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DETERMINANTS OF HOUSEHOLD FOOD EXPENDITURE IN MALI: A QUINTILE REGRESSION APPROACH

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Abstract

This article discusses the determinants of monthly food consumption expenditures of households in Mali, using a quintile approach. The study is based on survey data from the EMOP, 2020 on household expenditures. This survey was conducted in the same year among 6703 households in the eight regions of Mali and the District of Bamako. The application of the simultaneous quintile regression yields results indicating that total household expenditures are positively correlated with monthly household food consumption expenditures in the 25th, 50th, and 75th quintiles and also in all regions and the District of Bamako. An increase of one unit in the number of motorcycles in good condition owned by the household and in the number of internet connections would significantly reduce household food expenditures in all three quintiles in Mali. The inter-regional analysis, by OLS, indicates that with the exception of the regions of Koulikoro, Ségou and Kidal, the effect of the number of motorcycles in the other regions is negatively significant. It is most evident in Bamako (12018.88 FCFA), Kayes (10061.8 FCFA) and Timbuktu (5695.76 FCFA). Compared to the other regions, the effect of the cell phone would reduce the food consumption of households in Timbuktu more (5922.22 FCFA).

Keywords: *Consumption, food, household expenditure, Mali.*
JEL Codes: *O12, O18, O55, R20*

1. Introduction

This study is based on the theory of consumer behavior. According to Horakova (2015), individuals make their consumption decisions by allocating their resources (money, time, effort,...) to purchase the products of their consumptions. Consumer behavior has been developed in several studies from several disciplines such as the study of groups (in sociology), the study of the influence of society on the individual (in anthropology), the study of the individual (in psychology), the study of the functioning of individuals in groups (in social psychology), and the study on the economic well-being of households (in economics) (Schiffman & Kanuk, 1997).

It is difficult to know the reasons that drive individuals to purchase consumer goods, as they are subject to enormous influences (Gould, 1979). However, one certain reason is that individuals are influenced by their psyche. Even so, basic economic models tell us that individual buyers will spend their income on goods that will bring them the most satisfaction (utility), based on their tastes and the relative prices of goods (Sotsha et al., 2018). Schiffman

& Kanuk, (1997) find that consumers are also, so, informed about human need levels that they will prioritize satisfying basic needs before focusing on luxury needs.

Food consumption is one of the examples of basic needs that are the focus of this study in Mali. In relation to food consumption expenditures, Engel's Law posits that household income and the number of people in the household influence food consumption expenditures, but that budget shares are negatively correlated with household income (Donkoh et al., 2014).

Consumption expenditure is a good indicator of household well-being because it is more stable than income. Indeed, the higher the consumption expenditure per capita of the household, the more the household is supposed to satisfy its vital needs. In Mali, total annual consumption expenditure for the country as a whole in 2020 is estimated at CFAF 5,711 billion compared to CFAF 5,574 billion in 2019. 62.6% of spending is carried out by people in rural areas where about 75% of the population resides. The results of the EMOP-2020 also show that, on average, a household spends 2,034,212 FCFA annually. Per capita spending is estimated at 338,881 FCFA and 456,651 FCFA in adult equivalent. According to the gender of the head of household, 407 billion CFA francs are spent by households headed by women. Overall, on average, Malian households spend more than half of their income on food (64.9% versus 66.8% in 2019). This share varies from a high of 80.4% in the Kayes region to a low of 50.1% in the Bamako district. In other words, while households in all other regions put more than half of their expenditures on food, Bamako put at most half (INSTAT, 2020). Considering the importance of the share of food expenditures in total expenditures, we ask the question: what are the determining factors of this indicator? The objective of this paper is to identify the determinants of household food consumption expenditures in Mali using the quintile regression approach.

The literature is fairly abundant with respect to the study of the determinants of household food consumption expenditures. The particularity of this study in the context of Mali is the introduction of the determination by quintile of the effects of certain key variables (the number of cell phones in the household, the number of mopeds, and especially the household's connection to the internet) that are evident in the daily lives of households. Instead of household income, and unlike the majority of authors, this study uses total household expenditures. This is used to compare different household segments to determine which factors have a significant influence and to find out if there are differences between households.

The article is structured in three sections. After the introduction, we deal with the literature review in a first section, the methodology and source of data, and the presentation and discussion of the results in a second and third section. The work is concluded with a conclusion.

2. Literature Review

The literature is quite extensive, as there are enough studies on the topic. In a study of home consumption of fish products in Malaysia, Tan et al , (2015) find that marginal effects results, segmented by ethnicity, indicate that household size and household heads over 46 years of age or older are positively correlated with spending on all three fish products across all ethnic groups. Location, urbanicity, and education are associated with expenditures on some types of fish products among Malays and Chinese only.

According to Herrmann (1967), previous studies of household food expenditures suggest that the effect of income on expenditures varies between households of different sizes and in different urbanization and regional categories. On the 1955 USDA (Household Food Consumption Survey) data, significant interactions affecting expenditures on food and beverages consumed at home were found between household size and income, between household size and urbanization, and between household size, urbanization, and income. He finds that home food expenditures for households of up to two people vary less with income

than for households of at least three people. The effect of urbanization on expenditures also differs between small and large households. Urbanization causes less variation in average spending on food and beverages consumed at home among small families than among large families. Income, urbanization, and size also combine in a three-way interaction to affect the level of food expenditures. Expenditures in households of no more than two persons and in farm households of at least three persons vary less with income than do expenditures in nonfarm households and farm households of three or more persons.

In a study of the effects of income, assets, food programs, and household size on food consumption by Mexican Americans, blacks, and whites, West and Price (1976) report that household income has a relatively small and significant effect on food expenditures. The coefficient on household size indicates that the monthly value of food consumed per equivalent adult is reduced by $2.54 when household size increases by one person.

In a study of food expenditures across U.S. household income classes, Mcdowell et al. (1997) show that the food expenditure patterns of low-income households differ significantly from those of middle- and high-income households for total food expenditures, in-home food expenditures, and out-of-home food expenditures. Middle- and high-income households spend relatively more on food than low-income households, holding socioeconomic variables constant. A high-income household will allocate a relatively large proportion of its food budget to food away from home. Education level is not a significant determinant of food spending patterns for any of the income groups. Thus, increasing education level will not necessarily translate into increased spending, especially on fruits and vegetables. Family size was significant across all income groups for total food expenditures and for food at home. However, it did not have a significant impact on food consumed outside the home for any of the income categories. The impact of marital status tended to vary by income category. For example, it was a significant determinant of total food, food at home, and food away from home for low-income households. But for high-income households, it was significant only for food at home. Education had no significant effect on spending (total, at home, or away from home). As income increased, low-income households' spending on processed fruits and vegetables, beef, and poultry was likely to increase. Receiving food stamps also has a significant and positive effect on low-income households' total food and non-home food expenditures and was associated with higher expenditures on fresh and processed fruit.

