Mother's Marital Status on Chronic Malnutrition for Ecuadorian Children Under Five Years of Age[1]

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This study examines the effect of maternal marital status on chronic malnutrition (stunting) among children under five years of age in Ecuador, using data from the 2024 National Survey on Child Malnutrition (ENDI). Chronic malnutrition remains a pressing issue, with 17.5% of Ecuadorian children affected, particularly in rural, Indigenous, and low-income households. While the economic pathway—where marital status influences child nutrition through household income and food security—serves as the primary hypothesis, results indicate that maternal marital status has a small and statistically insignificant direct effect on chronic malnutrition. The estimated coefficients for Mother Married remain negligible across all specifications, suggesting that any observed relationship is largely mediated by household income and food insecurity. Interaction effects show limited evidence that marital status amplifies the adverse effects of income or food insecurity. These findings highlight the need for targeted policies addressing household income and food security, regardless of marital status, to reduce chronic malnutrition and improve child health outcomes in Ecuador. JEL Codes: I12, I32, J12, O54

Malnutrition among children under five years old remains a critical public health challenge in Ecuador and Latin America. It is typically categorized into three types: **chronic malnutrition (stunting)**, characterized by long-term insufficient nutrient intake that impairs growth and cognitive development; **acute malnutrition (wasting)**, which results from short-term severe nutrient deficiency and leads to rapid weight loss; and **global malnutrition**, a composite measure that encompasses both chronic and acute malnutrition. These conditions not only hinder the physical and mental development of affected children but also create substantial long-term barriers to national economic growth and productivity. In Ecuador, the prevalence of chronic malnutrition is alarmingly high, with 17.5% of children under five affected in 2024, according to the National Institute of Statistics and Census (INEC). The burden is disproportionately severe in marginalized communities, such as Indigenous populations (34.5%), uneducated households (23.2%), and rural highlands (26.9%).

Understanding the relationship between a mother's marital status and chronic malnutrition is critical in this context. Maternal marital status often shapes access to resources, social support networks, and decision-making autonomy, which are essential determinants of a child's nutritional status. As the World Bank (2007) notes, addressing these disparities requires a

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All errors here are mine alone.

nuanced understanding of the socio-economic and cultural factors influencing maternal and child health. In Ecuador, where socio-economic inequality, cultural practices, and variable access to health services intersect, maternal marital status may play an outsized role in shaping child health outcomes. By examining how maternal marital status impacts chronic malnutrition, this research aims to contribute to the evidence base needed to design effective interventions, ultimately improving child health outcomes and fostering more equitable development in Ecuador.

I. Literature Review

The socio-economic and demographic dimensions of child malnutrition suggest that maternal factors, such as empowerment and marital status, play significant roles in determining nutritional outcomes for children. Castillo-Guerra (2018) employs instrumental variables to estimate that female empowerment, particularly through improved decision-making and resource allocation within households, reduces acute malnutrition by 3.52 percentage points and global malnutrition by 5.95 percentage points in Colombia. Empowered women are more likely to make informed decisions about their children's health, ensuring better nutritional and hygiene practices. Similarly Bhagowalia, Menon, Quisumbing, and Soundararajan (2012) and Hossain (2019) both highlight the critical importance of maternal empowerment in reducing chronic malnutrition. Bhagowalia et al. identify maternal education, decision-making power, and attitudes toward domestic violence as significant determinants of diet diversity, while Hossain finds that the prevalence of stunting and wasting can be reduced by about 3% and 6%, respectively, if maternal empowerment is increased by 10%. Notably, Hossain's findings are limited by the cross-sectional nature of the data, which precludes causal interpretations.

Yigezu, Oumer, Damtew, Birhanu, Workie, Hamza, Atle, and Kebede (2024) provide insights into the dual burden of malnutrition, examining simultaneous maternal obesity and child stunting within Ethiopian households. They show that divorced mothers are 1.8 times more likely to experience this dual burden compared to married mothers, accentuating the importance of marital stability in reducing malnutrition risks. Tette, Sifah, Nartey, Nuro-Ameyaw, Tete-Donkor, and Biritwum (2016) similarly reveal that children of single or cohabiting mothers in Ghana are 2.43 and 2.24 times more likely, respectively, to suffer from malnutrition compared to children of married mothers. These disparities stem from lower household incomes and limited social support networks, which exacerbate the risks of inadequate dietary diversity and poor child health outcomes. In Ecuador, where informal labor markets and extended family structures are prevalent, single mothers may experience similar economic vulnerabilities but could partially offset these risks through familial support.

Miskir, Godana, Girma, and G/Miskel (2017) find that children of mothers who are not currently married are "3.33 times more likely to develop acute malnutrition as compared with those who live currently together (married)" (p. 250). This relationship is attributed to the economic hardships faced by single mothers, who often lack sufficient income to meet their children's nutritional needs. Similarly, Mim, Mamun, Sayem, Wadood, and Hossain (2024) demonstrate that children under five whose mothers married before the age of 18 are 1.21 times more likely to experience stunting. These findings underscore how early marriage and economic

precarity contribute to malnutrition, an issue that remains pertinent in Ecuador, where early marriage rates are higher in rural areas.

Household composition and social dynamics further influence malnutrition. Zewdie and Abebaw (2013) report that children from larger households are less likely to be stunted due to "economies of scale both in time available for childcare and in expenditure" (p. 368). However, their sample predominantly includes married mothers, limiting the applicability of this conclusion to other family structures. This raises important questions for Ecuador, where extended family households are common and may provide alternative support mechanisms for single mothers.

Neighborhood and community factors further compound the effects of marital status. Ijaiya, Anjorin, and Uthman (2022) highlight that "variability consequent upon neighborhood-level factors was twice that of country-level factors" (p. 10), emphasizing the importance of community interventions in addressing malnutrition. This finding suggests that in Ecuador, where access to community health programs varies significantly across regions, localized interventions may be crucial for mitigating the effects of maternal marital status on child nutrition. Maternal mental health and caregiving practices also mediate the impact of marital status on child nutrition. Le and Nguyen (2018) use fixed-effects and instrumental variable methods to examine how maternal mental health shocks affect child health outcomes in Australia. They find that "FE results indicate an insignificant impact of maternal mental health on all anthropometric measures, [but they] take the cautious interpretation that worse maternal mental health may increase only the number of ongoing health conditions in children or increase the probability that the child uses prescribed medicines or needs extra medical care" (p. 315). Notably, single mothers with worse mental health have more adverse health outcomes for their children. Although these results may not directly apply to developing countries like Ecuador, they highlight the need to explore how maternal mental health influences child malnutrition in contexts where health burdens and resource constraints are more severe.

Lastly, Bella, Dartanto, Nurshadrina, Kusnadi, Moeis, Nurhasana, Satrya, and Thabrany (2023) explore the impact of parental smoking behaviors on child malnutrition in Indonesia. They find that having a moderate or heavy-smoking father increases the likelihood of child stunting, mediated by reduced household budgets for food and the health effects of passive smoking. While this study focuses on smoking, it highlights broader household consumption dynamics that may apply to Ecuador, particularly in low-income households where resource allocation decisions are critical.

The reviewed literature emphasizes the complex impact of maternal marital status on child nutrition, mediated by socio-economic, educational, and health-related factors. Divorced and single mothers face heightened risks of economic insecurity and limited access to resources, which translate into poorer nutritional outcomes for their children. Empowering women through education and decision-making autonomy emerges as a critical intervention point, with broader implications for reducing intergenerational cycles of poverty and malnutrition.

However, significant research gaps remain. Few studies explore the intersection of marital status, mental health, and caregiving practices in Latin American contexts like Ecuador, where

cultural and economic dynamics may differ from those in Africa or Asia. Further research should integrate longitudinal designs to better capture causal pathways and examine how community-level interventions can mitigate the risks faced by vulnerable mothers.

II. Data and Descriptive Statistics

The present study uses the National Survey on Child Malnutrition (ENDI), conducted by the Ecuadorian National Institute of Statistics and Census (INEC), which evaluates the nutritional and developmental conditions of children under five years old across Ecuador. The survey is nationally representative, disaggregated by urban and rural areas, and provincial levels. The dataset used in this study is a cross-section from the second round of data collected from July 2023 to August 2024. The unit of analysis is children under five years old.

The dependent variable is chronic malnutrition (stunting) for children under five years, calculated by the INEC based on the anthropometric measures taken during the interview. Chronic malnutrition measures the proportion of boys and girls under five years that present a delay in size for their age, according to the stipulated international parameters by the World Health Organization. Based on these standards, the INEC categorized children who have an standardized score lower than two standard deviations to have chronic malnutrition.

The variable of interest is the mother's marital status, defined as "married" when the mother of the child under five is in "union" (cohabiting) or married, and "not married" when the mother is single, widowed, divorced, or separated. *Table 1* shows the main variables' names, as well as their definitions. A full list of definitions and measurements for variables can be found in *Appendix A*.

Table 1: Relevant Variable Descriptions

Type of Variable	Variable Name	Definition	Categories/Measurement
DV	dcronica	Binary variable indicating whether a child under the age of 5 is suffering from chronic malnutrition	1 if the child's height-for-age z-score (standardized score) is below -2.0 standard deviations from the mean for their age group. 0 if the child's height-for-age z-score is equal to or greater than -2.0 standard deviations.
IV	mother_married	Binary variable indicating if the mother of a child under the age of 5 is married/partnered or not	1 if the mother is currently married or partnered (i.e., unida or casada in question f1_s1_18). 0 if the mother is not married or partnered (i.e., separada, divorciada, viuda, or soltera in question f1_s1_18)
		Controls	
Control	father_in_home	Binary variable indicating if the father of a child under the age of 5 lives in the same household as the child	1 if the father currently lives in the same household as the child 0 if the father currently does not live in the same household as the child
Child-specific Control	age_group_child	Categorical variable indicating the age group (in months) for the child under age 5	1 if child is 0-5 months old 2 if child is 6-11 months old 3 if child is 12-23 months old 4 if child is 24-35 months old 5 if child is 36-47 months old 6 if child is 48-59 months old
Child-specific Control	male	Binary variable indicating if the child under the age of 5 is male or female	1 if the child is male 0 if the child is female
Socio-economic Control	nbi_1	Binary variable indicating basic unsatisfied needs in the household based on economic capacity, access to education, access to housing, access to basic services, and overcrowding	1 if the household meets basic needs 2 if the household does not meet basic needs
Socio-economic Control	quintil	Categorical variable indicating income quintile per capita, calculated based on the income reported by the respondent in Section II (Economic Activities) of the survey	1 if First quintile (lowest income group) 2 if Second quintile 3 if Third quintile 4 if Fourth quintile 5 if Fifth quintile (highest income group)
Geographic Control	rural	Binary variable indicating if the household is is in a rural or urban parish	1 if the household is in rural parish 0 if the household is in an urban parish
Household-specific Control	water_sanitation_index	Discrete variable calculated by summing three binary variables that indicate access to basic water and sanitation services in the household	0 if the household has none of piped water, safe water source, and improved sanitation 1 if the household has at least one of the three services in good condition 2 if the household has two of the three services in good condition 3 if the household has all three services in good condition
Household-specific Control	food_security_index	Discrete variable created by summing five binary indicators that reflect different aspects of food insecurity	0 if there is no food insecurity, none of the indicators (worried about food, lacked nutrition, skipped meals, fel hungry, no food all day) are reported 1-4 if there is some food insecuirty, some of the indicators are reported 5 severe food insecuirty, all of the indicators are reported
Mother-specific Control	mother_ethnicity[1-5]	Set of binary variables indicating the ethnicity of the mother 1 mother is of that ethnicity 0 mother is not of that ethnicity	mother_ethnicity1: Indigenous mother_ethnicity2: Afroecuadorian mother_ethnicity3: Montubia mother_ethnicity4: Mestiza (reference variable) mother_ethnicity5: White/other
Mother-specific Control	mother_monetary_income	Continuous numerical variable indicating the amount received by the mother from salary, wages, and other work related income in the past month	0-5000 USD
Mother-specific Control	mother_worked	Binary variable indicating whether the mother worked in the past week	1 if the mother worked (1-6 from question f1_s2_1) in the past week 0 if the mother did not work (7 from question f1_s2_1) in the past week
Mother-specific Control	mother_ed[1-11]	Set of binary variables indicating the highest level of education the mother passed (based on answers to question f1_s1_15_1) 1 if highest level passed 0 otherwise	mother_ed1: None (reference variable) mother_ed2: Literacy programs mother_ed3: Primary education mother_ed4: Basic General Education mother_ed5: Secondary education mother_ed6: High School (Bachillerato) mother_ed7:Post-high school cycle (non-university education) mother_ed8: Higher Technical or Technological Education mother_ed9: Higher Education mother_ed10: Master's degree or Specialization mother_ed11: PhD or Doctorate
Mother-specific Control	mother_age	Continuous numerical variable indicating the age in years of the mother of the child under age 5 (at the moment the interview was done)	13-57 years

Table 2 presents the summary statistics for these variables. The dependent variable, chronic malnutrition, shows that 17.9% of children under five years old suffer from stunting, like the estimate by the INEC which includes survey weights, highlighting a persistent challenge in Ecuador's child health outcomes.

The primary explanatory variable, mother's marital status, indicates that 72.5% of mothers are married or cohabiting, while 27.5% are single, widowed, divorced, or separated. This division reflects the distribution of family structures in the sample, which is relevant for understanding household dynamics and resource availability.

The age distribution of children under five in the sample highlights an important imbalance, particularly for children under 11 months old. The youngest age groups –0-5 months (7.4%) and 6-11 months (9.9%)– are underrepresented compared to older age groups, which comprise a larger proportion of the sample. Given the significant differences in growth trajectories and nutritional vulnerabilities across these age groups, age group will be included as a covariate in all models. In contrast, the sex of the child assigned at birth is evenly distributed, with 51.4% male and 48.6% female children. However, due to the widely documented higher likelihood of malnutrition among male children, this variable will also be included as a control to capture any potential gender-based differences in nutritional outcomes.

For maternal-specific characteristics, 56.5% of mothers reported working in the past week, with an average monthly income of $178.2. The substantial standard deviation indicates significant variation in economic conditions across mother-sourced income for households. Educational attainment among mothers is aggregated into subgroups, with 21.9% completing primary or basic general education, 52.0% attaining secondary or high school education, and 18.6% achieving higher education. Extreme ends of the education spectrum, such as mothers with no formal education (0.4%) or advanced degrees, are much less frequent. These disparities in maternal education provide important context for understanding variations in caregiving practices, nutritional knowledge, and access to healthcare resources.

The ethnic composition of mothers aligns with Ecuador's demographic structure. The majority of mothers identify as mestiza (77.1%), followed by indigenous (14.1%). Other ethnicities, including Afro-Ecuadorian, Montubia, and white/other, represent much smaller proportions of the sample. These patterns are consistent with national trends but emphasize the need to consider ethnic disparities when analyzing child malnutrition outcomes.

The presence of fathers in the household closely aligns with the reported marital status of mothers. 69.3% of fathers live in the same household as the child, a proportion very similar to the 72.5% of mothers who reported being married or cohabiting. This strong correlation reflects the expected overlap between maternal marital status and paternal household presence, supporting the inclusion of marital status as a key variable in the analysis.

