



Women's income contribution and its effect on food consumption: An evidence from Aceh Province, Indonesia

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ABSTRACT

Consumption of each society is closely related to micro and macro conditions, as the income received by each community will affect their lifestyle patterns. The higher the income, the greater the expenditure on food and non-food consumption. Women have considerable potential in contributing to income, especially in poor households, but women do not stand out and claim that they are the main support in providing the economy for the family. The purpose of this study is to analyse the effect of women's income in the short and long term and predict food consumption in Aceh Province in the future. The model analysis used in this study is a partial adjustment model with panel data from 23 cities/regencies in Aceh Province. The next step is to predict the level of consumption in each district and city, and make a regional analysis based on the geographical conditions of this province in four regional divisions to get an aggregate depiction of the differences in food consumption levels in each region. Regional development strategy should be made based on the estimation results and prediction of consumption levels and women's empowerment in development participation in this province in the future for food security development program.

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INTRODUCTION

Consumption rate of the Indonesian people is currently growing and in line with economic growth. In economic growth, household aggregate consumption expenditure gives a sizeable contribution (Wicaksono et al., 2020). Economic growth will cause household income to continue to increase, with economic growth having an impact on demand from the community, both industrial goods and agricultural goods themselves. In this case, it can be seen from the expenditure of Indonesian household consumption at current prices according to expenditure rate which continues to increase every year. In 2021, Indonesia's

total household consumption expenditure reached 9,236,010.03 billion rupiah (BPS, 2021). The Central Bureau of Statistics of Indonesia (BPS) distinguishes the consumption of the Indonesian population into two, namely food consumption and non-food consumption.

In general, public consumption also affects economic stability, where the level of change in consumption depends on the level of economic activity itself. Meanwhile, welfare is measured by the proportion of expenditure for consumption in the household. The proportion of expenditure on food consumption is lower than consumption expenditure

for non-food. This indicates that the household is classified as a high-income household (Lailani & Maulida, 2022). Consumption rate of each society is also closely related to micro and macro conditions. As the income received by each community will affect their lifestyle patterns. The higher the income, the greater the expenditure on food and non-food consumption (Lailani & Maulida, 2022).

In line with these conditions, in supporting the economy of the family, women also contribute. Today many women are already working. Women have considerable potential in contributing to income, especially for poor households, but women do not stand out and claim that they are the main support in providing the economy for the family (Ramli, Tambani, & Kotambunan, 2020). The demands between work and family make women have multiple roles in the family (Nova & Attiyyah, 2022).

Consumption is determined by the number of residents. The population of Aceh Province was 5.3 million people in 2020 (BPS, 2022a). However, in that same year, there was a decline in the population of around 96,661 people. Consumption expenditure is closely related to population. If the population increases it will expand market share due to increased demand for goods and services that will encourage economic growth (Minta et al., 2022).

The study of consumption is quite an interesting topic to get an ideal formulation of how the economic behaviour is shown by individuals or households as well as what is the consumption behaviour in the economy as a whole. Basically, consumption is the study of how much money is needed for current consumption and future consumption (Deaton, 1992). A static study considers balance in the long term while a dynamic study is a study that considers time and its nature in the short term. In basic economic theory, the study of consumption is divided into micro concepts and macro concepts. In the micro approach, consumption is seen as an entity or unit of a particular household, then spent on the purchase of goods and services to obtain satisfaction and meet the needs of each individual itself. Consumption expenditure depends on the amount of income received by the household and its consumption trend (Deaton, 1992). Food consumption is a certain pattern in individuals, households, groups or communities which is defined as a measure formed from habits, standardized in various types, quantity both in terms of nutrition which includes indicators of healthy, sufficient and safe,

obtained from food ingredients. The dimension of understanding from this definition is the existence of the subject who consumes, when and how often to consume and how the consumption is carried out. The consumption pattern of each entity is basically varied, not distinguished between low income or poor and high-income rich entities. Household consumption behavior to maintain consumption is to save some of their income for future retirement and households choose their consumption level based on their assets. Related studies can be seen in Deaton (1992), Deaton (1997), and Soraya & Afiatno (2021). Meanwhile, the data of this paper were macro data on consumption and the percentage contribution of aggregate income. Previous articles related to consumption expenditure in Aceh Province were conducted by Lailani & Maulida (2022) and Minta et al. (2022). In contrast to those articles, this paper uses a dynamic approach with panel data where current consumption expenditure is influenced by previous period of consumption. The purpose of this study is to analyse the effect of women's income in the short and long term and predict food consumption in Aceh Province in the future.

RESEARCH METHOD

This paper studies the household economic model, where consumption activities will not be separated and the use of labour from the household is prioritized. Households are consumers of goods and services, so the income of these consumers is a very important factor in determining the pattern of demand for goods (Noviar et al., 2022; Prasukti, Sulismati, & Rohmah, 2017). The dynamics of household-income will result in changes in demand for various types of goods, because the income of buyers is the inverse of their purchasing power. Studies on this include, among others, by Ghina & Sukarno (2021) and Haque (2005). In other words, income is also closely related to household consumption expenditure. In addition, the consumption expenditure of the public depends on the highest income they earn. In this case, women also take part in the household economy.

