

The nutritious foods Price Index and Food Security of Urban and Rural Households in Iran

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Abstract:

The high rate of food inflation in Iran during recent years causes many low-income households at risk of malnutrition. Since Food Security and Nutrition are essential dimensions of Sustainable Development Goals (SDGs) this paper aims to measure a reliable index to monitor food security in Iran among different income deciles groups and urban and rural areas. Despite the long history of conducting the “Consumer Price Index (CPI)” and “Household Income and Expenditure (HIES)” surveys in the Statistical Center of Iran (SCI), yet no attempt has been made to extract health-related indicators from these surveys. This study considers reaggregating CPI price data to calculate the Nutritious Food Price Index (NPI) for Urban and Rural households in Iran. Moreover, we use the “Cost of a Recommended Diet (CoRD)” method to measure the trends and spatial variation in the cost of nutrition. The paper presents the results of using the CoRD method for regional level and decile income groups. The results of the study show that the cost of a healthy diet has increased in recent years and more people are at risk of malnutrition. Furthermore, the healthy food price index is higher than the overall food price index. Finally, the results indicate that the nutritious food price index in urban areas is higher than in rural areas.

Keywords: SDGs, NPI, Healthy Food, Data Integration

1. Introduction:

Access to nutritious food depends on household income. The health of individuals in society is important for the development of a country. Numerous studies have shown that the cost of nutritious foods (such as fruits, vegetables, and meat) is generally higher than the cost of less nutritious foods (such as oil and sugar) because nutritious foods can be spoiled in a short period and therefore more difficult to transport than less nutritious foods. Therefore, low-income households face the problem of malnutrition in this type of food due to its high cost.

To assess the status of household consumption baskets, it is necessary to measure the cost of a desirable food basket recommended by nutritionists for a person's health during a day. For this purpose, we use the cost of the recommended diet (CoRD) method. Our study also calculates the Nutrition Price Index (NPI) to examine changes in nutritional food prices. This index reflects changes in food prices based on their nutritional value.

2. Methodology:

As mentioned in the previous section, in this study, we investigate the food security of Iranian households. First, we calculate the cost of a recommended diet according to the document "desirable food basket for the Iranian Society" which is published by the Ministry of Health of Iran and then we estimate the Nutrition Price Index (NPI).

a. Cost of the Recommended Diet (CoRD)

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The "desirable food basket" has been published according to the consumption pattern of Iranian households and per capita consumption, which is based on the information obtained from the study of food consumption patterns and the balance sheet of the Office of Community Nutrition Improvement of the Ministry of Health of Iran. (Desirable food basket for Iranian society, 2013)

The basket is designed to provide at least 100 percent of the household's energy needs and at least 80 percent of the five key nutrients (protein, iron, calcium, vitamin A and riboflavin). In this study, the recommended amounts of daily consumption of each food item for all age and sex groups have been used. (Table 1)

Table 1: Desirable food basket for Iranian society (individual daily consumption/gram)

| Items | 2-3 years | | 4-5 years | | 6-11 years | | 12-17 years | | 18-29 years | | 30-60 years | | 61 years and older | |
|------------|-----------|-----|-----------|-----|------------|-----|-------------|-----|-------------|-----|-------------|-----|--------------------|-----|
| | M | F | M | F | M | F | M | F | M | F | M | F | M | F |
| Rice | 30 | 30 | 40 | 30 | 80 | 70 | 100 | 60 | 120 | 75 | 120 | 75 | 80 | 75 |
| Bread | 50 | 50 | 60 | 60 | 110 | 110 | 350 | 270 | 340 | 240 | 340 | 210 | 220 | 150 |
| Noodle | 30 | 30 | 30 | 20 | 30 | 20 | 30 | 20 | 50 | 30 | 50 | 20 | 20 | 20 |
| Meat | 20 | 20 | 20 | 20 | 40 | 50 | 45 | 50 | 38 | 40 | 35 | 50 | 35 | 30 |
| Chicken | 10 | 10 | 30 | 30 | 40 | 50 | 70 | 64 | 64 | 70 | 64 | 70 | 64 | 65 |
| Dairy | 300 | 300 | 300 | 300 | 400 | 400 | 450 | 500 | 350 | 400 | 350 | 500 | 400 | 500 |
| Eggs | 30 | 30 | 35 | 30 | 35 | 40 | 50 | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| Oil | 20 | 20 | 25 | 30 | 35 | 30 | 45 | 35 | 45 | 25 | 40 | 25 | 49 | 20 |
| Fruits | 150 | 150 | 200 | 200 | 200 | 200 | 350 | 280 | 320 | 280 | 280 | 280 | 280 | 280 |
| Vegetables | 150 | 150 | 150 | 150 | 250 | 250 | 400 | 400 | 300 | 400 | 330 | 300 | 300 | 300 |
| Potatoes | 30 | 30 | 40 | 40 | 70 | 70 | 100 | 70 | 90 | 50 | 90 | 40 | 50 | 60 |
| Grain | 10 | 10 | 10 | 10 | 20 | 20 | 26 | 20 | 20 | 30 | 20 | 20 | 20 | 20 |
| Sugar | 20 | 20 | 35 | 30 | 30 | 25 | 40 | 30 | 50 | 30 | 40 | 30 | 30 | 20 |

