

THE COMPLEX UNIVERSE OF RICH AND POOR INFLATION RATES

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Executive Summary

Consumer price index (CPI) which is announced monthly by Turkish Statistical Institute (Turkstat) shows the rate of increase in the value of the consumption basket of a representative household. Therefore, the official inflation rate represents the inflation rate that a representative household faces. However, the weights of the goods and services in the consumption baskets of households in different expenditure groups may be different from the composition of the basket that a representative household consumes. For this reason, the inflation rates of different expenditure groups may change in time. In this research note, we calculated the cumulative inflation rate of each expenditure decile by using the data in Household Budget Survey (HBS) between 2003 and July 2021.

Our analysis does not provide support for the conventional wisdom that the cumulative inflation rate is the highest in the lowest expenditure group but the lowest in the highest expenditure group. Some of our findings are unexpected and surprising. As of July 2021 (2003=100), the group with the lowest cumulative inflation rate is the penultimate highest expenditure group. The cumulative inflation rate of the lowest expenditure group, i.e., "the poorest", is the second lowest inflation rate by a small margin. Contrary to expectations, the cumulative inflation rate of the highest expenditure group, i.e., "the richest", is the third highest cumulative inflation rate.

Along with these findings, inflation rates of other expenditure groups are mostly in line with the common perception. Even though inflation rates do not systematically increase as the expenditure level lowers, the second lowest expenditure group faces the highest cumulative inflation rate.

Inflation rate varies across expenditure groups

Inflation is the increase in the price paid to purchase the consumption basket that contains widely used goods and services. Which or whose consumption basket forms the basis to calculate the inflation rate? The conventional method is to use the consumption basket of the representative household in the middle after ordering the households based on their expenditure levels. Turkstat follows this approach as well. The weights of the goods and services in the representative household's consumption basket are the monthly shares of those items in the representative household's total spending. Therefore, CPI that Turkstat announces is the inflation rate of the representative household.

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Nevertheless, those weights in the consumption baskets of each household, due to their preferences, mostly vary with expenditure levels. For instance, as we will report later, the weight of transportation is quite high for high expenditure households while the share of food is quite high for low expenditure households. Therefore, it is inevitable that households in different expenditure groups face different inflation rates at the same point in time. In this regard, to what extent the inflation rates vary among the households in different expenditure groups is an interesting question. Simply, is there any significant difference between the inflation rates of the households in the lowest expenditure group (henceforth "the poorest" and "the poor") and the highest expenditure group (henceforth "the richest" and "the rich") over the last 18 years? If so, who did benefit from this divergence?

Surprising results

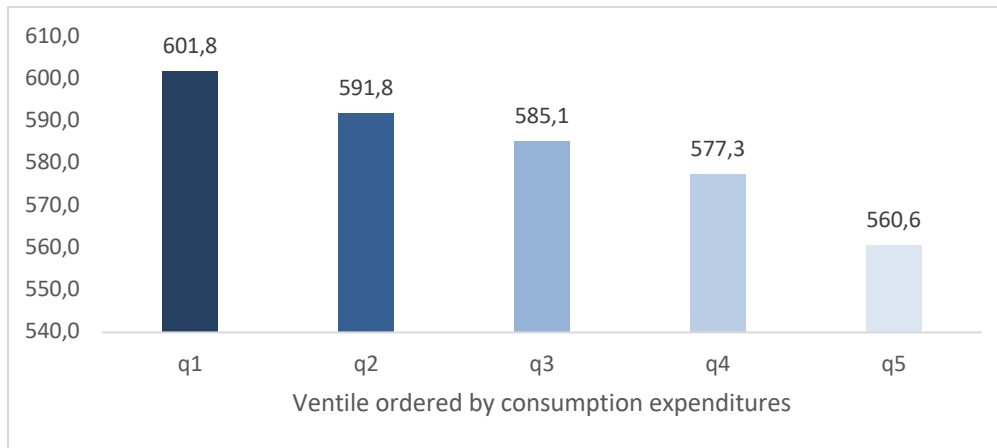
Betam regularly analyzed the inflation indexes (2003=100) of different expenditure groups for a long time. We published eight notes on this topic.¹ In those notes, after sorting the households by their expenditure levels, we calculated the inflation rates of each expenditure ventile by considering the composition of their consumption baskets.² This is our first note that utilizes the expenditure deciles rather than ventiles. Our current analysis revealed surprising results on the divergence of inflation rates between these two approaches.

