

Article

Food-Away-from-Home Expenditure in Mexico during the COVID-19 Pandemic: A Micro-Econometric Analysis

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Abstract: Disruptive events such as the coronavirus disease 2019 (COVID-19) pandemic have the potential to reshape even the most basic human systems and behaviors, including those related to food production, acquisition, and consumption. This paper provides an in-depth analysis of how the pandemic has changed the ratio of food-away-from-home (FAFH) expenditure to income in Mexico, as well as participation in this market. In 2020, household participation in FAFH expenditures declined in all income deciles and regions, but the impact on household shares is far from uniform. Using a detailed national database of household income and expenditures (N = 87,274), an Engel curve of the Working-Lesser functional form for FAFH including 19 independent variables was estimated using the Heckman method appropriate for censored response data. The results provide statistically significant estimates for income, which both increases the probability of participation in this expenditure and has a negative relationship with its budget share. The number of older adults and the exposure to food insecurity during the pandemic similarly limit participation and increase the budget share. In addition, remittances encourage participation and decrease the budget share. The corrected conditional income elasticity for FAFH is 0.4609; the sign and magnitude indicate that FAFH behaved as a necessary good in Mexico for the proportion of households that maintained spending during the lockdown conditions (about one-third of the sample). An increase or decrease in income will lead to a corresponding change in FAFH expenditure, but the change will be less than proportional.

Keywords: elasticity; Engel curve; food-away-from-home expenditure



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1. Introduction

Since the coronavirus disease 2019 (COVID-19) was declared a pandemic, various public health measures have been taken worldwide to reduce transmission. In Mexico, these measures have included the cancelation of mass events, closure of schools and workplaces, and social distancing [1]. These measures address two levels: micro (schools, workplaces, and households) and macro (city, state, and nation). At the macro level, interventions related to food-away-from-home (FAFH) spending include persuading people to avoid going to cafes and restaurants, increasing the space between tables and the provision of outdoor areas in such places, and the closing of establishments [2].

The strategy to curb the spread of the virus in Mexico is based on the so-called COVID-19 traffic light system, which was introduced on 22 July 2020. This system was designed to regulate the use of public spaces according to the risk of infection. Thus, the measures were classified into four categories or colors (hence the name), which were established at the state level [3]. Some of the provisions of this system have a direct impact on FAFH spending, as they limit the amount of time that catering establishments are open to the public or the capacity in which they are allowed to operate.

Because age and the presence of multiple preexisting comorbidities are among the most important predictors of COVID-19 severity and mortality [4], vulnerable groups were encouraged to remain at home, such as the elderly and people with chronic illnesses.

The pandemic led to changes throughout the food supply chain [5], some of which include (1) the introduction of innovative business models (such as online food delivery) [6], (2) a reduction in FAFH spending, although this was partially offset by take-away orders [7], and (3) food stockpiling [8].

Using data from an online survey conducted between December 2020 and January 2021, a recent study found that Mexican households changed their consumption behavior by (1) increasing their cash spending on food, (2) increasing the number of meals that family members share at home, (3) increasing online purchases, (4) improving meal planning and shopping, with the goal of staying at home as much as possible, and (5) reducing food waste [9]. However, the sample size in this study is small (525 observations).

Household data collection is a widespread practice in countries around the world. In the case of Mexico, a nationwide household expenditure survey, the Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH), conducted between 21 August and 28 November 2020, coincided with the first year of the pandemic. The results provide an opportunity for a deeper analysis of the impact of such a historical event on spending patterns. Comparable data are not available for other major economies in the region such as Argentina (2017–2018 edition) [10], Brazil (2017–2018 edition) [11], and Chile (2021–2022 edition) [12].

The data suggest (full survey) that average quarterly household expenditure on FAFH decreased by 44.46% between 2018 and 2020 (from 2524.45 to 1402.02 Mexican pesos, base second half of July 2018). On average, household participation in FAFH (measured as the share of households with FAFH expenditure > 0) decreased from 50.09% in 2018 to 32.42% in 2020. During the same period, participation decreased from 30.02% to 24.57% for households with family members aged 65 and older, and from 53.70% to 35.07% for the remaining households [13]. We traced the evolution of FAFH expenditure from 2008 to 2020 using previous surveys to get a glimpse at the impact of the pandemic.

In Mexico, the changes induced by the pandemic reshaped the relationship between income and FAFH expenditure in two ways: (1) dampening household participation (Figure 1) and (2) changing the budget shares (Figure 2).

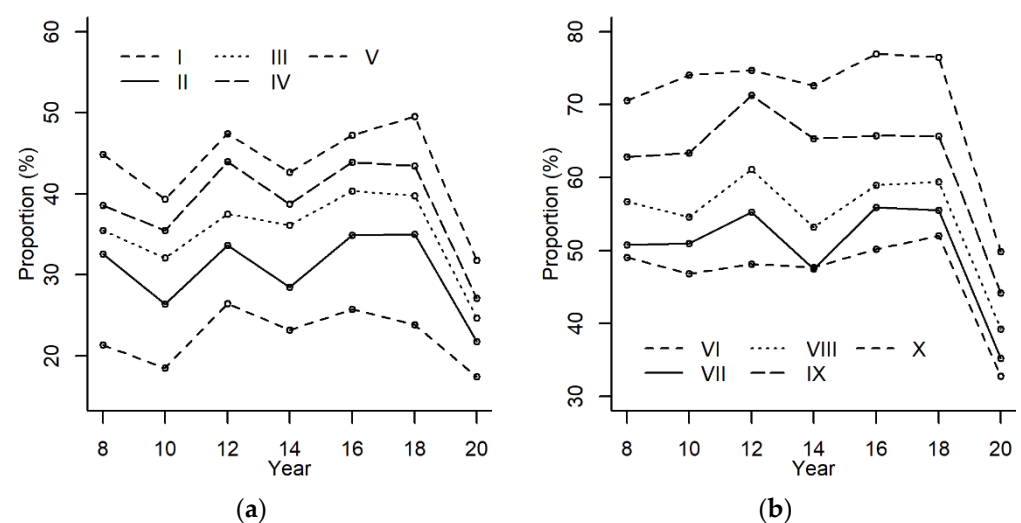


Figure 1. Proportion of households where FAFH > 0, by income decile, 2008–2020, for: (a) lower deciles; (b) upper deciles. Quarterly data (fuera_hog or ali_fuera depending on survey). Source: own elaboration with data from Instituto Nacional de Estadística y Geografía (INEGI) [13].

