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WHAT DETERMINES CONSUMPTION EXPENDITURE? ECONOMETRIC EVIDENCE AMONG HOUSEHOLDS IN LEYTE, PHILIPPINES

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Abstract

Household spending is essential in determining the productive success of an economy since changes in household consumption at the micro level will affect the economy as a whole. This study aims to evaluate the consumption expenditure of households in the province of Leyte and identify demographic characteristics that may affect it. Both descriptive statistics and multiple regression analysis were used to answer the objectives of this study. Based on the findings, the minimum monthly household consumption expenditure is PHP 2,222 (40.29 USD) and the maximum is PHP 71,792.10 (1,294.72 USD). A bigger portion of the overall spending is spent on food while the least is spent on healthcare. By econometric analysis, marital status, sex of the household head, education and income were positively related to the households' overall household spending. This study suggests that a family must increase their spending on healthcare, family planning must be considered to minimize household expenditures, and proper education must be promoted to ensure financial stability among households.

Key words**:** *household expenditure, consumption, econometric modelling*

INTRODUCTION

Consumption is the usage of goods and services by a household [1]. Household final consumption expenditure covers all purchases made by resident households to meet their everyday needs such as food, clothing, housing services (e.g. rents), energy, transport, durable goods spending on health, on leisure and on miscellaneous services [7]. Consumption behavior provides a good measure of the total national output in the economy and is a component in the calculation of the Gross Domestic Product (GDP). In fact, household spending accounts 60% of the GDP [13]. Household spending is an essential variable in determining the productive success in an economy [6]. In short run analysis, the level of household consumption determines the aggregate demand in the economy. Changes in the household consumption at micro level will affect the economy as a whole. On the other hand, household consumption also take part in long run analysis because of its influence in the growth of economy because GDP has a high share in GDP.

The level of household expenditures indicates the level of economic system development as a whole. This raises to examining what affects the consumption expenditure pattern at micro economic level. To do this, econometric analysis was done identifying and measuring the effect that may affect the household consumption expenditure. It was already found out in some studies that income is the most important factor that influence household spending however there are other factors that may affect it. This study focuses on identifying demographic characteristics that may influence household spending.

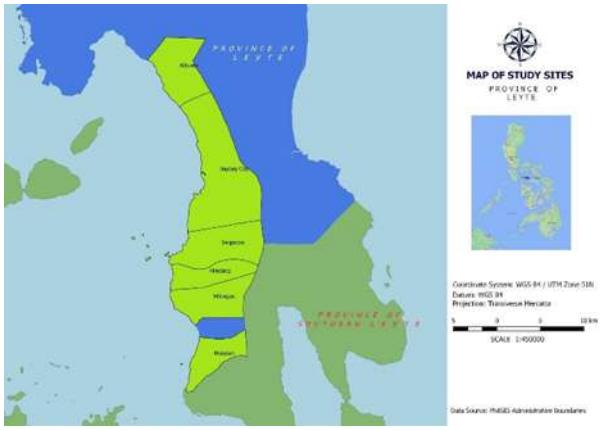
Generally, this study aims to evaluate the consumption expenditure of households in Leyte. The specific objectives are to examine the consumption pattern of households, identify the factors that may have influence on household expenditure, measure the impact of demographic attributes of a household on consumption expenditure of goods and services, evaluate the changes in individual household expenditure across demographic

subgroups and recommend policies that would make household consumption healthy.

MATERIALS AND METHODS

Study area

Leyte is an island in the Visayas region in the Philippines (Map 1). It is eighth-largest and sixth-most populous island in the Philippines, with a total population of 2,626,970 as of 2020 census. The island measures about 180 kilometres (110 mi) North-South and about 65 kilometres (40 mi) at its widest point. In the north it nearly joins the island of Samar, separated by the San Juanico Strait, which becomes as narrow as 2 kilometres (1.2 mi) in some places. The island province of Biliran is also to the north of Leyte and is joined to Leyte island by a bridge across the narrow Biliran Strait. To the south, Leyte is separated from Mindanao by the Surigao Strait. To the east, Leyte is somewhat "set back" from the Philippine Sea of the Pacific Ocean, Samar to the northeast and the Dinagat Islands to the southeast forming the Leyte Gulf. To the west is the Camotes Sea [11].



