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Mexico

Multipliers of Social Protection

Product 3 - Drafting the country case studies

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Product 3

Country Case Study – Mexico

1. Introduction

In the last two decades, Mexico has improved its social protection system, but there is still a long way to go to guarantee social protection for all and achieve the Sustainable Development Goals (SDGs). Whereas in most of the countries of Latin America recent improvements in social protection can be related to the redistributive policies adopted in the context of the commodities boom, the Mexican case is a bit different. With a different international economic insertion – as primary commodities comprise a much lower share of its exports than they do for its neighbours to the south –, Mexico's GDP growth rates lagged the regional average during the commodities boom but became higher than the regional average afterward (World Bank 2021).[1] However, the trajectory of income inequality in Mexico was in line with the regional one: the increases in inequality observed in the 1990s were more than reversed in the last two decades (Sedlac 2021; see also Lustig et al. 2013 and Cornia 2014). This can be partly attributed to the fact that Mexico adopted in the late 1990s a conditional cash transfer (CCT) programme (initially called *Progresa/Oportunidades*, later rebranded as *Prospera*) that was to become one of the models for the region, as CCTs became widespread during the commodities boom (Lavinas 2013, Lustig et al. 2013, Lavinas 2015, Lambert and Park 2019).[2]

Concerning the social protection system more broadly, Ocampo and Gómez-Arteaga (2017: 8) argued that the period between 2003 and 2013 can be considered a 'golden social decade' in Latin America due to the adoption of 'innovative programmes and stronger welfare States' throughout the region (see also ILO 2017: 132-139). Mexico is in line with the regional trend. In the last two decades, the government increased expenditures on social protection: the increase of social protection spending as a share of GDP can be identified for several alternative definitions of social expenditure, with such a share doubling between 2003 and 2020 for most definitions.[3,4] According to the latest available estimates from the *International Labour*

[1] It should be noted though that the commodities boom was parallel to an oil boom, which increased fiscal revenues in Mexico (Scott et al. 2017)

[2] The Mexican CCT was abolished in 2019 (Kidd 2019). According to the ILO (2021b: 97), this illustrates 'the particular vulnerability of targeted programmes to discontinuation'.

[3] See Section 4, below, for details about the different definitions of social spending.

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

Organization's (ILO) World Social Protection Data, it should be remarked that expenditure on social protection as a share of GDP in Mexico is still less than sixty per cent of the world average and less than three-quarters of the average for Latin America and the Caribbean – expenditure in healthcare represents even smaller shares of the world and regional averages (ILO 2021a, ILO 2021b: 278).

Such a relatively low level of expenditures is reflected in below-average effective coverage. The latest estimates from the ILO indicate that Mexico's social protection system provides effective coverage for 62.4 per cent of the population, a figure higher than the average for the world (46.9) or for Latin American and the Caribbean (56.3) (ILO 2021a). However, such a relatively high level of effective coverage is mostly a result of the high level of coverage for older and vulnerable persons, which compensate for the fact that effective coverage for children, mothers with newborns, persons with severe disability, unemployed, and workers in case of work injury are all substantially below the regional average and close to or below the world average. According to the Social Protection Index score calculated by Ocampo and Gómez-Arteaga (2017: 13), the Mexican social protection system is place at an intermediate level, close to the systems of poorer countries like Ecuador and Peru, whereas countries with GDP per capita levels closer to Mexico's, like Argentina and Costa Rica, score much higher, being considered countries with comprehensive social protection systems (see also Valencia Lomelí et al. 2012 and Cháves Presa et al. 2013).

With the adoption of the ILO's Recommendation No. 202 on national social protection floors and the subsequent publication of the *World Social Protection Reports* (ILO, 2014, 2017, 2021b), it became possible to assess in greater detail the effective coverage of social protection systems of different countries, both overall and disaggregated in its numerous functions. The main improvement observed in Mexico in the recent period seems to have been achieved in the coverage of social protection for old age (above the retirement age of 65 years old), which increased from 10 per cent in 2000 to 64.1 per cent in 2014 and reached the entire eligible population (that is, coverage of 100 per cent) in 2019 (ILO 2021a). Such an increase was part of a more general trend, observed in many countries, of expanding coverage 'through the establishment or extension of non-contributory pension schemes which provide at least a basic level of protection for many older persons' (ILO 2017: 82). In the case of Mexico, this non-contributory pension scheme is the *Programa para Adultos Mayores*, which covered, in 2013, 62.1 per cent of the population above 65 years – who received a monthly transfer of 580 pesos

(representing 39 per cent of the minimum wage) (see ILO 2017: 348, Scott et al. 2017). The coverage for vulnerable persons also improved, between 2016 and 2020, from 34 to 48 per cent, so much so that Mexico attained a coverage rate higher than the world and the regional averages.

The comprehensive coverage for older persons and the high coverage for vulnerable ones contrast with the relatively low coverage for all other social protection functions. One of the most striking cases is the one for unemployed persons: Mexico has no unemployment insurance and the unemployed are only entitled to severance payments and support from small government programmes (ILO 2017: 283). As a result of this weak institutional basis, effective coverage for the unemployed declined from 14.9 per cent to 6 per cent, between 2017 and 2020. The effective coverage observed in 2020 is less than a third of the world average and less than half of the average for Latin America and the Caribbean (ILO 2021b: 268-71). Effective coverage for children is also relatively deficient: the coverage of 23.4, achieved in 2020, was lower than the world and regional averages (ILO 2021b: 268-71). Besides, effective coverage for mothers with newborns was 10.4 per cent in 2020, less than a fourth of the world average and about a third of the Latin American one (ILO 2021b: 268-71). In the cases of coverage for persons with severe disabilities and for workers in case of work injury, Mexico still lags its Latin American neighbours but achieves effective coverage rates comparable with the world average. For the first group, the coverage of 40.4 compares with a Latin American average of 57.7 and a world average of 33.5 (ILO 2021b: 268-71). For the second group, the coverage of 35.4 is equal to the world average but below the one for Latin America and the Caribbean (40.8) (ILO 2021b: 268-71).

This summary indicates that Mexico seems to have, despite the improvements observed in the last two decades, an extreme version of the segmented and incomplete social protection system that is typical of Latin America (Valencia Lomelí et al. 2012, Lavinas 2013, Lavinas 2015, Ocampo and Gómez-Arteaga 2017) – an inheritance of the corporatist social protection systems historically restricted to the minority with formal relations of employment. Thus, by combining a contributory pension system with more recent focalised conditional cash transfers, it can achieve high effective coverage for older persons. However, the Mexican social protection system is still a long way from reaching universality, effectively protecting children, mothers with newborns, and the unemployed.