Firstly, let us report the analysis conducted in ventiles. Figure 1 depicts price indexes of each ventile which are calculated by using the weights of items in an average consumption basket of each expenditure group and the price indexes of those items.

¹ The reports are in Turkish and they are: Gıda Enflasyonu Yoksulu, Ulaştırma Enflasyonu Zengini Vurdu (2019), Yoksul ile Zengin Arasındaki Enflasyon Farkı Devam Ediyor (2017), Yoksul ile Zengin Arasındaki Enflasyon Farkı 8 Yılda 20 Puanı Geçti (2016), Yoksul ile Zengin Arasındaki Enflasyon Farkı Rekor Seviyede (2015), Yoksul ile Zengin Arasındaki Enflasyon Farkı Artıyor (2014), Yoksulun Enflasyonu Zenginin Enflasyonundan Yüksek (2012), Enflasyon Yoksulu Vuruyor (2010), Her Harcama Düzeyi İçin Farklı Enflasyon (2008).

² We previously conducted the inflation analysis based on ventiles because Turkstat released the weights of each item in the consumption baskets of each expenditure ventile but not deciles. In this research note, Betam calculated the shares of each item in the consumption basket of each expenditure decile. We also calculated the shares of each item in the consumption basket of each expenditure ventile to be consistent. In addition, we calculated the inflation rates by using the weights which Turkstat announces. The difference between these two indexes is ignorable. As of July 2021, the values of the price indexes (2003=100) of 5 ventiles are as follows: 599,4-601,8; 591,4-591,8; 584,5-585,1; 578,6-577,3; 562,0-560,6.

Figure 1: Consumer Price Indexes by Expenditure Groups (2003=100)



Source: Turkstat, Betam

This approach shows that as expenditure level gets lower (from the richest (q5) to the poorest (q1)) the price index significantly increases. In compare to 2003, the price index of the bottom ventile (the inflation rate of the poorest) rose to 601.8 while the price index of the top ventile (the inflation rate of the richest) rose to 560.6 as of July 2021. In other words, the value of the consumption basket of the poorest rose by about 500% whereas the value of the consumption basket of the richest increased by 460% in terms of Turkish Lira after 2003. Over the last 18 years, the inflation rate of the poorest is 40 percentage points (pp) higher than the inflation rate of the richest.

Figure 2 represents the CPI inflation rate in deciles. The first striking observation is that the inflation index does not monotonically increase as in ventiles from upper expenditure to lower expenditure. **This finding is not in line with our prior and it falsifies the conjecture that "the inflation rate of the poorest is systematically higher than the inflation rate of the richest".**

The average inflation index of the top decile (q10) (henceforth "the richest") increased to 560.6 while the average inflation index of the lowest decile (q1) (henceforth "the poorest") rose to 546.9. In other words, the value of the consumption basket of the poorest increased by about 447% but the value of the consumption basket of the richest rose by 461%. The inflation gap between the poorest group and the richest group was about 14 percentage points in favor of the poorest". This is an unexpected result.

