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Socioeconomic Effects of COVID-19 in Mexico: A Multisectoral Approach and Policy Options

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Abstract

The health crisis caused by the spread of COVID-19 has caused a profound social and economic disruption in Mexico. Our purpose in this paper is to contribute to the knowledge about the economic impact of the pandemic in Mexico and to evaluate social policy options to mitigate its effects. We do so based on a multisectoral-multiplier model and the most recent Social Accounting Matrix for Mexico, with which we estimate the direct and indirect impacts of COVID-19 as well the likely effects of two alternatives for mitigating them: an unconditional cash transfer scheme for households living in poverty, and the establishment of an unemployment insurance program for workers who have lost their jobs during the pandemic. We find that the first alternative alleviates more value added and loss of income, and thus has a greater effect in reducing inequality and the incidence of poverty.

Keywords: COVID-19 pandemic, Economywide impacts, Social policies, Income distribution, Poverty

JEL Classification: C63, H12, P36, P43

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Introduction

The COVID-19 pandemic caused by the SARS CoV-2 virus has been an unexpected event affecting economies around the world with different timing and degrees of severity. As of August 10, 2021, there have been 203,295,170 confirmed cases of COVID-19, including 4,303,515 deaths, worldwide. Mexico has been one of the countries hardest hit by the pandemic: in August 2021, it reported 2,971,817 cumulative cases and 244,420 cumulative deaths to the World Health Organization (WHO), occupying fourth place, behind the United States, Brazil, and India (WHO Health Emergency Dashboard, 2021).

Governments around the world have implemented actions to mitigate the spread of the virus, such as lockdowns on "non-essential" activities and social distancing measures. These responses, together with the health consequences of COVID-19, have caused a global economic recession, a rise in the incidence of poverty, and changes in income distribution.[1]

In addition to being one of the countries most affected by the pandemic, Mexico is one of the most unequal among middle income countries, and has not significantly reduced its incidence of poverty. The Mexican government has focused mainly on policies to mitigate the effects of the pandemic on people living in poverty and it has not provided aid to higher income groups or to businesses. Our study considers this feature of current policy and contributes to the evaluation of the effects of social policy aimed at mitigating the effects of the pandemic in middle-income countries.

In this paper we present the main results of our estimation of the direct and indirect multiplier effects of COVID-19 on value added, poverty, and income inequality in Mexico. We also present results of our estimations of the likely impact of two alternatives to mitigate the economic consequences of the pandemic: a cash transfer program to households living in poverty before the crisis (the current Mexican government policy), and an unemployment insurance program for workers who lose their jobs during the pandemic.

We use an applied multiplier model based on a Social Accounting Matrix (SAM) for Mexico for the year 2018 (SAM-MEX). This matrix is the most recent one constructed by the National Institute of Statistics, Geography, and Informatics (INEGI).[2] A SAM is an economy-wide dataset that captures information from a specific economic system, such as a country. It includes the economic flows of all transactions taking place over a specific period of time, usually a year. In general, SAMs include productive activities, private and public institutions, and interactions with the rest of the world, including interactions through commodity and factor markets. Multiplier models use SAMs to capture the relationships of output, factor demand, and income, and to separate the effects of these relationships.

Based on the literature related to multisectoral models,[3] we consider that SAM-based multiplier models are more appropriate than Computable General Equilibrium Models (CGEMs) for estimating short-term shocks like that caused by COVID-19: a sudden and unexpected event, leading to a significant reduction in economic activity and income. CGEMs are more appropriate for capturing long-run events, such as those related to trade liberalization under multilateral trade agreements (e.g., the North American Free Trade Agreement, NAFTA).[4]

SAM-based multiplier models assume fixed prices and unemployment, whereas in CGEMs, prices are flexible in a context of full employment. In a multiplier model the process of adjustment to a shock is through quantities, whereas in CGEMs it is through relative prices. In addi-

1 See: International Monetary Fund (2021); Economic Commission for Latin America and the Caribbean (2021a).

2 We obtained the SAM-MEX from INEGI, https://www.inegi.org.mx/investigacion/mcsm/. Accessed 29 April 2021.

3 See, for example, International Food Policy Research Institute (IFPRI, 2020).

4 See Robinson et al. (1993); Adelman and Taylor (1991).

tion, SAM-based multiplier models are linear, whereas CGEMs are not. One consequence of these differences is that multiplier models overestimate the effects of a shock, whereas CGEMs underestimate it, unless there is no unemployment with a full functioning of markets (Adelman and Taylor, 1991; Van Wyk et al., 2015).

There are other empirical studies that estimate the effects of COVID-19 in Mexico that use econometric approaches to estimate the direct impacts of the pandemic (see, for example, ECLAC (2021a), and Lustig and Martínez Pabón (2021)). We discuss their results below and evaluate our SAM-based multiplier results by comparing them with official data regarding the behavior of the Mexican economy in 2020.

The rest of this paper is organized as follows: In section 2 we present a summary of the literature that estimates the effects of COVID-19 on the economy of developing countries, including Mexico and those studies based on applied multiplier models. Section 3 summarizes the methodological and empirical approach we follow, and the data set we use, as well as the procedures we follow to estimate the impact of the pandemic on income distribution and poverty. Section 4 presents the shocks we simulate and their likely impact on the Mexican economy; we consider first the shock caused by the pandemic, and then those related to policy options to mitigate its effects. Also, Section 4 compares our results with those of other studies and official data on the evolution of the Mexican economy in 2020. In Section 5 we present our conclusions.