The weaknesses of such an incomplete social protection system were accentuated by the pandemic: in contrast with the actions of most governments not only in the region but throughout the world, the Mexican federal government did not establish any programme of social protection to face the challenge posed by the pandemic nor expanded existing ones, standing passively by as unemployment and poverty surged (Blofield et al. 2020, Blofield et al. 2021a, Blofield et al. 2021b, Lustig and Trasberg 2021).[5] As Lustig and Trasberg (2021: 60) put it, it was a clear case of 'ill-timed austerity'. As recently suggested in a document published by the *Economic Commission for Latin American and the Caribbean* (ECLAC), the health crisis should be considered a renovated stimulus

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

This report aims to show that such an expansion of the social protection system in Mexico is not only crucial to guarantee the human right to social security but also may contribute to promote sustained and inclusive growth. The key contribution is to present estimates of the multiplier effects of social protection expenditures, that is, the impact that increases in social protection expenditures may have on aggregate economic activity (for an introduction to the concept of fiscal multipliers, see Batini et al. 2014). The main result is that one additional peso spent on social protection leads to an increase in real GDP that ranges from 4.20 to 7.40 pesos – the cumulative impact after two years. The findings for the multiplier effects of social protection expenditure highlight one specific dimension of the interdependence between the SDGs: the interdependence between guaranteeing social security for all, promoting sustained and inclusive growth, ending poverty, and reducing inequalities.

The focus on such an interdependence links this report with a vast literature on the connections between social protection and economic development (for a recent review, see Gongcheng and Scholz 2019; see also Barrientos 2012, Atkinson 2015, ILO 2018, Barrientos and Malerba 2020, Bhalla et al. 2021, and Carraro and Marzi 2021). The potential connections between social protection and inclusive growth are varied, and the focus of the present report resides in one of

[5] There were some initiatives to counter the effects of the pandemic at the subnational level.

these connections: how expenditures on social protection can boost aggregate demand, bringing along with better social protection, higher incomes, government revenues, and employment. In the specific case of Mexico, the potential for unleashing inclusive growth through the expansion of social protection seems significant as its direct transfers and social spending present a degree of progressivity similar to the one found for other Latin American countries, and their contribution to reducing inequality is only restricted by their relatively small size, as a share of GDP (Ocampo and Gómez-Arteaga 2017). Thus, the progressive nature of its social expenditures not only helps to explain the strong multiplier effects reported below but also indicates that the higher incomes generated by an improved social protection system would also be distributed in a way that reduces overall inequality – absent a profound change in the progressivity of social spending.

This report is organised in the following way. The next section presents the recent literature on fiscal multipliers to contextualize the empirical estimates made for the present study and clarify their significance. Then, the two following section presents the methodology and database used. In the fifth section, several multipliers of expenditures on social protection are presented, resorting to different data and different definition of social spending. Finally, the concluding section summarises the findings and discusses the policy implications.

2. Recent empirical literature on fiscal multipliers

Since the global crisis that erupted in 2008, there has been a considerable increase in the empirical literature on fiscal multipliers. In country-specific empirical studies, following Blanchard and Perotti (2002), the strategy of using linear VAR models (autoregressive vectors) to estimate the impact of an exogenous shock in public expenditures or government revenues on the level of economic activity has been the most common approach. When disaggregating different government expenditures, this literature usually finds that public investment has a higher and more persistent multiplier effect on aggregate output than government consumption. However, only a few studies have focused on estimating the impacts of different social expenditures on economic growth. Blanchard and Perotti (2002) and Perotti (2004) treat transfers as a component that should be subtracted from total revenue, which is a strategy followed by several authors (Peres 2006, Giordano et al. 2007, Peres and Ellery 2009, Burriel et al. 2010, Tenhofen et al. 2010, Castro and Fernandez 2011, Lozano and Rodriguez 2011,

Jemec et al. 2013, Borg 2014, Skrbic and Simovic 2015, Mendonça et al. 2016, Alves 2017, Grudtner and Aragon 2017, Restrepo 2020, among others). However, such an empirical strategy has been criticized in the recent literature both for not taking into consideration government expenditures and revenues in a disaggregated way and for seldom focusing on social spending (Baum and Koester 2011, Gáldon 2013, Pereira and Wemans 2013, Gechert et al. 2018). Pereira and Wemans (2013: 10), for instance, make a case for going beyond aggregate government expenditures and revenues, given the likelihood that their components have heterogeneous multipliers:

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

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

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

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

Some of them find significant multiplier effects for social expenditures – impact multipliers close to one (Gáldon 2013, Adams and Wong 2018, Gechert et al. 2018) –, but, in some cases, the results suggest that the multiplier is non-persistent – the accumulated multiplier is close to zero (Adams and Wong 2018).[6] In other cases, the impact multiplier for social transfers is close to one, and the effect remains above zero in accumulated terms (Pereira and Wemans 2013). In contrast, some studies have found a negative - although non-significant – accumulated effect (Claus et al. 2006, Bruckner and Tuladhar 2010).

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

Romer and Romer (2016), using a 'narrative method' based on episodes of fiscal expansion in different countries, find that permanent increases in social expenditures exert significant and substantial impacts on consumption. However, tax reductions seem to have the highest and most persistent multiplier effect, which could be explained, in the authors' view, by a more significant positive response of interest rates to an expansion in social expenditures. Similarly, Alesina et al. (2017) report results for a panel of OECD countries showing that fiscal consolidations based on higher taxes are more costly in terms of output than those that resort to spending cuts, whether from government consumption spending or transfers. Meanwhile, Gechert et al. (2018) employ a similar methodology for social spending in Germany and find a higher and more persistent multiplier effect for social expenditures than for decreases in the social contributions that finance them.[7] In general, according to Batini et al. (2014: 4), studies resorting to the 'narrative approach' tend to 'find larger tax multipliers than conventional VAR models do.'

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

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

Besides, some empirical studies have used panel techniques to estimate multipliers for a group of countries or states and regions within the same country via VAR or one-equation methods (Beetsma and Giuliodori 2011, Furceri and Zdzienicka 2012, Ilzetski et al. 2013, Reeves et al. 2013, Silva et al. 2013, Valencia 2015, Carrière-Swallow et al. 2018, Deleidi et al. 2019, Izquierdo et al. 2019, Konstantinou and Partheniou 2019). For social expenditures, Furceri and Zdzienicka (2012) find a positive accumulated multiplier (but smaller than one) for a group of OECD countries, emphasizing the central role of health expenditures and unemployment benefits as the components with more substantial impacts on output. Moreover, Reeves et al. (2013) estimate a positive social protection multiplier for a group of European countries[8], which reaches 3 in the baseline scenario. In their estimates, health expenditures present an even higher multiplier (near 4.9).

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

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

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

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

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

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

To the best of our knowledge, there has been no attempt to estimate the multiplier of social protection expenditure in Mexico. However, there are a few studies that have adopted the approaches discussed above to estimate the multiplier of other components of government spending.[9] The one that is closer to the literature reviewed above was undertaken by Garry and Rivas Valdivia (2017) of ECLAC. The authors employ a SVAR model and find a positive and persistent effect of current government expenditure on GDP, using quarterly data for the period between 1993 and 2015. The impact and the cumulative multipliers are found to be significantly different from zero, considering a confidence interval of one standard deviation, and the magnitude of the cumulative multiplier is estimated as 2.2.[10] Comparing the results with those obtained for other countries in the region, the impact multiplier for Mexico is considered intermediate in its magnitude, whereas the cumulative multiplier is the strongest one (compared to the ones obtained for the other seven countries considered in the study). In contrast to some of the results reviewed previously, however, the multiplier for capital expenditure estimate by Garry and Rivas Valdivia (2017) is not only not larger than the one for current expenditure but also not significantly different from zero, considering a confidence interval of one standard deviation.

