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The fiscal cost of the provision of basic public services, subsidies for expenditure on food and basic citizen income per household in Costa Rica, Guatemala and El Salvador during the COVID-19 pandemic: An expenditure analysis

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Abstract

The objective of this article is to estimate the fiscal costs, using income and expenditure surveys, of the provision of basic public services (electricity, water, telephone and internet) for the 40% of the population with the lowest incomes, the provision of a subsidy of 50% of actual food expenditure for the 40% of the population with the lowest incomes and the provision of a basic income per household equivalent to the value of the poverty line for households under the poverty line in Costa Rica, Guatemala and El Salvador during the COVID-19 pandemic. These fiscal options are a fundamental component of any public health strategy against the COVID-19 considering they give economic viability to the population during the isolation and mobility restrictions period and financial support during the economic and social emergency. The results show that the fiscal costs of the provision of basic public services to 40% of the population with the lowest incomes or other fiscal measures considering less ambitious targets are heterogeneous between these Central American countries because of previous conditions and public policies but are reasonable and possible to cover under the actual circumstances.

Keywords: COVID-19, consumption, basic public services, food, basic income, fiscal costs

JEL Classification: E62, E63.

Introduction

The COVID-19 pandemic is generating global health, economic and social crises. All these crises are related but with asymmetric behaviors. That is, the epidemiological strategy to contain the COVID-19 pandemic includes measures such as social isolation, restrictions on social mobility and the imposition of various restrictions on labor and economic activities. These strategies generate negative shocks in supply (closure of businesses) and demand (reduction of income and a contraction of effective demand) which in combination with the closure or reduction of key public services like schools, universities and daycare centers, translate to significant economic costs with losses of jobs and income and an increase in the percentage of the population that lives in poverty and extreme poverty (ECLAC, 2020, IMF, 2020, World Bank, 2020).

The consequences of these crises are heterogenous between countries due to different initial economic and social conditions and different public policies. In this context, it is expected that Central American countries are particularly vulnerable to the COVID-19 pandemic shock, but with significant differences, considering the high percentages of the population under the poverty line and living in conditions of vulnerability, the high level of income concentration, the importance of the informal sector, the lack of social protection and universal healthcare systems without social and health insurances, consumption patterns, the high level of population with low saving rates, that suffer housing deficits and cannot access public services and present chronic health issues and with limited public policies designed to control the pandemic and to support the reactivation of the economy (Bodenstein, *et al.*, 2020).

The social and economic conditions in Central America indicates that the drastic downfall in income sources and employment make it very difficult for much of the population to comply with social isolation protocols since they need to look for sources of income. In this sense, a successful healthcare strategy of social isolation and reduction in mobility requires a fiscal strategy to make it possible for the population to stay at home, specially, for the 40% of the population with lower incomes. Henceforth, a fiscal strategy that offers economic viability for this most vulnerable part of the population during the phase of social isolation is essential for the public health strategy to work.

There are, of course, different fiscal options to compensate for decreased in income and employment; some of the most common proposals are to guarantee or suspend payments while still providing basic public services(electricity, water and telephone and internet), some type of subsidy for a basic food basket (50% of the expenditure on food) or a basic income per household under the poverty line equal to the poverty line, all for a period of three months (Blofield and Filgueira, 2020). However, these options could represent very different fiscal costs in each country and therefore it is important to estimate the potential cost of each specific option by country in order to identify the fiscal feasibility.

Therefore, the objective of this article is to estimate the fiscal cost of i) the provision of basic public services (electricity, running water, internet, and telephone), ii) a subsidy of 50% of food expenditure, both policies, to 40% of the population with the lowest income, and iii) the allocation of a basic income per household below the poverty line equivalent to the poverty line; all measures were estimated for a period of three months for Costa Rica, Guatemala and El Salvador. These options are only illustrations of some of the fiscal policies that can be used under the current circumstances. This analysis faces several limitations, such as potential errors in the original information employed, and that the estimations only consider the inertial or business as usual scenario without considering the potential adjustment in expenditure patterns due the significant fall of the economy or changes in prices.

The article is divided into five sections. The first is, obviously, the introduction. The second part presents stylized facts on health and economic data in relation to the COVID-19 pandemic in these countries, the third section presents the basic characteristics of the consumption pat-

terns in these countries and estimates the Engel curves for the main areas of expenditure in order to identify the fall in some items, such as food consumption. The fourth section presents the fiscal costs of the above identified policy options. The fifth section presents the conclusions.

The COVID-19 pandemic in costa rica, guatemala and el salvador: some stylised facts.

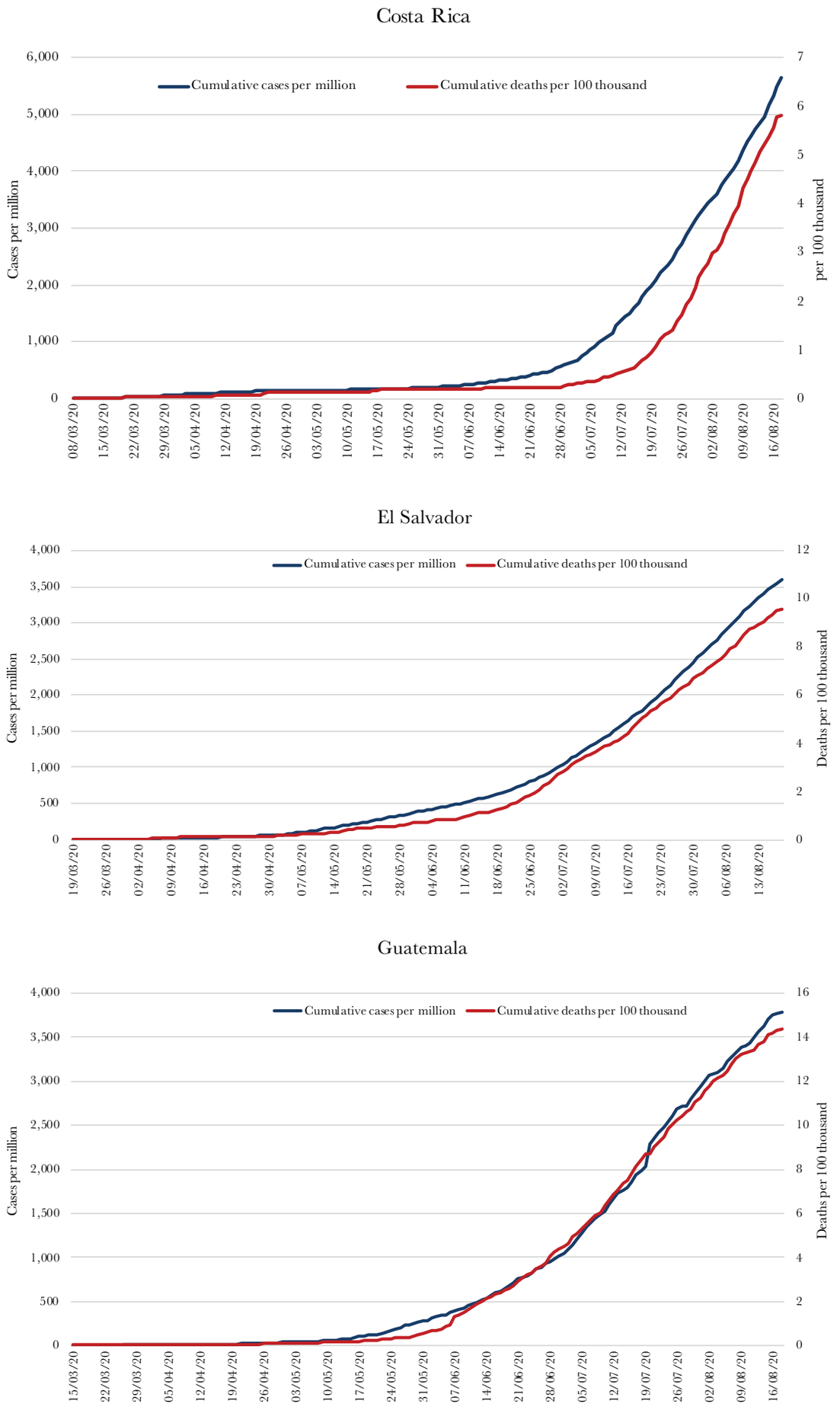
The COVID-19 crisis is generating an asymmetric twin crisis. That is, the public health strategy to control the contagion and mortality of the COVID-19 pandemic is based on isolation protocols and on social mobility restrictions which are generating significant disruptions in the production, distribution, and consumption with important income and job losses (Bodenstein, *et al.*, 2020). These economic costs are heterogeneous depending on the underlying conditions of each country, the kind of social isolation strategy that was implemented and the magnitude and orientation of different fiscal rescue packages. This ranges, on the health strategy, from a complete lockdown to more flexible social isolation or social distancing strategies and, on the economic side, from the instrumentation of fiscal emergency and reactivation packages to the use of very limited fiscal instruments (Eichenbaum, *et al.*, 2020, Alvarez, *et al.*, 2020).

The available data on the economic and social consequences of the COVID-19 pandemic as well as those on healthcare in Central America are, as in the rest of the world, still fragmented and with a high level of uncertainty. However, some inferences can be made. To this effect, a data base was created with information from Johns Hopkins University, Google Mobility, the COVID-19 database from ECLAC, and the surveys on household income-expenditure of each country.

The first officially confirmed COVID-19 cases in Costa Rica, Guatemala and El Salvador were announced between the end of February and the first two weeks of March 2020. From March onwards all three countries reported rapid growth of accumulated cases of COVID-19 per million inhabitants and the number of accumulated deaths per 100,000 inhabitants (Figure 1). However, Costa Rica shows an anomaly with relative containment in May and a considerable rise in June and July.

In this context the governments of Costa Rica, Guatemala and El Salvador implemented different types of isolation measures and restrictions on social mobility to contain the diffusion of the COVID-19 pandemic. In the first 20 days after identifying the first case in each country, it could be observed a decrease of up to 50% in people´s work-related mobility (Figure 2), and then from March to July, mobility fluctuated between -40% and -60%, though there were some recoveries in mobility in Guatemala and El Salvador in June (Figure 3).

Figure 1. Accumulated cases per one million of inhabitants and accumulated deaths per 100,000 inhabitants (in Costa Rica, Guatemala and El Salvador).