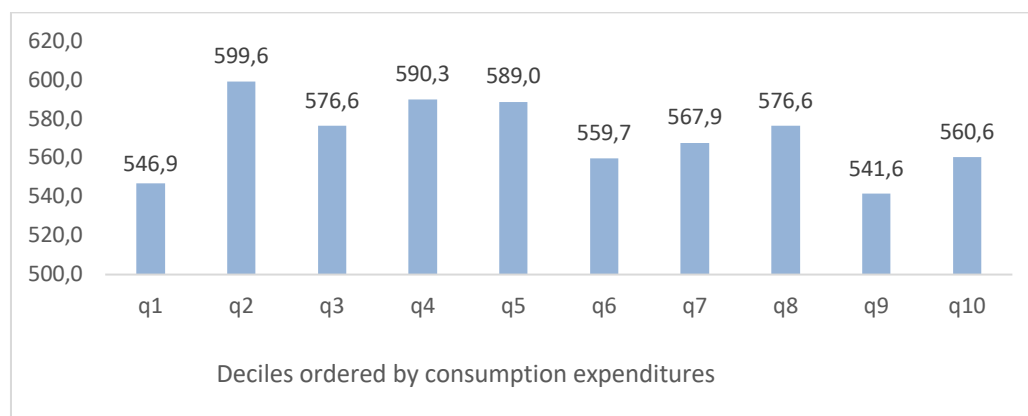
The second lowest decile (q2) ("the poor") faced the highest inflation rate which is about 500%. **As a result, the gap between the inflation rates of the poorest and the poor is about 53 pp.** This is another unexpected finding.

There is another surprising observation pertaining to the difference between the inflation rates of the richest group and the penultimate richest group (q9) (henceforth "the rich"). **The inflation rate of the rich is 441.6% (index value is 541.6) while the inflation rate of the richest is 460.0% (index value is 560.6) (Figure 2).** The gap is 19 pp. Moreover, the inflation rate of the rich is the lowest inflation rate, and it is even lower than the inflation rate of the poorest (446.9 %) by 5.3 pp.

All these findings are striking. How come the inflation rate of the poorest is lower than the inflation rate of the richest? Also, how come the inflation rates of the poorest and the poor or the inflation rates of the richest and the rich decouple to such extent?

Certainly, those are valid concerns. Such unexpected findings are possible only if the weights of the items in the consumption baskets of each expenditure group differ. Therefore, to answer those questions, it is necessary to disentangle the contributions of these differences to each inflation index.

Figure 2: Consumer Price Indexes by expenditure Groups (2003=100)



Source: Turkstat, Betam

Sources of the unexpected findings on inflation rates

The consumption basket contains 12 items (Table 1). The weights of these items in total consumption vary with expenditure levels. Therefore, the weights in the consumption basket of each group are different. Also, the inflation rate of each item changes in time. Ultimately, the inflation rate of each group can be calculated by multiplying the change in the price of an item with its weight in the consumption basket of the corresponding group. Hence, it is possible to disentangle the inflation rate to the contributions of each item in the consumption basket, as we thoroughly explain the method in Box 1, and the sum of those contributions yields the inflation rate of the corresponding group.

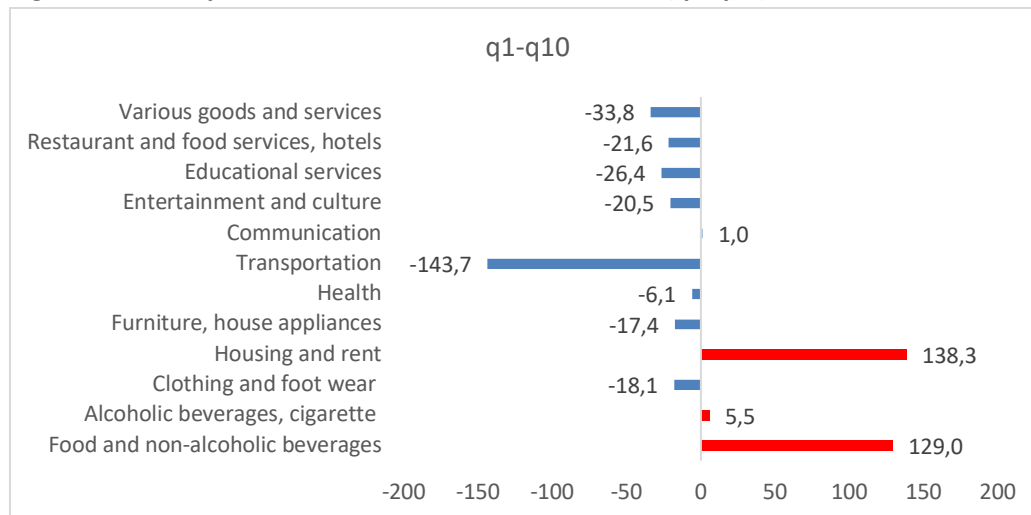
a) Sources of the elusive gap between the inflation rates of “the poorest” and “the richest”

