Faculty of Computing

University of Sri Jayewardenepura

A Statistical Analysis on Living Expenses of University Students

Statistical Distribution and Inferences

Group Project

Group Number 04

Members :

fc221034 - B.P.U.Mendis. (CS)

fc221004 - H.H.D.Nagahawatta. (CS)

fc221022 - W.P.Sudasun. (CS)

fc223002 - K.K.G.R.Sathnidu. (IS)

fc221008 - W.A.H.M.Wijayarathne . (CS)

A Statistical Analysis on Living Expenses of University Students

Contents

1 Introduction

University students face growing financial challenges in meeting their living expenses, which include rent, utilities, food, transport, and other personal costs. Rising costs of living and limited income opportunities place pressure on students, potentially affecting both academic performance and well-being.

The motivation for this study is to gain a better understanding of the financial realities faced by Sri Lankan university students. By analyzing data collected from students, this study identifies major expense categories, examines relationships between expenses, and applies statistical techniques to test for significant patterns.

Objectives of the Study:

- To describe the distribution of monthly expenses across major categories such as rent, food, and transport.
- To estimate average expenses with confidence intervals to represent typical costs.
- To test hypotheses about group differences and relationships (e.g., gender differences, living arrangements).
- To analyze correlations among expense categories and build a regression model to predict total expenditure.
- To provide insights and recommendations for students and policymakers regarding financial planning and support.

2 Literature Review

The financial circumstances of university students can be understood through economic theories of consumption and saving, such as Keynes' Absolute Income Hypothesis, Duesenberry's Relative Income Hypothesis, Fisher's Intertemporal Consumption Function, Modigliani and Brumberg's Life-Cycle Hypothesis, and Friedman's Permanent Income Hypothesis, all of which link income, consumption, and saving behaviour. Empirical studies show that students face significant financial strain due to limited income and rising costs, with many reporting that expenses exceed income and relying on savings or family support for basic needs. Socioeconomic background strongly influences outcomes, as students from higher-income families experience fewer financial difficulties, while those from lower-income households or living independently face greater hardship. Accommodation and food consistently account for the largest share of spending, followed by transport and other essentials, while discretionary costs such as entertainment vary. Economic crises, such as the recent UK cost-of-living crisis, intensify these pressures, leading students to cut back on essentials and experience academic and mental health impacts. Saving behaviour is generally weak, with most students unable to save or saving less than 10% of their income, leaving them financially vulnerable. Overall, the literature suggests that student living expenses are shaped by both structural economic conditions and family background, directly influencing well-being and academic success

3 Methodology

The data for this study was collected through a structured questionnaire distributed via Google Forms. The survey was designed to capture information on the living expenses of university students, focusing on various aspects of monthly spending. It included demographic questions such as gender and living arrangement, as well as detailed questions on around twenty categories of expenses, including rent, utilities, groceries, canteen food, outside food, transport, stationery, printing, personal care, clothing, medical expenses, entertainment, and gym or sports activities. A total of 213 valid responses were received from university students across Sri Lanka, providing a sufficient sample size for meaningful statistical analysis.

Once the responses were collected, the dataset was exported into CSV format for further analysis. Data cleaning was carried out to ensure accuracy and consistency. This process included the removal of incomplete or duplicate responses, the correction of irregularities in categorical answers, and the standardization of labels where students had entered the same information in slightly different formats. For example, responses such as "7000–9000" and "7000–9000/-" were merged into one category. Additionally, categorical ranges were converted into numerical midpoints to allow for statistical analysis. For instance, a response in the category "5000–7000" was recoded as 6000, and "10000–20000" was recoded as 15000. This transformation ensured that variables like rent, food, and transport could be treated as continuous numerical data, enabling the calculation of averages, confidence intervals, and other statistical measures.

The analysis was carried out in several stages. First, descriptive statistics were used to summarize the dataset. This included frequency tables, bar charts, and histograms that provided a general picture of the sample and their spending habits. These descriptive results were followed by distributional checks of the total monthly expenditure to see if the data approximated a normal distribution. Estimation techniques such as confidence intervals were then applied to key variables like rent and total expenditure, and comparisons were made between groups, such as male and female students. Hypothesis testing methods were employed to determine whether observed differences were statistically significant. For example, a t-test was used to compare the average spending between genders.