Household-specific characteristics provide further insights into the sample's living conditions. 38.8% of households are located in rural areas, where access to resources and healthcare may be more limited, as indicated by significant variation in rural household distribution. Additionally, 34.4% of households report not meeting basic needs (nbi_1), highlighting substantial deprivation in access to essential services. While the food insecurity index has a relatively low mean of 1.43 out of 5, its high standard deviation suggests that specific households experience severe food insecurity. On a more positive note, the water and sanitation index shows favorable outcomes, with an average score of 2.85 out of 3 and little variation, indicating widespread access to clean water and improved sanitation facilities.

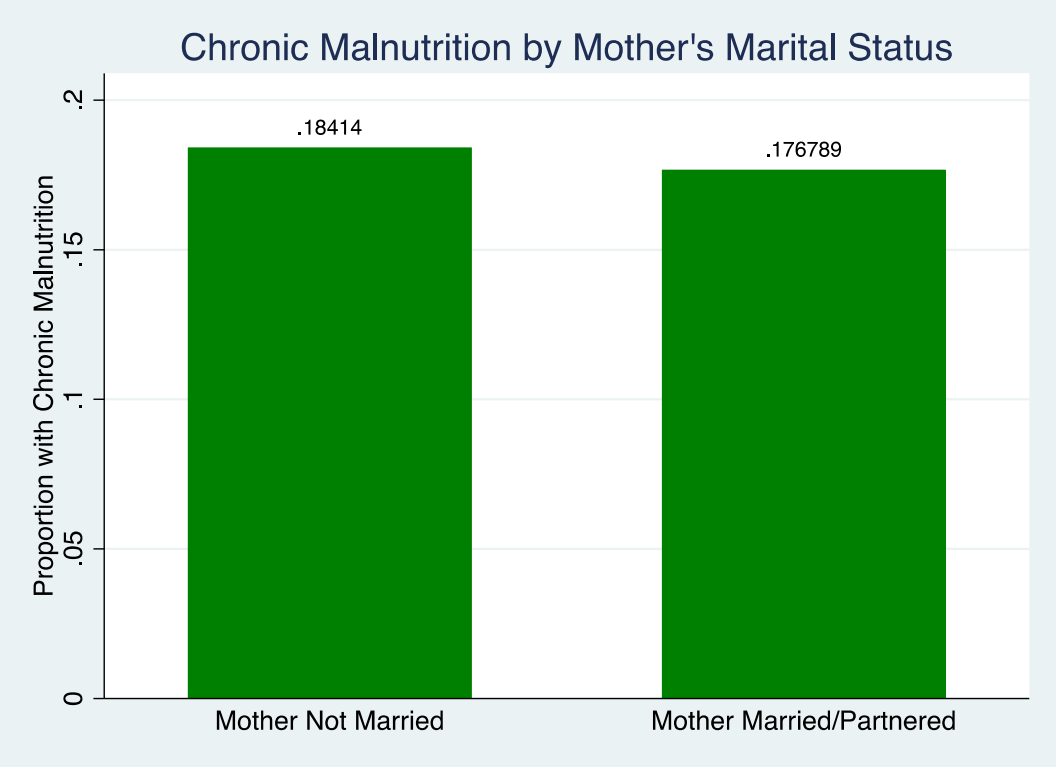
Table 2: Descriptive Statistics

Variable	Obs	Mean	SD	Min	Max
Chronic Malnutrition	22,331	0.179	0.383	0	1
Child Characteristics					
Male	23,187	0.514	0.500	0	1
Age Group	23,187	-	-	-	-
0-5 months old	1,717	0.074	0.262	0	1
6-11 months old	2,301	0.099	0.299	0	1
12-23 months old	4,595	0.198	0.399	0	1
24-35 months old	4,563	0.197	0.398	0	1
36-47 months old	4,898	0.211	0.408	0	1
48-59 months old	5,113	0.221	0.415	0	1
Mother Characteristics					
Mother Married	22,724	0.725	0.446	0	1
Mother Worked	23,033	0.565	0.496	0	1
Mother Education	22,724	-	-	-	-
None	98	0.004	0.066	0	1
Literacy Programs	18	0.001	0.028	0	1
Primary Education	2,688	0.118	0.323	0	1
Basic General Education	2,304	0.101	0.302	0	1
Secondary Education	5,648	0.249	0.432	0	1
High School	6,162	0.271	0.445	0	1
Post High School Cycle	4	0.000	0.013	0	1
Technological Education	975	0.043	0.203	0	1
Higher Education	4,234	0.186	0.389	0	1
Master's/specialization	578	0.025	0.157	0	1
PhD/Doctorate	15	0.001	0.026	0	1
Mother Ethnicity	22,724	-	-	-	-
Indigenous	3,193	0.141	0.348	0	1
Afroecuadorian	1,027	0.045	0.208	0	1
Montubia	746	0.033	0.178	0	1
Mestiza	17,527	0.771	0.420	0	1
White/Other	231	0.010	0.100	0	1
Mother Age	22,724	29.244	6.904	13	57
Mother Monetary Income	15,901	178.189	364.602	0	5000
Relevant Variables					
Father in Home	23,187	0.693	0.461		
Rural	23,187	0.388	0.487	0	1
nbi_1	23,187	0.340	0.474	0	1
Quintile	23,031				
First	4,444	0.193	0.395	0	1
Second	4,110	0.178	0.383	0	1
Third	4,126	0.179	0.383	0	1
Fourth	4,544	0.197	0.398	0	1
Fifth	5,807	0.252	0.434	0	1
Food Insecurity Index	23,187	1.433	1.445	0	5
Water Sanitation Index	21,412	2.854	0.397	1	3

Notes: The number of observations for chronic malnutrition is lower than the total number of children because a small fraction did not undergo anthropometric measurements. Variables related to mothers have fewer observations as they depend on the mother residing in the household. While this is true in most cases, it reduces the sample size slightly. For Mother Monetary Income, the sample size is further reduced because it is contingent on responses to prior screening questions regarding employment or income. The water sanitation index has lower

Figure 1 presents the proportion of children under five experiencing chronic malnutrition based on the mother's marital status. The results indicate that children of mothers who are not married exhibit slightly higher rates of chronic malnutrition (18.4%) compared to children of married or partnered mothers (17.7%). While the difference appears modest, it suggests a potential association between marital status and child nutritional outcomes that warrants further exploration in the regression analysis.

Figure 1: Chronic Malnutrition by Mother's Marital Status



III. Econometric Model and Results

The preferred identification strategy for estimating the causal effect of maternal marital status on chronic malnutrition would involve longitudinal data. As highlighted in the literature, studies such as Le and Nguyen (2018) and Bella et al. (2023) employ panel or longitudinal data to capture within-individual variations over time and isolate the effects of maternal characteristics like income, mental health, and marital status on child health outcomes. Longitudinal data would allow me to control for time-invariant unobserved heterogeneity (e.g., maternal characteristics or household-specific factors), and identify causal pathways by tracking changes in marital status, income, and child nutritional outcomes over time. However, the dataset used in this study—the National Survey on Child Malnutrition (ENDI)—is a cross-sectional dataset, which limits the ability to observe changes over time for the same individuals. As a result, I cannot use fixed-effects or dynamic panel models to address unobserved heterogeneity.

The causal pathway explored in this study focuses on household income and resource allocation (referred to as the economic pathway) as the primary mechanism through which maternal marital status influences chronic malnutrition. Single mothers (unmarried, separated, divorced, or widowed) often face reduced household income due to the absence of a second income provider or limited financial support. This reduction in financial resources constrains their ability to meet children's nutritional needs. This pathway can be summarized as:

Single Mother → Lower Household Income → Reduced Food Security → Higher Risk of Malnutrition.

To isolate this effect, my identification strategy includes controls that block alternative pathways, such as inadequate childcare time constraints or social support effects, while retaining those that account for household income and food security. By controlling for relevant factors, I aim to estimate the role household economic constraints play in explaining the relationship between maternal marital status and chronic malnutrition.

The equation for my baseline linear probability model, which isolates the direct effect before adding economic controls or mediators is:

$$(1)\ dcronica_i = \beta_0 + \beta_1 mother\ married_i + \beta_2 mother\ responsible_i + \boldsymbol{\gamma_i} + u_i$$

Where $\boldsymbol{\gamma_i}$ is a vector of child-specific controls of anemia risk, age group, and sex, and u_i is the error term. The marginal effect of mother married on the probability of chronic malnutrition is:

$$\frac{\partial P(dcronica_i = 1)}{\partial Mother\ Married_i} = \beta_1$$

Which is expected to be negative $\beta_1 < 0$, under the hypothesis that a mother being married or partnered reduces the probability of chronic malnutrition for children under 5. This is based on the causal pathway that married or partnered mothers may have better financial support from a spouse, leading to improved food security, access to healthcare, and overall household conditions.

The next model introduces household income as a key mediator in the economic pathway

$$(2)\ dcronica_i = \beta_0 + \beta_1 mother\ married_i + \beta_2 mother\ responsible_i + \beta_3 \ln(household\ income_i) + \boldsymbol{\gamma_i} + u_i$$

Household income is hypothesized to mediate the relationship between maternal marital status and chronic malnutrition. If the coefficient on mother_married decreases, it suggests that income constraints are a mechanism.

To further test the role of food insecurity in the economic pathway, I add the food insecurity index:

$$(3)\ dcronica_i = \beta_0 + \beta_1 mother\ married_i + \beta_2 mother\ responsible_i + \beta_3 \ln(household\ income_i) + \beta_4 Food\ Insecurity\ Index + \boldsymbol{\gamma_i} + u_i$$

Food insecurity is an intermediate step between income constraints and chronic malnutrition. By including the food insecurity index, I test whether it further explains the effect of maternal marital status.

$$(4)\ dcronica_i = \beta_0 + \beta_1 mother\ married_i + \beta_2 mother\ responsible_i + \beta_3 \ln(household\ income_i) + \beta_4 Food\ Insecurity\ Index + \boldsymbol{\gamma_i} + \boldsymbol{\delta_i} + \boldsymbol{\lambda_i} + \boldsymbol{\eta_i} + u_i$$

Where $\boldsymbol{\delta_i}$ is a vector of mother-specific controls, $\boldsymbol{\lambda_i}$ is a vector of socio-economic and geographic controls, $\boldsymbol{\eta_i}$ is a household-specific controls and u_i is the error term

To explore whether the effect of maternal marital status is moderated by household income and food insecurity, I include interaction terms:

(5) $$dcronica_i = \beta_0 + \beta_1 mother\ married_i + \beta_2 \ln(household\ income_i) + \beta_3(mother\ married_i * \ln(household\ income_i)) + \beta_4 mother\ responsible_i + \boldsymbol{\gamma_i} + u_i$$

This interaction term tests whether the effect of being unmarried on malnutrition is stronger for lower-income households. According to the economic pathway, households with limited income face amplified challenges in meeting children's nutritional needs.

(6) $$dcronica_i = \beta_0 + \beta_1 mother\ married_i + \beta_2 \ln(household\ income_i) + \beta_3(mother\ married_i * \ln(household\ income_i)) + \beta_4 mother\ responsible_i + \boldsymbol{\gamma_i} + \boldsymbol{\delta_i} + \boldsymbol{\lambda_i} + \boldsymbol{\eta_i} + u_i$$

(7) $$dcronica_i = \beta_0 + \beta_1 mother\ married_i + \beta_2 Food\ secuirty\ index + \beta_3\ (mother\ married_i * Food\ Insecurity\ Index_i) + \beta_4 mother\ responsible_i + \boldsymbol{\gamma_i} + u_i$$

This interaction tests whether food insecurity intensifies the impact of maternal marital status on malnutrition. Food insecurity is a critical mediator in the economic pathway. If the interaction is significant, it suggests that food-insecure households are disproportionately affected.

(8) $$dcronica_i = \beta_0 + \beta_1 mother\ married_i + \beta_2 Food\ secuirty\ index + \beta_3(mother\ married_i * Food\ Insecurity\ Index_i) + \beta_4 mother\ responsible_i + \boldsymbol{\gamma_i} + \boldsymbol{\delta_i} + \boldsymbol{\lambda_i} + \boldsymbol{\eta_i} + u_i$$

IV. Discussion and Results

Table 3 shows the results from these models.

Table 3: Results

Dependent Variable: dcronica (chronic malnutrition for children under 5 years of age)

Variables	1	2	3	4	5	6	7	8
Mother Married	-0.005	-.004	0.006	0.004	0.001	0.006	-0.006	0.008
	(0.006)	(0.006)	(0.006)	(0.006)	(0.008)	(0.008)	(0.009)	(0.011)
Mother Responsible	-0.102*	-0.099*	-0.088	0.007	-0.100*	0.006	-0.089	0.006
	(0.058)	(0.058)	(0.058)	(0.055)	(0.059)	(0.055)	(0.058)	(0.055)
log Household Income	-	-0.003***	-0.001	0.001	-0.0015	0.002	-	0.002
		(0.001)	(0.001)	(0.001)	(0.002)	(0.002)		(0.002)
Food Insecurity Index	-	-	0.027***	0.008***	-	-	0.022***	0.008**
			(0.002)	(0.002)			(0.004)	(0.004)
Constant	0.405***	0.406***	0.335	0.249	0.403***	0.269**	0.343***	0.248**
	(0.087)	(0.087)	(0.087)	(0.109)	(0.087)	(0.109)	(0.087)	(0.109)
(Mother Married)x(log Household income)	-	-	-	-	-0.002	-0.001	-	-.001
					(0.002)	(0.002)		(0.002)
(Mother married)x(Food insecurity index)	-	-	-	-	-	-	0.007*	0.000
							(0.004)	(0.005)
Child-specific controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mother-specific controls	No	No	No	Yes	No	Yes	No	Yes
Household controls	No	No	No	Yes	No	Yes	No	Yes
Geographic controls	No	No	No	Yes	No	Yes	No	Yes
Socio-economic controls	No	No	No	Yes	No	Yes	No	Yes
Observations	19616	19616	19616	18039	19616	18039	19616	18039
R-squared	0.016	0.017	0.026	0.088	0.017	0.088	0.026	0.369
F-statistics								
Household income and Food Insecurity = 0			93.18					
			(0.000)					
Interaction Term (married*income)= 0					1.09			
					(0.296)			
Interaction Term (married*income)= 0						0.34.		
						(0.557)		
Interaction Term (married*food_index)= 0							2.68	
							(0.101)	
Both interaction terms = 0								0.20
								(0.815)

Notes: All robust standard errors are shown in parenthesis under the coefficient.
* signficant at the 10% level
** significant at the 5 level
*** significant at the 1% level

Across all specifications, the coefficient on Mother Married is small and statistically insignificant. This suggests that marital status does not directly influence malnutrition, even once household income and food security are controlled for. For example, in model 3, the coefficient is 0.006 (SE = 0.006), suggesting no evidence that marital status directly affects malnutrition when accounting for these controls. The interaction term in models 5 indicates that the influence of marital status through household income or food insecurity is also weak and statistically inconclusive. I fail to reject the null hypothesis that maternal marital status has no effect on chronic malnutrition in favor of the alternative that married mothers experience lower rates of chronic malnutrition for their children because the estimated coefficient on mother married is both small in magnitude and statistically insignificant across all specifications. This lack of evidence, coupled with wide confidence intervals, suggests that any potential effect of marital status is likely negligible or obscured by other factors such as household income and food insecurity, which play more significant roles in explaining chronic malnutrition.