Households' income sources basically originate from production factors owned by households such as land, labour, capital, expertise and skills. Women are an inseparable entity of household components. Women also make real contribution to household income, even including food processing innovations

(BPS, 2018; Noviar et al., 2022), thereby generating household income and increasing spending on food consumption. This study used panel data on Food Consumption Expenditure from BPS (2022b) in 23 cities/regencies in Aceh Province in 2018-2021. Figure 1 shows the conceptual flow of writing and the achievements of this paper, starting from the phenomenon of women's income in relation to consumption and its relation to food security. It is expected that the results of this study can be a source for consideration to formulate a food security strategy. To obtain additional information on the results of the estimate, forecasting was carried out to strengthen the arguments obtained in the previous partial adjustment model estimates.

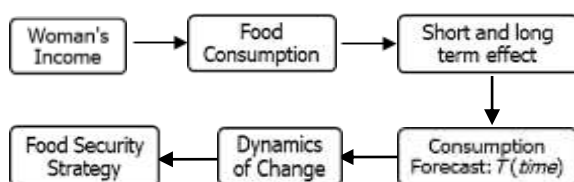


Figure 1. Research Conceptual Framework

The simple dynamic model of consumption can be stated as follows (Cheng, Yang, & Zhou, 2020; Li, Liu, & Song, 2020; Shoko, Chaminuka, & Belete, 2016).

$$cons_{it}^* = \alpha_0 + \alpha_1 w_inc_{it} + e_{it} \quad (1)$$

$\{cons_{it}^*\}$ is function of income (w_inc_{it}) and prior income (w_inc_{it-1}) where $t = 1 \dots T$ and $i = 1 \dots N$ are cities/regencies in Aceh Province. Assuming $cons_{it}^*$ is unobservable variable, the model was then rearranged to find the solution consumption as follows.

$$cons_{it} - cons_{it-1} = \delta(cons_{it}^* - cons_{it-1}); \text{ where } 0 < \delta < 1 \quad (2)$$

$$cons_{it} = \delta cons_{it}^* + (1 - \delta) cons_{it-1} \quad (3)$$

When equations (1) and (3) are combined, then:

$$cons_{it} = \delta(\alpha_0 + \alpha_1 w_inc_{it} + e_{it}) + (1 - \delta) cons_{it-1} \quad (4)$$

The consumption partial adjustment model of dynamic panel data regression is:

$$cons_{it} = \beta_0 + \beta_1 w_inc_{it} + \beta_2 cons_{it-1} + \varepsilon_{it} \quad (5)$$

The estimated equation is semi-logarithm, because the data is on the percentage of women's income. Therefore, only our consumption data was transformed into logarithmic form, and the consumption model becomes:

$$\log cons_{it} = \beta_0 + \beta_1 w_inc_{it} + \beta_2 cons_{it-1} + \varepsilon_{it} \quad (6)$$

Where $\beta_0 = \delta\alpha_0$ is constant $\beta_1 = \delta\alpha_1$ income elasticity, $\beta_2 = 1 - \delta$ speed of adjustment or short and long-term effect and finally $\varepsilon_{it} = \delta e_{it}$ is defined as stochastic error term. The most recent researches using this method were previously conducted by Li et al. (2020) and Yin, Zhou, & Zhu (2016).

There were several steps in estimating the panel data regression model. First, applying the Common Effect Model (CEM), Fixed Effect Model (FEM) and Random Effect Model (REM). Second, choosing which of the three models is the most appropriate for analysis through the Chow, Hausman and Lagrange-Multiplier (LM) tests (Hill, et al., 2018). Third, interpreting, analysing and drawing conclusions from the most appropriate model. Model selection hypothesis was conducted by comparing the statistical probability values and $=0.05$. The next estimate was to forecast the consumption expenditure. The use of forecasting methods must contain a degree of uncertainty. There is no forecast that is absolutely 100% correct, but forecasting is needed for consideration, planning and decision making. Therefore, indicators are needed in assessing forecasts that can be used as information and materials for this purpose. The test instrument used to measure the accuracy of forecasting in this article was the root of the mean squared error (RMSE) and the absolute value of the symmetrical mean absolute percentage error (SMAPE). Actually, there are several other forecasting accuracy measurement tools which mostly measure of the accuracy of over-predicting and under-estimating predictions. Basically, one measuring instrument to another is almost similar, therefore, RMSE and SMAPE were used (Ghysels & Marcellino, 2018; Makridakis et al., 1997; Tofallis, 2013).

RESULT AND DISCUSSION

Women's Income and Consumption

A descriptive figure of women's consumption expenditures and incomes is shown in Table 1 and 2. In general, the average food and beverage consumption expenditure of Aceh Province can be described as divided into 4 regions including the Southwest region consisting of Simeulue Regency, Aceh Singkil, South Aceh, West Aceh, Aceh Southwest, Nagan Raya, Aceh Jaya, Subulussalam City. Then the Eastern Region, namely the regencies of East Aceh,

Aceh Besar, Pidie, Bireuen, North Aceh, Aceh Tamiang, Pidie Jaya, Langsa City, and Lhokseumawe City. The Central Region consists of the regencies of Southeast Aceh, Central Aceh, Gayo Lues and Bener Meriah. The last is the administrative and port areas, namely Banda Aceh City and Sabang City. In addition to discussing about women's consumption and income, this paper also explains the poverty line in Aceh Province, where the city/regency with the highest poverty line was Aceh Singkil Regency at 20.36%. It was followed by Pidie Regency at 19.59%. The city/regency with the lowest poverty line was Banda Aceh City at 7.61%. The Human Development Index (HDI) analysis was divided into men and women, where the HDI in the cities/regencies of Aceh Province was predominantly male than female. The highest HDI for the male and female categories was in Banda Aceh City, with the percentage of men in 2020 87.8%, and 87.9% in 2021. The percentage of women's HDI in 2020 was 83.6% and in 2021 was 84.0% (Table 1).

