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Determinants of Adjusted Total Income Among Rural Households in Maharashtra: A Regression-Based Analysis Using CPHS Data for 2020

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Abstract: *This study investigates the intricate relationship between adjusted total income and household expenditure patterns in rural Maharashtra, drawing on data from the Consumer Pyramids Household Survey (CPHS) for the year 2020. By employing descriptive statistics, the research reveals notable disparities in income distribution among rural households. These inequalities highlight the uneven allocation of resources and the varying capacities of households to manage essential and discretionary spending.*

Keywords: Consumer Pyramids Household Survey

I. INTRODUCTION

To further understand the dynamics between income and spending, a regression analysis was conducted, focusing on *adjusted food expenditure* and *non-food expenditure* as primary predictors. The findings indicate that both categories of spending have a statistically significant impact on adjusted total income. Specifically, higher expenditures on food and non-food items are associated with variations in reported income levels, suggesting a strong bidirectional influence where income affects consumption, and in turn, consumption patterns reflect and potentially shape income levels.

This interplay between income and consumption provides critical insights into the financial behavior of rural populations. The results underscore the importance of considering both food and non-food expenditures when assessing economic well-being and income stability in rural areas. Additionally, the study points to the necessity for policy interventions that address income inequality while promoting sustainable consumption habits.

Overall, the research contributes to a deeper understanding of rural economic behavior and emphasizes the role of household expenditure as both a determinant and indicator of income in less urbanized settings.

	N	Minimum	Maximum	Mean	Std. Deviation
TOT_INC	2392	0	103100.0	15806.417	17646.3400
Valid N (listwise)	2392				

Source : Author's Analysis

Table 1 Descriptive Statistics for Rural Region

For the rural region, the descriptive statistics are derived from a sample size of 2,392 households. Similar to the urban region, the minimum adjusted total income recorded is ₹0, reflecting that some rural households also reported no income. The maximum income recorded in rural areas is ₹103,100, which is lower than the maximum income in urban areas. The mean adjusted total income for rural households is ₹15,806.417, which indicates that on average, rural households earn less than their urban counterparts. The standard deviation of ₹17,646.3400 is higher than that of the urban region, which suggests a greater variability in income among rural households. This higher variability points to a more uneven income distribution in rural areas with some households earning significantly more than others.

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Table No 2 Descriptive Statistics for Maharashtra Households

	N	Minimum	Maximum	Mean	Std. Deviation
TOT_INC	16511	0	2001480.0	27131.926	31247.5053
Valid N (listwise)	16511				

Source: Author's Analysis

Table No 2 Descriptive Statistics for Maharashtra Households

The statistics reveal a highly uneven income distribution among rural households in Maharashtra, with many earning very little or nothing, while a few earn substantially more. This widespread emphasizes the importance of analyzing how expenditures—particularly on food and essential services—vary across income levels in such a heterogeneous population.

Let me know if you want similar interpretations for other variables like food or non-food expenditure, or visualizations (e.g., histogram, box plot) to better understand the distribution.

Ho1: There is no significant association between the consumption expenditure of the households and their income during the study period

H11: There is a significant association between the consumption expenditure of the households and their income during the study period

Dependent Variable: Total Income

Independent Variables: Food Expenditure, Non-Food Expenditure - leisure - Recreation, Restaurant and Vacation

Adjusted Non-Food Expenditure include - expenditure on

Model		Sum of Squares	df	Mean Square	F	p-value
1	Regression	59545765660.727	2	29772882830.364	103.836	.000[b]
	Residual	684995649634.881	2389	286729028.730		
	Total	744541415295.608	2391			

a. Dependent Variable: TOT_INC

b. Predictors: (Constant), EXP_NONFOOD, EXP_FOOD

Source: Author's Analysis

Table No 3 **ANOVA**

This ANOVA table summarizes the results of a regression analysis.

The regression analysis shows that a significant portion of the variability in adjusted total income (TOT_INC) is explained by adjusted food and non-food expenditures. The regression sum of squares is 59.5 billion, while the residual (unexplained) variability is 684.9 billion, out of a total of 744.5 billion. The model has 2 degrees of freedom for regression and 2389 for residuals. A high F-value of 103.836 and a p-value of 0.000 indicate that the model is statistically significant. This confirms a strong and meaningful relationship between household expenditures and total income in rural areas.