Valencia (2015), in his turn, estimated for the *International Monetary Fund* (IMF) the Mexican fiscal multipliers, running a panel regression with state-level public spending and GDP real growth rates. The impact multiplier is estimated to have a magnitude that ranges from 0.5 to 0.6, whereas the cumulative multiplier reaches 0.7. In addition, Valencia (2015) also reports, in line with findings described above, that multipliers are state-dependent: the cumulative multiplier exceeds one in severe recessions and becomes statistically insignificant during cyclical expansions. A similar result is also found by Fraga et al. (2016). Adopting a GMM approach, the authors find positive fiscal multipliers for Mexico and Argentina, but not for Brazil and Chile. The magnitude of the multiplier estimated for Mexico is 0.81.

The estimated multipliers reported below (see section 5) were also found to be positive and persistent, in line with this previous research, but presented a higher magnitude: the cumulative multiplier, two years after a shock in social protection expenditure, ranges from around 4 to

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

[10] See the following section for definitions of different multipliers.

about 7. Such a discrepancy highlights the importance of estimating multipliers for different components of government expenditures and revenues, as Pereira and Wemans (2013) argued, going beyond the disaggregation between government consumption and investment, to obtain more precise estimates that can inform policy decisions.

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

3. Methodology

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

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

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

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

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

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

As discussed by Vdovychenko (2018), coefficients α_{gy}, α_{ty}, γ_{yt}, and γ_{yg} cannot be estimated without bias due to the instantaneous mutual relationship between output, expenditures, and revenues. Two steps are necessary to solve this. First, considering the identification hypothesis discussed above, component (b) is removed, and coefficients α are made to reflect only the first component – the response of the automatic stabilizer. As Perotti (2007: 176) argues: 'it typically takes longer than a quarter for discretionary fiscal policy to respond to, say, an output shock.' Following Perotti (2007), the second step is to use external information to the model to estimate the coefficients α_{gy} and α_{ty}.

Coefficient α_{gy} reflects the contemporary elasticity of expenditure to output, and α_{ty} is the contemporary elasticity of revenues to output. These coefficients measure both the discretionary and the automatic responses of fiscal variables to unexpected changes in economic activity (Jemec et al. 2013). Due to the identification hypothesis, the discretionary response of fiscal variables to output is disregarded so that these elasticities reflect only the automatic stabilizer. Consequently, the following elasticity is used:

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

The elasticity of revenue to output, in its turn, was estimated based on the 'IMF method,' as in Andreis (2014) and Maciel (2006), which is a regression using dummy variables for periods, outliers, and a trend control.

Since u_t^t and u_t^g are correlated, from these separate estimations of the exogenous elasticities, the cyclically adjusted residuals, $u_t^{g,ca}$ and $u_t^{t,ca}$, are obtained – which are the shocks without the effects of the cycle to eliminate the automatic stabilizer. Thus, component (a) is removed, guaranteeing exogeneity:

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

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

The structural shocks, e_t^g and e_t^t, can be obtained from the assumption of the ordering of the variables. Blanchard and Perotti (2002) claim that there is no reason to choose $\beta_{gt} = 0$ or $\beta_{tg} =$

0 *a priori*. Regarding shocks in spending and revenue, there is no theoretical or empirical basis to decide which variable will react first. As the correlation between adjusted residuals is small, Perotti (2007) points out that the order does not change the result. $\beta_{gt} = 0$ was then assumed, and the regression of the adjusted revenue residuals on the residuals of the structural form of expenditures was estimated by ordinary least squares (OLS) to obtain β_{tg} in equation (6) (Burriel et al. 2010). [11] The purpose of this regression is to obtain the estimates of e_t^g and e_t^t. These shocks are 'isolated' from the influence of output because the automatic response component has been removed. It, therefore, becomes possible to make the shocks exogenous by removing the (a) and (b) components mentioned above.

From equation (5), it is possible to recover e_t^g, using it to estimate equation (6) by OLS (Burriel et al. 2010). We then obtain instrumental variables, the structural shocks e_t^t and e_t^g in equation 3, since the regressors (residuals of the reduced form) are correlated with the error term (structural shock). Those structural shocks of expenditure and revenue are used as instruments since the correlation between them and the structural shock of output, e_t^y, is low. The last step is estimating the impulse-response functions using the estimated coefficients.

The basic model is estimated using the vector of endogenous variables, in real terms: the logarithms of social expenditures, total primary revenue, and output.[12] Dynamic effects of public spending can also be analyzed using a three-dimensional SVAR by replacing total social expenditures with its different components and the aggregate GDP by household consumption and private investment (Burriel et al. 2010, Çebi 2015).

The key goal of this report is to estimate the multipliers of social protection expenditures. As framed by Spilimbergo et al. (2009), there are four types of multipliers: a) the impact multiplier, for the analysis of a short-run period, $\frac{\Delta Y(t)}{\Delta G(t)}$; b) the horizon multiplier, for calculating the

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

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

multiplier for a specific period, $\frac{\Delta Y(t+n)}{\Delta G(t)}$; c) the peak multiplier, which represents the highest value in the period under analysis, $max\frac{\Delta Y(t+n)}{\Delta G(t)}$; d) the accumulated multiplier, which adds the total effect over a more extended period, $\frac{\sum_{i=1}^{n}\Delta Y(t+i)}{\sum_{i=1}^{n}\Delta G(t+i)}$.

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

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

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

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

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

To estimate the cumulative multiplier, we justify the number of periods based on Garcia et al. (2013: 11): 'The long-run multiplier is defined as the cumulative multiplier when $\rightarrow \infty$, but in

practice is used the number of periods needed for the multiplier to stabilize at its long-run value.' When the impact of social expenditures on GDP is more persistent, the cumulative multiplier is calculated for a more extended period.

In summary, for this report, the multiplier effects of social protection expenditures were estimated for Mexico through this three-dimensional structural linear VAR. Based on the estimations, cumulative impulse response functions were generated to obtain the dynamic impact of social protection expenditures on the level of real GDP. Then these functions were used to get the elasticities of GDP in response to a shock in social spending and, finally, the multipliers.

4. Data

To guarantee the robustness of the estimates four different series for social protection expenditure were used, two from different databases from the *Organization for Economic Co-operation and Development* (OECD), one from ECLAC, and one from the Mexican government (*Hacienda Pública*). The first series from the OECD is part of the Social Expenditure Database and is called 'Public Social Expenditure'. It is available at an annual frequency between 1985 and 2019, including expenditure, in kind and in cash, related to old age, survivors, incapacity-related benefits, family, active labour market programmes, unemployment, housing, and other social policy areas.[13] The series from ECLAC presents a similar trajectory to the previous one but at a lower level. It is available, at an annual frequency, from 1999 to 2018 and it is part of the database on 'Public spending by function'. Concretely, it comprises spending related to sickness and disability, old age, survivors, family and children, unemployment, housing, and social exclusion.

