

## ECON 422 Final Paper

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### Introduction

The relationship between household income and consumption is a central topic in economic research, as income directly determines purchasing power and shapes spending behavior. Prior studies, such as Olson and Manning (2021), highlight income's central role in driving economic activity, while Denton and Spencer (1976) demonstrate its influence on consumption when considered alongside household demographics. This paper builds on such findings by focusing on how household income affects consumption levels in South Africa. This paper uses the Income and Expenditure Survey specifically June 2011 to examine the positive relationship between household income and consumption in South Africa, where higher incomes lead to greater consumption due to increased purchasing power.

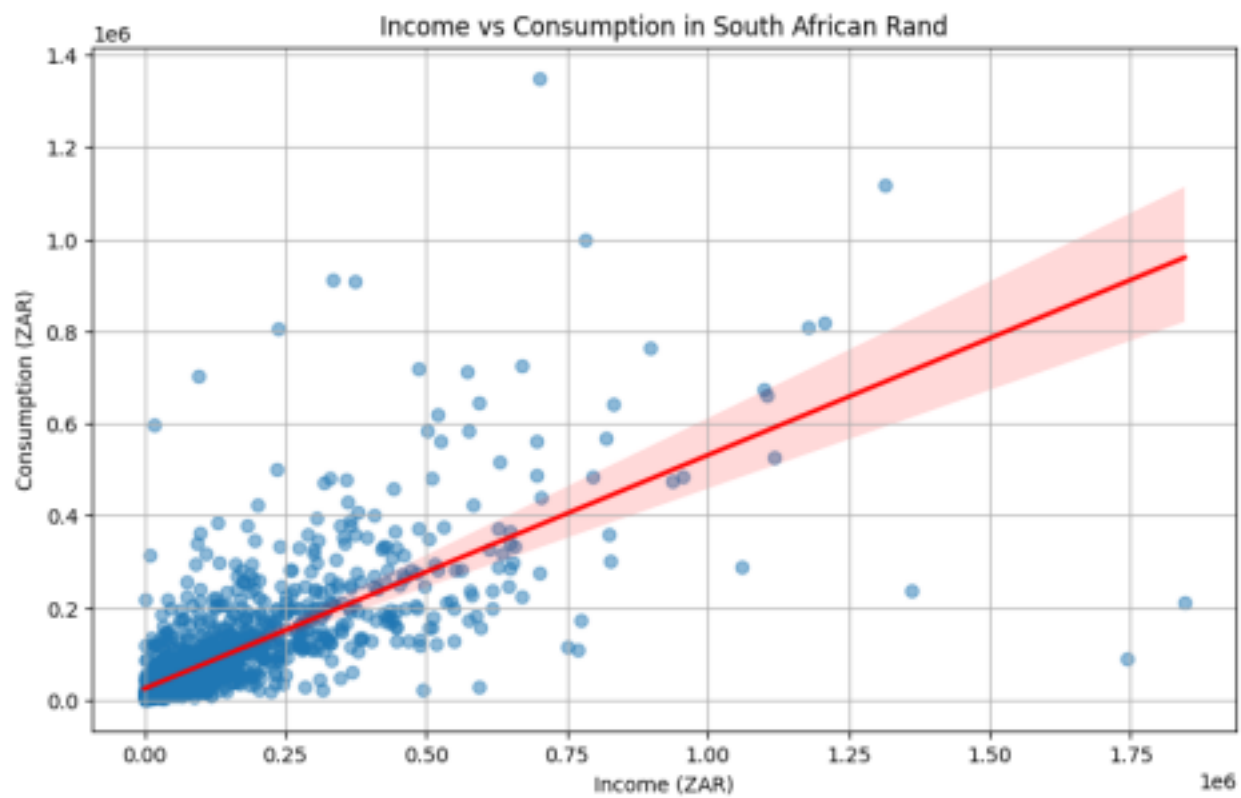
### Model and Graphs

$$\begin{aligned} \log(\text{Consumptions}) = & 10.83 + 0.000003611 \times \text{Income} + 0.0669 \times \text{Hsize} - 0.0263 \times \text{GenderOfHead} \\ & (0.073) \quad (0.000000111) \quad (0.007) \quad (0.033) \\ & - 0.8539 \times \text{PopGrpOfHead\_AfricanBlack} - 0.6327 \times \text{PopGrpOfHead\_Coloured} \\ & (0.069) \quad (0.082) \\ & - 0.3081 \times \text{PopGrpOfHead\_IndianAsian} \\ & (0.145) \end{aligned}$$

$$n = 2017, \quad R^2 = 0.503, \quad \bar{R}^2 = 0.502, \quad SER = 0.723, \quad F = 339.7$$