Overall, this ANOVA table suggests that the model, which includes adjusted non-food expenditure and adjusted food expenditure as predictors, significantly explains the variance in the adjusted total income. The low p-value supports the notion that these predictors collectively have a strong impact on the adjusted total.

The above table indicates the p-value for the regression model is 0.000, which is less than the standard p-value of 0.05. Hence, the linear regression model is applicable.

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Model		Unstandardized Coefficients		Standardized Coefficients	t	p-value
		B	Std. Error	Beta		
1	(Constant)	4671.059	928.377		5.031	.000
	EXP_FOOD	1.851	.195	.192	9.505	.000
	EXP_NONFOOD	7.468	.895	.168	8.345	.000

a. Dependent Variable: TOT_INC

Source: Author's Analysis

Table No 4 Coefficients

These coefficients represent the relationships between the predictors (EXP_FOOD and EXP_NONFOOD) and the dependent variable (TOT_INC).

Constant: The constant term in the model is 4671.059. This is the expected value of the dependent variable (TOT_INC) when all predictors are zero.

EXP_FOOD: For every unit increase in adjusted food expenditure (EXP_FOOD), the adjusted total income (TOT_INC) is expected to increase by 1.851 units. The p-value associated with this coefficient is very low (p = 0.000), indicating that this relationship is statistically significant.

EXP_NONFOOD: With every unit increase in adjusted non-food expenditure (EXP_NONFOOD), the adjusted total income (TOT_INC) is expected to increase by 7.468 units. The p-value (p = 0.000) suggests that this relationship is statistically significant as well.

Standardized Coefficients (Beta): These coefficients allow a comparison of the relative importance of the predictors within the model. Here, EXP_NONFOOD has a slightly higher standardized coefficient (Beta = 0.168) compared to EXP_FOOD (Beta = 0.192), indicating that adjusted non-food expenditure might have a slightly stronger impact on adjusted total income compared to adjusted food expenditure.

t-value: The t-values (9.505 for EXP_FOOD and 8.345 for EXP_NONFOOD) indicate how many standard errors the coefficients are away from zero. Higher absolute t-values typically indicate greater significance.

In summary, both adjusted food expenditure and adjusted non-food expenditure appear to have statistically significant relationships with adjusted total income. Adjusted non-food expenditure might have a slightly stronger impact based on the coefficient magnitudes and the associated t-values, although both predictors significantly contribute to explaining the variance in the adjusted total income.

In the above results, the p-values for all the independent variables are 0.000 or less than 0.05. It is less than the standard p-value of 0.05. This indicates that independent variables, Adjusted Food Expenditure and Adjusted Non-Food Expenditure, are significant predictors of Adjusted Total Income for rural households.

The regression equation is as follows. Adjusted Total Income = 4671.059+ (1.851) Adjusted Food Expenditure + (7.468) Adjusted Non-Food Expenditure

Path Diagram: The following model defines the relationships between the variables.

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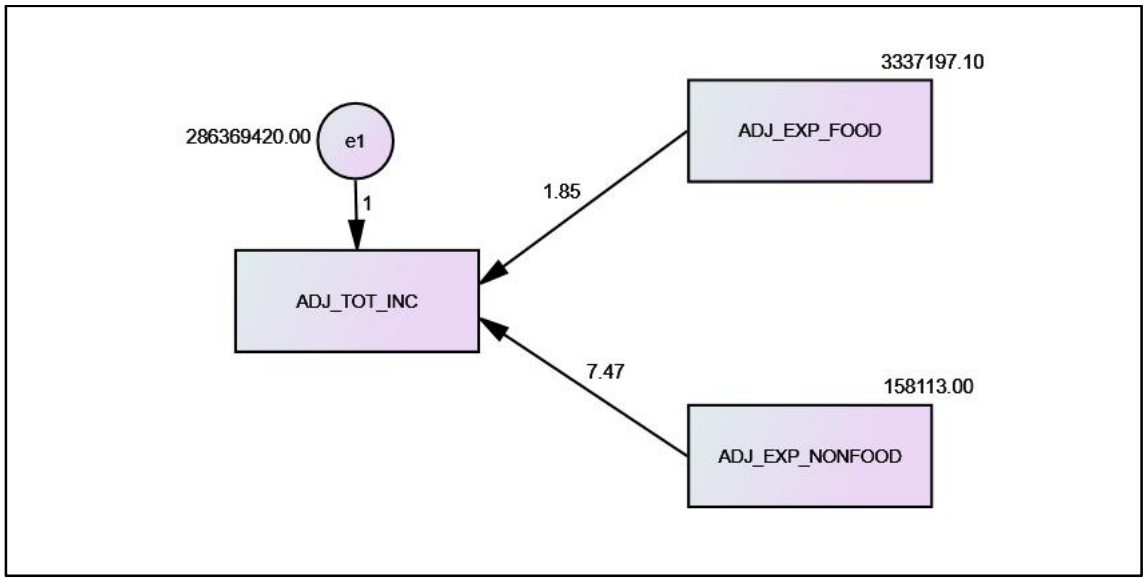

