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The Impact of Consumption Stability on Income in Urban Households in Iran

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Highlights

- **Consumption stability significantly correlates with urban household income across income quantiles, even after controlling for key socioeconomic factors via OLS and quantile regressions.**
- **Households stabilizing consumption amid income shocks exhibit stronger long-term resilience—translating into higher income growth and lower poverty risk**
- **Despite income volatility, stable consumption serves as a key buffer, sustaining economic welfare in Iranian urban households.**

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Abstract

In Iran, household consumption expenditure is a cornerstone of aggregate demand and a fundamental indicator of economic welfare. This study examines the extent of consumption instability among urban Iranian households and its bidirectional relationship with household income. Using nationally representative microdata from Iran's 2024 Household Budget Survey and a combination of multivariate ordinary least squares (OLS) regression and quantile regression (QR) techniques, the analysis controls for key demographic and socioeconomic variables. To measure consumption stability, a novel index is constructed based on the relative volatility of each household's current expenditures, which are categorized into levels ranging from "very low" to "very high." The findings show that, of the 19,898 households in the sample, 19,611 (98%) are classified as "very low" and 286 (2%) as "low"; none are classified as "moderate" or higher. Quantile regression results indicate that the effect of consumption stability on household income is statistically significant and positive across the 0.25, 0.5-, and 0.75-income quantiles ($p < 0.05$, and in some cases, $p < 0.01$). However, this effect is highly asymmetric; a one-unit increase in the consumption stability index results in income gains that are over 60% larger for high-income households (0.75 quantile) than for low-income households (0.25 quantile). This pattern reveals a self-reinforcing "welfare cycle" among affluent households coexisting with a "consumption instability trap" for low-income groups. Accordingly, we recommend that social policies prioritize sustainable household income generation through quality employment, vocational skills training, and equitable access to labor markets.

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1. Introduction

Household consumption is the largest component of aggregate demand, accounting for over 50 percent of gross domestic product. It is also a key indicator of economic well-being (Eichengreen, 2012; Hellmanzik, 2024). Consumption is a measure of economic health and a determinant of living standards and resilience to shocks. In economies with severe income fluctuations, inflationary pressures, and imperfect financial markets, the ability of households to stabilize consumption is central to mitigating welfare losses and sustaining long-term development (Hellmanzik, 2024).

Unsustainable consumption negatively impacts society by reducing motivation among its members. Inefficiency and overconsumption in patterns of unstable consumption and production undermine development goals and exacerbate inequality and poverty in communities (Rashid, 2021; Ateman et al., 2020). The United Nations Development Programme (2019) states that Sustainable Development Goal 12, which focuses on responsible consumption and production, aims to provide all people worldwide with the necessary information and awareness for sustainable development and lifestyles in harmony with nature by 2030. This underscores the urgent need to raise awareness and promote sustainable consumption in order to safeguard social welfare and environmental sustainability (Datta & Padmanabhan, 2011; Huang et al., 2008).

Therefore, the stability of urban household consumption patterns in Iran against economic shocks, severe income volatility, high inflation, exchange rate fluctuations, and widespread financial pressures is of great significance.

According to Friedman's theory, individuals prefer to maintain a stable consumption level, even if their lifetime income is inconsistent. Thus, wealth plays a crucial role in the consumption function. In other words, people relate their consumption behavior not only to their current income, but also to their long-term and permanent consumption opportunities (Sirisankanun, 2015; Karimi & Barati, 2017). Over their lifetime, individuals plan their consumption so that it does not fluctuate with changes in income, suggesting that households exhibit stable consumption behavior in the long term (Atansia & Pistaferri, 2016).

1.1. Classical consumption theories

Classical consumption theories, from Keynes's (1936) Absolute Income Hypothesis (1936) to Friedman's Permanent Income Hypothesis (1957) and Modigliani and Brumberg's Life-Cycle Hypothesis (1955), emphasize the tendency of households to stabilize their consumption over time. These approaches argue that rational households base their consumption on their permanent or lifetime income rather than their current income. They use mechanisms such as savings, credit, assets, or social transfers to maintain stable consumption (Tafazoli, 2006; Bakhshi Dastjerdi & Khaki Najafabadi., 2011). However, in developing economies like Iran, imperfect financial markets, liquidity constraints, and unequal access to smoothing instruments severely limit households' ability to achieve this goal. Under such conditions, households often

have to adjust their consumption patterns by changing the proportion of spending across categories, for example, by reducing spending on non-essential goods and focusing on basic necessities, such as food. While this behavior may be adaptive in the short term, it can result in long-term welfare losses, weakened human capital, and increased inequality (Flavin, 1981).

Empirical evidence from advanced economies suggests that consumption smoothing varies across the income distribution (Becker, 1964; Jalaei, 2015). Households with higher incomes have greater access to financial instruments and more diversified asset portfolios, allowing them to better protect their consumption from income shocks. In contrast, low-income households often face strict liquidity constraints, exhibiting a "hand-to-mouth" consumption pattern that heightens their vulnerability to economic fluctuations (Atansio & Pistaferri, 2016; Shehu & Sidique, 2015). Several studies in Iran, including those by Molaei & Adaei (2018) and Zara Nezhad & Mansouri (2015), have examined consumption smoothing behavior. These studies have shown that higher education, employment, marriage, and urban residence enhance households' capacity to adjust their consumption. Nevertheless, these analyses suffer from three major limitations: First, they rely on outdated data, mostly from before 2021. Second, they focus only on food consumption or total expenditure, ignoring the "strategic composition" of consumption. Third, they exclusively use mean-based models, such as OLS regression, which obscure distributional heterogeneity.

In this context, the present study differs from previous research in that it uses 2024 data from the Statistical Center of Iran to develop a new Sustainable Consumption Index (SCI).