Map 1. Map of Leyte Province
Source: PhilGIS Administrative Boundaries [9].

Sampling

This study recommends using a 95% confidence interval, which suggests that the sample is certain at 95% of the time. The established Z-value for the 95% confidence interval is 1.96. The population variance was estimated using proportions. It was assumed that the proportion is 0.5 since there is limited information available. A close to 1 proportion suggests a best-case assumption. For the margin of error, a modest 6% assumption was used. The bigger the margin of error the lower is the sample size and the smaller the margin of error the bigger is the sample size. Using the equation below, the estimated sample size for the study areas is computed as follows:

$$n_o = \frac{Z^2_{\alpha/2}(p)*(1-p)}{e^2} \quad \text{.....(1)}$$

$$n_o = \frac{1.96^2(0.5)*(1-0.5)}{0.06^2} = 266 \quad \text{.....(2)}$$

where:

n_o sample size to be determined

$Z_{\alpha/2}$ confidence interval (95%)

p proportion (0.5)

e margin of error (6%)

Based on the computation, a total of 266 respondents was surveyed for this study. This 266 sample size was proportionately allocated to selected municipalities in Leyte, Philippines.

Data collection

This study utilizes primary data through a pretested survey questionnaire. Enumerators were trained prior to the conduct of survey to ensure familiarity of the instrument. From each municipality, households were selected randomly and the following information were collected to answer the objectives of the study:

- Demographic characteristics
- Household expenditures
- Household income/s

Descriptive analysis

Descriptive statistics such as frequency counts, percentages, means, and standard deviations were computed to describe the data gathered from households. Analysis were presented using tables and graphs.

Econometric analysis

Multiple regression analysis was used to determine what affects the household consumption expenditures. There were nine models formulated to capture the factors that may affect the household expenditures. The

first model uses total monthly expenditures as dependent variable while the rest of the models utilizes expenditure share of item as response variable. In the analysis, the same explanatory variables were used across the models. The general econometric model that measures the impact of demographic characteristics on the expenditure pattern of households is postulated below:

$$Y_{it} = \alpha + \beta X_{it} + u_{it} \quad \text{.....(3)}$$

where: Y is the vector of expenditure share used as dependent variables. The expenditures are divided into eight groups. X represents a vector of independent variables, the demographic characteristics while u is an unobserved random disturbance.

Dependent variables

Since there were nine models formulated in the study, the following are the response variables (Table 1). The first model uses the total monthly household consumption expenditure as response variable which is obtained by adding reported expenditure on food and non-food items. The rest of the response variable is the expenditure share of food and non-food items.

Table 1. The explanatory variables

Variable	Definition
Exp_i	the total monthly household consumption expenditures
$Food_i$	the monthly household expenditure on food
$Debt_i$	the monthly payment to debts
$Personal_i$	the monthly personal spending
$Transpo_i$	the monthly expenditure for transportation
$Housing_i$	the monthly expenditure for house repairs
$Utilities_i$	the monthly household expenditure electricity and water
Entertainment	the monthly expenditure on entertainment
$Healthcare_i$	the monthly expenditure on health

Source: Set by the author.

Independent variables

Table 2 displays the seven explanatory variables used in the econometric model. These variables were the demographic characteristics of the respondents. Across the models, the same independent variables were utilized. It consists of three dummy variables and four continuous variables. All these variables were hypothesized to be positively related to the response variables.

Table 2. The explanatory variables and their description

Variable	Definition
$male_i$	a dummy variable that refers to male as household head (1- male, 0-female)
age_i	a continuous variable that refers to age of the respondents (in years)
$married_i$	a dummy variable that refers to married household head (1-married, 0-unmarried)
$educ_i$	a continuous variable that refers to the educational attainment of the respondent
$hhsize_i$	a continuous variable that refers to the size a family
inc_spouse_i	a dummy variable that refers to the availability of income among the spouse of a respondent (1- spouse has income, 0 –spouse has no income)
inc_i	a continuous refers to the monthly income of the respondent (in PHP)
u_i	the error term

Source: Set by the author.