Literature Review

Numerous studies have estimated the socioeconomic effects of COVID-19 throughout the world. These estimations have been continuously revised to adapt to the ups and downs in the spread of the pandemic and the return of social distancing and lockdown measures.[5] After initial significant disparities in forecasts of the effects of COVID-19 on Mexican GDP by international and Mexican institutions, more recent estimations have converged. Projections of the reduction in GDP estimated before official data was published in February 2021 ranged between 5% and 10%. Predictions for 2021 now range between 5% and 7% (Table 1).

There are also five studies that estimate the effects of COVID-19 based on multiplier models applied to Mexico:[6] Central Bank of Mexico (BANXICO, 2020b), Chapa (2020), Chapa and Ayala (2020), Díaz-González (2020), and Dávila-Flores and Valdés-Ibarra (2020). These five studies use Mexico's input-output table for 2013 and estimate the impact of COVID-19 depending on the duration of lockdown measures. Their methodological differences are in the degree of sectoral disaggregation, their shock scenarios, and their assumptions for the recovery process of the economy. BANXICO (2020b)—in a study made before the one referred to in Table 1—adds supply shocks to the traditional final-demand shocks applied in the other four studies and simulates the shock based on state-level data. The estimations of Chapa (2020) are for Mexico as a whole and for the state of Nuevo León. Chapa and Ayala (2020) examine the four regions of Mexico, and Díaz-González (2020), and Dávila-Flores and Valdés-Ibarra (2020) the country as a whole.

5 See, for example, Cuesta Aguirre and Hannan (2020) and World Bank (2020a).

6 SAM-multiplier models have also been applied to African and Asian countries (see IFPRI, 2020).

Table 1. Projected Changes in Gross Domestic Product (GDP) of Mexico

Institution		GDP Forecast in 2020		GDP Growth Rate	GDP Forecast in 2021	
		For 2020	**For 2021**	**In 2020**	**For 2021**	**For 2022**
Organisation for Economic Co-operation and Development (OECD, 2020 and 2021)		-10.2%	3%		5%	3.2%
International Monetary Fund (IMF, 2020b and 2021)		-9%	3.5%		5%***	3%***
Central Bank of Mexico (Banxico, 2020a and 2021)		Three scenarios according to the shape of economic recovery:		-8.5% compared to 2019, with seasonally adjusted series (INEGI, 2021)	6%, from a range of 5% to 7%*	3%, from a range of 2% to 4%*
	"V"	4.6% to -8.8%	4.0% to 5.6%			
	"Deep V"	-8.8% to -11.3%	4.1% to 2.8%			
	"Deep U"	-8.3% to -12.8%	-0.5% to 1.3%			
Mexican Secretary of Finance and Public Credit (SHCP, 2020b and 2021)		-7% to -10%	3.6% to 5.6%		5.3%, from a range of 4.3% to 6.3% **	3.6%, from a range of 2.6% to 4.6%*
World Bank (WB, 2020b and 2021)		-10%	3.7%		5%	3%
ECLAC (ECLAC, 2021a and 2021b)		-9%	3.8%		5.8%	3.2%

*Range reflects the persisting uncertainty.

** 6.5% is the last percentage, not officially published but disclosed in statements made by the Deputy Secretary of Finance, during the panel "OECD Economic Outlook. How to Promote the Recovery in Latin America," on May 31, 2021, and the Secretary of Finance in a press conference on Mexico's third enhanced follow-up report for the Financial Action Task Force (FATF), on June 28, 2021.

*** The IMF modified its growth projection to 6.3% for 2020 and 4.2% for 2022, according to the latest update, released on July 27, 2021.

Source: Authors' elaboration based on data from websites of the listed institutions (see References).

What is similar in the five studies are the definitions of the lockdown measures. All five are based on the nonessential economic activities shut down by the government under the decree containing the orders for dealing with the public health emergency (DOF, 31 March 2020). However, the differences in methodology of the five studies produce markedly different estimates. For example, in optimistic scenarios (lockdown measures lifted in the second or third quarter of 2020) the estimated 2020 GDP reduction ranges from 5.6% (BANXICO, 2020b) to 14.8% (Díaz-González, 2020). In pessimistic scenarios, where lockdown measures extend beyond the second or third quarter, the estimates range from 8.5% (Chapa and Ayala, 2020) to 17.4% (Díaz-González, 2020). These large differences in projections are explained not only by the studies' use of different empirical strategies, but also by their failure to consider the effects of changes in government policy to mitigate the social and economic effects of the pandemic.

To more fully examine the prevailing uncertainties about the intensity and duration of the pandemic and the corresponding lockdown measures, we follow a different simulation strategy.[7] We calculate the SAM-based multiplier effects of the pandemic on the Mexican economy using more recent official data from INEGI on its behavior during the pandemic: for July 2020. Using the multipliers, we simulate public policies aimed at reducing the adverse effects of the pandemic, as well as alternative policies. Unlike previous studies, we calculate the effects of the pandemic and of the simulated policies on income distribution and the incidence of poverty, not just its direct and indirect impacts on the economy.[8]

