

Economic Resilience in Bangladesh: Analyzing Household Well-Being amidst Price Hikes through ANOVA and Paired Sample t-Test Insights

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How to cite this paper: Ghosh, E. (2024) Economic Resilience in Bangladesh: Analyzing Household Well-Being amidst Price Hikes through ANOVA and Paired Sample t-Test Insights. *Open Journal of Statistics*, 14, 55-89.

<https://doi.org/10.4236/ojs.2024.141003>

Received: December 6, 2023

Accepted: February 26, 2024

Published: February 29, 2024

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Abstract

This study delves into the multifaceted impact of price hikes on the standard of living in Bangladesh, with a specific focus on distinct socioeconomic segments. Amidst Bangladesh's economic growth, the challenges of rising inflation and increased living costs have become pressing concerns. Employing a mixed-methods approach combines quantitative data from a structured survey with qualitative insights from in-depth interviews and focused group discussions to analyze the repercussions of price hikes. Stratified random sampling ensures representation across affluent, middle-class, and economically disadvantaged groups. Utilizing data [1] from 2020 to November 2023 on the yearly change in retail prices of essential commodities, analysis reveals significant demographic shifts, occupational changes, and altered asset ownership patterns among households. The vulnerable population, including daily wage laborers and low-income individuals, is disproportionately affected by adjustments in consumption, income generation, and living arrangements. Statistical analyses, including One-Way ANOVA and Paired Sample t-tests, illuminate significant mean differences in strategies employed during price hikes. Despite challenges, the prioritization of education remains evident, emphasizing its resilience in the face of economic hardships. The result shows that price hikes, especially in essential items, lead to substantial adjustments in living costs, with items like onions, garlic, and ginger experiencing significant increases of 275%, 108%, and 483%, respectively.

Keywords

Price Hike, Economic Growth, Socioeconomic, Development, Households

1. Introduction

Socioeconomic disparities in Bangladesh are substantial, with a significant proportion of the population living below the poverty line. These disparities have led to different sections of society experiencing the effects of price hikes in distinct ways. The rising cost of essential goods and services, such as food, housing, education, and healthcare, can have varying consequences for different socioeconomic strata. Price hikes can have multifaceted consequences, including altering consumption patterns, increasing the risk of poverty, and affecting the overall well-being of individuals and families. Understanding these impacts is crucial for policymakers, economists, and other stakeholders seeking to develop targeted strategies and interventions to mitigate the adverse effects of inflation and rising prices on different sections of society. The impact of price hikes on the standard of living in Bangladesh is a pressing issue that affects the welfare of its diverse socioeconomic groups. Rising prices of essential commodities, such as rice, oil, vegetables, and education, have been a significant concern not only in Bangladesh but also around the world. The consequence of price hikes ripples through the entire economy, impacting individuals, businesses, and government. In the case of Bangladesh, the annual inflation rate hovers around 9.63%, but it does not reflect the true impact on individual commodities, which may have seen more significant price increases [2]. Therefore, the consequences of price hikes are not evenly distributed across society, and they disproportionately affect those with limited savings and incomes.

2. Objective

This study aims to comprehensively analyze the repercussions of price hikes on the standard of living within distinct socioeconomic segments in Bangladesh, including the affluent, the middle class, and the economically disadvantaged. It seeks to uncover the intricate consequences of rising prices, including their impact on consumption patterns, the increased risk of poverty, and their influence on the overall well-being of individuals and families. By doing so, this research aspires to provide policymakers, economists, and stakeholders with insights necessary for the development of tailored strategies and interventions to ameliorate the adverse effects of inflation and escalating prices on diverse sections of Bangladeshi society.

3. Methodology

3.1. Research Design

I have employed a mixed-methods research design, combining both quantitative and qualitative approaches to offer a comprehensive understanding of the research topic. A structured survey has been conducted to collect quantitative data, including questions related to the impact of price hikes on the cost of living, income levels, consumption patterns, and overall well-being.

3.2. Sampling Design

Utilize the stratified random sampling technique to ensure representative samples from various socioeconomic groups, thereby ensuring adequate representation of the wealthy, middle class, and economically disadvantaged segments in the study.

3.3. Data Collection

I have selected a purposive sample of 109 income-earning individuals to collect information. In cases where multiple earners existed within a single joint-family household, only one earning individual was interviewed. Data was collected on essential commodities, their prices, household consumption patterns, demographic information, income levels, and other relevant socioeconomic data.

Sample data of the Socio-economic profile of households (Table 1):

Table 1. Socio-economic profile of the sample households.

Variable	2020	2023	% Change	χ^2	d.f	P-value
Family size(mean)	5.32	4.2	-1.12	66.986	4	0.000
Female headship %	40	34.9	-5.1	0.053	1	0.819
Occupation of the main earners	8.5	6.4	2.1			
Local businessman %	20.5	31.2	10.7			
Job holder %	4.5	2.8	-1.7			
Skilled labor %	10.5	16.5	6.0	76.128	7	0.000
Day laborer %	15.5	21.1	5.6			
Tempo/rickshaw/van/bus helper %	10.0	3.6	-6.4			
Hawker/Grocery shop %	25.5	8.3	-17.2			
Agriculture % retired person	5.0	10.1	5.1			
Material of house-cement/brick %	45	40	5			
Tin %	30	40	10	24.39	2	0.000
Bamboo %	25	20	-5			
Type of latrine used sanitary %	45.5	56.3	10.8			
Kacha %	39.1	30.2	-8.9	23.391	2	0.000
Open space %	15.4	13.5	-1.9			
Household owns homestead land %	67	46.8	-20.2	105.52	1	0.000
Own cultivable land %	20	15.6	-4.4	23.767	1	0.000
Own livestock %	62	45.0	-17	105.040	1	0.000
Monthly income up to 10,000%	2.5	5.7	3.2			
10,000% - 20,000%	27.5	51.1	23.6	16.80	2	0.000
20,000% - 30,000%	70.0	43.2	-26.8			

4. Data Analysis

The collected data was processed using Microsoft Excel 2013 and SPSS v-21 to generate outputs in the form of frequency distributions and quantitative analyses, including One-Way ANOVA and Paired Sample t-Tests.

$$t = \frac{\bar{d}}{s_d/\sqrt{n}} \quad (1)$$

where, \bar{d} is the mean difference.

s_d is the standard deviation of the differences.

n is the number of pairs.

These analyses were conducted to assess the impact of price hikes on different socioeconomic groups. The use of One-Way ANOVA enabled the evaluation of overall differences in the standard of living among the various socioeconomic groups in response to price hikes. Additionally, the application of paired sample t-tests allowed for more detailed comparisons before and after specific price increases. This combination of statistical methods provides a comprehensive perspective on the situation and offers valuable insights into specific areas where interventions may be most needed.

4.1. Analysis Procedure

To achieve the research objectives, I have considered demographic diversity within middle/lower-middle-income and fixed-income households. These individuals are faced with the challenging task of managing their families during periods of price hikes. Among the total observed individuals (OP) surveyed, 92% are household heads, and 70% are married. During times of price hikes, these individuals are tasked with making crucial decisions to support their families.

For the reason of price hike of essential commodities there has been change in the basic demographic status of the sampled households (see **Table 1**). However, the extent of female headship is much lower than national estimates; this is largely due to households having at least one under five-year-old child in 2020 to be considered in the sampling frame and significantly change was observed in the occupational patterns of the main earners. Although they have managed to improve their sanitation and housing system and there was a significantly decline in ownership of cultivable land, ownership of homestead, monthly income level between sep, 2020 to October, 2023.

Table 1 reveals that 6.4% of respondents are business owners, 2.8% are skilled professionals, 31.2% are employed, 8.3% are involved in agriculture, 10.1% are retired, 16.5% are day laborers, 21.1% work as helpers in the transportation sector (tempo/rickshaw/van/bus), and 3.7% are engaged in hawking or running grocery shops. Based on my study, I have observed a significant decline in family size, the number of local businesses, skilled laborers, those engaged in agriculture, and homeowners with houses made of cement/brick. Additionally, there has been a reduction in those owning cultivable land, homestead land, and li-

vestock due to the current situation of price hikes, even though the monthly income of respondents has increased (see **Table 1**).

Table 2 presents price changes for various essential commodities in Bangladesh from 2020 to November 3, 2023, indicating a significant increase in most items. Among the commodities, onions and potatoes have experienced the most substantial price hikes, with increases of 275% and 225%, respectively, impacting the cost of living significantly. These price increases are likely to have a substantial impact on the standard of living, particularly for lower and middle-income households. For the poor and extremely poor, managing three meals a day becomes increasingly difficult as the prices of essential commodities continue to rise rapidly and unpredictably. Additionally, items like white flour and sugar have also seen substantial price increases, which can further strain household budgets. Overall, these price changes reflect the challenges faced by consumers due to inflation and rising living costs. (The data was collected from various retail shops and markets from January 2020 to 3rd Nov, 2023) (see **Figure 1**) [3].

Table 2. Percentage change in retail prices of essential commodities (yearly).

Commodity	Unit	2020	3rd Nov, 2023	% change of price (Base year 2020)	Increased by
Rice (fine)	1 kg	60	85	0.42	42%
White flour	1 kg	28	56	1	100%
Soybean oil	1 lit	100	170	0.7	70%
Palm oil		80	145	0.81	81%
Lentils	1 kg	80	140	0.75	75%
Potato	1 kg	20	65	2.25	225%
Onion	1 kg	40	150	2.75	275%
Garlic	1 kg	120	250	1.08	108%
Ginger	1 kg	60	350	4.83	483%
Milk (liquid)	1 lit	50	70	0.4	40%
Sugar	1 kg	62	135	1.18	118%
Egg (farm, red)	1 hali	28	56	1	100%
Salt	1 kg	30	40	0.33	33%
Beef	1 kg	500	750	0.5	50%
Mutton poultry		700	1200	0.71	71%
		120	240	1	100%

