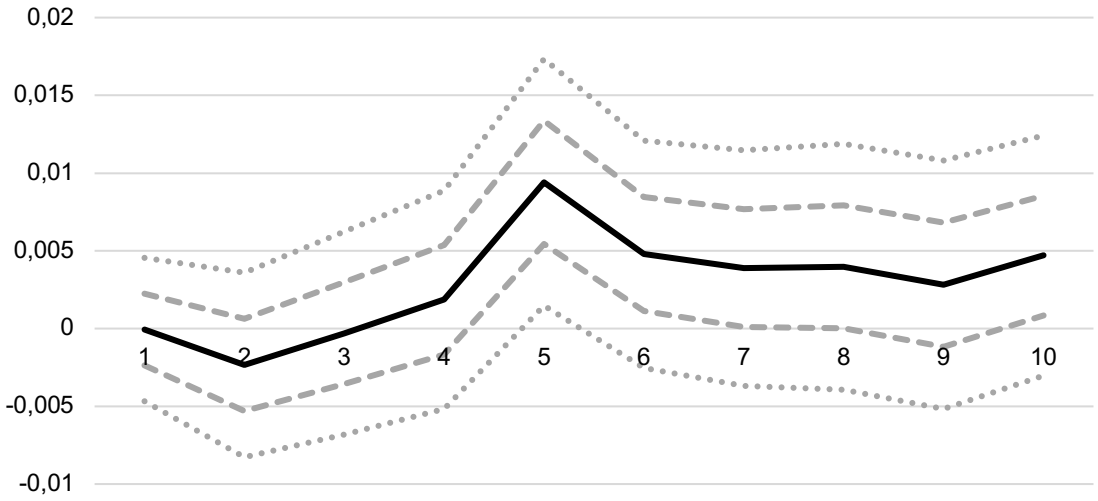
5.1. Effects of Total Social Expenditures on output

Following the first of the VAR specifications reported earlier, in this section we explore the effects of Total Social Expenditures shocks on the Vietnamese level of economic activity using data for the period 2005-2020 described earlier. It should be mentioned that all the series were displayed in 2010 prices from CPI.

We included four lags (according to LR lag length criteria), which yielded the best estimations in terms of significance and eliminated heteroscedasticity. As discussed in detail in the Appendix, the White test did not detect heteroscedasticity, but the LM test detected the presence of autocorrelation in certain lags.

Figure 3 reports the accumulated impulse response function of real GDP to a shock in Total Social Expenditure.

Figure 3 - Accumulated response of GDP to a shock in Total Social Expenditure



Dotted lines represent a confidence interval of 95% (two standard deviations). Dashed lines show a confidence interval of 68% (one standard deviation).

In Figure 3, it is shown that shocks in Total Social Expenditures have a negative impact on output in the first three periods after the initial shock and, from that, positively impact the Vietnamese real GDP. It is noteworthy that the impact of a Total Social Expenditure innovation achieves its peak in a year after the initial shock, in the fifth period of analysis. While the accumulated responses are not highly statistically significant (5% significance level) – except for the peak effect –, note that the positive responses after the fourth period of analysis are largely statistically significant considering a one standard deviation confidence interval.

Associated with the impulse response functions showed above, the estimated multipliers effects for Total Social Expenditures are the following: **-0.02 (impact); 3.191 (peak, fifth quarter), and 1.562 (accumulated in ten quarters)**. This result entails that a one-unit increase in Total Social Expenditures leads to a total expansion of 1.562 in real GDP after two and a half years in Vietnam. Thus, our results indicated that this component of the government's current expenditure significantly impacts on the Vietnamese economy.

This result is a first evidence of the importance of social protection in boosting the level of economic activity in Vietnam. Moreover, when suggesting that a component of the government's current expenditure positively impacts on output, this finding is partially in keeping with earlier estimations in the related literature, particularly Huy (2013) and Nguyen (2019). Notwithstanding, our result differs from the findings in Huy (2013) on a

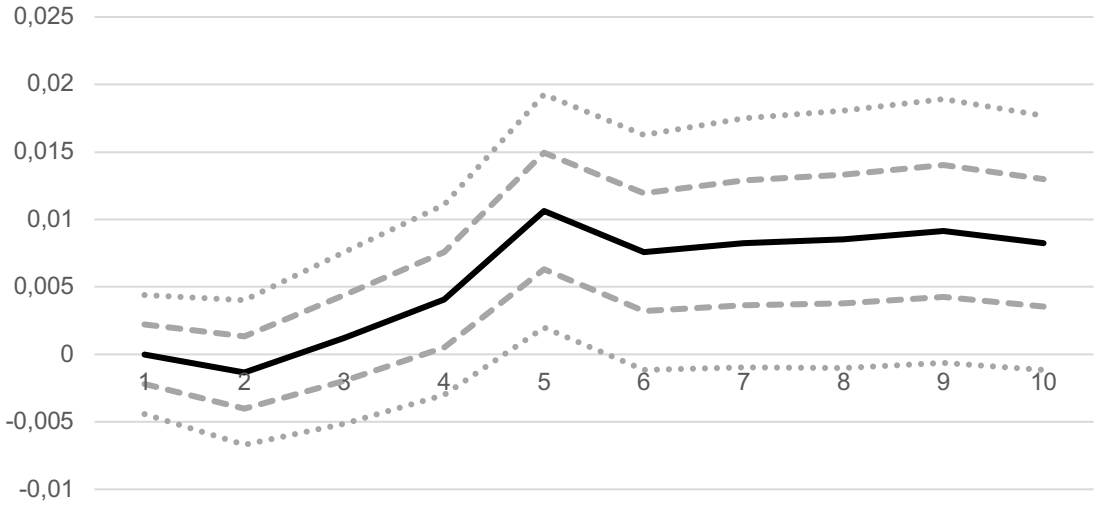
critical front. In addition to relatively limited short-run effects, our main finding regarding total social expenditures is that the impacts are more significant after a year of the initial shock (peaking in the fifth quarter), and it maintains a relatively high magnitude until the end of the period under analysis, in our case two and a half years after the shock. It is worth noting that, for example, compared to the ninth period of analysis, the output response to shocks in Total Social Expenditures increases significantly in the last period, which may be an indication that the effects on the economic growth of such a fiscal instrument are even more significant if we take into account a more extended period. Therefore, the accumulated multiplier over two and a half years, which is already substantially higher than an additional investment unit, can be even greater if we perform a long-run analysis.