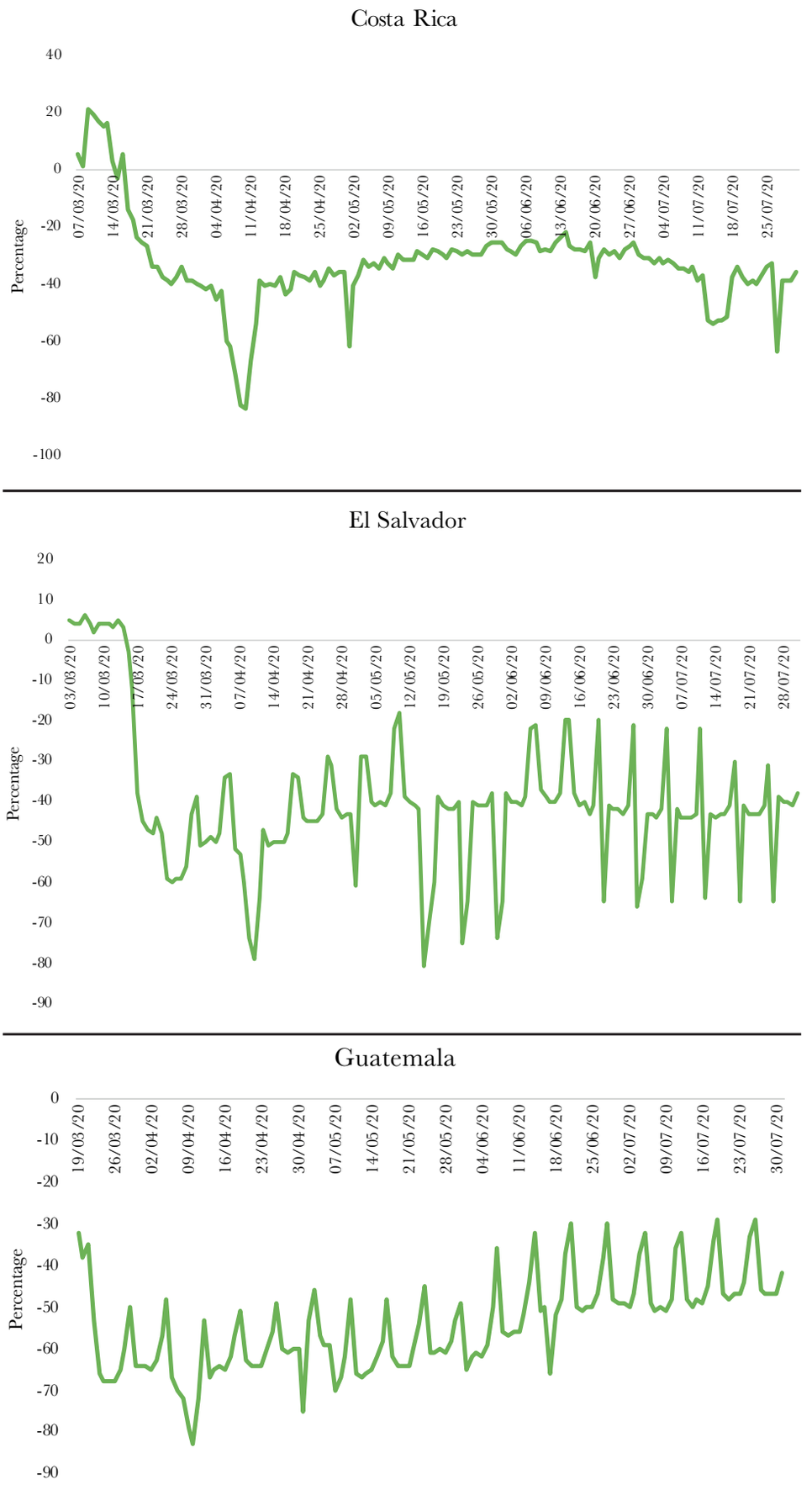


Source: Developed by the authors on the basis of the data from Johns Hopkins University

Figure 2. Variation in people's mobility to their workplace in the first 20 days since the identification of the first case of COVID-19.

Source: Developed by the authors on the basis of the Google Mobility Database, 2020

Figure 3. Variation in people's mobility to their workplace: period March – July 2020.



Source: Developed by the authors on the basis of the Google Mobility Database, 2020

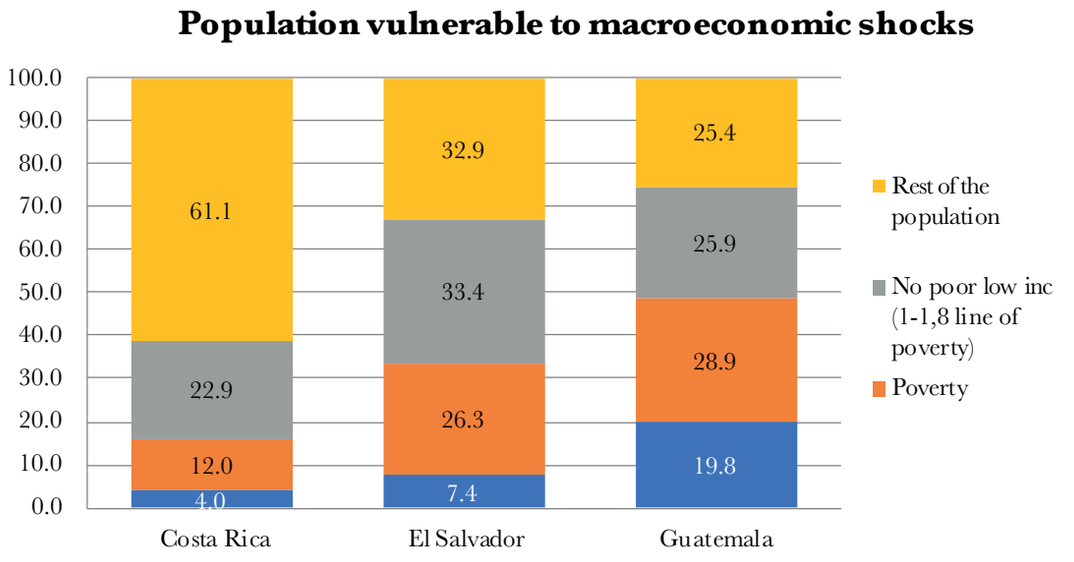
The restrictions on social mobility lead to a drastic decrease in formal and informal employment and incomes of people and businesses (Bodenstein, et al. 2020) and to significant drops in consumption (Baker, et al. 2020); with indications that the economic recovery will take several years (Jordá, et al. 2020).

The evidence available for Costa Rica, Guatemala and El Salvador, though fragmented and with a high level of uncertainty, suggests that the economic and social consequences of the pandemic COVID-19 will be very severe, especially due to preexisting social and economic conditions. The evidence from these countries indicates that a high proportion of their populations is very vulnerable to different macroeconomic shocks considering the concentration of income distribution, with an important part of the population with an income below 1.8 of the poverty line, with very limited education levels, sources of income, savings, assets or access to credits, without social security and unemployment insurance, and suffering from housing and other public service deficits (Figure 4). In this group, we also find an important proportion of children, who are particularly vulnerable to several macroeconomic shocks[1] (Raddatz, 2009).

Nonetheless, initial conditions are different in each country. Costa Rica has a lesser proportion of its population in conditions of vulnerability and under the poverty line, and the concentration of income is lower than El Salvador and Guatemala. (Figure 4, Table 11). These differences are an important reference for how each population is prepared to deal with the health, and socio-economic crises, and suggests that the consequences will be heterogeneous even between these Central American countries and that, therefore, required fiscal measures with heterogenous fiscal costs.

Projections by leading institutions suggest there will be a significant drop in Gross Domestic Product (GDP) and employment in Costa Rica, Guatemala and El Salvador, with differences between countries (Table 1) (ECLAC, 2020, IMF, 2020, World Bank, 2020).

Figure 4. Population vulnerable to macroeconomic shocks in Costa Rica, Guatemala and El Salvador, 2019



Source: ECLAC on the basis of special tabulations of household surveys.

1 In 2019 around 46% of the children in Latin America lived in poverty and the majority lived in households that depend on the informal sector for their income, ECLAC (2020).

Table 1. Projections for annual GDP growth rate for Costa Rica, Guatemala and El Salvador.

	IMF		WORLD BANK			ECLAC
	2020	**2021**	**2020**	**2021**	**2022**	2020
Costa Rica	-3,3	3	-3,3	4,5	3,5	-3,6
El Salvador	-5,4	4,5	-4,3	4,8	3	-3
Guatemala	-2	5,5	-1,8	4,4	3,1	-1,3

Sources: IMF: https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD, WORLD BANK: https://openknowledge.worldbank.org/bitstream/handle/10986/33555/211570SP.pdf?sequence=6&isAllowed=y, ECLAC: https://www.cepal.org/es/publicaciones/45445-dimensionar-efectos-covid-19-pensar-la-reactivacion

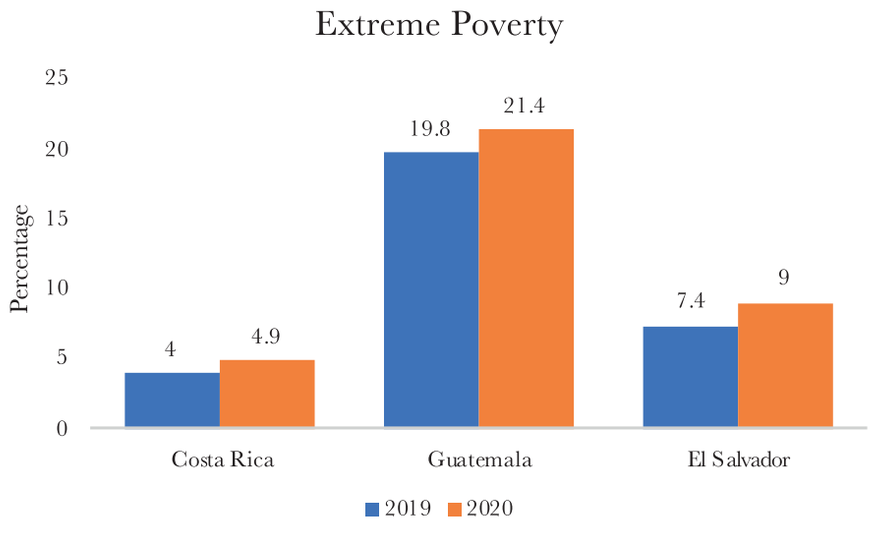
Table 2. Projections of the annual growth rate of formal employment for Costa Rica, Guatemala and El Salvador, 2020.