Food price data were collected from information on the average price of food items at the national and provincial levels using the Consumer Price Index of the Statistics Center of Iran. Also, the results of the household income and expenditure survey of the Statistics Center of Iran have been used to study and analyze the costs of nutritious foods.

The method of calculating the cost of recommended food diet allows us to assess the extent to which Iranian households have access to desirable nutrition. To calculate the CoRD, the recommended amounts of food items have been used (Table 1). The unit of measurement for some items in the consumer price index survey may vary at different times, so first, the unit of measurement for each item is converted to 1000 grams to make it easier to calculate the cost of items. For example, in the case of "bread", in some years the price of one loaf of bread and in some other years the price of 1000 grams has been taken. In this case, using the information published by the official institutions about the weight of bread, the price of one loaf of bread has converted to a price of 1000 grams.

Due to that, the goal in this method is to calculate the minimum cost required to achieve the recommended diet, in each group of the consumer price index, two items that have the lowest cost are selected. Finally, the required cost of the recommended amount of each food item for both males and females for all age groups has been calculated. By summing up the cost of items in the desirable food basket, the amount of money needed for proper nutrition has been achieved. In the end, to achieve a single index, simple arithmetic mean is obtained from the calculated costs for all males and females in all age groups.

b. Nutrition Price Index (NPI)

The method of calculating NPI is quite similar to CPI, but instead of using expenditure coefficients, it uses a weight that reflects the nutritional value of each item. Therefore, to calculate NPI, the classes' indices (4 digit COICOP classification) of food and beverage groups in COICOP classification by new

weights are reaggregated. In other words, the NPI does not reflect the level of food prices, but rather reflects the level of food prices in terms of nutritional value. Therefore, to calculate NPI, we need a weight that indicates the nutritional value of each item in the basket.

Many indicators rank food items based on their nutritional value. We don't have any document in Iran that scores food items specifically based on nutritional value, so in this study, we use the NuVal (Nutritional Scoring System), which previously ranked food items in the United States based on nutritional value. This index has ranked the nutritional value of items from 1 to 100. In the case of items that are in the consumer price index basket of Iranian households but do not have a NuVal score, the score of similar items has been used as an alternative.

In the first step, using NuVal coefficients, the index of each item is adjusted in the consumer price index survey, and then it is aggregated for classes of food. Finally, by aggregating these groups using nutritional weights, NPI is calculated. Comparison of NuVal weights and CPI weights for the urban and rural areas are shown in Table 2.

Table 2: CPI weight in urban and rural areas versus NuVal weight

| Group Items | Urban | Rural | NuVal |
|---|--------|--------|--------|
| Food and non-alcoholic beverages | 100.00 | 100.00 | 100.00 |
| Bread and cereals | 23.63 | 26.92 | 8.26 |
| Meat and other parts of slaughtered animals' preparations | 21.93 | 20.33 | 2.13 |
| Fish and other seafood | 3.00 | 2.17 | 7.03 |
| Milk, other dairy products and eggs | 10.69 | 8.42 | 11.05 |
| Oils and fats | 4.54 | 5.23 | 0.13 |
| Fruits and nuts | 13.10 | 10.38 | 40.42 |
| Vegetables | 10.66 | 12.22 | 27.59 |
| Sugar, confectionery and desserts | 5.13 | 5.70 | 0.40 |
| Other food products | 3.51 | 3.87 | 1.66 |
| Non - Alcoholic Beverages | 3.80 | 4.75 | 1.34 |

3. Result:

3.1 CoRD among Iran's provinces

The CoRD has been calculated using the information of food quantity in the "desirable food basket for the Iranian society" document and food price data from CPI for 30 provinces of Iran. The CoRD has been calculated for two years 2008 and 2018 in urban and rural areas to monitor changes in food security. Our CoRD estimates the cost of a desirable nutritious diet (individual daily cost), so we expect it to be an expensive basket for Iranian households.