RESULTS AND DISCUSSIONS

Demographic characteristics

In this study, there were a total of 266 households from Leyte who were interviewed. Table 3 below presents the descriptive analysis of the independent variables namely age, civil status (married), sex (male), household size, education, availability of income among spouses and monthly income. The analysis include mean, standard deviation, minimum and maximum values. It was expected that these factors positively influence the response variable(s), monthly household expenditures share. As indicated in the table below, the respondents from household respondents are 45 years old on average and about 80% of them are married. Ninety-seven percent of the household heads are male and have an average of five members in a family. The average education level for the respondents is seven years, meaning the majority of them

have completed primary school. About 30% responded that their spouses has income. Households make an average monthly income of 10,481 PHP (190.05 USD).

As displayed in Table 4, the minimum monthly household expenditure is 2,222 PHP (40.29 USD) while the maximum value is 71,792.10 PHP (1,301.76 USD).

About half of the respondents consumed about 11,198.01 PHP (203.05 USD), the median value and the rest is above this value. The mean is 13,903.49 PHP (252.10 USD) which is larger than the median. This is due to some households' higher consumption compared to majority of households, as seen by a right- skewness value (2.88, which is more than zero), indicating that the majority of the data are on the graph's left side (high values). The kurtosis value (10.10 > 3) on the other hand also suggests that the consumption data has more extreme values.

Table 3. Descriptive analysis of explanatory variables

Variable	Obs	Mean	Std. Deviation	Min	Max
Age	266	45.37594	13.54634	15	89
Married	266	.8007519	.4001879	0	1
Male	266	.9661654	.181144	0	1
Household size	266	5.030075	2.127187	1	13
Education	266	6.947368	3.078387	0	20
Spouse has income	266	.3045113	.4610676	0	1
Total monthly income	266	10,481.45	8,899.362	240	84,050

Source: Author's calculation and analysis (2023)
Note: As of 15th February 2023, 1 USD = 55.15 PHP

Table 4. Descriptive results of total monthly household consumption expenditure

	1st Qu.	Median	Mean	3rd Qu.	Min	Max	Skewness	Kurtosis
Value (PHP)	7,960.74	11,198.01	13,903.49	15,492	2,222	71,792.10	2.88	10.10

Source: Author's calculation and analysis (2023).

Household Expenditures Pattern

The descriptive analysis of household spending is shown in Table 5.

Households spent more for food than any other items that reached up to 6,234.52 PHP (113.05 USD) in a month, that is about half of the total household consumption expenditure as illustrated in Figure 1.

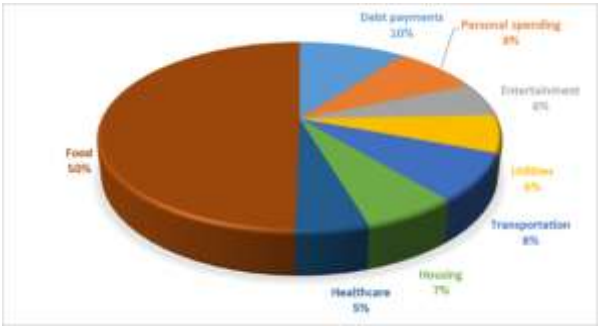


Fig. 1. Household consumption expenditure pattern of households
Source: Authors' design and calculation.

With food as a survival necessity for humans, the amount spent on it is a measure of household food security because it is well known that the poorer and more vulnerable a home is, the greater the percentage of household income spent on food [4]. Following that, a 1,282.84 PHP (23.26 USD) loan payment that equals up to 10% of the total cost was made.

Formal and informal personal loans count as payments on debts. Less money was allocated for personal expenses (such as gifts, clothing, and shoes), which on average totaled 1,046.62 PHP (1,898 USD), or around 8% of the overall.

This is close to transportation expenses (e.g. gas and public transit) which may total up to 1,023.583 PHP (18.56 USD).

Housing and utilities are nearly close, 806.96 PHP (14.63 USD) and 802.94 PHP (14.56 USD), that is about 7% and 6% respectively. Utilities generally include electricity, water bills, phone bills and internet expenses while housing expenses covers everything from rent or mortgage payments to property taxes, and home maintenance costs.