The coefficient on Log Household Income is consistently negative and significant in early specifications. For example, in model 4, a 10% increase in household income is associated with a

0.015 decrease in the probability of chronic malnutrition (dcronica = 1). This finding, although small, aligns with the economic pathway, where higher income reduces the risk of malnutrition by improving food security and access to nutritional resources.

The Food Insecurity Index has a strong positive and significant effect across specifications. For instance, in model 4 the coefficient for the food insecurity index is 0.027 (SE = 0.002), which means higher food insecurity increases the probability of chronic malnutrition. For each 1-point increase in the Food Insecurity Index (which reflects a worsening of food insecurity, from 0 to 5), the probability of a child having chronic malnutrition (dcronica = 1) increases by 0.008. This highlights food insecurity as a critical channel in the causal pathway, although the effects for household income and married mothers are not as influential. Additionally, from model 7, each additional point on the Food Insecurity Index increases the likelihood of chronic malnutrition for married mothers by 0.7% more than for non-married mothers, all else being equal. Although the effect is statistically significant, the 0.007 coefficient suggests that the increase in probability is relatively small. For a population with a higher baseline probability of chronic malnutrition, the magnitude could still be meaningful, but in absolute terms, 0.007 is a modest change. This goes against economic pathway with single mothers being the first determinant.

The current model includes household income, food insecurity, and child-specific controls, but other unobserved variables, such as maternal mental health or social support networks, could still influence chronic malnutrition. For example, Le and Nguyen (2018) highlight the role of maternal mental health, which can directly impact caregiving quality and children's health outcomes. By excluding this factor, the coefficient on food insecurity or income may be overstated as it captures additional variance explained by unobserved pathways. Moreover, Bhagowalia et al. (2012) and Hossain (2019) emphasize maternal empowerment and attitudes towards domestic violence as critical determinants of child nutrition. Failing to include such maternal-level empowerment indicators could bias the coefficient estimates, particularly for single mothers.

Errors-in-variable bias in this study could stem directly from my coding abilities rather than issues with the survey data collection itself. These coding decisions influence how variables are constructed and interpreted, potentially leading to measurement errors that bias the estimated coefficients. The marital status variable is dichotomized into "married" and "not married" (single, separated, divorced, or widowed). This coding assumes homogeneity within each group, which might mask important differences. For instance, the economic and social conditions faced by a widowed mother could differ substantially from those of a single never-married mother, introducing potential measurement error. This could potentially lead to attenuation bias, making the coefficients tend toward zero, making it harder to detect significant relationships.

The linear probability model (LPM) may not be the ideal specification for a binary outcome like chronic malnutrition (dcronica = 1). While the LPM offers ease of interpretation, it assumes linearity and constant marginal effects, which may not hold. Logistic or probit models, as used in Miskir et al. (2017) and Pulok et al. (2015), are more appropriate for modeling binary outcomes. These models could yield more robust estimates, particularly at extreme values of the independent variables (e.g., very high food insecurity or very low household income).

The finding that Mother Married has a small and statistically insignificant effect aligns with results from Zewdie and Abebaw (2013), where marital status had limited influence on child nutrition, primarily due to the overwhelming effect of household size and economic resources. Similarly, Yigezu et al. (2024) found that divorced mothers faced higher risks of malnutrition due to reduced resources, underscoring the indirect nature of marital status in the economic pathway. However, Tette et al. (2016) and Miskir et al. (2017) found that children of single mothers experienced significantly higher malnutrition risks (e.g., odds ratios of 2.43 and 3.33, respectively). The disparity could reflect contextual differences: in Ecuador, social support systems or extended family structures may mitigate the effects of single motherhood compared to Ethiopia or Ghana.

The negative relationship between household income and chronic malnutrition aligns with Pulok et al. (2015), who found that a 10% increase in maternal education and household wealth significantly reduced wasting in Bangladesh. Similarly, Bhagowalia et al. (2012) emphasize that income enables better resource allocation, particularly for food diversity and healthcare access. The positive and significant effect of food insecurity is consistent with findings in Bella et al. (2023), who showed that financial constraints (e.g., due to parental smoking behaviors) reduce food budgets and increase malnutrition risks. Furthermore, the small but significant interaction effect for married mothers (0.007 increase in probability) suggests that food insecurity operates similarly across marital statuses, contrary to expectations. This result may indicate that while single mothers face economic constraints, married mothers are not immune to food insecurity, particularly in larger households.

V. Conclusion

This study investigates the relationship between maternal marital status and chronic malnutrition among Ecuadorian children under five, focusing on the economic pathway as a primary mechanism. Using cross-sectional data from the 2024 National Survey on Child Malnutrition (ENDI), the results consistently show that maternal marital status has a negligible and statistically insignificant direct effect on chronic malnutrition. Across all specifications, the coefficient on Mother Married remains small, suggesting that marital status alone does not significantly influence child nutrition outcomes.

However, the analysis highlights household income and food insecurity as potential mediators. A 10% increase in household income is associated with a 0.015 percentage point reduction in the probability of chronic malnutrition, reflecting the importance of financial resources in ensuring adequate nutrition. Similarly, the food insecurity index consistently demonstrates a strong and positive effect, with each additional point increasing the probability of chronic malnutrition. Interaction terms further suggest that food insecurity and income constraints operate similarly across marital statuses, indicating that both married and single mothers face significant challenges when resources are limited.

These findings challenge the direct role of marital status in child malnutrition and instead emphasize the overarching importance of economic constraints and food insecurity. Policies aimed at reducing chronic malnutrition should prioritize improving household income,

expanding access to social safety nets, and addressing food insecurity, irrespective of maternal marital status. Strengthening targeted programs for vulnerable families in rural and indigenous communities, where malnutrition rates are highest, will be crucial to achieving sustainable improvements in child health outcomes.

Future research should explore additional mediators, such as maternal mental health, caregiving quality, and social support networks, which may further explain the relationship between family structure and child malnutrition. A longitudinal approach would also provide deeper insights into causal pathways, allowing for more robust policy recommendations.

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Appendix A: Variable Dictionary

Type of Variable	Variable Name	Definition	Categories/Measurement
DV	dcronica	Binary variable indicating whether a child under the age of 5 is suffering from chronic malnutrition	1 if the child's height-for-age z-score (standardized score) is below -2.0 standard deviations from the mean for their age group. 0 if the child's height-for-age z-score is equal to or greater than -2.0 standard deviations.
IV	mother_married	Binary variable indicating if the mother of a child under the age of 5 is married/partnered or not	1 if the mother is currently married or partnered (i.e., unida or casada in question f1_s1_18). 0 if the mother is not married or partnered (i.e., separada, divorciada, viuda, or soltera in question f1_s1_18)
		Controls	
Control	father_in_home	Binary variable indicating if the father of a child under the age of 5 lives in the same household as the child	1 if the father currently lives in the same household as the child 0 if the father currently does not live in the same household as the child
Child-specific Control	age_group_child	Categorical variable indicating the age group (in months) for the child under age 5	1 if child is 0-5 months old 2 if child is 6-11 months old 3 if child is 12-23 months old 4 if child is 24-35 months old 5 if child is 36-47 months old 6 if child is 48-59 months old
Child-specific Control	anemia	Categorical variable indicating the type of anemia for the child under age 5	1 if child has severe anemia 2 if child has moderate anemia 3 if child has mild anemia 4 if child has no anemia
Child-specific Control	male	Binary variable indicating if the child under the age of 5 is male or female	1 if the child is male 0 if the child is female
Socio-economic Control	nbi_1	Binary variable indicating basic unsatisfied needs in the household based on economic capacity, access to education, access to housing, access to basic services, and overcrowding	1 if the household meets basic needs 2 if the household does not meet basic needs
Socio-economic Control	quintil	Categorical variable indicating income quintile per capita, calculated based on the income reported by the respondent in Section II (Economic Activities) of the survey	1 if First quintile (lowest income group) 2 if Second quintile 3 if Third quintile 4 if Fourth quintile 5 if Fifth quintile (highest income group)
Socio-economic Control	household_income	Continuous numerical variable indicating the amount received by all members of the household from salary, wages, and other work related income in the past month	0-9600 USD
Geographic Control	rural	Binary variable indicating if the household is is in a rural or urban parish	1 if the household is in rural parish 0 if the household is in an urban parish
Geographic Control	region	Categorical variable indicating what region the household is located in	1 if the household is located in the "Sierra" (Andean Highlands) 2 if the household is located in the "Costa" (Coastal Lowlands) 3 if the household is located in the "Amazonía" (Amazon Rainforest) 4 if the household is located in the "Insular" (Galapagos Islands)
Geographic Control	altitud	Continuous numerical variable indicating the altitude at which the household is located	1-3966 meters above sea level 3-13000 ft above sea level
Household-specific Control	separate_kitchen	Binary variable indicating if the household has a separate room for cooking, based on answers to question f1_s3_17	1 if the household has a separate kitchen room 0 if the household does not have a separate kitchen room
Household-specific Control	household_density	Continuous numerical variable indicating the ratio of total members residing in the household to the total number of rooms (based on answers to question f1_s3_15	.2857143 -13 people/room
Household-specific Control	housing_quality_index	Discrete variable calculated by summing three binary variables that indicate whether the roof, walls, and floor of the household's housing are in good condition	0 if none of the housing features (roof, walls, floor) are in good condition 1 if at least one of the housing features is in good condition 2 if two of the housing features are in good condition 3 if all of the housing features are in good condition
Household-specific Control	water_sanitation_index	Discrete variable calculated by summing three binary variables that indicate access to basic water and sanitation services in the household	0 if the household has none of piped water, safe water source, and improved sanitation 1 if the household has at least one of the three services in good condition 2 if the household has two of the three services in good condition 3 if the household has all three services in good condition
Household-specific Control	food_security_index	Discrete variable created by summing five binary indicators that reflect different aspects of food insecurity	0 if there is no food insecurity, none of the indicators (worried about food, lacked nutrition, skipped meals, fel hungry, no food all day) are reported 1-4 if there is some food insecuirty, some of the indicators are reported 5 severe food insecuirty, all of the indicators are reported
Household-specific Control	water_overall_safe	Binary variable indicating whether the water is considered safe based on two indicators: the presence of chlorine and the absence of E. coli	1 if the water has chlorine and does not have E. coli (safe) 0 if either the water lacks chlorine or contains E. coli (unsafe)
Mother-specific Control	mother_ethnicity[1-5]	Set of binary variables indicating the ethnicity of the mother 1 mother is of that ethnicity 0 mother is not of that ethnicity	mother_ethnicity1: Indigenous mother_ethnicity2: Afroecuadorian mother_ethnicity3: Montubia mother_ethnicity4: Mestiza (reference variable) mother_ethnicity5: White/other
Mother-specific Control	mother_disability	Binary variable indicating whether the mother holds a disability card issued by the National Council for Disabilities (CONADIS) or the Ministry of Public Health (MSP)	1 if the mother has a disability card issued by CONADIS or MSP 0 if the mother does have a disability card issued by CONADIS or MSP
Mother-specific Control	mother_head_or_spouse	Binary variable indicating if the mother of the child under age 5 is the household head (legal representative) or married to	1 if the mother is the household head or spouse of household head 0 if the mother is not the household head or spouse of household head
Mother-specific Control	mother_monetary_income	Continuous numerical variable indicating the amount received by the mother from salary, wages, and other work related income in the past month	0-5000 USD
Mother-specific Control	mother_social_transfers	Continuous variable calculated by summing the amount received by the mother from: "bono de desarrollo humano", "bono Joaquín Gallegos Lara", and "bono de los 1000 días"	0-360 USD
Mother-specific Control	mother_inkind_income	Continuous variable indicating the amount of income received in the form of non-monetary compensation (in-kind benefits) for work	0-490 USD
Mother-specific Control	mother_worked	Binary variable indicating whether the mother worked in the past week	1 if the mother worked (1-6 from question f1_s2_1) in the past week 0 if the mother did not work (7 from question f1_s2_1) in the past week
Mother-specific Control	multiple_jobs	Binary variable indicating whether the mother has more than one job or not	1 if the mother has more than one job (question f1_s2_7) 0 if the mother only has one job (question f1_s2_7)
Mother-specific Control	mother_responsible	Binary variable indicating if the mother is the person responsible in the household for the child between 6 months old under 5 years of age	1 if the mother is the primary caregiver (question f1_s6_1) 0 if the mother is not the primary caregiver (questionf1_s6_1)
Mother-specific Control	mother_ed[1-11]	Set of binary variables indicating the highest level of education the mother passed (based on answers to question f1_s1_15_1) 1 if highest level passed 0 otherwise	mother_ed1: None (reference variable) mother_ed2: Literacy programs mother_ed3: Primary education mother_ed4: Basic General Education mother_ed5: Secondary education mother_ed6: High School (Bachillerato) mother_ed7:Post-high school cycle (non-university education) mother_ed8: Higher Technical or Technological Education mother_ed9: Higher Education mother_ed10: Master's degree or Specialization mother_ed11: PhD or Doctorate
Mother-specific Control	mother_age	Continuous numerical variable indicating the age in years of the mother of the child under age 5 (at the moment the interview was done)	13-57 years

Appendix B: Previous Literature Regression Tables

Castillo-Guerra (2018)

Tabla 7. Efecto del empoderamiento femenino sobre prácticas de cuidado infantil

Variables	Podría solo la mujer decidir si llevar al médico al niño	Si la mujer lava sus manos inmediatamente después de que limpia a su niño	El hijo de la mujer recibió alguna vacuna para protegerlo contra las enfermedades	Si la mujer recibió capacitación sobre lactancia materna
Índice de Empoderamiento Femenino	0,0206** (0,00997)	0,121*** (0,0315)	-0,0371* (0,0225)	0,113** (0,0551)
Constante	0,848*** (0,00609)	0,863*** (0,0116)	0,631*** (0,0190)	0,220*** (0,0308)
Controles	Sí	Sí	Sí	Sí
Efecto fijo año	Sí	Sí	Sí	Sí
Efecto fijo dptal	Sí	Sí	Sí	Sí
Observaciones	48.586	43.046	11.689	28.028

Errores estándares robustos entre paréntesis a nivel de clúster departamental. Se incluyen efectos fijos temporales y departamentales. Y como controles características de niño, del hogar, la mujer y su pareja.
*** p<0,01, ** p<0,05, * p<0,1

Fuente: cálculos de la autora con base en la ENDS Colombia (2000, 2005 y 2010).

Hossain (2019)

Table 5. Results of the estimated ordered probit models.