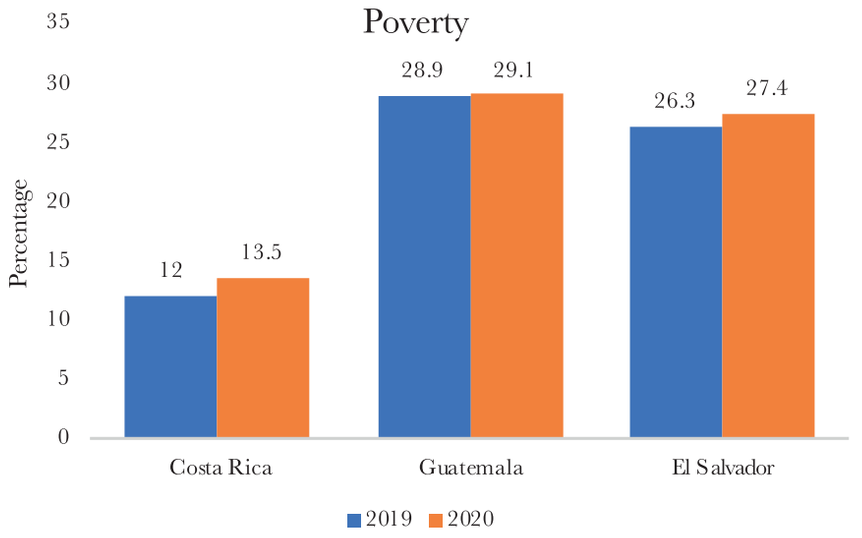
	Loss of formal employment in %		
	Short-Term Crisis	Medium-Term Crisis	Extended Recession
Costa Rica	-7,9%	-14,6%	-22,4%
Guatemala	-7,5%	-13,6%	-21,1%
El Salvador	-8,6%	-15,5%	-23,9%

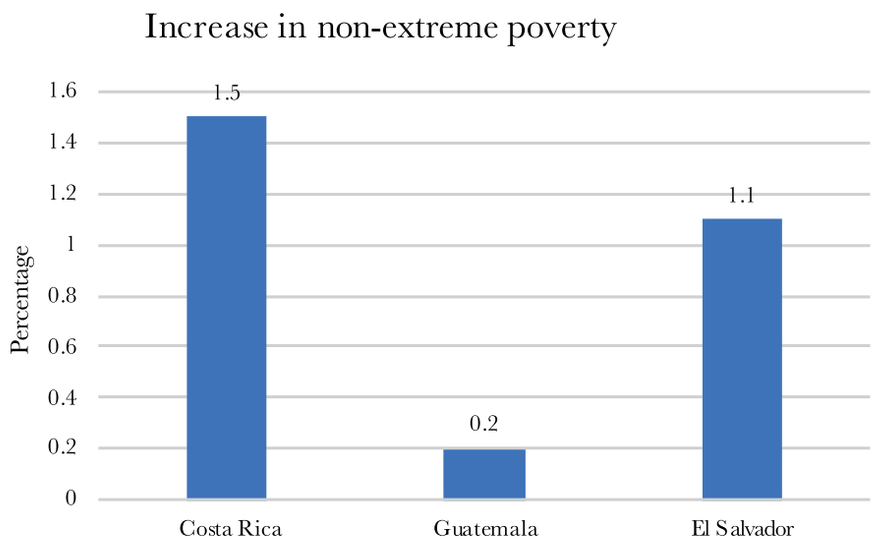
Source: IDB, 2020. The scenarios are the following: 1. Short-term crisis. This scenario, even though it is the most optimistic one, projects a drop in the GDP which duplicates the one seen in the crisis of 2009. It assumes that the sanitary crisis will disappear during the second semester of 2020 and that the economic recovery will begin to be noticed by the end of the year. 2. Medium-term crisis: This second scenario assumes that the recession will extend for three consecutive trimesters which translates into a negative growth rate that will be close to 10 percentage points with a slight improvement in the fourth trimester. 3. Extended recession: This third scenario assumes a large recession (15 percentage points) without any economic recovery in the medium term.

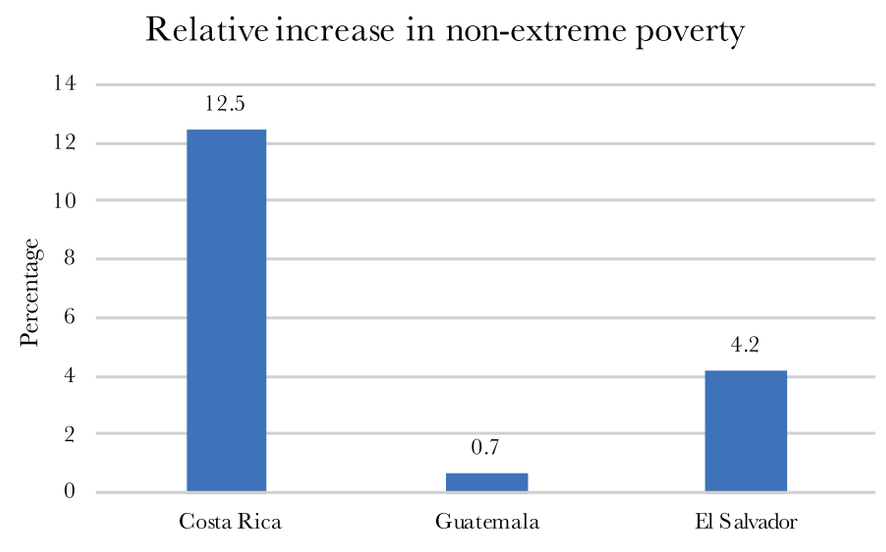
These reductions in GDP, employment and in population´s income will result in a significant increase in poverty and extreme poverty (Figure 5). Also, there is evidence that the first income quintile will be at risk of generalized food insecurity (Bottan et al, 2020), and that children in the lowest income quintiles will more vulnerable during social isolation, since they will not have access to subsidies, food aid and child-care that is normally provided in schools and daycare centers, and which now has to be shouldered by the household itself.

Figure 5. Population in poverty: estimates and projections 2019-2020.









Source: Developed by the authors on the basis of ECLAC, special tabulations on household surveys and projections.

Expenditure patterns in central american countries

The analysis of the household expenditure per country is based on the micro data from household income-expenditure surveys (Table 3).

Table 3. Income expenditure surveys for Costa Rica, Guatemala and El Salvador.

Country	Year
Costa Rica	Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH) 2018-2019
Guatemala	Encuesta Nacional de Condiciones de Vida (ENCOVI) 2014
El Salvador	Encuesta de Hogares de Propósitos Múltiples (EHPM) 2019

Source: developed by the authors

The consumption patterns that can be detected from these sources show that the main areas of expenditure in Costa Rica, Guatemala and El Salvador are food, housing, transport, education, and recreation (Figure 6).

Figure 6. Expenditure patterns in Costa Rica, Guatemala and El Salvador.

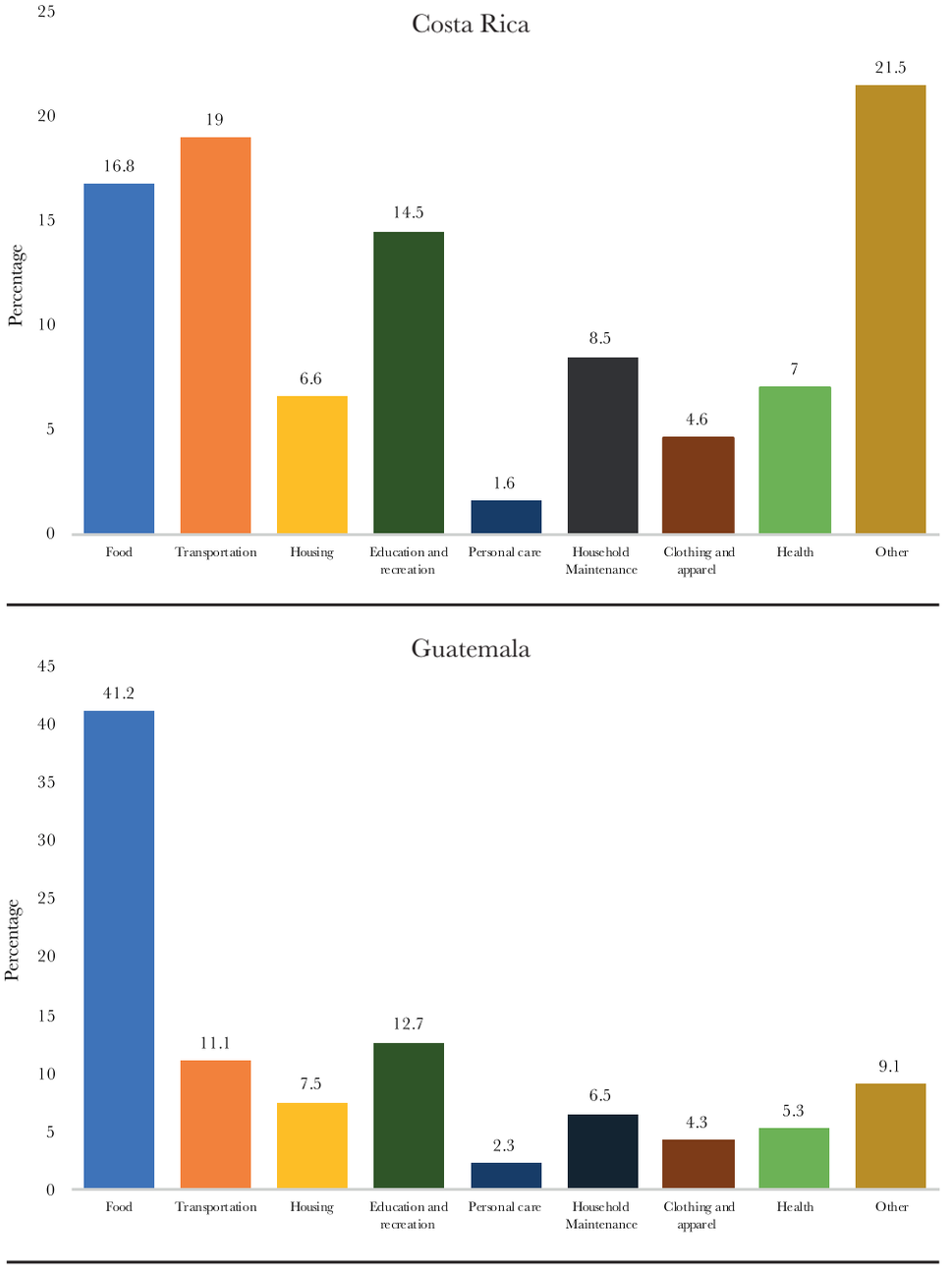
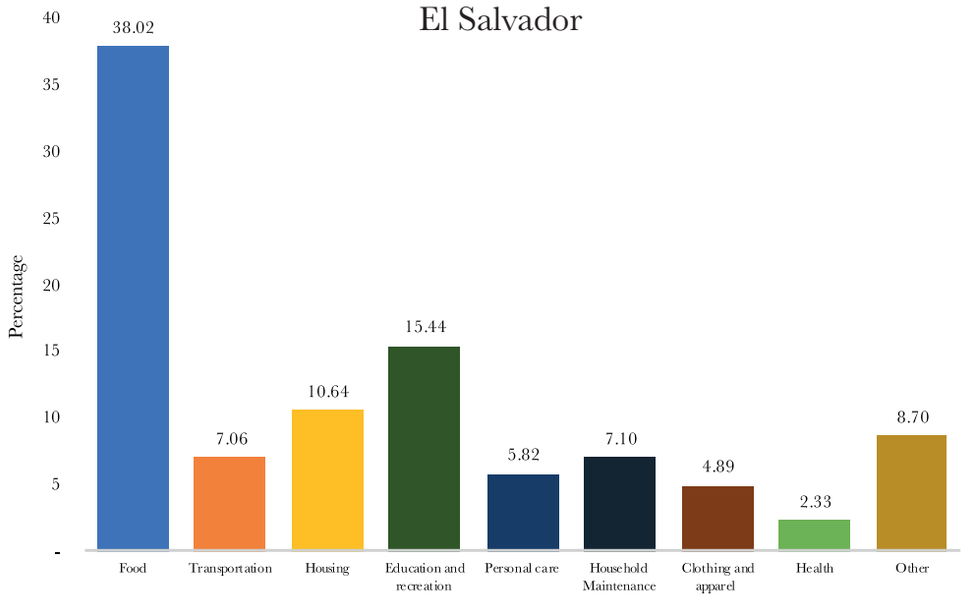


