Household Consumption and Food Insecurity in Mexico: Covid19 and Sustainable Development

Consumi delle famiglie e insicurezza alimentare in Messico: Covid19 e sviluppo sostenibile

Adrian Vargas-Lopez and Luca Secondi

Abstract Attaining a lower level of food insecurity is crucial for developing countries as its consequences spread wide and deep into specific communities. Covid-19 has magnified the adverse effects of several problems worldwide, including food security. This study investigates the Mexican Households' four food security thresholds using the 2018 and 2020 waves of the National Household Income and Expenditure Survey (ENIGH), which contains the Latin American and Caribbean Food Security Scale (ELCSA). In this research, we assess the differences in the four food security categories with reference to both individual and household variables as well as contextual factors.

Abstract *Raggiungere un livello inferiore di insicurezza alimentare è fondamentale per i paesi in via di sviluppo poiché le conseguenze si estendono in modo ampio e profondo in comunità specifiche. Il Covid-19 ha amplificato gli effetti negativi di diversi problemi in tutto il mondo, inclusa la sicurezza alimentare. Questo studio indaga le quattro soglie di sicurezza alimentare delle famiglie messicane utilizzando i microdati delle indagini 2018 e 2020 del National Household Income and Expenditure Survey (ENIGH), che contiene la scala di sicurezza alimentare dell'America Latina e dei Caraibi (ELCSA). In questa ricerca, valutiamo le differenze nelle quattro categorie di sicurezza alimentare sia con riferimento a variabili individuali e familiari che contestuali.*

Keywords: Food Insecurity, Covid19, Mexico, ELCSA

Adrian Vargas-Lopez, Tecnologico de Monterrey, School of Government and Public Transformation, Mexico City, Mexico; email: a.vargaslopez@tec.mx

Luca Secondi, University of Tuscia, Department for Innovation in Biological, Agro-food and Forest Systems (DIBAF), Via S. Camillo De Lellis, snc, Viterbo, 01100, Italy; email: secondi@unitus.it

1 Introduction

Food security is defined as "*having at all times, physical, social and economic access to sufficient, safe and nutritious food that meets dietary needs and food preferences for an active and healthy life*" (World Food Summit, 1996). On the other end, household food insecurity is a significant threat that targets vulnerable groups (Vilar-Compte et al., 2014). According to figures from FAO, almost 811 million people faced hunger last year.

The physical consequences of all forms of malnutrition intensify problems related to chronic illnesses, obesity and additional forms of maladies (Santana-Cárdenas and López-Uriarte, 2021). People living in food insecurity conditions significantly reduce their quality of life and cut their life expectancy (Hampton, 2007). Thus, reducing the number of people that suffer from food insecurity is morally urgent.

We know global crises intensify problems that individuals face daily (Vilar-Compte et al., 2014; Vilar-Compte et al., 2019). The Covid-19 pandemic is not the exception since several studies suggest that food supply chains were disrupted (Singh et al., 2021). Living in a family heavily hit by the pandemic made things more difficult for each member, where infants suffered the most (Magaña-Lemus et al., 2016).

In this study, we explore the likelihood of being into the four food security thresholds by referring to two different waves of the Mexican Household Income and Expenditure Survey (ENIGH) carried out in 2018 (before) and 2020 (during the Covid-19 pandemic).

The remainder of this paper is organized as follows. In the next section, we briefly describe the food security status in Mexico. Then, in Section 3, we describe the data and briefly mention the type of model we selected. In Section 4, we describe our results, while in Section 5, we draw the main conclusions and further necessary progress of the research.

2 Food insecurity in Mexico

In Mexico, individuals experiencing severe food insecurity are geographically located in some of the poorest regions (Mundo-Rosas et al., 2018). These areas are predominantly rural sites in the southern part of the country. Additionally, of these families, when asked if they speak an indigenous language, most state they do (Mundo-Rosas et al., 2018).

Concerning Mexicans' type of diet, Mundo-Rosas et al., 2019 find that having less healthy diets correlates with harsher food insecurity levels. Moreover, they also find that people with severe food insecurity have remained unchanged from 2012 until 2018, at 43%. Magaña-Lemus et al., 2016 paint a clear picture regarding the characteristics of the head of the household. Dwellings, where the head of the household is a woman with less education, single or widowed, younger,

with a disabled relative, experience higher insecurity levels (Magaña-Lemus et al., 2016). Mora-Rivera and van Gameren, 2021 find that homes with access to remittances improve their food security conditions (Mora-Rivera, J. and van Gameren, E., 2021).

3 Data and Methods

The data we used for the analysis considers two waves retrieved from the National Household Income and Expenditure Survey (ENIGH), a nationally representative survey conducted every two years. Most countries in Latin America measure food insecurity using the Latin American and Caribbean Food Security Scale (ELCSA). These are six questions where families signal if during the past three months they had access to a limited variety of food, whether they skipped a meal, if they had eaten less than they thought they should, if they ran out of food, if they felt hungry but did not eat, and if they had not eaten for a whole day. These questions are asked twice if in the household there are children (i.e., individuals younger than 18). The second time, respondents answer for the infants living in the dwelling (Villagómez-Ornelas, 2014).