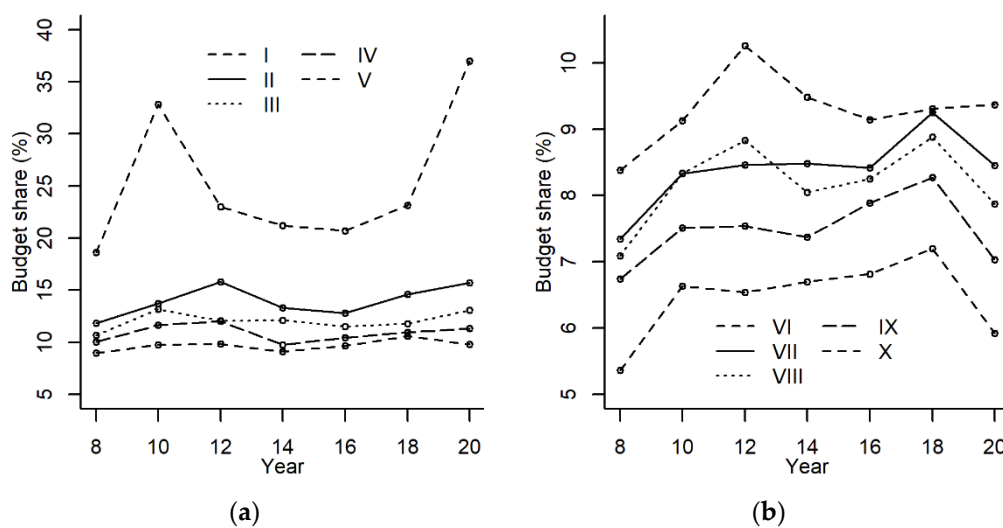


Figure 2. Average budget share for FAFH expenditure by income decile (households where budget share >0), 2008–2020, for: (a) lower deciles; (b) upper deciles. Quarterly data. The share for households with no income was set to 0 in decile I. Source: own elaboration with data from INEGI [13].

In fact, household participation in FAFH spending declined in all income deciles in 2020, reversing the slightly positive trends of the previous decade. In the poorest decile, participation fell from 23.86% to 17.46%, while, in the richest decile, it fell from 76.52% to 49.83%. Thus, the impact on the budget shares (i.e., the ratio of expenditure to income) was not uniform: they rose in the lower deciles, remained stable in the middle, and fell in the upper deciles. Interestingly, in 2008, during the global financial crisis, a similar decline was observed in the upper deciles, although participation was relatively less affected. Spatially, the negative impact on participation was not evenly distributed. The states that experienced the largest declines were Campeche, Sinaloa, and Oaxaca. Michoacan, Nayarit, and Aguascalientes were less affected (Table 1).

Prior to COVID-19, Mexico was already one of the members of the Organisation for Economic Cooperation and Development (OECD) with high levels of income inequality (Gini coefficient = 0.418 in 2018). In 2020, the percentage of the population experiencing some degree of poverty was 43.90%, compared to 41.90% in 2018. In addition, the wages of those workers who were able to keep their jobs fell by an average of 10.30% [14], and 24.92% of companies in the service sector were forced to close permanently [15]. On a positive note, Mexico was one of the five countries that received the most money from abroad; remittances were Mexico’s second most important source of revenue, accounting for over 40,000 M USD (3.80% of GDP). This inflow, together with the devaluation of the currency, helped to support household consumption [16].

Participation in FAFH expenditure was low among households with family members aged 65 years and older before the pandemic. These households account for about a quarter in the ENIGH data (23.03% in 2018 and 25.31% in 2020). Figure 3 shows a breakdown of household participation in FAFH expenditure by the presence/absence of family members aged 65 and older and a dummy variable indicating whether the household received cash transfers during the relevant survey.

Table 1. Proportion of households with FAFH > 0 by state, ENIGH 2008–2020. Quarterly data.

State	2008	2010	2012	2014	2016	2018	2020	Δ (%) ¹
Aguascalientes	55.51	52.39	51.20	49.91	53.87	58.19	42.82	−26.41
Baja California	44.05	50.62	61.31	51.57	56.69	60.74	36.46	−39.97
Baja California Sur	55.67	39.05	51.36	40.56	43.04	47.65	30.96	−35.03
Campeche	57.25	43.98	41.32	39.39	48.33	50.27	18.32	−63.56
Coahuila	34.96	30.88	43.53	43.90	35.51	33.47	18.50	−44.73
Colima	54.71	54.42	56.09	56.25	58.45	65.70	44.18	−32.75
Chiapas	35.19	21.78	27.47	28.87	28.28	32.73	21.04	−35.72
Chihuahua	31.97	17.37	15.30	39.60	38.86	45.63	28.79	−36.91
Ciudad de México	63.64	59.81	65.82	58.91	68.11	64.78	45.43	−29.87
Durango	45.49	41.30	47.65	36.98	40.98	37.60	20.37	−45.82
Guanajuato	43.09	35.77	56.04	41.31	51.69	44.80	30.92	−30.98
Guerrero	50.76	56.16	54.91	55.17	54.29	48.64	26.15	−46.24
Hidalgo	31.98	34.76	41.51	51.89	44.77	49.93	28.06	−43.80
Jalisco	53.41	63.95	57.54	57.11	62.06	64.68	46.07	−28.77
México	47.24	48.42	52.77	33.39	47.66	56.73	41.08	−27.59
Michoacán	48.54	44.75	64.43	57.35	61.63	53.91	46.63	−13.50
Morelos	57.13	49.83	52.83	54.44	56.52	56.51	36.29	−35.78
Nayarit	59.40	61.06	59.33	60.08	57.67	48.86	39.52	−19.12
Nuevo León	41.80	48.78	41.40	44.52	44.94	36.58	23.64	−35.37
Oaxaca	30.09	36.88	43.89	49.45	41.72	44.44	23.29	−47.59
Puebla	44.70	41.26	44.17	45.99	49.37	44.47	27.80	−37.49
Querétaro	44.95	54.19	49.65	52.09	52.62	51.37	36.01	−29.90
Quintana Roo	51.08	58.55	60.08	46.18	58.23	59.83	32.17	−46.23
San Luis Potosí	42.12	39.39	51.46	46.74	44.06	40.33	26.32	−34.74
Sinaloa	47.69	38.23	30.04	38.08	48.51	49.20	24.87	−49.45
Sonora	38.84	53.36	50.58	45.09	51.48	48.04	31.52	−34.39
Tabasco	37.26	37.52	48.12	45.46	42.99	40.77	21.92	−46.23
Tamaulipas	44.02	34.63	56.68	36.24	51.50	43.88	24.44	−44.30
Tlaxcala	47.79	65.92	37.96	48.52	47.01	46.33	25.87	−44.16
Veracruz	47.87	27.24	49.29	41.97	43.49	43.94	23.16	−47.29
Yucatán	53.11	50.88	60.35	55.03	52.13	53.51	29.04	−45.73
Zacatecas	38.55	29.62	43.28	39.78	33.62	40.91	27.10	−33.76

¹ Change in the proportion of households where FAFH > 0 between 2018 and 2020, by state. Source: own elaboration with data from INEGI [13].