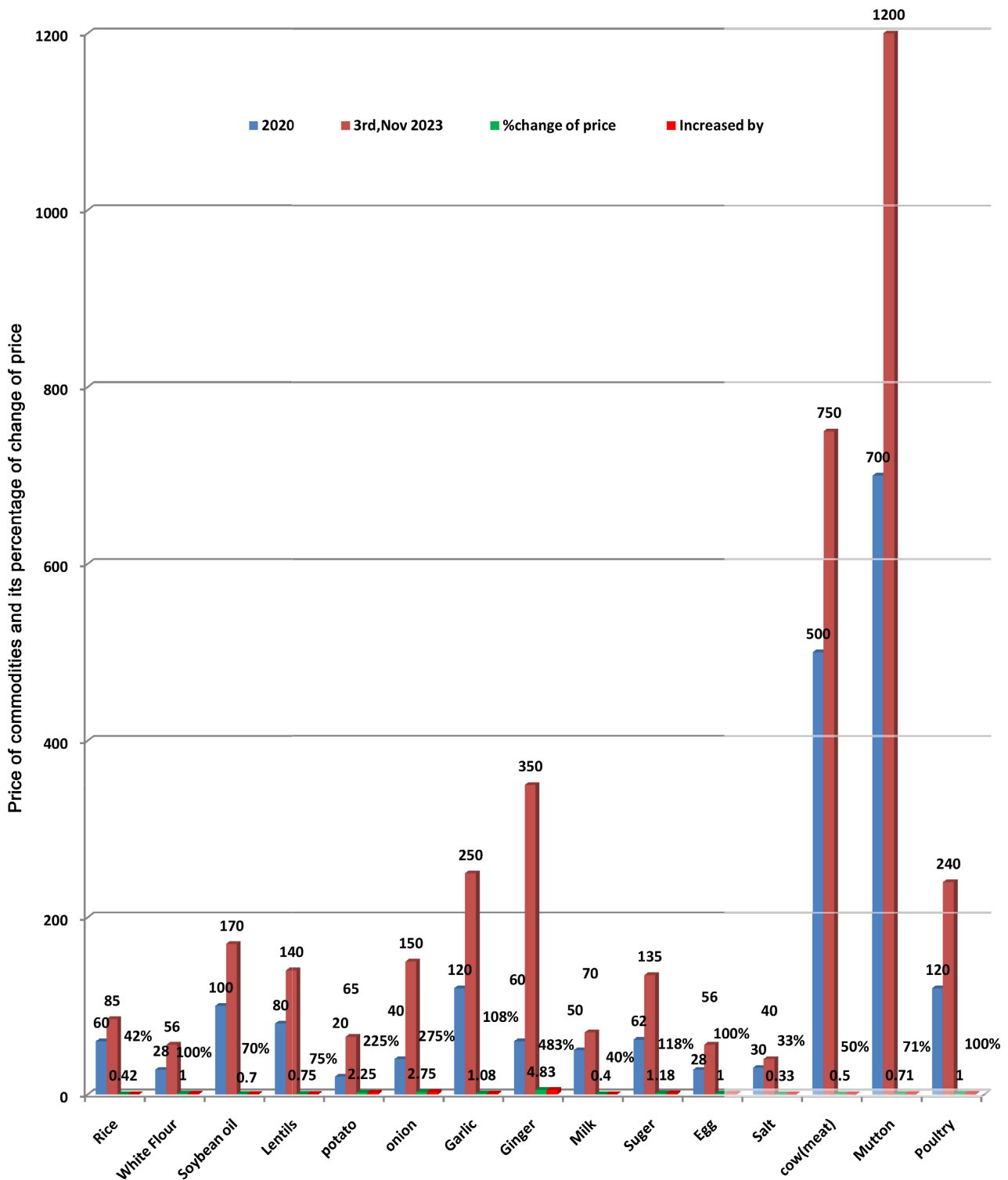


Figure 1. Percentage change in retail prices of essential commodities (yearly).

4.2. Paired Sample Analysis: (Paired Sample t-Test)

Paired sample analysis, also known as paired-sample t-test or dependent samples analysis, is a statistical technique used to compare the means of two related

groups or conditions. It is typically employed when you have two sets of data that are somehow paired or matched. The key characteristics of paired sample data are that each data point in one set is directly related or connected to a data point in the other set.

A paired sample t-test is a statistical method used to compare the means of two related groups or conditions. It is typically employed when you have two sets of data that are somehow paired or matched, such as before-and-after measurements on the same subjects or matched pairs in an experiment.

The formula for the paired sample t-test is as follows:

$$t = (M - \mu) / (s / \sqrt{n}) \quad (2)$$

where:

t is the t-statistic.

M is the mean of the differences between the paired observations.

μ is the hypothetical population mean (usually 0, indicating no difference).

s is the sample standard deviation of the differences.

n is the number of paired observations.

The paired sample t-test helps determine whether there is a statistically significant difference between the means of the two paired groups. It does so by calculating the difference between the pairs, measuring how variable that difference is, and assessing if the observed difference is likely due to chance or if it's a real, meaningful difference. In essence, it's a valuable tool for evaluating whether an intervention or treatment has had a significant impact on a specific variable of interest.

Paired Samples Analysis: Impact of Price Hike on Various Behaviors and Alternatives (see [Table 3](#)).

Table 3. Paired samples statistics.

		Mean	N	Std. deviation	Std. error mean
Pair 1	Price hike and alternatives	3.7156	109	1.37499	0.13170
	accommodation behaviors	4.3670	109	1.09427	0.10481
Pair 2	Price hike and alternatives	3.7156	109	1.37499	0.13170
	education behaviors	3.2569	109	1.39047	0.13318
Pair 3	Price hike and alternatives in	3.7156	109	1.37499	0.13170
	food consumption habits	3.3945	109	1.42087	0.13609
Pair 4	Price hike and income-raising alternatives	3.7156	109	1.37499	0.13170
		2.7798	109	1.51754	0.14535

Interpretation:

In Pair 1 (“Price Hike” and “Accommodation Behaviors”), there is a strong positive correlation with a correlation coefficient of 0.765. This indicates that as the experience of price hikes increases, there is a corresponding increase in certain accommodation behaviors. *I.e.* The correlation is statistically significant ($p < 0.05$). In Pair 2 (Education Behaviors), the correlation coefficient of 0.726 indicates a strong positive correlation between “Price Hike” and “Education Behaviors.” This implies that as the experience of price hikes increases, there is a corresponding increase in certain education-related behaviors. In Pair 3 there is a very strong positive correlation between “Price Hike” and “Food Consumption Habits” with a correlation coefficient of 0.807. The correlation is statistically significant ($p < 0.05$). This indicates that as the experience of price hikes increases, there is a significant increase in certain food consumption habits and Pair 4 (Income-Raising Alternatives), the correlation coefficient of 0.285 indicates a positive correlation between “Price Hike” and “Income-Raising Alternatives.” These correlations show that as the experience of price hikes increases, certain behaviors and alternatives (such as accommodation, education, food consumption, and income-raising) also tend to increase in some way (see **Table 4**).

From **Table 5**, the t-tests reveal statistically significant differences for all pairs. In Pair 1, the negative t-value indicates that respondents rated their experiences with “Price Hike” differently compared to the “Alternatives” in accommodation behaviors, with “Price Hike” having a higher mean score in this aspect. In contrast, Pair 2, Pair 3, and Pair 4 all exhibit positive t-values, indicating that the “Alternatives” have higher mean scores compared to “Price Hike” in education behaviors, food habits, and income-raising alternatives. These positive t-values imply that, on average, respondents rated their experiences with “Price Hike” lower in these aspects than in the respective “Alternatives.”

These results collectively shows that respondents’ perceptions and experiences with “Price Hike” significantly differ from the alternative scenarios considered in this analysis. The statistical significance underscores that these differences are unlikely to have occurred by random chance.

Table 4. Paired samples correlations.

		N	Correlation	Sig.
Pair 1	Price hike and alternatives accommodation behaviors	109	0.765	0.000
Pair 2	Price hike & alternatives education behaviors	109	0.726	0.000
Pair 3	Price hike & alternatives in food consumption habits	109	0.807	0.000
Pair 4	Price hike & income-raising alternatives	109	0.285	0.003

Table 5. Paired samples test.

		Paired differences					t	df	Sig. (2-tailed)
		Mean	Std. deviation	Std. error mean	95% confidence interval of the difference				
					Lower	Upper			
Pair 1	Price hike & alter accommodation	-0.6514	0.88586	0.08485	-0.81956	-0.48319	-7.68	108	0.000
Pair 2	Price hike & alternatives education behaviors	0.45872	1.02318	0.09800	0.26446	0.65297	4.681	108	0.000
Pair 3	Price hike & alter food habit	0.32110	0.87009	0.08334	0.15591	0.48629	3.853	108	0.000
Pair 4	Price hike& income rising alternatives	0.93578	1.73352	0.16604	0.60666	1.26490	5.636	108	0.000

4.3. One-Way ANOVA

The One-Way ANOVA procedure produces a one-way analysis of variance for a quantitative dependent variable by a single factor (independent) variable. Analysis of variance is used to test the hypothesis that several means are equal. The study on the impact of price hikes on the standard of living in Bangladesh aims to understand how different socioeconomic groups are affected by rising prices of essential commodities. To assess the variations in the standard of living across these groups, a one-way ANOVA is employed as a statistical tool.

The formula for the one-way ANOVA F-statistic is as follows:

$$F = (\text{Between-Groups Variance}/(k - 1)) / (\text{Within-Groups Variance}/(N - k)) \quad (3)$$

where: F : The F-statistic, which measures the ratio of variance between groups to variance within groups.

Between-Groups Variance: The variance between the group means.

k : The number of groups or levels of the independent variable.

Within-Groups Variance: The variance within each group.

N : The total number of observations (data points).

The F-statistic allows determining whether there are statistically significant differences in the means of the standard of living scores among the different socioeconomic groups. If the F-statistic is significantly greater than 1 and the associated p-value is less than your chosen significance level (alpha), it indicates that there are significant differences between at least two of the groups.

For Alternative income Behavior in Response to Price Rise:

Alternative income behavior in response to price rise” is a critical aspect of the study, as it directly addresses how individuals and households in Bangladesh respond to the escalating prices of essential goods. In this context, the study aims to investigate how various socioeconomic groups adapt their income sources and employment strategies in reaction to the challenges posed by price hikes. This investigation delves into understanding the specific measures taken by dif-

ferent groups to maintain or improve their standard of living. The study explores whether individuals seek additional employment opportunities, transition to higher-paying jobs, or explore alternative income-generating activities to counter the financial impact of rising prices. By analyzing these adaptive behaviors, the research will provide valuable insights into the diverse strategies employed by various socioeconomic groups as they navigate the economic challenges brought about by price hikes. This understanding is crucial for policymakers and stakeholders looking to develop targeted interventions that can mitigate the adverse effects of inflation and rising prices on different segments of society, ultimately improving the overall standard of living among the diverse socioeconomic groups in Bangladesh.

Interpretation:

From **Table 6**, shows that as the severity of the price hike (Pricehike 12) increases, people adopt various strategies to mitigate the impact, including shifting to other jobs, utilizing idle resources, and mortgaging assets. For lower price hikes (up to 20%), the primary response is to increase income through overtime or temporarily migrate for work. When the price hike falls in the range of 20% to 40%, a significant portion of individuals (68.8%) choose to shift to other jobs to address the situation. With higher price hikes, more people tend to utilize idle resources, mortgage assets, and temporarily migrate for work as part of their coping strategies. When facing an extreme price hike above 80%, a considerable number of individuals (28.9%) resort to increasing income through overtime, and the same percentage opt for temporary migration for work.

Table 6. Response strategies to price hike severity (pricehike12) for alter income.