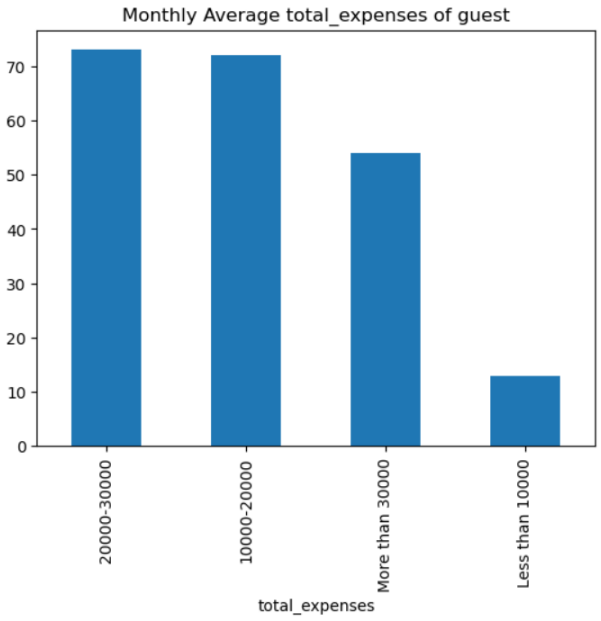
Finally, advanced statistical techniques such as correlation and regression analysis were conducted. Correlation analysis was used to explore how different categories of expenses were related to one another, while regression analysis was used to model total monthly expenditure as a function of major cost categories such as rent, food, and transport. These analyses provided deeper insights into which factors contributed most strongly to overall student living expenses. All statistical analysis and visualization were performed using Python, with the support of libraries such as pandas, numpy, matplotlib, seaborn, scipy, and statsmodels.

4 Results

4.1 Descriptive Outcomes

The dataset consisted of 213 student responses. After data cleaning and converting categorical ranges into numeric midpoints, the following descriptive statistics were obtained:

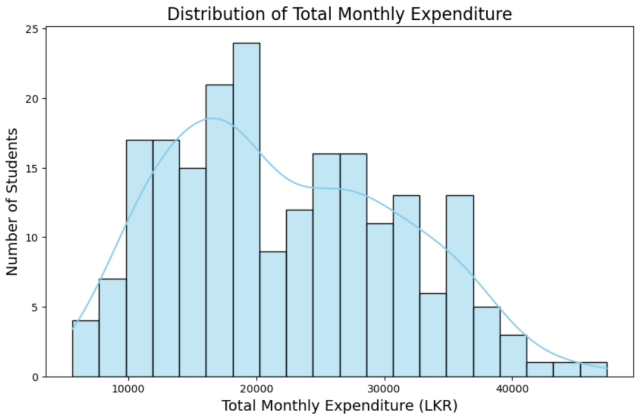
- Rent/Accommodation: Students living away from home reported monthly rent payments ranging from 5000 LKR to over 20,000 LKR, with an average of 7407.05 LKR.
- Groceries: Groceries averaged 1996.79 LKR, with a wide range indicating differences in lifestyle.
- Food Expenses: Canteen food spending was generally lower (mean 3775.51 LKR) compared to outside food (mean 6316.12 LKR).
- Transport: Transport costs ranged from minimal (<1000 LKR) for students to over 5000 LKR for daily commuters. The mean was 3693.75 LKR.
- Other Expenses: Stationery, printing, personal care, clothing, and medical costs showed high variability but contributed less to overall expenditure compared to rent and food.
- Total Expenditure: Most students reported total monthly spending between 20,000–30,000 LKR, with a mean of 22161.32 LKR. A small number of students spent more than 30,000 LKR.



4.2 Distribution of total expenditure

The distribution of students' total monthly expenditure does not perfectly follow a normal distribution but shows a right-skewed pattern. The majority of students spend between 20,000 and 30,000 LKR, while a smaller number report expenditures above 30,000 LKR, creating a longer tail on the right side of the distribution.

