

## INFLUENCE OF FEMALE AND MALE INCOMES ON FOOD EXPENDITURES OF NICARAGUAN HOUSEHOLDS

### INFLUENCIA DE LOS INGRESOS FEMENINOS Y MASCULINOS SOBRE EL GASTO EN ALIMENTOS DE LOS HOGARES NICARAGÜENSES

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#### Abstract

Many studies have explored whether household income is used in the same way depending on the gender of the person who earns it. However, most of these studies do not include in the analysis multi-earner households. This paper attempts to fill this gap in the literature by exploring changes in household food expenditures generated because of a variation in the income earned by women compared to the one earned by men, both in dual-earner nuclear households and in multi-earner households. This is an exploratory study and uses the 2014 Nicaragua Living Standard Measurement Study (LSMS) as the source of information. For this purpose, a Food Engel Curve is estimated, using regression analysis, which integrates the notion of gender coalitions of interest as part of the demographic variables. No large differences were found between household food budget allocations when comparing the changes in labour income earned by women and men. The personal characteristics analysed, negatively affect the food expenditures. In contrast, household characteristics, i.e., number of income-earning persons and area of residence, are the main determinants of the increase in household food expenditure. No differences were found between nuclear households and multi-earner households.

**Keywords:** incomes, gender, food expenditures, Engel Curve, Nicaragua.

#### Resumen

Otras investigaciones han explorado si los ingresos del hogar son utilizados de la misma manera dependiendo del género de la persona que los genere. Sin embargo, la mayoría de estos estudios no incluyen dentro del análisis a los hogares con múltiples miembros generadores de ingreso. Este trabajo intenta llenar este vacío en la literatura explorando los cambios en los gastos alimentarios de los hogares generados ante una variación en los ingresos de las mujeres frente a aquellos percibidos por los hombres, tanto en los hogares nucleares con dos generadores de ingresos como en los formados por múltiples miembros generadores de ingresos. Este estudio es exploratorio y utiliza la Encuesta de Medición del Nivel de Vida (EMNV) de Nicaragua de 2014 como fuente de información. Para ello, se estima una curva de Engel de alimentos, utilizando análisis de regresión, que integra la noción de coaliciones de intereses de género como parte de las variables demográficas. No se encontraron grandes diferencias entre las asignaciones del presupuesto del hogar destinado a alimentación frente a los cambios de los ingresos laborales generados por mujeres y hombres. Las características personales analizadas afectan de forma negativa el gasto en alimentación. Por el contrario, las características del hogar, i.e., número de personas generadoras de ingresos y área de residencia, son los principales determinantes del aumento de los gastos alimentarios del hogar. No se encontraron diferencias entre hogares nucleares y múltiples generadores de ingresos.

**Palabras clave:** ingresos, género, gastos en alimentos, curva de Engel, Nicaragua.

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## I- Introduction

The reasoning for targeting women as recipients of economic resources in public policy lies in the assumption that women's contribution, access, and control over resources improve household well-being. Incomes have been of particular interest to empirically test this assumption. Many studies (Armand, Attanasio, Carneiro & Lechene, 2016; Bhupal & Sam, 2014; Qian, 2008; Salas Alfaro & Baca Tavira, 2015) have been conducted to answer whether household outcomes, including household expenditure patterns, differ depending on the identity of the earners, e.g., whether incomes are brought by male or female household members, with most of them favouring the hypothesis and providing evidence against the unitary models of the household.