Source: Author's Analysis

Figure 1 Path Analysis

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	p-value
		B	Std. Error	Beta		
1	(Constant)	4671.059	928.377		5.031	.000
	EXP_FOOD	1.851	.195	.192	9.505	.000
	EXP_NONFOOD	7.468	.895	.168	8.345	.000

a. Dependent Variable: TOT_INC

Source: Author's Analysis

These coefficients describe the relationship between the predictors (EXP_FOOD and EXP_NONFOOD) and the dependent variable (TOT_INC).

The regression coefficients reveal that the constant term (4671.059) represents the expected adjusted total income (TOT_INC) when all expenditures are zero. A one-unit increase in food expenditure (EXP_FOOD) raises TOT_INC by 1.851 units, while non-food expenditure (EXP_NONFOOD) increases it by 7.468 units. Both relationships are statistically significant with p-values of 0.000. The standardized coefficients (Beta) show EXP_FOOD (0.192) has a slightly stronger influence than EXP_NONFOOD (0.168). High t-values (9.505 and 8.345 respectively) further confirm the strong and significant contribution of both predictors to explaining variations in rural household income.

In summary, both adjusted food expenditure (EXP_FOOD) and adjusted non-food expenditure (EXP_NONFOOD) demonstrate statistically significant and positive relationships with adjusted total income (TOT_INC) in this model. EXP_NONFOOD appears to have a slightly stronger impact based on its higher coefficient and beta value.

In the above results, the p-values for all the independent variables are 0.000 or less than 0.05. It is less than the standard p-value of 0.05. This indicates that independent variables, Adjusted Food Expenditure and Adjusted Non-Food Expenditure, are significant predictors of Adjusted Total Income for rural households.

The regression equation is as follows. Adjusted Total Income = 4671.059+ (1.851) Adjusted Food Expenditure + (7.468) Adjusted Non-Food Expenditure

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II. SUMMARY AND CONCLUSION

This study investigates the relationship between adjusted total income and consumption expenditure among rural households in Maharashtra using data from the Consumer Pyramids Household Survey (CPHS) for the year 2020. The analysis aims to understand how adjusted food and non-food expenditures serve as predictors of household income in the context of rural economic dynamics, particularly in the post-COVID period.

Descriptive statistics indicate that rural households report significantly lower average incomes compared to their urban counterparts, with wide variability suggesting unequal distribution. The mean adjusted total income stood at ₹15,806.42 with a high standard deviation of ₹17,646.34. Regression analysis using SPSS confirmed that both adjusted food and non-food expenditures significantly influence income levels. The regression model was statistically significant ($F = 103.836$, $p < 0.000$), and both predictors had strong t-values and p-values, indicating their reliability as explanatory variables.

Specifically, the regression coefficients show that for every unit increase in food expenditure, income increases by 1.851 units, and for every unit increase in non-food expenditure, income increases by 7.468 units. This suggests that consumption patterns are closely tied to household earning capacity and may reflect underlying income potential or financial well-being.

In conclusion, the findings emphasize the importance of understanding consumption behavior as a lens to assess and address income disparities. Policies aimed at supporting household expenditure—through subsidies or direct transfers—can play a critical role in stabilizing rural incomes. Future studies should explore longitudinal data to assess the evolving dynamics of this relationship in the wake of continued economic changes

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