	Coefficients of oprobit		Average elasticities of stunting (HAZ)			Average elasticities of underweight (WAZ)		
variables	stunting	underweight	No stunting	stunting	Acute stun.	No u-wt	Under-weight	Acute u.wt
M. Emp	−0.016 (0.006)***	−0.015 (0.006)***	0.169	−0.276	−0.583	0.140	−0.279	−0.575
EmpSq	0.0002 (0.0001)**	0.0003 (0.0001)***	−0.058	0.108	0.220	−0.067	0.141	0.285
M Endow:								
Mother's ht	−0.044 (0.004)***	−0.036 (0.004)***	3.881	−5.520	−12.19	2.859	−5.171	−10.935
Mother's bmi	0.095 (0.052)**	0.351 (0.053)***	−0.015	0.013	0.035	−0.059	0.047	0.133
Children born last 5 yrs	0.054 (0.046)	0.044 (0.046)	−0.042	0.054	0.124	−0.031	0.051	0.111
C. Char.:								
Child's age	0.063 (0.005)***	0.038 (0.005)***	−1.205	1.312	3.198	−0.641	0.647	2.132
C age sq.	−0.0008 (0.00)***	−0.0004 (0.00)***	0.639	−0.669	−1.657	0.298	−0.415	−0.953
Birth size	0.318 (0.059)***	0.466 (0.062)***	−0.033	0.024	0.069	−0.049	0.036	0.107
Male child	0.069 (0.042)*	0.018 (0.042)	−0.022	0.029	0.066	−0.005	0.009	0.019
HH char:								
Partner yrs schooling	−0.027 (0.006)***	−0.022 (0.006)***	0.068	−0.157	−0.302	0.053	−0.144	−0.276
Muslim	0.075 (0.073)	0.014 (0.074)	−0.041	0.056	0.125	−0.007	0.012	0.025
Poorer	−0.045 (0.059)	−0.094 (0.062)*	0.006	−0.005	−0.014	0.011	−0.014	−0.033
Middle	−0.149 (0.075)**	−0.191 (0.074)***	0.018	−0.024	−0.054	0.020	−0.036	−0.077
Richer	−0.342 (0.067)***	−0.335 (0.072)***	0.034	−0.066	−0.133	0.030	−0.073	−0.144
Richest	−0.597 (0.082)***	−0.537 (0.089)***	0.040	−0.150	−0.262	0.033	−0.145	−0.255
Geo.:								
Rural	−0.109 (0.049)**	−0.033 (0.051)	0.050	−0.063	−0.145	0.014	−0.022	−0.049
Barisal	0.128 (0.074)*	−0.007 (0.083)	−0.005	0.006	0.014	0.000	−0.000	−0.001
Chittagong	0.210 (0.067)***	0.078 (0.077)	−0.028	0.034	0.080	−0.010	0.014	0.033
Dhaka	0.081 (0.074)	−0.155 (0.082)*	−0.016	0.024	0.053	0.026	−0.058	−0.116
Rajshahi	−0.101 (0.072)	−0.152 (0.079)*	0.005	−0.010	−0.020	0.008	−0.016	−0.032
Khulna	−0.104 (0.076)	−0.215 (0.084)***	0.004	−0.009	−0.016	0.007	−0.019	−0.036
Sylhet	0.337 (0.072)***	−0.015 (0.082)	−0.027	0.015	0.051	0.001	−0.001	−0.003
Thresholds:								
K1	−5.616 (0.653)	−4.619 (0.613)						
K2	-4.668 (0.651)	-3.530 (0.612)						
Loglikely at zero	−5950.54	−5461.81						
Loglikely at con	−5366.21	−4984.09						
Wald statistics	608.42	569.38						
Sample size	6607	6607						

Notes: ***, ** and * denote 1, 5 and 10 percent levels, respectively. Robust standard errors are in the parentheses.

Appendix C: Stata Do-file

```
set more 1
capture log close
cd "/Users/felipedominguez/Desktop/Fall '24/Econometrics/RARP/BDD_ENDI_R2_dta"
log using RARP, text replace

use BDD_ENDI_R2_merged.dta, clear

duplicates report id_hogar /*make sure merge worked */


**# Definition of independent variable

gen married = .
replace married = 1 if f1_s1_18 == 1 | f1_s1_18 == 5 /*married or partnered*/
replace married = 0 if f1_s1_18 == 2 | f1_s1_18 == 3 | f1_s1_18 == 4 | f1_s1_18 == 6

label variable married "Married/Partnered Status (1=Yes, 0=No)"
label define married_label 0 "Not Married" 1 "Married/Partnered"
label values married married_label


destring(persona), replace


generate mother_in_home = .
replace mother_in_home = 1 if f1_s1_12 == 1 & grupo_edad_nin != . // Mother of child
under 5 lives in the home
replace mother_in_home = 0 if f1_s1_12 == 2 & grupo_edad_nin != . // Mother does not
live in the home
label variable mother_in_home "Mother lives in the home (1 = Yes, 0 = No)"


*Identify mother's position within the household
gen mother_position = f1_s1_12_1 if f1_s1_12 == 1 & grupo_edad_nin != .

*Propagate mother's position to all rows in the same household
bysort id_hogar (mother_position): replace mother_position = mother_position[_n] if
!missing(mother_position)
bysort id_hogar: replace mother_position = mother_position[_n-1] if
missing(mother_position)

gen mother_married = .
replace mother_married = 1 if married ==1 & mother_position == persona
replace mother_married = 0 if married == 0 & mother_position == persona

label variable mother_married "Mother Married/Partnered Status (1=Yes, 0=No)"
label define mother_married_label 0 "Mother Not Married" 1 "Mother Married/Partnered"
label values mother_married mother_married_label


tab married
tab mother_married

* Propagate mother's marital status
bysort id_hogar (mother_married): replace mother_married = mother_married[_n] if
!missing(mother_married)
bysort id_hogar: replace mother_married = mother_married[_n-1] if
missing(mother_married)
```

```
**# Controls

*Father lives in home dummy
generate father_in_home = .
replace father_in_home = 1 if f1_s1_11 == 1  & grupo_edad_nin != . // Father lives in
the home
replace father_in_home = 0 if f1_s1_11 == 2 & grupo_edad_nin != . // Father does not
live in the home
label variable father_in_home "Father lives in the home (1 = Yes, 0 = No)"

**#Mother specific controls
*Ethnicity

gen mother_ethnicity = etnia if persona == mother_position

tab mother_ethnicity, gen(mother_ethnicity)
label variable mother_ethnicity1 "Ethnicity: Indígena"
label variable mother_ethnicity2 "Ethnicity: Afroecuatoriana/o"
label variable mother_ethnicity3 "Ethnicity: Montubia/o"
label variable mother_ethnicity4 "Ethnicity: Mestiza/o"
label variable mother_ethnicity5 "Ethnicity: Blanca/o u Otra"

* Propagate mother's ethnicity
bysort id_hogar (mother_ethnicity): replace mother_ethnicity = mother_ethnicity[_n] if
!missing(mother_ethnicity)
bysort id_hogar: replace mother_ethnicity = mother_ethnicity[_n-1] if
missing(mother_ethnicity)
* Propagate mother's ethnicity dummies
foreach var of varlist mother_ethnicity1 mother_ethnicity2 mother_ethnicity3 ///
    mother_ethnicity4 mother_ethnicity5 {
    bysort id_hogar (`var'): replace `var' = `var'[_n] if !missing(`var')
    bysort id_hogar: replace `var' = `var'[_n-1] if missing(`var')
}


*Disability
gen mother_disability = .
replace mother_disability = 1 if f1_s1_8 == 1 & persona == mother_position
replace mother_disability = 0 if f1_s1_8 ==2 & persona == mother_position

* Propagate mother's disability status
bysort id_hogar (mother_disability): replace mother_disability = mother_disability[_n]
if !missing(mother_disability)
bysort id_hogar: replace mother_disability = mother_disability[_n-1] if
missing(mother_disability)

*Mother education
gen mother_ed = f1_s1_15_1 if persona == mother_position

tab mother_ed, gen(mother_ed)
label variable mother_ed1 "Education: None"
label variable mother_ed2 "Education:  Alfabetización (EBJA)"
label variable mother_ed3 "Education: Primaria"
label variable mother_ed4 "Education: Educacion General Basica"
label variable mother_ed5 "Education: Secundaria"
label variable mother_ed6 "Education: Bachillerato"
label variable mother_ed7 "Education: Ciclo Postbachillerato (no superior)"
label variable mother_ed8 "Education: Educación Técnica o Tecnológica Superior"
label variable mother_ed9 "Education: Educacion Superior"
label variable mother_ed10 "Education: Maestria/Especializacion"
label variable mother_ed11 "Education: PHD/doctorado"
```

```
* Propagate mother's education level
bysort id_hogar (mother_ed): replace mother_ed = mother_ed[_n] if !missing(mother_ed)
bysort id_hogar: replace mother_ed = mother_ed[_n-1] if missing(mother_ed)

* Propagate mother's education dummies
foreach var of varlist mother_ed1 mother_ed2 mother_ed3 mother_ed4 mother_ed5 ///
    mother_ed6 mother_ed7 mother_ed8 mother_ed9 mother_ed10 mother_ed11 {
    bysort id_hogar (`var'): replace `var' = `var'[_n] if !missing(`var')
    bysort id_hogar: replace `var' = `var'[_n-1] if missing(`var')
}


*Mother worked
gen mother_worked = inlist(f1_s2_1, 1, 2, 3, 4, 5, 6)  if persona == mother_position
replace mother_worked = 0 if f1_s2_1 == 7
label variable mother_worked "Mother worked last week (1=Yes, 0=No)"

* Propagate mother's work status
bysort id_hogar (mother_worked): replace mother_worked = mother_worked[_n] if
!missing(mother_worked)
bysort id_hogar: replace mother_worked = mother_worked[_n-1] if missing(mother_worked)



*multiple jobs (think of interaction term)
gen multiple_jobs = (f1_s2_7 == 2) if persona == mother_position
label variable multiple_jobs "Mother had multiple jobs (1=Yes, 0=No)"

* Propagate mother's multiple jobs indicator
bysort id_hogar (multiple_jobs): replace multiple_jobs = multiple_jobs[_n] if
!missing(multiple_jobs)
bysort id_hogar: replace multiple_jobs = multiple_jobs[_n-1] if missing(multiple_jobs)



*Mother household head or "spouse" to him
gen mother_head_or_spouse = inlist(f1_s1_1, 1, 2) if persona == mother_position
label variable mother_head_or_spouse "Mother is head or spouse of household head
(1=Yes, 0=No)"
//only moderately correlated with mother_married
* Propagate mother is head or spouse of household head
bysort id_hogar (mother_head_or_spouse): replace mother_head_or_spouse =
mother_head_or_spouse[_n] if !missing(mother_head_or_spouse)
bysort id_hogar: replace mother_head_or_spouse = mother_head_or_spouse[_n-1] if
missing(mother_head_or_spouse)


*Mother monetary income
replace f1_s2_12 = . if f1_s2_12 >= 999999 //replace place holder for missing values
replace f1_s2_12 = 0 if mother_worked == 0 | f1_s2_4 == 1 | f1_s2_1 == 7  //if didn't
work, no slary

gen  mother_monetary_income =  f1_s2_12 if mother_position ==persona
replace mother_monetary_income = 0 if mother_worked ==0 & mother_position ==persona
label variable mother_monetary_income "Mother's monetary income"
* Propagate mother's monetary income
bysort id_hogar (mother_monetary_income): replace mother_monetary_income =
mother_monetary_income[_n] if !missing(mother_monetary_income)
bysort id_hogar: replace mother_monetary_income = mother_monetary_income[_n-1] if
missing(mother_monetary_income)
```

```
* In-Kind Income Test on regression (low number of obs)
replace f1_s2_14_2 = 0 if f1_s2_4 == 1 | f1_s2_1 == 7 //if didn't work, no slary
replace f1_s2_14_2 = 0 if f1_s2_14_1 == 2 //if didn't work, no slary
replace f1_s2_14_2 = . if f1_s2_14_2 >= 999999 //replace place holder for missing
values
gen mother_inkind_income = f1_s2_14_2 if persona == mother_position
replace mother_inkind_income = 0 if mother_worked ==0 & mother_position ==persona
label variable mother_inkind_income "Mother's in-kind income"
* Propagate mother's in-kind income
bysort id_hogar (mother_inkind_income): replace mother_inkind_income =
mother_inkind_income[_n] if !missing(mother_inkind_income)
bysort id_hogar: replace mother_inkind_income = mother_inkind_income[_n-1] if
missing(mother_inkind_income)



* Social Transfers income

replace f1_s2_22 = 0 if f1_s2_21 ==2
replace f1_s2_24 = 0 if f1_s2_23 ==2
replace f1_s2_26 = 0 if f1_s2_25 ==2

gen mother_social_transfers = f1_s2_22 + f1_s2_24 + f1_s2_26 if persona ==
mother_position
label variable mother_social_transfers "Mother's social transfers income"

* Propagate mother's social transfers
bysort id_hogar (mother_social_transfers): replace mother_social_transfers =
mother_social_transfers[_n] if !missing(mother_social_transfers)
bysort id_hogar: replace mother_social_transfers = mother_social_transfers[_n-1] if
missing(mother_social_transfers)

replace f1_s2_20_2 = 0 if f1_s2_20_1 ==2
replace f1_s2_20_2 = . if f1_s2_20_2 >= 999999
sum f1_s2_20_2

*mother responsible for the child

gen mother_responsible = .
replace mother_responsible = 0 if f1_s6_1 != mother_position & grupo_edad_nin != .
replace mother_responsible = 1 if f1_s6_1 == mother_position & grupo_edad_nin != .
label variable mother_responsible "Mother is primary caregiver"
label define caregiver_label 0 "Not Mother" 1 "Mother Primary Caregiver"
label values mother_responsible caregiver_label
* Propagate mother's responsibility status
bysort id_hogar (mother_responsible): replace mother_responsible =
mother_responsible[_n] if !missing(mother_responsible)
bysort id_hogar: replace mother_responsible = mother_responsible[_n-1] if
missing(mother_responsible)


*mother age
gen mother_age = f1_s1_3_1 if persona == mother_position

* Propagate mother's age
bysort id_hogar (mother_age): replace mother_age = mother_age[_n] if
!missing(mother_age)
bysort id_hogar: replace mother_age = mother_age[_n-1] if missing(mother_age)



**#Child specific controls
*Sex of child at birth
```

```
gen male = .
replace male = 1 if f1_s1_2 == 1 & grupo_edad_nin != .
replace male = 0 if f1_s1_2 == 2 & grupo_edad_nin != .
label variable male "Child is male (1=Yes, 0=No)"

gen age_group_child = grupo_edad_nin if grupo_edad_nin != .

gen anemia = ane6_59 if grupo_edad_nin != .

* Create total household income by summing income for all members in the household
replace f1_s2_12 = . if f1_s2_12 >=999999
bysort id_hogar: egen household_income = total(f1_s2_12)
label variable household_income "Total household income"



*Area

gen rural = .
replace rural =1 if area ==2
replace rural =0 if area ==1




* Roof condition: Good vs Not Good
gen roof_good = (f1_s3_4 == 1)
label variable roof_good "Roof in good condition"

* Walls condition: Good vs Not Good
gen walls_good = (f1_s3_6 == 1)
label variable walls_good "Walls in good condition"

* Floor condition: Good vs Not Good
gen floor_good = (f1_s3_8 == 1)
label variable floor_good "Floor in good condition"

* Summary: Housing quality index
gen housing_quality_index = roof_good + walls_good + floor_good
label variable housing_quality_index "Housing quality index (0-3)"


gen piped_water = .
replace piped_water = 1 if f1_s3_9 == 1 | f1_s3_9 == 2 | f1_s3_9 == 3
replace piped_water = 0 if f1_s3_9 ==0
label variable piped_water "Household has piped water"

gen safe_water = .
replace safe_water = 1 if f1_s3_10 == 1 | f1_s3_10 == 2 //public system
replace safe_water = 0 if f1_s3_10 == 3 | f1_s3_10 == 4 | f1_s3_10 == 5
label variable safe_water "Safe water source"

gen improved_sanitation = .
replace improved_sanitation = 1 if f1_s3_11 == 1 | f1_s3_11 == 2 | f1_s3_11 == 3
replace improved_sanitation = 0 if f1_s3_11 == 4 | f1_s3_11 == 5 | f1_s3_11 == 6 |
f1_s3_11 ==7
label variable improved_sanitation "Improved sanitation access"

gen water_sanitation_index = piped_water + safe_water + improved_sanitation
label variable water_sanitation_index "Water and Sanitation Index (0-3)"

*Room for cooking
gen separate_kitchen = (f1_s3_17 == 1)
```

```
label variable separate_kitchen "Household has separate kitchen space"

* Count total people per household (id_hogar)
bysort id_hogar: gen total_members = _N

* Generate household density (people per room)
gen household_density = total_members / f1_s3_15


* Recode food insecurity variables into binary
recode f1_s4_1_1 (1 = 1) (2/8 = 0), gen(worried_food)
recode f1_s4_1_2 (1 = 1) (2/8 = 0), gen(lacked_nutrition)
recode f1_s4_1_4 (1 = 1) (2/8 = 0), gen(skipped_meals)
recode f1_s4_1_7 (1 = 1) (2/8 = 0), gen(felt_hungry)
recode f1_s4_1_8 (1 = 1) (2/8 = 0), gen(no_food_all_day)

* Create food insecurity index
gen food_insecurity_index = worried_food + lacked_nutrition + skipped_meals +
felt_hungry + no_food_all_day
label variable food_insecurity_index "Food insecurity index (0-5)"

* Recode chlorine variable
recode cloro_v (3/4 = 0 "Safe") (1/2 = 1 "Unsafe"), gen(water_chlorine_safe)
label variable water_chlorine_safe "Presence of chlorine in water"

* Recode E. coli variable
recode ecoli_v (3/4 = 0 "Safe") (1/2 = 1 "Unsafe"), gen(water_ecoli_unsafe)
label variable water_ecoli_unsafe "E. coli presence in water"

* Combine water safety indicators
gen water_overall_safe = (water_chlorine_safe == 1 & water_ecoli_unsafe == 0)
label variable water_overall_safe "Overall safe water (chlorine present & no E. coli)"



keep if grupo_edad_nin != .

**# Summary stats

sum dcronica i.age_group_child male mother_married i.mother_ed mother_ethnicity*
mother_age  mother_monetary_income father_in_home rural nbi_1 i.quintil
food_insecurity_index water_sanitation_index

/*graph bar (mean) dcronica, over(mother_married) ///
    bar(1, color(green)) title("Chronic Malnutrition by Mother's Marital Status") ///
    ytitle("Proportion with Chronic Malnutrition") blabel(bar)
*/
drop mother_ethnicity
drop mother_ethnicity4 //relative to mestiza
drop mother_ed
drop mother_ed1 //relative to none

**# MODELS

gen log_household_income = ln(household_income+1)
gen log_mother_monetary_income = ln(mother_monetary_income+1)

reg dcronica mother_married, r

*create vector controls
global child_controls i.age_group_child male i.anemia

global mother_controls mother_ethnicity* mother_ed* mother_age mother_disability
```

```
global geo_socio_economic_controls rural i.region i.prov altitud i.quintil i.nbi_1

global household_controls housing_quality_index water_sanitation_index
separate_kitchen household_density water_overall_safe

* 1. Baseline
reg dcronica mother_married mother_responsible  $child_controls , r

*2. Include household_income
reg dcronica mother_married mother_responsible log_household_income  $child_controls
, r

*3. Include food insecurity index
reg dcronica mother_married mother_responsible log_household_income
food_insecurity_index $child_controls   , r
test log_household_income food_insecurity_index

*4. Include all controls
reg dcronica mother_married mother_responsible log_household_income
food_insecurity_index $child_controls $mother_controls $household_controls
$geo_socio_economic_controls , r

*5. base interaction with household income
gen mother_married_household_income = mother_married*log_household_income
reg dcronica mother_married log_household_income mother_married_household_income
mother_responsible  $child_controls , r
test mother_married_household_income

*6. interaction with household income and controls
reg dcronica mother_married log_household_income mother_married_household_income
mother_responsible  $child_controls $mother_controls $household_controls
$geo_socio_economic_controls , r
test mother_married_household_income


*7. base interaction with food index
gen mother_married_food_index = mother_married*food_insecurity_index
reg dcronica mother_married food_insecurity_index mother_married_food_index
mother_responsible  $child_controls , r
test mother_married_food_index

*8. interaction with food index
reg dcronica mother_married mother_responsible log_household_income
food_insecurity_index mother_married_food_index mother_married_household_income
$child_controls $mother_controls $household_controls $geo_socio_economic_controls , r
test mother_married_household_income mother_married_food_index




log close
```