		Pricehike12 * alter income					Total
		Alter income					
		Increased by overtime	Shift to other job	Utilize idle resources	Mortgage assets	Temporary migration for work	
Price hike12	Up to 20%	10	0	0	0	0	10
		100.0%	0.0%	0.0%	0.0%	0.0%	100.0%
	(20 - 40)%	1	11	1	3	0	16
		6.3%	68.8%	6.3%	18.8%	0.0%	100.0%
	(40 - 60)%	3	4	1	1	5	14
		21.4%	28.6%	7.1%	7.1%	35.7%	100.0%
	(60 - 80)%	1	4	6	7	6	24
		4.2%	16.7%	25.0%	29.2%	25.0%	100.0%
	Above 80%	13	13	0	7	12	45
		28.9%	28.9%	0.0%	15.6%	26.7%	100.0%
Total	28	32	8	18	23	109	
	25.7%	29.4%	7.3%	16.5%	21.1%	100.0%	

Analysis:

Table 7 offers descriptive statistics for various strategies employed by individuals in response to price hikes. These strategies include “Increased by overtime,” “Shift to another job,” “Utilize idle resources,” “Mortgage assets,” and “Temporary migration for work.” “Temporary migration for work” has the highest mean rating of 4.30, indicating it is commonly used.

“Mortgage assets” also has a high average score of 4.00, signifying significant utilization. “Increased by overtime” is moderately used, with an average score of 3.21. “Shift to another job” shows relatively higher utilization with an average score of 3.59 and “Utilize idle resources” has a moderate to high utilization, with an average score of 3.63. The “Std. Deviation” measures the variability around the mean, and “Utilize idle resources” has a low standard deviation of 0.74, indicating consistent responses for this strategy.

From **Table 8**, the Levene Statistic, which is used to test the homogeneity of variances, is computed to be 16.166. It has 4 and 104 degrees of freedom, and the associated p-value is 0.000. This result indicates that there are statistically significant differences in variances among the groups being compared. Here, the assumption of equal variances across groups is violated. So we use a non-parametric Kruskal-Wallis test to conduct the analysis.

The Kruskal-Wallis test for homogeneity of variances retains the null hypothesis; it means that there is no statistically significant difference in variances between the groups being compared. In other words, the assumption of equal

Table 7. Descriptive statistics of strategies in response to price hikes.

	N	Mean	Std. deviation	Std. error	95% confidence interval for mean		Min	Max	Between component variance
					Lower bound	Upper bound			
Increased by overtime	28	3.2143	1.85307	0.35020	2.4957	3.9328	1.00	5.00	
Shift to other job	32	3.5938	1.34066	0.23700	3.1104	4.0771	2.00	5.00	
Utilize idle Resources	8	3.6250	0.74402	0.26305	3.0030	4.2470	2.00	4.00	
Mortgage assets	18	4.0000	1.08465	0.25565	3.4606	4.5394	2.00	5.00	
Temporary migration for work	23	4.3043	.82212	0.17142	3.9488	4.6599	3.00	5.00	
Total	109	3.7156	1.37499	0.13170	3.4545	3.9766	1.00	5.00	
Model									
Fixed effects			1.34156	0.12850	3.4608	3.9704			
Random effects				0.20806	3.1379	4.2933			0.11675

Table 8. Homogeneity of variances test for price hike strategies.

Levene statistic	df1	df2	Sig.
16.166	4	104	0.000

variances is met, and the variability in the data across different groups is not significantly different. This is a desirable result when conducting certain statistical analyses, such as one-way analysis of variance (ANOVA), which assumes equal variances between groups. When the null hypothesis is retained in the Kruskal-Wallis test, the Kruskal-Wallis test for homogeneity of variances retains the null hypothesis; it means that there is no statistically significant difference in variances between the groups being compared (see **Table 9**).

The ANOVA results for the “Price Hike Strategies” show that there is a marginally significant difference in the means of the strategies ($p = 0.051$). The Between Groups variance (4.251) is larger than the Within Groups variance (1.800), indicating some potential differences in the strategies across groups. However, the p-value is just above the conventional threshold of 0.05, indicating that the result is statistically significant at a standard confidence level (see **Table 10**).

Interpretation:

In the post hoc tests, the null hypothesis (H_0) is that there is no significant mean difference between the strategies used in response to price hikes. The post hoc tests, specifically the Tukey HSD tests, aim to determine whether this null hypothesis can be rejected. **Table 11** displays the results of pair wise comparisons between different strategies (“Alter Income”) employed in response to price hikes, and it provides information on the mean differences, standard errors, significance levels (Sig.), and 95% confidence intervals for each comparison. The results of the Tukey HSD test for the variable “Pricehike 12” reveal significant mean differences between specific pairs of strategies used in response to price hikes. The pair “Temporary migration for work” and “Increased by overtime” demonstrates a statistically significant mean difference ($p = 0.037$), with a mean difference of approximately 1.09006. However, for all other pairs, including “Increased by overtime” and “Shift to other job,” “Utilize idle Resources,” “Mortgage assets,” as well as “Shift to other job” and “Utilize idle Resources,” “Mortgage assets,” “Temporary migration for work,” and “Utilize idle Resources,” “Mortgage assets,” and “Temporary migration for work,” there is no significant evidence of mean differences ($p > 0.05$), as their p-values exceed the 0.05 significance level. Based on the results of the Tukey HSD test, the null hypothesis (H_0) is rejected for the pair “Temporary migration for work” and “Increased by overtime,” as their mean difference is statistically significant (see **Table 11**).

Alternative Food Consumption Behavior in Response to Price Rise: Household income does not always increase at the same rate as the rise in essential commodity prices. This discrepancy forces families to cut down their spending, affecting their overall standard of living. These findings highlight the critical need for effective policies, social safety nets, and strategies to address food price inflation and ensure food security for all, especially during times of severe economic challenges (see **Table 12**).

Table 9. Robust tests of equality of means for price hike strategies.

Robust tests of equality of means				
	Statistical	df1	df2	Sig.
Welch	2.925	4	38.116	0.033
Brown-Forsythe	2.907	4	85.460	0.026
Asymptotically F distributed				

Table 10. ANOVA for price hike strategies.

ANOVA for pricehike12					
	Sum of squares	D f	Mean square	F	Sig.
Between groups	17.006	4	4.251	2.362	0.051
Within groups	187.178	104	1.800		
Total	204.183	108			

Table 11. Post hoc tests for multiple comparisons of alternative income strategies.

Post hoc tests for multiple comparisons						
(I) Alter income	(J) Alter income	Mean difference (I-J)	Std. error	Sig.	95% confidence interval	
					Lower bound	Upper bound
Increased by overtime	Shift to other job	-0.37946	0.34716	0.810	-1.3433	0.5843
	Utilize idle resources	-0.41071	0.53782	0.940	-1.9038	1.0824
	Mortgage assets	-0.78571	0.40530	0.304	-1.9109	0.3395
	Temporary migration for work	-1.09006*	0.37753	0.037	-2.1382	-0.0420
Shift to other job	Increased by overtime	0.37946	0.34716	0.810	-0.5843	1.3433
	Utilize idle resources	-0.03125	0.53030	1.000	-1.5035	1.4410
	Mortgage assets	-0.40625	0.39526	0.842	-1.5036	0.6911
	Temporary migration for work	-0.71060	0.36674	0.304	-1.7287	0.3075
Utilize idle resources	Increased by overtime	0.41071	0.53782	0.940	-1.0824	1.9038
	Shift to other job	0.03125	0.53030	1.000	-1.4410	1.5035
	Mortgage assets	-0.37500	0.57005	0.965	-1.9576	1.2076
	Temporary migration for work	-0.67935	0.55066	0.732	-2.2081	0.8494
Mortgage assets	Increased by overtime	0.78571	0.40530	0.304	-0.3395	1.9109
	Shift to other job	0.40625	0.39526	0.842	-0.6911	1.5036
	Utilize idle resources	0.37500	0.57005	0.965	-1.2076	1.9576
	Temporary migration for work	-0.30435	0.42218	0.951	-1.4764	0.8677
Temporary migration for work	Increased by overtime	1.09006*	0.37753	0.037	0.0420	2.1382
	Shift to other job	0.71060	0.36674	0.304	-0.3075	1.7287
	Utilize idle resources	0.67935	0.55066	0.732	-0.8494	2.2081
	Mortgage assets	0.30435	0.42218	0.951	-0.8677	1.4764

*. The mean difference is significant at the 0.05 level.

Table 12. Homogeneous subsets.

Alter income	Tukey HSDa, b	
	N	Subset for alpha = 0.05
		1
Increased by overtime	28	3.2143
Shift to other job	32	3.5938
Utilize idle resources	8	3.6250
Mortgage assets	18	4.0000
Temporary migration for work	23	4.3043
Sig.		0.000

Interpretation:

From **Table 13**, Respondents exhibit a diverse set of strategies to address price hikes, adapting their approach based on the magnitude of the increase. For lower price hikes (up to 20% and 20% - 40%), 18.2% respondents Maintain quantity, quality and search other income and 29.4% maintain Lower quality in smaller quantity. As the price hikes become more severe, especially above 80%, a significant 58.1% of respondents prefer a strategy of “Lower quantity, quality, and engaging new members in the work.”

Analysis:

Table 14 provided in the descriptive statistics related to food consumption behavior in response to price hikes. The behaviors are categorized into different strategies, and each category represents a unique approach adopted by households when faced with rising food prices. The statistics include various measures such as mean, standard deviation, standard error, 95% confidence interval, minimum and maximum values for each category. **Table 14** also highlights the between-component variance, which shows the variability between the categories.

The strategies adopted by households include lowering the quantity while maintaining the same quality, opting for smaller quantities while maintaining the same quality, choosing lower quality while reducing the quantity, maintaining both quantity and quality while seeking additional income, and lowering both quantity and quality while involving new family members in income-generating activities. Lowering quantity while maintaining the same quality was the strategy adopted by 24 respondents with a mean score of 3.54. On the other hand, 26 respondents opted for smaller quantities while maintaining the same quality, with a mean score of 3.69. 17 respondents chose lower quality food but in smaller quantities, with a mean score of 3.24. 11 respondents aimed to maintain both the quantity and quality of food while seeking additional income sources, with an average score of 3.63. Meanwhile, the “Lower quantity, quality, and engaging new members in work” category had a high mean score of 4.71,

Table 13. Consumer response to food price hikes: strategies and preferences.

		Pricehike12					Total
		Up to 20%	(20 - 40) %	(40 - 60) %	(60 - 80) %	Above 80%	
Alter food	Lower quantity in same quantity	3	4	3	5	9	24
		12.5%	16.7%	12.5%	20.8%	37.5%	100.0%
	Smaller quantity in same quality	2	3	4	9	8	26
		7.7%	11.5%	15.4%	34.6%	30.8%	100.0%
	Lower quality in smaller quantity	2	5	2	3	5	17
		11.8%	29.4%	11.8%	17.6%	29.4%	100.0%
	Maintain quantity, quality and search other income	2	1	1	2	5	11
	18.2%	9.1%	9.1%	18.2%	45.5%	100.0%	
Lower quantity, quality and engaging new member in the work	1	3	4	5	18	31	
	3.2%	9.7%	12.9%	16.1%	58.1%	100.0%	
Total	10	16	14	24	45	109	
	9.2%	14.7%	12.8%	22.0%	41.3%	100.0%	

Table 14. Descriptive statistics for food consumption behavior in response to price hike categories.

