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Application of Engel Index in Measurement of Food Security situation of Rural and Urban Areas of Iran

Abstract

Food security issues are very serious in most parts of the world. On this basis due to the importance of the food security concept in this study with usage of index of expenditure reserve of Engel's law food security situation in urban and rural areas of Iran studied between years of 2000 to 12020. In this research work secondary data is utilized, data gathered from households' income and expenditure data of statistical center of Iran. Results of calculation of Engel's index indicate that rural households compare with urban households are in unfavorable situation as far as food security is concern. Results of comparing these values in income deciles of rural and urban areas indicate that difference and gap in Engel's index is increasing in recent years. The results of this index in urban household income deciles also showed that, according to Engel's law, the value of this index decreased with moving from lower-income deciles to upper-income deciles. But the comparison of the value of this index in the income deciles of urban and rural households shows that just as the average value of this index in the whole country was higher in rural areas than in urban areas, in income deciles, the value of this index is higher in rural areas than in urban areas

Keywords: "Food security", "Engel's index", "Households", "Rural", "Urban"

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Introduction:

In our time, improving the food security factor is one of the main demands of the world's political elites, and even this matter is compassionate in industrialized countries. In Iran, in the years after the Islamic revolution, the category of self-sufficiency in agricultural products has always been emphasized and it has been considered in the laws of the development program, it has paid great attention to food security and wanted to increase its coefficient; However, despite different emphasis and special sensitivities to achieve it, the food security coefficient has decreased in recent years.

Households' inability to access enough food for an active life is an important part of their poverty. Food security is the cornerstone of a developed society. Considering food security is a well-thought-out indicator of household and individual health, food insecurity can be a precursor to developmental, health, and nutritional problems.

Engel's law is an economic law established by Ernst Engel (1821-1896). It indicates that the share or proportion of income spent on food decreases with the rise in a person's income.

By using this law, it is possible to compare the status of food security in different societies and different periods, because societies and income groups that have a better income status spend a smaller share of their income on food, and, in terms of food security, they are in They live better. based on this simple principle, this research has tried to investigate the food security situation in the urban areas of Iran by using the parasite law.

Bala (1993), in his research conducted in South Asian countries, measured the food security situation in these countries by estimating the supply and demand functions for food and predicted that in 2030 in South Asian countries, the imbalance between Supply and demand will arise and the countries of this region will become food importers.

Andersen and Rajol (1995), in their study in order to achieve a balance between sufficient food production and food needs at the global level, the existence of things such as strengthening economic growth in all sectors, implementing appropriate policies to reduce population growth and migration to urban areas, optimal use From the resources for the development of sub-sectors, they considered the existence of technology, agricultural research, granting facilities to farmers and economic reforms necessary.

Gabbert and Wickard (1998) estimated the food security index for 36 African countries, for example, this index was estimated at 79.4% for Cameroon in 1998, which shows an average level



of food security. In the same year, Gabbert and his colleagues estimated the collective index of food security for Kenya at 71.7%, which indicates a low level of food security. In this study, 46% of the Kenyan population lacked the minimum recommended amount of energy per capita (225 kcal per day) and in 2006, 3.5 million Kenyans needed urgent food.

Smith et al. (1999), to investigate the causes of food insecurity in developing countries, introduced two main factors affecting food security, sufficient food supply and people's purchasing power, and concluded that unlike purchasing power, food supply has little interaction with It is food security and extreme poverty is the most important factor in food insecurity. They considered the correct implementation of specific policy goals effective in improving food security.

Khan and Shirani (2003) estimated the risk of losing food entitlements in India using household income and expenditure data and concluded that 53% of urban residents and 58% of rural residents are at risk of losing food entitlements. They are their food security.

Samar Abdallah et al. (2009) investigated the food security situation of farmer households in the dry areas of Sudan and showed that 85% of the farmer households in the region face food security problems.

Noorhasma et al. (2010) conducted a qualitative study of coping strategies among household women under food insecurity conditions in Selangor and Similan regions in Nigeria and showed that each strategy shows a different level of intensity.