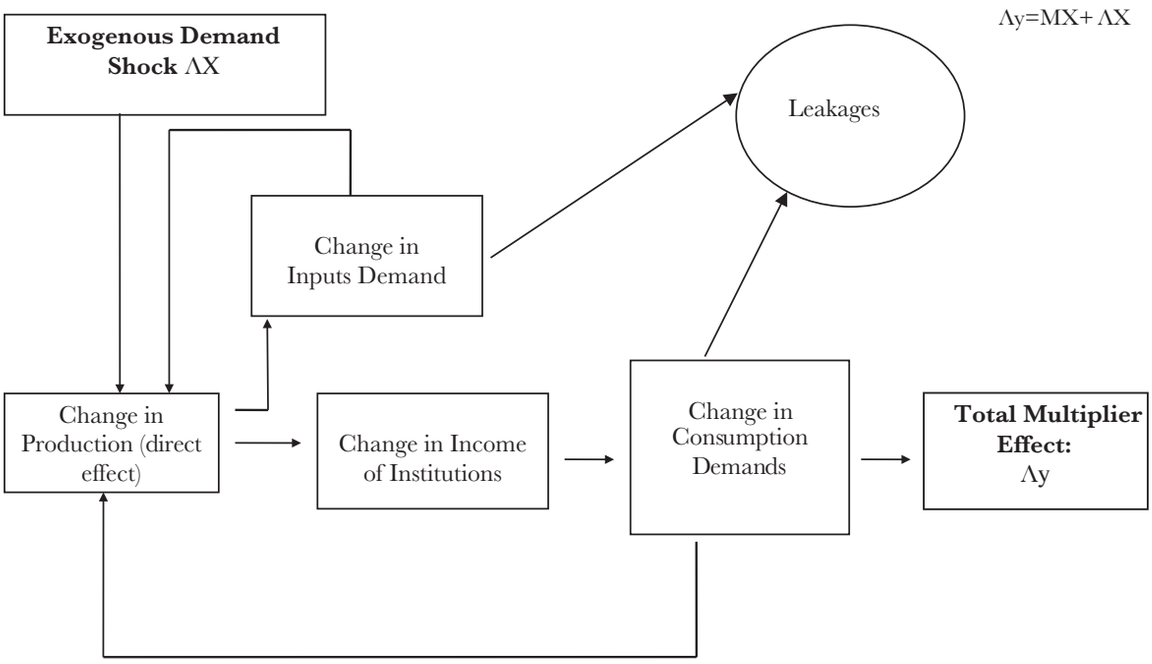
Empirical approach

Typically, a multiplier model assumes that economic activities use input in fixed proportions to output, that technology and preferences are linear, that prices are fixed, and that adjustments to shocks are thus made through changes in quantities. A SAM-multiplier model contains two groups of accounts, endogenous and exogenous, and the equilibrium equation of the model can be expressed as:

$$y_n = (I_n - A_n)^{-1} X = M_a X\,, \qquad (1)$$

where y_n is endogenous income, I_n is an n x n identity matrix (where n is the number of endogenous accounts), A_n is a square matrix of average propensities of consumption, and X is the matrix of exogenous injections to endogenous accounts. M_a is the SAM-multiplier matrix relating endogenous income y_n with exogenous variables X. M_a captures the direct and indirect effects of exogenous shocks, and the equation thus determines the equilibrium of products and incomes consistent with any level of exogenous entries (Round, 2003). Figure 1 illustrates the direct and indirect effects of an exogenous shock captured by a multiplier model.

Figure 1. Multiplier Model Scheme



Source: Authors' elaboration.

7 We also use a more recent dataset, for 2018, provided with the social accounting matrix (SAM) for Mexico, but not its input-output table.

8 There are other studies estimating the effects of COVID-19 on poverty and inequality. In Section 4 we compare the results of these studies with our own and with official data on the behavior of the Mexican economy in 2020.

A schematic SAM is presented in Table 2: an accounting frame that captures the interconnections of an economy, including its social components, for a period, generally a year.

Table 2. Basic SAM Accounts

	EXPENDITURES					
	1	**2**	**3**	**4**	**5**	
INCOME	Activities	Factors	Institutions	Capital Investment	Rest of the World	**TOTAL**
1. Activities Primary Manufactures Services	Input-output table		Consumption	Investment	Exports	Total sales
2. Factors Labor Capital	Value added				Transfers	Value added (GNP at factor prices)
3. Institutions						
a. Private households by income decile, etc.		Value added transfers	Transfers		Transfers (remittances)	Total institution income
b. Public (govt.)	Direct taxes	Taxes	Direct taxes			
4. Capital			Savings		Capital transfers	Total savings
5. Rest of the world	Imports					Imports
TOTAL	Total payments	Total payments to factors	Total expenditures	Total investment	Income from abroad	Totals: income/ expenditure

Source: Authors' elaboration.

The SAM-MEX contains 171 goods and services; 71 productive activities; 18 types of labor (divided by gender, age, and schooling) and physical capital; 23 institutional accounts, ten of which correspond to households divided by income decile, plus the central government, two non-financial societies (one private and one public), and ten financial institutions that include inventory change and gross fixed capital formation (GFCF); 18 capital accounts; 27 financial accounts; and the rest of the world.

Following standard procedures, we selected exogenous accounts that include institutions' final demand, government expenditures, capital formation, and the rest of the world. Since one of our purposes is to estimate the likely impact of alternative policies to mitigate the effects of the pandemic, we distinguished government expenditures as follows: final demand for goods and services, payments to institutions, properties and transfers to institutions (the latter including monetary transfers from social programs to households), changes in government inventory and investments in GFCF, and public debt.

The SAM-multiplier analysis allows for estimation of the impact of the pandemic on household income distribution and poverty. With respect to the former we used two measures. The first is called the Gini concentration index or GCI (Medina, 2001; de Miguel and Pérez-Mayo, 2006), and is defined as follows:

$$\text{GCI} = 1 - \sum_{i=1}^{n-1}(X_{i+1} + X_i)(Y_{i+1} + Y_i)\,, \qquad (2)$$

where X_i is the cumulative proportion of population in group i and Y_i the cumulative income of group i. $\text{GCI} = 0$ indicates no income inequality and $\text{GCI} = 1$ means total inequality. The second is the Theil index (TI):

$$\text{TI} = \sum_{i=1}^{n} y_i \log\left(\frac{y_i}{n_i}\right), \qquad (3)$$

where y_i and n_i correspond to relative income distribution and the population of group i, respectively. Like GCI, a TI close to zero indicates low levels of inequality.