5.2. Effects of Social Security expenditures on output

Moreover, focusing now on the second specification estimated in this report, we examine the impacts of increases in one of the components of the government's social expenditures – Social Security Expenditures – on Vietnamese output. It is important to indicate that in this first disaggregated estimation we include four lags (according to LR lag length criteria), the real exchange rate (REER) variable as a control, and two of the binary variables described earlier – dummies 2 and 3 – in order to control for outlier behavior in the series for Social Security Expenditures. This specification yielded the best results regarding residual diagnostic tests compared to other estimations with the same variables of interest. In the Appendix, we report the LM and White test results, which indicates that the model does not feature either of those specification problems.

Figure 4 shows the accumulated impulse response functions of output to a shock in Total Social Security Expenditures.

Figure 4 - Accumulated response of GDP to a shock in Total Social Security Expenditures



Dotted lines represent a confidence interval of 95% (two standard deviations). Dashed lines show a confidence interval of 68% (one standard deviation).

In keeping with the related literature on social expenditures multipliers in other countries, our results show that real GDP is positively impacted by increases in Total Social Security Expenditures and this positive impact increases after the first year of the shock, reaching its peak in the fifth period and maintaining a solid average impact afterwards. Note that, although there is an initial negative effect in the second period of analysis, it is not statistically significant even considering a one standard deviation confidence interval. Furthermore, from the fourth period to the last analyzed period, all positive responses of real GDP to increases in Social Security Expenditures are statistically significant at a significance level close to 5%.

The estimated multipliers associated with those output responses to Total Social Security Expenditures can be summarized as follows: **-0.003 (impact); 4.825 (peak, fifth quarter); 2.92 (accumulated in ten quarters)**. It is important to highlight that spending on Social Security has a positive effect which is significantly higher than Total Social Expenditures, as seen in the previous subsection. Although it is not statistically significant in both cases, note that the initial negative effect of Social Security expenditures on output is much lower than the responses to Total Social expenditures. Also, the peak multiplier, which occurs at the fifth quarter in both cases (which is indicative of the relative importance of the effect of this component of social expenditures for the total impact), is

approximately 1.6 units higher for Social Security expenditures than the average of social expenditures.

Note also that the accumulated multiplier of Social Security expenditure is approximately twice as large as the multiplier for total social expenditures, suggesting that one unit increase in this social security spending is associated with an increase of almost three units in Vietnamese output.

Thus, this component of the government's social expenditure has an above-average effect and, it is worth mentioning, indicates higher effectiveness of this fiscal policy instrument compared to other categories that compose those social expenditures. Nevertheless, as highlighted in the description of the data, we observed a relative downward trend in Social Security's share of Total Social Expenditures. Therefore, this result indicates a path of reversal of the previous trend, pointing to a rise in the relative share of Social Security Expenditures as a direct way to increase the effectiveness of fiscal policy in the country and, consequently, stimulate economic growth. Moreover, it is also worth pointing out the significant effects of expenditures in this component of the social protection net on Vietnamese society, a topic that will be explored in more detail shortly. However, further disaggregation should be pursued in order to better compare the effectiveness of different fiscal policy instruments in Vietnam. But given the limited availability of data, this result is a first indication of the relevance of social protection for sustainable economic growth in the country.

In fact, along these lines, this result is, in a way, complementary to those found in Fan et al. (2004) and Quy (2017). In addition to the already explored positive impacts of public investment, especially in research and development and infrastructure, on the level of economic activity, our findings indicate the substantial relevance of social protection expenditures, particularly of Total Social Security Expenditures, for socio-economic development in Vietnam.

Moreover, it is worth underscoring the relationship between this first result and the discussions carried out earlier in this report about the importance of social protection as an engine of social development. As noted in the description of the data, Social Security Expenditures have grown significantly in the last decades in Vietnam. Our results indicate that this increased spending has substantial positive impacts on the level of economic activity. Yet the effects of those social expenditures on Vietnamese society are far more

significant than those directly measured by the level of economic activity. Due to the nature of those expenditures, the reported strong positive effect on real GDP growth could be added, as discussed earlier, to the inclusion of ethnic minorities in the country's social development – minorities that were left out of the strong economic development of the last decades –, as well as directly attacking poverty and food insecurity throughout the provinces. Thus, this first result of the report already clearly points to the relevance of investments in social protection as a key inducer of sustainable and inclusive economic growth in Vietnam.

5.3. Effects of Social Insurance on output

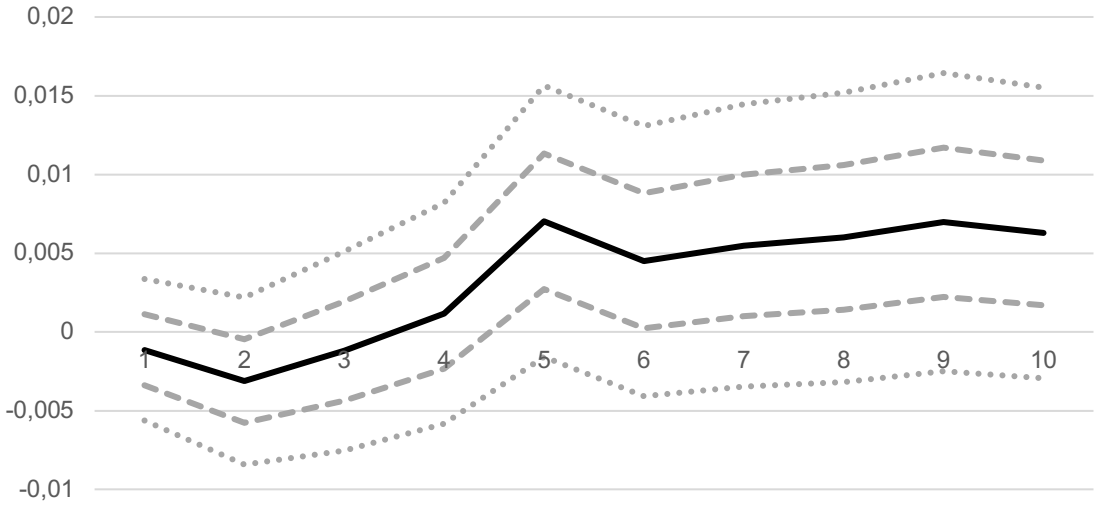
Following the path of disaggregating social expenditures, let us examine the impacts of Total Social Insurance Expenditures, a component of Social Security Expenditures, on the level of economic activity in Vietnam. In that regard, we estimated two different specifications to capture the effect of such expenditure on the country's output. The following subsections explore the results of each of these estimates.