A large part of the literature relating individual income contributions with household outcomes has been focused on low and middle-income countries, but only a few (Angelucci & Garlick, 2014; Djebbari, 2005; Gummerson & Schneider, 2013; Kazianga & Wahhaj, 2016) have integrated the complexity of household structures of these countries into the analysis. Latin American households are characterized by having complex arrangements where multi-earner households are as common as dual-earner nuclear households (Esteve, Castro-Martín, & Castro Torres, 2022; Esteve & Florez-Paredes, 2018). In Nicaragua, the proportion of non-nuclear households adds up to 63.04 per cent (INIDE, 2016a). Besides the intricacies of household composition in the country, the progress made over women's participation in the labour market has not been without polarities. The labour rate participation for women has increased over the last years from 40 per cent in 2000 to 49 per cent in 2010 and 53 per cent in 2019 (World Bank, nd), the gender wage gap has closed moderately (Herrera, Dijkstra, & Ruben, 2019), and female-maintained households, i.e., households where female incomes constitute the largest proportion of household incomes, represent 35.76 per cent of Nicaraguan households (INIDE, 2016a). At the same time, gender roles are still a strong determinant of women's participation in the labour market, e.g., women inserting in low-paid economic sectors (Herrera *et al.*, 2019), and of perceptions of women's incomes contributions to the household (Bradshaw, 2013), i.e., women's incomes perceived as supplementary to men's incomes. While being one of the poorest countries in Latin American and the Caribbean, the general poverty rates in the country (consumption-based) have decreased over the last years from 47.9 per cent in 1998 to 29.6 per cent in 2014 (INIDE, 2016b). This contextual background makes Nicaragua an interesting case of study to see whether female-generated incomes are used differently than male-generated incomes for the demand for food and whether these differences occur for any household composition.

This study follows an exploratory approach to uncover any differences in the share of household food expenditures, as a household outcome, as a result of changes in income sources. More specifically, it answers the research question: how does the demand for food change with a change in male vis-à-vis a change in female-generated income? Alternatively, are female-earned labour incomes spent equally on food as male-earned labour incomes? It also explores differences in food expenditures between nuclear dual-earner households and multi-earner households. These questions are answered by estimating an empirical food Engel curve on its quadratic generalization of the Working-Lesser specification (Lesser, 1963) using data from the 2014 Living Standard Measurement Study (LSMS) for Nicaragua,<sup>i</sup> co-managed by the World Bank and the Instituto Nacional de Información de Desarrollo (INIDE) (Zuniga Gonzalez, 2010). This paper does not attempt to test any of the economic models of household behaviour nor try to establish causal relationships between the measures of interest, but it provides a first exploration of the intrahousehold distribution of income using regression analysis.

The paper is structured as follows: The theoretical framework guiding the research is presented after the introduction. Section 3 describes the methodology used for the analysis and its limitations. The results are presented and discussed afterwards. Section 5 concludes.

## II- Theoretical framework

### 2.1. Models of household behaviour and household expenditure patterns

In the last decades, many theoretical economic models have been developed to explain whether social or economic relations within the household affect observed economic outcomes. The unitary model assumes that households have one utility function and one primary decision-maker who altruistically allocates the household resources to maximize utility. Under this model, household members have shared preferences and the same marginal utility of income (Elsas, 2013). Following the unitary model, the amount and composition of household expenditures depend only on the pooled incomes but not on who generates them (Abdullah Yusof & Duasa, 2010; Browning, Bourguignon, Chiappori, & Lechene, 1994).

Whether the household behaves as a unit or not may influence the results of policy interventions. Quisumbing (2003) identifies four types of policy failures in case the unitary model were rejected: i) not obtaining desired outcomes of public transfers if some recipients allocate the resources more "efficiently" than others; ii) if resources, including information, are not shared, a wrong targeting compromises the entire intervention; iii) having an imperfect/incomplete policy design, in case factors different than prices, incomes, or exogenous endowments impact the allocative outcomes; and iv) the dilution of transfers' objectives if some household members adjust their behaviour differently to new sources of income.

Consequently, a large body of empirical work has been oriented to test the unitary model (Bircan Bodur & Mukiyen Avci, 2016; Doss, 2013), mostly by comparing whether (and how) household expenditures change given different income sources, obtaining mixed results (Opata, Ezeibe & Ume, 2020; Phipps & Burton, 1998; Thomas, 1993). These results discrepancies gave birth to the conventional collective models - cooperative and non-cooperative models (Alderman, Chiappori, Haddad, Hoddinott & Kanbur, 1995). Collective models allow the possibility of divergent preferences between household members and recognize the role of individual economic resources to maximize individual desires and impose preferences. Under collective models, the source of income will influence the observed outcomes, including expenditure composition.