With respect to poverty, we follow Pyatt and Round (2006) in measuring the changes in the incidence of poverty caused by COVID-19, applying the following equation:

$$\frac{\mathrm{dS_i}}{\mathrm{S_i}} = (1 + |\epsilon_i|)\frac{\mathrm{dn_i}}{\mathrm{n_i}} - \frac{|\epsilon_i|}{\mathrm{y_i}}\mathrm{z'_i M_{ml} dx}\,, \qquad (4)$$

where i is the number of poor people in the household group I; S is the number of poor people in our study, identified as those with a current income below the CONEVAL poverty line;[9] n_i is the number of people included in an income group, g; ϵ_i is the elasticity of the incidence of poverty for households in group i with respect to changes in their average per capita income; y_i is the total income of the ith household group; z'_i is a vector with the ith element equal to 1 and all other elements equal to 0; and M_{ml} is the sub-matrix g x s of accounting multipliers for activities throughout household groups (where g is the number of household groups and s is the number of activities in the SAM); and x is the vector of inflows from the exogenous sectors in the original SAM.[10]

Simulations and Results

In this section we present our simulations and the main results obtained, first in relation to the effects of COVID-19 on the economy and Mexican society, and then with respect to alternative policies to mitigate the effects of the pandemic.

The Impact of COVID-19

The SAM-MEX models one year. Given the data available when the study was performed, we use monthly data to simulate the economic impact of COVID-19, as follows: 1) each exogenous monthly shock is treated as if it were an annual impact and the multiplier effect is obtained in accordance with equation (1); 2) the equivalent monthly multiplier effects are obtained by dividing these value by twelve; and 3) these monthly shocks are aggregated to obtain the total shock for the period analyzed (January-July 2020). The exogenous shocks on final demand for goods and services, on remittances received by households from abroad, on inventory changes, and on GFCF are simulated simultaneously, using data from the INEGI Economic Information Bank (BIE) (INEGI, 2018a) and from the Banco de México (2020c), covering the first seven months or the first two quarters of 2020 (Table 3).

Final demand includes domestic and foreign demand using monthly data from INEGI on sales from sectoral productive activities at constant 2013 prices.[11] Data on sales of the construc-

9 The National Council for the Evaluation of Social Development Policy (Consejo Nacional de Evaluacion de la Politica de Desarrollo Social, CONEVAL) is the public autonomous entity officially designated to measure poverty in Mexico.

10 To apply equations (2) through (4) we required additional data, which was obtained from the INEGI National Household Income-Expenditure Survey (ENIGH) (INEGI, 2018b). Our estimations are available upon request.

11 Except for the manufacturing sector, the rest of the data series are at constant prices. We deflate the series based on its implicit price index.

tion sector come from the National Survey of Construction Enterprises (ENEC); data for the manufacturing sector from the Monthly National Survey of Manufacturing Industries (EMIM); data for commercial services, from the Monthly Survey of Commercial Enterprises (EMEC); and data for non-financial services from the Monthly Survey of Services (EMS).[12] Changes in final demand are not included for primary and financial services because these activities re not subject to lockdown measures.

Data on remittances come from the monthly changes reported by Banco de México Economic Information System (Banxico, 2020c). Since this official source does not provide monthly data on the recipients of these transfers by income decile, we applied the same rate of change to the ten household groups in the SAM-MEX. Data on inventory changes for the first and second quarters of 2020 come from INEGI (INEGI, 2020d), as do monthly data on GFCF (INEGI, 2020c).

All of the data on exogenous shocks is used to estimate the monthly rate of change with respect to the same month of the previous year.[13] Table 3 shows the total values of the simulated shocks, that is, the sum of each monthly shock applied to SAM-MEX exogenous accounts, and the endogenous SAM-MEX accounts directly affected by them. We assume that shocks occurred simultaneously in the analyzed period.

Table 3. Simulated Exogenous Shock on Endogenous Accounts*

Endogenous account	Exogenous Modification	Exogenous Shock (millions of pesos)
Goods and Services	Final demand	-1,754,577.06
Households	Remittances	37,998.93
Inventory Changes	Inventory Changes	-112,176.34
Gross Fixed Capital Formation	Net Fixed Capital Formation	-143,588.15

* The exchange rate has fluctuated around 20 MXN/USD in recent years.

Source: Authors' estimations using INEGI (2020c and 2020d) and Banxico (2020c) data.

Table 4 shows monthly labor and capital value added (VA) before and during the COVID-19 pandemic in 2020, as compared with 2019. The figures reveal that the pandemic deepened negative rates of growth already present during the first three months of 2020. The drop in total VA of MXN $35 billion in January reached MXN $386 billion in April and MXN $425 billion in May. These reductions began to decrease in June and July when lockdown measures and social distancing were relaxed.