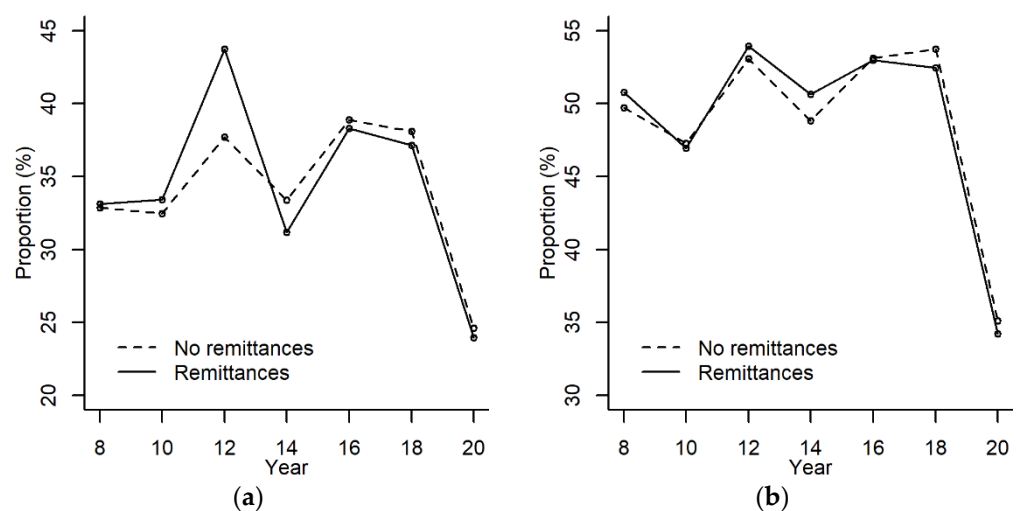


Figure 3. Proportion of households where FAFH > is 0, by household type and indicator of remittances, 2008–2020, for: (a) households with family members aged 65 and over; (b) rest of the households. Quarterly data. Source: own elaboration with data from INEGI [13].

This new situation requires a reassessment of the relationship between income and FAFH expenditure under the conditions imposed by the pandemic. The objective of this paper is therefore to estimate an Engel curve for FAFH in Mexico for 2020. Adhering to the strict version of Engel’s Law, we used income as the main independent variable and the budget share for FAFH as the dependent variable. We hypothesized and confirmed that the

budget share for FAFH decreases as income increases, confirming Engel's Law. A second objective was to provide an estimate for income elasticity.

We also set out to analyze the determinants of household participation in FAFH expenditure in 2020. In doing so, we focused on the effect of the number of household members aged 65 years and older, a dummy variable indicating whether the household received remittances, and a dummy variable indicating whether the household experienced food insecurity during the pandemic. We hypothesized that participation is dampened when the number of household members in that age group increases as well as when the household experienced food insecurity, whereas the presence of remittances increases participation.

The principle known as Engel's Law states that low-income households spend a larger proportion of their budget on food [17]; nevertheless, it cannot be assumed that the principle also applies to the individual components of the category [18] (in our case, the principle may be already appreciated in Figure 2). This fact has led to several studies in which food expenditure has been divided into two branches: food-at-home (FAH) and food-away-from-home. The basis for this distinction can be derived from Becker's theory of time allocation, which extends classical demand theory to account for the effects of prices, income, demographics, opportunity costs, and time constraints on household spending. In this approach, the cost of food can be extended to include the time spent on all stages of eating. The resources of the household are limited, therefore, depending on its characteristics, it decides whether to devote time to all phases (i.e., preparing FAH) or only to some of them (i.e., eating FAFH) [19].

In the United States, the second half of the 20th century witnessed FAFH expenditure growing faster than FAH expenditure, resulting in an increase in the former's share of total food expenditure (TF). This trend prompted domestic research [20–25], which later spread to countries such as Bangladesh [26], China [27], Slovakia [28], Spain [29], and Turkey [30]. Some extensions to the studies on FAFH are the inclusion of the food facility type [31] and consumption circumstances [32]. This trend is important for the functioning of agricultural markets and the allocation of resources.

Part of the literature on FAFH expenditure has been devoted to the question of whether Engel's Law also applies to this subcategory [18,33], using the so-called Engel curves. In microeconomics, Engel curves are used to describe household expenditure on goods or services as a function of household income.

Household surveys have been used in several countries to estimate Engel curves for FAFH. Lanfranco, Ames, and Huang [34] analyzed food expenditure patterns for households of Hispanic origin in the United States and estimated curves for three food categories: TF, FAH, and FAFH; data were compiled from the 1994–1996 Continuing Survey of Food Intakes by Individuals. Tey, Shamsudin, Mohamed, Abdullah, and Radam [35] found evidence of the curves for FAFH in Malaysia using the 2004–2005 household expenditure survey. García Arancibia [32] estimated curves for total FAFH and two consumption circumstances in Argentina using data from the Encuesta Nacional de Gastos de Hogares 1996–1997. More recently, Queiroz and Coelho [36] used the Pesquisa de Orçamentos Familiares 2008–2009 to construct curves for Brazil.

Studies in relation to FAFH expenditure in Mexico include the use of a binomial logit to analyze the determinants of households' participation in this market, using data from 1992 and 2008 [37], and an analysis of the changes in the budget share and frequency of FAFH expenditure during the period 1984–2014 [38]. Both examples used the Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH) national survey. However, there is no recent study that examines whether Engel's Law applies to FAFH expenditure in Mexico, and certainly not under the conditions of a pandemic. Previous studies have been conducted during a period of relative economic stability; nevertheless, they did not consider the effect of food insecurity or remittances.

Regarding the methodological approach, we used a two-step estimation method consisting of a participation equation and a level equation, known as the Heckman method.

Studies conducted over the years have suggested that FAFH expenditure can be classified as necessary good in countries such as Argentina, Malaysia, and the United States [22,24,25,31–35]. However, these results cannot be generalized because, in countries such as Slovakia, FAFH is perceived as a luxury good [28].

The rest of the article is organized as follows: in the Section 2, we describe the two-stage Heckman procedure for estimating single-equation representations of Engel curves, then the variables used in the procedure and the database. In the Section 3, we present the estimates of the two equations. Finally, in the Section 4, we interpret the significance of the results, considering similar studies.

2. Materials and Methods

The Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH) is a comprehensive statistical survey that tracks household income and expenditure trends in Mexico. It is common to find zero expenditures in the survey for some goods or services, a phenomenon known as censored data. The two-step Heckman (or Heckit) procedure has been used to circumvent this problem in single-equation Engel curves [39].

The Heckman procedure builds on the idea that censored data on household expenditure on goods and services can be understood as a combination of a selection mechanism for the purchase decision and a model for the level of consumption or expenditure.

The selection mechanism, the first step, is represented by the decision equation:

$$d_i = z_i' \gamma + u_i. \tag{1}$$

This step is applied to the entire sample of households. In the equation, d_i is an indicator variable that takes the value 1 if spending is observed in household i , and 0 otherwise; the vector z_i represents the regressors affecting the purchase decision and includes (a set of observed household sociodemographic characteristics); γ is a vector of coefficients determined by the Maximum Likelihood estimation (ML) of a Probit model, where:

$$Pr[d_i = 1 | z_i] = \Phi(z_i' \gamma). \tag{2}$$

The purpose of the first step is to generate estimates for the bias correction term (also known as the Inverse Mills Ratio, or *IMR*) given by:

$$\hat{\lambda}_i = \phi(z_i' \hat{\gamma}) / \Phi(z_i' \hat{\gamma}); \tag{3}$$

Φ is the standard normal cumulative distribution function and ϕ is the standard normal probability density function.