The SCI is a composite indicator designed to measure the sustainability level of urban household consumption patterns in Iran. The index is constructed using households' relative expenditure shares across five key categories of goods and services: health, education, transportation, communications, and culture/recreation. It emphasizes households' strategic allocation of resources to maintain welfare stability rather than focusing solely on consumption volume. The methodology operationalizes SDG 12's core mandate—advancing circularity, resource efficiency, and lifecycle accountability in consumption and production systems. It also enables the assessment of consumption quality rather than quantity. Furthermore, the study aims to address the following questions by integrating the SCI with quantile regression:

1. How does the relationship between consumption and sustainability vary across the income distribution from the poorest to the richest deciles?

2. To what extent were urban Iranian households able to maintain welfare-enhancing, sustainable consumption patterns amid severe income volatility in 2024?

3. How do demographic and economic factors, such as education, experience, the gender of the household head, and marital status, modify the

relationship between income and sustainability, and do these effects differ systematically across various income quantiles?

The main innovation of the present study's framework is its integration of three key components.:1) An assessment of a household sustainable consumption index based on the relative share of welfare-related expenditures (e.g., health, education, transportation, communication, and culture). This index examines the quality and strategic allocation of resources rather than the absolute volume of consumption. 2) The application of quantile regression to identify the heterogeneous effects of the index across Iran's income distribution, from poorest to wealthiest households. 3) Using highly up-to-date 2024 data from the Statistical Center of Iran provides a realistic depiction of household consumption behavior amid the recent economic crisis. Together, these approaches address a significant gap in previous research and lay the groundwork for formulating targeted policies aimed at reducing inequality and enhancing household welfare.

Due to significant economic changes in Iran, including rising costs, taxation, exchange rate volatility, and other economic shocks, which have led to recessions and negative growth, direct studies on income and consumption instability among Iranian urban households are scarce. This paper is structured to first review the relevant literature and methodology, and then present the empirical results. It concludes with an analysis and discussion of quantile regression estimates.

2. Literature Review

Empirical studies have applied multivariate and quantile regression models to analyze consumption patterns across income groups and demographic characteristics. These studies provide deeper insights into consumption stability and volatility (Galor & Zeira, 1994; Pomona, 2023). Furthermore, international research highlights the heterogeneity of consumption behavior and the impact of liquidity constraints, wealth, and expectations on consumption choices (Flavin, 1981). This extensive body of literature is essential for understanding consumption dynamics and informing policy interventions aimed at stabilizing aggregate demand and promoting economic welfare. Galí et al (2007) examined the impact of income volatility on household consumption, with a focus on food consumption and the role of food stamp programs in mitigating the effects of income shocks on consumption. Their study highlights how government assistance can mitigate consumption fluctuations in vulnerable households. The International Monetary Fund (IMF) (2020) investigated household consumption volatility and its relationship with poverty risk in South Africa and Tanzania.

The study used longitudinal microdata to link consumption instability to poverty dynamics, emphasizing policies aimed at reducing consumption volatility to alleviate poverty. Casado (2011) analyzed the interaction between income volatility, household debt, and consumption stabilization in Korea. They discovered that precautionary savings and credit constraints significantly impact households' ability to maintain stable consumption amid income uncertainty. Atansio & Pistaferri, (2016) examined income and consumption volatility trends

in the United States from 1970 to 2000. They documented increasing volatility, particularly among low-income households, and discussed the limited effectiveness of self-insurance mechanisms in fully smoothing consumption. Sirisankanun (2015) examined how financial constraints contribute to excessive consumption volatility in emerging economies. Their structural macroeconomic model showed that households with limited access to financial markets experience greater consumption fluctuations despite relatively stable aggregate income.

Molaei & Adaei (2018) examined how food consumption expenditures were affected by temporary and permanent household income shocks in Iran. They used panel data from 2009 to 2014 (1388–1393 in the Persian calendar) that included the incomes, expenditures, and social indicators of Iranian households. These indicators included experience, gender, education, employment status, and marital status. The researchers used covariance restrictions on income and consumption growth to determine the values of the parameters of permanent and temporary income shocks. Their results showed that, although household food expenditures were nearly fully insured against temporary and permanent income shocks during the study period, temporary shocks were smoothed to a greater extent. Additionally, higher education levels, urbanization, marital status, and employment were positively correlated with income and played a significant role in enhancing households' ability to smooth consumption in the face of income shocks.

Zara Nezhad & Mansouri (2015) estimated the Ando-Modigliani consumption function, incorporating various types of wealth in Iran. To accomplish this, they examined the consumption behavior of households in response to different types of wealth, as well as the marginal propensity to consume (MPC) for each type of wealth. Using the Ando-Modigliani consumption model and the Engle-Granger cointegration method with data from 2002 to 2014 (Persian calendar), the results showed that households react differently to various types of wealth. The marginal propensity to consume was estimated as follows: labor income (0.93); durable goods (0.012); housing (0.027); securities (0.80); savings (0.67); composite wealth (0.55); and normalized wealth (0.58). Furthermore, the long-term analysis revealed that the marginal propensity to consume remains constant at approximately 0.081 regardless of the type of wealth. Finally, a liquidity analysis of the various types of wealth revealed that savings have the fastest conversion speed, while durable goods have the slowest.

Nofaresti & Madani (2006) used the Ando-Modigliani life-cycle hypothesis and cointegration methods to examine how changes in the experience distribution of the population affect private-sector consumption expenditures. Their results indicate that private-sector consumption expenditures are significantly influenced by changes in the experience distribution of the population. Furthermore, Ando-Modigliani's claim that the middle-experience group serves as the effective savers

in society is confirmed for Iran. The results show that individuals in the experience range of 30 to 45 years achieve the highest level of savings.