Figure 3 shows sources of the 14-point gap between the cumulative inflation rates of the richest and the poorest, which is in favor of the latter. Benchmark group is the poorest. The red bars with positive sign indicate the increase whereas the blue bars with negative sign hint the decrease in the inflation rate of the richest stemming from the price change in the corresponding item. As Table 2 reports, red items have higher share in the consumption basket of the poorest while blue items weight relatively less. It is the opposite case for the richest. The sum of the contributions of each item is about 14 points (the precise value is 13.7 points, Table 3).

The analysis shows that price changes in food and housing items are against the poorest whereas the changes mainly in the transportation are against the richest. The shares of the food and non-alcoholic beverages and housing items were 35.5% and 40.1% in the consumption basket of the

poorest in 2019, respectively. However, the weights of those items in the basket of the richest are 11.8% and 14.6%, respectively. Similarly, the weight of transportation is 3.6% in the basket of the poorest whereas it is 29.2% for the richest (Table 2). Therefore, the increases in the prices of food and housing items are more pronounced on the inflation rate of the poorest than the inflation rate of the richest, and an increase in the transportation prices has the opposite impact.

Figure 3: Decomposition of Inflation Rate Difference* (q1-q10)



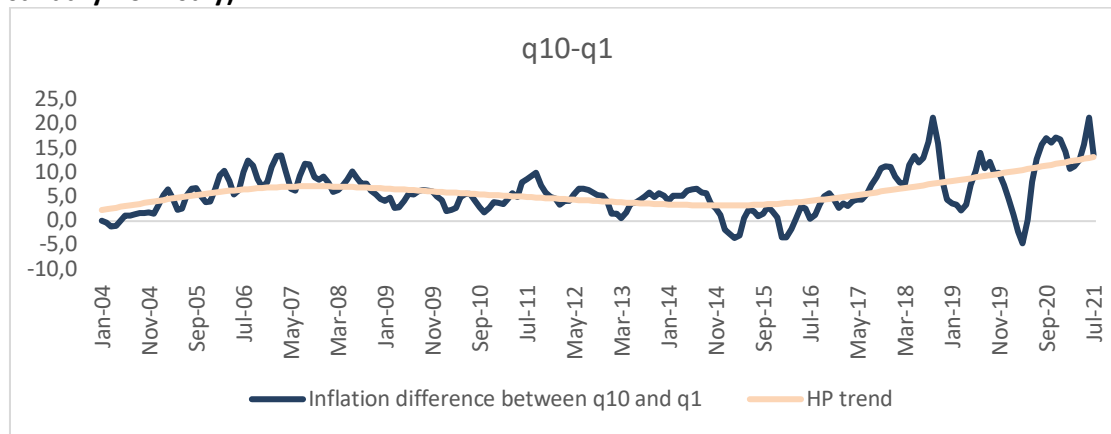
Source: Turkstat, Betam

* In the decomposition of the total inflation rate difference, red bars show the corresponding expenditure groups are against the first decile whereas blue bars show the corresponding expenditure groups are against the tenth decile.