Appendix D: Stata Log file

```
-------------------------------------------------------------------------------
-
      name:  <unnamed>
       log:  /Users/felipedominguez/Desktop/Fall
'24/Econometrics/RARP/BDD_ENDI_R2_dta/
> RARP.log
  log type:  text
 opened on:  17 Dec 2024, 16:15:37

.
. use BDD_ENDI_R2_merged.dta, clear

.
. duplicates report id_hogar /*make sure merge worked */

Duplicates in terms of id_hogar

--------------------------------------
   Copies | Observations       Surplus
----------+---------------------------
        2 |         1378           689
        3 |        13437          8958
        4 |        24416         18312
        5 |        21480         17184
        6 |        13572         11310
        7 |         8106          6948
        8 |         4664          4081
        9 |         2655          2360
       10 |         1700          1530
       11 |          825           750
       12 |          360           330
       13 |          247           228
       14 |          126           117
       15 |          135           126
       16 |           32            30
       17 |           68            64
       20 |           20            19
       21 |           21            20
--------------------------------------

.
.
. **# Definition of independent variable
.
. gen married = .
(93,242 missing values generated)

. replace married = 1 if f1_s1_18 == 1 | f1_s1_18 == 5 /*married or partnered*/
(35,439 real changes made)

. replace married = 0 if f1_s1_18 == 2 | f1_s1_18 == 3 | f1_s1_18 == 4 | f1_s1_18 == 6
(22,588 real changes made)

.
. label variable married "Married/Partnered Status (1=Yes, 0=No)"

. label define married_label 0 "Not Married" 1 "Married/Partnered"

. label values married married_label

.
.
```

```
. destring(persona), replace
persona: all characters numeric; replaced as byte

.
.
. generate mother_in_home = .
(93,242 missing values generated)

. replace mother_in_home = 1 if f1_s1_12 == 1 & grupo_edad_nin != . // Mother of child
> under 5 lives in the home
(22,633 real changes made)

. replace mother_in_home = 0 if f1_s1_12 == 2 & grupo_edad_nin != . // Mother does not
> live in the home
(554 real changes made)

. label variable mother_in_home "Mother lives in the home (1 = Yes, 0 = No)"

.
.
. *Identify mother's position within the household
. gen mother_position = f1_s1_12_1 if f1_s1_12 == 1 & grupo_edad_nin != .
(70,609 missing values generated)

.
. *Propagate mother's position to all rows in the same household
. bysort id_hogar (mother_position): replace mother_position = mother_position[_n] if
!
> missing(mother_position)
(0 real changes made)

. bysort id_hogar: replace mother_position = mother_position[_n-1] if
missing(mother_po
> sition)
(68,619 real changes made)

.
. gen mother_married = .
(93,242 missing values generated)

. replace mother_married = 1 if married ==1 & mother_position == persona
(14,377 real changes made)

. replace mother_married = 0 if married == 0 & mother_position == persona
(5,362 real changes made)

.
. label variable mother_married "Mother Married/Partnered Status (1=Yes, 0=No)"

. label define mother_married_label 0 "Mother Not Married" 1 "Mother
Married/Partnered"

. label values mother_married mother_married_label

.
.
. tab married

Married/Partnered |
   Status (1=Yes, |
            0=No) |      Freq.     Percent        Cum.
------------------+-----------------------------------
      Not Married |     22,588       38.93       38.93
```

```
Married/Partnered |     35,439       61.07      100.00
------------------+-----------------------------------
            Total |     58,027      100.00

. tab mother_married

Mother Married/Partnered |
    Status (1=Yes, 0=No) |      Freq.     Percent        Cum.
-------------------------+-----------------------------------
      Mother Not Married |      5,362       27.16       27.16
Mother Married/Partnered |     14,377       72.84      100.00
-------------------------+-----------------------------------
                   Total |     19,739      100.00

.
. * Propagate mother's marital status
. bysort id_hogar (mother_married): replace mother_married = mother_married[_n] if
!mis
> sing(mother_married)
(0 real changes made)

. bysort id_hogar: replace mother_married = mother_married[_n-1] if
missing(mother_marr
> ied)
(71,513 real changes made)

.
.
.
.
.
. **# Controls
.
. *Father lives in home dummy
. generate father_in_home = .
(93,242 missing values generated)

. replace father_in_home = 1 if f1_s1_11 == 1  & grupo_edad_nin != . // Father lives
in
>  the home
(16,079 real changes made)

. replace father_in_home = 0 if f1_s1_11 == 2 & grupo_edad_nin != . // Father does not
> live in the home
(7,108 real changes made)

. label variable father_in_home "Father lives in the home (1 = Yes, 0 = No)"

.
. **#Mother specific controls
. *Ethnicity
.
. gen mother_ethnicity = etnia if persona == mother_position
(73,503 missing values generated)

.
. tab mother_ethnicity, gen(mother_ethnicity)

mother_ethn |
      icity |      Freq.     Percent        Cum.
------------+-----------------------------------
          1 |      2,594       13.14       13.14
          2 |        877        4.44       17.58
```

```
          3 |        661        3.35       20.93
          4 |     15,407       78.05       98.99
          5 |        200        1.01      100.00
------------+-----------------------------------
      Total |     19,739      100.00

. label variable mother_ethnicity1 "Ethnicity: Indígena"

. label variable mother_ethnicity2 "Ethnicity: Afroecuatoriana/o"

. label variable mother_ethnicity3 "Ethnicity: Montubia/o"

. label variable mother_ethnicity4 "Ethnicity: Mestiza/o"

. label variable mother_ethnicity5 "Ethnicity: Blanca/o u Otra"

.
. * Propagate mother's ethnicity
. bysort id_hogar (mother_ethnicity): replace mother_ethnicity = mother_ethnicity[_n]
i
> f !missing(mother_ethnicity)
(0 real changes made)

. bysort id_hogar: replace mother_ethnicity = mother_ethnicity[_n-1] if
missing(mother_
> ethnicity)
(71,513 real changes made)

. * Propagate mother's ethnicity dummies
. foreach var of varlist mother_ethnicity1 mother_ethnicity2 mother_ethnicity3 ///
>     mother_ethnicity4 mother_ethnicity5 {
  2.     bysort id_hogar (`var'): replace `var' = `var'[_n] if !missing(`var')
  3.     bysort id_hogar: replace `var' = `var'[_n-1] if missing(`var')
  4. }
(0 real changes made)
(71,513 real changes made)
(0 real changes made)
(71,513 real changes made)
(0 real changes made)
(71,513 real changes made)
(0 real changes made)
(71,513 real changes made)
(0 real changes made)
(71,513 real changes made)

.
.
. *Disability
. gen mother_disability = .
(93,242 missing values generated)

. replace mother_disability = 1 if f1_s1_8 == 1 & persona == mother_position
(174 real changes made)

. replace mother_disability = 0 if f1_s1_8 ==2 & persona == mother_position
(19,565 real changes made)

.
. * Propagate mother's disability status
. bysort id_hogar (mother_disability): replace mother_disability =
mother_disability[_n
> ] if !missing(mother_disability)
(0 real changes made)
```

```
. bysort id_hogar: replace mother_disability = mother_disability[_n-1] if
missing(mothe
> r_disability)
(71,513 real changes made)

.
. *Mother education
. gen mother_ed = f1_s1_15_1 if persona == mother_position
(73,503 missing values generated)

.
. tab mother_ed, gen(mother_ed)

  mother_ed |      Freq.     Percent        Cum.
------------+-----------------------------------
          1 |         81        0.41        0.41
          4 |         15        0.08        0.49
          5 |      2,367       11.99       12.48
          6 |      1,780        9.02       21.50
          7 |      5,056       25.61       47.11
          8 |      5,165       26.17       73.28
          9 |          4        0.02       73.30
         10 |        881        4.46       77.76
         11 |      3,844       19.47       97.23
         12 |        531        2.69       99.92
         13 |         15        0.08      100.00
------------+-----------------------------------
      Total |     19,739      100.00

. label variable mother_ed1 "Education: None"

. label variable mother_ed2 "Education:  Alfabetización (EBJA)"

. label variable mother_ed3 "Education: Primaria"

. label variable mother_ed4 "Education: Educacion General Basica"

. label variable mother_ed5 "Education: Secundaria"

. label variable mother_ed6 "Education: Bachillerato"

. label variable mother_ed7 "Education: Ciclo Postbachillerato (no superior)"

. label variable mother_ed8 "Education: Educación Técnica o Tecnológica Superior"

. label variable mother_ed9 "Education: Educacion Superior"

. label variable mother_ed10 "Education: Maestria/Especializacion"

. label variable mother_ed11 "Education: PHD/doctorado"

.
. * Propagate mother's education level
. bysort id_hogar (mother_ed): replace mother_ed = mother_ed[_n] if
!missing(mother_ed)
(0 real changes made)

. bysort id_hogar: replace mother_ed = mother_ed[_n-1] if missing(mother_ed)
(71,513 real changes made)

.
. * Propagate mother's education dummies
```

```
. foreach var of varlist mother_ed1 mother_ed2 mother_ed3 mother_ed4 mother_ed5 ///
>     mother_ed6 mother_ed7 mother_ed8 mother_ed9 mother_ed10 mother_ed11 {
  2.     bysort id_hogar (`var'): replace `var' = `var'[_n] if !missing(`var')
  3.     bysort id_hogar: replace `var' = `var'[_n-1] if missing(`var')
  4. }
(0 real changes made)
(71,513 real changes made)
(0 real changes made)
(71,513 real changes made)
(0 real changes made)
(71,513 real changes made)
(0 real changes made)
(71,513 real changes made)
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(71,513 real changes made)
(0 real changes made)
(71,513 real changes made)
(0 real changes made)
(71,513 real changes made)
(0 real changes made)
(71,513 real changes made)

.
.
. *Mother worked
. gen mother_worked = inlist(f1_s2_1, 1, 2, 3, 4, 5, 6)  if persona == mother_position
(73,503 missing values generated)

. replace mother_worked = 0 if f1_s2_1 == 7
(17,463 real changes made)

. label variable mother_worked "Mother worked last week (1=Yes, 0=No)"

.
. * Propagate mother's work status
. bysort id_hogar (mother_worked): replace mother_worked = mother_worked[_n] if
!missin
> g(mother_worked)
(0 real changes made)

. bysort id_hogar: replace mother_worked = mother_worked[_n-1] if
missing(mother_worked
> )
(55,536 real changes made)

.
.
.
. *multiple jobs (think of interaction term)
. gen multiple_jobs = (f1_s2_7 == 2) if persona == mother_position
(73,503 missing values generated)

. label variable multiple_jobs "Mother had multiple jobs (1=Yes, 0=No)"

.
. * Propagate mother's multiple jobs indicator
```

```
. bysort id_hogar (multiple_jobs): replace multiple_jobs = multiple_jobs[_n] if
!missin
> g(multiple_jobs)
(0 real changes made)

. bysort id_hogar: replace multiple_jobs = multiple_jobs[_n-1] if
missing(multiple_jobs
> )
(71,513 real changes made)

.
.
.
. *Mother household head or "spouse" to him
. gen mother_head_or_spouse = inlist(f1_s1_1, 1, 2) if persona == mother_position
(73,503 missing values generated)

. label variable mother_head_or_spouse "Mother is head or spouse of household head
(1=Y
> es, 0=No)"

. //only moderately correlated with mother_married
. * Propagate mother is head or spouse of household head
. bysort id_hogar (mother_head_or_spouse): replace mother_head_or_spouse =
mother_head_
> or_spouse[_n] if !missing(mother_head_or_spouse)
(0 real changes made)

. bysort id_hogar: replace mother_head_or_spouse = mother_head_or_spouse[_n-1] if
missi
> ng(mother_head_or_spouse)
(71,513 real changes made)

.
.
. *Mother monetary income
. replace f1_s2_12 = . if f1_s2_12 >= 999999 //replace place holder for missing values
(101 real changes made, 101 to missing)

. replace f1_s2_12 = 0 if mother_worked == 0 | f1_s2_4 == 1 | f1_s2_1 == 7  //if
didn't
>  work, no slary
(50,422 real changes made)

.
. gen  mother_monetary_income =  f1_s2_12 if mother_position ==persona
(79,501 missing values generated)

. replace mother_monetary_income = 0 if mother_worked ==0 & mother_position ==persona
(0 real changes made)

. label variable mother_monetary_income "Mother's monetary income"

. * Propagate mother's monetary income
. bysort id_hogar (mother_monetary_income): replace mother_monetary_income =
mother_mon
> etary_income[_n] if !missing(mother_monetary_income)
(0 real changes made)

. bysort id_hogar: replace mother_monetary_income = mother_monetary_income[_n-1] if
mis
> sing(mother_monetary_income)
(49,818 real changes made)
```

```
.
.
. * In-Kind Income Test on regression (low number of obs)
. replace f1_s2_14_2 = 0 if f1_s2_4 == 1 | f1_s2_1 == 7 //if didn't work, no slary
(25,984 real changes made)

. replace f1_s2_14_2 = 0 if f1_s2_14_1 == 2 //if didn't work, no slary
(12,029 real changes made)

. replace f1_s2_14_2 = . if f1_s2_14_2 >= 999999 //replace place holder for missing
val
> ues
(2 real changes made, 2 to missing)

. gen mother_inkind_income = f1_s2_14_2 if persona == mother_position
(79,478 missing values generated)

. replace mother_inkind_income = 0 if mother_worked ==0 & mother_position ==persona
(0 real changes made)

. label variable mother_inkind_income "Mother's in-kind income"

. * Propagate mother's in-kind income
. bysort id_hogar (mother_inkind_income): replace mother_inkind_income =
mother_inkind_
> income[_n] if !missing(mother_inkind_income)
(0 real changes made)

. bysort id_hogar: replace mother_inkind_income = mother_inkind_income[_n-1] if
missing
> (mother_inkind_income)
(49,898 real changes made)

.
.
.
. * Social Transfers income
.
. replace f1_s2_22 = 0 if f1_s2_21 ==2
(55,064 real changes made)

. replace f1_s2_24 = 0 if f1_s2_23 ==2
(61,439 real changes made)

. replace f1_s2_26 = 0 if f1_s2_25 ==2
(60,435 real changes made)

.
. gen mother_social_transfers = f1_s2_22 + f1_s2_24 + f1_s2_26 if persona ==
mother_pos
> ition
(73,503 missing values generated)

. label variable mother_social_transfers "Mother's social transfers income"

.
. * Propagate mother's social transfers
. bysort id_hogar (mother_social_transfers): replace mother_social_transfers =
mother_s
> ocial_transfers[_n] if !missing(mother_social_transfers)
(0 real changes made)
```

```
. bysort id_hogar: replace mother_social_transfers = mother_social_transfers[_n-1] if
m
> issing(mother_social_transfers)
(71,513 real changes made)

.
. replace f1_s2_20_2 = 0 if f1_s2_20_1 ==2
(60,875 real changes made)

. replace f1_s2_20_2 = . if f1_s2_20_2 >= 999999
(1 real change made, 1 to missing)

. sum f1_s2_20_2

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
  f1_s2_20_2 |     61,575    2.532732    34.07251          0       2500

.
. *mother responsible for the child
.
. gen mother_responsible = .
(93,242 missing values generated)

. replace mother_responsible = 0 if f1_s6_1 != mother_position & grupo_edad_nin != .
(2,234 real changes made)

. replace mother_responsible = 1 if f1_s6_1 == mother_position & grupo_edad_nin != .
(20,953 real changes made)

. label variable mother_responsible "Mother is primary caregiver"

. label define caregiver_label 0 "Not Mother" 1 "Mother Primary Caregiver"

. label values mother_responsible caregiver_label

. * Propagate mother's responsibility status
. bysort id_hogar (mother_responsible): replace mother_responsible =
mother_responsible
> [_n] if !missing(mother_responsible)
(0 real changes made)

. bysort id_hogar: replace mother_responsible = mother_responsible[_n-1] if
missing(mot
> her_responsible)
(70,055 real changes made)

.
.
. *mother age
. gen mother_age = f1_s1_3_1 if persona == mother_position
(73,503 missing values generated)

.
. * Propagate mother's age
. bysort id_hogar (mother_age): replace mother_age = mother_age[_n] if
!missing(mother_
> age)
(0 real changes made)

. bysort id_hogar: replace mother_age = mother_age[_n-1] if missing(mother_age)
(71,513 real changes made)
```

```
.
.
.
. **#Child specific controls
. *Sex of child at birth
. gen male = .
(93,242 missing values generated)

. replace male = 1 if f1_s1_2 == 1 & grupo_edad_nin != .
(11,921 real changes made)

. replace male = 0 if f1_s1_2 == 2 & grupo_edad_nin != .
(11,266 real changes made)

. label variable male "Child is male (1=Yes, 0=No)"

.
. gen age_group_child = grupo_edad_nin if grupo_edad_nin != .
(70,055 missing values generated)

.
. gen anemia = ane6_59 if grupo_edad_nin != .
(73,020 missing values generated)

.
. * Create total household income by summing income for all members in the household