Approximately 727.7632 PHP, or 6% of the total, was spent on entertainment and recreation (e.g. spots, hobbies, vacations). The least amount, 619.5113 PHP, or around 5% of total spending, is on healthcare. Medication, dietary supplements, and vitamins are all part of healthcare.

Table 5. Descriptive analysis of household expenditure items

Statistics	Food	Healthcare	Housing	Transportation	Utilities	Entertainment	Personal spending	Debt payments
Mean	6,234.52	619.51	806.96	1,023.58	802.94	727.76	1,046.62	1,282.83
Std. Error of Mean	241.293	196.912	239.342	94.1	56.833	82.558	87.342	229.204
Median	5,470.5	0	0	510	540	260	725	0
Std. Deviation	3,935.377	3,211.536	3,903.544	1,523.137	926.919	1,346.479	1,424.511	3,738.207
Skewness	3.102	9.977	9.218	2.584	3.099	3.692	5.431	6.021
Kurtosis	18.075	113.938	102.846	7.737	12.742	16.585	40.618	40.896
Range	34,000	41,666	50,000	10,200	6,520	10,000	13,166	30,000
Minimum	0	0	0	0	0	0	0	0
Maximum	34,000	41,666	50,000	10,200	6,520	10,000	13,166	30,000

Source: Author's calculation and analysis (2023)
USD 1 = PHP 55.15 (as of 15th February 2023)

Comparison of household consumption expenditure and income by demographic characteristics

Table 6 displayed the comparison of household consumption expenditure and income by selected demographic characteristics such as sex, marital status, household size and higher educational attainment of the respondents. With male as the household head, household consumption expenditures is higher than the females as household head however female as household heads earned higher than males. Meanwhile, married respondents has higher incomes than the unmarried ones which leads higher consumption expenditures since having a family implies more members in a family resulted to higher expenses. Household size with more than five members has higher expenditures and incomes due to the fact that there are more members in a family, more member leads to higher demand especially on basic needs. In terms of education, those respondents who have higher education tend to have higher incomes and higher expenditure which is in parallel to the work of [3].

Table 6. Descriptive analysis of expenditure and income

Demographic characteristics		Expenditures (in PHP)	Expenditures (in USD)	Income (in PHP)	Income (in USD)
Sex	Male	14,021.56	254.24	10,433.62	189.19
	Female	10,532	190.97	12,851.11	233.02
Marital Status	Unmarried	8,586.96	155.70	9,839.53	178.41
	Married	15,226.38	276.09	10,680.8	193.67
Household size	3 and below	14,520.8	263.30	9,696.49	175.82
	3 to 5	12,576.65	228.04	10,132.79	183.73
	above 5	15,151.88	274.74	11,556.02	209.54
Education	Elementary level	12,686.55	230.04	8,957.99	162.43
	High school level	12,305.55	223.13	10,384.75	188.30
	College level	14,559.71	264	10,784.91	195.56

Source: Author's calculation and analysis.
USD 1 = PHP 55.15 (as of 15th February 2023).

Econometric Analysis

This section illustrates the demographic

characteristics that significantly influence the household expenditures. When the household respondent is married, household expenditures increases by 206.4 PHP, it shows statistical significance at 1% level. An additional years of education also increases the expenditure of a family by 31.08 PHP, it is significant at 1% level. Increase in income increases the expenditure by 0.00755 PHP significant at 5%. This means that for one additional unit in income it increases the expenditure by 0.00755. Other selected variables such as age, household size, and the presence of income for spouse showed to have positive impact in household expenditures however no statistical evidence to show their significance. The econometric model is significant since there is at least one variables which is significantly related to total expenditures. Only about 19.2% of the variation of total expenditures was explained by the sex, marital status, educational attainment and monthly income while the rest of 80.8% is due to other factors not mentioned in the econometric model.