A large part of the literature studying the relationship between incomes and expenditure composition in Latin America are impact assessments of the PROGRESA/OPORTUNIDADES/PROSPERA (POP) program, a conditional cash transfer (CCT) intervention directed to improve welfare conditions in rural Mexico. Bobonis (2009) and Attanasio and Lechene (2002), find out that female incomes positively affect public goods expenditures more than those from alternative sources, especially on children's clothing. Similarly, Attanasio and Lechene (2010, 2014) find that the impact of the transfers to women on food consumption differs from the result expected by the unitary model and instead follows the patterns of an efficient collective model. Other studies assessing the impact of CCT targeting women as recipients on the share of food expenditures in Colombia (Attanasio, Battistin & Mesnard, 2011) and Nicaragua (Maluccio & Flores, 2004) and from an unconditional cash transfer (UCT) program in Ecuador (Schady & Rosero, 2008) have obtained similar results.

## 2.2. Multi-earner households

The evidence on expenditure compositions for Latin America has usually used nuclear households as the unit of study, yet household composition in the region is more complicated. Outcomes, resource allocations, and decision-making processes may vary according to family types (De Backer, Holvoet & Milanzi, 2021; Djebbari, 2005; Hayashi, 1995; Kazianga & Wahhaj, 2016), whence the comparison of outcomes for different household arrangements become necessary. Even nuclear households may have different age compositions, resulting in members generating incomes beyond the married dyad. Phipps and Burton (1998) recognize that adult sons and daughters generating income may have some space to decide how they should be spent. Shared preferences for parents and non-dependent children are less likely to occur because of age and hierarchical relationships. Parents may try to maximize their children's welfare, but it is less likely that it occurs, e.g., between siblings.

Divergent preferences in multi-earner households may be simplified by the emergence of interest coalitions. It means that individuals with similar preferences create groups to position themselves in the allocative process (Gummerson & Schneider, 2013; Pickbourn, 2016). It also opens the possibility of resource sharing within the coalitions. Gender has been pointed out as a crucial factor in shaping member preferences. Schmeer (2005) emphasizes that "[...] gender norms and stratification systems create differences in women's and men's roles and responsibilities, resulting in husbands and wives having distinct interests, power, and spending preferences" (p.400). This statement may be extended to different members having similar preferences according to their position in social life.

Nevertheless, the analysis needs to be careful when preferences over outcomes are not observed or revealed. For these events, preferences are usually assumed based on groups, especially gender (Doss, 2013). Thomas (1990) calls this an "inferential approach" for preferences, i.e., the inference that a person does prefer an observable outcome.

For the Nicaraguan case, not empirical evidence was found exploring the relationship between incomes and household expenditures that consider the role of multi-earner households in the allocative process. The rest of this paper explores how the household demand for food changes with a variation in male incomes vis-à-vis a change in female incomes, with the hypothesis that the identity of the income providers should not generate any changes in the demand for food. More specifically, it explores how female and male-generated incomes are related to changes in the household demand for food, being aware of any difference between nuclear dual-earner and multi-earner households. It is worth mentioning that this study does not pretend to do formal tests of the unitary model but to advance an overview of the relationship between income sources and allocative outcomes in contexts where the nuclear household is not representative of the household structure.