The gap between the inflation rates of the poorest and the richest was not uniform because the rate of price increases are different for all items, especially in these ones, in the last 18 years. As Figure 4 depicts, the inflation rate of the richest rose faster than the inflation rate of the poorest roughly between 2004 and 2008. Then, the gap between the inflation rates of these groups slightly narrowed until 2015. After 2015, the inflation rate wedge is in an increasing trend which is against the richest.

In recent years, high volatility in the monthly gap between inflation rates is striking. **Supply and demand shocks stemming from COVID-19 pandemics** (deceleration in the inflation rate of transportation along with a high increase in the food inflation rate) led to **decrease of the inflation gap in favor of the richest**. In fact, the gap became negative, and it receded to 4.6 in April 2020. In other words, it was the first time that the inflation rate of the poorest was higher than the inflation rate of the richest. However, this gap was not persistent, **because of the removal of the lockdown measures over time, high increases in the prices of transportation, restaurant and hotel items led to re-widening of the inflation gap is against the richest**. To remind, the inflation gap is still about 14 points.

Figure 1: Monthly inflation rate difference between the tenth decile and the first decile (2004 January-2021 July)



Source: Turkstat, Betam

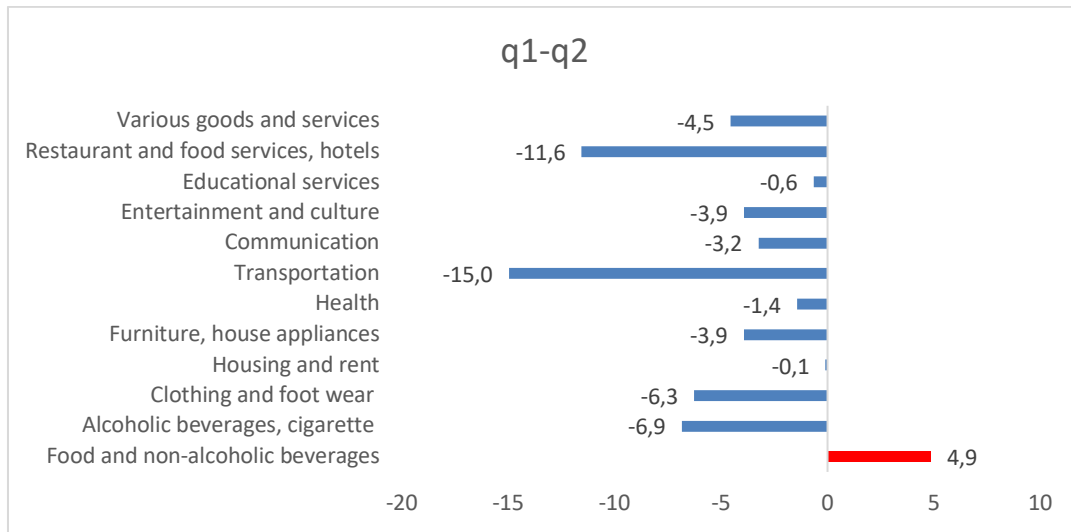
b) Sources of the huge gap between inflation rates of the poorest and the poor

Even though they are the lowest two expenditure groups the inflation gap between the poorest and the poor is high in favor of the poor (52.7 points). To be concrete, **in July, the inflation rate of the poor is about 500% while it is about 447% for the poorest in compared to 2003** (Figure 2). Moreover, the inflation rate of the poor is the highest whereas the inflation rate of the poorest is the second lowest inflation rate in deciles.

This unexpected finding points that the compositions of these two expenditure groups are quite different. In fact, among 12 items, only food and housing items have higher shares in the basket of the poorest as of 2019. The share of the food is 35.5% for the poorest and 31.5% for the poor while the share of the housing is 40.1% for the poorest and 36.5% for the poor (Table 2). The inflation difference caused by the differences in the weights of those items consists of 4.8 points (Figure 5). On the other hand, the shares of other items are lower in the basket of the poorest (see Table 2). The share of the transportation is 3.6% for the poorest and 5.8% for the poor while the share of the restaurant-hotel is 2.9% for the poorest and 4.5% for the poor. Specifically, these two items increased the inflation rate of the poor by 26.5 points (Figure 5).