The severity of food insecurity is constructed by the number of questions that people answer affirmatively. When households without children answer "Yes" to 5-6 questions, they are *Severely Insecure*. If they answer 3-4 questions affirmatively, they are *Moderately Insecure*; 1-2 questions, *Mildly Insecure*; and, 0 questions, *Secure*. Similarly, each threshold is built for households with and without children. Those homes with children that answer 8-12 questions affirmatively are *Severely Insecure*; 4-7, *Moderately Insecure*; 1-3, *Mildly Insecure*; and 0, *Secure*.

Additionally, the data we include in our model is if people live in an urban or rural condition (1 "Rural" or 0 "Urban"), their level of socioeconomic status (1 "Low", 2 "Medium Low", 3 "Medium High" or 4 "High"), the gender of the head of the household (1 "Male" or 0 "Female"), if they receive government's aid (1 "Yes" or 0 "No"), if the household receives remittances (1 "Yes" or 0 "No"), if they have a form of debt (1 "Yes" or 0 "No"), if they have received donations in the past three months (1 "Yes" or 0 "No"), if they live in a household with children (1 "Yes" or 0 "No"), the type of diet consumed at home to meet basic needs (1 "Poor", 2 "Bordering" or 3 "Acceptable"), and the region they belong (i.e., eight regions in total). Where traditionally, regions 6 and 7 are the ones with higher levels of poverty.

To analyze food insecurity in households, we used a multinomial logistic regression. The preliminary analysis considers the variables described in the data section as the vector of X_i independent variables and the four possible thresholds of food insecurity as the *k* categorical outcomes. Furthermore, we stick to the traditional approach of multinomial logistic regressions shown in Greene, 2012. Since the interpretation of the coefficients from multinomial logit is not straightforward because they are relative to the base outcome, we evaluated the

effect of covariates through Marginal Effects (ME) of changing their values on the probability of observing an outcome.

4 Results

Some of the preliminary results from Tables 1 and 2 show the average marginal effects of food insecurity conditions for 2018 and 2020.

Table 1: Average Marginal Effects by Food Insecurity Condition for 2018

	Secure	***Mild***	***Moderate***	***Severe***
Urban (ref.)	-	-	-	-
Rural	-0.007	0.017***	-0.003	-0.007***
	(0.005)	(0.004)	(0.003)	(0.003)
Socioeconomic (Low) (ref.)	-	-	-	-
Socioeconomic (MedLow)	0.076***	-0.030***	-0.023***	-0.024***
	(0.006)	(0.004)	(0.004)	(0.003)
Socioeconomic (MedHigh)	0.170***	-0.066***	-0.050***	-0.054***
	(0.008)	(0.006)	(0.005)	(0.004)
Socioeconomic (High)	0.255***	-0.100***	-0.076***	-0.079***
	(0.009)	(0.007)	(0.005)	(0.004)
Head HH (Female) (ref.)	-	-	-	-
Head Household (Male)	0.047***	-0.006*	-0.016***	-0.025***
	(0.004)	(0.003)	(0.003)	(0.002)
Government beneficiary	-0.095***	0.048***	0.029***	0.019***
	(0.004)	(0.003)	(0.003)	(0.002)
Receives remittances	0.028***	0.000	-0.013***	-0.016***
	(0.007)	(0.006)	(0.004)	(0.004)
Is in debt	-0.063***	0.020***	0.032***	0.011***
	(0.007)	(0.005)	(0.004)	(0.004)
Receives donations	-0.079***	0.036***	0.025***	0.017***
	(0.005)	(0.004)	(0.003)	(0.003)
Household with infants	-0.069***	0.026***	0.049***	-0.007***
	(0.004)	(0.003)	(0.002)	(0.002)
Diet (Poor) (ref.)	-	-	-	-
Diet (Bordering)	-0.016	0.093***	0.010	-0.086***
	(0.026)	(0.017)	(0.020)	(0.024)
Diet (Acceptable)	0.251***	0.064***	-0.063***	-0.252***
	(0.024)	(0.016)	(0.019)	(0.023)
Region 1 (ref.)	-	-	-	-
Region 2	-0.071***	0.029***	0.031***	0.011***
	(0.007)	(0.006)	(0.005)	(0.004)
Region 3	-0.094***	0.056***	0.026***	0.011***
	(0.007)	(0.006)	(0.004)	(0.004)
Region 4	0.005	-0.019***	0.002	0.012***
	(0.007)	(0.005)	(0.004)	(0.004)
Region 5	0.028***	-0.008*	0.009**	0.027***
	(0.006)	(0.005)	(0.004)	(0.003)
Region 6	-0.098***	0.019***	0.038***	0.042***
	(0.007)	(0.006)	(0.005)	(0.004)
Region 7	-0.146***	0.077***	0.042***	0.028***
	(0.008)	(0.007)	(0.005)	(0.004)
Region 8	-0.030***	0.004	0.013***	0.013***
	(0.007)	(0.005)	(0.004)	(0.004)
N	74,647	74,647	74,647	74,647