Bashir et al. (2012), in a study entitled the differences in food security of rural households in the Punjab State of Pakistan, examined the level of food security at the national and household levels and in the first step concluded that the level of food security at the national level is equal to the level of security Food is at the international level; But at the household level, 26 percent of the 1152 households questioned do not have adequate food security. In the second step, they investigated the factors affecting food security that monthly income, household livestock assets, and household size having a positive effect on the food security of rural households.

Blay Badek (2012) determined the factors influencing the food security situation in the Kersa region in eastern Ethiopia. The results of Pearson's correlation coefficient showed that factors affecting the level of food insecurity, such as household size and the gender of the head of the household (being a woman), have a negative relationship with food security.

In their study, Schotten et al. (2017) examined the approaches, methods, and consequences of food security in Africa. The results showed that, firstly, to encourage improvements in food security in Africa, there is a need for a method to recognize local resources, which can guide decision-makers to design and intervene appropriately in the field of providing people's food

security. Secondly, identifying the constructive institutions in line with the sustainability of food security requires knowing the causes of food insecurity and regulating the institutions that affect food security.

Shame Levy et al. (2017) investigated the food security situation in Mexico. The results showed that this country currently lacks a national food and nutrition strategy to ensure food security for the people. In addition, permanent or long-term strategies in the field of food and nutrition management can be the best solution in this field.

Farhadi Mahali and Shirani Bidabadi (2014), investigated the food security status of 206 households from rural areas of Sari using the Coping Strategy Index (CSI) and Household Food Access and Insecurity Scale (HFIAS). The results of calculating the CSI index showed that 14% of households are in a food security situation and the rest of the households are in various degrees of insecurity. However, the HFIAS index showed that 35% of households in Sari are in the food secure category, and the rest suffer from the problem of food insecurity.

Materials and methods

For the purpose of this study secondary data is utilized. Data collected from annual statistical reports of statistical center of Iran. The Engel law shows that the share or proportion of income spent on food decreases with a person's income and the proportion of unnecessary expenses increases. Consumers increase their food consumption costs less than their income increases. Based on this, the following relationship is used in this study to check the food security situation using the Engel index:

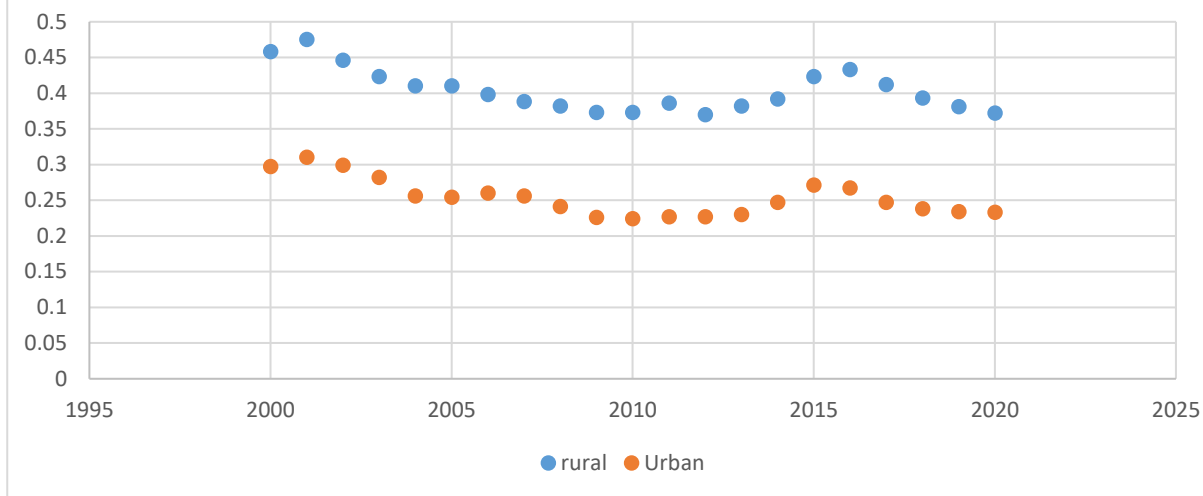
$$Engel = \frac{FC}{FC + OC}$$

where FC is the average food expenses of each household in one year and OC is the average non-food expenses of each household in one year. This relationship states that this index is obtained by dividing the food cost by the total food and non-food costs of the household.