The other two series are substantially higher, including a larger amount of spending. The first of them is also from the OECD and is called 'Social Benefits in Cash to Households'. It is available from 2003 to 2018, at an annual frequency, and it includes bot pension and non-pension benefits, including transfers related to sickness, unemployment, housing, education, or family circumstances. Finally, the last series, 'Social Development Expenditure' is made

[13] The original series also includes expenditure related to health, but the latter has been deducted for the present project, in line with ILO standard practice.

available, at an annual frequency, by the Mexican government (*Hacienda Pública*). It ranges from 2003 to 2019 and it presents a trajectory similar to the second series from the OECD (Social Benefits in Cash).

To transform the annual series into quarterly data, the quarterly series for total government expenditures was used as an indicator in the 'Denton-Chollete' temporal disaggregation method (available in the R Package 'tempdisagg'). Such a series, as well as the series for total tax revenues, were obtained from *Banco de México*. GDP data at quarterly frequency was obtained from INEGI - *Sistema de Cuentas Nacionales de México*, as well as its implicit deflator (available only from 1993 onwards). All series were brought to real terms, using either the consumer price index provided by the IMF or the GDP deflator, and were seasonally adjusted, using the X13 Arima Method, available in Eviews. Figures 1 to 3, below, show the four different series for social protection expenditure, in real terms and as a share of GDP. As already stated in the introduction, the increase in spending is noteworthy.

Figure 1 - Social Expenditure in Mexico (in millions of national currency in 2013 prices, seasonally adjusted)

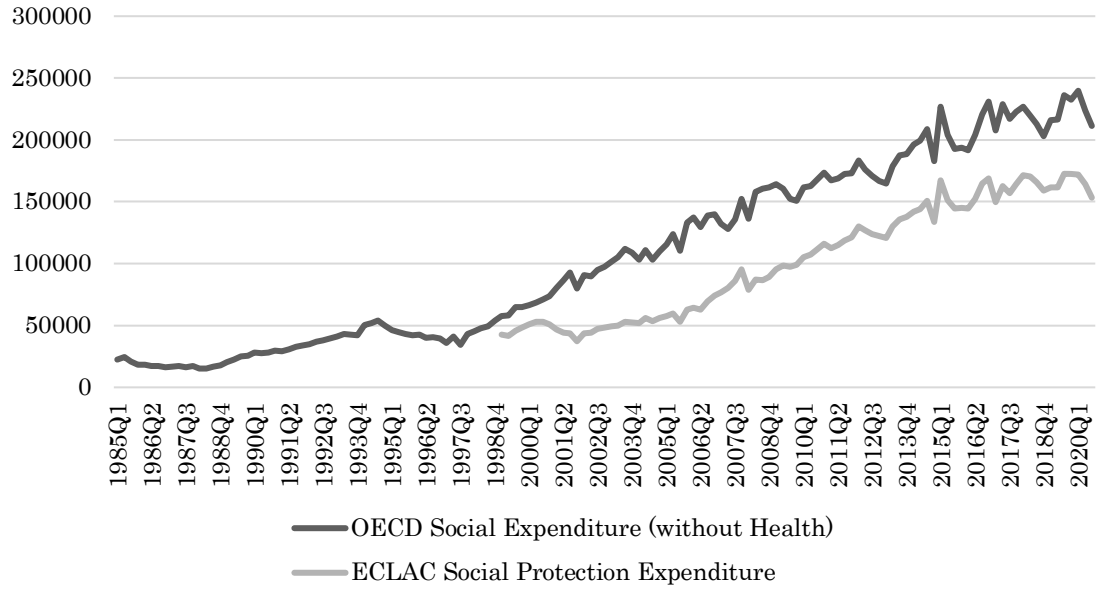


Figure 2 - Social Expenditure in Mexico (in millions of national currency in 2013 prices, seasonally adjusted)

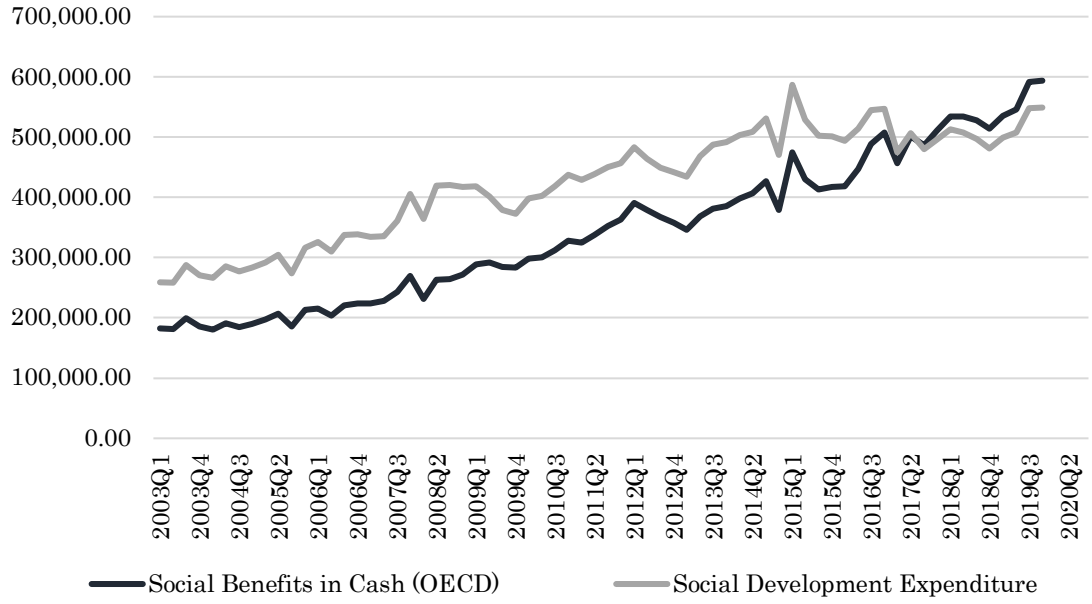
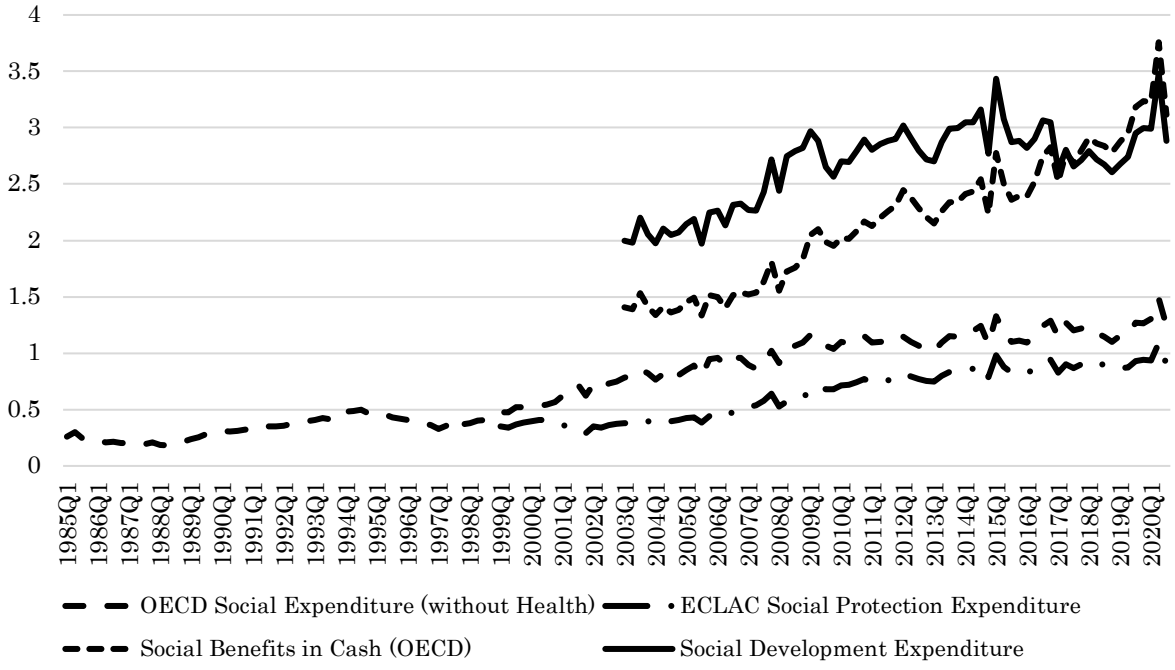