5.3.1. First specification

In the first specification estimated to capture the impacts of Social Insurance Expenditures on output, we included four lags (according to LR lag length criteria), two binary variables – dummies 2 and 3 -, and the real exchange rate (REER) variable as a control variable, which yielded the best estimations in terms of significance and eliminated serial heteroscedasticity. Similar to the previous specifications explored in this report, the results and analysis of residual diagnostics are reported in the Appendix. However, it is worth indicating that this model does not present heteroscedasticity, but the LM test detected serial autocorrelation in one of the examined lags (although only at the 5% or lower significance levels).

Figure 5 shows the accumulated impulse-response function of real GDP to a shock in Total Social Insurance Expenditures.

Figure 5 - Accumulated response of GDP to a shock in Total Social Insurance Expenditures



Dotted lines represent a confidence interval of 95% (two standard deviations). Dashed lines show a confidence interval of 68% (one standard deviation).

From Figure 5, we can conclude that the responses of real GDP to shocks in Social Insurance Expenditures are primarily positive, with the exception of the first three periods, but lower than for the previously analyzed expenditures and are also less statistically significant – note that the responses are not statistically significant at the 5% significance level in none of the analyzed periods. However, they are significant after the fourth period considering a one standard deviation confidence interval.

Moreover, the estimated multipliers associated with Social Insurance expenditures are the following: **-0.545 (impact); 3.364 (peak, fifth quarter); 1.629 (accumulated in ten quarters)**. This result indicates that a one-unit increase in Social Security and Welfare expenditures leads to a total expansion of approximately 1.6 in real GDP after two and a half years. Note that, besides being less statistically significant, the effects of this government expenditure on Vietnamese real GDP are lower compared to the multipliers of Total Social Security Expenditures.

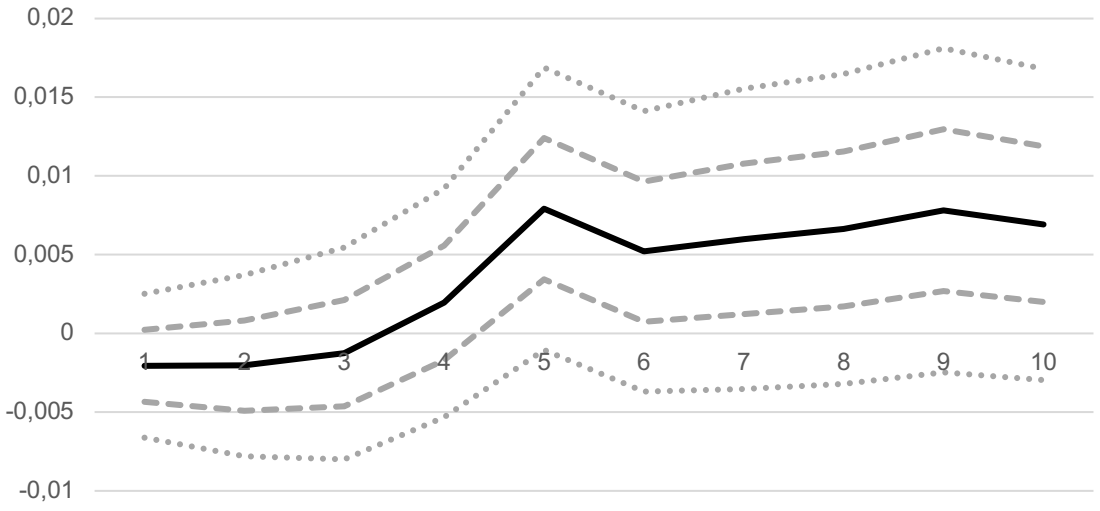
5.3.2. Second specification

This second specification also included four lags (according to LR lag length criteria) and the real exchange rate as a control variable. However, now we took into account other binary variables – namely, dummies 1, 3, 4, 5, 6 –, which, again, yielded the best results

in terms of stability and autocorrelation. As discussed in detail in the Appendix, this specification does not suffer from heteroskedasticity problems or (serial) autocorrelation.

Figure 6 depicts the accumulated responses of real GDP to a shock in Total Social Insurance Expenditures.

Figure 6 - Accumulated response of GDP to a shock in Total Social Insurance Expenditures



Dotted lines represent a confidence interval of 95% (two standard deviations). Dashed lines show a confidence interval of 68% (one standard deviation).

Similarly to the previous specification, the output responses to shocks in Total Social Insurance Expenditures are negative for the first three periods after the initial shock, although not statistically significant even considering a one standard deviation confidence interval. From the fourth period up to two and a half years after the shock, the responses are consistently positive but only statistically significant when considering a one standard deviation confidence interval.

The estimated multipliers associated with the impulse-response function shown in Figure 6 are the following**: -0.93 (impact); 3.613 (peak, fifth quarter); 1.796 (accumulated in ten quarters)**. As expected, the estimated multipliers – impact, peak, and accumulated – are quite similar to those found for the previous specification, which shows the robustness of the results regarding the impacts of Social Insurance Expenditures on output. Yet the magnitude of all multipliers are relatively higher in this second case.