Based on the regional division, on average, the first rank with the most expenditure on food and beverage consumption was Banda Aceh City, and the second most was Aceh Regency in the Southwest Region West, where the total food consumption expenditure was 119,326 rupiah per capita per week and beverage

consumption expenditure was 406,945 rupiah per capita per week. The third area with most F & B expenditure was Lhokseumawe City in the Eastern Region, with a total consumption expenditure of 109,338 rupiah per capita per week and the amount of beverage consumption expenditure which was widely available in Pidie Jaya Regency as much as 429,605 rupiah per capita per week. The last area was Gayo Lues Regency in the Central Region, with a total consumption expenditure of 103,132 rupiah per capita per week and the amount of beverage consumption expenditure which was mostly found in Bener Meriah Regency as much as 352,238 rupiah per capita per week.

This study employed data on average consumption expenditure of food and beverage and the contribution of women's income in cities/regencies of Aceh Province (Table 2). The average expenditure on food and beverage consumption was mostly in the city of Banda Aceh. Expenditure on food consumption attained 180,802 rupiah per capita per week and beverage consumption expenditure of 746,789 rupiah per capita per week. This could be because Banda Aceh is a capital city and an administrative center where many people travel or do transaction in this city.

Table 1. Income, Consumption Expenditure and HDI

Cities/regencies	Women's Income Share	Consumption	Poverty Rate	HDI Male		HDI Female	
				2020	2021	2020	2021
	%	Rupiah/capita.week			%		
Simeulue	24.7	47,490	18.98	71.8	72.1	56.0	56.4
Aceh Singkil	28.3	53,993	20.36	75.1	75.2	63.4	63.7
Aceh Selatan	27.9	76,655	13.18	70.8	71.1	64.9	65.2
Aceh Tenggara	31.3	56,674	13.41	73.9	74.0	68.7	68.9
Aceh Timur	29.7	78,792	14.45	72.7	72.8	62.3	62.5
Aceh Tengah	37.9	96,599	15.26	74.0	74.2	72.1	72.1
Aceh Barat	30.3	134,709	18.81	76.0	76.2	65.2	65.5
Aceh Besar	25.7	102,891	14.05	76.7	76.8	72.8	72.9
Pidie	31.8	106,960	19.59	73.8	73.9	69.1	69.2
Bireuen	39.7	112,312	13.25	75.7	75.7	71.8	71.9
Aceh Utara	34.6	65,081	17.43	72.6	72.7	67.2	67.4
Aceh Barat Daya	30.6	69,158	16.34	72.6	72.8	65.2	65.5
Gayo Lues	37.0	111,218	19.64	72.6	72.9	64.6	65.1
Aceh Tamiang	27.5	64,815	13.34	75.7	75.9	62.0	62.3
Nagan Raya	27.5	117,467	18.23	74.1	74.2	66.9	67.1
Aceh Jaya	38.6	115,197	13.23	74.6	74.6	66.7	66.8
Bener Meriah	29.7	88,842	19.16	75.1	75.4	72.6	72.9
Pidie Jaya	34.9	109,230	19.55	76.5	76.9	72.6	73.0
Banda Aceh	28.1	209,810	7.61	87.8	87.9	83.6	84.0
Sabang	33.2	139,868	15.32	78.1	78.6	74.9	75.1
Langsa	27.3	115,243	10.96	79.7	80.0	76.2	76.4
Lhokseumawe	23.5	124,024	11.16	80.8	81.0	76.7	77.0
Subulussalam	37.0	55,079	17.65	70.6	70.9	60.1	60.5

Source: BPS (2021; 2022a; 2022b), processed

Table 2. Descriptive Overview of Women's Consumption and Income

Descriptive statistics	Income (<i>w_inc</i>)	Consumption (<i>cons</i>)
	%	Rupiah/capita.week
Mean	30.913	172,133.5
Median	30.225	90,468.5
Maximum	39.67	927,591
Minimum	23.28	45,460
Std. Dev.	4.453156	169,947
Skewness	0.296451	1.904
Kurtosis	2.111859	6.612
Jarque-Bera	4.371259	105.578
Probability	0.112407	0
Sum	2843.97	15836284
Sum Sq. Dev.	1804.585	2.63E+12
Observations	92	92

Table 3. Stationary Panel Test

Variables	Hadri Z-stat	Sig.	Heteroscedastic Consistent Z-stat	Sig.
Log constant	40.16550	0.000	41.6258	0.000
Income (<i>w_inc</i>)	5.73541	0.000	4.99126	0.000
Lag Income	5.02534	0.000	5.19917	0.000

Size: 23 cities/regencies of Aceh Province

** assuming asymptotic normality

Table 4. Model Selection Mechanism of Women's Income

Testing Mechanism	Probability	Model	Goodness of fit
Chow	0,1656	CEM	0,0530
Hausman	0,0000	FEM	0,5205
Lagrange Multiplier	0,0000	REM	0.0530

Decesion: FEM

The stationarity test of the data for a relatively small sample used Hadri's unit root test method (Table 3). Tests were carried out for normally distributed data. Unit root test method for panel data along the error term (ϵ_{it}) across units i and between time t (Hadri, 2000) was done. It shows that the data were stationary or there was no unit root over time and across cities/regencies in Aceh Province. This finding is in line with the study of across countries (Manu et al., 2011). Thus, it can be concluded that the estimation process at the data level can be carried out using a dynamic panel data model.