		Pricehike12								
		N	Mean	Std. deviation	Std. error	95% confidence interval for mean		Min	Max	Between- component variance
						Lower bound	Upper bound			
Lower quantity in same quantity	24	3.5417	1.47381	0.30084	2.9193	4.1640	1.00	5.00		
Smaller quantity in same quality	26	3.6923	1.25759	0.24663	3.1844	4.2003	1.00	5.00		
Lower quality in smaller quantity	17	3.2353	1.48026	0.35902	2.4742	3.9964	1.00	5.00		
Maintain quantity, quality and search other income	11	3.6364	1.62928	0.49125	2.5418	4.7309	1.00	5.00		
Lower quantity, quality and engaging new member in the work	31	4.1613	1.18594	0.21300	3.7263	4.5963	1.00	5.00		
Total	109	3.7156	1.37499	0.13170	30.4545	3.9766	1.00	5.00		
Model	Fixed effects		10.36331	0.13058	3.4566	3.9745				
	Random effects			0.16134	3.2676	4.1635			0.04067	

indicating that many households reduce both food quantity and quality and engage new members in income-generating activities to address the financial challenges posed by rising food prices. The fixed effects show a value of 0.74095, while the random effects have a value of 0.66894. These values indicate the ex-

tent to which the model's factors account for the variation in the data. The fixed effects explain about 74% of the variation, while the random effects account for approximately 67%. This suggests that the fixed factors have a significant impact on the data, and the random factors also contribute to the overall variation.

Interpretation: For **Table 15**, since p-value is 0.197, so, I fail to reject the null hypothesis that the variances are equal across groups. This indicating that the assumption of homogeneity of variances is met, which is important for the validity of ANOVA. Both the Welch and Brown-Forsythe tests, the p-values are above 0.05 (0.217 and 0.265, respectively). So we may accept the null hypothesis. Again, we run the Kruskal-Wallis test for homogeneity of variances. From the Kruskal-Wallis test for homogeneity of variances, decision is retaining the null hypothesis; it means that there is no statistically significant difference in variances between the groups being compared. In other words, the assumption of equal variances is met, and the variability in the data across different groups is not significantly different. This is a desirable result when conducting certain statistical analyses, such as one-way analysis of variance (ANOVA), which assumes equal variances between groups (see **Table 16**).

Interpretation: The ANOVA results for "Pricehike12" indicate a statistically significant difference between the groups. The between-groups variation (Sum of Squares = 147.086) is much larger than the within-groups variation (Sum of Squares = 57.097). The F-statistic of 66.978 with a corresponding p-value (Sig.) of 0.000 strongly indicates that the differences among the group means are highly significant (see **Table 17**).

Table 15. Homogeneity of variances test for price hike strategies.

Test of homogeneity of variances			
Levene statistic	df1	df2	Sig.
1.538	4	104	0.197

Table 16. Robust tests of equality of means for price hike strategies.

Robust tests of equality of means				
	Statistical	df1	df2	Sig.
Welch	1.510	4	40.185	0.217
Brown-Forsythe	1.338	4	66.277	0.265
Asymptotically F distributed				

Table 17. ANOVA for price hike strategies.

	Sum of squares	df	Mean square	F	Sig.
Between groups	147.086	4	36.772	66.978	0.000
Within groups	57.097	104	0.549		
Total	204.183	108			

Interpretation:

The results of the Tukey HSD test indicate that there are significant mean differences between certain pairs of strategies. The pairs “Lower quantity, quality, and engaging new members in the work” and “Smaller quantity in the same quality” show a statistically significant mean difference ($p < 0.05$). The pair “Lower quantity, quality, and engaging new members in the work” and “Maintain quantity, quality, and search other income” also demonstrate a statistically significant mean difference ($p < 0.05$). All other pairs do not show statistically significant mean differences ($p > 0.05$). This shows that for the variable “Pricehike12,” there are significant distinctions between these specific pairs of strategies. The choice of “Alter Food” strategy appears to have a significant impact on “Pricehike12” for these pairs (see **Table 18**).

Alternative Accommodation Behavior in Response to Price Rise:

In an ever-fluctuating global economy, numerous industries are susceptible to the impacts of change, and one such industry is hospitality. A notable consequence of economic fluctuations is the unpredictable rise and fall of accommodation prices. These price shifts can exert a profound influence on consumer behavior, prompting individuals to explore alternative strategies to meet their housing needs. These shifts in accommodation behavior can be attributed to a range of factors, including economic conditions, personal preferences, and regional dynamics. Consequently, understanding these adaptive strategies becomes essential for both consumers and industry stakeholders as they navigate the uncertainties of the market. While moderate price hikes in accommodation may not immediately disrupt the status quo, they can cumulatively erode housing affordability over time. When the price hike reaches the 20% - 40% range, it can often trigger housing crises, leading to a struggle for affordable living spaces. Beyond this range, at 40% - 60% price hikes, housing affordability becomes a critical issue, potentially leading to homelessness and social unrest. Extreme price hikes can push the situation into a housing emergency, leaving a significant portion of individuals without access to adequate shelter. Additionally, the practice of landlords increasing rent with each change of tenant significantly influences people’s decisions to remain in the same place. During major price hikes, a substantial portion of the population, approximately 49.5% (**Table 19**), is compelled to make compromises in their living arrangements, often choosing smaller and lower-quality homes due to rising rental costs.

Analysis:

The strategies adopted by households include lowering the quantity while maintaining the same quality, opting for smaller quantities while maintaining the same quality, choosing lower quality while reducing the quantity, maintaining both quantity and quality while seeking additional income, and lowering both quantity and quality while involving new family members in income-generating activities. From **Table 20**, lowering quantity while maintaining the same quality was the strategy adopted by 19 respondents with a mean score

Table 18. Post hoc tests for multiple comparisons of alternative income strategies.

Multiple comparisons						
Dependent variable: Pricehike12						
Tukey HSD						
(I) Alter food	(J) Alter food	Mean diff (I-J)	Std. error	Sig.	95% confidence interval	
					Lower bound	Upper bound
Lower quantity in same quantity	Smaller quantity in same quality	-0.15064	0.38591	0.995	-1.2220	0.9207
	Lower quality in smaller quantity	0.30637	0.43217	0.954	-0.8934	1.5062
	Maintain quantity, quality and search other income	-0.09470	0.49639	1.000	-1.4728	1.2834
	Lower quantity, quality and engaging new member in the work	-0.61962	0.37067	0.456	-1.6487	0.4094
Smaller quantity in same quality	Lower quantity in same quantity	0.15064	0.38591	0.995	-0.9207	1.2220
	Lower quality in smaller quantity	0.45701	0.42522	0.819	-0.7235	1.6375
	Maintain quantity, quality and search other income	0.05594	0.49036	1.000	-1.3054	1.4173
	Lower quantity, quality and engaging new member in the work	-0.46898	0.36255	0.000	-1.4755	0.5375
Lower quality in smaller quantity	Lower quantity in same quantity	-0.30637	0.43217	0.954	-1.5062	0.8934
	Smaller quantity in same quality	-0.45701	0.42522	0.819	-1.6375	0.7235
	Maintain quantity, quality and search other income	-0.40107	0.52754	0.941	-1.8656	1.0635
	Lower quantity, quality and engaging new member in the work	-0.92600	0.41144	0.170	-2.0682	0.2163
Maintain quantity, quality and search other income	Lower quantity in same quantity	0.09470	0.49639	1.000	-1.2834	1.4728
	Smaller quantity in same quality	-0.05594	0.49036	1.000	-1.4173	1.3054
	Lower quality in smaller quantity	0.40107	0.52754	0.941	-1.0635	1.8656
	Lower quantity, quality and engaging new member in the work	-0.52493	0.47845	0.000	-1.8532	0.8034
Lower quantity, quality and engaging new member in the work	Lower quantity in same quantity	0.61962	0.37067	0.456	-0.4094	1.6487
	Smaller quantity in same quality	0.46898	0.36255	0.000	-0.5375	1.4755
	Lower quality in smaller quantity	0.92600	0.41144	0.170	-0.2163	2.0682
	Maintain quantity, quality and search other income	0.52493	0.47845	0.000	-0.8034	1.8532

Table 19. Consumer response to accommodation price hikes: strategies and preferences.

		Alter accommodation					Total
		Lower quantity in same quantity	Smaller quantity in same quality	Lower quality in smaller quantity	Maintain quantity, quality and search other income	Lower quantity, quality and engaging new member in the work	
Price hike ¹²	Up to 20%	1 10.0%	2 20.0%	6 60.0%	0 0.0%	1 10.0%	10 100.0%
	(20 - 40)%	3 18.8%	2 12.5%	6 37.5%	3 18.8%	2 12.5%	16 100.0%
	(40 - 60)%	0 0.0%	0 0.0%	4 28.6%	4 28.6%	6 42.9%	14 100.0%
	(60 - 80)%	3 12.5%	2 8.3%	1 4.2%	3 12.5%	15 62.5%	24 100.0%
	Above 80%	12 26.7%	1 2.2%	1 2.2%	1 2.2%	30 66.7%	45 100.0%
Total		19 17.4%	7 6.4%	18 16.5%	11 10.1%	54 49.5%	109 100.0%

Table 20. Descriptive analysis of consumer responses to accommodation price hikes.

Price hike	N	Mean	Std. deviation	Std. error	95% confidence interval for mean		Min	Max	Between-component variance
					Lower Bound	Upper Bound			
Lower quantity in same quantity	19	4.1579	1.34425	0.30839	3.5100	4.8058	1.00	5.00	
Smaller quantity in same quality	7	2.7143	1.60357	0.60609	1.2312	4.1973	1.00	5.00	
Lower quality in smaller quantity	18	2.1667	1.15045	0.27116	1.5946	2.7388	1.00	5.00	
Maintain quantity, quality and search other income	11	3.1818	0.98165	0.29598	2.5223	3.8413	2.00	5.00	
Lower quantity, quality and engaging new member in the work	54	4.3148	0.94817	0.12903	4.0560	4.5736	1.00	5.00	
Total	109	3.7156	1.37499	0.13170	3.4545	3.9766	1.00	5.00	
Model	Fixed effects		1.10827	0.10615	3.5051	3.9261			
	Random effects			0.56250	2.1538	5.2774			0.96139

of 4.16, indicating that, on average, consumers are willing to reduce the quantity of accommodation without compromising on quality when faced with price increases. On the other hand, 7 respondents opted for smaller quantities while maintaining the same quality, with a mean score of 2.71, suggesting that some consumers opt for smaller accommodation without compromising on quality. 18

respondents chose lower quality food but in smaller quantities, with a mean score of 2.17, indicating that consumers are willing to accept a lower quality accommodation if it allows them to reduce the quantity. 11 respondents aimed to maintain both the quantity and quality of food while seeking additional income sources, with an average score of 3.18, showing that consumers prefer to maintain their desired quantity and quality of accommodation and look for additional income sources to cope with price increases. Meanwhile, the “Lower quantity, quality, and engaging new members in work” category had a high mean score of 4.31, suggesting that many consumers are willing to reduce both the quantity and quality of accommodation while engaging new members in work to address price hikes.