Our results show that the cost of the recommended diet for a typical 4-person family is 54% of the minimum wage for urban households and 48% for rural households.

This is the expected result because they show that most Iranian households spend less than CoRD for food and beverage. This can be due to low income or an unhealthy diet. Comparing the results of the CoRD and household income and expenditure survey in Iran's provinces indicates that in 2018, 52 to 80 percent of households suffer from an unhealthy diet. Tehran province has the best situation with 52 percent with 52 percent of households that exped on food and beverage less than CoRD value, while Hormozgan province has the worst situation with 80 percent. Besides, the results for the rural area show that at least 40% of households in the Alborz province and up to 92% of households in Sistan and Baluchistan province suffer from an unhealthy diet. A comparison of these results with 2008 shows that over ten years, households that fall below CoRD have risen in 26 provinces of 30 provinces.

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Figure 1: Percent of households with Food Expenses Falling below CoRD in Urban area

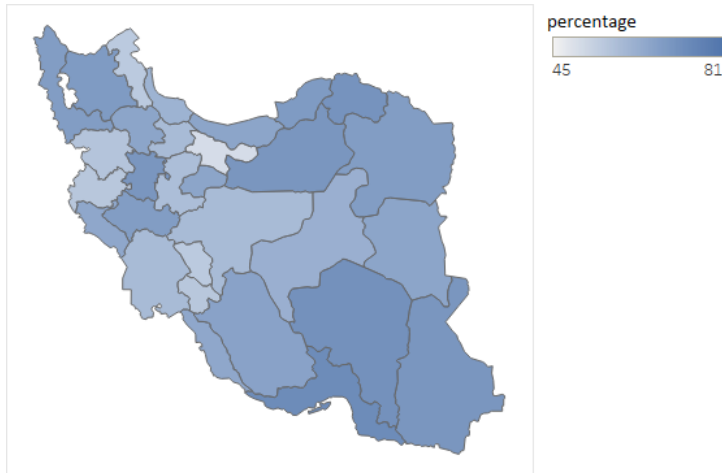
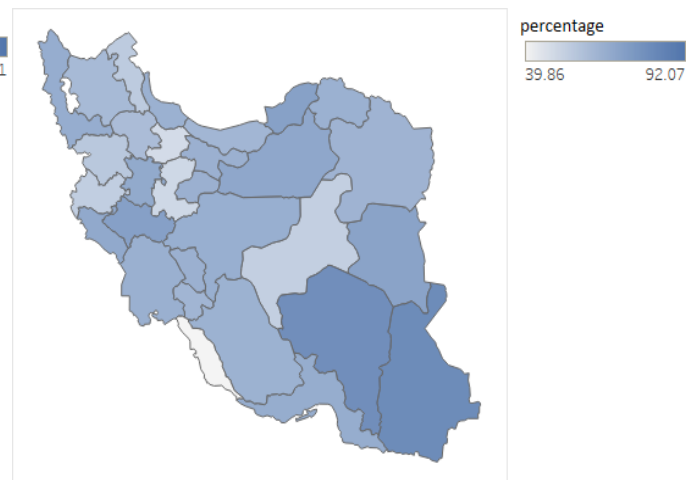


Figure 2: Percent of households with Food Expenses Falling below CoRD in Rural area



3.2 Compare between urban and rural areas

To calculate the CoRD for both groups of urban and rural households, the same nutrition diet has been used. However, because the CPI survey in Iran is implemented separately in urban and rural areas, we had access to the price of food items separately in urban and rural areas.