### III- Methodology

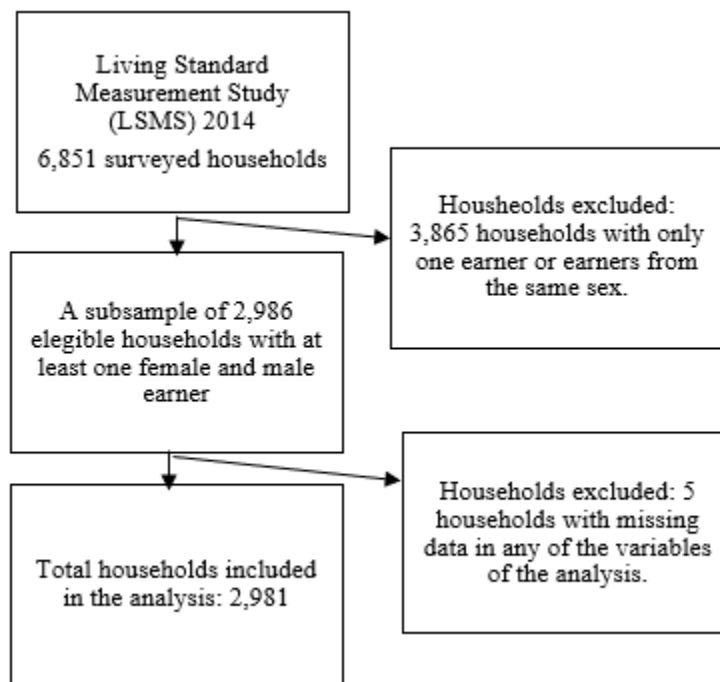
#### 3.1. Empirical approach

This paper follows a quantitative and exploratory approach and uses regression analysis to establish the non-causal relationship between female and male-earned incomes and household food expenditures. This relationship is estimated using an empirical food Engel curve on its quadratic generalization of the Working-Lesser specification (Lesser, 1963). The function to be estimated is represented by:

$$\omega_f = \alpha_0 + \beta_1 I_f + \beta_2 I_f^2 + \beta_3 I_m + \beta_4 I_m^2 + \beta_5 P + \beta_6 X_d + \beta_7 X_h + \varepsilon \quad (1)$$

where  $\omega_f$  is the household share of food,  $I_f$  represents the natural logarithm of female-earned household incomes and  $I_f^2$  its quadratic form,  $I_m$  designates the natural logarithm of male-earned household incomes, also included in its quadratic form  $I_m^2$ ;  $P$  represents the aggregated prices for food;  $X_d$  is a vector of demographic characteristics attributable to the household members, following the interest coalition assumptions, and  $X_h$  is a set of household variables;  $\varepsilon$  and  $\alpha_0$  are the stochastic disturbance and constant of the model, respectively.

Equation (1) is estimated using cross-sectional data from the 2014 Nicaragua LSMS (INIDE, 2016a). The 2014 Nicaragua LSMS is the last openly available nationally representative survey that collects data on household expenditures, and individual earned incomes. The survey has a sample of 6,851 households. However, only those households with at least one female and one male earner are included in the analysis leading to 2,986 households and 2,981 observations without missing values. Figure 1 describes the households included in the analysis. The number of observations per variable, and other descriptive statistics, are presented in Table 1.



**Figure 1.** Flowchart of households included in the analysis.

The dependent variable, the household share of food, is estimated as the percentage of the monthly household expenditures assigned to food. Household expenditures for food include cash expenses, the value of goods produced for self-consumption and those obtained from small businesses owned by the household members,<sup>ii</sup> and the demand for prepared meals consumed inside the household. Expenditures in prepared meals consumed outside the household were not included under this category since the survey did not provide additional information to identify whether these were demanded as a leisure activity, e.g., meals in restaurants under the context of social events or as food away from home consumption. The LSMS collects information of food demanded over the last 15 days.

The price for food is approximated as the sum of the prices of each good consumed by the household in the local currency, córdoba oro (CO). For those goods that were obtained from the market and produced by the household members, the price was estimated as the average between the market and the estimated value to account for good differentiation. The analysis did not include expenditure categories different from food, given the lack of information about their market prices.