Figure 3 - Social Expenditure in Mexico (as a share of GDP)



5. Estimation results

Following the procedures described above, different VAR models were used for estimating the multipliers of social protection expenditure, always resorting to the following variables in logarithmic form: social protection expenditures (in one of its four definitions), tax revenues,

and GDP. The first difference of each variable was used to avoid spurious relationships as all series are integrated of first order according to stationary tests (ADF, PP, and KPSS). For each model, different specifications were tried, using two control variables, two different deflators, and many time dummies. The specification chosen in the end was the one that performed better in terms of significance and robustness (free of heteroscedasticity, autocorrelation, and non-stability problems, according to LM and White tests).

The two control variables tested were: an index of effective exchange rate (in first difference) obtained from the IMF and a real interest rate accumulated in a quarter. For the latter, monthly data of 'Financial, Interest Rate, Money Market, Percent per annum' was obtained from the IMF and was then transformed into quarterly frequency and deflated using the CPI index. These control variables were included if they showed significance. Different time dummies were also tested: dum09 is included to control for the year of 2009 (sharp fall in GDP due to global financial crisis); dum10 for 2010 (economic recovery after the crisis); dum0810 controls from the third quarter of 2008 to the last quarter of 2010 (entire global financial crisis); dum1115 controls for a change in trend in the observed tax revenue series (from the first quarter of 2011 to the first quarter of 2015); dum2020 (control for the pandemic year).

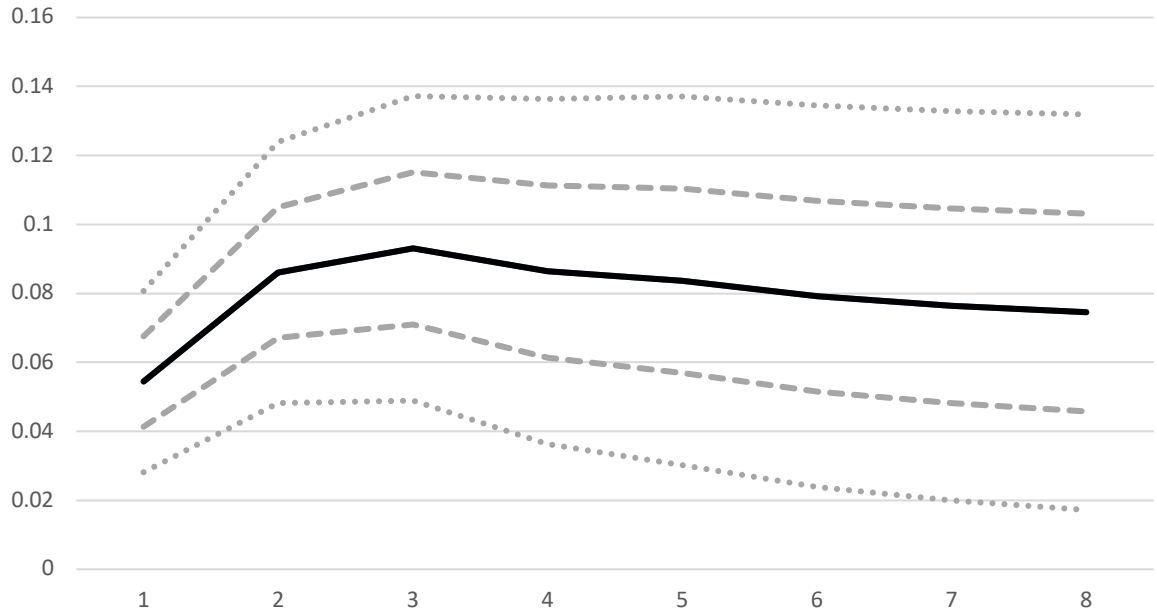
The impact, peak, and accumulated multipliers were obtained. Both the impulse response functions and the corresponding multipliers are presented in the following four subsections. In their turn, diagnostic tests and estimated coefficients are reported in the appendix.

5.1. Effects of Public Social Expenditure (OECD) on output

The first model (VAR 1) was estimated using Public Social Expenditures from OECD (deflated by the CPI) and real GDP (deflated by the GDP deflator) for the period 1985-2019. The specification chosen included three lags and the following dummy variables (which improve the estimations in terms of significance and eliminated heteroscedasticity): dum09, dum10, and dum0810. Although the real interest rate shows significance at 5 per cent in the expenditure equation, its impact on the revenue and output equations was not significant. For this reason and to avoid a heteroscedasticity problem, it was not included. Also, the real effective exchange rate was not included as control because it is available only for the period from 1990 onward, in contrast to the sample, which begins in 1985. The model is stable and free of heteroscedasticity, according to White test.

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

Figure 4 - Accumulated response of GDP to a shock in Public Social Expenditure (OECD)



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

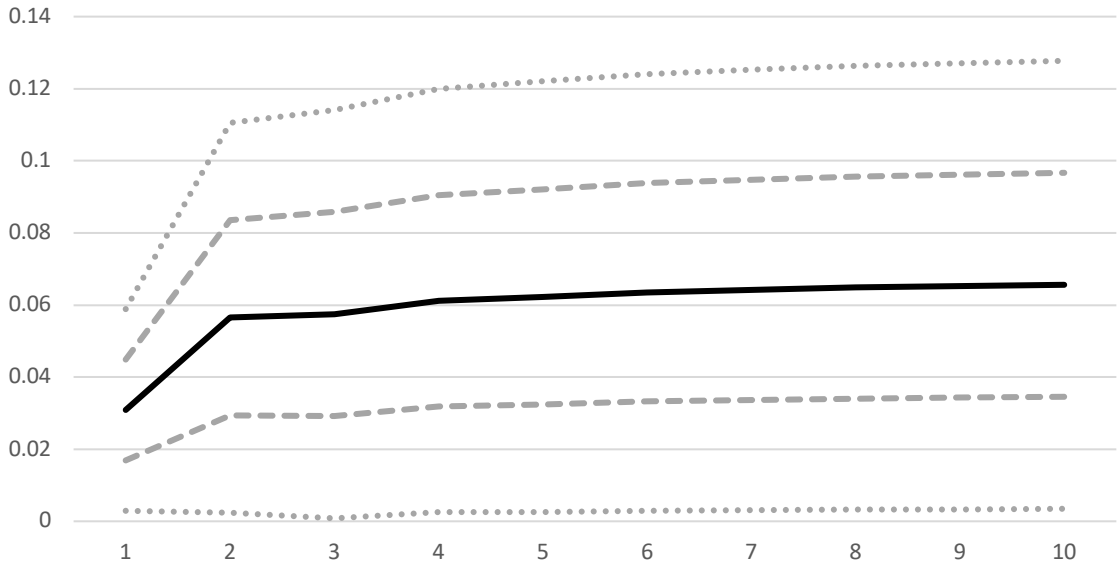
After a strong immediate impact on output, the expansionary effect of increased social protection expenditure increases for a couple of quarters and then declines slightly. The estimated size of the impact multiplier is 5, meaning that, for each additional peso of social protection expenditure, real GDP becomes 5 pesos larger. The estimated size of the peak multiplier is 9.70, attained in the third quarter. Finally, the accumulated multiplier after two years (eight quarters) is 7.40: each additional peso spent in social protection has a persistent expansionary impact of more than 7 pesos on GDP.