Table 7. Regression analysis results

VARIABLES	Total expenditures	Food	Debt payments	Personal spending	Transportation	Housing	Utilities	Entertainment	Health care
Male as HH head	4,892**	833.7	1,541**	232.6	411.9	1,021	252.2	227.8	378.9
	(-2,082)	(-1,209)	(-619.9)	(-207.2)	(-268.2)	(-682.3)	(-156.6)	(-359.3)	(-337.7)
Age	21.3	1.793	-7.013	-11.93	-0.677	31.8	8.228**	-9.729	8.816
	(-47.84)	(-14.2)	(-22.09)	(-8.787)	(-7.964)	(-20.04)	(-3.664)	(-6.999)	(-11.71)
Married	5,014***	2,363***	978.4**	543.8***	-35.99	158.2	105.8	328.9*	517.6
	(-1,233)	(-531.6)	(-441.9)	(-203.5)	(-292.4)	(-306.2)	(-122.7)	(-191.9)	(-322.5)
Education	970.1***	169.4*	138.8	45.45	56.97*	347.6*	41.19**	-7.987	174.4
	(-311.4)	(-86.58)	(-109)	(-40.36)	(-32.36)	(-177.4)	(-17.04)	(-27.18)	(-110)
Household size	-221.3	-33.99	57.1	-10.59	-33.2	-29.05	-13.1	-24.68	-134.5
	(-256.6)	(-113.6)	(-98.17)	(-44.69)	(-36.67)	(-77.12)	(-26.12)	(-39.74)	(-113)
Spouse has income	590.6	-485.4	56.53	-36.21	62.79	1,170*	146.2	-22.66	-231.4
	(-1,350)	(-498.4)	(-530.7)	(-214.9)	(-190.4)	(-663.6)	(-129.6)	(-201.2)	(-423.1)
Monthly income	0.238***	0.0779***	0.109	0.00853	0.0182	-0.00714	0.0273**	0.0176	-0.0124
	(-0.0859)	(-0.0291)	(-0.069)	(-0.00974)	(-0.013)	-(0.0131)	(-0.0135)	(-0.0135)	(-0.0137)
Constant	-5,473	1,781	-3,081	586.7	244.5	-4,299*	-450.1	688	-895.8
	(-4,909)	(-1,783)	(-2,296)	(-697.9)	(-521.9)	(-2,497)	(-362.6)	(-569.9)	(-1,060)
Observations	262	266	266	266	262	266	266	266	266
R-squared	0.192	0.108	0.101	0.043	0.03	0.106	0.112	0.031	0.042

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1
Source: Author's calculation and analysis (2023).

Food

Food expenses consist of food and nonalcoholic beverages purchased at grocery, convenience, stores dining at restaurants [10]. As seen in Table 7, expenditure share on food is higher by 2,363 PHP (152.45 USD) when the head of the household is married. The difference of food expenditure between married and unmarried household heads is statistically significant at 1%. This is due to that fact that married people have larger families with more members, thus there is a corresponding rise in food consumption. Education was also found to be significantly related with households' food expenditure share at 10% level. That is, as educational level increases by one unit, the level of expenditure share on food rises by 169.4 PHP (11.18 USD). This is in parallel to the study of Hogan et al. We find that investments made in education can increase expenditure on fresh fruits and vegetables among food insecure

household (FAO, 2023) [3]. Meanwhile, results appeared that monthly income had a positive effect on a household's food expenditure share. For every peso increase in monthly income, there was a 0.0779 PHP (0.0014 USD) rise in monthly food spending. This outcome is in contrary to Engel's law that states other things being equal, the share of the household budget spent on food will rise as household income falls [5]. This scenario may be because as income rise, consumers purchase more expensive foods because they are more health conscious because prices play an important role in household's expenditures. Other factors including age, household size, and the availability of income among spouses did not appear to be significantly related to household monthly food expenses.

Debt Payment

Debt payments include formal and informal loans. Based on the econometric analysis, the share for debt payments is higher by 1,541 PHP (27.94 USD) when males are the household heads in the family, this difference is statistically significant at 5%. Married respondents' payments of debts increases by 978.4 PHP (17.74 USD) than unmarried individuals. This outcome is due to the fact that married individuals are having more financial responsibilities thus they are more exposed to having debts. On the other hand, a negative relationship was posted by age to debt payments but not statistically significant. Other variables such as education, household size, availability of income among spouses and monthly income displayed positive impact to debt payments however no statistical evidence to support this.