Figure 6 (continued). Expenditure patterns in Costa Rica, Guatemala and El Salvador.



Sources: National surveys of household income-expenditure. **Costa Rica**: Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH) 2018-2019), **Guatemala**: Encuesta Nacional de Condiciones de Vida (ENCOVI) 2014, and **El Salvador**: Encuesta de Hogares de Propósitos Múltiples (EHPM) 2019.

There are several systematic expenditure patterns in these countries that are useful for the identification of the potential effects of the economic crisis derived from the COVID-19 pandemic, and for the analysis of the potential fiscal costs of different types of fiscal interventions (Figure 7, Figure 8 and Figure 9).

1. Quintiles IV and V have the larger share of expenditure in most expenditure items (Figure 7). This reflects the high level of income concentration in these countries.

2. The structure of expenditure shows some differences in each income group by country. However, a common pattern in all these countries is that the participation of food expenditure in total expenditure decreases from Quintile I to Quintile V (Engel's Law) (Banks, et al., 1997, Battistin & De Nadai, 2015) (Figure 8). In this sense, fiscal support to food expenditure has a progressive effect, in relative terms, on income distribution.[2]

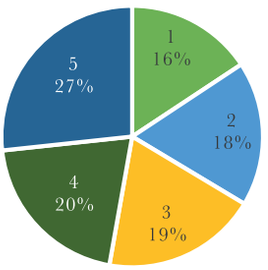
3. In these Central American countries, the sum of food and housing expenditure in the first quintile represents at least 50% of its total expenditure (Figure 8). Therefore, fiscal strategies that are concentrated in these items have significant social consequences.

4. The reduction from Quintile I to Quintile V in the share of food expenditure in total expenditure of each Quintile, is compensated for an increase in the share of expenditure dedicated to education, healthcare, and transport, among other items (Figure 8) (Levinson & O´Brien, 2018). This shows that as their income increases, households use less public education, public healthcare, and public transport and instead move to private education, private healthcare and private transportation. This configurates a style of development that it is segmented and not sustainable. For example, it is difficult to reduce CO2 emissions using a massive private transport instead of massive public transport.

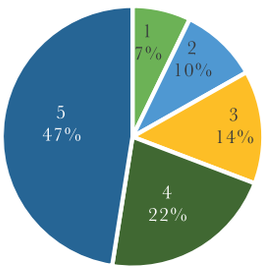
2 In this article, a progressive or a regressive impact is considered in relative terms. That is, a fiscal measure is considered progressive considering the percentage of expenditure in total expenditure that benefits each Quintil and this does not refer to absolute expenditure. Therefore, a fiscal measure with a progressive effect on income distribution might be considered with caution regarding its consequence in absolute terms.

Figure 7. Percentage participation by expenditure items per income quintile in Costa Rica, Guatemala and El Salvador.

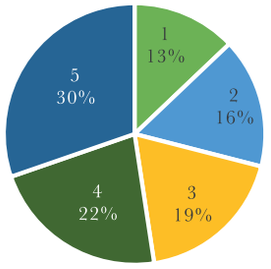
Costa Rica



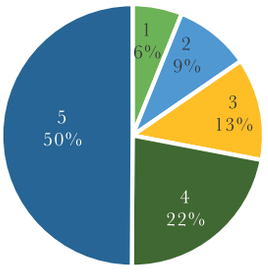
Food



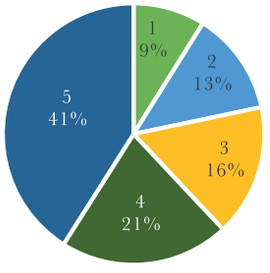
Transportation



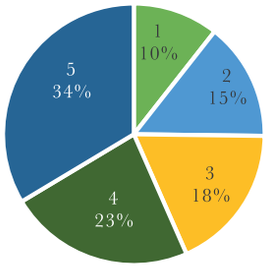
Housing



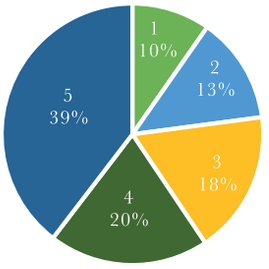
Education and Recreation



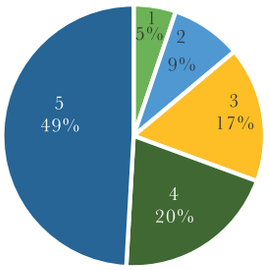
Personal care



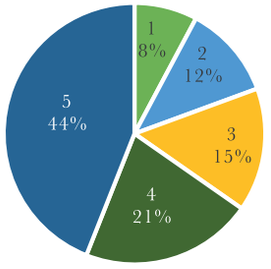
Household Maintenance



Clothing

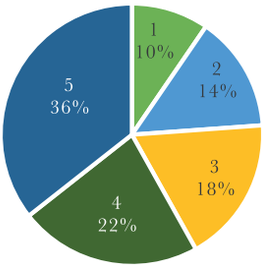


Health

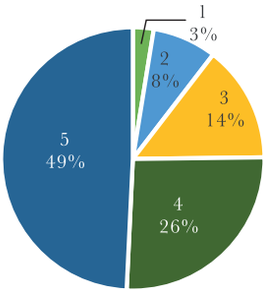


Others

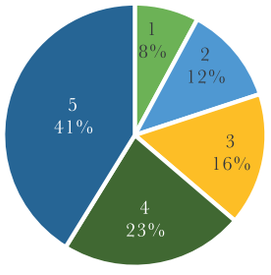
Guatemala



Food



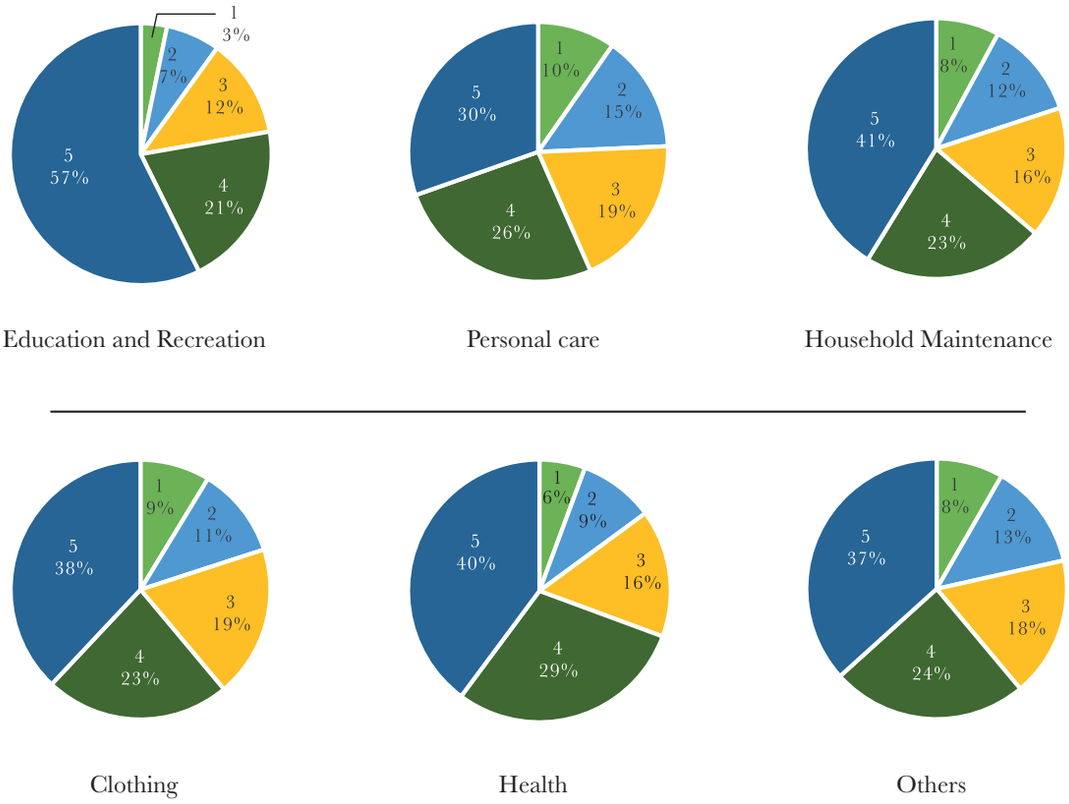
Transportation



Housing

Figure 7 (continued). Percentage participation by expenditure items per income quintile in Costa Rica, Guatemala and El Salvador.