Table 4. Monthly Impact of COVID-19 on Value Added with Respect to 2019 (millions of pesos and percent changes)

Month (2020)	Millions of Pesos			Percentage Changes		
	Labor	Capital	Total	Labor	Capital	Total
January	-15,251.72	-19,712.61	-34,964.33	-2.97%	-1.49%	-1.90%
February	-13,415.42	-19,791.05	-33,206.46	-2.61%	-1.49%	-1.81%
March	-31,550.01	-55,577.99	-87,128.00	-6.15%	-4.20%	-4.74%
April	-108,832.04	-276,678.12	-385,510.16	-21.21%	-20.88%	-20.97%
May	-119,792.10	-304,965.02	-424,757.12	-23.34%	-23.02%	-23.11%

12 The ENEC, EMIM, EMEC, and EMS data can be found in INEGI (2018b).

13 We implement the X11 method to adjust the non-seasonally adjusted series, using the "seas()" function in "seasonal" of the R package.

Table 4 (continued). Monthly Impact of COVID-19 on Value Added with Respect to 2019 (millions of pesos and percent changes)

Month (2020)	Millions of Pesos			Percentage Changes		
	Labor	Capital	Total	Labor	Capital	Total
June	-80,937.47	-200,770.92	-281,708.39	-15.77%	-15.15%	-15.33%
July	-60,799.37	-149,479.63	-210,278.99	-11.85%	-11.28%	-11.44%
Total change during pandemic, April-July	-370,360.98	-931,893.68	-1,302,254.66	-18.04%	-17.59%	-17.71%
Total change, Jan.-July	-430,578.13	-1,026,975.32	-1,457,553.45	-11.99%	-11.07%	-11.33%

Note: Figures include income from VA as well as government transfers, remittances, etc.

Source: Authors' elaboration with INEGI's data sources (see references above).

According to our estimations, Mexico's total VA from April to July 2020 was 17.7% less than in the same months of 2019, and from January to July 2020 it was 11.3% less than in the same months of 2019 (bottom two rows and right column of Table 4). The reductions in labor and capital VA in the first seven months of 2020 were similar: -12% and -11%, respectively, with respect to the same months in 2019.

Our results also show that the COVID-19 shock reduced income inequality in Mexico in January-July 2020: by 0.25% according to the estimated Gini concentration index and by 0.33% according to the Theil index. These results imply that income inequality changed from 0.4560 to 0.4553 and from 0.1615 to 0.1612, respectively, meaning that the income loss from the COVID-19 pandemic has been greater for wealthier households.

Table 5. Impact of COVID-19 on Household Disposable Income, by Decile

Decile	Millions of pesos	Change
I	-19,931.88	-9.41%
II	-34,080.84	-9.77%
III	-44,190.83	-10.02%
IV	-53,743.98	-10.14%
V	-67,034.85	-10.43%
VI	-80,349.51	-10.44%
VII	-99,468.93	-10.53%
VIII	-122,843.55	-10.49%
IX	-172,920.43	-10.58%
X	-424,487.29	-10.36%

Source: Authors' estimations.

Impact of COVID-19 on Poverty

To assess the likely economywide impact of the pandemic on the incidence of poverty by household decile, we estimate the elasticity of poverty for the SAM-MEX income deciles IV to VI. Deciles I to III are excluded because in these deciles all households have incomes below

the poverty line, and according to our estimations, the income loss caused by COVID-19 has made them poorer (Table 5). Deciles VI to X are excluded because their income was above the poverty line before and during the pandemic.[14]

The results show that COVID-19 also caused an increase in poverty in deciles IV to VI, from 49% to 57%, which means that during the seven first months of 2020, 5.029 million Mexicans were added to the ranks of those living in poverty (Table 6).

Table 6. Effects of COVID-19 on Poverty

	Percent		Number of households	
Decile	**Poverty incidence before the shock**	**Poverty incidence after the shock**	**Poverty before the shock**	**Change in poverty after the shock**
I	100.00%	100.00%	12,511,524	0
II	100.00%	100.00%	12,507,713	0
III	100.00%	100.00%	12,513,161	0
IV	76.97%	86.77%	9,629,077	1,225,141
V	78.72%	100.00%	9,845,810	2,661,350
VI	32.36%	41.50%	4,047,627	1,142,438
VII	0.00%	0.00%	0	0
VIII	0.00%	0.00%	0	0
IX	0.00%	0.00%	0	0
X	0.00%	0.00%	0	0
Total	48.81%	57.04%	61,054,912	5,028,929

Source: Authors' estimations based on SAM-MEX, ENIGH (INEGI, 2018b) data and CONEVAL (2018, n.d.).

Alternative Social Policies to Mitigate the Effects of COVID-19

Given our results on the impact of COVID-19 and the social focus of Mexican President López Obrador's policies under his austerity measures, we focus our simulations on the likely economywide effects of two social alternative policies to mitigate the effects of COVID-19.[15] In a stylized way, these simulations are also in line with suggestions from the ECLAC: to apply direct transfers to vulnerable individuals, to provide unemployment insurance, and to offer economic support to low-income and informal workers and to those employed by small or medium-sized businesses (ECLAC, 2020a).[16]

Taking into account the government's current austerity measures, we simulate two policy choices whose fiscal cost would be the same: non-conditional direct cash transfers and unemployment insurance. The budget used to simulate each of these policies is MXN $102,368.45 million.[17] We introduce this amount into the SAM-MEX, and our simulation results offer a

14 Even with the income reduction due to COVID-19, household income in deciles VI-X remained above the 2018 CONEVAL poverty line.

15 We do not estimate the impact of other policies because, although multiplier models are useful tools for simulating a broad spectrum of public policies and their economic implications, there are limitations regarding the SAM-MEX structure and the information needed to make other simulations.

16 Our proposed policy simulations coincide with the contention of ECLAC (2021a) that current social policies in Mexico are insufficient to alleviate poverty derived from the pandemic.