(Blaylock & Blisard, 1989; Frazao, 1992; Hui et al., 1997; Kinsey, 1990; Lutz et al., 1993; Nayga, 1995) show that food consumption in the United States is influenced by demographic, geographic, cultural, and psychological factors. Specifically, food expenditures and eating patterns vary with geographic location, income level, degree of urbanization, participation in food stamp programs, household size and age distribution, education, marital status and employment, ethnic and cultural background, and seasonality.

In determining the determinants of household spending on juice and vegetables, Price et al. (1980) find that nontraditional variables such as cash flow, household management style, and psychological need levels influence both the type and variety of fruits and vegetables served by Washington households. Among the traditional variables, household size, education level, and geographic area of Washington state are relatively important factors. Income and occupation were relatively weak as explanatory variables. The level of cash held had a significant effect on the type and variety of fruits and vegetables served by Washington households. Because food is an item typically purchased with cash, this result suggests that households with low cash reserves may restrict the types and variety of fruits and vegetables purchased to control food expenditures. Some variables traditionally designed to explain consumption patterns were found to be comparatively weak in explaining the types of fruits and vegetables consumed. Income and occupation were significant for only a few of the fruit and vegetable factors analyzed. Household size, however, was the statistically strongest

variable in the study. Education, geographic area, and whether or not the household regularly eats out also influenced consumption patterns.

Davis et al, (1983) examine the impact of selected socioeconomic characteristics on aggregate and group food expenditures of low-income households of different races in Miami and Florida. They found that household income, family size, and participation in the food stamp program had a significant positive impact on food expenditures. Overall education level did not have a significant impact on household food expenditures.

In studying the relationships of the share of income of married women in the share of food and alcohol consumption expenditures, Gummerson & Schneider (2013), find that the shares of married women and education level have a positive and significant effect on food expenditures. The effects of household income and age of the household head are not significant. The fact that the head of the household is a woman has a positive and significant effect on food expenditures. Adding children's expenditure on clothing and health, they find that women's income share, household income, and the value of household assets have a negative and significant effect on household food expenditure.

In studying food expenditures and nutrient availability in American elderly households, Hama & Chern (1986), show that household size positively affects food consumption expenditures in the structural form of the equation. In other words, larger households have higher food consumption expenditures. However, in the reduced form of the food consumption equation, household size has a negative effect. This implies that larger households spend less on food per person than smaller households. Relative to residence, urban has no effect on food consumption in contrast to rural, whose households attempt to have a low level of food expenditure in the reduced form of the equations.

In the study of the analysis of the determinants of household alcohol expenditures in the United States, Steven & Helen (1995), find that income, region, education and household demographic variables are among the significant determinants of alcohol consumption expenditures. Age, household members under 18 years of age, and marital status of the head of household had a significant negative effect on alcohol consumption. Also, place of residence (region), education (higher education and college) have a positive and significant effect on household alcohol consumption.

Data from 23 years of the U.S. Consumer Expenditure Survey (1982-2004) are analyzed to investigate cohort effects on Americans' non-household food expenditures. Zan & Fan (2010), find that age acts negatively and significantly on the share of the US household non-household food budget. Age squared acts contrary. Income acts positively and significantly on the share of the household non-household food budget. Income squared acts contrary. Having a household with less than high school level acts negatively and significantly on the share of the household non-household food budget. High school, university and post-graduate levels have a positive and significant effect. Household size has a negative and significant effect on the share of the household's out-of-home food budget; size squared has the opposite effect. Female and male households have a negative and positive effect on the share of the non-household food budget, respectively. The effects are significant. The other household types have a positive and significant effect on food expenditures.

Ogundari et al, (2015) examine the demand characteristics of out-of-home food consumption by households, focusing on the role of household head education in Nigeria. The empirical results show that education of the household head decreases the demand and probability of out-of-home consumption, while household income and households with younger age cohorts increase the demand and probability of out-of-home consumption. The results also reveal that education reduces out-of-home food demand twice as much for the richest households as for the poorest households.

Pingali (2007) revealed a growing popularity of out-of-home food consumption in Asian countries, while Bai et al., (2012) argued that rising incomes and demographic factors

contribute to the increase in out-of-home consumption in China. A similar finding was also observed in Malaysia by Tan (2010), Turkey by Gal et al., (2007), and the United States by McCracken & Brandt (1987) and Liu et al., (2013).

San & Chaloupka (2016) determine whether smoking-related expenditures have a crowding-out effect on food and utility expenditures of Turkish households. In Turkey, for the two years studied, a crowding out effect was demonstrated whereby smoking-related expenditures lead to a decrease in household expenditures on food, housing, durable/non-durable goods, and education.

Studying household food expenditures, parental time allocation, and overweight among U.S. children, You & Davis (2010), find that age has no significant effect on household food consumption

In an attempt to test the validity of Engel's law using data on consumption patterns in Pakistan, Siddiqui (1982) estimates consumption functions for urban and rural areas separately. It is shown that these functions are determined by total expenditure and household size. Engel's law is confirmed for some product groups, but not for all.

In a study on the survey data of rural households in Rawalpindi, Habib et al, (2016) analyze the socio-economic determinants of food expenditures. To provide details on the responses of socioeconomic factors to monthly household food expenditures, a double log multiple regression model was used as having the advantage that the estimated parameter can be easily explained as expenditure elasticity. They find that variables related to household income, marital status of the head of household and number of employees have a significant impact on household food expenditures. The qualification of the head of household, age and gender do not have a significant impact.

Lee et Tan (2006), study data from the Malaysian Household Expenditure Survey 1998/1999 (MHES), conducted from July 1998 to June 1999 by the Department of Statistics Malaysia. The results of their study indicate that household income, race, and household residence significantly affect total monthly non-household consumption expenditure, *ceteris paribus*. As household income increases, total monthly spending on non-household consumption is expected to increase. Gender, education, age, and household size have no significant effect on household food expenditures. Household income has a positive and significant effect on Malaysian household food expenditures.

Nayga (1995) examines the different factors that influence household expenditures on fresh and processed fruit and vegetable consumption in the United States using the 1992 Survey of Consumer Expenditures. The empirical results suggest that higher-income, better-educated, larger, and older-headed households spend more on fresh and processed fruits and vegetables than other households. Seasonal and regional variations are also evident.

Meng et al, (2013) apply quantile regression to identify the determinants of the entire distribution of food expenditures and quantify their effects among subgroups of urban households in Ghana. Quantile regression at the 25^{th}, 50^{th}, 75^{th} and 90^{th} quantiles is applied to examine how sociodemographic factors affect the distribution of food expenditures. Their results indicate that among the significant factors, the most important effects in descending order are location, marital status, education, household composition, age and income.