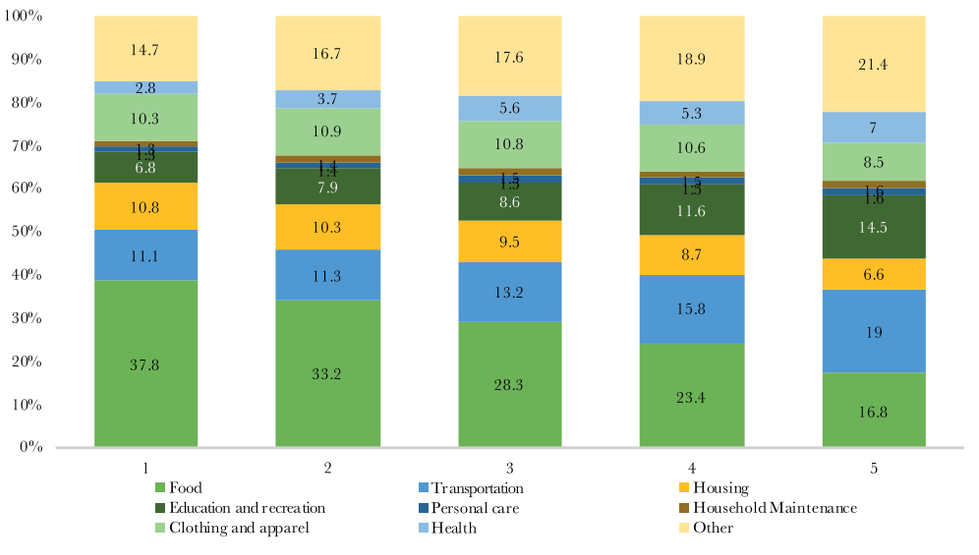
Guatemala

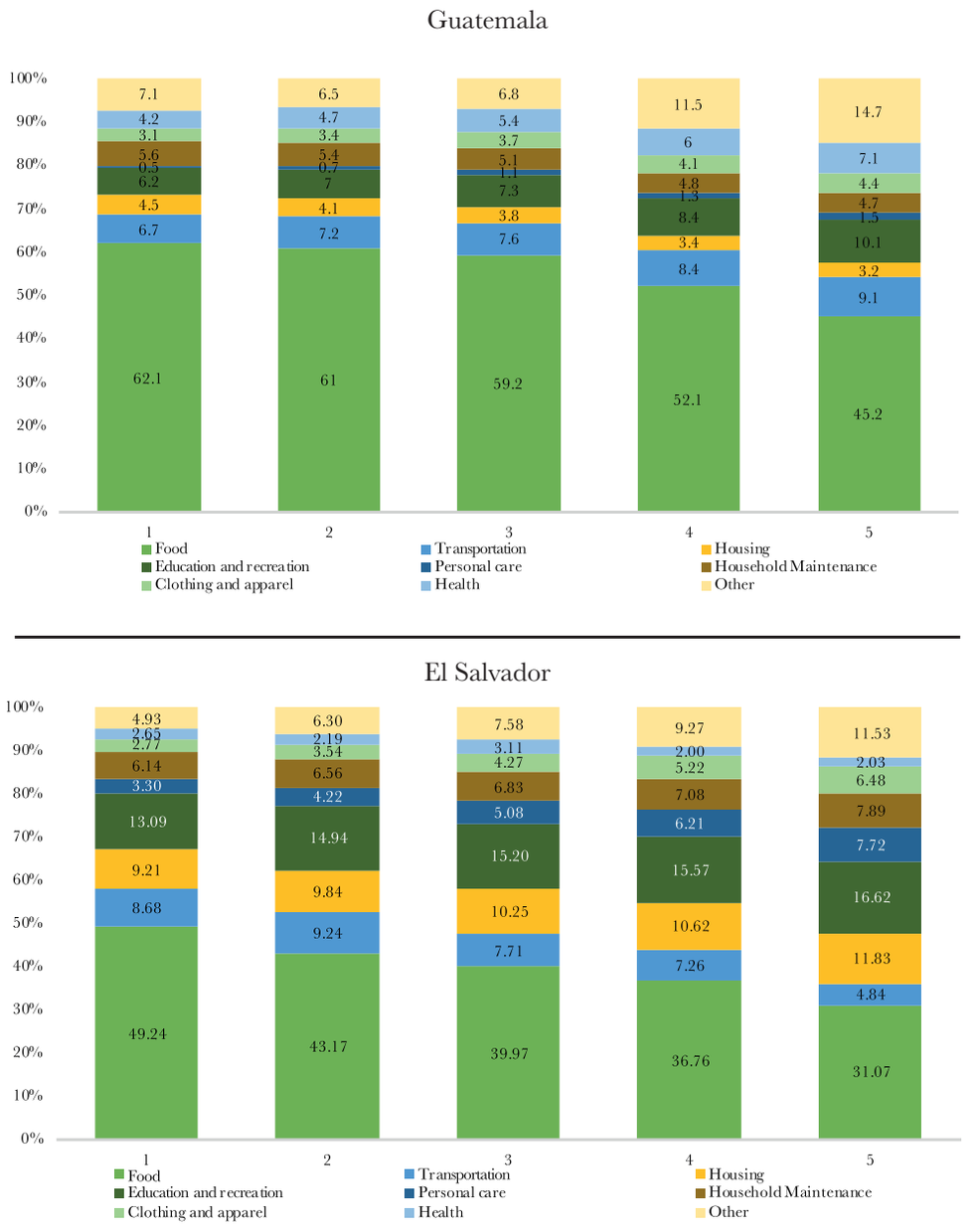


Sources: National surveys of household income-expenditure **Costa Rica**: Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH) 2018-2019), **Guatemala**: Encuesta Nacional de Condiciones de Vida (ENCOVI) 2014, and **El Salvador**: Encuesta de Hogares de Propósitos Múltiples (EHPM) 2019.

Figure 8. The expenditure structure per income quintile.

Costa Rica





Sources: National surveys of household income-expenditure **Costa Rica**: Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH) 2018-2019), **Guatemala**: Encuesta Nacional de Condiciones de Vida (ENCOVI) 2014, and **El Salvador**: Encuesta de Hogares de Propósitos Múltiples (EHPM) 2019.

5. The major share of the expenditure on public services is made by Quintile IV and Quintile V, even though this expenditure is not as concentrated as in other expenditure items (Figure 9).

Figure 9. Percentage participation of the expenditure on public services (electricity, running water and telephone) per item and per income quintile.

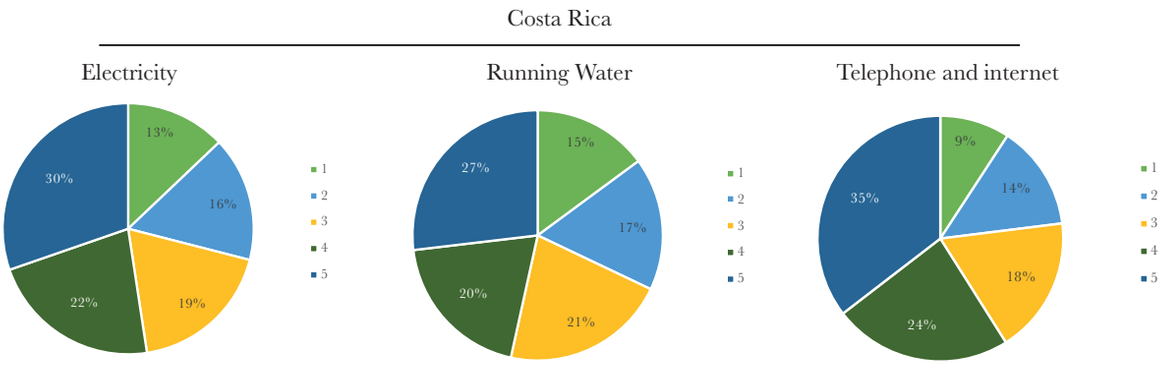
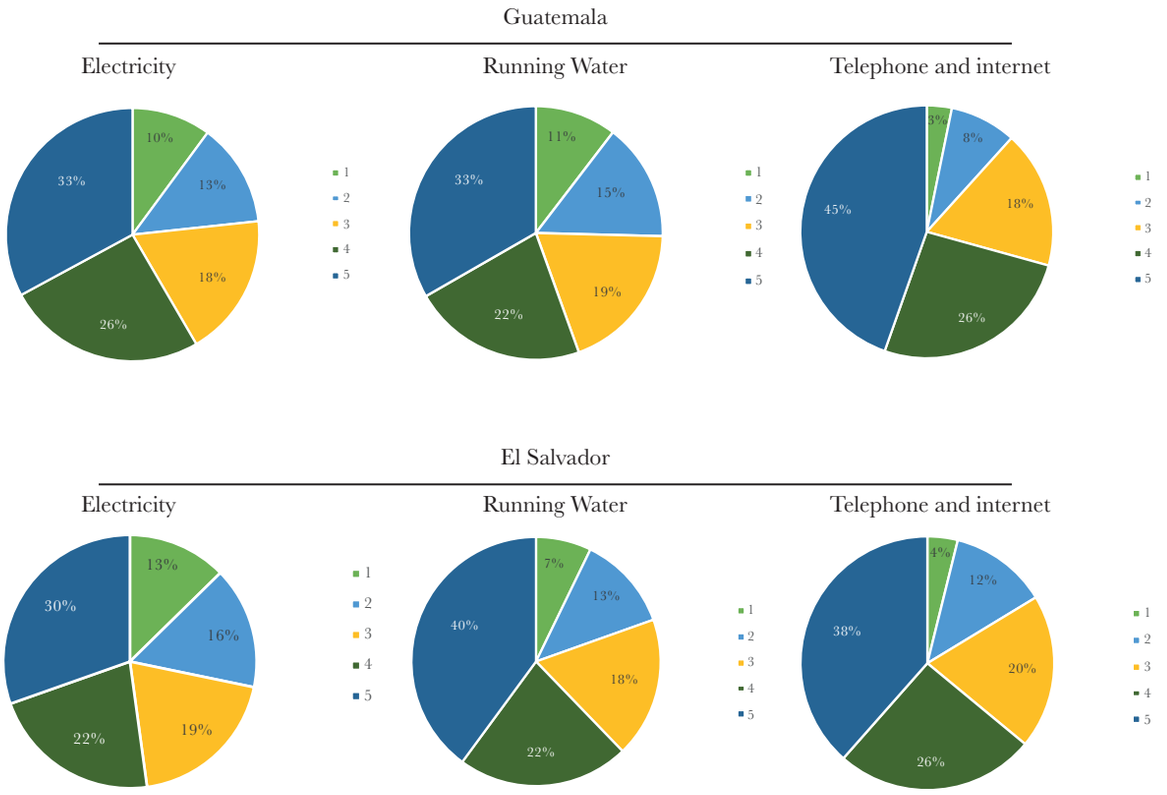


Figure 9 (continued). Percentage participation of the expenditure on public services (electricity, running water and telephone) per item and per income quintile.