Figure 3: average price of selected nutrition food items in Urban and Rural area, 2018 (1000 gram/IRR)

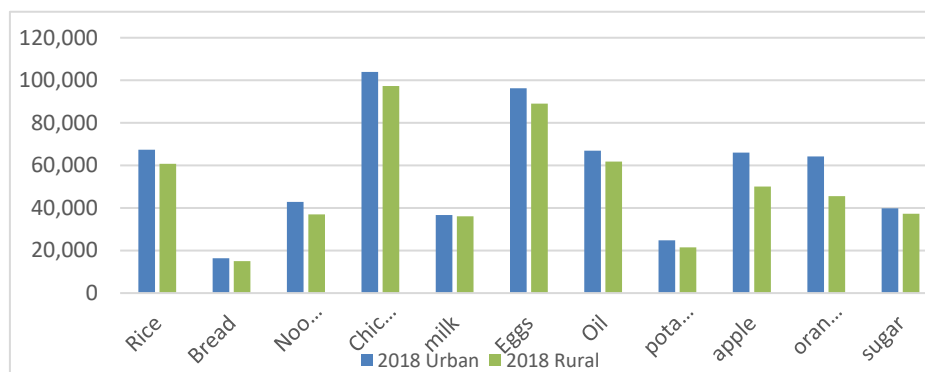
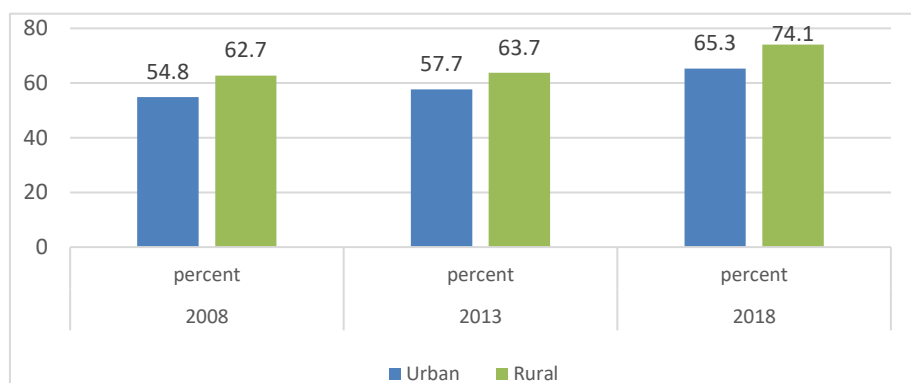


Figure 3 shows the prices of selected nutrition food items in urban and rural areas in 2018. It is clear that the price of food items, especially fruits and meat, is higher in urban areas than in rural.

Figure 4: Percent of household with Food Expenses Falling below CoRD in Rural and



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However, as you can see in Figure 4, the percentage of households that spend less CoRD is higher in rural areas than in urban, and this gap has increased in recent years. We argue that because fresh food prices are determined by the local market, they are cheaper in rural areas, however, the low-level income in rural areas has led to a higher percentage of households suffering from malnutrition than urban areas

3.3 CoRD and The income decile group

An examination of the Food Expenses among Urban income decile shows that from 25 percent of households in the tenth decile to 93 percent in the first decile spend less than CoRD on food and beverage. As well as in the rural area, 34 percent of households in the tenth decile to 94 percent of households in the first decile spend less than CoRD.

Figure 5: Percent of household with Food Expenses Falling below CoRD in Rural and Urban deciles - 2018

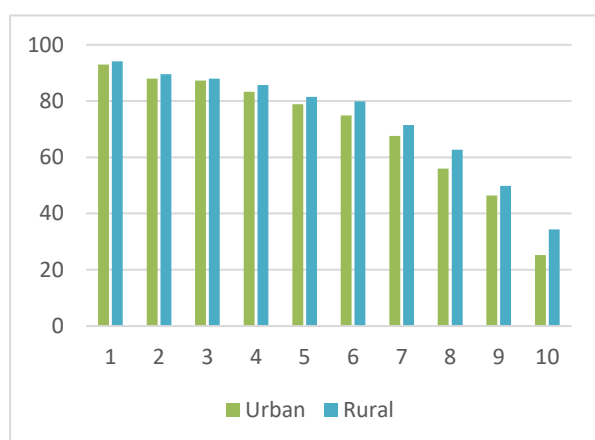
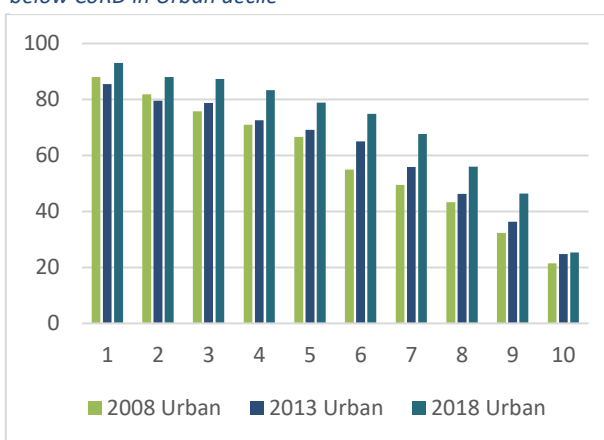