The 2014 Nicaragua LSMS collects information on the earned labour incomes of all household members above ten years old at the individual level. For dual-earner nuclear households, each of the couple's incomes constitutes household female-generated and male-generated incomes. For multi-earner households, i.e., a household with multiple adult earners, the paper follows the construction proposed by Gummerson and Schneider (2013) under the assumption of gender interest coalitions. For these households, female-generated incomes represent the total amount of earned labour income generated by the female household members; analogously, male-generated incomes are the addition of all earned labour incomes generated by the male household members. Multi-earner households are not only constituted by nuclear households with adult children earning an income but any other household configuration with at least three earners, e.g., three-generation households.

Similar to the construction of incomes, the variables reflecting personal demographic characteristics were aggregated by gender group. The variables include the average age and education of female and male earners, as suggested by previous research (Gummerson & Schneider, 2013). The literature (Doss, 2001, 2006; Schmeer, 2005; Mulamba, 2022; Tingum & Kuponyi, 2020) also guided the selection of correlates indicating household characteristics, namely the number of adult earners in the household (female and male), the natural logarithm of the household size,<sup>iii</sup> the number of children in the household, the area and region of residence and the household structure (dual-earner nuclear and multi-earner households). Table 1 presents the variables used with their descriptive statistics.

**Table 1**  
*Summary statistics*

Variable	Observations	Mean	Std. Dev.	Min	Max	Notes
Share of food expenditures (%)	2,981	44.52	14.30	0.64	88.73	Food expenditures over the last 15 days in monthly frequency. Percentage over the total household expenditures. In the local currency (CO) and monthly frequency.
Female incomes (ln)	2,986	8.26	1.11	1.67	12.61	Labour incomes derived from first and second job of the past week and work of the last 12 months.
Female incomes (squared)	2,986	69.52	17.77	2.77	159.05	In the local currency (CO) and monthly frequency.
Male incomes (ln)	2,986	8.79	1.03	3.54	12.38	Labour incomes derived from first and second job of the past week and work of the last 12 months.
Male incomes (squared)	2,986	78.32	17.28	12.50	153.38	In the local currency (CO) and monthly frequency.
Food price (CO)	2,981	500.30	241.29	30.00	2,605.27	Sum of prices for each good demanded.
Average age of female earners (years)	2,986	30.22	12.28	7.50	79.00	Only those earning an income included
Average age of male earners (years)	2,986	28.97	12.52	7.00	90.00	Only those earning an income included
Years of education of female earners (years)	2,986	6.78	3.86	0.00	20.00	Only those earning an income included
Years of education of male earners (years)	2,986	6.56	3.91	0.00	21.00	Only those earning an income included

Number of female earners (linear)	2,986	2.58	1.45	1.00	14.00	Only those earning an income included
Number of male earners (linear)	2,986	2.44	1.34	1.00	10.00	Only those earning an income included
Household size (ln)	2,986	1.53	0.41	0.69	3.04	Derived from the number of household members
Area of residence (binary, rural)	2,986	0.29	0.45	0	1	Rural households used as the base
<i>Region of residence (macroregions)</i>						Managua (capital) used as the base
Rest of Pacific	2,986	0.27	0.44	0	1	
Central region	2,986	0.31	0.46	0	1	
Caribbean region	2,986	0.12	0.33	0	1	
Number of children (linear)	2,986	1.38	1.26	0.00	10.00	Under 14 years old
Household structure (binary, nuclear)	2,986	0.05	0.22	0	1	Nuclear households with or without dependant children

Author's elaboration based on LSMS (2016a). All results are weighted.

Variables with high variance were checked for high leverage data points (atypical values). Influential leverage, presumably not derived from data entry errors or related, was found for one of the independent variables (effect on its regression coefficient). Given that the estimation using Ordinary Least Squares (OLS) was too sensitive to these values, a robust approach is used to estimate equation (1). Since “bad leverage points” were found in one independent variable an estimator with a high breakdown point that could deal with this type of outlier was selected based on Verardi and Croux (2009). A robust MM-estimator is used in this study. Given the small number of dummy variables among the regressors, these are not expected to affect the estimator. It is worth mentioning that robust regression analysis is not without its critics (Brossat, Parker & Castillo, 2011), but not reasons of concern were found for this analysis. Moreover, robust standard errors were used to “correct” for heteroskedasticity in the dependent variable. Both, the selection process for the estimator and heteroskedasticity tests can be followed with the data shared with this paper.