Sources: National surveys of household income-expenditure **Costa Rica**: Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH) 2018-2019), **Guatemala**: Encuesta Nacional de Condiciones de Vida (ENCOVI) 2014, and **El Salvador**: Encuesta de Hogares de Propósitos Múltiples (EHPM) 2019.

6. The participation of expenditure on public services such as electricity, running water, telephone and internet in total expenditure decreases, in relative terms, from Quintile I to Quintile V in Costa Rica and Guatemala. In the case of El Salvador, there is only a reduction in the expenditure on electricity in total expenditure (Figure 10), while the participation of expenditure on water and telephone and internet in total expenditure increases from Quintile I to Quintile V.

Figure 10. Percentage of expenditure on public services (electricity, running water, telephone, and internet) per income quintile.

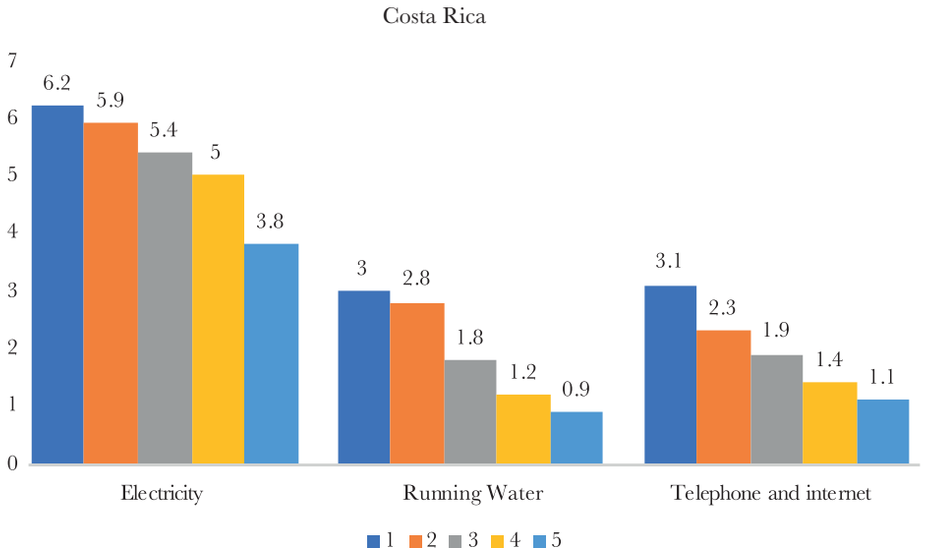
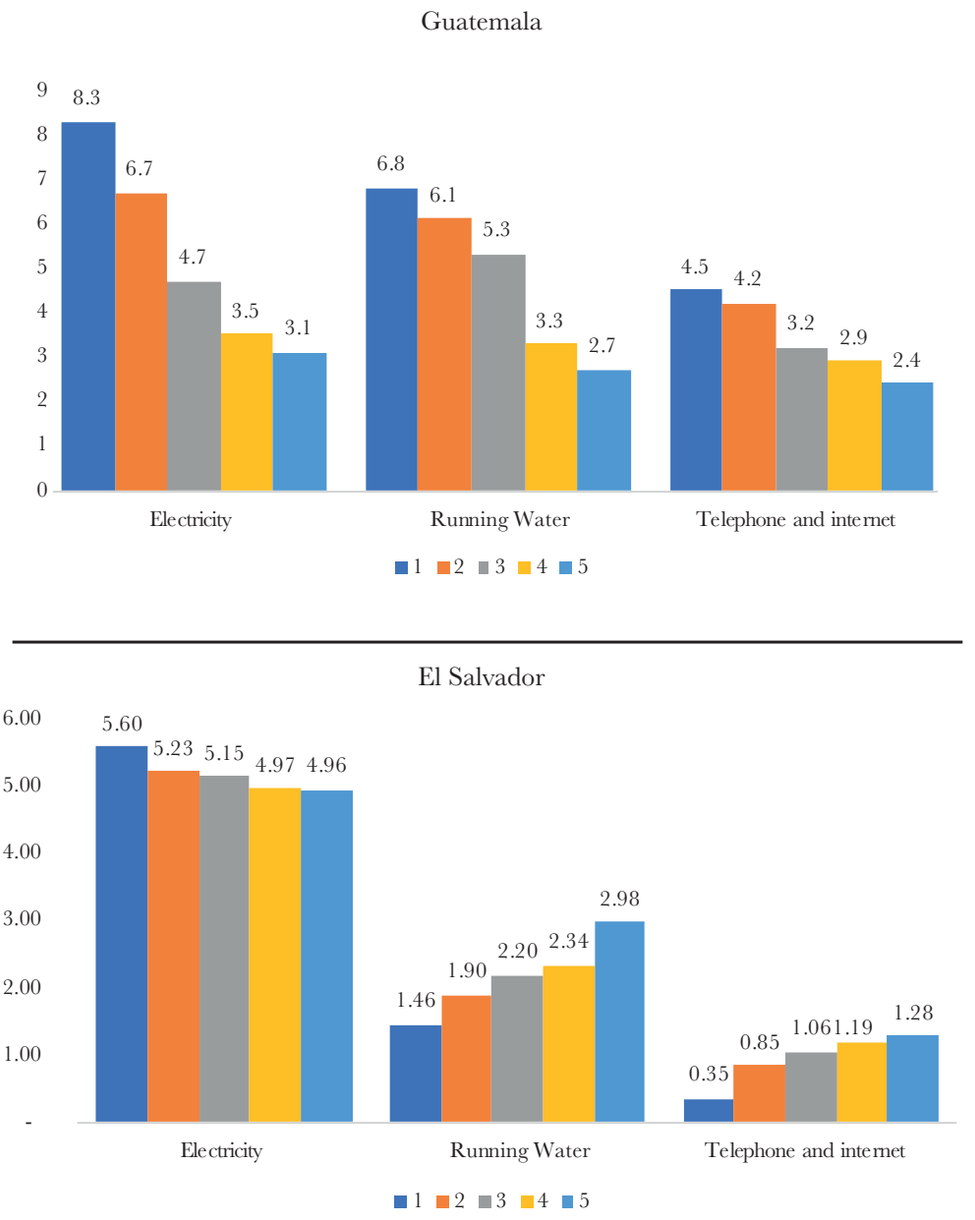


Figure 10 (continued). Percentage of expenditure on public services (electricity, running water, telephone, and internet) per income quintile.



Sources: National surveys of household income-expenditure **Costa Rica**: Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH) 2018-2019), **Guatemala**: Encuesta Nacional de Condiciones de Vida (ENCOVI) 2014, and **El Salvador**: Encuesta de Hogares de Propósitos Múltiples (EHPM) 2019.

The effects of the decrease in expenditure in the expenditure patterns can thus be identified using the Engel expenditure curves (Chai & Moneta, 2010). These Engel curves describe the proportion of the expenditure on certain item or good *i* in total expenditure (Nakamura et al., 2016, Blundell et al., 2007, Al-Habashene, F. & Al-Majali, (2014):

(1) $$w_{ij} = F(m_j) + u_{ij}$$

Where w_{ij} represents the proportion of the expenditure in total household expenditure on good i of household j, m_j is the total household expenditure and u_i is the error term.

The econometric expression of the Engel expenditure curve of the Working-Lesser type (Deaton & Muelbauer, 1980) in both its linear and quadratic form, and including additional control variables, can be represented by equations (2) and (3) (Banks et al., 1997, Sager, 2019, Chai & Moneta, 2010):

$$w_i = \varphi_i + \beta_{ij} lnx_i + \lambda + u_i \quad (2)$$

$$w_i = \varphi_i + \beta_{ij} lnx_i + \gamma_{ij} (lnx_i)^2 + \lambda + u_i \quad (3)$$

Where i represents the household or person, j is the expenditure or specific good, w_i is the proportion in the total expenditure of good i and $w_i = \left[\frac{\partial logc(U,P}{\partial logP_i}\right] = \frac{p_i q_i}{m}$, x_i stands for total expenditure, u_i is the error term and ln is for the natural logarithm. The term λ represents the inverted Mills ratio which is calculated by means of Heckman's two-stage method (Heckman, 1979) to avoid endogeneity problems, eliminate bias in the selection of the households, possible bias in estimates due to zero expenditure in some items for some of the households, possible errors in measurement of the variables or heteroscedasticity in the residuals, and to allow for the inclusion of the relevant control variables (Heckman, 1979; Hoffmann and Kassouf, 2005). Therefore, in the first stage of the Heckman method, the model estimates the consumption decision using a *Probit*[3] model where the dependent variable is the decision to consume and including a number of control variables of the households' socioeconomic characteristics (Pesaran, 2015). Thus, the size of the bias to the probability of occurrence by means of the Mills ratio (λ) can be defined as (Heckman, 1979; Hoffmann and Kassouf, 2005):

$$E(y|y > \alpha) = \mu + \sigma \left[\frac{\varphi\left(\frac{\alpha-\mu}{\sigma}\right)}{(1-\Phi)\left(\frac{\alpha-\mu}{\sigma}\right)}\right] = \mu + \sigma\lambda \quad (4)$$

Where y is the normally distributed random variable with mean size μ and variance σ^2, a is a constant, ϕ is a normal function of standard density and $\boldsymbol{\Phi}$ is an accumulative standard distribution function. In the second stage, the inverted Mills ratio (λ) is incorporated as a regression in the equation of the Engel expenditure curve which is estimated with a maximum likelihood procedure. The control variables considered are age, gender, level of schooling of the head of the household, number of household members, area of residence (urban or rural), number of cars and motorcycles in the household. The results are only presented for statistically significant control variables.

The Engel curve identifies a necessary good as $\beta_i < 0$ and a luxury good as $\beta_i > 0$. The Engel curve also implies that $\sum \beta_i = 0$ and $\sum \alpha_i = 1$, and the income elasticity is calculated by (Deaton and Muelbauer, 1980, Chai and Moneta, 2009):

$$\epsilon_i = 1 + \frac{\beta_i}{w_i} \quad (5)$$

Where ϵ_i is the elasticity of the expenditure on good i.

The resulting Engel expenditure curves suggest that items such as food, clothing, housing, transport and education[4] have positive elasticities lower than 1[5] (Tables 4, 5 and 6). These expenditure elasticities indicate that a decrease in income and total expenditure will lead to contractions in spending on these items.

3 The discrete variables are called binary or dummies (Webster, 1997).

4 With the exception of the elasticity in education in Guatemala.

5 The elasticity of the proportion of expenditure on housing in relation to total expenditure, is anomalous for Costa Rica and needs further research.