Therefore, comparing the two specifications for Total Social Insurance Expenditures, we obtained relatively more modest results for the respective multipliers than in the case of

the Total Social Security expenditures. In general, one additional unit of Social Insurance Expenditure generates an average increase of roughly 1.7 units of real GDP in Vietnam in two and a half years after the initial shock. This result indicates that, as a component of Social Security Expenditures, Social Insurance Expenditures are less effective, in terms of their impacts on economic activity, than the average for the aggregate component of the government's social expenditure. But it is worth noting that the concentration of social protection contributions and coverage for workers in the formal sector – which makes up the upper quantiles of income, as discussed in UNESCAP and ILO (2021) – may be related to the relatively lower impact of this component of Social Security Expenditures compared to the average of the category. However, when comparing with the Total Social Expenditure, note that spending on social insurance also has a higher multiplier than the average.

As discussed earlier in this section, this report points to several fiscal policy instruments that have positive and significant impacts (both in economic and statistical terms) on the Vietnamese aggregate output. In particular, Social Insurance Expenditure is another very effective instrument of economic stimulus within the government's current expenditures, a result that, again, indicates a certain contrast with the related literature on the impact of fiscal policy in the country.

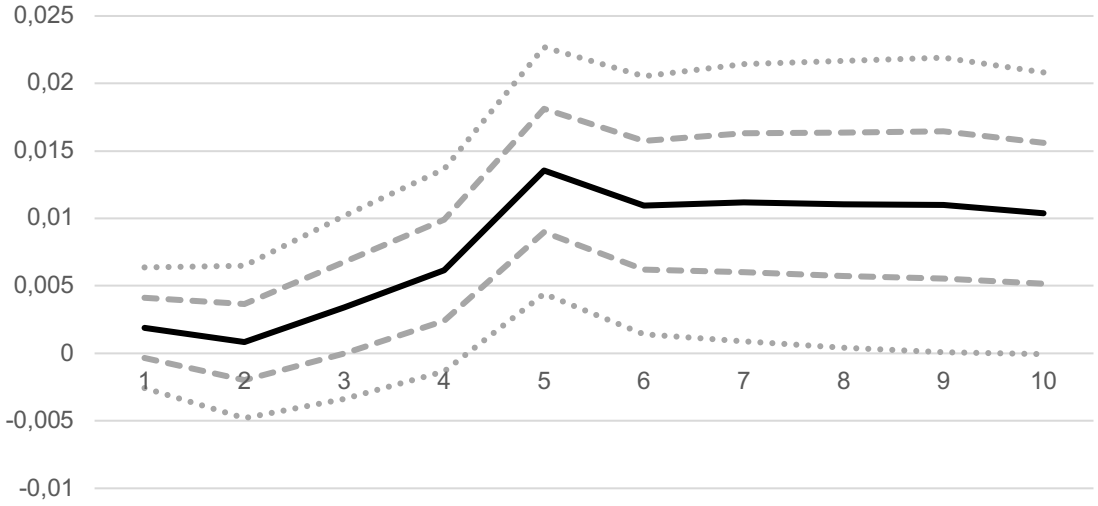
Moreover, as explored for Total Social Security Expenditures, it is essential to emphasize that, in addition to the substantial effect on economic activity captured in this result, increased spending on this component of social expenditures has other important impacts on the country's development. As largely discussed in the literature, the expansion of the social protection network potentially affects several layers of the society, ensuring income security for families in delicate financial situations, which, in turn, has varied impacts on the economy. As Social Insurance Expenditures includes pensions and unemployment insurance, it is clear that increases in this component of social expenditures largely affect the living conditions of several families in the country, for instance, by reducing food insecurity and potentially increasing labor productivity. Thus, this result further indicates the crucial role that social protection plays for inclusive economic growth in Vietnam.

5.4. Effects of Social Security for ND on output

Lastly, in order to examine the effects of Social Security for ND Expenditures on the Vietnamese level of economic activity, we estimated the VAR model including four lags (according to LR lag length criteria), two binary variables: dummies 2 and 3, and also controlled for the real exchange rate effects.

Figure 7 depicts the accumulated impulse-response function of GDP to a shock in Total Social Security for ND Expenditures.

Figure 7 - Accumulated response of GDP to a shock in Total Social Security for ND Expenditures



Dotted lines represent a confidence interval of 95% (two standard deviations). Dashed lines show a confidence interval of 68% (one standard deviation).

From Figure 7, it is immediate to see that our results indicate that real GDP is positively impacted by increases in Social Security for ND Expenditures and this positive impact increases after the first year of the shock, reaching its peak in the fifth period and maintaining a consistently large average impact afterwards. Differently from the other social expenditures analyzed in this report, note that none of the output responses are negative for shocks in Social Security for ND Expenditures. Furthermore, the positive impacts from the end of the first year after the initial shock through the end of our analysis (two and a half years after the shock) are statistically significant at the 5% significance level.

Also, the estimated multipliers associated with those output responses to Social Security for ND Expenditures can be summarized as follows: **0.73 (impact); 5.258 (peak, fifth quarter); 3.315 (accumulated in ten quarters)**. In short, this result shows that a one-

unit increase in Social Security for ND Expenditures leads to a total expansion of 3.315 in real GDP after two and a half years in Vietnam. It is important to point out that the multipliers associated with those responses have a large magnitude for all three measures: impact, peak, and the accumulated over two and a half years. Those multipliers are more prominent than all other disaggregated expenditures examined in this empirical exercise. Thus, as mentioned in the previous subsection, our results indicate that this portion of the Total Social Security Expenditures is more effective in terms of fiscal policy than Social Insurance Expenditures, both in the short and medium run.

Given the relative lack of coverage of the social protection net for the elderly population in the country, as seen earlier in this report, and taking into account that this component of Social Security Expenditures is related to supporting the family income of national devotees of the National Defence War, it is reasonable to argue that these expenditures impact the Vietnamese economy more substantially by guaranteeing income for a group relatively more dependent in terms of social protection and occupying lower quantiles of the country's income distribution (as compared, for instance, to formal workers). Hence, this result is yet another indication of the fundamental importance of expanding the social protection net in order to achieve social and economic development in the country.

5.5. Summary of results and implications

After reporting the detailed results for each of the categories of social expenditures analyzed in this report, it is worth, by way of conclusion, briefly discussing a summary of the main results arising from our estimations and relate them to the existing literature, as well as to explore some policy implications of these results.