The next step was model estimation. Based on the estimation results of three dynamic panel data regression models, the results were quite diverse. The estimation of the CEM model shows none of the coefficients were significant. Meanwhile, the result of the estimated coefficient of less than one shows a magnitude that was consistent with the limitations of

the dynamic partial adjustment model, especially the lag variable coefficient of women's income.

The three model selection test instruments, the FEM and REM models, were considered (Table 4). Meanwhile, based on the goodness of fit results from the model, FEM was the choice in this study. However, the REM model were still considered by making a comparison model as shown in Table 5.

Table 5. Comparison and Selection of Model of Women's Income

Variable	Coefficient	Std. Error	t	Sig.
<u>Common Effect Model</u>				
Income (<i>w_inc</i>)	-0.7795	0.4322	-1.8033	0.0759
Lag Income	0.7938	0.4326	1.8340	0.0710
Constant	11.5147	0.6907	16.6712	0.0000
<u>Fixed Effect Model</u>				
Income (<i>w_inc</i>)	0.6140	0.5181	1.1851	0.2423
Lag Income	2.7267	0.5421	5.0295	0.0000
Constant	-91.3143	19.2314	-4.7482	0.0000
<u>Random Effect Model</u>				
Income (<i>w_inc</i>)	-0.7795	0.3767	-2.0693	0.0424
Lag Income	0.7938	0.3770	2.1056	0.0391
Constant	11.5147	0.6019	19.1290	0.0000

The third model, namely REM, shows the estimation results of all significant coefficients and the magnitude of the coefficient numbers, especially for women's income lag coefficients of less than one. This requires that the partial adjustment coefficient encounters the criteria for the interval limitation of this dynamic model, so that the REM model can predict the effect of women's income in the long term. However, the sign of women's income coefficient is not significant in theory of consumption. Even so, this brake model is still relatively precise compared to the CEM and FEM models. Thus, the Random Effect Model was chosen to interpret the short-term and long-term dynamic adjustment model of the influence of women's income on consumption.

Meanwhile, the sign of a negative female income coefficient was not theoretically consistent. Therefore, the decision to use FEM was relatively better than using CEM. In the FEM model, the coefficient or elasticity of women's income was not significantly greater than the critical limit or a significance level of 0.05. For the female income lag variable, which is a measure of the speed of adjustment, the coefficient obtained exceeded the interval limit of men from one, so this estimation result could not be used to interpret the magnitude of the effect in the long term.

Table 6. Estimated Women Income on Food Consumption, using Random Effect Model

Variable	Short-term	Long-term	Sig
Constant	11.5147	55.84197	0.0000
Income (w_inc)	-0.7795	-3.78012	0.0424
Lag Income	0.7938	3.84964	0.0391

The Random effect model was used to explain the short-term and long-term effects of food consumption in Aceh Province (Table 6). Statistically the variables in this model were significant. In addition, there was consistency between consumption theory and income as indicated by the positive sign of the income coefficient. To interpret the long-term coefficient, the value of the income lag coefficient must be in the interval of $0 < \delta < 1$. The REM model shows consistency and theoretical significance of the partial adjustment mechanism. This model can also explain the variations between regions and between times that have different levels of consumption and income. In the long run the income coefficient became elastic > 1 , but the sign of the negative coefficient was not significant in theory. Women's income in the long run was elastic but inversely proportional to the level of consumption, may be indicating efficiency in the household. In other words, the average percentage of women's income contribution was more than 30% and in the long term would increase their role, but the level of food

consumption decreased, due to scarcity of some types of food.

Furthermore, in the long term the constant rate increased by 55.84197 (Table 6). This indicates that in the consistent estimation results of autonomous consumption theory, food consumption has increased, meaning that there is an improvement in the type of food consumed if there is an increase in the percentage contribution of women's income in the household. However, the sign of the negative coefficient certainly requires a more thorough interpretation. In simple terms, women's income is certainly not directly spent on food. The possibility that can be happen is that the income will be saved or taken home first (take-home pay). However, this still requires further comprehensive research.

Food consumption expenditure in Aceh Province continued to increase every year according to a regional analysis of 23 cities/regencies in Aceh Province, following the method used by Larson (1998) to study consumption patterns in the United States of America. The types of food were very diverse and very easy to find starting from markets, stalls, minimarkets, supermarkets and restaurants. Women's participation in the world of employment was also increasing, so there was not enough time to prepare food at home, as was also found by Ariani et al. (2018) and Onah, Horton, & Hoddinott (2021).