Table 4. Costa Rica: Elasticities of Engel expenditure curves.

Variable	Food	Clothing	Housing	Transport	Education and Recreation	Personal Care
Expenditure	0. 890*	0.655	0.453**	0.782***	0.989**	0.748***
	(0.418)	(0.319)	(0.135)	(0.199)	(0.323)	(0.153)
Variable	Food	Clothing	Housing	Transport	Education and Recreation	Personal Care
Expenditure 2	-0.234***	-0.005	-0.010	-0.332*	-0.003	-0.031
	(0.072)	(0.071)	(0.023)	(0.174)	(0.167)	(0.021)
# of household members	0.321	0.513	0.346	0.278	0.245	0.257***
	(0.258)	(0.284)	(0.123)	(0.239)	(0.357)	(0.451)
Constant	11.57***	-10. 140	10.142***	-11.556	-16.781***	16.823***
	(1.272)	(2.762)	(1.495)	(6.025)	(1.413)	(1.140)
Selected criteria						
Consumer good	-1.124***	-1.968***	-1.345***	-1.584***	-1.958***	-1.432***
	(0.139)	(0.220)	(0.139)	(0.213)	(0.271)	(0.352)
Age	-0.316***	-0.423***	-0.283***	-0.320***	-0.424***	-0.452***
	(0.003)	(0.003)	(0.002)	(0.003)	(0.004)	(0.002)
Sex	-0.103*	-0.127*	-0.340*	-0.115*	-0.123	-0.240***
	(0.099)	(0.109)	(0.200)	(0.103)	(0.114)	(0.030)
Urban area	0.214**	0.289***	0.142***	0.296***	0.216***	0.233**
	(0.098)	(0.207)	(0.022)	(0.301)	(0.132)	(0.021)
Constant	2.669	1.466	1.896	1.199	1.514	1.511
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Mills						
lambda	3.882	4.437	1.342	3.761	1.133	1.347
	(3.652)	(25.888)	(19.821)	(55.277)	(21.811)	(13.944)
N	9,529	9,529	9,529	9,529	9,529	9,529

Source: Estimated by authors on the basis of Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH) 2018-2019. The standard error between parenthesis. * p<0.05, ** p<0.01, ** p<0.001.

Table 5. Guatemala: Elasticities of Engel expenditure curves.

Variable	Food	Clothing	Housing	Transport	Education and Recreation	Personal Care
Expenditure	0.929***	0.535*	0.612*	0.581*	1.021*	1.202***
	(0.326)	(0.420)	(0.673)	(0.398)	(0.728)	(0.114)
Expenditure 2	-0.337***	-0.025	-0.001	0.537***	-0.137*	0.047
	(0.084)	(0.747)	(0.007)	(0.036)	(0.204)	(0.613)

Table 5 (continued). Percentage of expenditure on public services (electricity, running water, telephone, and internet) per income quintile.

Variable	Food	Clothing	Housing	Transport	Education and Recreation	Personal Care
# household members	0.830**	0.303	-0.443*	-0.474	0.865***	0.158***
	(0.846)	(0.491)	(0.100)	(0.373)	(0.278)	(0.154)
# children	-1.450***	0.337***	-0.327	-1.116	1.194***	-0.440
	(0.668)	(0.082)	(0.678)	(0.907)	(0.041)	(0.410)
Constant	1.307***	-6.970	28.063***	5.926	-50.840***	22.590***
	(0.161)	(6.995)	(3.986)	(9.352)	(5.120)	(4.120)
Selected criteria						
Consumer good	-1.134***	-1.138***	-1.147***	-1.316***	-1.167***	-1.452***
	(0.000)	(0.535)	(0.523)	(0.527)	(0.537)	(0.521)
Age	0.006***	0.005***	0.003***	0.005***	0.004***	0.006***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Sex	2.445***	1.122***	1.940***	1.648***	1.139***	1.104 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Urban area	0.413	0.433	0.421	0.432	0.453	0.413
	(0.329)	(0.335)	(0.329)	(0.330)	(0.338)	(0.329)
Constant	5.838***	6.046***	5.926***	5.901***	6.084***	5.958***
	(0.520)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Mills						
Lambda	12.642***	17.489***	-8.422***	6.275***	2.617	6.993
	(3.430)	(4.641)	(2.234)	(4.322)	(4.558)	(2.532)
N	7,107	7,107	7,107	7,107	7,107	7,107

Source: Estimated by authors on the basis of Encuesta Nacional de Condiciones de Vida (ENCOVI) 2014.
Standard error between parenthesis. * p<0.05, ** p<0.01, ** p<0.001.

Table 6. El Salvador: Elasticities of Engel expenditure curves.

Variable	Food	Clothing	Housing	Transport	Education and Recreation	Personal Care
Expenditure	0.861	0.937**	0.322	0.758***	0.764**	0.602***
	(0.406)	(0.540)	(0.670)	(0.171)	(0.775)	(0.719)
Expenditure 2	-0.425	-0.000	-0.022	0.546	-0.072	0.018
	(0.172)	(0.347)	(0.667)	(0.785)	(0.720)	(0.333)
# household members	0.693	-0.114	0.880	-0.594	-0.015**	0.939
	(2.741)	(6.260)	(1.663)	(0.975)	(0.381)	(0.644)
# children	0.960***	0.194	0.882***	0.464***	0.340***	-0.396***
	(0.321)	(0.706)	(0.103)	(0.548)	(0.089)	(0.028)

Table 6 (continued). El Salvador: Elasticities of Engel expenditure curves.

Variable	Food	Clothing	Housing	Transport	Education and Recreation	Personal Care
Constant	15.096	-3.100	12.165	5.732	-18.824	13.381
	(5.766)	(36.108)	(48.860)	(40.569)	(45.148)	(11.766)
Selected criteria						
Consumer good	-0.702	-0.859	-0.765*	-0.901*	-0.735	-0.638
	(1.490)	(5.096)	(1.147)	(1.149)	(6.446)	(1.492)
Age	-0.009***	-0.009***	-0.009***	-0.009***	-0.009***	-0.009***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.002)	(0.000)
Sex	-1.591***	-1.766***	-1.761***	-1.757***	-1.769***	-1.589***
	(0.489)	(0.096)	(0.000)	(0.000)	(0.447)	(0.492)
Urban area	0.810***	0.818***	0.819***	0.826***	0.824***	0.810***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	2.197***	1.469***	4.507***	3.542***	3.235***	3.130***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Mills						
lambda	12.458***	14.744***	-13.155	13.052	13.002***	-9.573
	(3.233)	(3.950)	(2.136)	(3.163)	(3.030)	(7.192)
N	19,141	19,141	19,141	19,141	19,141	19,141

Source: Estimated by authors on the basis of Encuesta de Hogares de Propósitos Múltiples (EHPM) 2019.
Standard error between parenthesis. * p<0.05, ** p<0.01, ** p<0.001.

Therefore, the potential expected decrease in expenditure in Costa Rica, Guatemala and El Salvador indicate, with the Engel curves, a potentially significant reduction in expenditures on food, education and transport and a less pronounced one on housing (Table 7)[6]. It is worth mentioning that the expected decrease in food and education expenditures have long term economic and social consequences.

Table 7. Expected decrease in different expenditure items considering the expected GDP decrease.

Country	GDP 2020	Food	Clothing	Housing	Transport	Education and Recreation	Personal Care
Costa Rica	-3.6	-3.20	-2.36	-2.02	-2.82	-3.56	2.34
Guatemala	-3	-2.79	-1.61	-1.84	-1.74	-3.06	-3.61
El Salvador	-1.3	-1.12	-1.22	-0.42	-0.99	-0.99	-0.78

Source: Estimated by authors. These estimations are related with the economic projections in Table 1 for 2020.

The fiscal cost of the provision of basic public services, food subsidies and basic income per household: preliminary estimations

A successful public health response, based on social mobility restrictions and social isolation, requires an economic strategy that offers economic viability to the population during the isolation period, in particular for the 40% of the population with the lowest income. Of course, an optimum strategy would imply creating universal healthcare and a basic minimum citizen income

6 There are other methods to calculate the decrease in income and household expenditure, for example Najera and Huffman (2020).

that is financed by a progressive fiscal structure. However, the fiscal costs of these proposals are, arguably, too high in the short term since the narrow margin for fiscal maneuvering in these countries has been worsened by the current economic crisis.

There are, however, specific proposals that might help to mitigate the economic emergencies of the population at a lower fiscal cost. For example, there are measures such as subsidies that guarantee the survival of companies and the preservation of payments to their employees, subsidies to pay for social security and contribute to the maintaining of employment, postponing payments on taxes and credit; then there are measures focused on the most vulnerable and low income groups, the broadening of coverage of the healthcare system and guaranteeing the provision of basic public services for this population.

In this article, in order to illustrate some of the fiscal costs of these options we considered three potential measures:

- Guarantee the provision of basic public services for a period of three months for the 40% of the population with the lowest income. The provision of essential public services for households contributes to the maintaining of a minimal level of livelihood and the continuation of a variety of labor, educational, social, and recreational activities (Dingel and Neiman (2020). The provision of public basic internet and telephone services also supports indispensable connectivity in order to access essential information, continue with education and work, and offers innovative ways to estimate mobility patterns and make payments or access to helplines for gender violence.

- Offer a subsidy that is equivalent to half the estimated food expenditure for the poorest 40% of the population for a period of three months. This is particularly important considering the projected decrease in this expenditure and therefore the potential risk that part of this population will end in food poverty during the COVID-19 pandemic, in particular children (Headey and Alderman, 2019).

- Offer a basic citizen income per household for the households under the poverty line that is equivalent to the poverty line, for a period of three months. This guarantees a minimum income per family and it allows to avoid significant social negative consequences.

These three public policies offer short term alternatives for the actual economic and social emergency and all are consistent with a policy pathway towards the long-term implementation of universal healthcare systems and a basic minimum income.

The estimation[7] of the fiscal cost of these three measures uses the national household income-expenditure surveys to:

- Estimate the expenditure on electricity, running water, telephone and internet for the first two income Quintiles with the lowest income, the expenditure on food for the first two Quintiles with the lowest income, and the cost to offer a basic income that is equal to the poverty line for the households under the poverty line. The estimations consider the latest available information on income and expenditure surveys for each country.

- Apply the expansion factor of each survey to identify the annual expenditure, and therefore the potential fiscal cost of covering expenditure on electricity, running water, telephone, internet and food for the first two income quintiles; and the cost of a household income equal to the poverty line for households under the poverty line.