Interpretation:

For **Table 21**, since p-value is 0.082, so, I fail to reject the null hypothesis that the variances are equal across groups. This indicating that the assumption of homogeneity of variances is met, which is important for the validity of ANOVA. **Table 22** presents the results of robust tests for the equality of means among different groups, specifically utilizing statistics that are asymptotically F distributed. Two such statistics, the Welch and Brown-Forsythe tests, have been applied to the data to assess the equality of means. The degrees of freedom (df1 and df2) and the associated p-values (Sig.) for each test are provided. Both tests yield highly significant p-values ($p < 0.001$), indicating strong evidence of differences in means among the groups. Based on these results (**Table 22**), it would be appropriate to conclude that there are significant differences in means across the groups which are comparing.

Interpretation:

The ANOVA results for “Pricehike12” indicate a statistically significant difference between the groups. The between-groups variance (19.111) is much larger than the within-groups variance (1.228). The F-statistic of 15.559 with a corresponding p-value (Sig.) of 0.000 strongly indicates that the differences among the group means are highly significant.

Table 21. Test of homogeneity of variances for price hike responses.

Levene statistic	df1	df2	Sig.
2.129	4	104	0.082

Table 22. Robust tests of equality of means using asymptotically f distributed statistics.

Robust tests of equality of means				
	Statistical	df1	df2	Sig.
Welch	14.112	4	24.500	0.000
Brown-Forsythe	12.089	4	32.259	0.000
Asymptotically F distributed				

Interpretation:

The pair “Lower quantity in the same quantity” and “Smaller quantity in the same quality” have a significant mean difference of approximately 1.44 ($p = 0.032$), with a confidence interval (CI) suggesting that the mean difference falls between 0.0832 and 2.8040. “Lower quantity in the same quantity” and “Lower quality in smaller quantity” also has a significant mean difference. The pair “Smaller quantity in the same quality” and “Lower quantity, quality, and engaging new member in the work” have a significant mean difference of approximately 1.60053 (CI: 0.3645 to 2.8365). The pair “Lower quantity, quality, and engaging new member in the work” and “Maintain quantity, quality, and search other income” also have a significant mean difference of approximately 1.13300. The pairs “Lower quantity, quality, and engaging new member in the work and Lower quality in smaller quantity” and “Lower quantity, quality, and engaging new member in the work and smaller quantity in the same quality” also have significant mean differences. For all other pairs, there are no statistically significant mean differences in “Pricehike12.” Based on the results, it appears that there are statistically significant differences in “Pricehike12” between specific pairs of strategies, as indicated by the significant mean differences and the associated p-values. These results provide insights into how different accommodation strategies affect the “Pricehike12” variable (see [Table 23](#) and [Table 24](#)).

Analysis:

For the “No change” in alternative education behavior, the highest preference is for maintaining the same educational approach when the price hike is relatively low (up to 20%), accounting for 36.4% of the total responses, while (27.3%) faced a (40 - 60)% price hike. Few respondents faced lower or higher price hikes. This suggests that individuals tend to stick to their existing educational methods when the cost increase is minimal. “Less expensive school in the same coaching” was most common when the price hike was above 80%, with 75% of respondents in this category. The other price hike categories had fewer respondents choosing this alternative. For a price hike in the range of 40% - 60%, a significant portion of respondents (28.6%) prefers to stay in the same school and coaching but actively search for alternatives and with 35.7% of respondents choosing this alternative when the price hike was above 80%. When the price hike is substantial, between 60% - 80%, the majority of respondents (62.5%) are willing to forego coaching but stay in the same school. This indicates a prioritization of school over coaching when cost constraints become pronounced. When the price hike exceeds 80%, a significant proportion (33.3%) is willing to reduce coaching while staying in the same school. This suggests that people are more inclined to compromise on additional educational support when the cost increase becomes extreme. When price hikes are above 80%, a substantial portion (30.8%) considers pulling children out of school as an alternative, indicating the severe impact of such price increases on access to education. This alternative was also chosen by a substantial percentage in the (40 - 60)% price hike category (see [Table 25](#)). The overall distribution of responses

Table 23. ANOVA for price hike strategies.

ANOVA					
	Sum of squares	df	Mean square	F	Sig.
Between groups	76.444	4	19.111	15.559	0.000
Within groups	127.739	104	1.228		
Total	204.183	108			

Table 24. Post hoc tests for multiple comparisons of alternative accommodation strategies.

Multiple comparisons							
Dependent variable: Price hike12							
Tukey HSD							
(I) Alter accommodation	(J) Alter accommodation	Mean difference (I-J)	Std. error	Sig.	95% confidence interval		
					Lower bound	Upper bound	
Lower quantity in same quantity	Smaller quantity in same quality	1.44361*	0.49001	0.032	0.0832	2.8040	
	Lower quality in smaller quantity	1.99123*	0.36453	0.000	0.9792	3.0032	
	Maintain quantity, quality and search other income	0.97608	0.41989	0.145	-0.1896	2.1418	
	Lower quantity, quality and engaging new member in the work	-0.15692	0.29562	0.984	-0.9776	0.6638	
Smaller quantity in same quality	Lower quantity in same quantity	-1.44361*	0.49001	0.032	-2.8040	-0.0832	
	Lower quality in smaller quantity	0.54762	0.49366	0.801	-0.8229	1.9181	
	Maintain quantity, quality and search other income	-0.46753	0.53584	0.906	-1.9551	1.0201	
	Lower quantity, quality and engaging new member in the work	-1.60053*	0.44521	0.004	-2.8365	-0.3645	
Lower quality in smaller quantity	Lower quantity in same quantity	-1.99123*	0.36453	0.000	-3.0032	-0.9792	
	Smaller quantity in same quality	-0.54762	0.49366	0.801	-1.9181	0.8229	
	Maintain quantity, quality and search other income	-1.01515	0.42414	0.125	-2.1927	0.1624	
	Lower quantity, quality and engaging new member in the work	-2.14815*	0.30163	0.000	-2.9855	-1.3107	
Maintain quantity, quality and search other income	Lower quantity in same quantity	-0.97608	0.41989	0.145	-2.1418	0.1896	
	Smaller quantity in same quality	0.46753	0.53584	0.906	-1.0201	1.9551	
	Lower quality in smaller quantity	1.01515	0.42414	0.125	-0.1624	2.1927	
	Lower quantity, quality and engaging new member in the work	-1.13300*	0.36661	0.021	-2.1508	-0.1152	
Lower quantity, quality and engaging new member in the work	Lower quantity in same quantity	0.15692	0.29562	0.984	-0.6638	0.9776	
	Smaller quantity in same quality	1.60053*	0.44521	0.004	0.3645	2.8365	
	Lower quality in smaller quantity	2.14815*	0.30163	0.000	1.3107	2.9855	
	Maintain quantity, quality and search other income	1.13300*	0.36661	0.021	0.1152	2.1508	

*. The mean difference is significant at the 0.05 level.

Table 25. Response to price hikes in education: strategies and preferences.

	Price hike ¹²					Total	
	Up to 20%	(20 - 40) %	(40 - 60) %	(60 - 80) %	Above 80%		
Alternatives education	No change	1 9.1%	4 36.4%	3 27.3%	2 18.2%	1 9.1%	11 100.0%
	Less expensive school in same coaching	3 7.5%	2 5.0%	2 5.0%	3 7.5%	30 75.0%	40 100.0%
	Same school and coaching and search alternative	2 14.3%	4 28.6%	1 7.1%	2 14.3%	5 35.7%	14 100.0%
	No coaching but same school	2 12.5%	2 12.5%	2 12.5%	10 62.5%	0 0.0%	16 100.0%
	Less coaching in same school	1 6.7%	2 13.3%	3 20.0%	4 26.7%	5 33.3%	15 100.0%
	Getting children out of school	1 7.7%	2 15.4%	3 23.1%	3 23.1%	4 30.8%	13 100.0%
	Total	10 9.2%	16 14.7%	14 12.8%	24 22.0%	45 41.3%	109 100.0%

shows that when price hikes are relatively low (up to 20%), most people prefer to maintain their existing education arrangements. As the price hikes become more significant, there is a shift toward exploring alternatives, reducing expenses, or even, in extreme cases, discontinuing education. In summary, the data demonstrates that as the financial burden of price hikes increases, individuals and communities are more inclined to make significant adjustments to their educational choices. This shift is noticeable in the transition from maintaining the status quo to exploring alternatives, reducing expenses, or even discontinuing education as the price hikes become more substantial. These findings emphasize the critical role that financial considerations play in shaping educational decisions and underscore the importance of addressing the accessibility and affordability of education in the face of rising prices (see [Table 26](#)).

The mean scores indicate the average preference level for each education behavior in response to price hikes. The “Less expensive school in the same coaching” alternative has the highest mean score (4.375), suggesting that, on average, this option is the most preferred when dealing with price hikes. “No change” has the lowest mean score (2.8182), indicating it is less preferred, especially in the context of substantial price increases. “Same school and coaching and search alternative” has the highest standard deviation (1.58980), indicating a wider range of preferences, while “No change” has a relatively lower standard deviation (1.16775). The 95% confidence intervals provide a range within which the true population mean is likely to fall. For all alternatives, the confidence intervals are

Table 26. Descriptive analysis of consumer responses to education price hikes.

	N	Mean	Std. deviation	Std. error	95% confidence interval for mean		Min	Max	Between-component variance
					Lower bound	Upper bound			
No change	11	2.8182	1.16775	0.35209	20.0337	3.6027	1.00	5.00	
Less expensive school in same coaching	40	4.3750	1.25448	0.19835	30.9738	4.7762	1.00	5.00	
Same school and coaching and search alternative	14	3.2857	1.58980	0.42489	20.3678	4.2036	1.00	5.00	
No coaching but same school	16	3.2500	1.12546	0.28137	20.6503	3.8497	1.00	4.00	
Less coaching in same school	15	3.6667	1.29099	0.33333	20.9517	4.3816	1.00	5.00	
Getting children out of school	13	3.5385	1.33012	0.36891	20.7347	4.3422	1.00	5.00	
Total	109	3.7156	1.37499	0.13170	30.4545	3.9766	1.00	5.00	
Model									
Fixed effects			10.29011	0.12357	3.4705	3.9607			
Random effects				0.27756	3.0021	4.4291			0.28589

relatively narrow, suggesting that the sample mean is a reasonably accurate estimate of the population mean. “No change” has the lowest minimum value (1.00), indicating that, in some cases, respondents showed a strong preference for maintaining the same educational approach even in the face of price hikes. The maximum value is 5.00 for all alternatives, which implies that some respondents rated each alternative as their top choice.