Results and Discussion

The results of the calculation of the Engel index for rural and urban areas are shown in Figure 1. This figure shows that in both regions (rural and urban) the Engel index fluctuations have many similarities.

Figure 1: Engel index in rural and urban areas of Iran.



In both cases, between 2001 and 2005, due to the reform government's correct economic policies, the Engel index's numerical value decreased, which means that in urban and rural areas, people spent less of their income on buying food. This process continued until 2010 due to the high prices of crude oil in international markets and the payment of cash subsidies to the people. From 2010 to 2015, due to the intensification of international sanctions against Iran, the Engel index has been increasing, which means people in both rural and urban areas spend a larger portion of their income on food items.

After examining the situation of the Engel index in the whole country, to check the value of the Engel index in the household income deciles of rural and urban areas and also to examine the Engel law, we calculated the Engel index for different income and expenditure decile in urban and rural areas of Iran results of this index in the income deciles are shown in Tables 1 and 2. According to Engel's law, with the increase in income, the share of people's food expenses in the cost of living basket decreases. In other words, as the income of people increases, this index decreases. This is consistent with data presented in Table 1 and Table 2.

The results of this index in urban household income deciles also showed that, according to Engel's law, the value of this index decreased with moving from lower-income deciles to upper-income deciles. But the comparison of the value of this index in the income deciles of urban and rural households shows that just as the average value of this index in the whole country was higher in rural areas than in urban areas, in income deciles, the value of this index is higher in rural areas than in urban areas, which This difference has increased in the years of 2016, so that compared to the past, the status of this index shows that households in urban areas have a lower cost share for providing food than the total food and non-food expenses of their lives.

Table 1: Engel's index in urban areas income and expenditure deciles

year	1st Decile	2nd Decile	3rd Decile	4th Decile	5th Decile	6th Decile	7th Decile	8th Decile	9th Decile	10th decile	urban
2000	0.402	0.386	0.373	0.366	0.349	0.344	0.331	0.312	0.288	0.21	0.297
2001	0.394	0.4	0.382	0.379	0.361	0.352	0.344	0.318	0.302	0.23	0.31
2002	0.382	0.379	0.364	0.354	0.346	0.346	0.325	0.317	0.299	0.225	0.299
2003	0.361	0.364	0.356	0.342	0.344	0.335	0.321	0.3	0.279	0.206	0.282
2004	0.563	0.363	0.354	0.333	0.321	0.305	0.293	0.281	0.249	0.165	0.256
2005	0.463	0.35	0.345	0.338	0.324	0.312	296	0.279	0.242	0.166	0.254
2006	0.427	0.352	0.337	0.323	0.308	0.296	0.281	0.276	0.251	0.182	0.26
2007	0.502	0.355	0.346	0.33	0.31	0.307	0.292	0.274	0.243	0.169	0.256
2008	0.437	0.354	0.337	0.317	0.304	0.29	0.282	0.258	0.225	0.159	0.241
2009	0.439	0.336	0.327	0.298	0.286	0.283	0.265	0.238	0.214	0.152	0.226
2010	0.421	0.325	0.316	0.295	0.289	0.21	0.253	0.243	0.211	0.155	0.224
2011	0.357	0.312	0.291	0.284	0.269	0.256	0.246	0.227	0.207	0.164	0.227
2012	0.353	0.312	0.303	0.276	0.272	0.257	0.25	0.233	0.205	0.16	0.22
2013	0.382	0.314	0.307	0.286	0.283	0.262	0.24	0.235	0.21	0.161	0.23
2014	0.361	0.341	0.323	0.312	0.3	0.279	0.264	0.241	0.225	171	0.24
2015	0.405	0.36	0.344	0.331	0.324	0.308	0.29	0.267	0.252	0.192	0.271
2016	0.427	0.36	0.34	0.334	0.313	0.305	0.284	0.264	0.242	0.185	0.26
2017	0.394	0.341	0.324	0.309	0.299	0.28	0.2	0.248	0.22	0.17	0.247
2018	0.367	0.333	0.311	0.299	0.288	0.274	0.257	0.239	0.213	0.164	0.238
2019	0.359	0.32	0.316	0.294	0.28	0.265	0.248	0.236	0.21	0.165	0.234
2020	0.365	0.325	0.313	0.29	0.286	0.265	0.251	0.232	0.213	0.161	0.233