Hone & Marisennayya, (2019) evaluate the consumption expenditures of households in Debremarkos town in the Amhara region of Ethiopia. A total of 100 households were randomly selected. They found that disposable income and family size are positively correlated with consumption. Age, household size, education, gender of the head of household has no significant effect on household consumption expenditure.

Enbeyle et al, (2020) investigate the factors that affect household food expenditures in Tepi city in Ethiopia. To achieve this objective, 130 households were selected for the study. Multiple regression models showed that family size, household income, additional household income and marital status (single) have a significant positive effect on monthly household food

expenditures at the 5% significance level in the study area. However, age, occupation, religion, mother's and father's education levels, high food price, do not have a significant effect on monthly household food expenditures.

Pahlevi et al, (2018) analyze the effect of gross regional domestic product, human development index, and number of family members on food expenditure in Indonesia. They explore the three factors using a population sample of 34 provinces in 2015. Causal research was employed, and cross-sectional method was used in this research to collect the data. The result of statistical analysis applying multiple regression shows that gross regional domestic product has a positive influence on food expenditure. On the other hand, the other factors such as human development index and household size do not have a significant effect on food expenditure.

In this paper, Wigraiphat et al, (2012) examine the factors influencing household expenditure on non-household food in the Bangkok area. The data are from the socio-economic survey of 2502 households in 2009, collected by the National Statistics Office and analyzed by the tobit model. The results show that the average household expenditure on non-household food relative to total household income is 0.12. The age of the household head, total household income, household size, place of residence, marital status of the household head, and occupation are the factors that affect expenditures. Gender, education of the household head, type of residence, household debt, and hours of labor force participation of the household head have no influence on non-household food expenditures.

Sekhampu & Niyimbanira, (2013) examined the socioeconomic determinants of household spending patterns in a South African township of Bophelong. Their results are based on a survey of 579 households. A multiple regression model was used to explain monthly expenditure responses to socioeconomic factors. Household income, size, number of persons employed, employment status, and education level of the household head exert a significant positive impact on household expenditures. The marital status of the household head was associated with a negative impact on household expenditures. The gender and age of the household head had no impact on changes in household expenditures.

Mubarak et al, (2019) analyze poor households' expenditures using survey data in Luwu. The results of their study indicate that about 78% of poor households' expenditures are influenced by the variables in the model, while the rest is influenced by other factors outside the model. In part, education level, number of household dependents, and income have a positive and significant effect on poor households' expenditures.

Marnisah et al, (2019) determine the factors affecting farmers' household expenditures. Data were randomly collected from August to October 2017 from 360 farmers in 12 representative villages in Musi Rawas, Muara Enim, and Musi Banyuasin in South Sumatra. The results showed that household expenditure positively affected farmers' income; household size negatively affected consumption expenditure.

Maniriho et al, (2021) use data from the Comprehensive Food Security and Vulnerability Analysis (CFSVA) collected from a random sample in 2015 in Rwanda. The ordinary least squares (OLS) method was applied to a linear regression model to estimate household demand functions (total household consumption expenditure, household food consumption expenditure, and household non-food consumption expenditure). Their results show that the most significant factors affecting household demand decisions are household size, age of household head, education level of household head, number of livestock units, poverty status, access to credit, and size of cultivated land. Furthermore, the results revealed that most of these factors apply to both poor and non-poor households, as well as to households in rural and urban areas. Logit estimates revealed that household socioeconomic characteristics, livestock ownership, and share of off-farm income are among the key variables that can improve the likelihood of households consuming protein-rich foods.

Zani et al, (2019) analyze the factors affecting food consumption expenditure of 32 cassava producing households in Southeast Sulawesi province, Indonesia. The study was conducted in Lapodi village, Pasarwajo sub-district, Buton district, from April to July 2018. Their results show that household income, fish price, household size, and cassava yield had a positive and significant influence on food consumption expenditure. The education level of the household head acts negatively and significantly.

Meng et al, (2012) determine the weekly consumption expenditure of households in the northern region of Ghana. They arrive at the results that the level of education has a positive and significant impact on weekly vegetable expenditure of rural households. Also, demographic factors, namely gender (negative), age (positive), number of children and number of elders also significantly determine weekly expenditure on fresh vegetables.

Primarily, Donkoh et al, (2014) examine the determinants of household food expenditures and their effects on household welfare in Ghana. Due to the potential simultaneity between food expenditure and welfare, a simultaneous equations model is estimated using the two-stage least squares method. The results show that gender, age, education of the household head, household size negatively and significantly affect household consumption expenditures. Age squared, marital status have a positive and significant effect.

Bata et al, (2018) empirically analyze the determinants of household food consumption expenditure in Gombe State, Nigeria. The study used data from the 2014/2015 General Household Survey conducted by the National Bureau of Statistics of Nigeria, on a sample of 400 households. The results were obtained using the ordinary least squares regression model. They reveal that age of household head, income, household size, education level of household head positively and significantly affect household consumption expenditure. Marital status and the number of women in the household have a negative and significant effect on household consumption expenditures.

Leschewski & Sellnow, (2021), analyze the determinants of 4826 households' spending on fortified fruit juice, using 2012 to 2013 public use data from the National Household Food Acquisition and Purchase Survey (FoodAPS) (USDA, 2019). The dataset consists of food diaries that characterize household home and non-home food purchases and acquisitions over a one-week period. Results indicate that rural location and household income do not have a significant effect on Americans' consumption of fortified juice.

Daniel & Isitor, (2014) identify the determinants of urban household food expenditures in Lagos State, Nigeria. They find that household income, size, and composition have a positive and significant effect on household consumption expenditures in Nigeria. Age and education of the household head play negatively, but the effect is not significant.

Sekhampu, (2012) analyzes the impact of selected socioeconomic characteristics on food expenditure patterns of a low-income township in South Africa. Household income, household size, age, employment status, and education level of the household head were found to have a significant (meaningful) positive impact on food expenditure. The marital status of the household head was associated with a negative impact on household food expenditures, and the coefficient on the variable was significant. Household size, employment, and marital status of the household head were the most significant predictors of food expenditures. The gender of the household head had no significant effect on household food expenditures.

Codjia & Saghaian, (2022) examine the factors that determine U.S. households' spending patterns on food products in the context of exceptional price shocks due to the COVID-19 pandemic. This research used the Journal of Consumer Expenditures (CEX) survey for the year 2020, where households or consumer units represent the units of observation. With a sample size of 10,453 observations, the empirical estimation of the two-stage Heckman model yields interesting results. Codjia and Saghaian showed that marital status, education, seasonal pattern, race, and ethnicity had a significant effect on the probability of purchasing food. As a result, married individuals were more likely to purchase food than single individuals.

Compared to households headed by someone who attended high school but did not earn a degree, those headed by highly educated individuals with a bachelor's, master's, or doctoral degree were more likely to purchase food. A household headed by a black person was less likely to purchase food. However, variables such as household size, age of household reference person, gender of reference person, number of dependents under 18, and housing status, taken separately, had a statistically insignificant effect on the likelihood of purchasing food based on the sample analyzed.