Table 2 summarizes the results for the estimated multipliers associated with the impulse response functions of output to shocks in social expenditures in Vietnam.

TABLE 2 - SUMMARY OF THE RESULTS FOR ESTIMATED MULTIPLIERS

Social Expenditure	Impact Multiplier	Peak Multiplier (in period "t")	Accumulated Multiplier (over ten quarters)
Total Social Expenditures	-0.020	3.191 (Fifth quarter)	1.562

Total Social Security Expenditures	-0.003	4.825 (Fifth quarter)	2.920
Social Insurance Expenditures (First specification)	-0.545	3.364 (Fifth quarter)	1.629
Social Insurance Expenditures (Second specification)	-0.930	3.613 (Fifth quarter)	1.796
Social Security for ND	0.73	5.258 (Fifth quarter)	3.315

First, our main conclusion from the results reported in Table 2 is that social expenditures – and here, we analyzed three different disaggregation of the total social expenditures – positively impact on the level of economic activity in Vietnam. This result is in line with the related literature on the impact and effectiveness of fiscal policy in the country (Fan et al., 2004; Huy, 2011; Thành, 2014; Vu et al., 2016; Thi, 2017; Quy, 2017; Nguyen, 2019; Dao and Nguyen, 2020).

More importantly, the social expenditure multipliers estimated in this report indicate that for all categories considered, an additional unit of investment generates more than one unit of increase in output in a relatively short period of time, possibly reaching from 1.5 to 3.3 units increase in aggregate output over two and a half years of the initial shock. Nevertheless, it is important to point out that the positive impacts of social spending on the level of economic activity in Vietnam occur especially after the first year of the initial shock (until the end of the period examined) and are of reasonable statistical significance only considering one standard deviation confidence intervals. Output responses to shocks in Social Security Expenditures and Social Security for ND Expenditures characterize the two exceptions, as the positive effects associated with such expenditures are statistically significant at levels close to the 5% significance level for almost all periods from the third quarter after the spending shock. Therefore, our results suggest that an increase in some components of current government expenditure positively impact on the real GDP in Vietnam, pointing to a certain contrast with the results in Huy (2011), but in keeping with earlier findings, for instance, in Nguyen (2019).

More specifically, it is worth pointing out that in all specifications analyzed the effect of the studied social expenditure on aggregate output reaches its peak soon after the first year of the initial shock and maintains a high positive average in subsequent periods. Especially in the specification for the Total Social Security Expenditures, the response of the Vietnamese aggregate output to such a spending shock grows again in the last period of our empirical analysis, that is, two and a half years after the shock, which suggests that the accumulated multiplier could be significantly greater (in magnitude) if we extended the period of analysis. Thus, our results contrasts with the existing literature, in particular with the findings in Huy (2013) and Thành (2014), as this report finds limited effects of social expenditures on the level of economic activity in the very short run, but a growing impact in the medium run and possibly in the long run[17], suggesting the occurrence of a sustained effect on the level of economic activity over the initial years after the increase in government spending.

Besides, it is worth noting that the results of this report are better interpreted within a context of disaggregation of social spending. Initially, starting from the total government current expenditure, we examined the specific impact of Total Social Expenditures on output. Our results for such an aggregate spending suggest that increases in Total Social Expenditure positively and significantly affect the level of economic activity in Vietnam, thus highlighting the positive effect of social spending on the country's economic and social development.

Next, we moved forward with the breakdown of social expenditures and examined the impacts of one of the specific components of such government expenditures – Social Security Expenditures – on the level of economic activity in Vietnam. In short, we found that shocks in Social Security Expenditures have consistent positive impacts on the Vietnamese real GDP, reaching its peak effect one year after the initial expenditure shock and accounting for an accumulated multiplier of almost 3 after two and a half years. These results suggest that the impacts of Social Security Expenditures on aggregate output are more significant than the average of social expenditures. Thus, in terms of fiscal policy effectiveness, Social Security Expenditures appear to be an excellent instrument to drive sustainable economic growth in the Vietnamese economy. Nevertheless, it is worth noting

[17] Subject to data availability, it would be quite interesting to examine the impacts of government fiscal policy choices on Vietnam's macroeconomic variables over the previous decades, using "long" time series (annual frequency) to capture longer-run relationships between social expenditures and economic and social development in the country.

that, in the analyzed period, these expenditures decreased their relative share in the Total Social Expenditures. Therefore, our results point to the need of a reversal of that trend, suggesting that the relative increase in the share of Social Security Expenditures in total social spending would be directly associated with greater effictiveness of fiscal policy and, therefore, greater stimulus for economic growth in Vietnam.

Lastly, we analyzed the impacts of the two components of social security expenditures – Social Insurance Expenditures and Social Security for ND Expenditures – on the country's economic performance. For Social Insurance Expenditures, we estimated two different specifications that showed similar results, pointing to the robustness of the empirical-econometric exercise performed. In summary, the impacts of Social Insurance spending on Vietnam's real GDP are positive and statistically significant from the first year after the initial shock until the last period in the analysis (one standard deviation confidence interval). Yet the multipliers are smaller than the average for Social Security Expenditures. But it is noteworthy that the impacts of Social Insurance Expenditures are still more significant than the average for Social Expenditures, thus suggesting that, although it is not the most effective fiscal policy instrument in comparison to other components of Social Security Expenditures, any increased investment in Vietnam's social protection structure has a greater-than-average impact on the country's economic development than other social expenditures, with short- and medium-run returns (in terms of real GDP) well above the initial spending.

Moreover, for Social Security for ND Expenditures, our results show that the multipliers associated with those expenditures are more prominent than for all other disaggregated expenditures examined in this econometric exercise. In short, we estimated that a one-unit increase in Social Security for ND Expenditures would lead to a total expansion of 3.315 in real GDP after two and a half years in Vietnam.