. replace f1_s2_12 = . if f1_s2_12 >=999999
(0 real changes made)

. bysort id_hogar: egen household_income = total(f1_s2_12)

. label variable household_income "Total household income"

.
.
.
. *Area
.
. gen rural = .
(93,242 missing values generated)

. replace rural =1 if area ==2
(36,868 real changes made)

. replace rural =0 if area ==1
(56,374 real changes made)

.
.
.
.
. * Roof condition: Good vs Not Good
. gen roof_good = (f1_s3_4 == 1)

. label variable roof_good "Roof in good condition"

.
. * Walls condition: Good vs Not Good
. gen walls_good = (f1_s3_6 == 1)

. label variable walls_good "Walls in good condition"

.
```

```
. * Floor condition: Good vs Not Good
. gen floor_good = (f1_s3_8 == 1)

. label variable floor_good "Floor in good condition"

.
. * Summary: Housing quality index
. gen housing_quality_index = roof_good + walls_good + floor_good

. label variable housing_quality_index "Housing quality index (0-3)"

.
.
. gen piped_water = .
(93,242 missing values generated)

. replace piped_water = 1 if f1_s3_9 == 1 | f1_s3_9 == 2 | f1_s3_9 == 3
(86,331 real changes made)

. replace piped_water = 0 if f1_s3_9 ==0
(0 real changes made)

. label variable piped_water "Household has piped water"

.
. gen safe_water = .
(93,242 missing values generated)

. replace safe_water = 1 if f1_s3_10 == 1 | f1_s3_10 == 2 //public system
(80,390 real changes made)

. replace safe_water = 0 if f1_s3_10 == 3 | f1_s3_10 == 4 | f1_s3_10 == 5
(12,852 real changes made)

. label variable safe_water "Safe water source"

.
. gen improved_sanitation = .
(93,242 missing values generated)

. replace improved_sanitation = 1 if f1_s3_11 == 1 | f1_s3_11 == 2 | f1_s3_11 == 3
(83,217 real changes made)

. replace improved_sanitation = 0 if f1_s3_11 == 4 | f1_s3_11 == 5 | f1_s3_11 == 6 |
f1
> _s3_11 ==7
(10,025 real changes made)

. label variable improved_sanitation "Improved sanitation access"

.
. gen water_sanitation_index = piped_water + safe_water + improved_sanitation
(6,911 missing values generated)

. label variable water_sanitation_index "Water and Sanitation Index (0-3)"

.
. *Room for cooking
. gen separate_kitchen = (f1_s3_17 == 1)

. label variable separate_kitchen "Household has separate kitchen space"

.
```

```
. * Count total people per household (id_hogar)
. bysort id_hogar: gen total_members = _N

.
. * Generate household density (people per room)
. gen household_density = total_members / f1_s3_15

.
.
. * Recode food insecurity variables into binary
. recode f1_s4_1_1 (1 = 1) (2/8 = 0), gen(worried_food)
(36,950 differences between f1_s4_1_1 and worried_food)

. recode f1_s4_1_2 (1 = 1) (2/8 = 0), gen(lacked_nutrition)
(51,489 differences between f1_s4_1_2 and lacked_nutrition)

. recode f1_s4_1_4 (1 = 1) (2/8 = 0), gen(skipped_meals)
(78,187 differences between f1_s4_1_4 and skipped_meals)

. recode f1_s4_1_7 (1 = 1) (2/8 = 0), gen(felt_hungry)
(76,493 differences between f1_s4_1_7 and felt_hungry)

. recode f1_s4_1_8 (1 = 1) (2/8 = 0), gen(no_food_all_day)
(89,150 differences between f1_s4_1_8 and no_food_all_day)

.
. * Create food insecurity index
. gen food_insecurity_index = worried_food + lacked_nutrition + skipped_meals +
felt_hu
> ngry + no_food_all_day

. label variable food_insecurity_index "Food insecurity index (0-5)"

.
. * Recode chlorine variable
. recode cloro_v (3/4 = 0 "Safe") (1/2 = 1 "Unsafe"), gen(water_chlorine_safe)
(17,157 differences between cloro_v and water_chlorine_safe)

. label variable water_chlorine_safe "Presence of chlorine in water"

.
. * Recode E. coli variable
. recode ecoli_v (3/4 = 0 "Safe") (1/2 = 1 "Unsafe"), gen(water_ecoli_unsafe)
(79,476 differences between ecoli_v and water_ecoli_unsafe)

. label variable water_ecoli_unsafe "E. coli presence in water"

.
. * Combine water safety indicators
. gen water_overall_safe = (water_chlorine_safe == 1 & water_ecoli_unsafe == 0)

. label variable water_overall_safe "Overall safe water (chlorine present & no E.
coli)
> "

.
.
.
. keep if grupo_edad_nin != .
(70,055 observations deleted)

.
. **# Summary stats
```

```
.
. sum dcronica i.age_group_child male mother_married i.mother_ed mother_ethnicity*
moth
> er_age  mother_monetary_income father_in_home rural nbi_1 i.quintil
food_insecurity_i
> ndex water_sanitation_index

    Variable |        Obs        Mean    Std. dev.       Min        Max
-------------+---------------------------------------------------------
    dcronica |     22,331    .1788097    .3832015          0          1
             |
age_group_~d |
           1 |     23,187    .0740501    .2618581          0          1
           2 |     23,187    .0992366    .2989859          0          1
           3 |     23,187    .1981714    .3986306          0          1
           4 |     23,187    .1967913    .3975818          0          1
-------------+---------------------------------------------------------
           5 |     23,187    .2112391    .4081964          0          1
           6 |     23,187    .2205115    .4146005          0          1
             |
        male |     23,187    .5141243    .4998112          0          1
mother_mar~d |     22,724    .7253565    .4463443          0          1
             |
   mother_ed |
           1 |     22,724    .0043126    .0655302          0          1
-------------+---------------------------------------------------------
           4 |     22,724    .0007921     .028134          0          1
           5 |     22,724     .118289    .3229572          0          1
           6 |     22,724    .1013906    .3018519          0          1
           7 |     22,724    .2485478    .4321805          0          1
           8 |     22,724     .271167    .4445719          0          1
-------------+---------------------------------------------------------
           9 |     22,724     .000176    .0132666          0          1
          10 |     22,724    .0429062    .2026501          0          1
          11 |     22,724    .1863228    .3893755          0          1
          12 |     22,724    .0254357    .1574477          0          1
          13 |     22,724    .0006601    .0256844          0          1
-------------+---------------------------------------------------------
             |
mother_eth~y |     22,724    3.465411    1.096654          1          5
mother_eth~1 |     22,724    .1405122    .3475253          0          1
mother_eth~2 |     22,724    .0451945    .2077351          0          1
mother_eth~3 |     22,724    .0328287     .178192          0          1
mother_eth~4 |     22,724    .7712991    .4200055          0          1
-------------+---------------------------------------------------------
mother_eth~5 |     22,724    .0101655    .1003124          0          1
  mother_age |     22,724     29.2441    6.903637         13         57
mother_mon~e |     15,901    178.1893    364.6015          0       5000
father_in_~e |     23,187    .6934489    .4610712          0          1
       rural |     23,187    .3882348     .487359          0          1
-------------+---------------------------------------------------------
       nbi_1 |     23,187    .3395006      .47355          0          1
             |
     quintil |
  Quintil 1  |     23,031    .1929573    .3946284          0          1
  Quintil 2  |     23,031    .1784551    .3829037          0          1
  Quintil 3  |     23,031    .1791498    .3834861          0          1
  Quintil 4  |     23,031    .1972993    .3979688          0          1
-------------+---------------------------------------------------------
  Quintil 5  |     23,031    .2521384    .4342497          0          1
             |
food_insec~x |     23,187    1.432527    1.445332          0          5
water_sani~x |     21,412    2.854101    .3974494          1          3
```

```
.
. /*graph bar (mean) dcronica, over(mother_married) ///
>     bar(1, color(green)) title("Chronic Malnutrition by Mother's Marital Status")
///
>     ytitle("Proportion with Chronic Malnutrition") blabel(bar)
> */
. drop mother_ethnicity

. drop mother_ethnicity4 //relative to mestiza

. drop mother_ed

. drop mother_ed1 //relative to none

.
. **# MODELS
.
. gen log_household_income = ln(household_income+1)

. gen log_mother_monetary_income = ln(mother_monetary_income+1)
(7,286 missing values generated)

.
. reg dcronica mother_married, r

Linear regression                               Number of obs     =     21,896
                                                F(1, 21894)       =       1.58
                                                Prob > F          =     0.2090
                                                R-squared         =     0.0001
                                                Root MSE          =     .38319

------------------------------------------------------------------------------
             |               Robust
    dcronica | Coefficient  std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
mother_married |  -.0073516   .0058509    -1.26   0.209    -.0188198    .0041166
       _cons |   .1841402   .0050083    36.77   0.000     .1743236    .1939568
------------------------------------------------------------------------------

.
. *create vector controls
. global child_controls i.age_group_child male i.anemia

.
. global mother_controls mother_ethnicity* mother_ed* mother_age mother_disability

.
. global geo_socio_economic_controls rural i.region i.prov altitud i.quintil i.nbi_1

.
. global household_controls housing_quality_index water_sanitation_index
separate_kitch
> en household_density water_overall_safe

.
. * 1. Baseline
. reg dcronica mother_married mother_responsible  $child_controls , r

Linear regression                               Number of obs     =     19,616
                                                F(10, 19605)      =      29.53
                                                Prob > F          =     0.0000
                                                R-squared         =     0.0160
```

```
                                                Root MSE          =     .38492

------------------------------------------------------------------------------
             |               Robust
    dcronica | Coefficient  std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
mother_married |  -.0046263   .0061833    -0.75   0.454     -.016746    .0074934
mother_responsible |  -.1019352    .058273    -1.75   0.080    -.2161551    .0122848
             |
age_group_child |
           3 |   .0609872   .0103278     5.91   0.000     .0407438    .0812306
           4 |   .0577621   .0103638     5.57   0.000     .0374481    .0780761
           5 |   .0074008   .0098802     0.75   0.454    -.0119653    .0267669
           6 |  -.0185258   .0096099    -1.93   0.054     -.037362    .0003103
             |
        male |   .0271349   .0054996     4.93   0.000     .0163552    .0379145
             |
      anemia |
           2 |  -.0864088   .0642429    -1.35   0.179    -.2123303    .0395127
           3 |   -.129546   .0638867    -2.03   0.043    -.2547694   -.0043226
           4 |  -.1708849   .0636773    -2.68   0.007    -.2956979    -.046072
             |
       _cons |   .4053438   .0865983     4.68   0.000     .2356038    .5750837
------------------------------------------------------------------------------

.
. *2. Include household_income
. reg dcronica mother_married mother_responsible log_household_income  $child_controls
>  , r

Linear regression                               Number of obs     =     19,616
                                                F(11, 19604)      =      28.02
                                                Prob > F          =     0.0000
                                                R-squared         =     0.0166
                                                Root MSE          =     .38481

------------------------------------------------------------------------------
             |               Robust
    dcronica | Coefficient  std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
mother_married |  -.0040695   .0061873    -0.66   0.511    -.0161971     .008058
mother_responsible |   -.099346   .0584402    -1.70   0.089    -.2138937    .0152017
log_household_income |  -.0030663   .0008637    -3.55   0.000    -.0047592   -.0013734
             |
age_group_child |
           3 |   .0621984   .0103386     6.02   0.000     .0419339    .0824629
           4 |   .0596355   .0103868     5.74   0.000     .0392764    .0799946
           5 |   .0096806   .0099201     0.98   0.329    -.0097637    .0291249
           6 |  -.0159955   .0096468    -1.66   0.097    -.0349039     .002913
             |
        male |   .0271587   .0054981     4.94   0.000     .0163818    .0379355
             |
      anemia |
           2 |  -.0843844   .0640753    -1.32   0.188    -.2099775    .0412087
           3 |  -.1277566   .0637183    -2.01   0.045    -.2526499   -.0028634
           4 |  -.1688226   .0635084    -2.66   0.008    -.2933045   -.0443407
             |
       _cons |   .4063494   .0865768     4.69   0.000     .2366514    .5760473
------------------------------------------------------------------------------

.
. *3. Include food insecurity index
```

```
. reg dcronica mother_married mother_responsible log_household_income
food_insecurity_i
> ndex $child_controls   , r

Linear regression                               Number of obs     =     19,616
                                                F(12, 19603)      =      40.63
                                                Prob > F          =     0.0000
                                                R-squared         =     0.0260
                                                Root MSE          =     .38297

------------------------------------------------------------------------------
                     |               Robust
            dcronica | Coefficient  std. err.      t    P>|t|     [95% conf. interval]
---------------------+--------------------------------------------------------------
      mother_married |   .0059071   .0062196     0.95   0.342    -.0062839    .0180981
  mother_responsible |  -.0881783   .0581879    -1.52   0.130    -.2022315    .0258749
log_household_income |  -.0009221   .0008731    -1.06   0.291    -.0026334    .0007893
food_insecurity_in~x |   .0267367   .0020228    13.22   0.000     .0227718    .0307015
                     |
     age_group_child |
                   3 |   .0590959   .0103126     5.73   0.000     .0388823    .0793096
                   4 |   .0565764   .0103392     5.47   0.000     .0363106    .0768421
                   5 |   .0081288   .0098895     0.82   0.411    -.0112554     .027513
                   6 |  -.0185542   .0096092    -1.93   0.054    -.0373891    .0002807
                     |
                male |   .0270451   .0054715     4.94   0.000     .0163205    .0377698
                     |
              anemia |
                   2 |  -.0775581   .0642921    -1.21   0.228     -.203576    .0484599
                   3 |  -.1196501   .0639404    -1.87   0.061    -.2449788    .0056785
                   4 |  -.1566587   .0637408    -2.46   0.014    -.2815961   -.0317213
                     |
               _cons |   .3346785   .0867699     3.86   0.000     .1646021     .504755
------------------------------------------------------------------------------

. test log_household_income food_insecurity_index

 ( 1)  log_household_income = 0
 ( 2)  food_insecurity_index = 0

       F(  2, 19603) =   93.18
            Prob > F =    0.0000

.
. *4. Include all controls
. reg dcronica mother_married mother_responsible log_household_income
food_insecurity_i
> ndex $child_controls $mother_controls $household_controls
$geo_socio_economic_control
> s , r
note: 22.prov omitted because of collinearity.
note: 24.prov omitted because of collinearity.

Linear regression                               Number of obs     =     18,039
                                                F(62, 17976)      =      25.14
                                                Prob > F          =     0.0000
                                                R-squared         =     0.0881
                                                Root MSE          =     .36876

------------------------------------------------------------------------------
                     |               Robust
            dcronica | Coefficient  std. err.      t    P>|t|     [95% conf. interval]
---------------------+--------------------------------------------------------------
```