In the second step, Ordinary Least Squares (OLS) or Generalized Least Squares (GLS) are applied to the chosen functional form of the Engel curve plus the *IMR*. GLS are the favored method in the presence of heteroskedasticity, which is a common trait in cross-sectional data. Thus, the level equation is:

$$y_i = x_i' \beta + \theta \hat{\lambda}_i + \varepsilon_i, \tag{4}$$

where x_i represents a vector of sociodemographic features of the household that affect the level of expenditure. This step only uses the sample of households where expenditure is observed.

In the paper at hand, the decision equation is given by:

$$d_i = \gamma_1 + \gamma_2 \ln(\text{income}_i) + \sum_{k=3}^k \gamma_k z_{k,i} + u_i, \tag{5}$$

where d_i indicates whether food-away-from-home (FAFH) expenditure is observed in household i .

The Engel curve used in the second step follows the Working-Lesser form, because it allows a direct test of Engel's Law [21]. Thus, the level equation is given by:

$$y_i = \beta_1 + \beta_2 \ln(\text{income}_i) + \sum_{k=3}^k \beta_k x_{k,i} + \theta \hat{\lambda}_i + \varepsilon_i, \quad (6)$$

where y_i stands for the budget share of FAFH expenditure. This equation indicates that the share of income devoted to FAFH, its budget share, tends to change in arithmetic progression as income changes in geometric progression.

In this paper, we present a corrected estimate for the income elasticity of the budget share of FAFH (i.e., monetary spending on goods and services for the household). At the mean of the data, the elasticity is given by:

$$e_s = 1 + \frac{1}{E(y_i)} \left[\hat{\beta}_2 + \hat{\theta} E \left(\frac{\partial}{\partial z_2} \hat{\lambda}_i \right) \right], \quad (7)$$

where $z_2 = \ln(\text{income})$. This is equivalent to [39]:

$$e_s = 1 + \frac{1}{E(y_i)} \left[\hat{\beta}_2 - \hat{\theta} \hat{\gamma}_2 \left\{ E(z'_i \hat{\gamma}) E(\hat{\lambda}_i) + E(\hat{\lambda}_i^2) \right\} \right]. \quad (8)$$

The ENIGH data are collected by Mexico's Instituto Nacional de Estadística y Geografía (INEGI) and are representative at the national level. The survey includes a series of tables on the level, origin, and distribution of income, as well as the demographic characteristics of household members and the physical features of the homestead. The main attributes for the households in the sample can be found in the 'concentradohogar' table, which contains records of expenditure on selected food groups (including FAFH) and income.

The FAFH expenditure category defined by ENIGH is composed of three types of expenditure: (1) G1, or monetary expenditure on goods and services for the household, (2) G6, or nonmonetary expenditure due to transfers from institutions, and (3) G4, or nonmonetary expenditure due to benefits in kind. In this analysis, we take G1 as the measure of FAFH expenditure because it represents an actual monetary disbursement.

The dependent variables used in the analysis are: *fafh_dum*, a dummy variable that takes the value of 1 if quarterly food and beverage out-of-home expenditures are observed (i.e., $G1 > 0$), and 0 otherwise; and *fafh_bsh*, the ratio of quarterly food and beverage out-of-home expenditures to quarterly current income ($G1/\text{income}$).

The independent variables are: *income*, equal to the household's current quarterly income (sum of income from work, rents, transfers, imputed rent, etc.); *household size*, equal to the number of household members (domestic workers and their families are not included, nor are guests); *age*, measures the age of the household head; *female* is a dummy variable for the biological sex of the household head, equal to 0 if male; *employed*, equal to the number of employed household members (14 years and older); *hours* adds the hours worked by household members aged 14 and over in the past week; *p11* represents the number of household members aged 11 and under; *p65* equals the number of household members aged 65 and over; *food insecurity* is a dummy variable indicating whether the household feared running out of food in the previous quarter due to lack of income or resources. It equals 1 if the answer is affirmative, 0 otherwise; *urban* is a dummy variable that equals 1 for households in places with a population of 15,000 or more, 0 otherwise; *internet*, *automobile*, *microwave* are categorical variables indicating whether the corresponding item is present in the household, 1 if affirmative, 0 otherwise; and *tourism* indicates whether the household has expenditure on tourist celebrations, accommodation, and lodging, 1 if affirmative, 0 otherwise.

Scholarships are a source of income that can increase the probability of FAFH expenditure for households in Mexico [37]. Therefore, we added the variable *scholarship* to indicate whether a household received such income from the government or other institutions,

equal to 1 if affirmative, 0 otherwise. In the same way, we added the dummy variable *remittances* to indicate whether a household received income from abroad (usually from family members living in the United States), equal to 1 if affirmative, 0 otherwise.

The categorical variable *region* takes the values: NW (Baja California, Baja California Sur, Chihuahua, Durango, Sinaloa, and Sonora), NE (Coahuila, Nuevo León, and Tamaulipas), W (Colima, Jalisco, Michoacán, and Nayarit), E (Hidalgo, Puebla, Tlaxcala, and Veracruz), CN (Aguascalientes, Guanajuato, Querétaro, San Luis Potosí, and Zacatecas), CS (Ciudad de México, Estado de México, and Morelos), SW (base category which includes: Chiapas, Guerrero, and Oaxaca), and SE (Campeche, Quintana Roo, Tabasco, and Yucatán). The levels for the *head of household education* variable are none or kindergarten (base category), primary school, secondary school, high school and technical school, and university degree (incomplete or complete in each case). The levels for the variable *household type* are single person household (*unipersonal*), core household (*nuclear*, base category), multi-person household (*extended*), multi-person household (*composite*), and co-habitants (*co-resident*).

The ENIGH 2020 contains 89,006 records representing—larger number of households, in line with the survey design. For the budget shares to be confined between zero and one, households that reported no income, or expenditure either on FAFH or FAH greater than income, were removed from the sample. This resulted in a subset of 87,274 households (or 35,123,275 after accounting for the expansion factor).

The data suggest that, on average, households spent about 3.09% of their income on FAFH. In addition, 31.62% of households in the sample participated in FAFH consumption in 2020 (as measured by G1 in the survey subset). Summary statistics for the main variables used in the analysis are presented in Table 2 (means obtained with the *svyratio* function from the *survey* package and standard deviations with the *svysd* function from the *jtools* package, both from the R software).

Table 2. Descriptive statistics of the variables used in the analysis (survey weighted).