In contrast, international studies have contributed foundational theories and empirical evidence on consumption smoothing. Rankle (1991) supported the permanent income hypothesis, and Flavin (1981) emphasized the high explanatory power of current income in forecasting future consumption, investigating consumption's sensitivity to current income. Blundell et al. (2008) applied the permanent-temporary (PT) income model to estimate the parameters of temporary and permanent income shocks, as well as their transmission to household consumption. Using panel data with social indicators such as experience, gender, education, and employment, they used covariance restrictions between consumption and income changes to identify the impact of unobserved income shocks on consumption.

Casado (2011) and Hollweg (2014) used this methodology to analyze how income shocks affect food consumption expenditures in Spanish and Australian households, respectively. Atansio & Pistaferri (2016) examined the relationship between rising consumption inequality and income and wages in the United States and other developed countries. They found that, at a given point in time, consumption inequality is lower than income inequality. This implies that consumption is smoother and more stable than income over time. When consumption exceeds or does not align with income, consumers resort to borrowing, saving, or receiving loans from family members.

Rashid (2021) examined sustainable consumption levels among Malaysian households using expenditure and income data collected from 635 households in eight urban and rural districts in Terengganu via stratified random sampling. Their analysis revealed a low level of sustainable household consumption in Terengganu.

These results are consistent with the hypothesis that consumption smoothing is a strategy used to mitigate welfare losses caused by income instability, particularly in situations involving liquidity constraints and imperfect credit markets (Molaei & Adaei, 2018; Dargahi & Mohammadzadeh, 2019). Transitioning consumption systems entails deeper socio-behavioral and institutional inertia than production-side transformations, which are more amenable to regulatory and technological intervention, because it involves significant technical and political issues. Changes in the consumption of goods within household baskets reflect shifts in living conditions and income fluctuations. Furthermore, measuring consumption and expenditures is more difficult than measuring income, and estimating sustainable consumption varies between wealthy and low-income households (Atansia & Pistaferri, 2016; Anderson et al., 2021).

Currently, micro-level analyses of consumption and income reflecting households with diverse demographic characteristics are research priorities both domestically and internationally. Although economic policies are formulated at

the macro level, their effects cannot be reliably evaluated without examining their impact on individuals and firms (Di Giorgi et al., 2017; Najarzadeh et al., 2021).

The literature emphasizes the fundamental role of the relationship between consumption and income in both macroeconomic analysis and household welfare. Empirical studies in developed and developing countries have shown that liquidity constraints, market imperfections, and unequal access to financial resources hinder the realization of optimal consumption, leaving low-income households more vulnerable. In this context, consumption stability is not only an indicator of household economic health, but also a factor that influences income growth, credit accessibility, and reduction of inequality. In Iran, despite several scattered studies, few analyses have examined the link between income and consumption fluctuations, focusing on the sustainability of consumption patterns and their distributional effects. This highlights the need for new research based on updated data.

3. Methodology

3.1. Demographic Characteristics of Studied Urban Households

This study analyzed data from 19,898 urban Iranian households from the Iranian Statistical Center's expenditure and income section for the year 2024 to examine consumption instability. The Household Income and Expenditure Survey primarily aims to estimate annual average total household expenditures and income, analyze annual changes in these variables across urban and rural areas nationwide, and estimate average total household expenditures, including food and non-food expenditures, as well as income, in urban and rural areas of each province.

This survey is significant because it can examine household consumption patterns and trends in the consumption of goods and services. It can also study the interrelationships among the socioeconomic characteristics of households, assess the impact of economic policies on social justice and income distribution, and identify households below the poverty line. Additionally, it plays a vital role in providing data for national and regional accounts, particularly for socioeconomic studies and planning. In this study, the independent variables include the Sustainable Consumption Index and demographic variables, such as gender, experience, education level, and marital status. These variables' effects on household income (the dependent variable) have been examined. Additionally, some control variables were considered to mitigate the effects of nuisance assumptions in the model. The statistical distribution of these variables was analyzed using descriptive statistics. Demographic variables mainly consist of discrete or categorical data; the frequency and percentage for each category were calculated. The distribution of numerical variables, such as experience and the Sustainable Consumption Index, was examined in terms of mean, standard deviation, and percentage distribution. This indicates appropriate variability and dispersion within the sample.

This variable distribution analysis shows that the selected sample is representative of the urban population and that the data are diverse enough for regression analyses. Additionally, the variable distributions provide crucial information for selecting appropriate statistical methods and validating the model. The data and findings from this survey are also used to calculate the Consumer Price Index and the Gross National Product and to adjust national accounts. In this study, the control variables are gender, marital status, age, educational level, and the number of dependents of the household head. Based on the extracted data, we calculated the household consumption sustainability index, as well as the average equivalent per capita income and consumption.

Table 1 shows the characteristics of urban households based on the frequency with which the variables were used in the model. According to the results, 87% of households were headed by men, while 13% were headed by women. Of the households studied, 0.02% of heads of household were single, 85% were married, and 13% were widowed, divorced, or had a spouse who was deceased. Household heads were distributed across experience groups as follows: less than 30 years, 4%; 30–45 years, 34%; 45–60 years, 32%; and 60 years and older, 28%. The largest proportion of respondents was in the 30–45 experience group. Of those surveyed, 41% are illiterate, 18% have an elementary education, 26% have a high school diploma, and 15% have a bachelor's degree or higher. In terms of dependents, 6% have none, 74% have one to three, 18% have four to seven, and 2% have eight or more.

Next, the distribution of income and consumption among urban households was analyzed. The per capita equivalent consumption and income variables were calculated by dividing the total consumption and income of urban households by the square root of their household size.