<b>variable name (variable nickname)</b>	<b>description</b>	<b>units</b>
Income	The total amount of money the household earns in the month of June 2011 this is a gross amount before deductions. This is a continuous variable, reflecting household income levels.	South African Rand
Consumption (dependent Variable)	The total spending by the household in the month of June 2011 also a gross amount. This continuous variable indicates the household's monthly consumption or expenditure.	South African Rand
Hsize	The size of the household, represented by the number of people in the household consistently living there at least 4 nights a week on average. This variable is discrete and reflects household composition.	Person
GenderOfHead	The gender of the head of the household which is self reported. This is a dummy variable, helping assess any consumption or income differences associated with the household head's gender. Male = 0 Female = 1	
PopGrpOfHead_AfricanBlack	The population group to which the household head belongs. It is self reported This is a categorical variable African Black = 1 Not African Black = 0 The reference category is White	
PopGrpOfHead_Coloured	The population group to which the household head belongs. It is self reported and refers to people of Mixed Race This is a categorical variable Coloured = 1 Not Coloured = 0 The reference category is White	
PopGrpOfHead_IndianAsian	The population group to which the household head belongs. It is self reported and refers to people of Asian descent. This is a categorical variable IndianAsian =1 NotIndianAsian=0 The reference category is White	

variable nickname	median	mean	standard deviation	minimum	maximum	number of observations
Income	43062	104043	161646	0	1845877	2017
Consumption	39185	77488	111255	6.46	1349449	2017
Hsize	3	3.791770	2.445289	1	17	2017
GenderOfHead	0	0.427863	0.494892	0	1	2017
PopGrpOfHead_AfricanBlack	1	0.814576	0.388737	0	1	2017
PopGrpOfHead_Coloured	0	0.100149	0.300273	0	1	2017
PopGrpOfHead_IndianAsian	0	0.014874	0.121077	0	1	2017



## **Results**

For Income, the coefficient is 0.000003611, which means a 1-unit increase in income leads to a  $0.000003611 * 100 = 0.0003611\%$  increase in consumption on average, ceteris paribus. This is statistically significant at the 1% level with a p-value of 0.000. The income is also very economically significant, even though the percentage may seem small, but the units are in South African rand, and the data had a mean of 43,062 and a standard deviation of 161,646. This shows that large changes in income will have a large change in consumption, which is expected from the literature.

For Household Size, the coefficient is 0.0669, so a 1-unit increase in household size results in a  $0.0669 * 100 = 6.69\%$  increase in consumption on average, ceteris paribus. This result is statistically significant at the 1% level with a p-value of 0.000. The economic significance is clear as larger households typically have higher consumption due to increased demand for goods and services. Given the mean of Hsize at approximately 3.8 and a standard deviation of 2.4, this coefficient indicates a substantial effect on consumption, as larger households naturally require more goods and services to meet their needs.

For GenderofHead, the coefficient is -0.0263, indicating that a 1-unit increase in the gender variable (moving from male to female-headed households) results in a  $-0.0263 * 100 = -2.63\%$  lower consumption on average, ceteris paribus. However, the p-value is 0.427, indicating that this result is not statistically significant. The economic significance of GenderofHead is limited in this context because, although the coefficient suggests a small negative relationship with consumption, the lack of statistical significance (p-value of 0.427) indicates that this result is unreliable. The size of the coefficient is small, and while the direction aligns with expectations (female-headed households tend to have lower incomes, which could lead to lower consumption), the insignificance suggests that income and other factors might be overshadowing the effect of gender on consumption. This could indicate a confounding effect, where gender's impact on consumption is not isolated due to its

overlap with income differences.

For PopGrpOfHead\_AfricanBlack, the coefficient is -0.8539, so a 1-unit increase (moving to the African Black population group) results in an 85.39% lower consumption compared to White-headed households on average, *ceteris paribus*. This result is statistically significant at the 1% level with a p-value of 0.000, suggesting a large and meaningful economic difference in consumption between African Black-headed households and White-headed households not just due to income as well since it is controlled for.

For PopGrpOfHead\_Coloured, the coefficient is -0.6327, meaning a 1-unit increase (moving to the Coloured population group) leads to a 63.27% lower consumption compared to White-headed households on average, *ceteris paribus*. This is statistically significant at the 1% level with a p-value of 0.000, which is a notable economic difference in consumption patterns for Coloured-headed households compared to White-headed households.