Overall, the several empirical results obtained in this report point to new components of the Vietnamese government spending with a high and significant impact on the country's economic development. Therefore, in addition to previous results in the literature which suggest, for example, the fundamental role of investments in research and development, infrastructure, and education, in stimulating economic growth (Fan et al., 2004; Thánh, 2014; Quy, 2017; Dao and Nguyen, 2020), in this report we suggested the positive effects of investments in social protection, with a special emphasis on Social Security, and yet

more especially Social Security for ND, for achieving sustainable and inclusive economic development in Vietnam.

In this sense, it is worth highlighting the importance of considering other disaggregated components of government spending in studies on fiscal policy in the country. It seems quite important that researchers and policymakers come to focus, as done in this report, on the analysis and estimation of the specific effects of each particular type of expenditure on the Vietnamese aggregate output, calculating the impact, peak, and accumulated fiscal multipliers. This is, undoubtedly, a promising path for further evaluating the effectiveness potency of fiscal policy and directing government efforts in that regard in the short and long run in the country.

Finally, as a more straightforward policy implication, our results suggest that increases in Social Security Expenditures and Social Insurance Expenditures are, among the analyzed expenditures, the most effective way to boost the level of economic activity in Vietnam, especially considering the medium-run effects of fiscal policy. In view of the Vietnamese government's recent effort to expand its social protection net, with the development and extension of social programs – as documented, for instance, in Evans et al. (2011), Bonnet et al. (2012), and Kidd et al. (2016) –, the results of this report can be seen as supportive of those effort. By providing detailed evidence that investments in social protection are quite effective in stimulating the level of economic activity – given, for instance, the average impact of social expenditures – and potentially generating inclusive growth in the country, the several empirical results presented in this report can serve not only as a thermometer for the Vietnamese government, indicating the validity of measures already taken to increase investment in social protection, but also as a compass, suggesting the "best" direction for increases in government expenditures, with the main focus being on social protection and, especially, on Social Security Expenditures.

6. Concluding remarks

This report offers evidence of the impact of social expenditures on the level of economic activity in Vietnam. The research methodology is robust as it relies on a technique that allows using economic theory to transform the reduced-form VAR model into a system of structural equations, making it feasible to generate impulse responses that can be given structural interpretations.

Using quarterly data on Total Social Expenditures, Total Social Security Expenditures, Social Insurance Expenditures, Social Security for ND Expenditures, total tax revenues, and real GDP over the period from 2005 to 2020, the findings of this report offer empirical evidence of a positive impact of social expenditures – in particular, social protection – on Vietnamese aggregate output, which is partially in keeping with the related literature. Our results reveal that the estimated multipliers for social expenditures are: -0.02 (impact), 3.191 (peak, fifth period), and 1.562 (accumulated after ten quarters), for Total Social Expenditures; -0.003 (impact), 4.825 (peak, fifth quarter), and 2.92 (accumulated after ten quarters), for Total Social Security Expenditures; -0.7375 (impact), 3.5 (peak, fifth quarter), and 1.71 (accumulated over eight quarters) for Social Insurance Expenditures (average of both specifications); and, 0.73 (impact), 5.258 (peak, fifth quarter) and 3.315 (accumulated in ten quarters), for Social Security for ND Expenditures.

In short, the estimated results confirm that all peak and accumulated multipliers are above one, implying that one unit spending on social expenditures generates more than one unit of increase in output. In particular, the results suggest that an increase in Social Security Expenditures, and particularly in Social Security for ND Expenditures, is associated with the most substantial boosts to the level of economic activity in Vietnam in the short and medium run. These findings have important policy implications, as they serve not only as a stimulus for the continuation and expansion of social protection programs developed by the Vietnamese government in the last decades, but, most importantly, suggest avenues for the further improvement of the effectiveness of fiscal policy in the country. In fact, these findings suggest what are the specific components of government spending that most significantly impact on the Vietnamese economy both in periods of expansion and recession.

By suggesting the relevance of the effects of Social Security Expenditures (and both its components, that is, Social Insurance and Social Security for ND) to stimulate the level of economic activity in Vietnam, this report contributes to establishing the case for the paramount importance of public expenditure on social protection. In fact, this kind of public expenditure is critical in the building of a robust, non-discriminatory, disability-inclusive, and gender-sensitive social protection system which is also socially effective and economically productive under both normal and crisis conditions. Thus, this report paves the way for policymakers and analysts to engage in social dialogues, incorporating all stakeholders involved in building and strengthening social protection systems, to argue

in favor of the importance of social protection in successfully yielding sustainable and inclusive economic growth.

By way of conclusion, it is useful to underline some possible extensions of this research that can significantly increase the understanding of the impacts of social expenditures in Vietnam. First, it is worth mentioning a direct extension of the empirical experiments carried out in this report, which is the estimation of multipliers for other components of government expenditures, following up on this research agenda to assess the effectiveness of fiscal policy based on the examination of various disaggregated social expenditures. In addition, as highlighted earlier in this report, it would be interesting to analyze the long-run impacts of components of social expenditure, and therefore of government decisions in terms of fiscal policy, on key macroeconomic variables in Vietnam in the last decades, using time series with annual frequency and considering several years in the sample – something that was not possible in this report due to data availability. Finally, a relevant extension of this research would be to explore the impacts of the social expenditures analyzed here, especially those that make up the social protection net, not only on the level of economic activity, as widely explored here, but on the several variables that can somehow capture inclusive social development in the country, which would give greater empirical substance to the suggestions based on the results of this report. For example, studies that explore the direct impacts of social protection on poverty reduction and income inequality, as well as on the educational level and food insecurity measures in the country, seem to be a promising way forward.

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APPENDIX – Estimated coefficients and residual analysis

In this Appendix, we describe the diagnostic tests and estimated coefficients for all VAR specifications explored in this report. First, it is important to clearly state that, in this Appendix, we consider the following typology for statistical significance when presenting the results: **** 1% / *** 5% (two standard-deviation bands) / **10% / *30% (one standard- deviation bands).

1. Total Social Expenditures specification – VAR 1

First specification – "VAR 1": Total Social Expenditures from "The Ministry of Finance of the Socialist Republic of Vietnam", Real GDP, and Current Government Tax Revenues for the period 2005-2020. All these series were displayed in 2010 prices using the CPI. We included four lags (according to LR lag length criteria). The estimated coefficients of this SVAR are summarized in the following table.