Figure 1 shows the average per capita consumption and the mean distribution of per capita income. The data show that the average consumption and income of the tenth decile are more than seven times greater than those of the first decile. Additionally, only households in the tenth decile had an average per capita consumption that exceeded their average per capita income. This may be attributed to higher-income groups having better access to smoothing mechanisms, such as savings accounts and stock dividends, as noted in the study by Najjarzadeh et al. (2020).

Table 1. Summary of the Characteristics of the Studied Urban Households

Household Characteristics	Relative Frequency
Gender (Household Head)	
Male	0.87
Female	0.13
Marital Status	
Single	0.02
Married	0.85
Widowed (Divorced or Deceased)	0.13
Experience	
Under 30 years	0.04
30 to 45 years	0.34
45 to 60 years	0.32
60 years and above	0.28
Educational Attainment	
Illiterate or with some primary education	0.41
Completed primary education to less than a diploma	0.18
Diploma to less than a bachelor's degree	0.26
Bachelor's degree and above	0.15
Number of Dependents	
None	0.06
1 to 3 persons	0.74
4 to 7 persons	0.18
8 persons and above	0.02

***Source**: Calculations by the present study, Statistical Center of Iran, 2024.*

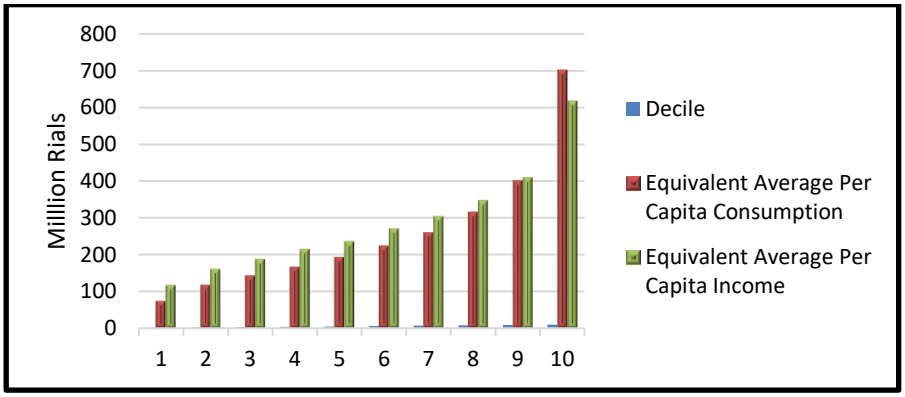

Figure 1. Average Per Capita Income Distribution and Average Equivalent Per Capita Consumption (in millions of rials).
***Source:** Research findings.*

3. 2. The Sustainable Consumption Index for Urban Households

The level of sustainable consumption among urban households in Iran is measured using a Sustainable Consumption Index. Five key expenditure categories were selected from the thirteen main household consumption categories surveyed in 2024: transportation, healthcare, cultural/recreational

services, education, and communication. These categories were chosen based on the methodologies of Rashid (2021), Haironizam et al. (2010), and Rahmeh et al. (2010). These methodologies argue that such expenditures reflect intentional efforts by households to achieve or maintain sustainable consumption levels and improve or preserve their social standing.

Because consumption patterns vary significantly across income groups with luxury goods comprising a larger share of expenditures for wealthier households and essential goods dominating spending for poorer households (Atansia & Pistaferri, 2016) the index is calculated using relative expenditures (share of total spending) rather than absolute values. This approach ensures comparability across diverse socioeconomic contexts and captures households' strategic allocation of resources to maintain consumption stability. First, an index is calculated for each household in each of the five expenditure categories. The variable $X_{i,j}^{\sim}$ represents the relative consumption expenditure share of household i in category j (where "relative" denotes this category's expenditure share for the given household divided by its total expenditure).

As specified in Equation (1), the maximum and minimum relative consumption expenditure shares in a specific category across all 19,898 households are denoted by $Max\ x_j$ and $Min\ x_j$, respectively.

$$X_{i,j}^{\sim} = \frac{Actual\ Value\ of\ \ X_{ij} - \ Min\ x_j}{Max\ x_j - \ Min\ x_j}$$
$$i = 1,\ldots,19898$$
$$j = 1,\ldots 5 \qquad (1)$$

In other words, for each household, an index is calculated based on the five specified relative consumption expenditure shares. According to Equation (1), these values range between 0 and 1. Then, the Sustainable Consumption Index (SCI) for each household is derived using Equation (2).

$$SCI_i = \sum_{j=1}^{5} X_{i,j}^{\sim} \qquad (2)$$

According to Table 2, the Sustainable Consumption Index (SCI) ranges from 0 to 5 for each household. A value of 5 indicates an excellent level of consumption sustainability, and a value of 0 reflects an unfavorable status.

Table 2. Classification of the Sustainable Consumption Index of Urban Iranian Households by Sustainability Levels

Consumption Level	Index Range(SCI)
Very Low	$0 \le SCI_{\ i} \le 1$
Low	$1 < SCI_{\ i} \le 2$
Medium	$2 < SCI_{\ i} \le 3$
High	$3 < SCI_{\ i} \le 4$
Very High	$4 < SCI_{\ i} \le 5$

Source: *Research finding*

3.3. Multivariate regression model

Finally, a multivariate regression analysis is used to evaluate the relationship between household income levels, demographic characteristics, and consumption instability. Based on the theoretical framework presented for this study, equation 3 specifies a multivariate regression model, considered the most appropriate approach to estimating the level of sustainable consumption of households as a function of income. In this model, the effects of the explanatory variables including level gender_i, experience_i, education level, marit status, and SCI_i on the dependent variable are assessed.

$$y_i = \alpha_0 + \alpha_1 \text{gender}_i + \alpha_2 \text{experience}_i + \alpha_3 \text{education} + \alpha_4 \text{marit} + \alpha_5 \text{SCI}_i + u_i \quad (3)$$

3.3.1. Ordinary least squares (OLS) and quantile regression models

Finally, quantile regression was employed to examine heterogeneity in household behavior across different points of the income distribution. The primary motivation for using quantile regression is to provide a detailed and comprehensive evaluation of the response variable by modeling the influence of independent variables across the entire distribution, not just at the central tendency of the data. This is particularly important at the lower and upper tails. This approach avoids the limitations of the assumptions of ordinary least squares (OLS) regression, such as heteroscedasticity and the undue influence of outliers on coefficient estimates.