Interpretation:

From **Table 27**, see that The Levene Statistic is a test statistic used to determine whether there are significant differences in variances between the groups. In this case, the test has resulted in a p-value (Sig.) of 0.324. A p-value of 0.324 is greater than the typical significance level of 0.05. This suggests that there is no strong evidence to reject the null hypothesis, which means that the variances in the “Pricehike12” variable across the different groups are approximately equal.

From **Table 28**, Both the Welch and Brown-Forsythe tests are considered robust tests for comparing means because they do not rely on the assumption of equal variances. The fact that both tests have p-values less than 0.05 indicates that there is strong evidence to conclude that the means of the groups are different (see **Table 29**).

Interpretation:

In the ANOVA (**Table 30**), between Groups shows the variability between the different groups (categories within “Pricehike12”). The sum of squares between groups is 32.751, and there are 5 degrees of freedom (See **Table 29**, df= Degrees of freedom). The mean square is calculated as 6.550 (Mean Square = Sum of

Squares/d f). The F-statistic is 3.935, and the associated p-value (Sig.) is 0.003. Since the p-value (0.003) is less than the typical significance level of 0.05, you reject the null hypothesis. This indicates that there are significant differences in means between the groups. And the sum of squares between groups is 32.751, with 5 degrees of freedom (d f). The mean square is calculated as 6.550 (Mean Square = Sum of Squares/d f). The F-statistic is 3.935, and the associated p-value (Sig.) is 0.003. Since the p-value (0.003) is less than the typical significance level of 0.05, you reject the null hypothesis. This indicates that there are significant differences in means between the groups. The total sum of squares is 204.183, (108 Degrees of freedom). In summary, the ANOVA results show that there are significant differences in means between the groups in the “Pricehike12” variable. The p-value (0.003) is less than the typical significance level of 0.05, indicating that the null hypothesis can be rejected.

Interpretation:

The Tukey HSD test results indicate significant differences in mean scores for specific pairs of “Alternatives Education” categories, as highlighted by the 95% confidence intervals that do not include zero. These significant differences imply that certain groups within “Alternatives Education” have distinct responses to the price hike, while others do not exhibit statistically significant differences. For the pair between “No change” and “Less expensive school in the same coaching,” the mean difference is significant at the 0.05 level. The same significant difference is noted in reverse (“Less expensive school in the same coaching” vs. “No change”) and the 95% confidence interval (−2.8324, −0.2813) does not include zero, indicating a significant difference between these two categories at the 0.05 level. Some group comparisons, such as “Same school and coaching and search alternative” vs. “Getting children out of school,” do not show significant differences (p-value is greater than 0.05). The significance level for each comparison is specified, and when the difference is significant, it is marked with an asterisk (see [Table 30](#)).

Table 27. Test of homogeneity of variances for price hike responses.

Test of homogeneity of variances			
Levene statistic	df1	df2	Sig.
1.180	5	103	0.324

Table 28. Robust tests of equality of means using asymptotically f distributed statistics.

Robust tests of equality of means				
	Statistical	df1	df2	Sig.
Welch	4.021	5	36.814	0.005
Brown-Forsythe	3.852	5	73.990	0.004
Asymptotically F distributed				

Table 29. ANOVA for price hike strategies.

ANOVA					
	Sum of squares	df	Mean square	F	Sig.
Between groups	32.751	5	6.550	3.935	0.003
Within groups	171.433	103	1.664		
Total	204.183	108			

Table 30. Post hoc tests for multiple comparisons of alternative educational strategies.

Multiple comparisons						
Tukey HSD						
(I) Alternatives education	(J) Alternatives education	Mean difference (I-J)	Std. error	Sig.	95% confidence interval	
					Lower bound	Upper bound
No change	Less expensive school in same coaching	-1.55682*	0.43922	0.008	-2.8324	-0.2813
	Same school and coaching and search alternative	-0.46753	0.51980	0.946	-1.9771	1.0420
	No coaching but same school	-0.43182	0.50531	0.956	-1.8993	1.0356
	Less coaching in same school	-0.84848	0.51212	0.563	-2.3357	0.6388
	Getting children out of school	-0.72028	0.52853	0.749	-2.2552	0.8146
Less expensive school in same coaching	No change	1.55682*	0.43922	0.008	0.2813	2.8324
	Same school and coaching and search alternative	1.08929	0.40062	0.080	-0.0741	2.2527
	No coaching but same school	1.12500*	0.38162	0.044	0.0167	2.2333
	Less coaching in same school	0.70833	0.39060	0.462	-0.4260	1.8427
	Getting children out of school	0.83654	0.41187	0.332	-0.3596	2.0327
Same school and coaching and search alternative	No change	0.46753	0.51980	0.946	-1.0420	1.9771
	Less expensive school in same coaching	-1.08929	0.40062	0.080	-2.2527	0.0741
	No coaching but same school	0.03571	0.47213	1.000	-1.3354	1.4068
	Less coaching in same school	-0.38095	0.47942	0.968	-1.7732	1.0113
	Getting children out of school	-0.25275	0.49691	0.996	-1.6958	1.1903
No coaching but same school	No change	0.43182	0.50531	0.956	-1.0356	1.8993
	Less expensive school in same coaching	-1.12500*	0.38162	0.044	-2.2333	-0.0167
	Same school and coaching and search alternative	-0.03571	0.47213	1.000	-1.4068	1.3354
	Less coaching in same school	-0.41667	0.46366	0.946	-1.7632	0.9298
	Getting children out of school	-0.28846	0.48172	0.991	-1.6874	1.1105
Less coaching in same school	No change	0.84848	0.51212	0.563	-0.6388	2.3357
	Less expensive school in same coaching	-0.70833	0.39060	0.462	-1.8427	0.4260
	Same school and coaching and search alternative	0.38095	0.47942	0.968	-1.0113	1.7732
	No coaching but same school	0.41667	0.46366	0.946	-0.9298	1.7632
	Getting children out of school	0.12821	0.48887	1.000	-1.2915	1.5479

Continued

	No change	0.72028	0.52853	0.749	-0.8146	2.2552
Getting children out of school	Less expensive school in same coaching	-0.83654	0.41187	0.332	-2.0327	0.3596
	Same school and coaching and search alternative	0.25275	0.49691	0.996	-1.1903	1.6958
	No coaching but same school	0.28846	0.48172	0.991	-1.1105	1.6874
	Less coaching in same school	-0.12821	0.48887	1.000	-1.5479	1.2915

*. The mean difference is significant at the 0.05 level.

5. Result and Discussion

The study explores household responses to escalating commodity prices, focusing on economic adjustments related to food, accommodation, and education. Survey data from respondents aged 18 and above reveal significant demographic shifts. The average family size decreased from 5.32 (2020) to 4.2 (2023), accompanied by a decline in female-headed households from 40% to 34.9% (Table 1).

Occupational changes are evident with declines in categories like “Local businessman,” “Skilled labor,” and “Agriculture,” coupled with an increase in “Day laborer” and “Tempo/Rickshaw/Van/Bus helper.” Asset ownership patterns also shifted, showing a decrease in homestead land (67% to 46.8%), cultivable land (20% to 15.6%), and livestock (62% to 45%) from 2020 to 2023. Onions, garlic, ginger, white flour, sugar, eggs, and potatoes experienced substantial price hikes (275%, 108%, 483%, 100%, 118%, 100%, and 225%, respectively), impacting living costs significantly. The prices of various items, including vegetables, fish, housing rent, educational costs, transportation expenses, toothpaste, soap, and detergent, other grocery items, fruits, and clothing, are continually increasing. Vegetable prices, in particular, have not fallen below 60 Taka. Despite government regulations, retailers often deviate from price controls, posing challenges for poor and extremely poor households (Table 2).

Households respond differently to price hikes. For lower hikes (up to 20%), the primary response is increased income through overtime or temporary migration. At 20% - 40%, a significant portion (68.8%) shifts to different jobs. Extreme hikes prompt the use of idle resources, asset mortgages, and temporary migration. When facing an extreme price hike above 80%, a considerable number of individuals (28.9%) resort to increasing income through overtime, and the same percentage opts for temporary migration for work (see Table 6 and Figure 2). Notably, the poor and extremely poor resort to temporary migration during major price hikes, whereas middle-class individuals could better accommodate smaller price increases.

For food, moderate price hikes can impact food affordability, particularly for lower-income individuals or families. They may adjust their diets and seek cheaper alternatives, but extreme price hike conditions in food can lead to hunger, malnutrition, and potential food riots. Keeping in mind that household income did not increase at the same rate as the increase in the prices for essential

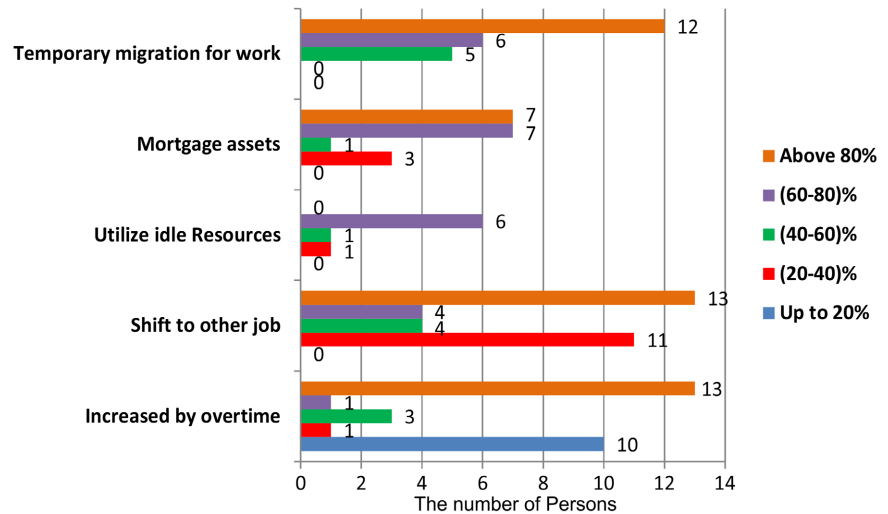


Figure 2. Response strategies to price hike severity (pricelike12) for alter income.

commodities, families are now forced to reduce their spending. During major price hikes, households adjust food quality and quantity. Only 45.5% attempt to maintain the same food quality and quantity. At 40% - 60% hikes, 15.4% maintain food quality but in smaller quantities. Beyond 80%, 58.1% reduce both quantity and quality, engaging new members in work to sustain family expenditures (Table 13 and Figures 3-6). It becomes increasingly challenging to maintain the same quantity and quality of food during such severe price hikes, even though food is an essential part of our daily lives (Table 18).