Table 7. Food Consumption Expenditure by City/Regency, 2018-2023

City/Regency	2018	2019	2020	2021	2022*	2023*	RMSE	SMAPE
..... Rupiah/capita.week								
Simeulue	45,460	53,205	46,259	226,082	248,246	305,426	61.038	0.48
Aceh Singkil	68,390	53,939	53,482	273,463	296,041	362,290	80.873	0.55
Aceh Selatan	63,963	66,389	76,772	345,322	385,729	476,653	92.252	0.50
Aceh Tenggara	69,688	57,400	60,133	285,837	311,556	381,514	82.057	0.53
Aceh Timur	80,464	70,558	85,336	371,576	412,028	506,818	101.803	0.51
Aceh Tengah	68,530	82,882	98,210	426,632	481,507	596,996	109.393	0.48
Aceh Barat	74,033	100,117	113,469	526,271	595,128	740,273	135.638	0.49
Aceh Besar	100,716	95,398	93,818	466,202	510,928	628,245	131.393	0.52
Pidie	87,668	80,293	93,269	447,674	496,806	613,481	124.871	0.53
Bireuen	76,658	83,152	83,034	438,598	486,196	602,077	122.094	0.53
Aceh Utara	58,373	69,419	68,968	307,076	341,180	420,555	79.932	0.46
Aceh Barat Daya	67,700	71,263	82,777	345,776	386,465	476,377	89.923	0.47
Gayo Lues	63,008	83,465	82,550	435,287	487,163	605,825	117.314	0.51
Aceh Tamiang	53,568	59,882	55,236	286,310	315,664	389,778	79.090	0.51
Nagan Raya	64,020	60,892	85,831	422,777	477,334	594,323	116.918	0.56
Aceh Jaya	79,632	81,620	87,405	448,633	498,342	617,066	124.955	0.53
Bener Meriah	73,481	102,817	93,606	434,572	483,916	598,089	111.539	0.45
Pidie Jaya	105,017	99,121	130,798	524,274	588,480	725,455	137.083	0.48
Banda Aceh	181,667	198,606	185,714	927,591	1021,664	1259,453	254.695	0.50
Sabang	121,348	139,918	151,221	658,425	735,550	908,022	170.774	0.47
Langsa	110,059	106,238	109,471	530,252	584,147	719,309	147.531	0.51
Lhokseumawe	85,272	114,263	104,973	523,184	582,206	721,030	138.473	0.48
Subulussalam	50,079	52,573	53,982	255,952	283,312	349,372	69.589	0.50

*Forecasting calculation

Table 8. Food Consumption Expenditure by Region, 2018-2023

Region	2018	2019	2020	2021	2022*	2023*	RMSE	SMAPE
Rupiah/capita.week								
East	82,135	85,366	91,386	428,618	475,839	587,313	116223.71	0.50
Center	134,577	144,641	143,584	684,073	756,047	931,907	185600.24	0.49
Capital and Nearby	70,566	81,033	83,983	382,347	425,66	525,534	100840.00	0.48
South-West	63,654	66,962	73,886	356,929	397,734	492,201	97259.84	0.52

*forecasting calculation

At a low-income level, consumption expenditure is generally used to spend on basic needs. Food consumption is the most important factor because food is the main thing in survival. Then the diversity of consumption depends on the level of household income. Different income levels will result in different types of consumption levels. Based on the 2018-2022 BPS monthly data (Table 7), the forecasting results show that in 2023 the consumption expenditure of the Acehnese people will increase, meaning that in 2023 people will spend more money to buy the food they want. In the Southwest region the average consumption expenditure will be 492,201 rupiah per capita per week, East region 587,313 rupiah per capita per week, Eastern Region 931,907 rupiah per capita per week and the capital city area 525,534 rupiah per capita per week (Table 8). From the four regions, it is seen that the highest consumption expenditure for 2023 will happen in the Central region. The amount of consumption expenditure is also determined by income. An increase in household income will encourage households to consume so that consumption expenditure will increase (Sugiarto & Wibowo, 2020).

The results of forecasting indicate that food consumption in the future tends to increase. The economic turmoil caused by the Covid-19 pandemic is at least a trigger for consumption, especially food, both in the form of foods and drinks. It is estimated that the highest consumption will still be dominated by Banda Aceh City, followed by Sabang City, then West Aceh, Pidie Jaya and Langsa City. The growing culinary sector in this place is one indicator of the high consumption in the city/regency. In other words, the stretching of the trade sector, especially food and beverage providers, is a driving factor for increasing consumption. Various food and beverage alternatives are an attraction to spend their income for consumption.

Another driving factor in consumption is mainly income. The development of the trade sector indicates the running economic activities, especially the creative

and culinary industries as a source of community livelihood in the aggregate. In addition, the presence of large industries also affects the increase in consumption. For example, in mining industry in West Aceh, increasing activities in the oil palm plantation sector are the driving factors of the growing food and beverage consumption in this area.

The level of consumption of the people of Aceh Province will increase differently in 2023. The highest level of consumption will be in Banda Aceh City, as many as 1,259,453 rupiah per capita per week. This increase in consumption occurs because Banda Aceh City is the center of Aceh Province. This city is also visited by many people from outside the region, similar to city of Sabang, which will also experience the second largest increase in consumption in 2023, i.e., 908.022 rupiah per capita per week. Not only Banda Aceh and Sabang, West Aceh Regency also faces an increase in consumption where the total consumption expenditure of the people of West Aceh in 2023 will be 740,273 rupiah per capita per week. It is followed by Pidie Jaya Regency, with a consumption increase into 725,455 rupiah per capita per week. In addition, the city of Lhokseumawe experiences an increase in consumption up to 721,030 rupiah per capita per week and Langsa City up to 719,309 rupiah per capita per week.

The least increase in consumption in Aceh Province in 2023 will be experienced by Simeulue Regency, as few as 305.426 rupiah per capita per week, then Subulussalam city with 349,372 rupiah per capita per week and Aceh Singkil Regency with 362,290 rupiah per capita per week. Obviously, the large or small increase in the level of consumption is based on the increase in the population, income of each household, and the price of the goods. When the price of goods increases, people will reduce their level of consumption due to the inability to buy. But, if the income of the community increases, the community will increase their consumption. Therefore, the level of access to consumption from the community will determine the level of welfare of the city/regency.