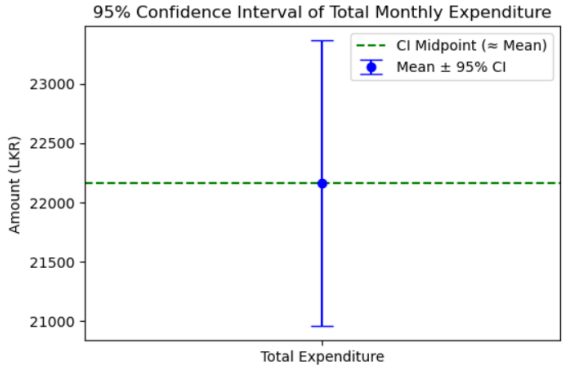
```
Grand Total Statistics for Monthly Expenditure
------------------------------------------------
Mean   : 22161.32 LKR
Median : 20375.00 LKR
Mode   : 18625.00 LKR
Std Dev: 8932.32 LKR
```



4.3 Estimation

The analysis showed that the mean total monthly expenditure was 22161.32 LKR, with a 95% CI ranging from 20958.93 to 23363.71 LKR. This interval indicates that we can be 95% confident that the true average monthly expenditure for the broader student population falls within this range.

```
95% Confidence Interval for Total Monthly Expenditure: (20958.93, 23363.71) LKR
Sample Mean: 22161.32 LKR
Midpoint of CI: 22161.32 LKR
```



4.4 Hypothesis Testing

To examine differences in students' expenditure patterns, several t-tests were conducted:

1.One-sample t-test (Mean vs 15,000 LKR)

- Hypothesis: The average monthly expenditure equals 15,000 LKR.
- Result: $t = 11.67$, $p < 0.001$.
- Interpretation: The null hypothesis was rejected, indicating that the average student expenditure is significantly different from 15,000 LKR.

2.Independent-samples t-test (Male vs Female Total Expenditure)

- Hypothesis: There is no difference in mean total expenditure between male and female students.
- Result: $t = 1.71$, $p = 0.09$.
- Interpretation: The null hypothesis was not rejected, showing that there is no statistically significant difference in average expenditure between male and female students.

3.Independent-samples t-test (Boarding/Hostel vs From Home)

- Hypothesis: There is no difference in mean total expenditure between students living in boarding/hostel arrangements and those living from home.
- Result: $t = 11.33$, $p < 0.001$.
- Interpretation: The null hypothesis was rejected, indicating that students living in boarding or hostels spend significantly more on average compared to those living at home.

4.5 Correlation Analysis

Correlation analysis showed that outside food expenses and total expenditure were strongly correlated ($r = 0.711$), indicating that students who spend more on outside food tend to have much higher overall expenses. Rent displayed a moderate correlation ($r = 0.55$). Although rent is typically a major expense, not all students in the sample paid rent (e.g., those living with family or in hostels), which reduced its direct alignment with reported total spending. Transport had a very weak correlation ($r = 0.12$). This may be explained by the fact that many students who live in hostels or rented accommodation close to campus spend very little on transport, while commuting students represent a smaller group in the dataset. Stationery, clothing, personal care, medical costs, printing, and gym expenses all showed weak correlations ($r < 0.30$), indicating that these categories contribute relatively little to differences in overall student spending.