Housing affordability becomes critical beyond 40% price hikes, potentially leading to homelessness. Respondents, in the face of rising rents, often compromise on their living arrangements by opting for smaller and lower-quality homes. During major price hikes, a substantial portion of the population, approximately 49.5% (see Table 19), is compelled to make compromises in their living arrangements, often choosing smaller and lower-quality homes due to rising rental costs. The responses to major price hikes can vary widely among individuals, with different strategies being adopted in response to the shifting market conditions. Typically, people have to opt for smaller homes with comparatively lower quality due to rent increases. The response to major price hikes varies among all respondents, with individuals adopting different strategies. From Table 1 and Figures 7-10, it is evident that in accommodation, they are not ready to sacrifice the quality of the living place but try to manage by a smaller space.

Despite price hikes, the target population prioritizes education. They are found not to sacrifice the quality of education by changing the school but try to manage the expenditure by manipulating additional educational services through coaching (Table 25). During extreme hikes (>80%), 30.8% consider pulling children out of school. Financial considerations play a crucial role in educational decisions.

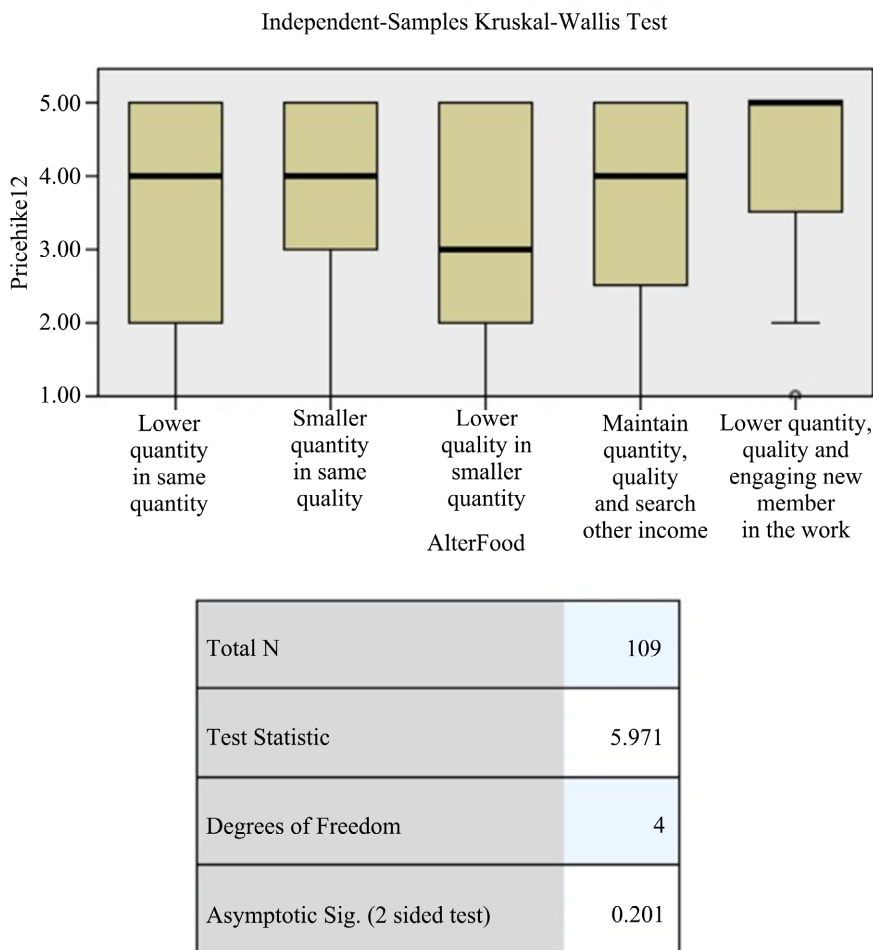


Figure 3. Non parametric test (Kruskal-Wallis test).

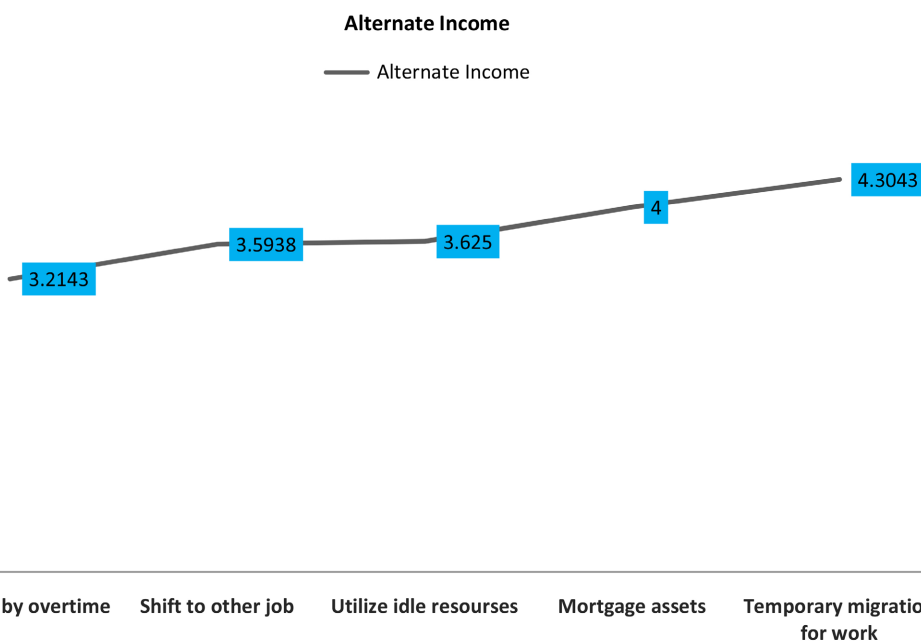


Figure 4. Means plots for consumer responses to alternate income.

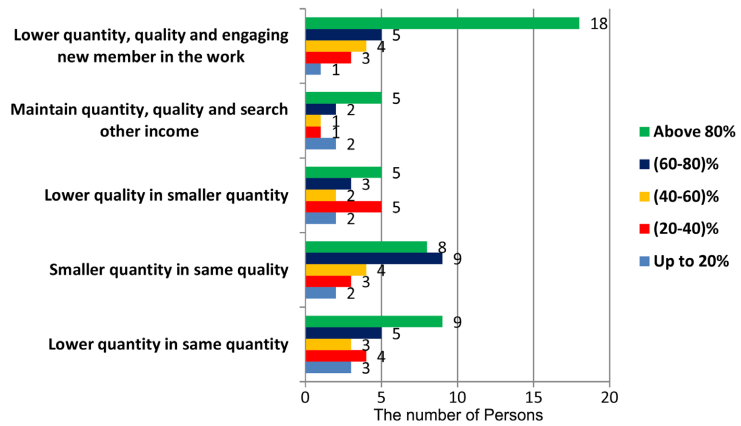


Figure 5. Consumer response to food price hikes: strategies and preferences.

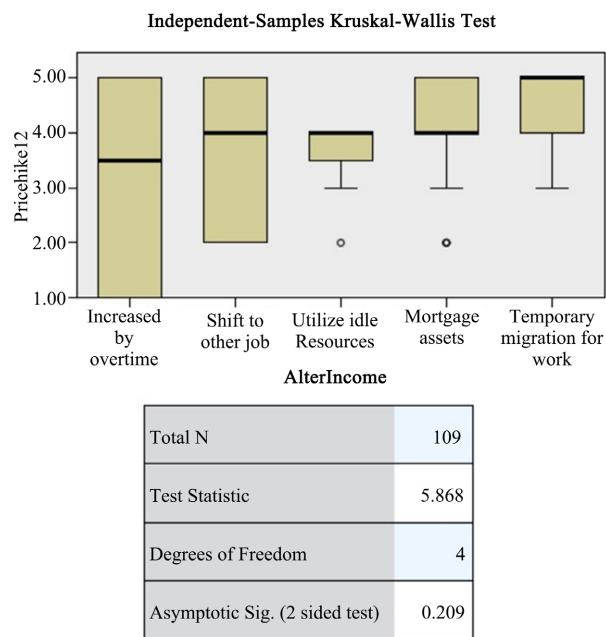


Figure 6. Non parametric test (Kruskal-Wallis test).

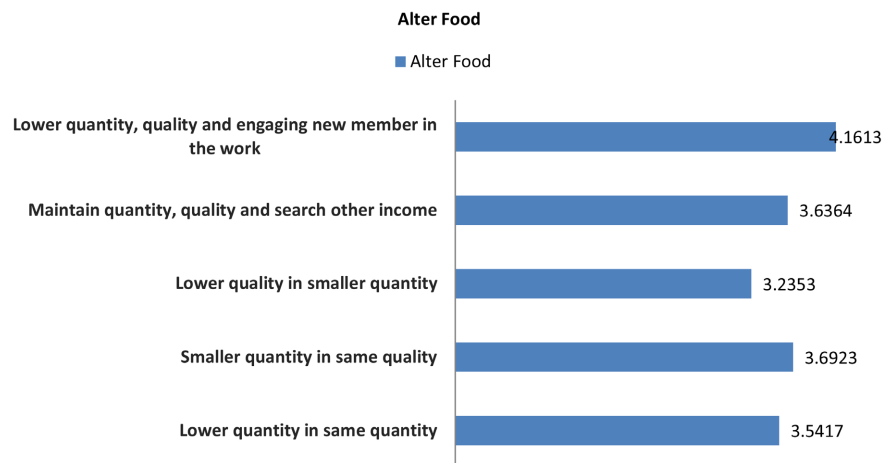


Figure 7. Means plots for consumer responses to food price hikes.

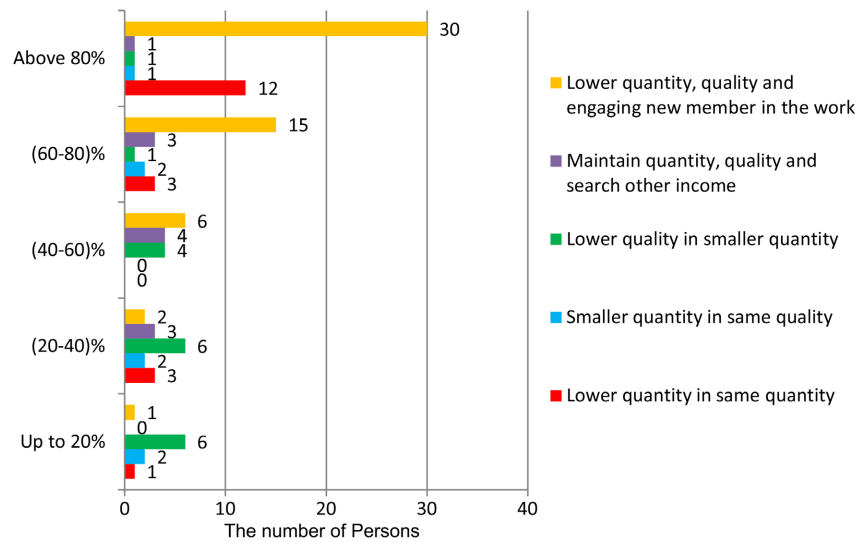


Figure 8. Consumer response to accommodation price hikes: strategies and preferences.