Kostakis, (2014) illustrates the main determinants of food expenditures of 800 households in Athens and Crete, Greece. The survey is conducted from October 2011 to February 2012. The results showed that independent variables of demographic and socioeconomic characteristics such as income, gender, age, marital status, place of residence and employment status have a significant impact on household food expenditures. Furthermore, further empirical analysis confirms Engel's first law in our data. Strong associations were found between demographic, socioeconomic, and consumer attitude parameters in food expenditure experimentation.

This study adds to the existing literature on household food expenditures. One of the specificities of the study for Mali is the determination of the effects of certain factors, namely the number of mopeds, cell phones, televisions owned by the household and its internet connection on food consumption expenditures, in addition to the effects of traditional socioeconomic and demographic variables.

3. Data and Methodological Approach

3.1. Data Source

This study uses survey data from EMOP (2020). In Mali, it surveyed 7,398 households, of which 6,703 reported their consumption expenditures in the regions of Kayes, Koulikoro, Sikasso, Ségou, Mopti, Timbuktu, Gao, Kidal and the district of Bamako. This represents a response rate of 90.6%. The questionnaire focused on household food consumption expenditures, total household expenditures, and certain socioeconomic and demographic characteristics (area of residence, household size, number of motorcycles, televisions, and cell phones owned by the household, sale of livestock, household connection to the Internet, sale of goods, gender, age of the head of household, level of education of the head of household, poverty status of the head of household, and rental costs of the houses housing the households, etc.). To examine the influence of socio-economic and demographic factors on household food expenditures in Mali, the quintile regression approach is used. The reason for using quantile regression analysis is that two of the most important variables in this analysis, namely food expenditures and total household expenditures, are asymmetric. In other words, they do not have a normal distribution. As noted by (Hung et al., 2010), the quintile regression coefficients are not sensitive to outliers. This makes this analysis more appropriate, in this case, compared to an ordinary least squares (OLS) method.

3.2. Econometric Model

Theoretically, quintile regression has been explored by several authors and tested empirically by others. In the empirical studies, a comparison has been made between quintile regression and OLS regression. The quintile regression approach seeks to model the quintiles of the conditional distribution of the dependent variable as functions of the observed covariates (Koenker & Bassett Jr, 1978). Quintile regression can be applied to biomedicine, economics, etc. (Koenker & Hallock, 2001). This study uses quintile regression analysis to discern the relationship between a dependent variable and several independent variables. Ordinary least

squares regression models the relationship between the set of explanatory variables and the conditional mean of the dependent variable, while quintile regression extends the regression model to conditional quintiles of a dependent variable, such as the 10^{th} or 90^{th} quintile (Meng et al., 2013)

We assume that socio-demographic factors do not have exactly the same effects on each point of the food expenditure distribution, so the quintile regression approach is more appropriate. Simultaneous quintile regression at the 25^{th}, 50^{th} and 75^{th} quintiles is employed in this study and the matched bootstrap procedure (500 replications) is used to obtain the standard errors of the estimators. In addition, the F-test is used to test whether the explanatory variables have a statistically significant differential effect at the different quintiles.

Table 1. Description of Variables and their Means

Variables	Obs.	Average	Std. Err.	Description
Food_exp_month	6703	121187	96253.65	Monthly household food expenditures (FCFA)
Tot_exp_month	6703	174806.3	127012.9	Total monthly household expenses (FCFA)
Urban	6703	.4903774	.4999447	Place of residence (Urban =1 and Rural=0)
HH_size	6703	7.153812	4.416411	Number of people in the household
Motorcyles	6703	.8093391	.8365651	The number of motorcycles owned by the household in good condition
Televisor	6703	.5421453	.7713773	The number of televisions owned by the household in good condition
Number_cell	6703	2.086528	1.794992	The number of cell phones owned by the household in good condition
Sale_livestock	2295	.1220044	.3273622	Sale of livestock by the household (yes=1 and no=0)
Internet	6703	.2613755	.4394168	The household is connected to the internet (yes =1 and no=0)
Sale_goods	2295	.0187364	.1356221	The household sold goods (yes=1 and no=0)
Gender	6703	.9121289	.2831285	Gender of the head of the household (Male=1 and Female=0)
HH_age	6703	47.43234	14.01444	Age of the head of the household
Education	6703	1.324929	.5936982	The level of education of the head of the household (No level=1, Primary=2, Secondary=3 and Higher=4)
Poor	6703	.2473519	.4315052	Poverty status (Poor=1 and non-poor=0)
Monthly_rent_fees	6703	13722.98	11605.63	Monthly rental fees for the house housing the household (FCFA)

Source: Authors based on EMOP-2020 data, Mali.

Drawing on studies by Davis et al. , (1983); Deaton & Paxson, (1998); Kirkpatrick & Tarasuk, (2003); Meng et al., (2012); Healy, (2014); Donkoh et al., (2014); Kostakis, (2014); Sotsha et al., (2018); Zani et al., (2019); Codjia & Saghaian, (2022), a household is considered a single organizational unit in which food expenditure behavior can be explained using the following general functional form:

$$y_i = x_i^{'}\beta_i + u_{\theta i} \quad \text{with} \quad \text{Quint}_{\theta}\left(y_i \middle| x_i^{'}\right) = x_i^{'}\beta_i \tag{1}$$

Where x_1' denotes a vector of regressors, β_θ represents the vector of parameters to be estimated and u_i is a vector of residuals. $\text{Quint}_\theta(y_i|x_1')$ represents the θ^{th} conditional quintile of y_i given x_1'.

Indeed, the basic empirical model can be written as follows:

$$\begin{aligned} Food\_\exp\_month = {} & \alpha + \beta_1 Tot\_\exp\_month + \beta_2 Urban + \beta_3 HH\_size \\ & + \beta_4 Motorcycles + \beta_5 Televisor + \beta_6 Number\_cell \\ & + \beta_7 Sale\_livestock + \beta_7 Internet + \beta_8 Sale\_goods \\ & + \beta_9 Gender + \beta_{10} HH\_age + \beta_{11} Education \\ & + \beta_{12} Poor + \beta_{13} Monthly\_rent\_fees + \varepsilon \end{aligned} \tag{2}$$

Table 1 contains the description of the variables, the number of observations and the averages.

4. Results and Discussion

In this section, the results of the quintile regression of the model are reported.