Figure 6: Percent of household with Food Expenses Falling below CoRD in Urban decile



As figure 6 shows, in the first two deciles, the percentage of the household that below CoRD decreased in 2013 compared to 2008. The reason for this could be the implementation of a targeted subsidy policy at that time. We find the same result for rural deciles in 2013.

3.4 Increasing NPI in recent years

To understand how the cost of nutritious foods has changed over time, we calculate the NPI for the last ten years.

Figure 7: NPI versus food and beverage CPI inflation – Rural area

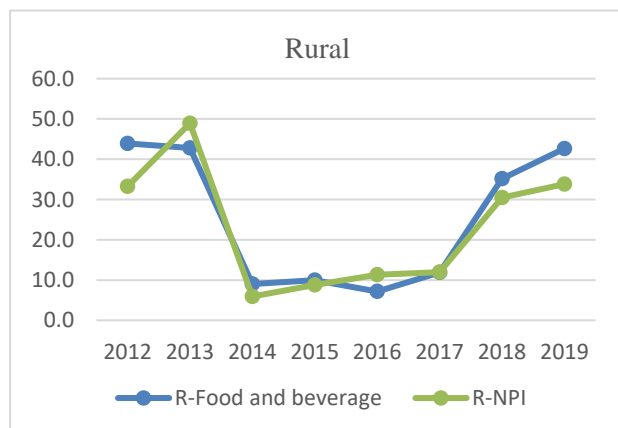
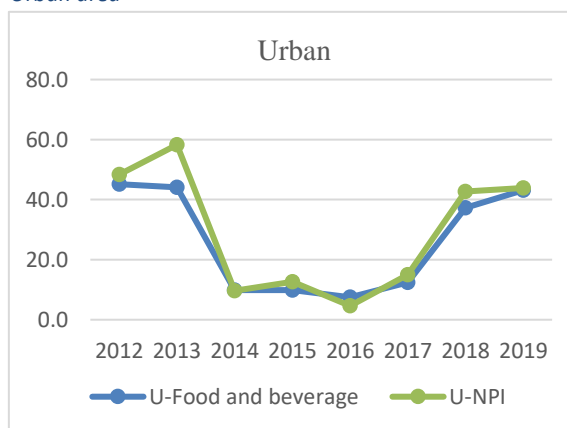


Figure 8: NPI versus food and beverage CPI inflation – Urban area



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The results show that in most years the rate of NPI inflation has been higher than food inflation. In 2019, the inflation rate of the NPI was 0.8 percent higher than the inflation rate of the food and beverage group. However, this trend has been the opposite for rural households, and in most years the rate of NPI inflation in rural areas has been lower than the inflation rate for food and beverages. In 2019, the NPI inflation rate was 8.8 percent lower than the inflation rate for the food and beverage group. Finally, These results confirm previous obtained using CoRD method which is nutrition costs in rural areas is less than urban.

Conclusion

In this paper, we tried to use the indicators beyond the CPI to examine the food basket consumed by households. Therefore, we used two indicators, CoRD and NPI. We examined the CoRD index both in different deciles and in different areas (urban and rural, each separate province). Comparing the CoRD index and HIES information shows that it is difficult for households to provide a healthy food basket, and this is more severe in rural areas. Findings show that the percentage of households whose food costs are below the CoRD is rising over time, and also more percentage of households in the lower-income deciles are under the CoRD. This matter indicates a serious threat to the food security of Iranian households, which emphasizes the attention of policymakers in this field. Controlling the prices that supply the CoRD basket and subsidizing deprived areas and deciles are some of the things policymakers can do in this direction.

In the end, it is necessary to remember that paying attention to the nutrition of the people of the society is a precondition for socio-economic development, and not paying attention to this issue will take the society away from the development goals.

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