Variable	Non-Zeros (%)	Mean ¹	Std. Dev.	Min	Max
Income	100.00	51,033.29	68,662.85	1096.72	10,702,107.40
FAFH (G1 + G6 + G4)	32.53	1524.22	4022.48	0.00	157,371.39
G1	31.62	1502.75	4016.34	0.00	157,371.39
G6	0.10	1.03	43.51	0.00	6428.50
G4	1.28	20.45	234.59	0.00	26,999.91

¹ Figures in Mexican pesos. Source: own elaboration with data from INEGI [13].

Data analysis was performed using the open-source software R, version 4.1.1, and Rstudio Desktop 2021.09.0 + 351. In the first step, the participation equation was fitted considering the ENIGH sample design using the *svyglm* function from the *survey* package, version 4.1-1. In the second step, the adjustment was performed considering the frequency weights obtained from the sampling design using the function *lm* from the *stats* package, version 4.1.1. The bootstrapped standard errors specified for the second step were obtained using the *boot* function from the *car* package, version 3.0-11. The code is available upon request.

3. Results

As mentioned above, we applied the two-stage Heckit or Heckman method to estimate an Engel curve for food-away-from-home (FAFH) expenditure in Mexico, using a subset of the Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH) 2020 data. Our results suggest that this expenditure can be modeled as a two-stage process, as the coefficient associated to the Inverse Mills Ratio (*IMR*) is statistically significant in the second stage. This indicates that the correlation between the error term from the participation equation and the error term from the level equation is different from zero.

The results for each of the two steps of the Heckit method are shown in Table 3. The first column shows the results of the Maximum Likelihood estimation (ML) of the

participation equation (survey-weighted), while the second column shows the results of the Ordinary Least Squares (OLS) estimation of the level equation (weighted by the frequency indicator factor available in the dataset).

Table 3. Heckit estimates of the Engel curve for FAFH expenditure in Mexico during 2020.

Covariate ¹	Dependent Variable	
	Fafh_dum (Probit)	Fafh_bsh (OLS)
Ln (income)	0.3354 *** (0.0140)	−0.0616 *** (0.0023)
Household size	−0.1408 *** (0.0091)	
Age	−0.0105 *** (0.0006)	−0.0002 (0.0001)
Employed	0.0962 *** (0.0114)	0.0005 (0.0012)
Hours	0.0015 *** (0.0002)	0.0001 ** (0.00002)
P11	0.0238 * (0.0122)	−0.0021 * (0.0011)
P65	−0.0389 ** (0.0154)	−0.0006 (0.0019)
Food insecurity	−0.0740 *** (0.0150)	−0.0094 *** (0.0020)
Internet	−0.0090 (0.0173)	0.0023 (0.0022)
Automobile	0.1004 *** (0.0176)	0.0080 *** (0.0020)
Microwave	0.0905 *** (0.0159)	0.0066 *** (0.0020)
Tourism	0.2166 *** (0.0372)	0.0025 (0.0040)
CN	0.0232 (0.0278)	
NW	−0.1792 *** (0.0283)	
E	−0.0176 (0.0294)	
W	0.4007 *** (0.0322)	
CS	0.3291 *** (0.0329)	
NE	−0.3758 *** (0.0337)	
SE	−0.0928 *** (0.0292)	
Woman	−0.0733 *** (0.0164)	−0.0181 *** (0.0020)
Urban	0.0751 *** (0.0177)	0.0042 ** (0.0021)
Scholarship	−0.0905 ** (0.0409)	0.0012 (0.0043)
Remittances	0.0913 *** (0.0289)	−0.0160 *** (0.0033)
Primary	−0.0262 (0.0294)	−0.0070 (0.0053)
Secondary	0.0004 (0.0319)	−0.0019 (0.0054)
High School	0.0626 * (0.0359)	0.0014 (0.0057)
Professional and graduate	0.0444 (0.0373)	0.0068 (0.0058)
Unipersonal	0.3940 *** (0.0256)	0.0179 *** (0.0037)
Extended	0.1117 *** (0.0191)	0.0031 (0.0023)
Composite	0.3033 *** (0.0794)	0.0070 (0.0068)
Co-resident	0.1882 * (0.1136)	0.0357 ** (0.0166)
G4	−0.1395 ** (0.0588)	−0.0239 *** (0.0059)
IMR		−0.0321 *** (0.0046)
Constant	−3.4787 *** (0.1397)	0.7914 *** (0.0270)
Observations	87,274	24,626
R ²		0.140
Log Likelihood	−48,007.67	
F Statistic		160.1489 *** (df = 25; 24,600)

¹ Standard errors in parentheses (for OLS, bootstrapped estimates after 2000 samples); * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Source: own elaboration with data from Instituto Nacional de Estadística y Geografía (INEGI) [13].

The variables used in the first stage of the analysis correspond to those of the model proposed by Llamas Huitrón et al. [37] for the probability of FAFH expenditure in Mexico. The Working-Lesser Engel curve was estimated on the same variables from the first step plus the *IMR*, minus those discarded by stepwise regression.

The results of the first equation show that the probability of participating in FAFH expenditure increases with *income* (which is in line with the trends observed in Figure 1). This supports the idea that FAFH behaves like a normal good, in the sense that better-off households have a higher participation rate. Large households imply the possibility of division of labor and thus lower opportunity costs for internally produced goods and services, such as food. This could be the reason for the negative coefficient for *household size*

and the positive coefficient of *unipersonal*. On the other hand, more working *hours* leave less time available for cooking, increasing participation in FAFH expenditure, however this is not compensated by larger incomes, since the budget share increases as well.

The coefficient on *age* suggests that the older the head of the household, the less involved the household is in economic and social activities (bear in mind the mandate to stay at home), which in turn decreases participation in FAFH expenditure. The coefficient of *p65* supports this interpretation.

Theoretically, the effects of *scholarship* and *remittances* on the household are similar: they expand the consumption possibility frontier; however, the results suggest different effects in the participation equation: the first variable reduces participation, while the second increases it.

The variables *internet*, *automobile*, *microwave*, and *tourism* were added to capture the impact of the strategies of those households that maintained their spending despite the restrictions. Only *automobile*, *microwave*, and *tourism* were found to be statistically significant and had a positive effect on participation.

The dummy variables *food insecurity* and *woman* affect the probability of participation in FAFH expenditure. The interpretation of the first variable is relatively straightforward, but the effect of the second is not. A paid job increases the opportunity cost of cooking at home and decreases the time available for such purposes; therefore, the negative coefficient could indicate the dual task of having to work and cook for the family.

All variables in the first step have a variance inflation factor (VIF) value below the threshold of 10; thus, the model does not exhibit collinearity. As expected, the coefficient on the logarithm of income in the Working-Lesser Engel curve is negative and statistically significant. The corrected conditional elasticity at the mean of the data is 0.4609, and the positive sign indicates that FAFH spending is considered a normal good by Mexican households that maintained their spending in 2020.

The dummy variables *food insecurity*, *woman*, and *remittances* have negative and statistically significant coefficients. This indicates that these attributes decrease the budget share of FAFH. On the other hand, *automobile* and *microwave* increase the budget share.