Table 2. Simultaneous Quintile Regression Results

Food_exp_month	25th quintile		50th quintile		75th quintile	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Tot_exp_month	.4641024***	.0256218	.3405732***	.0369913	1.020331***	.0544293
Urban	-1334.523	876.5675	-5484.314***	1586.768	-20903.88***	5076.457
HH_size	987.3734***	246.0761	1693.049***	396.4796	1712.055**	800.1731
Motorcycles	-2889.018***	940.8443	-1676.568*	932.6474	-19889.36***	2763.362
Televisor	-3484.739*	1839.948	1691.546	1546.169	-3420.335	5186.868
Number_cell	429.7094	501.9231	-570.0365	704.5102	-896.6724	1509.827
Sale_livestock	-572.5081	862.5557	3745.34	2785.583	3991.643	7742.689
Internet	-8109.106***	1735.56	-4802.295**	1990.08	-41041.45***	6172.293
Sale_goods	1863.752	3978.722	-2751.904	6304.022	-17936.27	17346.6
Gender	1593.34	1030.191	2577.534	2473.527	-1456.932	17241.47
HH_age	-11.95281	34.1865	17.84967	62.65244	-12.27105	125.8745
Education	2055.015**	928.1464	1411.621	2204.937	2938.376	4887.767
Poor	-121.4661	1113.622	-4312.943	3462.882	-15668.05*	8028.067
Monthly_rent_fees	-.3579457***	.0746087	-.1636469	.1285909	-1.310748***	.289682
Cont	10045.28***	1861.264	38487.98***	5693.983	1796.847	23291.02
Nb. Obs.	678		1128		489	
Pseudo R^2	0.4639		0.2478		0.6151	

*Significant at 10%,** Significant at 5%,*** Significant at 1%.
Source: Authors based on EMOP-2020 data from Mali.

The quintile regression results in Table 2 indicate that there is a positive correlation between total household expenditures and their food consumption expenditures in all three quintiles. The effects are significant at a reasonable 1% level. This would mean that an increase in total monthly household expenditures would cause an increase in monthly food consumption expenditures by quintile. When total monthly expenditures increase by one franc unit, food expenditures increase by 1,020 FCFA in the 75th, by 0.464 FCFA in the 25th and by 0.340 FCFA in the 50th. The incidence is higher among households in the 75th quintile. It is higher among households in the 25th quintile than those in the 50th quintile.

The area of residence has a negative effect on household food expenditures in the different quintiles. The effect is significant in the 50th and 75th quintile. The fact that the household lives in an urban area decreases its food consumption. Households living in urban areas spend less on food than those in rural areas. The effect is more pronounced in the 75th quintile (20903.8 FCFA) than in the 50th (5484.3 FCFA). Households living in the urban area of the 75th quintile spend less on food than their counterparts in the 50th.

Food consumption expenditures in the 25th, 50th and 75th quintile are positively and significantly correlated with the number of people in the household. The effect of household size is stronger in the 75th compared to the others. In this quintile, increasing the size of an additional person would cause an increase in food expenditures of 1712.05 FCFA; this increase is 1693.04 FCFA and 987.37 FCFA in the 50th and 25th.

The number of mopeds (two-wheeled gasoline-powered vehicles) owned by the household has a negative effect on household spending on food in the 25th, 50th and 75th quintiles. The effect is significant at the 1 percent level and dominant in the 75th. Owning a moped would significantly reduce the household's monthly food consumption expenditures by 19889.36 FCFA. This is because the monthly expenses incurred by the moped (fuel, maintenance costs, ...) contribute to lowering the expenses for food. In other words, households in the 75th, 50th and 25th quintiles are able to reduce their food consumption in favor of owning a moped in good condition.

The number of televisions in good condition owned by households in the 25th quintile also has a significant negative impact on monthly household consumption expenditures. Households in this quintile would prefer a television in good condition at the expense of their food consumption. In the 25th quintile, the monthly maintenance of a television set (in good condition) would significantly reduce monthly household consumption expenditures by 3484.74 FCFA.

Monthly food expenditures for the 25th, 50th and 75th quintile are strongly negatively correlated with household internet connection. Household internet connection would significantly lower household food consumption expenditures at the 1% threshold. Thus, in the 75th quintile, the household's connection to the internet would cause a decrease in its monthly expenditure on food of 41041.45 FCFA. This effect decreases by 8109.10 FCFA for the 25th and 4802.29 FCFA for the 50th. This result sheds light on a clear decrease in household food consumption in favor of internet connection.

The number of cell phones in good condition owned by the household, the sale of livestock, the sale of goods by the household, the gender of the head of the household, and the age of the head of the household have no significant effect on the food consumption of households in the selected quintiles.

The poverty status of the head of household in the 75th quintile is negatively correlated with food consumption expenditures. The effect is significant at the 10% level. In this quintile, the poverty status of the head of household would cause a decrease in food consumption of 15668.05 FCFA. This result is logical, especially since the poorer a household becomes, the lower its consumption expenditures will be.

In Mali, the level of education of the household head has a positive and significant effect at the 5 percent threshold on food consumption expenditures of households in the 25th quintile. These results confirm those of Stewart et al. (2003) and Meng et al. (2013). This result indicates that an educated household would think about improving its food well-being by spending consistently on food consumption than the uneducated one. The effect on other quintiles is not significant.

The cost of renting the houses housing the households has a negative and significant effect of only one percent on the monthly consumption expenditures of households in the 25th and 75th quintiles.

The analysis of Table 3 by region gives us the following results:

- Kayes: The variables of total monthly household expenditures, urbanity, and gender of the head of household have a positive effect on monthly household consumption expenditures. The effects of these variables are significant at reasonable rates of 1% and 5%. Households living in urban areas are likely to increase their consumption of food goods, while those living in rural areas are less likely to do so. Male gender tends to increase food consumption expenditures. The number of mopeds in good condition, television sets, cell phones, the sale of livestock, household internet connection, and the cost of renting houses in which households live have significant and negative effects on monthly household food consumption. The possession of a moped in good condition, a television set and an internet connection would significantly reduce household consumption by FCFA 10061.05, FCFA 4293.17 and FCFA 33595.04 respectively. In other words, these households would rather connect to the internet than improve their food well-being. Poverty status, education level of the head of household, age and size are not significant.
- Koulikoro: total monthly expenditures, household size, and number of cell phones are factors that are positively correlated with household food consumption in this region. The effects are significant. Increasing household size by one unit would cause household consumption to increase by 5095.6 FCFA, confirmed by Davis et al, (1983), Hone & Marisennayya (2019). Poverty status significantly and negatively reduces monthly household food consumption. In this region, a poor household would see a decrease in consumption of 31710.15 FCFA. Internet connection, area of residence, number of motorcycles, education level of the head of household, number of televisions, gender, and age of the head of household are not significant.
- Sikasso: In this region, household size and total monthly expenditure are the positive determinants of household food consumption with significant effects. The positive impact of household size is 2400.01 FCFA confirmed by Hama & Chern (1986), Hone & Marisennayya (2019), Zani et al, (2019). The number of motorcycles, internet connection, gender, poverty status, and house rental costs have significant negative effects on household food consumption. The negative impact of internet connection and poverty on consumption is 10021.37 FCFA and 12619.15 FCFA.
- Segou: total monthly expenditures and area of residence are the variables that positively influence household food consumption. The effects are significant. The number of cell phones, gender, and house rental costs are the factors that negatively determine food consumption expenditures. The effects are significant.
- Mopti: In this region, we find a positive correlation between total monthly expenditures, place of residence, internet connection and household food consumption expenditures. The effects are significant. Household size, number of motorcycles and televisions, age of the head of household, and house rental costs have negative impacts on monthly household food consumption. The effects are clear.