7 The year of reference is the year of the income-expenditure survey of each country. This data could be adjusted to 2020 but this will probably increase the uncertainty level as a result of the high uncertainty of the figures available for 2020.

The main results from these estimations indicate that:

- The provision of electricity, running water, telephone and internet for 40% of the population with the lowest income, for a period of three months, has a fiscal cost of 0.37%, 0.87% and 1.47% of the GDP in Costa Rica, Guatemala and El Salvador, respectively (Table 8). This financial support has a progressive impact, in relative terms, in Costa Rica and Guatemala as the share of expenditure in electricity, water and telephone and internet on total expenditure for Quintiles I and II is reduced from Quintile I and Quintile V. However, in El Salvador, the share of expenditure in electricity on total expenditure shows only a small reduction (it only reduces from 5.60% to 4.96%) and the participation of the expenditure on water and telephone and internet on total expenditure by income groups increase form Quintile I to Quintile V (Figure 11). Additionally, it is worth noticing that the share of expenditure in total expenditure for public basic services in Quintiles I and II in Costa Rica and Guatemala represents a larger proportion of total expenditures by Quintiles than in El Salvador (Figure 11). Therefore, the positive collateral effects of the support on all public basic services is more relevant Costa Rica and Guatemala than in El Salvador.

- Guaranteeing a subsidy of 50% of the actual expenditure on food to 40% of the population for a period of three months has a fiscal cost of 1.68%, 4.12% and 3.80% in Costa Rica, Guatemala and El Salvador (Table 9). An alternative option is to offer a financial support that represents only 25% of food expenditure and in this case the fiscal costs decrease to 0.84%, 2.06% and 1.9% respectively. Moreover, if only 20% of the poorest part of the population is supported with his policy, then the costs decrease in another 50%. These differences in the fiscal costs are originated by different participations of food expenditures in total expenditure in these countries. That is, the expenditure shares in food in total expenditure in Guatemala and El Salvador are higher than in Costa Rica for the first two Quintiles (Figure 9). It is also worth noticing that the fiscal support to food expenditure is progressive, in relative terms, in all countries as the share of food expenditure with respect to total expenditure reduces from Quintile I to Quintile V (Figure 9). Nevertheless, the rhythm on the reduction of the share of food expenditure in total expenditure is heterogeneous in each country. A financial support for food expenditure is particularly relevant considering that the Engel curves elasticities indicate that food expenditure is expected to have a significant fall in the three countries during the COVID-19 pandemic with a potential risk that part of the population faces nutrition challenges (Table, 5, Table 6 and Table 7 and Table 8).

- To guarantee a basic citizen income that is equivalent to the poverty line for the households under the poverty line for a period of three months, has a fiscal cost of 0.85%, 6.92% and 5.28% in Costa Rica, Guatemala and El Salvador respectively (Table 10). The fiscal cost of this measure is rather high in Guatemala and El Salvador. Of course, a stricter targeting of economic measures would again reduce these costs significantly. As it is expected these fiscal costs are related with the proportion of population under the poverty line. That is, Guatemala and El Salvador with a higher population under the poverty line have significant higher fiscal costs than Costa Rica (Table 11). This result shows the relevance of social initial conditions for the potential fiscal costs under emergency situations.

Table 8. Estimations of the fiscal costs of subsidizing/postponing the payment of basic public services for one trimester. (Percentage of GDP)

Country	Running Water	Electricity	Telephone and internet	Total
Costa Rica	0.09	0.22	0.06	0.37
Guatemala	0.05	0.48	0.34	0.87
El Salvador	0.02	0.51	0.94	1.47

Source: developed by the authors on the basis of the special tabulations of the surveys on household income and expenditure, and projections of GDP.

Table 9. Estimations of the fiscal cost of subsidizing 50% of food expenditure for a period of 3 months for 40% of the population with lower incomes. (Percentage of GDP)

Country	Total
Costa Rica	1.68
Guatemala	4.12
El Salvador	3.80

Source: developed by the authors on the basis of the special tabulations of the surveys on household income and expenditure, and projections of GDP.

Table 10. Estimations of the fiscal cost of a basic income equivalent to the line of poverty for the households under the poverty line for a period of 3 months. (Percentage of GDP)

Country	Total
Costa Rica	0.85
Guatemala	6.92
El Salvador	5.28

Source: developed by the authors on the basis of the special tabulations of the surveys on household income and expenditure, and projections of GDP.

This set of results suggests that a fiscal effort that guarantees basic public services for a period of three months, is economically viable, particularly in relation to the benefits it will bring. It gives economic viability to the health public strategy of mobility restrictions and has positive collateral effect, in relative terms, in income distribution in Costa Rica and Guatemala and partially and depending on the items in El Salvador.

The estimates by the Engel curves indicates a projected significant drop in food expenditure in the three countries during the COVID-19 pandemic with the risk of increased malnutrition. Fiscal support of 50% of food expenditure for the first two Quintiles is feasible in Costa Rica, but it has much higher fiscal costs in Guatemala and El Salvador. This difference in the fiscal costs is related with the differences in the participation of food expenditure on total expenditure in these countries. The evidence also indicates that the fiscal support on food expenditure has progressive effects, in relative terms, on income distribution as the share of expenditure on total expenditure is reduced from Quintile I to Quintile V. The fiscal costs can be reduced considering a financial support to only 25% of the food basket and only to the poorest 20% of the population. Henceforth, this type of support is relevant under the actual circumstances, but it requires considering its potential high fiscal costs and, therefore, the option to use more concentrated target groups.

The fiscal costs of providing a basic income per house similar to the poverty line for households under the poverty line implies significant financial resources in Guatemala and El Salvador, though Costa Rica might find it within its margins of fiscal possibilities. The difference in the potential fiscal costs of these measures are related with the initial conditions in each country. That is, Costa Rica has a lower percentage of the population under the poverty line and a smaller Gini coefficient than Guatemala and El Salvador (Table 11). This evidence shows that the negative consequences of the pandemic of the COVID-19 are strongly related with the initial income distribution and poverty levels.

Thus, this analysis suggests that the option of basic public services is, in general financially feasible under the actual fiscal conditions and that it is possible to advance with the other options considering more targeted choices. It is important to emphasize that these fiscal costs might in the long term turn out to be less costly than not implementing them. A failure in epidemiological containment can bring fiscal costs that are, most probably, much higher in the long term than those considered in this article.

The instrumentation of these options requires an appropriate institutional network for the identification of beneficiaries and the monetary transfers. In this sense, financial support through basic publics services is an option that already has a clearly identified target group (clients of the services), and a well establish financial channels for money transfers. The additional effort for the instrumentation of other options, in particular the financial support for food expenditure, will depend on whether the target groups are already registered in support programs, such as cash transfer or supplementary food provision schemes. Otherwise, it might imply additional costs to construct an appropriate institutional arrangement.

Table 11. Population under the poverty line and Gini coefficients.

	Costa Rica	El Salvador	Guatemala
Percentage of population under the poverty line	16.1	34.5	50.5
Gini coefficients	0.493	0.405	0.535

Sources: National surveys of household income-expenditure **Costa Rica**: Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH) 2018-2019), **Guatemala**: Encuesta Nacional de Condiciones de Vida (ENCOVI) 2014, and **El Salvador**: Encuesta de Hogares de Propósitos Múltiples (EHPM) 2019.

Conclusions

The COVID-19 pandemic is generating a combined health and economic and social crisis. That is, the main public health strategies to contain the dispersion of the virus and reduce morbidity and mortality, consists of a policy of restrictions on social mobility and social isolation. These measures interrupt production, distribution and consumption processes leading to an economic and social crisis.

The magnitude of the economic and social crisis is heterogeneous in different countries depending, among other factors, on the initial conditions such as the percentage of the population in poverty or living in highly vulnerable conditions who could now face a return to poverty, consumption patterns, particularly on basics, such as food, housing and education, which may be sensitive to such a significant decrease in expenditure with long term consequences and on the specific public policies to control the pandemic and reduce the economic emergency and promote the reactivation (Bodenstein, et al., 2020, Deb, et al., 2020).

In this context, the success of the public health strategy depends on the economic viability of the policy of restrictions on mobility and social isolation, in particular for the 40% of the population with lower incomes. Therefore, it is indispensable to offer reasonable financial support to the population, if only restricted to the first two income Quintiles in countries such as Costa Rica, Guatemala and El Salvador given their pre-existing social and economic conditions, considering the presence of chronic fiscal restrictions.

The analysis shows that, by looking at the household expenditure patterns, the provision of basic public services (electricity, running water, telephone and internet) for the 40% of the population with lower incomes, a 50% subsidy on the expenditure on food for the 40% of the population with lower incomes or a basic citizen income per household equivalent to the poverty line, all for a period of three months have differentiated fiscal costs.

The financial support to maintain access public basic services have the lowest fiscal cost in all three countries. Additionally, it is a fiscal policy with, in general, positive relative consequences on income distribution considering that the percentage of the expenditure in public basic services in total expenditure reduces form Quintile I to Quintile V for Costa Rica and Guatemala and in electricity but not in water and telephone and internet in El Salvador. This fiscal support

represents a significant part of their total household expenditure for the 40% of the population with the lowest income in these Central American countries.

The financial support for food expenditure is important considering the expected drop in actual food expenditure during the pandemic and, also, it has a positive relative effect on income distribution and nutritional status. However, the fiscal costs of this measure are substantially high in Guatemala and El Salvador, but still reasonable in Costa Rica as a consequence, basically, of their actual consumption patterns. In this sense, it is possible to consider options with more reduced target groups and magnitude (i.e. lowest income 20% of the population or 25% of food expenditure).

The financial support for a basic citizen income is the most expensive fiscal measure, in particular, in Guatemala and El Salvador. The estimated fiscal costs are smaller in Costa Rica with less percentage of population under the poverty line than in El Salvador and Guatemala.

The increasing fiscal restrictions due the actual health, economic and social crises in these Central American countries indicates the relevance to consider the potential consequences and the fiscal costs of these measures. In this sense, the option with the lowest fiscal cost, which is viable when considering the fiscal restrictions in these countries, is the financial support for continuity of pre-pandemic access to basic public services and/or using specific targets of other fiscal subsidies. The use of some of these options will have positive effects in the long run as they will contribute to control the fall in some indispensable expenditure items such as food and education.

These results indicate that the initial presence of social protection policies and programs, including an appropriate institutional arrangement, and better initial socio-economic conditions reduces significantly the fiscal costs of any rescue package. Therefore, the long-term construction of universal social protection systems with automatic stabilization policies such as unemployment and health insurance schemes would represent a safety net for future negative shocks of diverse origins.

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