Research Implication

This study uses a simple dynamic model approach to see trends in food consumption spending in the short and long term and is combined with panel data in cities/regencies in Aceh province. This simple method needs to be followed up with complex dynamic methods while at the same time forecasting can be done in the short and long term. Further time series models need to be carried out in explaining the phenomenon of consumption expenditure in Indonesia and specifically in Aceh Province. The implication of the results of this research is a policy brief to the government through formulating a development plan with a growth-based food security strategy to spur increased income distribution and equity. This strategy begins with the empowerment of women, which in the long term will have a greater influence in contributing to household income.

In the results of this study, the contribution of women in household income turns out to have a significant effect but contradicts the theory of income and consumption. It can be explained that there are cultural factors as found by the role of family, women, culture and their impact on food security (Akhter et al., 2022; Elena, Cockx & Swinnen, 2018; Onah et al., 2021). Human cultural interactions have an impact on food security where the household decisions affect consumption behavior and food access. Women make a significant contribution in increasing household income, but the final decision in the household in consuming is determined in the family. Consumption patterns and eating patterns, for example, are one of the important objects in household decisions. In line with this argument, although women's income increase, the decision on consumption behavior rests with the family. In addition, consumption theory can explain how saving behavior will be formed. Family savings are part of the income that is not consumed. In contrast, culture and decisions in the household can also have a negative impact, especially on patriarchal culture where the dominance of men in affecting decisions in the household has an impact on women's empowerment and family income (Akhter et al., 2022; Tohani, 2022). Hence, it can be concluded that the strategy of empowering women is through the integration of activities in agriculture, both production and marketing policies. Input subsidy policies, access to agricultural credit and land expansion are integrated with women's capacity training in getting opportunities from these policies in Aceh Province.

In addition to culture, government policies also affect food security, especially in production factors such as land access, fertilizer and seed subsidies, expansion of market access, and government investment (Souratié et al., 2019; Sutrisno, 2019). The study of Souratié et al. (2019) shows that government intervention affects food security and income. More interestingly, it has an impact on increasing women's income in the agricultural sector. In another study, market expansion of government policies to improve infrastructure also contributes to increasing food security and women's participation and involvement in commodity marketing. The involvement of women in working world can have a positive impact on the family, especially in terms of income. In Theys' (2018) study, women's empowerment can have important implications in addressing domestic problems. This study also discusses promoting women's empowerment as the best way or solution to improve the quality of life for at-risk households by consuming animal source foods. With the improvement of a healthy diet, it is likely to be able to encourage women's participation in making decisions related to food expenditure. Healthy diet that is applied by every household can have the advantage of the family itself from the aspect of health. Women's empowerment is a path from agriculture to improving child nutrition, where women can access and control livestock as agricultural assets, since producing livestock can build and contribute as a way out of poverty (Chen et al., 2021). Women who earn more can provide flexibility in making decisions related to household expenses to ensure better and healthier family health. Within a family, the health of a child must be considered, where the child is a family asset. Another way to improve children's nutrition and health is to increase financial capital for vulnerable communities by increasing women's participation in savings and loans (Mbiro & Ndlovu, 2021). The existence of this village savings and loans can contribute to an increase in scores for food consumption and food diversity for children. Not only women's participation, village savings and loans can also have a positive influence on children's health and nutritional diversity, which contributes to the achievement of sustainable development goals. However, according to the study of Akhter et al. (2022), although the women have access to financial resources obtained from their job, many of them think that everything related to household expenses or food consumed is decided by men (husband). Therefore,

we can see that for the large part of the household, the regulation of all aspects of expenditure no longer come from women but men. This means that the role of a woman related to the expenditure and selection of food menus that will be consumed every day is limited. In fact, those who have to decide regarding expenses and also consumption from the household is women because they know the healthy food that will be given for consumption by their families.

Another view of women's income and its negative effect is Engel's theory, where in certain types of consumption of goods, changes in income will have a negative effect on consumption (Merella, 2006). The increase in women's income in Aceh Province food consumption lowered, and the nature of the goods consumed based on research estimate data is inferior goods, which is also the case in Indonesia as a whole (Ishida, Law, & Aita, 2003; Skoufias, 2003). This indicates that consumption patterns in Aceh province are still dominated by low-quality food.

CONCLUSION AND SUGGESTION

Random Effect is the model chosen to be used in analysing food consumption expenditure and its relation to the contribution of women's income. In the short term, women's income has a significant positive effect on food consumption. Then the contribution of women's income in the long term in the REM model shows consistency and theoretical significance of the partial adjustment mechanism and women's income in the long run is more elastic but inversely proportional to the level of consumption. That is, with an increase in income, the change is more than 30%, the level of consumption for food will decrease, due to the possible low-quality food. In simple terms, women's income is not directly spent on food, it is possible that the results of this income are saved or take-home pay.

In addition, the consumption expenditure pattern of the people of Aceh Province in 2023 continues to increase, especially in the Banda Aceh City and Sabang City areas. Not only that, West Aceh Regency in 2023 will also face an increase in consumption expenditure. This means that in 2023 people will spend a lot of money to spend on their food needs. Obviously, this large amount of consumption expenditure is based on increasing income and population in several the next year. Fluctuations in expenditure consumption indicate the level of welfare of regency or city in Aceh Province. The more consumption is done, the more prosperous

the community, whereas less consumption indicate the welfare of the community.