Notes: Ref.- Reference category; SE in parenthesis; * p<0.10, ** p<0.05, *** p<0.01

Table 2: Average Marginal Effects by Food Insecurity Condition for 2020

	Secure	***Mild***	***Moderate***	***Severe***
Urban	-	-	-	-
Rural	0.023***	-0.000	-0.009***	-0.014***
	(0.004)	(0.004)	(0.003)	(0.002)
Socioeconomic (Low)	-	-	-	-
Socioeconomic (MedLow)	0.084***	-0.035***	-0.026***	-0.024***
	(0.005)	(0.004)	(0.003)	(0.003)
Socioeconomic (MedHigh)	0.188***	-0.073***	-0.061***	-0.054***
	(0.007)	(0.006)	(0.004)	(0.004)
Socioeconomic (High)	0.274***	-0.112***	-0.082***	-0.081***
	(0.008)	(0.006)	(0.005)	(0.004)
Head Household (Female)	-	-	-	-
Head Household (Male)	0.035***	-0.004	-0.015***	-0.016***
	(0.004)	(0.003)	(0.002)	(0.002)
Government beneficiary	-0.027***	0.024***	0.008***	-0.005***
	(0.004)	(0.003)	(0.002)	(0.002)
Receives remittances	0.011	0.011*	-0.011**	-0.011***
	(0.007)	(0.006)	(0.004)	(0.004)
Is in debt	-0.073***	0.031***	0.024***	0.018***
	(0.006)	(0.005)	(0.004)	(0.003)
Receives donations	-0.081***	0.030***	0.028***	0.024***
	(0.004)	(0.003)	(0.003)	(0.002)
Household with infants	-0.084***	0.030***	0.054***	-0.000
	(0.003)	(0.003)	(0.002)	(0.002)
Diet (Poor)	-	-	-	-
Diet (Bordering)	0.089***	0.056***	-0.030	-0.115***
	(0.025)	(0.020)	(0.022)	(0.025)
Diet (Acceptable)	0.365***	0.036*	-0.110***	-0.291***
	(0.023)	(0.019)	(0.021)	(0.024)
Region 1	-	-	-	-
Region 2	-0.075***	0.042***	0.036***	-0.003
	(0.007)	(0.006)	(0.004)	(0.003)
Region 3	-0.093***	0.050***	0.033***	0.010***
	(0.007)	(0.006)	(0.004)	(0.004)
Region 4	0.047***	-0.036***	-0.010***	-0.001
	(0.006)	(0.005)	(0.004)	(0.004)
Region 5	0.021***	-0.033***	0.001	0.010***
	(0.005)	(0.004)	(0.003)	(0.003)
Region 6	-0.085***	0.020***	0.039***	0.026***
	(0.007)	(0.006)	(0.004)	(0.004)
Region 7	-0.109***	0.061***	0.036***	0.012***
	(0.008)	(0.006)	(0.005)	(0.004)
Region 8	0.026***	-0.021***	-0.001	-0.004
	(0.006)	(0.005)	(0.004)	(0.003)
N	89,006	89,006	89,006	89,006

Notes: Ref.- Reference category; SE in parenthesis; * p<0.10, ** p<0.05, *** p<0.01

The analysis of the two ENIGH waves led us to a picture of household food (in)security in Mexico and changes that occurred with the COVID-19 pandemic. As a general result, we found that food insecurity conditions remained similar before and during the pandemic for socioeconomic status. People living in a high economic power household still maintain higher chances of food security (and vice versa). However, specific findings deserve to be mentioned and further investigated. First, people living in rural zones were less likely to become food insecure during the Covid-19 period than people living in urban areas. Second, receiving government's aid has helped to stave off severe food insecurity. Third, maintaining a close to or acceptable diet confirmed in both 2018 and 2020 (during the pandemic) is an

essential driver of reducing household food insecurity, holding other variables constant. Lastly, the regional effect - proxied at this stage by the dummy variables in the model - shows that the probability of being severely food insecure in 2020 measured through ME was lower than 2018 in regions 5 and 7, while it remained constant for region 1, ceteris paribus.

5 Conclusions

Traditional public policies designed to reverse the effects of food insecurity have to account for the multiple variables operating at different levels. In this study, we begin to explore and understand how the regions have different food insecurity levels and how the context where individuals live can explain food insecurity levels. It is worth noting that these are preliminary results, and further analysis is needed in order to disentangle correctly, through a multilevel approach, the variability of food insecurity at least into individual/households and state/regional levels.

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