Table 3. OLS Regression Results by Region

	Kayes	Koulikoro	Sikasso	Segou	Mopti	Timbuktu	Gao	Kidal	Bamako
Food_exp_month	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
Tot_exp_month	1.115856***	.1058828***	.4962823***	.6806177***	.7993443***	.3902351***	.8121785***	.5963051***	.7763554***
Urban	5435.246**	-2055.02	-2933.977	3742.869**	2808.1*	3275.587*	79.76186	-329.9993	-
HH_size	-254.4874	5095.609***	2400.01***	500.6459	-666.6454**	2459.057***	1536.509***	-1444.697	-112.9427
Motorcycle	-10061.05***	1626.473	-3421.264*	1918.324	-2969.53***	-5695.768**	-3331.54***	11606.11	-12018.88***
Televisor	-4293.171*	319.7087	173.839	-2238.09	-5274.043***	-915.235	4223.318**	10278.31	-6601.926**
Number_cell	-1863.564**	1896.255*	432.3782	-1764.291**	725.5303	-5922.227***	-1645.802**	-2154.29	199.6644
Sale_livestock	-11001.8***	-6577.608	395.415	-2257.289	-1080.626	3533.006	-6223.851***	-10699.62	-
Internet	-33595.04***	583.4478	-10021.37***	2669.086	6283.588***	-	-8799.833***	-6305.755	-6698.838**
Sale_goods	-1684.565	-14542.1	-	1636.19	-5.98674	3043.13	-	-	2288.635
Gender	15450.89***	-4301.861	-6471.606*	-8504.563***	-745.9708	-5637.708***	-3706.07***	-14496.31	-11.9337
HH_age	-1.457852	81.18888	81.2888	-43.48308	-283.227***	-261.3892***	10.69974	502.7987	-183.0643
Education	-3544.398	1091.396	-193.393	1034.812	468.9058	-1031.746	2543.516**	610.0668	-269.0196
Poor	-2444.206	-31710.15***	-12619.15***	-2339.774	1957.106	-7144.957**	3472.6**	-10468.01	3170.17
Monthly_rent_fees	-1.813704***	.0251233	-1.437436***	-.6631109***	-1.119068***	1.106031***	-1.135611***	-.936149	-.9590928***
Const	-65497.89***	96961.19	8358.292	2380.429	-6165.327	16229.88	32224.82***	51787.62	-8214.603
Nb. Obs.	459	291	206	181	286	258	243	46	325
R^2	0.9746	0.5397	0.9491	0.9270	0.9653	0.8046	0.9480	0.8582	0.8858
F-stat.	1215.31	23.11	275.30	150.65	537.95	77.27	320.93	14.90	201.73
Prob > F-stat.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

* Significant at 10%, ** Significant at 5%, *** Significant at 1%.

Source: Authors based on EMOP-2020 data, Mali.

- Timbuktu: Urban location, total monthly expenditures, household size, and household house rental costs positively and significantly determine household food consumption expenditures. Household food consumption increases with a one-unit increase in these variables. On the other hand, the number of motorcycles, cell phones, gender, age and poverty status have a negative impact.

- Gao: total monthly expenditure, household size, number of televisions, education level of the household head (contradicted by Zani et al., 2019) and poverty status positively affect monthly household food consumption. The effects are significant. Notwithstanding, the number of motorcycles and telephones, sale of livestock, internet connection, gender, and household house rental costs negatively and significantly impact monthly household food consumption expenditures.
- Kidal: With an obvious effect, total monthly household expenditures are the only variable that positively determines household food consumption expenditures in this northern region of Mali.
- Bamako: Like the Kidal region, Bamako households' consumption expenditures are positively and significantly impacted by total monthly consumption expenditures. In contrast, the number of motorcycles, televisions, internet connections, and house rental costs have clear negative effects.

Inter-regional analysis of certain variables: The positive impact of total monthly expenditures is evident in all eight regions and the district of Bamako. The effect of the area of residence is most important in the Kayes region (5435.24 FCFA), followed by the Segou (3742.86 FCFA) and Timbuktu (3275.58) regions. In Mali, household size impacts household food consumption in the Koulikoro region (5095.60 FCFA) which is followed by Timbuktu (2459.05 FCFA), Sikasso (2400.01 FCFA) and Gao (1536.50 FCFA). With the exception of the regions of Koulikoro, Ségou and Kidal, the effect of the number of motorcycles in the other regions is negatively significant. It is most evident in Bamako (12018.88 FCFA), Kayes (10061.8 FCFA) and Timbuktu (5695.76 FCFA). Compared to the other regions, the effect of cell phones would reduce household food consumption more in Timbuktu (5922.22 FCFA). The Internet connection would reduce household food consumption by 33595.04 FCFA in the Kayes region, 10021.37 FCFA in Sikasso, 8799.83 FCFA in Gao and 6698.83 FCFA in the Bamako district. In other words, food consumption is very sensitive to internet connection in Mali. Annual food consumption in the Koulikoro region is more sensitive to the poverty status of the household (31710.15 FCFA). Its impact in the Sikasso region decreases food consumption by 12619.15 FCFA.

5. Conclusion

The objective of this study is to determine the factors that influence household food consumption expenditures in Mali. The study is based on survey data from the EMOP 2020. The survey was conducted in the same year. The use of the quintile approach seemed more appropriate to better capture the effects of the determinants. The results of the quintile regression indicate that in all three quintiles, total expenditure, household size have positive effects on monthly household food consumption expenditure. An increase of one unit in the number of mopeds and internet connection would significantly decrease household food expenditures in Mali. The inter-regional analysis indicates that, with the exception of the regions of Koulikoro, Ségou and Kidal, the effect of the number of motorcycles in the other regions is negatively significant. It is most evident in Bamako (12018.88 FCFA), Kayes (10061.8 FCFA) and Timbuktu (5695.76 FCFA). Compared to the other regions, the effect of the cell phone would reduce household food consumption more in Timbuktu (5922.22 FCFA).

References

Bai, J., Zhang, C., Qiao, F. & Wahl, T. (2012). "Disaggregating household expenditures on food away from home in Beijing by type of food facility and type of meal". *China Agricultural Economic Review*. 4. 18-35. 10.1108/17561371211196757.