Unlike OLS regression, quantile regression estimates parameters by minimizing the sum of weighted absolute residuals, a method known as the least absolute deviations (LAD) approach. This analysis is especially useful when the conditional distribution is heterogeneous and non-standard, such as in the case of asymmetric, heavy-tailed, or wide distributions. The quantile regression model can be formally expressed as follows (Keshavarz Haddad, 2016):

$$y_i = X_i' \beta_q + e_i \quad (4)$$

Where β_q is the vector of unknown parameters corresponding to the quantile q^{th}. The quantile regression estimator q^{th} is obtained by minimizing the following expression with respect to β_q:

$$O_{\sim}(\beta_q) = \sum_{i:y_i \geq X_i'\beta}^{N} q\left|y_i - X_i' \beta_q\right| + \sum_{i:y_i \geq X_i'\beta}^{N} (1-q)\left|y_i - X_i' \beta_q\right| \quad (5)$$

In the above equation, y represents the dependent variable of this study (household income), and x represents the vector of explanatory variables introduced in the previous section. The quantile parameter q can take any value between 0 and 1. However, this study estimates the regression for the 0.25, 0.50, and 0.75 quantiles.

4. Results

4.1. Measuring Consumption Sustainability in Iranian Urban Households

First, the Sustainable Consumption Index was calculated for the households under study. Figure 2 shows the status of urban households according to this

index. The index ranges from "Very Low" to "Very High." The criteria for classifying and ranking these indices are based on household consumption expenditures and behavior.

Overall, of the 19,898 urban households surveyed in 2024, 19,611 were classified as having a "Very Low" sustainable consumption level. Over 98 percent of urban households have a very low sustainable consumption level, indicating an imbalance between income and consumption. Meanwhile, 286 households fell into the low sustainable consumption category. In other words, according to the index, the majority of Iranian urban residents have a dire consumption sustainability status. This finding corroborates previous studies indicating that, in less developed societies, consumption behavior tends to be hand-to-mouth (Najarzadeh et al., 2021).

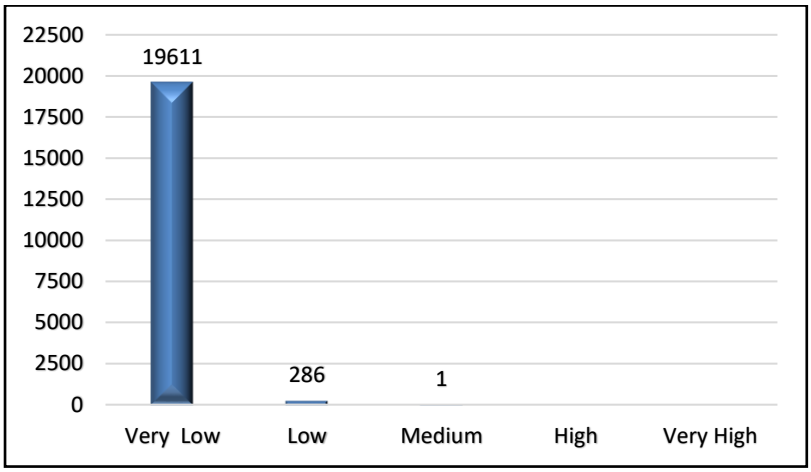

Figure 2. The Sustainable Consumption Index of Urban Households in Iran
Source: *Research findings.*

4.2. Correlation Analysis Between the Sustainable Consumption Index and Household Income

After calculating the correlation coefficients among the study variables, we estimated the coefficients for Equations (3) and (5), which correspond to the simple multivariate regression and quantile regression models. The bivariate relationship between two or more dependent and independent variables is assessed through their correlation coefficients. Table 3 shows the correlation coefficients for income, household sustainable consumption level, gender, experience, education level, and marital status of household heads in 2024.

Table 3 shows that the correlation coefficient between the Sustainable Consumption Index and household income is 0.4406. This indicates a positive and significant relationship between income and sustainable consumption levels in 2024. Additionally, there is a negative relationship between gender and

sustainable consumption levels, though it is not statistically significant. Education level positively and significantly correlates with household income. Higher education levels are associated with increased employment opportunities, higher wages, and consequently, a better level of consumption.

Table 3. Correlation coefficients between model variables

Variables	Income	Sustainable Consumption	Gender	Experience	Education	Marital Status
Income	1					
Sustainable Consumption	0.4406*	1				
Gender	-0.1551	-0.1184	1			
Experience	0.0141	-0.0737	0.2688	1		
Education	0.3733*	0.2875	-0.2362	-0.4003*	1	
Marital Status	-0.1366	-0.1148	0.7474**	0.2370	-0.1782	1

Source:*Research findings. * and ** indicate statistical significance of the correlation coefficients at the 95% and 99% confidence levels, respectively.*

4.3. Analysis of Comparative Evaluation Results: Ordinary vs. Quantile Regression

Table 4 shows the results of Ordinary Least Squares (OLS) and quantile regression models that estimate the factors influencing household per capita income in urban Iran. Key explanatory variables include sustainable consumption, the gender of the household head, the household head's experience, education level, and marital status. Theoretical interpretation of these results provides deeper insight into the socioeconomic mechanisms underlying income distribution and consumption behavior.