### 3.2. Limitations in the methodology

Given that the LSMS 2014 does not contain information on unearned incomes, e.g., remittances, at the individual level, the analysis is made using earned labour incomes only, which may underestimate the availability of resources of each gender interest coalition group and the final effect on food expenditures (Armand et al., 2016). More importantly, the 2014 Nicaragua LSMS is designed to estimate living standards; therefore, it has no specific information about household members' preferences or control over earned incomes. The results in this study should be read as the use of earned labour incomes coming from different sources, i.e., male and female-generated incomes, and not as female or male control or decision-making over incomes.

## IV- Results

Table 2 presents the results from the regression analysis. The results support the hypothesis that female-generated labour incomes lead to higher shares of household food expenditures compared to male-generated labour incomes, but the difference is small. The personal characteristics of the earners do not contribute to higher shares of food expenditures, but the opposite. In this regard, the results are more aligned with the unitary models of the household, where the identity of the income generator does not affect substantially the household outcomes. On the other hand, household-related characteristics, such as the number of earners and the area of residence, are the main determinants of positive changes in household food expenditures.

**Table 2**  
*Regression results*

Variable	Coefficient	Robust Std. Err.	95% Confidence interval	
			Lower bound	Upper bound
Female incomes (ln)	7.2188	1.9018	3.4897	10.9478
Female incomes (squared)	-0.5230	0.1164	-0.7513	-0.2947
Male incomes (ln)	6.8442	2.4064	2.1258	11.5626
Male incomes (squared)	-0.4984	0.1384	-0.7698	-0.2270
Food price	0.0053	0.0011	0.0031	0.0074
Average age of female members	-0.1360	0.0251	-0.1852	-0.0867
Average age of male earners	-0.0263	0.0240	-0.0733	0.0207
Years of education of female earners	-0.9351	0.0753	-1.0828	-0.7874
Years of education of male members	-0.8719	0.0746	-1.0181	-0.7257
Number of female earners	0.9080	0.4760	-0.0254	1.8414
Number of male earners	2.3457	0.5465	1.2742	3.4172
Household size (ln)	-5.0132	2.6619	-10.2327	0.2062
Area of residence (binary, rural)	2.9904	0.7360	1.5472	4.4336
<i>Region of residence</i>				
Rest of Pacific	0.8898	0.5687	-0.2253	2.0050
Central region	-0.2565	0.5852	-1.4040	0.8910
Caribbean region	-0.3138	0.7024	-1.6912	1.0635
Number of children	-1.3151	0.3140	-1.9308	-0.6993
Household structure (binary, nuclear)	0.4973	1.4155	-2.2780	3.2727
Constant	15.3882	13.2097	-10.5129	41.2893

Author's elaboration based on LSMS (2016a). Based on 2,981 observations.

Both female and male-generated incomes increase the share of household food expenditures, although very modestly, with female-generated incomes having a higher effect than male-generated incomes, in line with previous research in low and middle-income countries (Gummerson & Schneider, 2013; Hoddinott & Haddad, 1995; Levin *et al.*, 1999). One per cent change in female-generated incomes will change the proportion of household food expenditures by 0.0617 percentage points, while one per cent change in male-generated incomes will alter this share by 0.0585 percentage points. Moreover, both female and male-generated incomes will only increase the shares of food expenditures at 6.90 and 6.87 per cent, respectively, changing to a negative relationship after those points. The results endorse the "traditional" shape of a food Engel curve - concave downward with a positive but decreasing slope. Moreover, the effect of the food price is also very small, meaning that the price of food explains very little of the increased demand for food led by changes in perceived incomes.