mother_married	.0042529	.0064571	0.66	0.510	-.0084038	.0169095
mother_responsible	.0068034	.0551595	0.12	0.902	-.1013144	.1149213
log_household_income	.0010112	.0009924	1.02	0.308	-.000934	.0029563
food_insecurity_in~x	.0076075	.0024683	3.08	0.002	.0027693	.0124457
age_group_child						
3	.0632864	.0105312	6.01	0.000	.0426443	.0839285
4	.0624819	.010591	5.90	0.000	.0417225	.0832414
5	.0105042	.0101009	1.04	0.298	-.0092946	.0303029
6	-.0120307	.0099066	-1.21	0.225	-.0314486	.0073872
male	.0317954	.0055077	5.77	0.000	.0209998	.042591
anemia						
2	.0220452	.0654284	0.34	0.736	-.1062007	.1502912
3	-.0082162	.065114	-0.13	0.900	-.1358459	.1194134
4	-.0326573	.0649558	-0.50	0.615	-.1599769	.0946623
mother_ethnicity1	.0706724	.0108949	6.49	0.000	.0493173	.0920274
mother_ethnicity2	-.0506835	.0128721	-3.94	0.000	-.075914	-.025453
mother_ethnicity3	-.0092684	.0175316	-0.53	0.597	-.0436319	.0250952
mother_ethnicity5	-.0639788	.0243803	-2.62	0.009	-.1117665	-.0161912
mother_ed2	-.037541	.1442831	-0.26	0.795	-.3203497	.2452676
mother_ed3	-.1248055	.056048	-2.23	0.026	-.234665	-.0149461
mother_ed4	-.1275666	.0566941	-2.25	0.024	-.2386926	-.0164407
mother_ed5	-.1762151	.0557283	-3.16	0.002	-.2854478	-.0669823
mother_ed6	-.1718875	.0560656	-3.07	0.002	-.2817814	-.0619936
mother_ed7	-.0458422	.2275068	-0.20	0.840	-.4917774	.400093
mother_ed8	-.2006107	.0568476	-3.53	0.000	-.3120374	-.089184
mother_ed9	-.2060304	.056023	-3.68	0.000	-.3158409	-.0962199
mother_ed10	-.2223056	.0576197	-3.86	0.000	-.3352457	-.1093656
mother_ed11	-.0248447	.1255958	-0.20	0.843	-.2710246	.2213352
mother_age	-.0018099	.0005588	-3.24	0.001	-.0029052	-.0007146
mother_disability	.019223	.0304598	0.63	0.528	-.0404813	.0789272
housing_quality_in~x	-.0018529	.0025284	-0.73	0.464	-.0068088	.003103
water_sanitation_i~x	-.0022988	.0101063	-0.23	0.820	-.0221081	.0175104
separate_kitchen	-.0117136	.0107494	-1.09	0.276	-.0327836	.0093563
household_density	.0199479	.0038075	5.24	0.000	.0124848	.027411
water_overall_safe	.0014629	.0059978	0.24	0.807	-.0102934	.0132193
rural	.0273795	.007057	3.88	0.000	.013547	.0412119
region						
Costa	.193054	.0266856	7.23	0.000	.1407477	.2453603
Amazonía	.0151554	.0241359	0.63	0.530	-.0321533	.062464
prov						
Bolívar	.0307572	.020498	1.50	0.134	-.0094209	.0709354
Cañar	.0250396	.0201902	1.24	0.215	-.014535	.0646143
Carchi	-.0212638	.021372	-0.99	0.320	-.063155	.0206274
Cotopaxi	.0184778	.0238501	0.77	0.439	-.0282708	.0652263
Chimborazo	.0435006	.0219859	1.98	0.048	.0004062	.0865951
El Oro	-.1583741	.0205304	-7.71	0.000	-.1986155	-.1181326
Esmeraldas	-.1583797	.0222671	-7.11	0.000	-.2020253	-.114734
Guayas	-.1476546	.0208568	-7.08	0.000	-.188536	-.1067732
Imbabura	-.0302692	.0206774	-1.46	0.143	-.0707989	.0102605
Loja	.0021662	.0205553	0.11	0.916	-.0381242	.0424566
Los Ríos	-.1633095	.0225796	-7.23	0.000	-.2075677	-.1190514
Manabí	-.1099392	.0230715	-4.77	0.000	-.1551615	-.0647169
Morona Santiago	.0015382	.0251768	0.06	0.951	-.0478108	.0508872
Napo	-.0624064	.0210362	-2.97	0.003	-.1036394	-.0211733
Pastaza	.0323132	.0233396	1.38	0.166	-.0134346	.0780611
Pichincha	-.0186516	.0158706	-1.18	0.240	-.0497595	.0124563
Tungurahua	.0184634	.0177895	1.04	0.299	-.0164058	.0533325

```
   Zamora Chinchipe  |  -.0205251   .0205447    -1.00   0.318    -.0607946    .0197445
          Sucumbíos  |  -.0214645   .0194013    -1.11   0.269    -.0594929    .0165639
           Orellana  |          0  (omitted)
Sto Domingo de lo..  |   .0108293   .0201526     0.54   0.591    -.0286717    .0503303
        Santa Elena  |          0  (omitted)
                     |
             altitud |   .0000599   5.72e-06    10.47   0.000     .0000487    .0000711
                     |
             quintil |
          Quintil 2  |  -.0229592   .0104077    -2.21   0.027    -.0433594   -.0025591
          Quintil 3  |   -.021448   .0104523    -2.05   0.040    -.0419355   -.0009605
          Quintil 4  |   -.034022   .0105504    -3.22   0.001    -.0547018   -.0133421
          Quintil 5  |  -.0407036   .0116998    -3.48   0.001    -.0636362   -.0177709
                     |
              nbi_1  |
    Pobreza por NBI  |   .0070984   .0098852     0.72   0.473    -.0122775    .0264744
               _cons |    .248845   .1094414     2.27   0.023     .0343293    .4633607
------------------------------------------------------------------------------

.
. *5. base interaction with household income
. gen mother_married_household_income = mother_married*log_household_income
(463 missing values generated)

. reg dcronica mother_married log_household_income mother_married_household_income
moth
> er_responsible  $child_controls , r

Linear regression                               Number of obs     =     19,616
                                                F(12, 19603)      =      25.75
                                                Prob > F          =     0.0000
                                                R-squared         =     0.0167
                                                Root MSE          =     .38481

------------------------------------------------------------------------------
                     |               Robust
            dcronica | Coefficient  std. err.      t    P>|t|     [95% conf. interval]
---------------------+--------------------------------------------------------------
      mother_married |    .001101   .0080542     0.14   0.891     -.014686     .016888
log_household_income |  -.0014766    .001765    -0.84   0.403    -.0049361    .0019829
mother_married_hou~e |  -.0021097   .0020171    -1.05   0.296    -.0060634    .0018441
  mother_responsible |   -.100225    .058508    -1.71   0.087    -.2149057    .0144557
                     |
     age_group_child |
                   3 |   .0621156    .010337     6.01   0.000     .0418543    .0823769
                   4 |   .0595052   .0103879     5.73   0.000      .039144    .0798663
                   5 |   .0095975   .0099195     0.97   0.333    -.0098456    .0290407
                   6 |  -.0162424   .0096541    -1.68   0.092    -.0351652    .0026804
                     |
                male |   .0271158   .0054989     4.93   0.000     .0163375    .0378942
                     |
              anemia |
                   2 |   -.084291   .0640753    -1.32   0.188     -.209884     .041302
                   3 |  -.1276045   .0637185    -2.00   0.045    -.2524981   -.0027109
                   4 |  -.1686916   .0635085    -2.66   0.008    -.2931736   -.0442096
                     |
               _cons |   .4034141   .0866907     4.65   0.000     .2334928    .5733353
------------------------------------------------------------------------------

. test mother_married_household_income

 ( 1)  mother_married_household_income = 0
```

```
       F(  1, 19603) =    1.09
            Prob > F =    0.2956

.
. *6. interaction with household income and controls
. reg dcronica mother_married log_household_income mother_married_household_income
moth
> er_responsible  $child_controls $mother_controls $household_controls
$geo_socio_econo
> mic_controls , r
note: 22.prov omitted because of collinearity.
note: 24.prov omitted because of collinearity.

Linear regression                               Number of obs     =     18,039
                                                F(62, 17976)      =      24.98
                                                Prob > F          =     0.0000
                                                R-squared         =     0.0876
                                                Root MSE          =     .36886

------------------------------------------------------------------------------
             |               Robust
    dcronica | Coefficient  std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
      mother_married |   .0058791   .0084286     0.70   0.485    -.0106418       .0224
log_household_income |   .0020435   .0018464     1.11   0.268    -.0015758    .0056627
mother_married_hou~e |  -.0011938   .0020329    -0.59   0.557    -.0051784    .0027909
  mother_responsible |   .0057855   .0552299     0.10   0.917    -.1024705    .1140415
                     |
     age_group_child |
                   3 |   .0644769   .0105221     6.13   0.000     .0438526    .0851012
                   4 |   .0633375   .0105935     5.98   0.000     .0425732    .0841017
                   5 |   .0112331   .0100985     1.11   0.266    -.0085609    .0310271
                   6 |  -.0111988   .0099133    -1.13   0.259    -.0306298    .0082323
                     |
                male |   .0319473   .0055106     5.80   0.000     .0211459    .0427486
                     |
             anemia |
                   2 |   .0218362   .0654287     0.33   0.739    -.1064103    .1500828
                   3 |  -.0088045   .0651148    -0.14   0.892    -.1364358    .1188267
                   4 |   -.033253   .0649558    -0.51   0.609    -.1605725    .0940666
                     |
   mother_ethnicity1 |   .0747396   .0108045     6.92   0.000     .0535617    .0959174
   mother_ethnicity2 |  -.0491218   .0128843    -3.81   0.000    -.0743763   -.0238674
   mother_ethnicity3 |   -.008792   .0175411    -0.50   0.616    -.0431742    .0255902
   mother_ethnicity5 |  -.0648154    .024308    -2.67   0.008    -.1124614   -.0171695
          mother_ed2 |   -.039531   .1433278    -0.28   0.783    -.3204673    .2414053
          mother_ed3 |  -.1272281   .0559326    -2.27   0.023    -.2368614   -.0175947
          mother_ed4 |  -.1299376   .0565834    -2.30   0.022    -.2408465   -.0190286
          mother_ed5 |  -.1798903   .0556033    -3.24   0.001    -.2888781   -.0709024
          mother_ed6 |  -.1754076   .0559449    -3.14   0.002     -.285065   -.0657503
          mother_ed7 |  -.0518903    .228836    -0.23   0.821    -.5004308    .3966502
          mother_ed8 |  -.2056209   .0567199    -3.63   0.000    -.3167974   -.0944444
          mother_ed9 |  -.2115314   .0558881    -3.78   0.000    -.3210775   -.1019853
         mother_ed10 |  -.2280495   .0574788    -3.97   0.000    -.3407134   -.1153856
         mother_ed11 |  -.0315956   .1256266    -0.25   0.801    -.2778359    .2146446
          mother_age |  -.0018234   .0005587    -3.26   0.001    -.0029185   -.0007283
   mother_disability |   .0203479   .0305295     0.67   0.505    -.0394929    .0801887
housing_quality_in~x |  -.0033743   .0024868    -1.36   0.175    -.0082487    .0015001
water_sanitation_i~x |  -.0024083   .0101119    -0.24   0.812    -.0222285     .017412
    separate_kitchen |  -.0127127   .0107563    -1.18   0.237    -.0337961    .0083707
   household_density |   .0205878   .0038048     5.41   0.000     .0131302    .0280455
  water_overall_safe |   .0005327   .0059939     0.09   0.929    -.0112159    .0122812
               rural |   .0266526   .0070543     3.78   0.000     .0128256    .0404797
```

```
                    |
             region |
              Costa |   .1944042   .0267004     7.28   0.000     .1420688    .2467396
           Amazonía |    .015879   .0241329     0.66   0.511    -.0314238    .0631819
                    |
               prov |
            Bolívar |    .031117   .0204982     1.52   0.129    -.0090615    .0712954
              Cañar |   .0234497    .020197     1.16   0.246    -.0161384    .0630378
             Carchi |  -.0201155   .0214042    -0.94   0.347    -.0620698    .0218388
           Cotopaxi |   .0208534   .0238791     0.87   0.383     -.025952    .0676588
         Chimborazo |   .0442628   .0220216     2.01   0.044     .0010983    .0874273
            El Oro  |  -.1605225   .0205378    -7.82   0.000    -.2007786   -.1202664
         Esmeraldas |  -.1573629    .022285    -7.06   0.000    -.2010437   -.1136821
            Guayas  |  -.1480752     .02087    -7.10   0.000    -.1889824   -.1071679
           Imbabura |  -.0302061   .0206894    -1.46   0.144    -.0707592    .0103471
               Loja |   .0025179   .0205694     0.12   0.903    -.0378001     .042836
           Los Ríos |  -.1640914    .022596    -7.26   0.000    -.2083817   -.1198011
             Manabí |  -.1104518   .0230854    -4.78   0.000    -.1557014   -.0652022
    Morona Santiago |   .0028986   .0251484     0.12   0.908    -.0463946    .0521918
              Napo  |  -.0594814   .0209954    -2.83   0.005    -.1006343   -.0183284
            Pastaza |   .0340933   .0233684     1.46   0.145    -.0117111    .0798976
          Pichincha |  -.0174621   .0158747    -1.10   0.271     -.048578    .0136538
         Tungurahua |   .0197161   .0177867     1.11   0.268    -.0151475    .0545797
   Zamora Chinchipe |  -.0215399   .0205156    -1.05   0.294    -.0617525    .0186728
          Sucumbíos |  -.0219647   .0193978    -1.13   0.258    -.0599863     .016057
           Orellana |          0  (omitted)
Sto Domingo de lo.. |   .0119689   .0201627     0.59   0.553    -.0275519    .0514898
        Santa Elena |          0  (omitted)
                    |
             altitud |   .0000596   5.72e-06    10.41   0.000     .0000484    .0000708
                    |
             quintil |
          Quintil 2 |  -.0251711   .0104054    -2.42   0.016    -.0455667   -.0047756
          Quintil 3 |  -.0256498   .0104442    -2.46   0.014    -.0461213   -.0051783
          Quintil 4 |   -.040318   .0104553    -3.86   0.000    -.0608114   -.0198245
          Quintil 5 |  -.0497939   .0113414    -4.39   0.000    -.0720242   -.0275636
                    |
              nbi_1 |
    Pobreza por NBI |   .0076996   .0098841     0.78   0.436    -.0116741    .0270734
              _cons |   .2695138   .1092075     2.47   0.014     .0554567     .483571
------------------------------------------------------------------------------------------

. test mother_married_household_income

 ( 1)  mother_married_household_income = 0

       F(  1, 17976) =    0.34
            Prob > F =    0.5571

.
.
. *7. base interaction with food index
. gen mother_married_food_index = mother_married*food_insecurity_index
(463 missing values generated)

. reg dcronica mother_married food_insecurity_index mother_married_food_index
mother_re
> sponsible  $child_controls , r

Linear regression                               Number of obs     =     19,616
                                                F(12, 19603)      =      40.66
                                                Prob > F          =     0.0000
                                                R-squared         =     0.0261
```

```
                                                Root MSE          =     .38295

------------------------------------------------------------------------------
             |               Robust
    dcronica | Coefficient  std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
      mother_married |  -.0058767   .0087502    -0.67   0.502    -.0230277    .0112744
food_insecurity_in~x |   .0219842   .0036392     6.04   0.000     .0148511    .0291174
mother_married_foo~x |   .0071152   .0043428     1.64   0.101    -.0013971    .0156274
  mother_responsible |  -.0888029    .058106    -1.53   0.126    -.2026956    .0250897
                     |
     age_group_child |
                   3 |   .0585462   .0103045     5.68   0.000     .0383485     .078744
                   4 |   .0559053   .0103152     5.42   0.000     .0356866     .076124
                   5 |   .0074455   .0098486     0.76   0.450    -.0118587    .0267496
                   6 |  -.0195488   .0095758    -2.04   0.041    -.0383183   -.0007794
                     |
                male |   .0270618   .0054713     4.95   0.000     .0163375    .0377861
                     |
             anemia |
                   2 |  -.0787777   .0644976    -1.22   0.222    -.2051984     .047643
                   3 |  -.1205978   .0641476    -1.88   0.060    -.2463325    .0051369
                   4 |  -.1577287   .0639481    -2.47   0.014    -.2830723   -.0323851
                     |
               _cons |   .3431641   .0869862     3.95   0.000     .1726638    .5136645
------------------------------------------------------------------------------

. test mother_married_food_index

 ( 1)  mother_married_food_index = 0

       F(  1, 19603) =    2.68
            Prob > F =    0.1014

.
. *8. interaction with food index
. reg dcronica mother_married mother_responsible log_household_income
food_insecurity_i
> ndex mother_married_food_index mother_married_household_income  $child_controls
$moth
> er_controls $household_controls $geo_socio_economic_controls , r
note: 22.prov omitted because of collinearity.
note: 24.prov omitted because of collinearity.

Linear regression                               Number of obs     =     18,039
                                                F(64, 17974)      =      24.36
                                                Prob > F          =     0.0000
                                                R-squared         =     0.0881
                                                Root MSE          =     .36877

------------------------------------------------------------------------------
             |               Robust
    dcronica | Coefficient  std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
      mother_married |   .0075998   .0110841     0.69   0.493    -.0141262    .0293258
  mother_responsible |   .0060971   .0552283     0.11   0.912    -.1021557    .1143499
log_household_income |   .0019897   .0018672     1.07   0.287    -.0016702    .0056497
food_insecurity_in~x |   .0076334   .0038725     1.97   0.049     .0000429    .0152239
mother_married_foo~x |  -1.56e-06   .0045124    -0.00   1.000    -.0088462    .0088431
mother_married_hou~e |  -.0013016   .0020625    -0.63   0.528    -.0053442    .0027411
                     |
     age_group_child |
                   3 |   .0632372   .0105335     6.00   0.000     .0425906    .0838838
```