The recommendation that can be given from the results of this study is a food security development strategy based on women's empowerment. Empowering women through investment, especially in the culinary field, to meet the increasing food consumption needs and increase job opportunities in Aceh Province. Research related to consumption is still limited, and using simple dynamic models. In the future, what might be done is developing forecasting techniques using more complex dynamic models to explain more complex consumption phenomena.

REFERENCES

- Akhter, R., Wilson, J. K., Haque, S. E., & Ahamed, N. (2022). Like a caged bird: The coping strategies of economically empowered women who are victims of intimate partner violence in Bangladesh. *Journal of Interpersonal Violence*, 37(11–12), NP9040–NP9065. <https://doi.org/10.1177/0886260520978177>
- Ariani, M., Suryana, A., Suhartini, S. H., & Saliem, H. P. (2018). Keragaan konsumsi pangan hewani berdasarkan wilayah dan pendapatan di tingkat rumah tangga. *Analisis Kebijakan Pertanian*, 16(2), 147–163. <https://doi.org/10.21082/akp.v16n2.2018.147-163>
- BPS. 2021. Ringkasan Eksekutif Pengeluaran dan Konsumsi Penduduk Indonesia. (04200.2115):1–115. Retrieved from <https://www.bps.go.id/subject/5/konsumsi-dan-pengeluaran.html#subjekViewTab2>.
- BPS. 2022a. Data Series Kependudukan. Badan Pusat Statistik.
- BPS. 2022b. Konsumsi dan Pengeluaran. Badan Pusat Statistik. Retrieved July 7, 2022. Retrieved from <https://www.bps.go.id/subject/5/konsumsi-dan-pengeluaran.html#subjekViewTab3>
- Chen, D., Mechlowitz, K., Li, X., Schaefer, N., Havelaar, A. H., & McKune, S. L. (2021). Benefits and risks of smallholder livestock production on child nutrition in low- and middle-income countries. *Frontiers in Nutrition*, 8(October). <https://doi.org/10.3389/fnut.2021.751686>
- Cheng, F., Yang, S., & Zhou, K. (2020). Quantile partial adjustment model with application to predicting energy demand in China. *Energy*, 191, 116519. <https://doi.org/10.1016/j.energy.2019.116519>

- Deaton, A. (1992). *Understanding Consumption* (First Edit). Clarendon Press - Oxford. <https://books.google.co.id/books?id=5whREAAQBAJ>
- Deaton, A. (1997). *The Analysis of Household Surveys: A Microeconometrics Approach to Development Policy*. World Bank Publication-Johns Hopkins University Press. https://books.google.co.id/books?id=Mfe8ukMh_v4C&
- Elena, B. A., Cockx, L., & Swinnen, J. (2018). Culture and food security. *Global Food Security*, 17(July 2017), 113–127. <https://doi.org/10.1016/j.gfs.2018.02.002>
- Ghina, A. A., & Sukarno, S. (2021). Household finances and social comparison: Determinants of financial well-being in Indonesia. *Journal of Socioeconomics and Development*, 4(1), 81. <https://doi.org/10.31328/jsed.v4i1.2223>
- Ghysels, E., & Marcellino, M. (2018). *Applied Economic Forecasting Using Time Series Methods*. Oxford University Press, New York. <https://books.google.co.id/books?id=NZNODwAAQBAJ&pg>
- Hadri, K. (2000). Testing for stationarity in heterogeneous panel data. *The Econometrics Journal*, 3(2), 148–161. <https://doi.org/10.1111/1368-423x.00043>
- Haque, M. O. (2005). *Income Elasticity and Economic Development Advanced Studies in Theoretical and Applied Econometrics* (J. Marquez (ed.); First). Springer. <https://books.google.co.id/books?id=OCNH9ifMIvAC&>
- Hill, R. C., Griffiths, W. E., & Lim, G. (2018). *Principles of Econometrics*. 5 th. Edition, Wiley. <https://books.google.co.id/books?id=LnNdDwAAQBAJ>
- Ishida, A., Law, S. H., & Aita, Y. (2003). Changes in food consumption expenditure in Malaysia. *Agribusiness*, 19(1), 61–76. <https://doi.org/10.1002/agr.10038>
- Lailani, S., & Maulida, S. P. (2022). Analisis pendapatan dan jumlah penduduk terhadap tingkat konsumsi di provinsi Aceh. *Langgas: Jurnal Studi Pembangunan*, 1(1), 31–37. Retrieved from <https://talenta.usu.ac.id/jlpsp/article/view/8153>
- Larson, R. B. (1998). Regionality of food consumption. *Agribusiness*, 14(3), 213–226. [https://doi.org/10.1002/\(SICI\)1520-6297\(199805/06\)14:3<213::AID-AGR4>3.0.CO;2-3](https://doi.org/10.1002/(SICI)1520-6297(199805/06)14:3<213::AID-AGR4>3.0.CO;2-3)
- Li, J., Liu, W., & Song, Z. (2020). Sustainability of the adjustment schemes in China's grain price support policy-An empirical analysis based on the partial equilibrium model of wheat. *Sustainability* (Switzerland), 12(16). <https://doi.org/10.3390/su12166447>
- Makridakis, S., Wheelwright, S. C., & Hyndman, R. J. (1997). *Forecasting: Methods and Applications* (3th ed.). New York: Wiley. <https://books.google.co.id/books?id=kZAoAQAAAMAAJ>
- Manu, L. P., Adjasi, C. K. D., Abor, J., & Harvey, S. K. (2011). Financial stability and economic growth: a cross-country study. *International Journal of Financial Services Management*, 5(2), 121. <https://doi.org/10.1504/ijfsm.2011.041920>
- Mbiro, K. A., & Ndlovu, T. (2021). Impact of women's participation on village savings and loan on children's nutritional diversity in rural Chimanimani in Zimbabwe. *Jamba: Journal of Disaster Risk Studies*, 13(1), 01–08. <https://doi.org/10.4102/jamba.v13i1.1043>
- Merella, V. (2006). Engel's curve and product differentiation: a dynamic analysis of the effects of quality on consumer's choice. *International Review of Economics*, 53(2), 157–182. <https://doi.org/10.1007/BF03029582>
- Minta, S., Suriani, & Meutia, R. (2022). Pengaruh pendapatan dan jumlah penduduk terhadap konsumsi masyarakat di Provinsi Aceh dengan regresi data panel. *JIBES: Jurnal Ilmiah Basis Ekonomi Dan Bisnis*, 1(1), 1–17. Retrieved from <https://journal.ar-raniry.ac.id/index.php/JIBES/article/view/1577>
- Nova, V., & Attiyyah. (2022). My Family, My Teamss Pengalaman Perempuan menghayati peran, antara Konflik dan Keseimbangan. In A. Suhenda (Ed.), *Perempuan dan Pandemi Covid-19* (Pertama, Issue 3, pp. 55–72). Syiah Kuala University Press. Retrieved from <https://omp.unsyiahpress.id/index.php/unsyiahpress/catalog/book/216>
- Noviar, H., Sari, Y. P., Suriani, N., & Handayani, F. (2022). Perempuan dan pertanian di masa Covid-19. In A. Suhenda (Ed.), *Perempuan dan Pandemi Covid-19* (Vol. 3, Issue January, pp. 127–144). Syiah Kuala University Press.
- Onah, M. N., Horton, S., & Hoddinott, J. (2021). What empowerment indicators are important for food consumption for women? Evidence from 5 sub-Saharan African countries. *PLoS ONE*, 16(4 April), 1–34. <https://doi.org/10.1371/journal.pone.0250014>