Sustainable consumption exhibits a positive and highly significant effect on household per capita income across all models (OLS and quantiles 0.25, 0.5, and 0.75). This finding is consistent with consumer behavior models that assert higher income enables households to allocate more resources to sustainable consumption. Furthermore, quantile regression results show that this effect varies across the income distribution. The income increase associated with sustainable consumption is greater for higher-income households. For example, the increase is over 60% greater at the 0.75 quantile than at the 0.25 quantile. These results suggest that richer households have the financial capacity and awareness to invest in sustainability, reflecting the income elasticity of sustainable consumption.

The negative and significant coefficient of female-headed households indicates that structural gender inequalities affect income generation. From a theoretical perspective rooted in labor economics and gender studies, women face systemic barriers, including labor market discrimination and a lack of access to high-paying jobs, as well as social norms that constrain their economic opportunities. The absence of significant variation across quantiles indicates that the gender income gap is relatively uniform across income levels.

The positive effect of the household head’s experience on income supports human capital theory, which posits that accumulated work experience enhances

skills and productivity, thereby increasing earnings. However, it is important to note that the quantile regression coefficients vary substantially. The effect at the 0.75 quantile is nearly three times that at the 0.25 (QR). This suggests that, although experience benefits all households, wealthier households disproportionately benefit more, possibly due to better job mobility, access to premium positions, or complementary assets.

The level of education has a significant and positive influence on income, reflecting the important role of formal education in developing human capital. The existence of four education categories enables a more detailed analysis, demonstrating that the income premium increases with higher educational attainment. However, differences in quantile coefficients imply that the income return to education is greater for higher-income households. This may be explained by variations in educational quality, field of study, or labor market segmentation favoring educated individuals in higher income brackets.

The finding that marriage increases per capita income aligns with sociological and economic theories that emphasize marriage's stabilizing role. Married individuals may benefit from pooled resources, a greater division of household labor, and stronger social networks, all of which contribute to higher household earnings. Because the negative coding (1 for married) is used, the coefficient is interpreted as a positive income premium for marriage.

The statistical differences detected between the OLS and quantile regression coefficients highlight the importance of examining heterogeneous effects across the income distribution. Policies aimed at improving sustainable consumption and income should recognize these disparities and target support measures differently for low-income versus high-income households. For example, promoting access to education and experience-building opportunities could reduce income inequality. Addressing gender disparities requires structural reforms to enhance female labor market participation and income equality.

Table 4. Results of Ordinary and Quantile Regressions Across Different Quantiles

Dependent variable: Household per capita income	OLS regression	Quantile regression 0.25	Quantile regression 0.5	Quantile regression 0.75
Sustainable consumption level	1.85e+09**	1.47e+09**	1.96e+09**	2.73e+09**
Gender	-5.33e+07**	-5.45e+07**^	-6.38e+07**^	-5.29e+07**^
Experience	4413962**	1889420**	3204502**	505896**
education level	1.00e+08**	6.36e+07**	7.83e+07**	9.74e+07**^
marital status	-3.66e+07**	-3.9e+07**^	-2.79e+07**^	-3.75e+07**
intercept	1.35e+09**	-9.94e+08**	-1.37e+09**^	-1.97e+09**

Source: *denotes the research findings. * and ** indicate the significance of the regression coefficient at 95% and 99% confidence levels, respectively. ^ indicates a significant difference between the quantile*

regression coefficient and the OLS regression coefficient, which occurs when the OLS coefficient lies outside the confidence interval of the respective quantile regression.

4.4. Comparing ordinary least squares (OLS) and quantile regression models

Figure 3 illustrates the OLS and quantile regression coefficients for various variables simultaneously, providing a graphical, comprehensive summary of the results reported in Table 4. The dependent variable's (urban household per capita income) different quantiles are shown on the horizontal axis, and the magnitude of the coefficients is displayed on the vertical axis. The OLS regression coefficients for each variable are represented by horizontal dashed lines, and their 95% confidence intervals are depicted by horizontal dotted lines surrounding them. A notable feature is the constancy of the OLS coefficients across different quantiles.

The quantile regression coefficients are shown as solid lines that vary across the quantiles. The 95% confidence intervals for the quantile regression coefficients are indicated by the shaded areas around the lines. If the quantile regression coefficients fall outside the confidence interval of the ordinary least squares (OLS) coefficients, it indicates a statistically significant difference between the quantile and OLS regression coefficients a distinction marked with the symbol ^ in Table 4.

Figure 3 shows that the effect of the Sustainable Consumption Index (SCI) on income increases from 6.3 million tomans at the 0.25 quantile to 10.1 million tomans at the 0.75 quantile. This indicates a difference of over 60 percent, or up to threefold in some analyses, in the returns to sustainable consumption favoring higher-income households. Similarly, returns on education and work experience are significantly higher in the higher quantiles (the education coefficient rises from 7 to 12 million tomans and the experience coefficient rises from 0.3 to 0.9 million tomans). In contrast, the effects of gender and marital status are almost uniform across the distribution: female-headed households earn about 5.5 million tomans less in all quantiles, while being married increases income by about 3.5 million tomans. This pattern of heterogeneity confirms that the ordinary least squares (OLS) model fails to capture structural differences in income responses across income groups. Quantile regression, however, clearly reveals this disparity and provides an empirical basis for targeted policies, particularly those that facilitate low-income households' access to sustainable consumption tools.

