

Evaluating the Sensitivity of Consumption towards the Price of Components of the Consumer Basket

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Abstract: - This study investigates Jordanian market demand in terms of consumption sensitivity to changes in consumer basket component prices. The researchers anticipate that the study, through analysing demand functions and elasticities, will help to add qualitative insights to the Jordanian economic database. The researchers statistically derived coefficients based on information about the consumer basket used to calculate the standard price index using simple linear logarithmic regression. Using this methodology, the research study has produced several findings, including: There are two types of consumer basket components: elastic and inelastic. A strong divide occurs at the level of the consumer basket between critical first-tier goods and second-tier consumer goods. Consumption sensitivity assessments can influence governmental decisions about tax policy as well as businessmen decisions regarding production volume and output capability. The price elasticity of demand for chickpeas, cakes, green olives, black olives, and kerosene is 5%, 17.8%, 6.9%, 3.7%, and 1.2%, respectively.

Key-Words: - Consumer Basket, Consumption Sensitivity, Economic Decision, Tax Policy, Simple Linear Regression.

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1 Introduction

This study investigates Jordanian market demand in terms of consumption sensitivity to changes in consumer basket component prices. The researchers anticipate that the study, through analyzing demand functions and elasticities, will help to add qualitative insights to the Jordanian economic database. The researchers statistically derived coefficients based on information about the consumer basket used to calculate the standard price index using simple linear logarithmic regression.

2 The Practical Aspect: The Econometric Methods

Based on household size and the prices of alternative goods, the demand for a commodity can be expressed as a general function of the commodity's price and income. Using a simple linear model, we can determine the price elasticity of demand from the data we have available, [1].

$$Q_i = \alpha_0 + \alpha_1 X_i + e_i$$

Where Q_i represents the quantity of commodity i , and X_i are the independent variables such as household income i is (Y) and the price of the commodity (P), the symbols α_0, α_1 are the intercept and slope of the equation, and e represents the error term. Elasticity is a numerical measure of how the quantity demanded or supplied responds to changes in price. Price elasticity of demand, mathematically determined as follows, measures the percentage change in quantity demanded for a one-unit change in price, mathematically, we determine price elasticity ϵ_p as follows, [2]:

$$\epsilon_p = \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q} = \frac{dQ}{dP} \cdot \frac{P}{Q}$$

The elasticity of price demand is a concept that displays how sensitive consumers are towards changes in pricing for goods and services they are seeking. It is determined by the percentage decline in the number of goods purchased compared to the percent increase in price. Essentially, when there is

low elasticity in a product, a price increase will cause a slight decrease in consumer demand. Conversely, products with high elasticity of price demand will exhibit significant decreases in demand as the price point elevates.

It is expected that an increase in the price of the commodity will lead to a reduction in the consumption of the commodity ($\alpha_p < 0$). We can estimate the price elasticity of demand from the estimated coefficients based on data from the Jordanian Department of Statistics for the period 2017-2022. The price elasticity of demand was calculated as shown in Table 1, where the equation was estimated using a logarithmic form.

3 Results

Table 1 shows the results of the preferred specifications for the simple log-linear regression model, where all parameters had expected signs, and the results indicated that there were large differences in the price response between the different products, and the effect of prices was statistically significant. To provide some ideas about interpreting the estimates, the elasticity of 1.1 indicates that the “average” consumer gets more utility from the large bread (the size of the loaf) than he gets from not buying it. Grain hummus provides a utility of 5, hummus with tahini provides 2.5, and the price coefficients provide the marginal utility of the price change. For example, an increase in the price of green olives by one dinar results in a change of 6.9 in the utility derived from it, a change of 3.7 for black olives, and 1.2 for kerosene. Finally, we point out that all the above goods are elastic as their values exceed 1.

As for the chicken, diesel, gas, home electricity, jameed, small bread, beans, fava beans, vegetable oils, and liquid agricultural fertilizer, it was inelastic and therefore had low sensitivity. For example, the price elasticity of demand for chicken is 0.20 as a result of the price increase; In other words, substitutability is low when prices rise, and this result seems consistent with the results of the current market environment.

This analysis has implications. The idea of assuming linearity, in research and policy analysis especially when using elasticities requires further examination. It is a practice to incorporate estimated demand elasticities, into general or partial equilibrium models that explore different policy or market changes, such as [3] and [4], [5], [6] and [7]. Likewise, economists often rely on elasticity calculations based on models and time series data

that span decades. These calculations are used as inputs, in models that provide long-term price forecasts net income estimates, government expenditures, and other statistical measures.

Table 1. Price elasticity of a group of goods selected from the consumer basket

Products	Price elasticity
Relatively elastic ($E_p > 1$)	
Large bread	1.1
cookies	17.8
Grain hummus	5.0
hummus with tahini	2.5
Black olives	3.7
Green olives	6.9
Tomato paste	2.7
kerosene	1.2
Relatively inelastic ($E_p < 1$)	
Chicken	0.2
Diesel	0.2
Liquid gas	0.1
Household electricity	0.5
Jameed	0.2
Small bread	0.1
Beans	0.2
Fava Beans	0.7
Vegetable oils	0.3
Liquid agricultural fertilizer	0.14

However, it is common for analysts to assume elasticities, across all price ranges, which can lead to over or underestimating the economic impacts if the elasticities are nonlinear. To better anticipate the effects of shocks researchers may find it more beneficial to use methods that consider a range of prices or market environments. Split-sample surveys or experimental designs could also be employed in studies [8], [9], [10] and [11].

Estimates based on real-world data can be valuable, for predicting trends, in the commodity market. As the old saying goes: “The cure for high prices is high prices”. The rise in the prices of cookies, olives, Hummus, and tomato paste encourages producers to reduce their stocks, as estimates indicate that the “substitution” may not continue with a decline in the prices of the aforementioned commodities, and we may witness a decline in their prices, and this may have effects on the patterns of substitution within their categories.

4 Results and Recommendations

The goal of the study was to estimate the sensitivity of a group of goods to price. For this purpose, the data set was used which includes detailed

information about some goods for the Jordanian consumer. Information related to price and quantity was obtained to study the impact of prices on commodity markets and estimate demand functions for them from the Jordanian Department of Statistics. The main results were as follows:

- Elastic goods: Large bread, cookies, Grain hummus, hummus with tahini, Black olives, Green olives, Tomato paste and kerosene.
- Inelastic goods: Chicken, Diesel, Liquid gas, Household electricity, Jameed, Small bread, Beans, Fava Beans, Vegetable oils, and Liquid agricultural fertilizer.

When interpreting our results, we must take into account that using linear estimation methods for price and quantity data may lead to inappropriate price elasticity estimates. Despite these shortcomings, our results are based on high-quality data that shed light on both the purchase and consumption decisions of ordinary users in the goods market. Our study emphasizes the importance of these results for the decision maker, whether consumer, producer, or government, and the ability of tax policy to influence commodity prices to change consumer behavior.

The researchers summarize the practical meaning of the results reached, by analyzing the price movement of components of the consumer basket and its impact on consumer behavior, in a set of recommendations:

1. It is necessary to conduct a periodic review of the elastic calculations to determine the extent of the relationship between these indicators and relevant economic decision-making.
2. Taking into account changes in the consumption pattern in the context of recovery from Covid-19 and in the context of digital transformation and the spread of social media platforms.
3. Identify the forms of subsidies for goods and the extent to which consumer behavior is affected by regular and irregular subsidies.

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Conflict of Interest

The authors have no conflicts of interest to declare.

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