TABLE 3 - VAR 1 ESTIMATED COEFFICIENTS

	Social expenditure	Revenue variable	GDP
Social expenditure (0)			0.008
Social expenditure (-1)	-0.286004**	0.410433**	-0.023828
Social expenditure (-2)	-0.147293	0.381151*	0.039491*
Social expenditure (-3)	0.014136	0.318954*	0.048819*
Social expenditure (-4)	-0.328669***	0.198108	0.12066****
Revenue variable (0)			-0.0129
Revenue variable (-1)	0.067789	-0.870805****	-0.014645
Revenue variable (-2)	-0.021264	-0.450198***	-0.043941*
Revenue variable (-3)	-0.100836	-0.150715	-0.011369
Revenue variable (-4)	-0.114934*	0.016993	0.02033

GDP (-1)	0.805391*	1.509761**	-0.260133***
GDP (-2)	0.03635	1.122011*	0.035814
GDP (-3)	0.778392*	1.533337**	-0.08404
GDP (-4)	-0.249431	0.729698	0.137466*
Constant	0.008137	-0.069489**	0.016013***
Dummy1	-0.010937	-0.063572	-0.002259

(0) It 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).

Regarding the analysis of the residuals of this specification, the outputs below report the White, LM (autocorrelation) and VAR stability tests. We do not reject the null hypothesis of the White test, which indicates that the residuals do not show heteroscedasticity. In addition, note that the LM test indicates that there are no autocorrelation problems in this SVAR model, with the exception of the sixth lag. Finally, it is important to emphasize that this model is stable, since the roots of the characteristic polynomial are smaller than one in absolute value.

White test p-value: 0.2356

LM test p-value:

0.6375
0.3722
0.6414
0.1504
0.6496
0.0459
0.5667
0.0278

VAR Roots (modulus)

0.774450
0.774450
0.772656
0.772656
0.687170
0.687170
0.618210
0.578087
0.578087
0.492114

0.492114
0.398917

2. Total Social Security Expenditures specification – VAR 2

Second specification – "VAR 2": Model VAR 2 was estimated using real Total Social Security Expenditures from "The Ministry of Finance of the Socialist Republic of Vietnam", Real GDP, and Current Government Tax Revenues for the period 2005-2020. All these series were displayed in 2010 prices using the CPI. We included four lags (according to LR lag length criteria) and controlled for with dummy2, dummy3 and REER variable. The following table summarizes the estimated coefficients of this SVAR.

TABLE 4 - VAR 2 ESTIMATED COEFFICIENTS

	Social Security	Revenue variable	GDP
Social Security (0)			-0.000148
Social Security (-1)	-0.070112	0.143969	-0.021145
Social Security (-2)	-0.014683	0.25084*	0.047306*
Social Security (-3)	0.106254	0.358297*	0.071476***
Social Security (-4)	-0.071622	0.402987**	0.143814****
Revenue variable (0)			0.001055
Revenue variable (-1)	0.002125	-0.779415****	-0.016642
Revenue variable (-2)	-0.052521	-3.16E-01*	-0.027784
Revenue variable (-3)	-0.131484*	-0.125942	-0.003222
Revenue variable (-4)	-0.084586*	0.065805	0.032236*
GDP (-1)	0.303661	1.020606*	-0.254841**
GDP (-2)	-0.09162	0.989791*	0.014315
GDP (-3)	0.297857	1.232746*	-0.113678
GDP (-4)	-0.56402*	0.738767	0.13918

Constant	0.017753	-0.039052	0.018929****
Dummy2	0.112597****	-0.051666	-0.004091
Dummy3	-0.180854****	-1.24E-01*	-0.004367
REER	-0.522997*	-0.338363	-0.175173*

(0) It 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).

Similarly to the previous case, the outputs below report the White, LM (autocorrelation) and VAR stability tests. Note that we do not reject the null hypothesis of the White test, which indicates that the residuals do not show heteroscedasticity. In addition, notice that the LM test suggests that there are no autocorrelation problems in this SVAR model. Finally, it should be emphasized that this model is stable, as the roots of the characteristic polynomial are smaller than one in absolute value.

White test p-value: 0.566

LM test p-values:

0.8240
0.8552
0.7779
0.9540
0.8058
0.2690
0.6812
0.8464

VAR Roots (modulus):

0.790643
0.790643
0.757309
0.757309
0.715102
0.715102
0.698932
0.698932
0.638644
0.638644
0.606895
0.233762

3. Social Insurance Expenditures specifications – VAR 3 and 4

Third specification – "VAR 3": Model VAR 3 was estimated using real Total Social Insurance Expenditures from "The Ministry of Finance of the Socialist Republic of Vietnam", Real GDP, and Current Government Tax Revenues for the period 2005-2020. All these series were displayed in 2010 prices using the CPI. We included four lags (according to LR lag length criteria), dummy2, dummy3, and controlled for with the REER variable. The estimated coefficients of this SVAR are summarized in the following table.

TABLE 4 - VAR 3 ESTIMATED COEFFICIENTS

	Social Insurance	Revenue variable	GDP
Social Insurance (0)			0.02426
Social Insurance (-1)	-0.061576	0.128305	-0.041451
Social Insurance (-2)	0.011983	2.25E-01	0.032758
Social Insurance (-3)	0.128949*	0.311759*	0.059547**
Social Insurance (-4)	-0.042169	0.342842*	0.134796****
Revenue variable (0)			-0.00527
Revenue variable (-1)	-0.003825	-0.779371****	-0.014718

Revenue variable (-2)	-0.055579	-0.318505*	-0.027347
Revenue variable (-3)	-0.135254*	-0.122875	-0.005105
Revenue variable (-4)	-0.080775*	6.73E-02	0.030082*
GDP (-1)	0.262896	1.15524*	-0.233082**
GDP (-2)	-0.092043	1.08588*	0.04311
GDP (-3)	0.264866	1.337961*	-0.08085
GDP (-4)	-0.563884*	0.836236	0.183001*
Constant	0.018793*	-0.045377*	0.017357****
Dummy2	0.113655****	-0.061373	-0.008511
Dummy3	-0.195219****	-0.113006*	-0.001794
REER	-0.526063*	-3.26E-01	-0.17193*

(0) It 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).