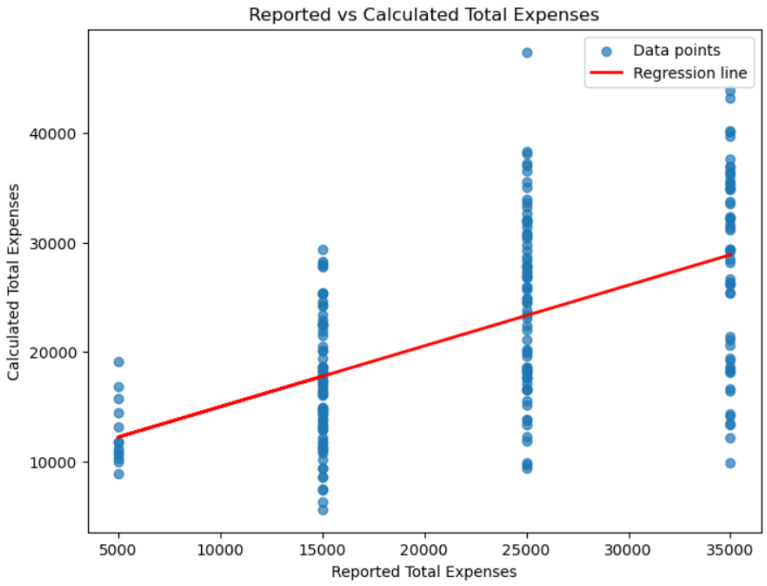
```
Correlation of each expense with total monthly expenditure:

outside_food     0.711286
rent             0.554518
canteen_food     0.405725
utilities        0.389840
groceries        0.387423
stationery       0.275786
clothing         0.253468
personal_care    0.173233
medical_cost     0.165554
transport        0.118788
printing         0.097557
gym_cost         0.035420
dtype: float64
```

4.6 Regression Analysis

Regression analysis showed that canteen food (coefficient = 1.19) and rent (0.76) were the strongest predictors of total expenditure, followed by outside food (0.43). Utilities and gym costs contributed weakly, while other categories such as groceries, transport, stationery, clothing, and medical costs had little or no measurable impact. Negative coefficients for stationery, printing, and personal care likely reflect overlaps between categories rather than genuine negative effects.

A simple linear regression was conducted to compare students' reported total expenditure with the sum of individual expense categories. The resulting regression equation was y = 0.55x + 9440.50, where x represents reported expenditure and y the calculated sum of categories. The slope being less than 1 suggests that reported totals tend to be higher than the sum of detailed categories, while the positive intercept reflects a baseline level of spending across categories.




```
Regression equation: y = 0.55 * x + 9440.50
```

5 Discussion

The findings confirm that living expenses place significant burdens on Sri Lankan university students, particularly those living in rented accommodation or boarding houses. Rent and food were found to be the most significant cost drivers, consistent with previous literature.

Although gender differences were not statistically significant, living arrangements had a strong impact on rent, which in turn influenced total expenditure. Correlation and regression analyses confirmed that rent and food are reliable predictors of overall student costs. These results highlight the need for financial support mechanisms, particularly accommodation subsidies and affordable food options for students living away from home.

6 Conclusion

The study analyzed the living expenses of Sri Lankan university students using a dataset of 213 responses. The results showed that rent, food, and transport were the largest contributors to student expenditure. Estimation with confidence intervals provided reliable ranges for typical costs, while hypothesis testing confirmed that living arrangement significantly influences rent but gender differences in total expenses were not significant. Correlation and regression analyses highlighted rent and food as the strongest drivers of total expenditure.

These findings underscore the financial pressures faced by students, particularly those living away from home. The results suggest that financial aid and subsidized accommodation could play an important role in reducing students' burdens. Limitations of the study include reliance on self-reported data and the relatively small sample size, which may not fully represent all university students in Sri Lanka. Future research could expand the dataset and compare expenses across universities or regions.

7 References

- Akandere, G. (n.d.). Analysis of university students' income, expenditure-saving relationship and living costs.
- Ozekicioglu, S. (2017). Students' economic backgrounds in meeting living costs of higher education: A regression analysis. International Journal of Economics and Financial Issues, 7(3), 161-165
- Daud, N., Norwani, N. M., & Yusof, R. (2018). Students financial problems in higher education institutions. International Journal of Academic Research in Business and Social Sciences, 8(10), 1558–1565.
- Iqbal, S. N., Rekhi, A., James, A., Johnson, J. A., & Trinidade, A. (2025). The UK cost-of-living crisis and its effect on students at a British medical school. BMC Medical Education.
- Vickers, P., & Bekhradnia, B. (2007). The economic costs and benefits of international students. Higher Education Policy Institute.