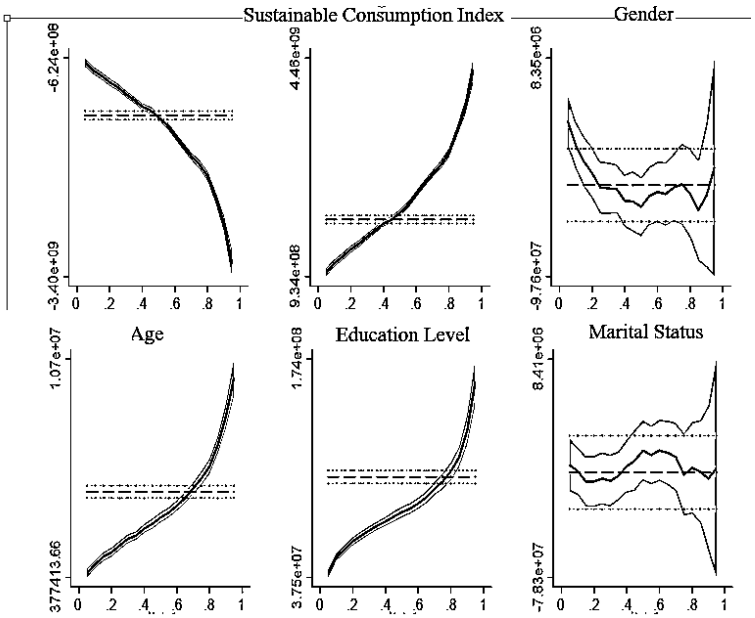

Figure 3. Quantile Regression Coefficients
Source: *Research findings.*

Figure 3 presents how the influence of each predictor varies across quantiles of the outcome distribution, summarized by the central estimate (solid black line). The 95% confidence interval for these coefficients is indicated by the shaded area. The dashed black line represents the constant OLS regression coefficient, and the blue and red dotted lines indicate the 95% confidence interval for the OLS regression. A test for heteroscedasticity is necessary to justify the use of quantile regression.

4.5. Heteroscedasticity Test

The results of the heteroscedasticity test are presented in Table 5. The Breusch–Pagan test yields a statistically significant result ($p < 0.05$), rejecting the null hypothesis of homoskedasticity. Therefore, the null hypothesis of homoscedasticity is rejected, which justifies the use of quantile regression. Results from OLS and quantile regressions (Table 4) indicate a significantly positive effect of the Sustainable Consumption Index on income across all quantiles and in the overall regression. Specifically, a one-unit increase in the Sustainable Consumption Index for Iranian urban households in 2024 results in an increase in the coefficient for households at the upper end of the income distribution that is more than 60% higher than the increase for households at the lower end.

Table 5. Results of the Heteroscedasticity Test

Heteroscedasticity Test	Test Statistic Value	Significance Level
Breusch-Pagan	308**	0.000

Notes*:** *The null hypothesis of homoscedasticity is rejected at the 95% confidence level.* ***Source: *Research findings.*

5. Discussion

The effect of gender on the per capita income of urban households in Iran is negative and significant. This indicates that households headed by women had much lower per capita income than those headed by men. Households headed by women were relatively rare, accounting for only 0.13% of all urban households. On average, female-headed households had a per capita income that was 5.5 million tomans less than male-headed households.

Consistent with the findings of Molaei & Adaei (2018) and Blundell et al. (2008), the coefficient for education level is positive and significant. In other words, a one-unit increase in the education level of the household head increases the average per capita income of urban households by 10 million tomans. The coefficient for marital status in the OLS regression is negative and significant. In this study, households with married heads are coded as 1 (with a relative frequency of 0.85), while those without are coded as 2, thus indicating that being married increases the average per capita income of Iranian households by 3.5 million tomans. These findings suggest that, in 2024, there was income and consumption inequality among urban households based on the marital status of the household head. The study assessed the highest increase in household consumption inequality and its determinants.

These findings align with those of Atansia & Pistaferri, (2016) and Sirisankanun (2015), who also identified positive consumption and income inequality in the United States and other developed countries.

5.1. Constraints

While this study offers valuable insights into the instability of consumption and income among urban households in Iran, it is subject to several methodological limitations. First, the analysis relies exclusively on cross-sectional data from the 2019 Household Income and Expenditure Survey by the Iranian Statistical Center, which limits the ability to infer causal relationships or capture dynamic changes in consumption behavior over time. Second, the sample is limited to urban households, excluding rural populations whose consumption patterns, income sources, and vulnerability to economic shocks may differ substantially. Consequently, the findings cannot be generalized to the entire Iranian household population. Furthermore, although the Sustainable Consumption Index is based on established literature, it is still a composite proxy based on self-reported expenditure and behavioral indicators. This may not fully encompass the multidimensional aspects of consumption sustainability, such as environmental impact or long-term welfare resilience.

Furthermore, the study's reliance on self-reported income and expenditure data introduces potential measurement bias due to underreporting, recall errors, and social desirability bias, especially among low-income and informal-sector households. The analytical framework also omits key macroeconomic variables, such as inflation volatility, exchange rate fluctuations, and nationwide subsidy reforms, that significantly impact household budget constraints and consumption decisions in Iran's volatile economic context. Additionally, the model does not differentiate between types of income, such as labor, transfer, or capital income, which may have different effects on consumption stability. Despite these limitations, quantile regression effectively reveals heterogeneity in consumption-income dynamics across the income distribution, which is a notable strength. Future research could address these limitations by using panel data analysis, including rural samples, integrating macroeconomic indicators, and refining sustainability metrics. This would enhance external validity and policy relevance.

5. 2. Policy implications

These findings align with those of Rashid (2021), Sirisankanun (2015), Karimi & Barati (2017), Dargahi et al. (2024), Attanasio, & Guglielmo (2010), and Mohammadi et al. (2017). These researchers also identified a positive correlation between consumption, experience, and education, and income and household inequality. Notably, as education levels increase, so do income and household consumption, rising proportionally or as a fraction of the income increase. This result aligns with the Permanent Income Hypothesis Friedman (1957), which posits that consumption is more stable than income. Furthermore, marital status negatively affects income, suggesting that the sustainable consumption level of these households exceeds their income. To maintain their consumption behavior, these households may resort to borrowing from financial institutions, using savings, or adjusting their consumption patterns to improve their income situation.