5.2. Effects of Social Protection Expenditure (ECLAC) on output

The second model (VAR 2) was estimated using the series on social protection expenditure from ECLAC. Although the annual series is available from 1999 to 2018, an R Package provides an estimation of the quarterly series for 2019 and the first three quarters of 2020, using the quarterly expenditure series, available from 1999 to 2020. The model included one lag, the real effective exchange rate index (in first difference) as a control variable, and two time dummies (dum 1115 and dum2020). The real effective exchange rate shows a positive effect at a 1 per cent level of significance on the output equation. In contrast, the real interest rate did not show significance and was not included. The model is stable and free of autocorrelation and heteroscedasticity.

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

Figure 5 - Accumulated response of GDP to a shock in Social Protection Expenditure (ECLAC)



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

The result is similar to the one obtained in the previous subsection. In this case the immediate expansionary effect of the increase in social protection expenditures rises steeply in the following quarter and goes on increasing – if at a slower pace – for the following year and half. An increase of 1 peso in social protection expenditure has an immediate impact of 3.40 pesos in GDP (impact multiplier). The peak multiplier, of 6, is attained at the second quarter and, after two years, the accumulated expansionary effect is estimated as 7.20.

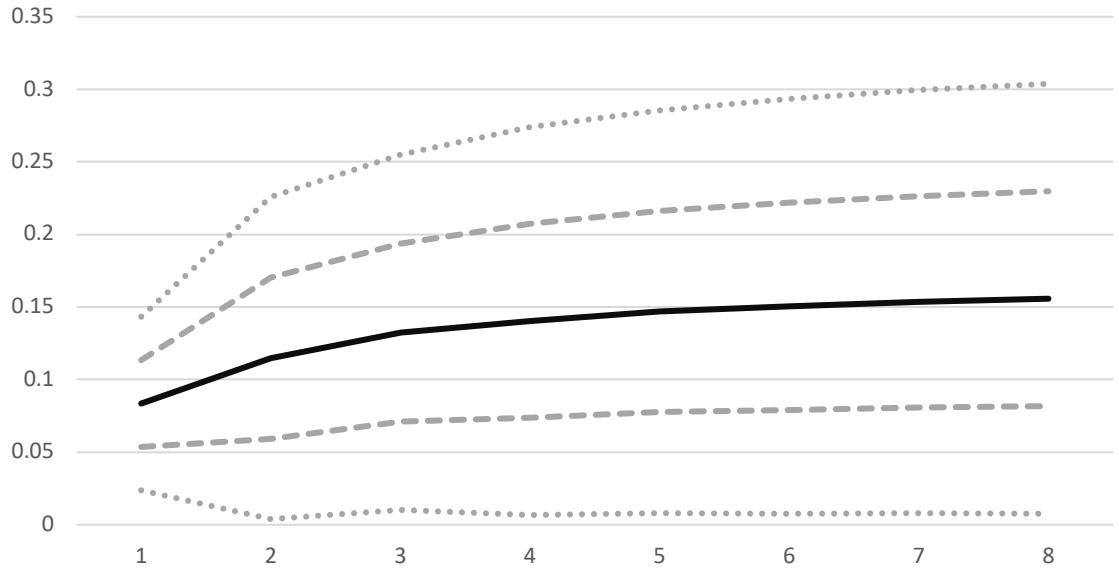
5.3. Effects of Social Benefits in Cash to Households (OECD) on output

5.3.1. First specification

The third model (VAR 3) was estimated using the series of Social Benefits in Cash to Households, from the OECD, for the period between 2003 and 2020. As in the other models, the series for GDP and tax revenues were brought to real terms by the GDP deflator. The model included one lag and three dummies (dum09, dum10, and dum0810), as well as the interest rate as a control variable. Although the interest rate was not found to be significant in the output equation, it was able to remove the heteroscedasticity problem. The real effective exchange rate, in contrast, did show significance at 5 per cent level in output equation (with a positive coefficient). Nevertheless, it was not included, given that it caused heteroscedasticity and did not change results substantially. Finally, the model did not show any evidence of heteroscedasticity, autocorrelation, or lack of stability.

Figure 6 shows the accumulated impulse-response function of GDP to a shock in Social Benefits in Cash to Households. As in the two previous figures, dotted lines represent a confidence interval of 95 per cent (two standard deviations) and dashed lines show a confidence interval of 68 per cent (one standard deviation). In line with the results obtained with the two previous models, the effect was found to be positive and significant at a confidence interval of 95 per cent.

Figure 6 - Accumulated response of GDP to a shock in Social Benefits in Cash (OECD)



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

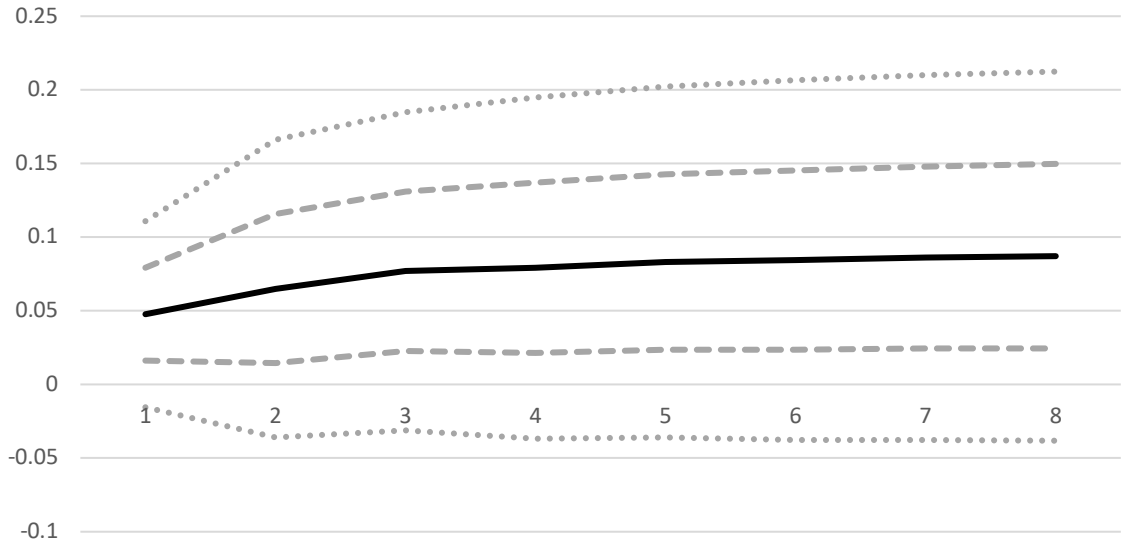
The temporal trajectory of the multiplier is very similar to the one obtained with the previous model. The immediate impact of an increase of Social Benefits in Cash of 1 peso is a rise in GDP of 3.90 pesos. The expansionary impact builds up in the following quarters and the peak multiplier, of 5.6, is attained in the third quarter after the shock. In the subsequent period, the expansionary impact rises further and the accumulate multiplier after two years is estimated as 7.3.