Source: Research findings.

Table 1: Engel's index in rural areas income and expenditure decile

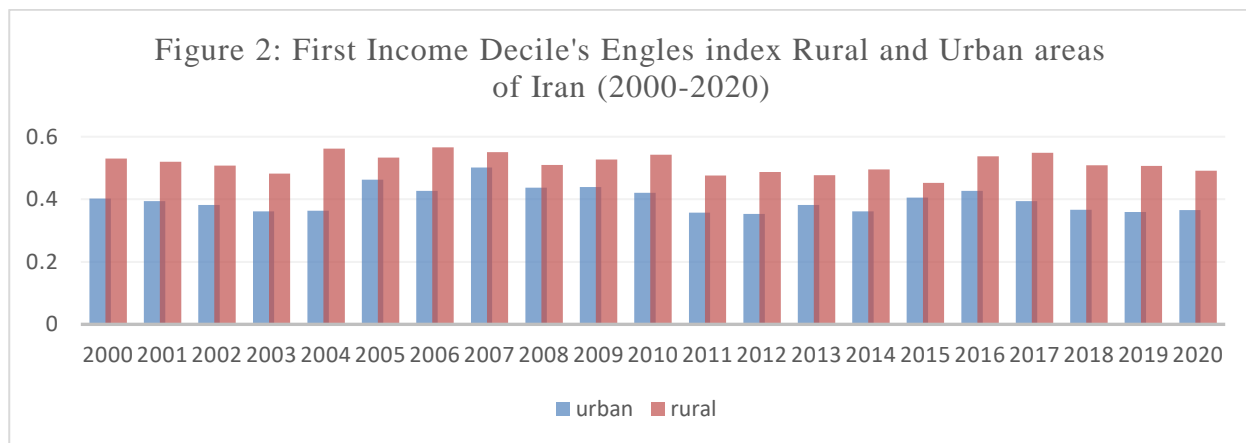
Year	1st Decile	2nd Decile	3rd Decile	4th Decile	5th Decile	6th Decile	7th Decile	8th Decile	9th Decile	10th Decile
2000	0.53	0.549	0.548	0.533	0.524	0.493	490/0	0.471	0.444	0.386
2001	0.52	0.548	0.55	0.544	0.527	0.51	487/0	0.45	0.439	0.44
2002	0.508	0.527	0.535	0.51	0.513	0.493	480/0	0.456	0.427	0.379
2003	0.482	0.517	0.516	0.493	0.482	0.483	455/0	0.435	0.402	0.352
2004	0.562	0.51	0.494	0.485	0.472	0.454	437/0	0.418	0.395	0.331
2005	0.533	0.504	0.491	0.481	0.471	0.449	442/0	0.416	0.388	0.336
2006	0.566	0.492	0.481	0.468	0.453	0.446	428/0	0.401	0.387	0.309
2007	0.551	0.495	0.479	0.464	0.446	0.438	420/0	0.402	0.379	0.304
2008	0.51	0.487	0.484	0.466	0.446	0.435	413/0	0.394	0.361	0.296
2009	0.527	0.467	0.459	0.454	0.43	0.426	401/0	0.384	0.364	0.299
2010	0.543	0.49	0.469	0.445	0.46	0.426	399/0	0.389	0.355	0.297
2011	0.476	0.459	0.468	0.448	0.44	0.428	418/0	0.397	0.371	0.316
2012	0.487	0.462	0.465	0.442	0.442	0.422	398/0	0.378	0.355	0.294
2013	0.477	0.48	0.469	0.452	0.441	0.427	402/0	0.385	0.357	0.316
2014	0.495	0.483	0.474	0.459	0.445	0.431	408/0	0.394	0.373	0.317
2015	0.453	0.519	0.505	0.484	0.46	0.456	444/0	0.423	0.402	0.352
2016	0.537	0.529	0.507	0.485	0.477	0.46	452/0	0.437	0.41	0.358