The policy recommendations derived from the study's findings are listed below:

1. The findings indicate that more than 98% of urban households in Iran exhibit "very low" levels of sustainable consumption. Therefore, targeted support programs should be prioritized to raise the minimum consumption standard. These programs could include conditional cash transfers for households below the consumption poverty line and essential subsidies, such as food packages or housing assistance.

2. Given the positive and statistically significant correlation between household income and sustainable consumption ($r = 0.44$), economic policies should be implemented to directly increase household income and enhance sustainable consumption.

3. The results show that the impact of sustainable consumption on income A pronounced upward dispersion is observed, with the conditional effect at the 75th quantile roughly tripling that at the 25^{th}, which highlights severe inequality in

consumption capacity and income-generating potential. Accordingly, differentiated policies are recommended: direct support and cost-reduction measures for low-income households and tax incentives for savings and sustainable consumption for high-income households.

4. Since marital status and gender negatively affect income and sustainable consumption in certain groups (e.g., single-headed or female-headed households), vulnerable demographic groups should receive special support. Specifically, housing and credit facilities should be allocated to single-headed households, and cultural and legal barriers limiting women's access to economic resources should be eliminated.

5. 3. Suggested improvements of this work and future

Based on the findings and limitations of this study, future research should employ panel data to observe household consumption and income dynamics over time, as well as to more precisely estimate causal relationships between key variables. Additionally, the geographical scope of the study should expand to include rural households, systematically comparing sustainable consumption patterns between urban and rural areas. This approach could provide a more comprehensive understanding of spatial and structural inequalities within Iran's consumption economy. Additionally, the "sustainable consumption" index should be expanded to include dimensions such as the environmental impact of consumption, consumer goods quality, nutritional health, and household financial resilience. This will lead to a more multidimensional and realistic measure of consumption sustainability.

Future research should also consider different income sources, such as labor income, government transfers, asset income, and informal assistance, and analyze the specific impact of each on consumption sustainability. Incorporating macroeconomic variables, such as the inflation rate, exchange rate fluctuations, subsidy policies, and external shocks, into microeconometric models can clarify the relationship between macroeconomic policies and household consumption behavior. Finally, using mixed methods that combine quantitative data with qualitative interviews, especially with vulnerable groups such as female- or single-headed households, can enrich the depth of the analysis and help design more targeted, effective socioeconomic policies.

6. Conclusion

This study introduces a composite index of investment-oriented expenditures in education, health, transportation, communications, and cultural and recreational services. This index is used to evaluate the sustainability of consumption patterns among urban households in Iran. Overall, the findings reveal structural unsustainability in household consumption behaviors nationwide. According to the Household Sustainable Consumption Index, 98% of urban households are classified as having "very low" sustainable consumption. This suggests that households can only afford to meet their basic living needs,

with virtually no capacity to invest in sustainable consumption, such as human capital development, health, education, and cultural and recreational activities. These results highlight the ongoing risk of multidimensional poverty cycles and the declining socioeconomic resilience of households in the face of future shocks.

Quantile regression results at the 0.25, 0.50, and 0.75 quantiles confirm a positive, statistically significant relationship between sustainable consumption and household income across all income segments. However, more importantly, this relationship exhibits pronounced heterogeneity. A one-unit increase in the sustainable consumption index results in a greater income increase for high-income households than for low-income households. These results suggest that in Iran, sustainable consumption functions as a cumulative advantage. Wealthier households, who benefit from greater access to financial resources, credit markets, and high-quality education and health services, can leverage sustainable consumption to further increase their income. In contrast, low-income households face structural barriers in achieving even the most basic level of sustainable consumption.

Moreover, statistical analyses reveal that female-headed households are associated with significantly lower incomes, a disparity that remains consistent throughout the income distribution. This disparity indicates deep-rooted structural obstacles that limit women's labor market participation in Iran. These obstacles include occupational discrimination, a gendered division of labor, and sociocultural constraints. Conversely, education and work experience, two core indicators of human capital, positively and significantly affected household income; however, this effect varied greatly across the income distribution. Specifically, the return on work experience at the 0.75 quantile was nearly three times greater than at the 0.25 (QR), highlighting deep inequalities in access to quality employment opportunities. Furthermore, quantile regression coefficients for key variables, particularly sustainable consumption and work experience, fell significantly outside the confidence intervals of the corresponding ordinary least squares (OLS) estimates. This highlights that conventional linear models mask important distributional dynamics and may yield misleading policy implications. Overall, this study provides policymakers with a critical analytical framework. Rather than perpetuating structural inequities or class-based disparities, sustainable consumption should be redefined as a fundamental socioeconomic right accessible to all. In light of these findings, the following key political implications are proposed:

1. Design targeted support policies based on empirical indicators of consumption behavior and the real needs of households, especially low-income groups, who are largely excluded from sustainable consumption patterns.

2. Move beyond one-size-fits-all, macro-level interventions by adopting data-driven precision policy tools that use the Sustainable Household Consumption Index to accurately identify and prioritize vulnerable households.

3. Proactively invest in human capital, especially by providing marginalized groups with equitable access to quality education, skills development, and decent employment opportunities, to disrupt the self-reinforcing cycle of inequality.

4. Integrate the Sustainable Consumption Index into national monitoring frameworks for SDG 12 (Sustainable Consumption and Production), positioning it as a policy-relevant instrument to track progress toward sustainable consumption and production at the household level.

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