Bata, M., Aliero, H.; Gatawa, N. & Elijah, S. (2018). "An Empirical Study of The Determinants of Household Food Consumption Expenditure In Gombe State". *The Journal of Value Inquiry*. Volume 7. 36 - 49.

Blaylock, J. R. & Blisard, W. N. (1989) "La répartition des revenus et des dépenses alimentaires aux États-Unis". *J. Consumer Aff*. 23:226-41.

Blisard, N., & Blaylock, J. R. (1993), "U.S. Demand for Food Household Expenditures, Demographics, and Projections for 1990-2010". Washington DC: U.S. Department of Agriculture, TB-1818, *Econ. Res. Serv*.

Codjia, C. O. & Saghaian, S. H. (2022) "Determinants of Food Expenditure Patterns: Evidence from U.S. Consumers in the Context of the COVID-19 Price Shocks" Sustainability 2022, 14, 8156. https://doi.org/10.3390/su14138156 https://www.mdpi.com/journal/sustainabilit

Daniel, B. & Isitor, U. (2014). "Analysis of the Determinants of Food Expenditure Patterns among Urban Households in Nigeria: Evidence from Lagos State". *IOSR Journal of Agriculture and Veterinary Science.* 7. 71-75. 10.9790/2380-07537175.

Davis, C. G., Moussie, M., Dinning, J.S., & Christakis, G. (1983). "Socioeconomic Determinants of Food Expenditure Patterns among Racially Different Low-Income Households: An Empirical Analysis". *Western Journal of Agricultural Economics*, *08*, 183-196

Deaton, A. & Paxson, C., (1998). "Economies of Scale, Household Size, and the Demand for Food". Journal of Political Economy, 106(5), pp.897–930.

Donkoh, S., Alhassan, H. & Nkegbe, P. (2014). "Food expenditure and household welfare in Ghana". *African Journal of Food Science*, Vol. 8(3), pp. 164-175

Enbeyle, W., Meslie, Y. & Pandey, D. (2020). "Determinants of Household Consumption Expenditure in Tepi Town". *International Journal of Intelligent Computing and Technology*, June (2020) - Vol.4, Iss.1 Pages: 40-56

Frazao, E. (1992), "Food Spending by Female-Headed Households" Washington DC : U.S. Department of Agriculture, TB-1806, *Econ. Res. Serv*.

Gäl, A., Akbay, C., Özcicek, C., Özel, R., & Akbay, A. (2007). "Expenditure Pattern for Food Away from Home Consumption in Turkey". *Journal of International Food & Agribusiness Marketing, 19*, 31 - 43.

Gummerson, E., & Schneider, D. (2013). "Eat, Drink, Man, Woman: Gender, Income Share and Household Expenditure in South Africa". *Social Forces, 91*, 813 - 836.

Habib, H. S., Malik, A. M., Ali, A. & Khan, M. A., (2016) "Socioeconomic determinants of rural household food expenditures in Rawalpindi, Pa*kistan J. Agric. Res*. Vol. 29 No. 1

Hama, M. Y. & Chern, W. S., (1986), "Food Expenditure and Nutrient Availability in Elderly Households", No 278061, 1986 Annual Meeting, July 27-30, Reno, Nevada, American Agricultural Economics Association (New Name 2008: Agricultural and Applied Economics Association), https://EconPapers.repec.org/RePEc:ags:aaea86:278061.

Healy, A.E., (2014). "Convergence or difference? Western European household food expenditure". British Food Journal, 116(5), pp.792–804.

Herrmann, R.O. (1967). "Interaction Effects and the Analysis of Household Food Expenditures". *American Journal of Agricultural Economics*, Vol. 49, No. 4, pp. 821-832

Hone, Z., & Marisennayya, S. (2019). "Determinants of Household Consumption Expenditure in Debremarkos Town, Amhara Region, Ethiopia". *American Scientific Research Journal for Engineering, Technology, and Sciences* (ASRJETS) (2019) Volume 62, No 1, pp 124-144

Horakova, M., (2015). “Consumer Behaviour of College Students in the Czech Republic”. Journal of Competitiveness, vol. 7, issue 4, p. 68-85

Hui, J.P., McLean-Meyinsse, P.E. & Jones, D. (1997), "An Empirical Investigation of Consumer Concerns about Nutrition, Taste, Price and Chemical Additives during Meat Shopping ". *J. Food Prod. Mktg*. 4:31-41

Hung, W. T., Shang, J. K. & Wang, F. C., (2010). “Pricing determinants in the hotel industry: Quantile regression analysis”. International Journal of Hospitality Management, 29(3), pp.378–384.

INSTAT, (2021), “CONSOMMATION PAUVRETE BIEN-ETRE DES MENAGES 2020“, Résultats annuels de l’EMOP-2020/2021

Kinsey J. D. (1990) "Diverse Demographics Drive the Food In dustry". *Choices*, deuxième trimestre 1990, pp. 22-23.

Kinsey J. D. (1994) “Food and families' socioeconomic status”. J Nutr. 1994 Sep; 124(9 Suppl):1878S-1885S. doi: 10.1093/jn/124.suppl_9.1878S. PMID: 8089765

Kirkpatrick, S. & Tarasuk, V., (2003). “The relationship between low income and household food expenditure patterns in Canada”. Public Health Nutrition, 6(6), pp.589–597.

Koenker, R., & Bassett Jr, G. (1978). “Regression quantiles. Econometrica”, 46(1), 33-50.

Koenker, R., & Hallock, K. (2001). “Quantile regression: An introduction”. Journal of Economic Perspectives, 15(4), 43-56.

Kostakis, I., (2014). “The Determinants of Households’ Food Consumption in Greece”. *International Journal of Food and Agricultural Economics*, 2(2), pp.17–28.

Lee, H. & Tan, A. K. G., (2006), “Determinants of Malaysian Household Expenditures on Food-Away-From-Home”, No 25430, 2006 Annual Meeting, August 12-18, 2006, Queensland, Australia, International Association of Agricultural Economists, https://EconPapers.repec.org/RePEc:ags:iaae06:25430.

Leschewski, A. & Sellnow, C. (2021). “Determinants of US household expenditures on fortified fruit juice.” *International Food and Agribusiness Management Review* Volume 25, Issue 1, p69-82

Liu, M., Kasteridis, P. & Yen, S. T., (2013), “Breakfast, lunch, and dinner expenditures away from home in the United States”, *Food Policy*, 38, issue C, p. 156-164, https://EconPapers.repec.org/RePEc:eee:jfpoli:v:38:y:2013:i:c:p:156-164.

Lutz, S.M., Blaylock, J.R., & David, M. (1993), "Household Characteristics Affect Food Choices". *Food Rev*. 16: 12-17

Maniriho, A., Musabanganji, E., Nkikabahizi, F., Ruranga, C. & Lebailly, P. (2021). “An Analysis of the Determinants of Household Expenditures in Rwanda”. UKH Journal of Social Sciences. 5. 8-17. 10.25079/ukhjss.v5n1y2021.pp8-17.