- Prasekti, Y. H., Sulismiati, I., & Rohmah, N. (2017). peran wanita tani dalam menunjang perekonomian rumah tangga keluarga petani. *Jurnal AGRIBIS*. Retrieved from <https://journal.unita.ac.id/index.php/agribisnis/article/view/117>.
- Ramli, K., Tambani, G. O., & Kotambunan, O. V. (2020). Kontribusi perempuan terhadap pendapatan keluarga di Desa Pentadu Timur Kecamatan Tilamuta Kabupaten Boalemo. *Akulturas*, 8(2), 164–168. <https://doi.org/10.35800/akulturas.8.2.2020.30621>
- Shoko, R. R., Chaminuka, P., & Belete, A. (2016). Estimating the supply response of maize in South Africa: A nerlovian partial adjustment model approach. *Agrekon*, 55(3), 237–253. <https://doi.org/10.1080/03031853.2016.1203802>
- Skoufias, E. (2003). Is the calorie-income elasticity sensitive to price changes? Evidence from Indonesia. *World Development*, 31(7), 1291–1307. [https://doi.org/10.1016/S0305-750X\(03\)00070-6](https://doi.org/10.1016/S0305-750X(03)00070-6)
- Soraya, N., & Afiatno, B. E. (2021). Elastisitas harga dan elastisitas pendapatan permintaan energi listrik pada rumah tangga di Indonesia. *Jurnal Sains Sosio Humaniora*, 5(2), 1046–1060. <https://doi.org/10.22437/jssh.v5i2.16483>
- Souratié, W., Koinda, F., Decaluwé, B., & Samandoulougou, R. (2019). Agricultural policies, employment, and income of women in Burkina Faso. *Revue d'économie Du Développement*, 27(3), 101–127. <https://doi.org/10.3917/edd.333.0101>
- Sugiarto, S., & Wibowo, W. (2020). Determinants of regional household final consumption expenditure in Indonesia. *Jejak*, 13(2), 332–344. <https://doi.org/10.15294/jejak.v13i2.25736>
- Sutrisno. (2019). The feasibility of staple food business and its implication on regional food supply chain development. *Journal of Socioeconomics and Development*, 2(1), 54–60. <https://doi.org/10.31328/jsed.v2i1.956>
- Theys, N. (2018). Can women's empowerment increase animal source food consumption in flood prone areas of Bangladesh? IFPRI - Discussion Papers, 01736, 32-pp. Retrieved from <http://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/132730/filename/132941.pdf>
- Tofallis, C. (2013). Measuring relative accuracy: a better alternative to mean absolute percentage error. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2350688>
- Tohani, E. (2022). Women's awareness raising in the development of ecotourism Evidence from Glugut Park Yogyakarta, Indonesia. *Journal of Socioeconomics and Development*, 5(2), 140–152. <https://doi.org/10.31328/jsed.v5i2.3681>
- Wicaksono, E., Nugroho, S. S., & Woroutami, A. D. (2020). Pola konsumsi dan beban PPN kelas menengah Indonesia. *Kajian Ekonomi Dan Keuangan*, 4(1), 1–16. <https://doi.org/10.31685/kek.v4i1.506>
- Yin, H., Zhou, H., & Zhu, K. (2016). Long- and short-run elasticities of residential electricity consumption in China: a partial adjustment model with panel data. *Applied Economics*, 48(28), 2587–2599. <https://doi.org/10.1080/00036846.2015.1125436>