5.3.2. Second specification

The fourth model (VAR 4) is very similar to the third one: it uses the same series, deflators, and lags. The only difference is that it incorporates time dummy Dum202. VAR 4 has the disadvantage of presenting heteroscedasticity and autocorrelation problems, but it controls for the year 2020. The results, presented in Figure 7 (below), are similar to the ones from the previous model, but the estimated level of the multipliers is lower – so much so that they are significantly different from zero only at a confidence interval of 68 per cent. The magnitudes

estimated for, respectively, the impact, the peak and the accumulated (in eight quarters) multipliers are: 2.4, 3.5 and 4.2

Figure 7 - Accumulated response of GDP to a shock in Social Benefits in Cash (OECD)



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

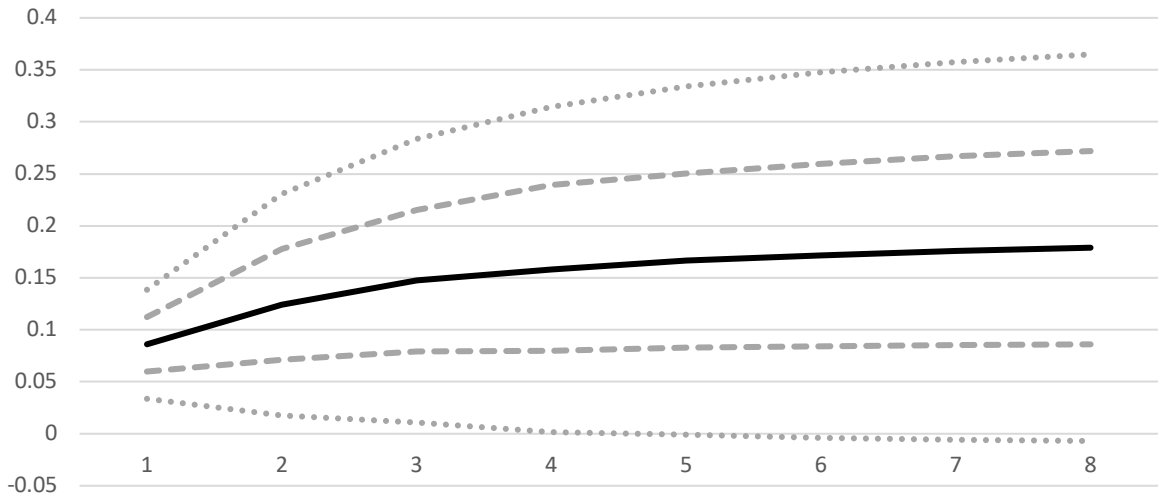
*5.4. Effects of Social Development Expenditure (***Hacienda Pública***) on output*

The fifth model (VAR 5) was estimated using the Social Development Expenditure series, from *Hacienda Pública*. This series and the one for tax revenues are deflated, in this case, using the CPI, whereas the GDP series is brought to real terms by the GDP deflator. The specification chosen included one lag and the following dummy variables: dum09, dum10, and dum0810. In addition, the real interest rate was used as a control variable. The model is free of heteroscedasticity and autocorrelation problems. As in the previous subsection, an additional model (VAR 6) was estimated, including dum2020, but it presented heteroscedasticity and autocorrelation. Its results are reported nonetheless because, despite these weaknesses, it controls for the year 2020.

Figure 8 shows the accumulated impulse-response function of GDP to a shock in Social Development Expenditure, according to VAR 5. As before, dotted lines represent a confidence

interval of 95 per cent (two standard deviations), and dashed lines show a confidence interval of 68 per cent (one standard deviation). The exercise indicates a positive effect of Social Development Expenditure on GDP at a confidence interval of 68 per cent.

Figure 8 - Accumulated response of GDP to a shock in Social Development Expenditure



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

An increase in Social Development Expenditure has an immediate positive impact on GDP at a 5 per cent level of significance. The magnitude of the impact multiplier is estimated as 3.28. Thereafter, the expansionary impact increases for a couple of quarters, and the peak multiplier – also significantly different from zero at a confidence interval of 95 per cent – is attained in the third quarter, presenting a value of 4.7. As in most previous models, the expansionary impact goes on rising, at a slower pace, in the next quarters and the accumulated multiplier after two years is estimated as 6.8. The latter, however, is significantly different from zero only at a confidence interval of 68 per cent. The estimated values of the three multipliers (impact, peak, and accumulated) in the alternative model that includes dum2020 (VAR 6) are 2.3, 3.4, and 4.3.

5.5. Summary of results and implications

Table 2, below, summarises all the multipliers estimated for the current report. The similarity of the results for the three multipliers, considering four different series from three different sources and six different model specifications, points toward the robustness of the results. In

addition, these results indicate that social protection expenditure has a positive and persistent effect on GDP, an effect that is substantially larger than the one estimated by previous efforts for government current and capital expenditure. In other words, it is also possible to claim, based on these results, that increases in social protection expenditure have both short- and medium-run expansionary impacts on output, leading to more than proportional increases in real GDP. The immediate expansionary impact, which leads to increases in real GDP 2.3 to 5 times as high as the increase in expenditure, is persistent: two years after the shock, real GDP is, at least, more than 4 pesos higher than it was initially for every additional peso spent on social protection.

Table 2: Social protection expenditure multipliers for each model

Model	Category of expenditure	Impact Multiplier	Peak Multiplier (quarter)	Accumulated Multiplier (over eight quarters)
VAR 1	Public Social Expenditure (OECD)	5.0	9.7 (third quarter)	7.4
VAR 2	Social Protection Expenditure (ECLAC)	3.4	6.0 (second quarter)	7.2
VAR 3	Social Benefits in Cash (OECD)	3.9	5.6 (third quarter)	7.3
VAR 4	Social Benefits in Cash (OECD)	2.4	3.5 (third quarter)	4.2
VAR 5	Social Development Expenditure (*Hacienda Pública)*	3.3	4.7 (third quarter)	6.8
VAR 6	Social Development Expenditure (*Hacienda Pública)*	2.3	3.4 (third quarter)	4.3

These results have several implications. First, as argued before, they point toward a crucial dimension of the interdependence of the SDGs, as expansion of social protection expenditure not only contributes to guaranteeing the human right of social security for all but also is instrumental to sustaining processes of inclusive growth and, in this way, reducing poverty and inequality. The persistent positive multiplier of social protection expenditure indicates that growth and redistribution can be combined by resorting to increases in this specific component of government expenditure. Second, it confirms the importance of estimating fiscal multipliers in a disaggregate way, as argued by Pereira and Wemans (2013), given that the multipliers estimated for this study are generally larger than those reported by previous empirical efforts

to estimate fiscal multipliers for Mexico (Valencia 2015, Fraga et al. 2016, Garry and Rivas Valdivia 2017). For policymakers, an awareness of the heterogeneity of multipliers can be useful, so that they can predict, with a higher degree of precision, the potential impacts of different policy choices.