4	.0624291	.010593	5.89	0.000	.0416658	.0831925
5	.0104752	.0101015	1.04	0.300	-.0093247	.0302751
6	-.0121666	.0099172	-1.23	0.220	-.0316053	.0072721
male	.0317574	.0055095	5.76	0.000	.0209582	.0425566
anemia						
2	.0220905	.0654124	0.34	0.736	-.1061241	.150305
3	-.0081658	.0650983	-0.13	0.900	-.1357647	.1194331
4	-.0326241	.0649394	-0.50	0.615	-.1599116	.0946635
mother_ethnicity1	.070692	.010906	6.48	0.000	.0493151	.0920688
mother_ethnicity2	-.0506317	.0128729	-3.93	0.000	-.0758639	-.0253995
mother_ethnicity3	-.0093074	.0175296	-0.53	0.595	-.0436671	.0250523
mother_ethnicity5	-.0641264	.0243465	-2.63	0.008	-.1118479	-.0164049
mother_ed2	-.0371355	.1443622	-0.26	0.797	-.3200992	.2458282
mother_ed3	-.1246959	.056021	-2.23	0.026	-.2345024	-.0148894
mother_ed4	-.1275636	.0566721	-2.25	0.024	-.2386464	-.0164808
mother_ed5	-.1761233	.0557045	-3.16	0.002	-.2853094	-.0669371
mother_ed6	-.1718433	.0560441	-3.07	0.002	-.2816951	-.0619915
mother_ed7	-.0433683	.2275257	-0.19	0.849	-.4893405	.4026039
mother_ed8	-.2004776	.0568234	-3.53	0.000	-.3118569	-.0890982
mother_ed9	-.2057538	.0560026	-3.67	0.000	-.3155243	-.0959833
mother_ed10	-.2217931	.0576042	-3.85	0.000	-.3347028	-.1088833
mother_ed11	-.0240522	.125711	-0.19	0.848	-.2704579	.2223535
mother_age	-.0018141	.0005591	-3.24	0.001	-.0029101	-.0007182
mother_disability	.0195527	.0304579	0.64	0.521	-.0401478	.0792532
housing_quality_in~x	-.0018332	.0025293	-0.72	0.469	-.0067908	.0031244
water_sanitation_i~x	-.002262	.0101076	-0.22	0.823	-.0220738	.0175498
separate_kitchen	-.0118696	.0107503	-1.10	0.270	-.0329412	.009202
household_density	.0198978	.003809	5.22	0.000	.0124317	.0273639
water_overall_safe	.0014297	.005998	0.24	0.812	-.0103269	.0131863
rural	.0273478	.0070581	3.87	0.000	.0135133	.0411824
region						
Costa	.192911	.026689	7.23	0.000	.1405981	.245224
Amazonía	.0152602	.0241375	0.63	0.527	-.0320516	.062572
prov						
Bolívar	.0306888	.0205021	1.50	0.134	-.0094973	.0708749
Cañar	.0249546	.020192	1.24	0.217	-.0146236	.0645329
Carchi	-.0215761	.0213895	-1.01	0.313	-.0635016	.0203493
Cotopaxi	.0185509	.0238511	0.78	0.437	-.0281995	.0653013
Chimborazo	.0433272	.0219962	1.97	0.049	.0002125	.0864419
El Oro	-.1582233	.0205349	-7.71	0.000	-.1984737	-.1179729
Esmeraldas	-.1581291	.0222662	-7.10	0.000	-.201773	-.1144853
Guayas	-.1475074	.0208594	-7.07	0.000	-.1883939	-.1066209
Imbabura	-.0305284	.0206938	-1.48	0.140	-.0710903	.0100334
Loja	.0022657	.0205558	0.11	0.912	-.0380255	.042557
Los Ríos	-.1630459	.0225799	-7.22	0.000	-.2073047	-.1187871
Manabí	-.1098521	.0230733	-4.76	0.000	-.155078	-.0646261
Morona Santiago	.0015166	.0251762	0.06	0.952	-.0478312	.0508643
Napo	-.0624149	.0210339	-2.97	0.003	-.1036433	-.0211865
Pastaza	.0322227	.0233391	1.38	0.167	-.0135242	.0779696
Pichincha	-.0188265	.0158721	-1.19	0.236	-.0499373	.0122843
Tungurahua	.0185772	.0177895	1.04	0.296	-.016292	.0534465
Zamora Chinchipe	-.0205977	.0205448	-1.00	0.316	-.0608675	.0196721
Sucumbíos	-.021536	.0194032	-1.11	0.267	-.0595681	.0164961
Orellana	0	(omitted)				
Sto Domingo de lo..	.0108773	.020153	0.54	0.589	-.0286245	.0503791
Santa Elena	0	(omitted)				
altitud	.0000599	5.72e-06	10.47	0.000	.0000487	.0000711

```
                    |
             quintil |
          Quintil 2  |  -.0232521   .0104261    -2.23   0.026    -.0436882    -.002816
          Quintil 3  |  -.0219609   .0105075    -2.09   0.037    -.0425566   -.0013653
          Quintil 4  |  -.0346116   .0106162    -3.26   0.001    -.0554203   -.0138028
          Quintil 5  |  -.0410016     .01172    -3.50   0.000    -.0639739   -.0180293
                    |
              nbi_1 |
    Pobreza por NBI  |   .0071123   .0098856     0.72   0.472    -.0122644    .0264891
               _cons |   .2475338   .1096044     2.26   0.024     .0326987     .462369
------------------------------------------------------------------------------

. test mother_married_household_income mother_married_food_index

 ( 1)  mother_married_household_income = 0
 ( 2)  mother_married_food_index = 0

       F(  2, 17974) =    0.20
            Prob > F =    0.8147

.
.
.
.
.
.
. log close
      name:  <unnamed>
       log:  /Users/felipedominguez/Desktop/Fall
'24/Econometrics/RARP/BDD_ENDI_R2_dta/
> RARP.log
  log type:  text
 closed on:  17 Dec 2024, 16:15:42
-------------------------------------------------------------------------------
-
```