Personal Spending

This expenditure covers personal care products (e.g. soap) or lifestyle expense and includes things like clothes and shoes. When married, share on personal expenditure increases by 543.8 PHP (9.86 USD), this results is statistically significant at 1%. One possible explanation for this outcome is that married individuals have more members in a family thus increasing their personal expenditures. Other variables such as age, household size, presence of income among spouse showed to have negative influence to personal expenditures however it has no statistical significance for this. Sex of household heads, educational attainment and monthly income are positively related to personal expenditures however it has no sufficient evidence to prove this.

Transportation

Transportation expenses consist of the monthly payments on vehicle loans, down payments, gasoline and motor oil, maintenance and repairs, insurance, and public transportation including airline fares [10]. Based on the results, with higher education so also the transportation expenditure increases. That is, one unit increase in education increases the transportation spending by 56.97 PHP (1.03 USD), this outcome is significant at 10% level. That is, more educated individuals have higher incomes resulted to more decent jobs and higher incomes thus most of them have their own vehicles thus increasing their expenditures in terms of gas. Those with lower incomes prefer to commute since it is quite cheaper on their side than buying their own vehicle [12].

Housing

Housing expenses consist of shelter mortgage payments, property taxes, or rent; maintenance and repairs; and insurance [10]. As illustrated in Table 7, education is statistically significant to affect housing expenditures. This translates to a one unit increase in education increases the housing spending by 347.6 PHP (6.03 USD). According to [8] there is a strong link between education and income. When spouse has income, their housing spending is higher by 1,170 PHP (21.21 USD) than those families whose spouses who don't income, significant at 5%. This is because when spouses are working they have additional income resulting to more income and more capacity to pay for housing expenditures.

Other variables such as male as head, age, civil status, household size and monthly income showed no statistical evidence of its impact to housing expenditures.

Utilities

Utility expense is the cost incurred by using utilities such as electricity, water, waste disposal, heating, and sewage [2]. As seen in the Table 7, one unit increase in age significantly increases the monthly utilities by 2.23 PHP (0.04 USD). Education also affects this spending significantly. That is, one year increase in education increases this spending by 41.19 PHP (0.74 USD). Meanwhile, increase in income also increases the amount spent for utilities. A one unit increase in income increases the utility by 0.0273 PHP (0.0005 USD).

Entertainment

Married individuals spent 328.9 PHP (5.96 USD) higher than unmarried individuals, significant at 10%. Male as household head, availability of income for spouse and monthly income showed to have positive influence to entertainment expenditure while age, marital status, educational attainment and household size displayed to be negatively related but no enough evidence to show its significance.

Healthcare

Healthcare expense consists of any costs incurred in the prevention or treatment of injury or disease. It include health and dental insurance premiums, doctor and hospital visits, co-pays, prescription and over-the-counter drugs, glasses and contacts. As reported in Table 7, no demographic variables showed to have significant impacts to share for healthcare.

CONCLUSIONS

This study examines the consumption expenditure of 266 households in Leyte, Philippines. The respondents were selected randomly from each municipalities in the said province. Based on the results obtained in descriptive analysis, the minimum monthly household consumption expenditure is PHP 2,222 (USD) and the maximum is PHP 71,792.10 (USD). This indicates that there is a high difference among household consumption expenditure. A significant portion is spent on the overall spending on food. The household spent more on food than any other items, this was followed by payments to debts while the least spent is on healthcare. By descriptive analysis, female as household heads has higher incomes than male as household head. However, male household heads has higher expenditures than females. Meanwhile, married respondents has higher incomes than unmarried ones leading to higher expenditures due to the fact that married individual children in the family. Those respondents who have higher educational level as higher income thus, increasing their expenditures as well. Using econometric analysis, monthly household consumption expenditures is determined by sex of household head, marital status, education and monthly income. They appeared to be positively related to overall household spending.

It was observed that more money is spent on food however households spent less on healthcare. With this, it is recommended that a family must increase their spending on healthcare (e.g. health insurance, vitamins). Second, since more household size mean higher expenditure, family planning must be considered to minimize household expenditures. Third, considering higher education leads to higher income, proper education must be promoted to ensure financial stability among households. Lastly, since the regression showed to have a lower R squared, meaning only a small portion of the response variable was explained by the explanatory variables it is highly suggested to add more demographic variables hypothesized to be related to consumption expenditure.

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