6. Concluding remarks

The current report presented estimates of fiscal multipliers for Mexico, resorting to the SVAR approach pioneered by Blanchard and Perotti (2002). Using data on social protection expenditure from different sources (OECD, ECLAC, and the Mexican *Hacienda Pública*), it estimated the fiscal multipliers of four different series of social spending. A positive and persistent impact of shocks in social protection expenditure on GDP was found: over eight quarters, the accumulated multiplier is statistically significant and ranges (depending on the series) from 4.2 to 7.4. This result means that each additional peso spent on social protection leads to an increase in real GDP, two years after the shock, of at least 4.20 pesos.

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

A second dimension of the contribution of the research done for this report is emphasising the interdependence of several SDGs. Improving social protection systems are an end in itself and play a crucial part in ending poverty and reducing inequality. In the specific case of Mexico, the scope for such an improvement is vast, despite the positive changes observed in the last two

decades. But this interdependence of the SDGs can be taken further. Such an improvement in social protection should not be thought of as a policy disconnected from the more general development strategy of the country and the prospects of sustaining inclusive growth. In fact, the multipliers estimated for the present report suggest that building more robust social protection systems also has a potential to unleash a virtuous economic dynamic, in which higher expenditure in social protection leads to higher incomes, employment, and tax revenues. Besides, a growth process sustained by improvements in the social protection system has a higher likelihood of distributing its fruits more evenly than one that disregards the importance of social protection.

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APPENDIX

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

VAR 1

	Social Exp. OECD	Revenue variable	GDP variable
Social Exp. OECD (0)			-0.070547****
Social Exp. OECD (-1)	-0.276161****	-0.033370	0.033517**
Social Exp. OECD (-2)	0.184319***	0.028326	0.011869
Social Exp. OECD (-3)	0.180102***	0.037192	0.037420***
Revenue (0)			0.103340****
Revenue (-1)	0.242750**	-0.188124**	0.018387
Revenue (-2)	0.058354	-0.112391*	-0.015737
Revenue (-3)	-0.021969	0.087293	0.017089
GDP (-1)	-0.348140	0.427393*	0.087366
GDP (-2)	0.246822	0.731543***	0.103779*
GDP (-3)	-0.326105	0.283748	-0.172801**
C	0.017493***	0.002823	0.006092****
Dum09	-0.083346*	0.040459	0.017015*
Dum10	-0.001610	0.016260	0.026665***
Dum0810	0.023532	-0.003940	-0.025063***

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

White test (p-value):

0.3369

(no cross terms)

0.3436

(cross terms)

LM (p-values):

0.0155
0.2427
0.3343
0.4908
0.0450
0.8290
0.1079

VAR Roots (Modulus)

0.646580
0.600868
0.600868
0.563250
0.545771
0.545771
0.498568
0.498568
0.418429

VAR 2

	Social Exp. Cepal	Revenue variable	GDP variable
Social Exp. Cepal (0)			-0.042802*
Social Exp. Cepal (-1)	-0.349322****	-0.086849	0.069063***
Revenue (0)			0.095658**
Revenue (-1)	0.073393	-0.246426***	-0.171591****
GDP (-1)	0.180201	-0.409587*	-0.494628****
C	-0.177168*	-0.100336	-0.063184*
Dum2020	0.001171	-0.031147	-0.044128***
Exchange rate	0.016426	-0.095836	0.196119****
Dum1115	0.007725	0.042477**	0.017431***
Trend	-2.77E-05	-1.89E-05	-1.20E-05***

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

White test p-value: 0.002 (no cross terms) / 0.115 (cross terms)

LM test p-values:

0.1923
0.1800
0.2561

0.4147
0.6146
0.9929
0.9861

VAR roots (Modulus):

0.681277
0.331620
0.077479

VAR 3

	Social Benefits Cash	Revenue variable	GDP variable
Social Benefits Cash (0)			-0.106830**
Social Benefits Cash (-1)	-0.497861****	-0.203898*	0.020631
Revenue (0)			0.126174**
Revenue (-1)	0.086658	-0.284749**	-0.150757***
GDP (-1)	-0.462193	-0.462136	0.121468
C	0.020355**	0.019326*	0.009028**
Dum09	-0.048933	-0.007292	0.026567*
Dum10	0.034921	0.002817	-0.032134**
Dum0810	0.034921	0.002817	-0.032134**
Interest rate	2.515577**	-1.404946	-0.942740

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

White test p-value:

0.2159
(no cross terms)/
0.1854

(cross terms)
LM test p-values:

0.1868
0.2767
0.5681
0.7091
0.5972
0.6857
0.4697

VAR roots (Modulus):

0.517269
0.346450
0.202578

VAR 4

	Social Benefits Cash	Revenue variable	GDP variable
Social Benefits Cash (0)			-0.057355*
Social Benefits Cash (-1)	-0.495105****	-0.201314*	0.028920
Revenue (0)			0.058487*
Revenue (-1)	0.098964	-0.266227**	-0.138539****
GDP (-1)	-0.592637	-0.635962	-0.087934
C	0.022619***	0.023190**	0.009656***
Dum09	-0.052219	-0.011874	0.022013*
Dum10	-0.004288	0.025293	0.035775**
Dum0810	0.033565	0.000316	-0.031851***
Interest rate	2.639476*	-1.240795	-0.740463*
Dum2020	-0.036237*	-0.044195*	-0.072697****

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

White test p-value:

0.0015

(no cross terms)/

0.0001

(cross terms)
LM test p-values:

0.0077
0.0024
0.0667
0.7794
0.6216

0.6422
0.3248

VAR roots (Modulus):

0.564443
0.324986
0.040164

VAR 5

	Social Expend.	Revenue variable	GDP variable
Social Expend. (0)			-0.099277**
Social Expend. (-1)	-0.488461****	-0.220727**	0.028142
Revenue (0)			0.082556*
Revenue (-1)	0.083959	-0.276382**	-0.166210***
GDP (-1)	0.009024	-0.432212	0.173891
C	0.002737	0.019426*	0.005831*
Dum09	-0.086670**	-0.020407	0.029596*
Dum10	0.013705	0.021579	0.034690*
Dum0810	0.026433	0.006949	-0.028781*
Interest rate	3.723745***	-1.732113	-1.517573*

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

White test p-value: 0.1079/ 0.0506
LM p-values
0.3530
0.2807
0.5724
0.8489
0.9551
0.5724
0.4545

VAR roots (modulus):
0.447326
0.447326
0.284322