Marnisah, L., Karim, A., Sanmorino, A. & Jenahar, T. (2019). “Analysis of Factors Affecting the Household Expenditure of Rubber Farmers in Indonesia”. *International Journal of Engineering and Advanced Technology (IJEAT*), Volume-8 Issue-4, p304-306.

McCracken, V. & Brandt, J. A., (1987), “Household Consumption of Food-Away-From-Home: Total Expenditure and by Type of Food Facility”, *American Journal of Agricultural Economics*, 69, issue2, p.274-284, https://EconPapers.repec.org/RePEc:oup:ajagec:v:69:y:1987:i:2:p:274-284

Mcdowell, D.R., Allen-Smith, J.E., & McLean-Meyinsse, P.E. (1997). “Food Expenditures and Socioeconomic Characteristics: Focus on Income Class”. *American Journal of Agricultural Economics, 79*, No. 5, pp. 1444-1451.

Meng, T., Florkowski, W. J., Kolavalli, S. & Ibrahim, M., (2012), “Food Expenditures and Income in Rural Households in the Northern Region of Ghana”, No 124638, 2012 Annual Meeting, August 12-14, 2012, Seattle, Washington, Agricultural and Applied Economics Association, https://EconPapers.repec.org/RePEc:ags:aaea12:124638.

Meng, T., Florkowski, W. J., Sarpong, Daniel B., R., Anna V.A. & Chinnan, M. S. (2013), "The Determinants of Food Expenditures in the Urban Households of Ghana: A Quantile Regression Approach" *Southern Agricultural Economics Association (SAEA) > 2013 Annual Meeting, February 2-5, 2013, Orlando, Florida*

Mubarak, M.S., Yunus, A.K., Mandela, A., & Yunus, A. (2019). "Analysis of Factors Affecting Expenditure of Poor Households in Luwu District, Indonesia". *IOSR Journal of Economics and Finance (IOSR-JEF).*Volume 10, Issue 5 Ser. I, PP 54-58

Nayga, R. (1995). "Determinants of U.S. Household Expenditures on Fruit and Vegetables: A Note and Update" *Journal of Agricultural and Applied Economics*, *27*(2), 588-594. doi:10.1017/S1074070800028613

Ogundari, K., Aladejimokun, O. & Arifalo, S. (2015). "Household Demand for Food Away from Home (FAFH) in Nigeria: The Role of Education". The Journal of Developing Areas. 49. 247-262. 10.1353/jda.2015.0004.

Pahlevi, M.R., Andita, D.Y., Gumilar, E., Nursafitri, F., & Sofiani, S.S. (2018). "Examining Factors Affecting the Food Expenditure in Indonesia". *Industrial Research Workshop and National Seminar, Vol 9:* pp. 493–498

Pingali, P (2007). "Westernization of Asian diets and the transformation of food systems: implications for research and policy". *Food policy*, Vol. 32(3): 281

Price, D. W., Price, D. Z. & West, D. A., (1980), "Traditional and nontraditional determinants of household expenditures on selected fruits and vegetables", *Western Journal of Agricultural Economics*, 05, issue 1, number 32525, https://EconPapers.repec.org/RePEc:ags:wjagec:32525.

San, S. & Chaloupka, F. (2016) "The impact of tobacco expenditures on spending within Turkish households" *Tobacco Control*, Vol. 25, No. 5, pp. 558-563

Schiffman, L.G., & Kanuk, L.L., (1997). "Consumer Behaviour". NJ. Upper Saddle River, Prentice-Hall, Inc

Sekhampu T. J., (2012) "Socio-Economic Determinants of Household Food Expenditure in a Low Income Township in South Africa" *Mediterranean Journal of Social Sciences*, Vol. 3 (3), p449-453

Sekhampu, T. & Niyimbanira, F. (2013). "Analysis Of The Factors Influencing Household Expenditure In A South African Township". International Business & Economics Research Journal. 12. 279-284. 10.19030/iber.v12i3.7671.

Siddiqui R., (1982) "An Analysis of Consumption Pattern in Pakistan" *The Pakistan Development Review*, Vol. 21, No. 4 (Winter 1982), pp. 275-296

Sotsha, K., Rambau, K., Khoza, T., Mmbengwa, V. & Ngqangweni, S., (2018), "Socio-economic determinants of rural household food expenditure: A quantile regression analysis", No 284768, 2018 Annual Conference, September 25-27, Cape Town, South Africa, Agricultural Economics Association of South Africa (AEASA), https://EconPapers.repec.org/RePEc:ags:aeas18:284768.

Steven T. Y. & Helen, H. J., (1995). "Determinants of Household Expenditures on Alcohol," Center for Agricultural and Rural Development (CARD) Publications 95-wp144, Center for Agricultural and Rural Development (CARD) at Iowa State University.

Stewart, H., Blisard, N., & Jolliffe, D. (2003). "Do income constraints inhibit spending on fruits and vegetables among low-income households?" Journal of Agricultural and Resource Economics, 465-480.

Tan, A. K. G (2010). "Demand for food away from home in Malaysia: a simple selection analysis by ethnicity and gender". *Journal of food service Business Research*, Vol. 13(3): 252-

Tan, Andrew K.G., Yen, S. T. & Hasan, A. R., (2015), "At-Home Consumption of Fish Products in Malaysia: An Analysis of Household Expenditure Survey Data", *Marine*

Resource Economics, 30, issue 4, p. 417 - 433, https://EconPapers.repec.org/RePEc:ucp:mresec:doi:10.1086/682214.

West, D.A., & Price, D.W. (1976). "The Effects of Income, Assets, Food Programs, and Household Size on Food Consumption." *American Journal of Agricultural Economics*, Vol. 58, No. 4, pp. 725-730

Wigraiphat, P., Limsombunchai, V. & Kittiveja, T., (2012), "Factors Affecting Households' Expenditure on Food Away from Home (in Thai)", *Applied Economics Journal*, 19, issue 2, p. 37-49, https://EconPapers.repec.org/RePEc:aej:apecjn:v:19:y:2012:i:2:p:37-49.

You, W. & Davis, G. (2010). "Household Food Expenditures, Parental Time Allocation, and Childhood Overweight: An Integrated Two-Stage Collective Model with an Empirical Application and Test". American Journal of Agricultural Economics. 92. No. 3. 859-872. 10.1093/ajae/aap031.

Zan, H. & Fan, J. (2010). "Cohort Effects of Household Expenditures on Food Away from Home". Journal of Consumer Affairs. Vol. 44, No. 1, pp.213-

Zani, M., Saediman, H., Abdullah, S., Daud, L & Yunus, L. (2019). "Determinants of Household Food Expenditure in a Cassava Growing Village in Southeast Sulawesi". *Academic Journal of Interdisciplinary Studies*. Vol 8 No 3, pp.302-310.