The striking gap in inflation rates of these two low expenditure groups, which stems from the fact that the compositions of their consumption baskets are quite different, suggests that the households in these groups are also in different socio-economic segments. In fact, the components of the employment levels of these two groups differ significantly. The poorest mostly work in agricultural sector. The employment rates of the poorest and the poor are 46.5% and 29.4%, respectively. Manufacturing employment is significantly high for the poor. The share is 16.4% for the poor but 11.4% for the poorest (Table 4). There is a limited difference between education years of these groups (Table 5). There is roughly 1.3 years difference in education levels of these groups. In sum, the poorest predominantly lives in rural area, travels less, and spends little on entertainment; however, the poor is predominantly lives in urban areas.

Figure 5: Decomposition of Inflation Rate Difference* (q1-q2)

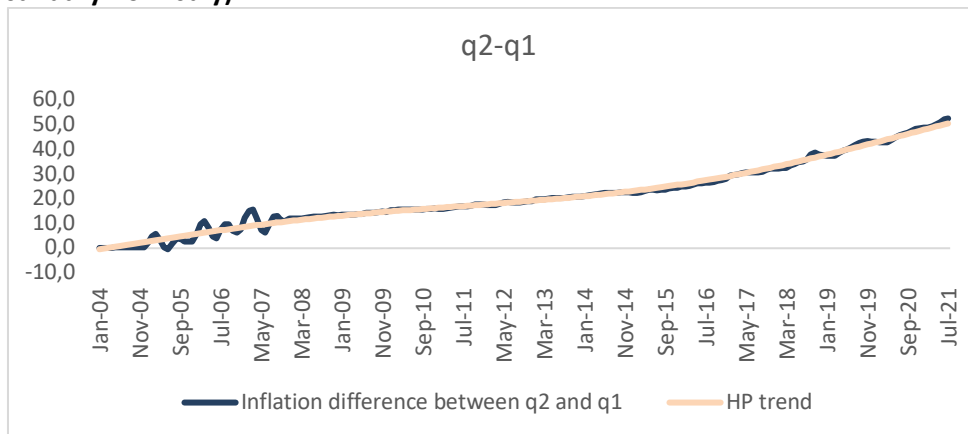


Source: Turkstat, Betam

* In the decomposition of the total inflation rate difference, red bars show the corresponding expenditure groups are against the first decile whereas blue bars show the corresponding expenditure groups are against the second decile.

The gap in the inflation rates of these two groups unlike the gap in the inflation rates of the richest and the poorest pursued a steady increase during the period under study (Figure 6). The inflation rate gap increased to 52.7 points in July 2021. Also, there is much less volatility in the inflation gap. The steady increase in the inflation gap has been against the poor because the shares of 10 out 12 items are higher for the poor.

Figure 6: Monthly inflation rate difference between the second decile and the first decile (2004 January-2021 July)