2017	0.549	0.506	0.49	0.471	0.456	0.442	427/0	0.409	0.385	0.346
2018	0.509	0.486	0.481	0.451	0.44	0.419	402/0	0.397	0.373	0.322
2019	0.507	0.476	0.455	0.447	0.43	0.412	395/0	0.381	0.354	0.308
2020	0.491	0.474	0.45	0.431	0.416	0.405	389/0	0.372	0.346	0.307

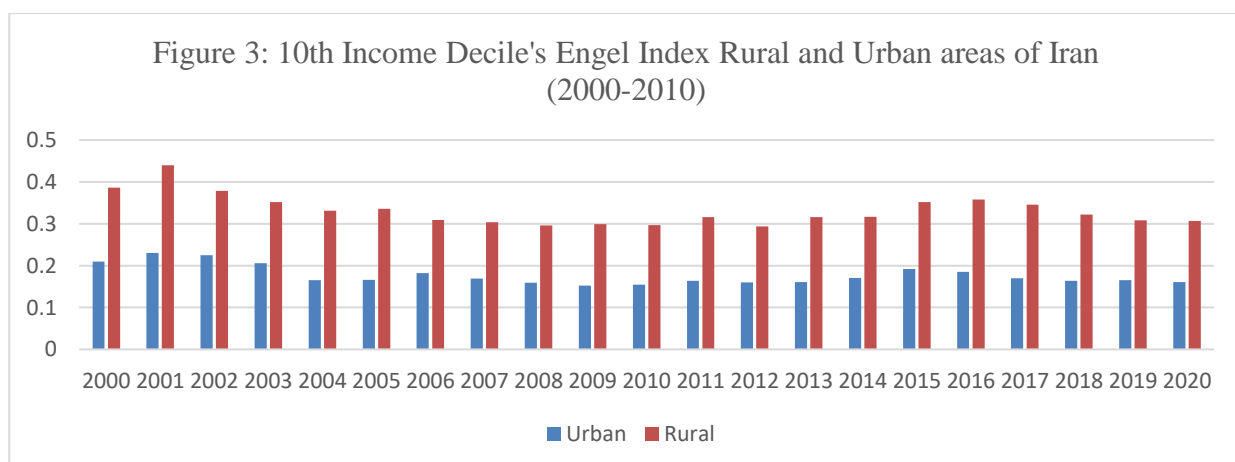
Source: Research findings.

Results of comparison of Engels index of first income decile presented in figure 2, as it is obvious from figure 2 that between the years of 2000 to 2020 the poorest strata of urban households expend less portion of their income on food items compared with the poorest strata of rural households, which is in tune with urban and rural average of Engels index that presented in figure 1.



Source: Research Finding.

Figure 3 compares value of Engel index of 10th income decile in rural and urban areas of Iran. The figure indicates that value of Engels index is higher in rural areas compare with urban areas. Which is in tune with data presented in figure one. This means people in rural areas of Iran even in highest income strata spent higher proportion of their income on food item comparing with urban households of same income strata.



Source: Research Findings

Conclusion:

Despite all economic problems including mismanagement of the country by the government which resulted in international sanctions and their obvious results including shortages of some food items and high prices of other food items, due to direct and indirect subsidies granted to people by the

government there is no meaningful differences in the value of Engel index between 2000 and 2020. However, during the study time, the value of the Engel Index was higher in rural areas than in urban areas, meaning that rural areas' food security situation is in a deficit compared with urban areas. This necessitate the direct intervention of government in rural areas as far as food security is concerned.

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