All variables in the second step have a VIF below the cut-off value of 10. However, since the standard errors from the OLS estimates are prone to heteroskedasticity, we present bootstrapped standard errors instead.

4. Discussion

The paper presents an in-depth analysis of food-away-from-home (FAFH) expenditure in Mexico under the lockdown conditions imposed by the coronavirus disease 2019 (COVID-19) pandemic in 2020. The sanitary measures introduced in the country, such as mobility restrictions and the closure of businesses, schools, and universities, as well as food shops and restaurants, changed the way the population accessed food, as well as the preparation and the place it was eaten. Our focus was the change related to a specific food channel, namely FAFH. Food purchases and consumption behavior were altered during the pandemic by risk management and perception; for example, consumers tried to minimize the risk of contagion by increasing the use of delivery services or purchasing more packaged food, which was seen as being more hygienic [40]. In this regard, the willingness to adopt preventive measures is affected by risk-averse behavior, whereas their adoption hinges on peer groups' beliefs, self-efficacy, perceived risk, and knowledge about the pandemic [41].

The results of this study indicate that Mexican households in the sample spent 29.47% of their income on total food, i.e., food-at-home (FAH) and FAFH. FAH accounted for 26.33%, while FAFH accounted for the remaining 3.13% (actual cash expenditures on goods and services for the household, or G1, account for 3.09%). In comparison, Hispanic households in the United States (about half of them of Mexican origin) spent 29.40% of their income on food overall; 25.80% on FAH and 3.60% on FAFH [34].

The increase in FAFH expenditure was a well-recognized phenomenon in many developed and developing countries before the pandemic, mainly due to alternatives of access such as apps for home-delivery. In the wake of the COVID-19 outbreak, more people have been relying on these apps and other delivery services [42]. Nevertheless, our results show that the number of households participating in this market decreased in Mexico in all income deciles and regions during the first year of the pandemic, though the impact on their budget shares was diverse. Moreover, we found that income displays a negative relationship with the budget share for this expenditure, as predicted by Engel's Law.

Several research papers [20,22–25] have confirmed that expenditure on FAFH grew faster than FAH expenditure, resulting in an increase in the former's share in total food (TF) expenditure. For example, urban households in China were more likely to eat out and tended to spend more as income increased, but at a decreasing rate [27]. These results led to the conclusion that FAFH is an important driver of the food supply system, including the primary agricultural production and the downstream strategic collaboration arrangements, since they significantly affect the development trends and business conduct. As such, one direction for new research is the effect of the pandemic on climate change and the attainment of the goals in the post COVID-19 era [43].

In the meantime, the pandemic has impacted the expenditure on food directly, bringing reductions in FAFH expenditure in countries such as the United States. In their case, there is uncertainty about whether FAFH spending will rebound or whether the drivers behind the previous growth may hold as the pandemic unravels [7].

Our results show that the number of family members aged 65 years and older significantly inhibited participation in FAFH expenditure during 2020. However, this pattern was already present before the pandemic [37]. Other studies indicate that consumption of FAFH increases with the age of the children in the household: it peaks in late adolescence or early adulthood and then drops with increasing age in adulthood [44–46]. Similar findings hold for urban households in China, where age structure is found to have significant effects on FAFH expenditure. In this country, households with people between the ages of 15 and 39 years dine out more often and spend more when doing so, while households with people older than 50 years are less likely to eat away from home, especially those with members of 65 years old and above [27]. Gül et al. [47] explained the importance of age by the new consumption patterns widespread in younger cohorts, the motivations concerning a reference group, and increasing promotions directed towards this group of consumers.

In addition to accounting for the sample design, one contribution of this study is the addition of a dummy variable indicating whether the household experienced food insecurity (46.38% of the sample) during the period covered by the survey (the first year of the pandemic). The share of households in this condition in the sample closely resembles the share of the Mexican population experiencing some degree of poverty. The associated coefficient showed a negative and statistically significant estimate.

Another addition is a dummy variable indicating whether the household received remittances (4.36% of the sample). Remittances are becoming a significant source of income in many low- and middle-income countries [48]. The coefficient on this variable is statistically significant as well as positive. Thus, our results confirm that the variable on remittances significantly encouraged participation in FAFH and decreased the budget share of this expenditure among Mexican households in 2020. This has important implications since the global volume of remittances is increasing at a high rate. More analysis is required to understand how this source of income is perceived and used in relation to food consumption. The possible impact of remittances on the quality of nutrition is important as well: the possibility that remittances may have an impact on the emerging dual burden of malnutrition (coexisting undernourishment and obesity) is of particular concern [49].

Based on the estimated and corrected conditional income elasticity of 0.4609, with the Engel curve specification presented, we conclude that the FAFH category is less sensitive to changes in household income than other food categories. Therefore, it is reasonable to expect that the demand for FAFH will change accordingly as the income of Mexican

households increases or decreases. However, it is important to emphasize that the change is less than proportional to the change in income. Therefore, the share of household expenditure on the FAFH category will decrease when household income increases and increase when household income decreases. The estimate of income elasticity is lower than those for Argentina (0.824) [32] and Malaysia (0.9075) [35], with the same Engel curve specification; however, it is similar to that for Hispanic households in the United States (0.4847) [34], since the underlying sociodemographic and cultural determinants are comparable. However, in the case of Slovakia, the elasticities are 0.740 (conditional) and 1.373 (unconditional) [28], which is a significant difference.

The paper shows the importance of various determinants of FAFH expenditure in the period of the COVID-19 pandemic in Mexico using a very large sample of households. In this regard, we explored the effects of a massive reduction in both the demand and supply of FAFH consumption goods, which might be a recurrent event due to other phenomena such as climate change, soil degradation, ocean acidification, and aging population. Thus, we learned that, despite the harsh conditions imposed by the pandemic, about a third of the households (32.42%) maintained their demand for these goods.

5. Limitations and Direction for Future Studies

Due to the complexity of the phenomenon, some questions remain unanswered; at the same time, some relevant directions for further research emerged, which could reduce the limitations of this study. Despite the comprehensiveness of the data used in our research, namely the Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH), the study only includes aggregate FAFH expenditure. Therefore, it is not possible to draw conclusions about the demand for specific food items. This is clearly the direction in which further studies should go, as some specific data can be obtained. However, the usefulness of these sources needs to be assessed, which is not one of the objectives of this study. In particular, the clarity of the definition and explanation of the subcategories of food-away-from-home expenditure (FAFH) in the survey needs to be reviewed. Another related limitation is that the data do not include information on the strategies households use to maintain their levels of FAFH consumption, i.e., what the sources of the increased spending are. Our results show that the households that maintained consumption were those with growing disposable income, but household expenditure restructuring could also provide another explanation.

About a quarter of the households in the sample have members of 65 years and older. In these households, participation in FAFH was already low before the pandemic. Nevertheless, more studies are required to indicate whether the magnitude of the effect associated with this age group changed significantly after the pandemic.