17 In 2018 pesos, this amount is equivalent to 60% of the federal budget for social programs in 2020. Estimations based on the figures from the Secretary of Finance (SHCP, 2018; 2019; 2020a).

comparison of the effect on the COVID-19 situation with and without these two types of transfers.[18]

i) Cash transfers

The results presented in Table 5 show that the economywide impact of COVID-19 on the income of Mexican households has been considerable and differentiated. The pandemic has negatively affected all economic strata, and increased the incidence of poverty by 8.23 percentage points (Table 6).

The Interamerican Development Bank (IDB) and ECLAC (2020b) have argued that in order to respond to the economic crisis, governments in the region need to insure a minimum income level for all households. For Mexico, this could have been partially achieved through Prospera, a conditional cash transfer program.[19] However, the federal budget assigned to this program decreased by 57% in 2019 and was eliminated in 2020 (SHCP, 2018; 2019; 2020a). The programs that replaced Prospera are not specifically designed to address poverty in conjunction with measures to mitigate the effects of the pandemic. It is thus necessary to analyze the efficiency of a public policy consisting of direct income transfers to Mexican households in the setting of the health crisis. For this purpose, we simulate a single per capita transfer of MXN $1,549.08 to the population in poverty during the confinement measures of April to July 2020. The amount applied in the simulation is equivalent to the extreme income poverty line published in September 2019, which corresponds to the value of a minimal food basket in an urban area, as calculated by CONEVAL.[20] Table 7 shows the estimated costs by decile of the simulated policy; the total cost is MXN $102 billion.

Table 7. Proposed Cash Transfers (millions of pesos)*

Decile	Total transfers*
I	19,381.40
II	19,375.50
III	19,382.36
IV	16,814.37
V	19,374.64
VI	8,040.17
VII	0.00
VIII	0.00
IX	0.00
X	0.00
Total	102,368.45

* The amounts of transfers are distributed consistent with the figures in Table 6.

Source: Authors' estimations.

18 These two public policies have been thoroughly debated in Mexico, before and during the pandemic (Esquivel, 2020; Rivero Cob, 2020).

19 IDB (2020) modeled a scenario for Mexico, the Bahamas, Chile, and Panama, in which every household would be eligible to receive a transfer equal to the amount of the international poverty line of USD $3.10 per capita per day for three months. It found that the cost of the transfer is less than 0.5% of the annual GDP in these countries, assuming families with an average of five members each.

20 We use only the urban extreme poverty line because the SAM-MEX does not distinguish the type of area in which the households are located.

Table 8 presents the main results of the simulation. It shows that the simulated cash transfers considerably reduce the negative effects of the pandemic on the beneficiaries of the program (deciles I-VI), to the extent that the impact is reversed from negative to positive for the first decile (from -9.4% to 1%). It also shows that because of the multiplier effect of the support to poor households, the initial reduction in income of non-beneficiaries (deciles VII to X) caused by the pandemic decreases by approximately one percentage point.

Table 8. Impact of Cash Transfers on Household Income by Decile

Decile	Income Changes	
	COVID-19 Impact	COVID-19 and Public Policy Impact
I	-9.41%	0.95%
II	-9.77%	-3.00%
III	-10.02%	-4.42%
IV	-10.14%	-5.78%
V	-10.43%	-6.25%
VI	-10.44%	-8.23%
VII	-10.53%	-9.37%
VIII	-10.49%	-9.33%
IX	-10.58%	-9.45%
X	-10.36%	-9.18%

Source: Authors' estimations.

In addition to these changes in income, the simulated direct cash transfers to low-income households also mitigate the decline in VA from -11.30% (Table 4) to -10.06%, and reduce inequality from 2% to 3.6% (Table 9).

Table 9. Impact of Cash Transfers on Inequality

Indicator	Inequality		Percent change
	COVID-19 scenario	COVID-19 and public policy scenario	
GINI	0.4553	0.446	-2.04%
THEIL	0.1612	0.1554	-3.60%

Source: Authors' estimations.

ii) Unemployment Insurance

One consequence of the pandemic shutdown has been the loss of jobs. According to INEGI (2020a; 2020b), unemployment rates during April, May, and June 2020 were 4.7%, 4.2%, and 5.5%, respectively. The figures are above the 2.8% registered in March 2020, before the lockdown and social distancing began to be implemented. One suggested policy measure has been the adoption of unemployment insurance (Esquivel, 2020 and ECLAC, 2020b). However, this strategy has only been adopted by two state governments: Yucatán and Mexico City. Although 15 proposals for national unemployment insurance were published in the Parliamentary Gazette from August 2012 to April 2020, it has never been approved (Rivero Cob, 2020).

In this subsection we analyze how implementation of an unemployment insurance program would alter the negative economic effects of the pandemic. The simulation of this policy is based on the current unemployment program in Mexico City (Secretary of Labor, STFYE, 2020; Rivero Cob, 2020). It assigns MXN $5,870.13 per month during the pandemic period (April to July 2020) to unemployed individuals 18 years of age and older. Although the policy

in Mexico City provides only two monthly transfers of MXN $1,390.20 each to unemployed workers, in the simulation we adjust the amount so that its total cost is equal to the MXN $102 billion cost of the previous simulation. In addition to allowing us to compare the effects of the two policy options, this adjustment in the per capita payment is above the urban poverty line (MXN $3,001.67), but below the average minimum monthly amount workers say they need (MXN $6,170.83) in order to stay at home during the pandemic (Hernández-Solano and Triano-Enríquez 2020).