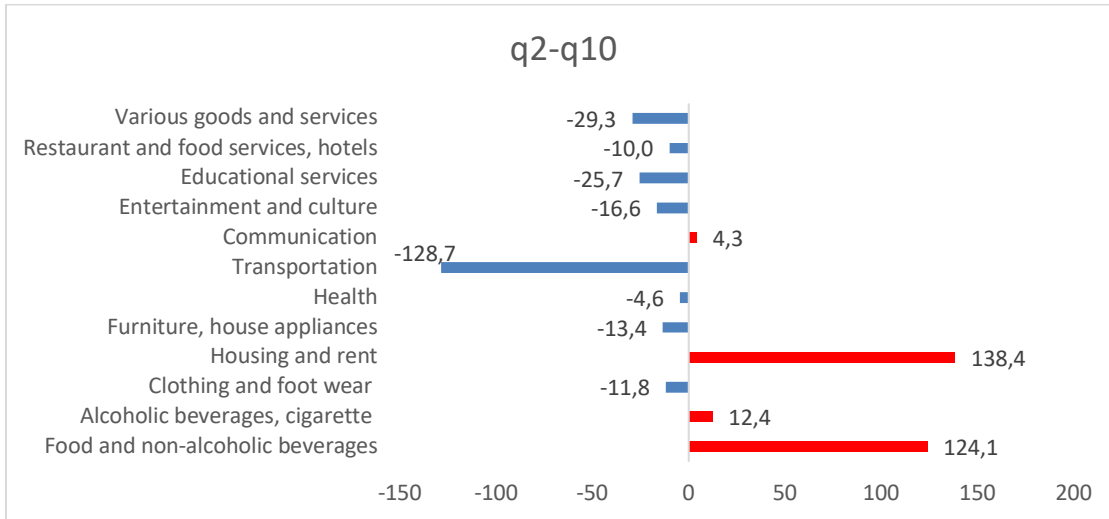
Source: Turkstat, Betam

c) Sources of the inflation gap between “the richest” and “the poor”

As we stated above, there is a 39-point inflation rate gap between the poor and the richest which is against the former as of July 2021 (Figure 2). This an expected observation. Food and housing, which have higher share in the basket of the poor, contribute more to the inflation rate of the second group than the tenth group. Food and housing items increased the inflation rate of the poor relative to the richest by 124.1 and 138.4 points, respectively. On the other hand, transportation which has a quite high weight in the basket of the richest increased the inflation rate of the richest by 128.7

points (Figure 7). Education, miscellaneous goods and services, and entertainment items led to an increase in the inflation rate of the richest by 71.6 points. As we showed, the inflation of the poor depends heavily on mandatory expenditure (food and housing) while the inflation rate of the richest is more sensitive to luxury spending (transportation, restaurant and hotel, private education).

Figure 7: Decomposition of Inflation Rate Difference* (q2-q10)

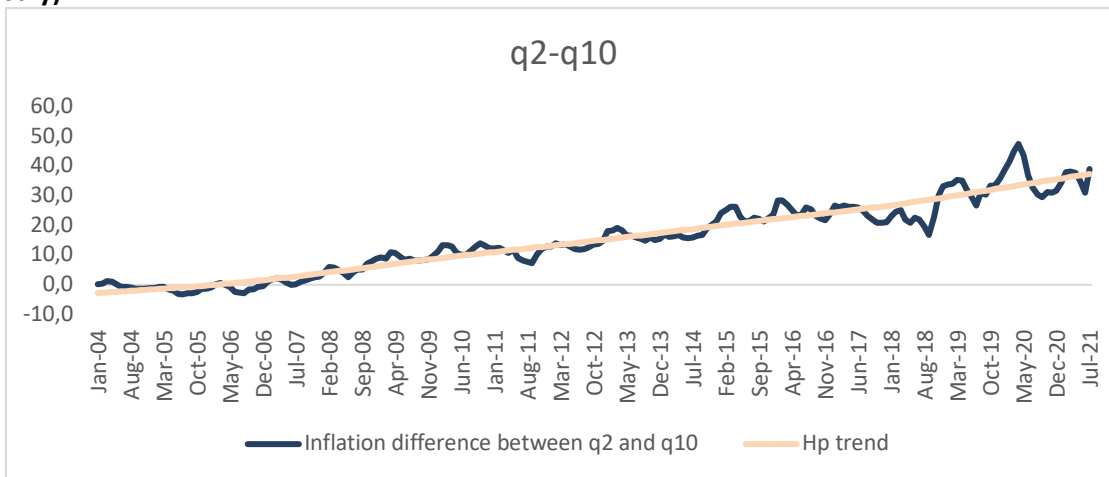


Source: Turkstat, Betam

* In the decomposition of the total inflation rate difference, red bars show the corresponding expenditure groups are against the second decile whereas blue bars show the corresponding expenditure groups are against the tenth decile.