Contrarily, the personal characteristics of the household earners have a reversed effect on the share of food, but their economic significance is minimal. Further research needs to be done to understand this relationship better, but a potential explanation may be the highest consumption of food away from home generated by higher incomes and educational levels of the earners (Nayga, 1996; Seidu, 2019), which is not included in the share of household food due to the lack of background information about it. The finding is similar to those of Aguilar-Lopez, González-Andrade, and Kuhar (2020) and Brillanti, Echeverria, and Berges (2022), but the authors do not provide an explanation for this negative relationship.

Looking at household-related characteristics, it is evident that larger households spent smaller proportions of their household incomes in food. However, an additional male or female earner will have a positive effect over the demand for food, which is similar to previous findings in Mexico (Djebbari, 2005), especially male household members. An additional male earner will increase the proportion of household incomes spent on food by 2.35 percentage points, while the increase derived by an additional female earner is only 0.91 percentage point. Next to it, there are not statistically significant differences between nuclear dual-earner and multi-earner households. This is an interesting finding that reflects the importance of the earner identity over the earning structure where the identity of the earner is not specified.

Finally, the share of food expenditures in rural areas is larger than in urban areas, which is in line with the existent literature (Chikobola & Edriss, 2016; Rehman, Jian & Runqing, 2014), but there are not significant differences when comparing the regions of residence. Residing in a rural area increases the expenditures share on food by 2.99 percentage points compared to urban areas. For rural areas, the average of food expenditures as a percentage of household expenditures is 50.60 per cent, and 42.58 per cent in urban areas (statistically significant difference).

## V- Conclusions

This paper contributes to the literature on female-generated incomes and their contribution or effects on household outcomes by analysing the relationship between female and male-generated labour incomes and household expenditures on food using regression analysis. It is worth highlighting that this paper does not represent a proof for any economic model of household behaviour.

In contrast to previous evidence for other Latin American countries, female-generated incomes do increase the share of household food expenditures more than male-generated incomes, but the difference is minimal. A traditional Engel curve for food is confirmed for the Nicaraguan case. The identity of the earners and the area of residence are the drivers of increased household expenditure on food. Multi-earner households alone will not generate an increase in household shares of food expenditures, but what matters is the identity of the earners, with an additional male earner being more significant in the increased proportion of food expenditures than an additional female earner.

While female and male-generated labour incomes are used (almost) equally for food expenditures, their use may differ for other expenditure groups, e.g., transportation or leisure, or depending on their source, i.e., unearned incomes. Unearned incomes carry substantial policy implications, including the effect of cash transfers and other social programmes transferring resources into women's hands. Further research exploring whether the effect varies for unearned incomes should be developed. Moreover, the LSMS does not allow further explore any effect of "control" over incomes on the expenditure patterns, which can shed light to policy programs like CCT and UCT. Future lines of research could also explore other methodological approaches that can better estimate the relationship of the variables of interest, such as estimation of food Engel curves by quantiles. Although the methodological scope of this study is limited, its results still add policy value generating information on earned labour incomes which could inform the linkages between the generation of incentives and policies focused on women's insertion into the paid labour market and any expected changes in household shares of food expenditures. Considering the strong influence of gender norms in household allocative processes and decision-making in Nicaragua suggested in previous research, future studies should be conducted not only to account for the difference in income sources but also for gender norms influencing household economic behaviour. Further research should also explore the negative effect of personal characteristics on household food expenditures, since this question remains unanswered in the few studies reviewed obtaining similar results.

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#### Notes:

<sup>i</sup> Encuesta de Medición de Nivel de Vida – EMNV 2014 (INIDE, 2016).

<sup>ii</sup> The values correspond to the category “pulperia o negocio propio” in the LSMS.

<sup>iii</sup> It was decided to compute the natural logarithm of the household size given the difference of members among households, where the number ranged from 2 to 21.