A necessary input for the simulation is the number of individuals who were unemployed during the quarantine for each of the income distribution deciles at the start of the pandemic. The estimation of this information follows Hernández-Solano et al. (2020) and uses data from a household survey, the ENCOVID-19, whose purpose was to evaluate the impact of the pandemic on the welfare of Mexican households (Teruel-Belismelis et al., 2020).

The estimation is made in two steps. The first estimates a linear regression model from Hernández-Solano et al. (2020) to predict the income before the pandemic of households included in the ENCOVID-19. This is done using socioeconomic variables that describe the households' situation before the pandemic and variables that do not change over time. Then, labor information from the ENCOVID-19 is used to estimate the number of unemployed individuals during the first 15 days of April 2020, broken down into income deciles (details are provided in Appendix A).

Our results indicate that between 3.27 and 5.62 million people lost their employment or could not find a job during April 2020 (95% confidence interval). Table 10 shows the distribution of unemployed individuals by income decile according to the income distribution data registered before the pandemic. It also includes the costs per decile and total costs to implement the simulated employment insurance policy for all unemployed individuals during the month referred to.

Table 10. Unemployed Individuals and Proposed Unemployment Insurance Payments

Decile	**No. of Unemployed**	**Insurance Transfers** (millions of pesos)
I	728,272	17,100.20
II	699,392	16,422.09
III	466,877	10,962.51
IV	778,440	18,278.18
V	261,800	6,147.20
VI	441,719	10,371.81
VII	234,841	5,514.20
VIII	376,914	8,850.13
IX	226,884	5,327.35
X	144,578	3,394.77
Total	4,359,716	102,368.45

Source: Authors' estimations.

Table 11 presents the results of the simulation related to household income by decile. It shows that unemployment insurance mitigates the negative effects of the pandemic on income in all economic strata. However, since it is a less progressive policy than cash transfers, it is less effective in the poorest deciles (I-III) (compare Table 11 with Table 8).

Table 11. Impact of Unemployment Insurance on Income, by Decile

Decile	Changes	
	COVID-19 Impact	COVID-19 and Public Policy Impact
I	-9.41%	-0.16%
II	-9.77%	-3.89%
III	-10.02%	-6.37%
IV	-10.14%	-5.54%
V	-10.43%	-8.34%
VI	-10.44%	-7.97%
VII	-10.53%	-8.82%
VIII	-10.49%	-8.61%
IX	-10.58%	-9.16%
X	-10.36%	-9.14%

Source: Authors' estimations.

In addition to this result, Table 12 indicates that income transfer might be preferable to unemployment insurance since it has a greater multiplier effect on improving equality. Finally, our results indicate that unemployment insurance is less effective in reducing the loss in VA caused by the pandemic in the Mexican economy: 1.19, as compared with 1.24 percentage points for the cash transfer policy.

Table 12. Impact on Inequality of Unemployment Insurance

Indicator	Inequality		Percent change
	COVID scenario	COVID and public policy scenario	
GINI	0.4553	0.4482	-1.56%
THEIL	0.1612	0.1565	-2.92%

Source: Authors' estimations.

Behavior of the Mexican Economy in 2020: Comparison of Our Results with Other Published Findings

According to INEGI, Mexico's GDP decreased by 8.5% in 2020, whereas our estimations show a decrease of 11.3% in VA caused by COVID-19 (Tables 1 and 4, respectively). In addition to the inherent difference between GDP and VA, our result reflects the magnitude of the change during the first seven months of 2020 with respect to the same months of 2019, when the economy was most affected by the pandemic. Indeed, INEGI's quarterly estimations of changes in GDP show that GDP increased by 1.6% in the first quarter of 2020 with respect to the same period in 2019, and it decreased by 18.2% in the second quarter, by 4.9% in the third quarter, and by 0.1% in the fourth quarter (INEGI, 2021a). It can thus be argued that our results are comparable to INEGI's estimations.

Based on figures from the ENIGH, INEGI (2021b) estimates a decrease of 10.7% in labor income in 2020 with respect to 2018. Our estimation of a loss of 12% in workers' income for the first seven months of 2020 (Table 4), is likewise comparable to the INEGI data. Both the INEGI data and our results indicate that the pandemic caused a greater reduction in the income of the richest decile, and thus caused lesser inequality.[21]

21 In contrast, Lustig and Martínez Pabón (2021) and Salas et al. (2020) projected that COVID-19 would increase income inequality.

In July 2021, CONEVAL published its estimations of changes in the incidence of poverty in 2020, using INEGI data. According to these estimations, the proportion of Mexicans living below the poverty line increased from 48.8% in 2018 to 56-56.7% in 2020. The latter figure is similar to our estimation of an increase of 57% (CONEVAL, 2021 and Table 6, respectively).

These three comparisons confirm that both our model and the results of a study conducted before the publication of official data for 2020 reflect what has been reported about the changes in the Mexican economy brought about by the pandemic.

Conclusions

The COVID-19 pandemic took world leaders by surprise. After a year and a half of this health crisis, uncertainties remain about the spread of the disease, and thus about the social distancing and lockdown measures required to contain it and its socioeconomic consequences.

In Mexico, since the implementation of the 2019-2024 National Development Program, the federal government has prioritized social policies, reflected by the increase in the budget for the Secretary of Social Development (now called the Secretary of Welfare). In constant 2018 pesos this budget increased by 41% from 2018 to 2019 and by 20% from 2019 to 2020, notwithstanding the austerity measures applied to the federal budget for 2020. President López Obrador has also modified policies implemented by the Secretary of Welfare, including the discontinuance in 2019 of Prospera, a conditional cash transfer program aimed at reducing household poverty, and an increase in the budget for pensions for the elderly and disabled in 2019 and 2020. In 2020 these two pension programs accounted for 81.8% of the government's budget for social programs (SHCP 2019, 2020a; see also Mexico, n.d.).