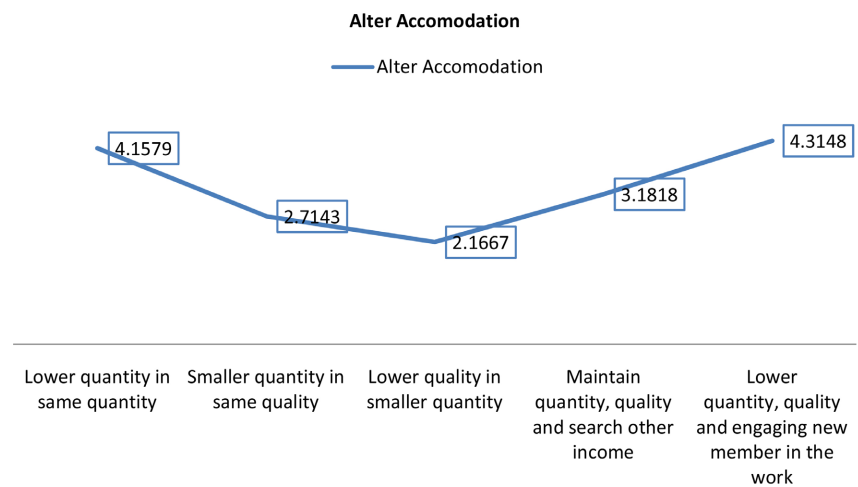


Figure 9. Means plots for consumer responses to accommodation price hikes.

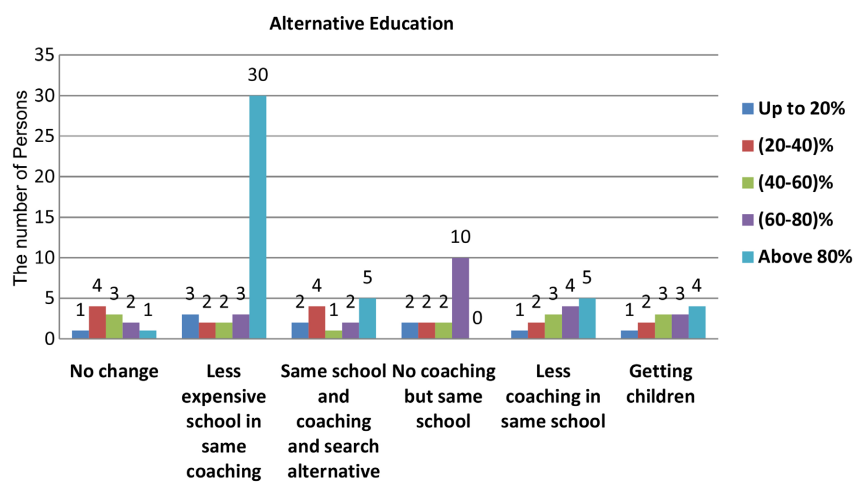


Figure 10. Response to price hikes in education: strategies and preferences.

The results of the Tukey HSD test (**Table 18**) indicate that the pairs “Lower quantity, quality, and engaging new members in work” and “Smaller quantity in the same quality” show a statistically significant mean difference ($p < 0.05$), and the pair “Lower quantity, quality, and engaging new members in work” and “Maintain quantity, quality, and search for other income” also demonstrate a statistically significant mean difference ($p < 0.05$). While moderate price hikes in accommodation may not immediately disrupt the status quo, they can cumulatively erode housing affordability over time. When the price hike reaches the 20% - 40% range, it can often trigger housing crises, leading to a struggle for affordable living spaces. Beyond this range, at 40% - 60% price hikes, housing affordability becomes a critical issue, potentially leading to homelessness and social unrest. Extreme price hikes can push the situation into a housing emergency, leaving a significant portion of individuals without access to adequate shelter.

From **Table 24**, The pair “Lower quantity in the same quantity” and “Smaller quantity in the same quality” have a significant mean difference of approximately 1.44 ($p = 0.032$), with a confidence interval (CI) suggesting that the mean difference falls between 0.0832 and 2.8040, and “Lower quantity in the same quantity” and “Lower quality in smaller quantity” also has a significant mean difference. Again, the pair “Smaller quantity in the same quality” and “Lower quantity, quality, and engaging new members in work” have a significant mean difference of approximately 1.60053 (CI: 0.3645 to 2.8365), and the pair “Lower quantity, quality, and engaging new member in work” and “Maintain quantity, quality, and search for other income” also have a significant mean difference of approximately 1.13300. The pairs “Lower quantity, quality, and engaging new member in work and Lower quality in smaller quantity” and “Lower quantity, quality, and engaging new member in work and smaller quantity in the same quality” also have significant mean differences. For all other pairs, there are no statistically significant mean differences in “Pricehike12.” Based on the results, it appears that there are statistically significant differences in “Pricehike12” between specific pairs of strategies, as indicated by the significant mean differences and the associated p-values. These results provide insights into how different accommodation strategies affect the “Pricehike12” variable.

In the ANOVA (**Table 29**), the p-value (0.003) is less than the typical significance level of 0.05, indicating that the null hypothesis can be rejected. This means that there are meaningful differences in the means of the groups, and further post-hoc tests or analyses may be conducted to identify which specific groups differ from each other (**Table 30**). For the pair between “No change” and “Less expensive school in the same coaching,” it shows that there are significant mean differences in the pair. From the Paired Samples Analysis (**Table 2**), all the pairs showed a strongly positive correlation between price hikes and alternative behaviors. These correlations show that as the experience of price hikes increases, certain behaviors and alternatives (such as accommodation, education, food consumption, and income-raising) also tend to increase in some way. From **Ta-**

ble 5, the t-tests reveal statistically significant differences for all pairs. In Pair 1, the negative t-value indicates that respondents rated their experiences with “Price Hike” differently compared to the “Alternatives” in accommodation behaviors, with “Price Hike” having a higher mean score in this aspect. In contrast, Pair 2, Pair 3, and Pair 4 all exhibit positive t-values, indicating that the “Alternatives” have higher mean scores compared to “Price Hike” in education behaviors, food habits, and income-raising alternatives. These positive t-values imply that, on average, respondents rated their experiences with “Price Hike” lower in these aspects than in the respective “Alternatives.” These results collectively show that respondents’ perceptions and experiences with “Price Hike” significantly differ from the alternative scenarios considered in this analysis. The statistical significance underscores that these differences are unlikely to have occurred by random chance. From **Table 8**, the assumption of equal variances across groups is violated. So we use a non-parametric Kruskal-Wallis test to conduct the analysis. **Figure 3** the Kruskal-Wallis test for homogeneity of variances retains the null hypothesis; it means that there is no statistically significant difference in variances between the groups being compared. So, we may go a one-way ANOVA analysis for Alternative income Behavior in Response to Price Rise. The ANOVA results for the “Price Hike Strategies” show that there is a marginally significant difference in the means of the strategies ($p = 0.051$). The Between Groups variance (4.251) is larger than the within-groups variance (1.800), indicating some potential differences in the strategies across groups. However, the p-value is just above the conventional threshold of .05, indicating that the result is statistically significant at a standard confidence level (See **Table 10**). **Table 11** displays the results of pair wise comparisons between different strategies (“Alter Income”) employed in response to price hikes. The pair “Temporary migration for work” and “Increased by overtime” demonstrates a statistically significant mean difference ($p = 0.037$), with a mean difference of approximately 1.09006 (**Figure 11**).

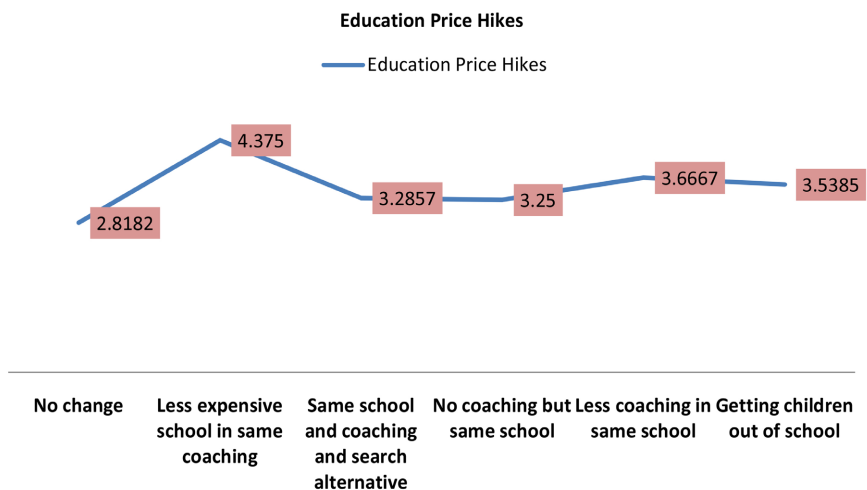


Figure 11. Means plots for consumer responses to education price hikes.

In summary, the study shows significant changes in household demographics, economic activities, and responses to price hikes in essential commodities. These changes are often influenced by the severity of the price increase and the income group to which households belong. Such trends can have social, economic, and health implications, and they often require attention from policymakers and governments to address the needs of vulnerable populations and ensure food affordability and accessibility.

6. Conclusion

The study sheds light on the intricate repercussions of price hikes on the standard of living in Bangladesh, dissecting the impacts across distinct socioeconomic segments. The findings reveal significant shifts in household demographics, economic activities, and coping strategies in response to escalating commodity prices, particularly in essential goods and services such as food, housing, and education. The research underscores the fact that rising prices have far-reaching consequences, touching various facets of individuals' lives and forcing adjustments in consumption patterns, income-generating activities, and even living arrangements. The vulnerable segments of the population, including daily wage laborers, low-income individuals, and those in the informal sector, bear a disproportionate burden when prices soar. These groups often resort to sacrifices such as compromising on the quality and quantity of food, engaging in additional work, and relying on informal credit to navigate the challenges posed by price hikes. The statistical analyses conducted in the study reveal significant mean differences in the strategies employed during price hikes, emphasizing the nuanced ways in which different socioeconomic groups respond to economic pressures. It becomes evident that financial considerations play a crucial role in shaping decisions related to accommodation, education, food habits, and income-raising alternatives. Ultimately, the study provides valuable insights for policymakers, economists, and stakeholders seeking to formulate targeted strategies and interventions. Recognizing the diverse experiences and challenges faced by different segments of society, tailored approaches are essential to mitigate the adverse effects of inflation and escalating prices. This research contributes to a deeper understanding of the dynamics at play and lays the foundation for evidence-based policies aimed at promoting economic resilience and well-being across the socioeconomic spectrum in Bangladesh.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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