Since remittances gain importance as a source of revenue for Mexico, more studies are necessary to ascertain the effect of this source of income on food security, especially in the context of climate change and rising food prices.

Despite the above limitations, the study identified the main sociodemographic and contextual determinants of FAFH expenditure under the conditions imposed by the coronavirus disease 2019 (COVID-19) pandemic in Mexico. These findings could help to understand the drivers of food intake and identify household segments, including their characteristics, and eventually develop appropriate policy approaches and specific public interventions to achieve socially optimal impacts in terms of the functioning of food supply systems and nutritional well-being of the Mexican population.

6. Conclusions

It is yet uncertain whether the coronavirus disease 2019 (COVID-19) will become endemic. Therefore, it is reasonable to expect that possible regional or global outbreaks could result in new measures to contain the spread of the infection, so that changes to eating patterns could become more important and permanent.

Our results indicate a reduction in household participation in food-away-from-home (FAFH) expenditure in 2020 of 35.28% compared with participation in 2018. The amount spent also dropped by 44.46% in the same period. Although we cannot draw conclusions on individual food items, it may be inferred that the demand for inputs used in resource-intensive dishes will drop, since some of them are simply too expensive for a single household to bear the cost, and business in this sector will avoid preparing them due to a fear of low attendance and the capacity restrictions. In this regard, we are witnessing a reshuffling of the options available for the public. The health crisis might spawn a new set of business models for FAFH, in which other concerns, such as carbon footprints and the preservation of biodiversity, might have a role to play. The permanent inclusion of measures aimed at containing the spread of diseases might be another direction of change.

Compared to previous pandemics, the availability of data allowed us to closely track the impact of the current outbreak at the household level in Mexico, which is not possible for other major economies in the region (as of 2021). The even spacing of Mexico's household survey allowed us to construct a time series for both the budget share and the participation of households in FAFH spending. We observed a sharp decline in out-of-home food expenditures across income groups and regions. In general, it may be assumed that, at one point or another, the COVID-19 pandemic led to similar significant changes in the consumption patterns in other countries. Moreover, a growing body of literature has examined the immediate negative impacts of COVID-19 on the food supply systems as the outbreak and economic shutdowns have significantly disrupted agricultural production, food processing, and logistics.

Therefore, this paper seeks to provide insight and reduce the knowledge gap on how disruptive events such as the global pandemic of COVID-19 affect consumer dietary behavior and provide a basis for developing appropriate economic development and public health policies. The pandemic is thus seen as an opportunity to improve the competitiveness of the agricultural and food system and to support the prevention of potential adverse public health impacts associated with FAFH consumption in Mexico and other similar countries.

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References

1. Caldera-Villalobos, C.; Garza-Veloz, I.; Martínez-Avila, N.; Delgado-Enciso, I.; Ortiz-Castro, Y.; Cabral-Pacheco, G.A.; Martínez-Fierro, M.L. The Coronavirus Disease (COVID-19) Challenge in Mexico: A Critical and Forced Reflection as Individuals and Society. *Front. Public Health* **2020**, *8*, 337. [CrossRef]
2. Barrientos-Gutiérrez, T.; Alpuche-Aranda, C.; Lazcano-Ponce, E.; Pérez-Ferrer, C.; Rivera-Dommarco, J. La salud pública en la primera ola: Una agenda para la cooperación ante Covid-19. *Salud Pública México* **2020**, *62*, 598–606. [CrossRef]
3. Semáforo COVID-19. Available online: <https://coronavirus.gob.mx/semaforo/> (accessed on 7 December 2021).
4. Gallo Marin, B.; Aghagoli, G.; Lavine, K.; Yang, L.; Siff, E.J.; Chiang, S.S.; Salazar-Mather, T.P.; Dumenco, L.; Savaria, M.C.; Aung, S.N.; et al. Predictors of COVID-19 severity: A literature review. *Rev. Med. Virol.* **2020**, *31*, 1–10. [CrossRef]
5. Aday, S.; Aday, M.S. Impact of COVID-19 on the food supply chain. *Food Qual. Saf.* **2020**, *4*, 167–180. [CrossRef]