These policies are not directly designed to mitigate the effects of COVID-19 on poor households; indeed, our estimations of the direct and indirect impacts of the pandemic indicate that the incidence of poverty increased from April to July 2020, despite an increase in the remittances households received from family members working abroad. Thus, in order to mitigate the negative effect on income and poverty, we propose different or additional social policies than the ones currently in force. We examine two alternatives: the first, an unconditional cash transfer program to households in poverty either before or as a result of COVID-19, and the second, unemployment insurance. Considering the limitations of public funding and political debate over where to channel social subsidies, we simulate the likely multiplier effects of these two alternatives, applying the same budget to each for purposes of comparison. We find that direct monetary cash transfers to households in poverty are preferable to unemployment insurance for those who have lost their jobs during the pandemic: the cash transfers better alleviate income loss, inequality, and the incidence of poverty.

These findings are based on the application of a model using empirical data, and are not influenced by the ideological biases and political interests that have characterized the policy debate before and during the pandemic. We thus hope that it contributes to the design of efficient and effective government measures to mitigate the effects of this crisis. However, additional research is required to fully understand the consequences of the pandemic on the economy and society of Mexico, as well as to explore the best policies to promote future development. It is possible to simulate existing policies and possible alternatives with multisectoral approaches based on the social accounting matrix for Mexico, as data becomes available. Based on the SAM-MEX, it would be possible to extend the current study to cover a longer period and to incorporate relative prices based on a computable general equilibrium model.

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Appendix A. Estimation of Unemployment in Mexico During the Quarantine, by Income Decile

A necessary input in this study is the estimation in the decline of employment during the quarantine by income decile. This information can only be partially obtained from the ENCOVID-19 survey, given that it includes the number of unemployed individuals during the first fifteen days of April, but does not provide data about their income before the quarantine. To address this limitation, we follow the methodology of Hernández-Solano et al. (2020), who use the methodology of Lawless et al. (1978) and information from the ENIGH 2018 to calculate the best reasonable model of linear regression, which predicts the logarithm of household per capita income based on socioeconomic characteristics. With this calibrated model we estimate household income from the ENCOVID-19 before the pandemic. This method is possible since each of the independent variables of the model is selected to meet the following conditions. First, the information on the independent variable is found in the ENIGH 2018 and the ENCOVID-19. Second, the variable in the ENCOVID-19 must have retrospective information for the month of February (before the pandemic) or must not have been affected during the first month of the pandemic. The results of the regression model estimated from the ENIGH 2018 are shown in Table A.

The ENCOVID-19 allows us to indirectly compute household per capita income for February, although the percentage of non-responses reduces the valid data to 49% of the original sample. Nevertheless, per capita income permits us to validate the predictions of the model. The findings show that the average per capita income predicted by the econometric model is MXN $3,910.633 per month, whereas the figure obtained indirectly from ENCOVID-19 data is MXN $4,820.045; the medians are MXN $2,935.375 and MXN $2,381.652, respectively.

Table A. Linear Regression Model to Explain the Logarithm of Per Capita Household Income

Independent variable	Coefficient*
Number of individuals per room in the household	-0.038
	(-0.004)
Number of full bathrooms (with shower and toilet) in the household	0.198
	(-0.006)
Number of household members	-0.32
	(-0.008)
Square of number of household members	0.016
	(-0.001)
Household has a permanent internet connection (1 yes, 0 no)	-0.239
	(-0.008)
Number of cars or trucks belonging to the household	0.157
	(-0.007)
Number of employed household members, 14 years or older	0.192
	(-0.004)
Household head completed elementary school (1 yes, 0 no)	0.166
	(-0.009)
Household head completed junior high school (1 yes, 0 no)	0.259
	(-0.009)
Household head completed high school (1 yes, 0 no)	0.43
	(-0.011)
Household head who completed college (1 yes, 0 no)	0.784
	(-0.013)
Household belongs to 2nd group of states (1 yes, 0 no)**	0.207
	(-0.012)
Household belongs to 3rd group of states (1 yes, 0 no)**	0.276
	(-0.011)
Household belongs to 4th group of states (1 yes, 0 no)**	0.332
	(-0.013)
Household belongs to 5th group of states (1 yes, 0 no)**	0.369
	(-0.012)
Household belongs to 6th group of states (1 yes, 0 no)**	0.418
	(-0.012)
Household belongs to 7th group of states (1 yes, 0 no)**	0.466
	(-0.012)
Household belongs to 8th group of states (1 yes, 0 no)**	0.571
	(-0.013)
Constant	7.973
	(0.019)
Number of observations	72,267

* Standard errors are shown in parentheses. All variables are statistically significant ($p < 0.01$).
** 2nd group of states: Puebla; Tabasco; Tlaxcala; and Zacatecas.
3th group of states: Guanajuato, Hidalgo, Michoacán, and Morelos.
4th group of states: Campeche, Durango, Estado de México, and San Luis Potosí.
5th group of states: Nayarit, Sinaloa, Tamaulipas, and Yucatán.
6th group of states: Aguascalientes, Chihuahua, Colima, and Querétaro.
7th group of states: Baja California, Coahuila, Jalisco, and Sonora.
8th group of states: Baja California Sur, Ciudad de México, Nuevo León, and Quintana Roo.
Source: Authors' estimations based on ENIGH 2018 and Hernández-Solano et al. (2020).