Regarding the analysis of the residuals of this specification, the outputs below report the White, LM (autocorrelation) and VAR stability tests. We do not reject the null hypothesis of the White test, which suggests that the residuals do not show heteroscedasticity. In addition, note that the LM test indicates that there are no autocorrelation problems in this SVAR model, with the exception of the fourth and fifth lags. Finally, it is important to emphasize that this model is stable, since the roots of the characteristic polynomial are smaller than one in absolute value.

White test p-value: 0.3309

LM test p-values:

0.1810
0.0106
0.0347
0.0004
0.5142
0.1205
0.0964
0.1373

VAR Roots (modulus):

0.635959
0.635959
0.606150
0.606150
0.389583
0.389583

Fourth specification – "VAR 4": Model VAR 4 was estimated using real Total Social Insurance Expenditures from "The Ministry of Finance of the Socialist Republic of Vietnam", Real GDP, and Current Government Tax Revenues for the period 2005-2020. All these series were displayed in 2010 prices using the CPI. We included four lags (according to LR lag length criteria), dummies 1, 3, 4, 5, 6, and controlled for with REER variable. The estimated coefficients of this SVAR are summarized in the following table.

TABLE 6- VAR 4 ESTIMATED COEFFICIENTS

	Social Insurance	Revenue variable	GDP
Social Insurance (0)			0.042096
Social Insurance (-1)	-0.119243	0.113502	-0.005953
Social Insurance (-2)	0.029813	0.115568	0.021376
Social Insurance (-3)	0.152719*	0.294597*	0.060098**
Social Insurance (-4)	-0.000685	0.287306*	0.137501****
Revenue variable (0)			-0.009741
Revenue variable (-1)	0.009824	-8.48E-01****	-0.008078
Revenue variable (-2)	-0.059125	-0.376586**	-0.029493
Revenue variable (-3)	-0.183335**	-0.105042	-0.003814

Revenue variable (-4)	-0.126494**	0.097774	0.029843*
GDP (-1)	0.177651	1.416372*	-0.218227*
GDP (-2)	-0.002354	1.097409*	0.013613
GDP (-3)	0.391442	1.297923*	-0.105141
GDP (-4)	-0.413767	7.41E-01	0.166067*
Constant	0.016133	-0.044795	0.018011****
Dummy1	0.066605	-0.030235	0.02704*
Dummy3	-0.207678****	-0.081322	-0.000996
Dummy4	0.025766	-1.07E-01	-0.014722
Dummy5	-0.058992*	0.095653	-0.01768
Dummy6	0.098897***	-0.039726	-0.005757
REER	-0.516295*	-0.54006	-0.156383*

(0) It 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).

Concernng the analysis of the residuals of this specification, the outputs below report the White, LM (autocorrelation) and VAR stability tests. We do not reject the null hypothesis of the White test, which suggests that the residuals do not show heteroscedasticity. Also, note that the LM test indicates that there are no autocorrelation problems in this SVAR model. The model is stable, as the roots of the characteristic polynomial are smaller than one in absolute value.

White test p-value: 0.7296

LM test p-values:

0.9613
0.7313
0.7996
0.9809
0.9029
0.1055
0.5045

0.6283

VAR Roots (modulus):

0.798815
0.798815
0.754552
0.754552
0.717407
0.717407
0.715560
0.710430
0.710430
0.710048
0.710048
0.142026

4. Social Security for ND specification – VAR 5

Fifth specification – "VAR 5": Model VAR 5 was estimated using real Total Social Security for ND Expenditures from "The Ministry of Finance of the Socialist Republic of Vietnam", Real GDP, and Current Government Tax Revenues for the period 2005-2020. All these series were displayed in 2010 prices using the CPI. We included four lags (according to LR lag length criteria), dummy2, dummy3, and controlled for with REER variable. The estimated coefficients of this SVAR are summarized in the table below.

TABLE 7 - VAR 5 ESTIMATED COEFFICIENTS

	Social Security ND	Revenue variable	GDP
Social Security ND (0)			-0.031861
Social Security ND (-1)	0.040364	0.077015	-0.005425
Social Security ND (-2)	0.011973	0.163879	0.042596*
Social Security ND (-3)	0.079113	0.299589*	0.057381**
Social Security ND (-4)	-0.142502*	0.372975**	0.125904****
Revenue variable (0)			0.004037

Revenue variable (-1)	0.008059	-7.67E-01****	-0.015555
Revenue variable (-2)	-0.051342	-0.292668*	-0.023294
Revenue variable (-3)	-0.103992	-0.108837	0.006663
Revenue variable (-4)	-0.072131	0.068535	0.038095*
GDP (-1)	0.379179	0.931441	-0.267477**
GDP (-2)	-0.13642	0.873996	-0.028816
GDP (-3)	0.266734	1.127213*	-0.16316*
GDP (-4)	-0.735828*	6.70E-01	0.072494
Constant	0.017687	-0.030783	0.021548****
Dummy2	0.128339****	-0.053265	-4.55E-05
Dummy3	-0.166546****	-0.114348*	-0.003143
REER	-0.446115*	-3.51E-01	-0.167078*

(0) It 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).

Finally, the analysis of the residuals of this specification are reported in outputs below, with the results for the White, LM (autocorrelation) and VAR stability tests. Note that we do not reject the null hypothesis of the White test, which reveals that the residuals do not show heteroscedasticity. Moreover, the LM test indicates that there are no autocorrelation problems in this SVAR model. Lastly, it is to be emphasized that this model is stable, since the roots of the characteristic polynomial are smaller than one in absolute value.

White test p-value: 0.623

LM Test p-values:

0.3843
0.8954
0.4290
0.7373
0.3331
0.6340
0.5993
0.4967

VAR Roots (modulus):

0.796916
0.796916
0.746546
0.746546
0.743646
0.743646
0.708975
0.708975
0.569971
0.546096
0.546096
0.317561