6. Gavilana, D.; Balderas-Cejudo, A.; Fernández-Loresa, S.; Martínez-Navarro, G. Innovation in online food delivery: Learnings from COVID-19. *Int. J. Gastron. Food Sci.* **2021**, *24*, 100330. [CrossRef]
7. Ellison, B.; McFadden, B.; Rickard, B.J.; Wilson, N.L.W. Examining food purchase behavior and food values during the COVID-19 pandemic. *Appl. Econ. Perspect. Policy* **2020**, *43*, 58–72. [CrossRef]
8. Chenarides, L.; Grebitus, C.; Lusk, J.L.; Printezis, I. Food consumption behavior during the COVID-19 pandemic. *Agribusiness* **2020**, *37*, 44–81. [CrossRef]
9. Vargas-Lopez, A.; Cicatiello, C.; Principatoc, L.; Secondi, L. Consumer expenditure, elasticity and value of food waste: A quadratic almost ideal demand system for evaluating changes in Mexico during COVID-19. *Socio-Econ. Plan. Sci.* **2021**, *in press*. [CrossRef]
10. Encuesta Nacional de Gastos de los Hogares (ENGHO). Available online: <https://www.indec.gov.ar/indec/web/Nivel4-Tema-4-45-151> (accessed on 7 December 2021).
11. Pesquisa de Orçamentos Familiares (POF). Available online: <https://www.ibge.gov.br/estatisticas/sociais/saude/24786-pesquisa-de-orcamentos-familiares-2.html?=&t=microdados> (accessed on 7 December 2021).
12. Encuesta de presupuestos familiares 2021–2022 (EPF). Available online: <https://www.inec.cl/epf> (accessed on 7 December 2021).
13. Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH) 2020 Nueva Serie. Available online: <https://www.inegi.org.mx/programas/enigh/nc/2020/> (accessed on 2 August 2021).
14. El Economista. Available online: <https://www.eleconomista.com.mx/capitalhumano/Pandemia-redujo-en-10-en-promedio-el-nivel-de-los-salarios-en-Mexico-20210805-0122.html> (accessed on 7 November 2021).
15. El Financiero. Available online: <https://www.elfinanciero.com.mx/economia/mas-de-un-millon-de-establecimientos-cerraron-a-causa-del-covid-19-en-2020-inegi/> (accessed on 7 November 2021).
16. El Economista. Available online: <https://www.eleconomista.com.mx/economia/Mexico-recibio-40606-millones-de-dolares-en-remesas-en-el-ano-de-la-pandemia-20210202-0052.html> (accessed on 7 November 2021).
17. Chai, A.; Moneta, A. Engel curves. *J. Econ. Perspect.* **2010**, *24*, 225–240. [CrossRef]
18. Byrne, P.J.; Capps, O.J. Does Engel’s law extend to food away from home? *J. Food Distrib. Res.* **1996**, *27*, 22–32.
19. Stewart, H.; Blisard, N.; Bhuyan, S.; Nayga, R.M. The demand for food away from home. Full-service or fast food? *Agric. Econ. Rep.* **2004**, *829*, 1–20.
20. Prochaska, F.J.; Schrimper, R.A. Opportunity cost of time and other socioeconomic effects on away-from-home food consumption. *Am. J. Agric. Econ.* **1973**, *55*, 595–603. [CrossRef]
21. Sexauer, B. The Effect of demographic shifts and changes in the income distribution on food-away-from-home expenditure. *Am. J. Agric. Econ.* **1979**, *61*, 1046–1057. [CrossRef]
22. Kinsey, J. Working wives and the marginal propensity to consume food away from home. *Am. J. Agric. Econ.* **1983**, *65*, 10–19. [CrossRef]
23. Lee, J.-Y.; Brown, M.G. Food expenditures at home and away from home in the United States—A switching regression analysis. *Rev. Econ. Stat.* **1986**, *68*, 142–147. [CrossRef]
24. Yen, S.T. Working wives and food away from home: The box-cox double hurdle model. *Am. J. Agric. Econ.* **1993**, *75*, 884–895. [CrossRef]
25. Byrne, P.J.; Capps, O.; Saha, A. Analysis of food-away-from-home expenditure patterns for U.S. households, 1982–1989. *Am. J. Agric. Econ.* **1996**, *78*, 614–627. [CrossRef]
26. Mottaleb, K.A.; Rahut, D.B.; Mishra, A.K. Consumption of food away from home in Bangladesh: Do rich households spend more? *Appetite* **2017**, *119*, 54–63. [CrossRef]
27. Liu, H.; Wahl, T.L.; Seale, J.L.; Bai, J. Household composition, income, and food-away-from-home expenditure in urban China. *Food Policy* **2015**, *51*, 97–103. [CrossRef]
28. Cupák, A.; Pokrivčák, J.; Rizov, M. Demand for food away from home in Slovakia. *Czech J. Econ. Financ.* **2016**, *66*, 354–369.
29. Angulo, A.M.; Gil, J.M.; Mur, J. Spanish demand for food away from home: Analysis of panel data. *J. Agric. Econ.* **2007**, *58*, 289–307. [CrossRef]
30. Terin, M. Determining factors in food away from home expenditure of Turkish households. *Appl. Ecol. Environ. Res.* **2019**, *17*, 3441–3455. [CrossRef]
31. McCracken, V.A.; Brandt, J.A. Household consumption of food-away-from-home: Total expenditure and by type of food facility. *Am. J. Agric. Econ.* **1987**, *69*, 274–284. [CrossRef]
32. García Arancibia, R. Curvas de Engel de alimentos fuera del hogar según circunstancia de consumo. El caso de Argentina. *Cuad. Econ.* **2013**, *32*, 209–232.
33. Holcomb, R.B.; Park, J.L.; Capps, O.J. Revisiting Engel’s law: Examining expenditure patterns for food at home and away from home. *J. Food Distrib. Res.* **1995**, *26*, 1–8.
34. Lanfranco, B.A.; Ames, G.C.W.; Huang, C.L. Food expenditure patterns of the Hispanic population in the United States. *Agribusiness* **2002**, *18*, 197–211. [CrossRef]
35. Evidence of Engel Curves in Food Away from Home: A Study of Malaysia. Available online: <https://mpra.ub.uni-muenchen.de/14833/> (accessed on 2 August 2021).
36. Queiroz, P.; Coelho, A.B. Food away from home in Brazil: The role of sociodemographic factors and family structure. *Int. J. Soc. Econ.* **2018**, *46*, 503–522. [CrossRef]

37. Llamas Huitrón, I.; Charles Leija, H.A.; Aboites Manrique, G. Gasto en alimentos y bebidas fuera del hogar. El caso de México, 1992 y 2008. *Econ. Teoría y Práctica* **2012**, *37*, 177–198. [[CrossRef](#)]
38. Garza-Montoya, B.G.; Ramos-Tovar, M.E. Cambios en los patrones de gasto en alimentos y bebidas de hogares mexicanos (1984-2014). *Salud Pública de México* **2017**, *59*, 612–620. [[CrossRef](#)]
39. Saha, A.; Capps, O.; Byrne, P.J. Calculating marginal effects in models for zero expenditures in household budgets using a Heckman-type correction. *Appl. Econ.* **1997**, *29*, 1311–1316. [[CrossRef](#)]
40. Bracale, R.; Vaccaro, C.M. Changes in food choice following restrictive measures due to COVID-19. *Nutr. Metab. Cardiovasc. Dis.* **2020**, *30*, 1423–1426. [[CrossRef](#)]
41. Ahmad, M.; Akhtar, N.; Jabeen, G.; Irfan, M.; Anser, M.K.; Wu, H.; Işık, C. Intention-based critical factors affecting willingness to adopt novel coronavirus prevention in pakistan: Implications for future pandemics. *Int. J. Environ. Res. Public Health* **2020**, *18*, 6167. [[CrossRef](#)]
42. Bezerra, I. Away-from-home food during coronavirus pandemic. *Public Health Nutr.* **2020**, *23*, 1855. [[CrossRef](#)]
43. Yang, C.; Hao, Y.; Irfan, M. Energy consumption structural adjustment and carbon neutrality in the post-COVID-19 era. *Struct. Change Econ. Dyn.* **2021**, *59*, 442–453. [[CrossRef](#)]
44. Burke, S.J.; McCarthy, S.N.; O’Neill, J.L.; Hannon, E.M.; Kiely, M.; Flynn, A.; Gibney, M.J. An examination of the influence of eating location on the diets of Irish children. *Public Health Nutr.* **2007**, *10*, 599–607. [[CrossRef](#)]
45. Orfanos, P.; Naska, A.; Trichopoulos, D.; Slimani, N.; Ferrari, P.; van Bakel, M.; Trichopoulou, A. Eating out of home and its correlates in 10 European countries. The European prospective investigation into cancer and nutrition (EPIC) study. *Public Health Nutr.* **2007**, *10*, 1515–1525. [[CrossRef](#)]
46. Vandevijvere, S.; Lachat, C.; Kolsteren, P.; van Oyen, H. Eating out of home in Belgium: Current situation and policy implications. *Br. J. Nutr.* **2009**, *102*, 921–928. [[CrossRef](#)]
47. Gül, A.; Akbay, C.; Özcicek, C.; Özel, R.; Akbay, A.O. Expenditure pattern for food away from home consumption in Turkey. *J. Int. Food Agribus. Mark.* **2007**, *19*, 31–43. [[CrossRef](#)]
48. Smith, M.D.; Floro, M.S. The effects of domestic and international remittances on food insecurity in low-and middle-income countries. *J. Dev. Stud.* **2021**, *57*, 1198–1220. [[CrossRef](#)]
49. Thow, A.M.; Fanzo, J.; Negin, J. A systematic review of the effect of remittances on diet and nutrition. *Food Nutr. Bull.* **2016**, *37*, 42–64. [[CrossRef](#)]