For PopGrpOfHead\_IndianAsian, the coefficient is -0.3081, so a 1-unit increase (moving to the Indian/Asian population group) results in a 30.81% lower consumption compared to White-headed households on average, *ceteris paribus*. With a p-value of 0.034, this result is statistically significant at the 5% level, suggesting a more moderate economic difference relative to the previous two groups in consumption between Indian/Asian-headed households and White-headed households.

Overall, we observe that all other population group-headed households consume significantly less than White-headed households, *ceteris paribus*.

## **Problems Section**

The first problem is that the original model may suffer from misspecification of the functional form, failing to capture non-linear relationships between the dependent variable and

independent variables. To check for this, I conducted a RESET test. The test revealed a significant increase in R-squared (from 0.503 to 0.637) after adding squared and cubic terms, indicating that the original model overlooks important non-linear effects. The F-statistic of 440.3 allows us to easily reject the null hypothesis, meaning there is high likelihood of functional form misspecification. This misspecification could lead to biased estimates, meaning the coefficients may not accurately represent the true relationships between variables. It could also result in inefficient estimates, where the standard errors are larger than necessary, making the model's predictions less precise. Including higher-order terms improves the model's accuracy by better capturing these non-linear effects.

The second major issue with the analysis is the inclusion of the GenderOfHead variable, which appears to be irrelevant to the model. Despite being part of the regression, the variable has a high p-value (0.427), suggesting that it does not significantly contribute to explaining the variation in log\_Consumptions. The inclusion of the GenderOfHead does not affect the unbiasedness of the OLS estimators, meaning the estimates of other coefficients remain correct. However, it does increase the sampling variance of the estimators, leading to less precise estimates and affecting the reliability of hypothesis tests (such as t-tests) for other variables. This makes it harder to draw clear, statistically sound conclusions about the relationships in the model.

## **Conclusion**

This paper concludes that household income has a positive effect on consumption levels in South Africa, with higher income leading to increased consumption. Additionally, household size is positively associated with consumption, as larger households tend to consume more due to higher demand for goods and services. However, the gender of the household head does not significantly affect consumption, as the variable was found to be statistically insignificant. The analysis also shows significant differences in consumption across population groups, with African Black, Coloured, and Indian/Asian-headed households consuming significantly less than White-headed

households. These findings are consistent with existing research on the role of income in shaping consumption patterns, while also showing how household size and demographic factors have an impact as well. There were 2 issues which were functional form misspecification and the inclusion of the irrelevant variable GenderOfHead, Despite these issues, the model results still provide valuable insights into the factors that influence consumption in South Africa.

## **Bibliography**

### Annotated Bibliography:

1. Olson, A., & Manning, B. (2021a, March 25). *New Study finds that income, not prices, drives the economy*. Dartmouth.  
<https://home.dartmouth.edu/news/2021/03/new-study-finds-income-not-prices-drives-economy>
2. Denton, Frank T., and Byron G. Spencer. "Household and Population Effects on Aggregate Consumption." *The Review of Economics and Statistics*, vol. 58, no. 1, 1976, pp. 86–95. *JSTOR*, <https://doi.org/10.2307/1936013>. Accessed 25 Oct. 2024.  
Summary:  
This study examines how demographic factors such as household size, age, and population composition affect overall consumption. It finds that larger households may spend more efficiently, and consumption patterns vary with age and family responsibilities. The authors argue that both income and demographics influence spending at the individual and national levels.  
Relevance:  
This research helps illustrate how household income and demographics shape consumption, providing a foundation for my analysis of South Africa. My model will estimate consumption while considering household size gender and other factors as well
3. Beaujot, Roderic P. "Components of Change in the Numbers of Households in Canada, 1951-1971." *The Canadian Journal of Sociology / Cahiers Canadiens de Sociologie*, vol. 2, no. 3, 1977, pp. 305–19. *JSTOR*, <https://doi.org/10.2307/3340495>. Accessed 25 Oct. 2024.  
Summary:  
This study analyzes changes in the number of households in Canada between 1951 and 1971. It finds that the overall increase in population size was the main driver of household growth. However, for female-headed households and non-family households, the growth was influenced more by social changes, such as a higher likelihood of individuals becoming household heads, rather than demographic factors alone.  
Relevance:  
This paper highlights the importance of both demographic trends and social shifts in shaping household structures, which is relevant to my research on household income and consumption in South Africa.
4. Source of data
  - a. *Income and expenditure survey 2010-2011*. South Africa - Income and Expenditure Survey 2010-2011. (n.d.).  
<https://microdata.worldbank.org/index.php/catalog/1545/get-microdata>