The gap between the inflation rates of these groups remained relatively stable (Figure 8). However, in 2020 Q1 when COVID-19 shock hit, the inflation gap reached its maximum level (47.5 points), then it receded. Following 2020 autumn, the gap started to increase, and it reached 39 points in July 2021.

Figure 8: Monthly inflation rate difference between the poor and the richest (2004 January-2021 July)



Source: Turkstat, Betam

d) Unexpectedly low inflation rate of “the rich”

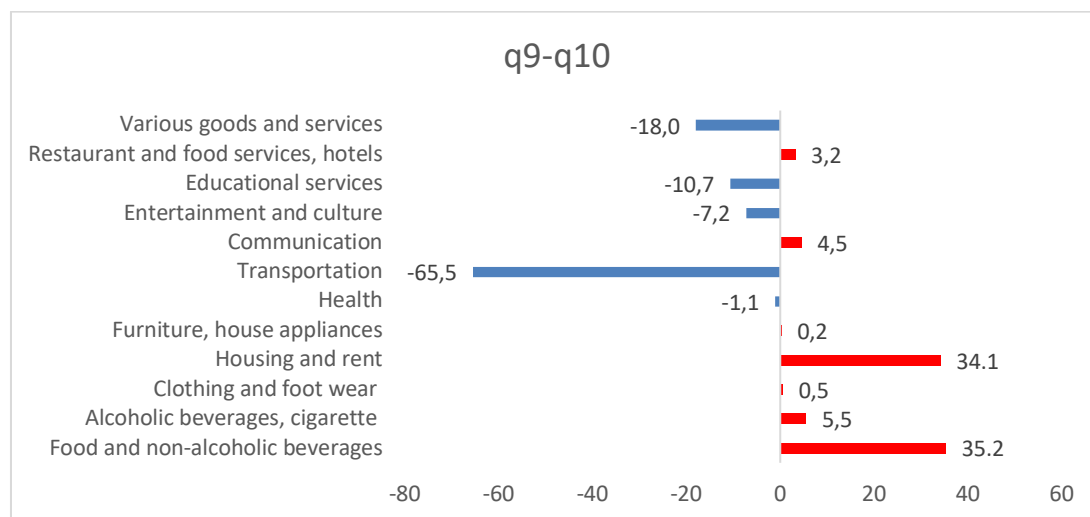
An important observation to scrutinize is the fact that "the rich" group (q9) has the lowest inflation rate as of July 2021. The inflation rate of this group was 441.6% from 2003 to July 2021 and it was

the lowest in deciles (Figure 2). Specifically, why the inflation rate of this group is 20 pp lower than the inflation rate of the richest is an important fact to consider.

Analysis on the expenditure items reveals that transportation, food and housing items are the drivers of the inflation rate gap between these groups. Even though expenditure levels of these groups are similar, the compositions of their consumption baskets are quite different. In fact, shares of food and housing items in the basket of the rich are 18.6% and 21.3%, respectively while the shares of those items in the basket of the richest are 11.8% and 14.6%, respectively (Table 2). This difference increased the inflation rate of the rich by 69.5 points more than the inflation rate of the richest (Figure 9). On the other hand, transportation weighs 18.1% in the basket of the rich while it weighs 29.2% in basket of the richest. This sizable difference reduced the inflation rate of the rich by 65.5 points. Similarly, the differences in the inflation rates of miscellaneous goods and services, education and entertainment items reduced the inflation rate of the rich by 36 points.

In short, the rich group spends less on transportation and luxury items than the richest. As the relative prices of these items rose, the inflation rate gap widened in favor the rich.

Figure 9: Decomposition of Inflation Rate Difference* (q9-q10)

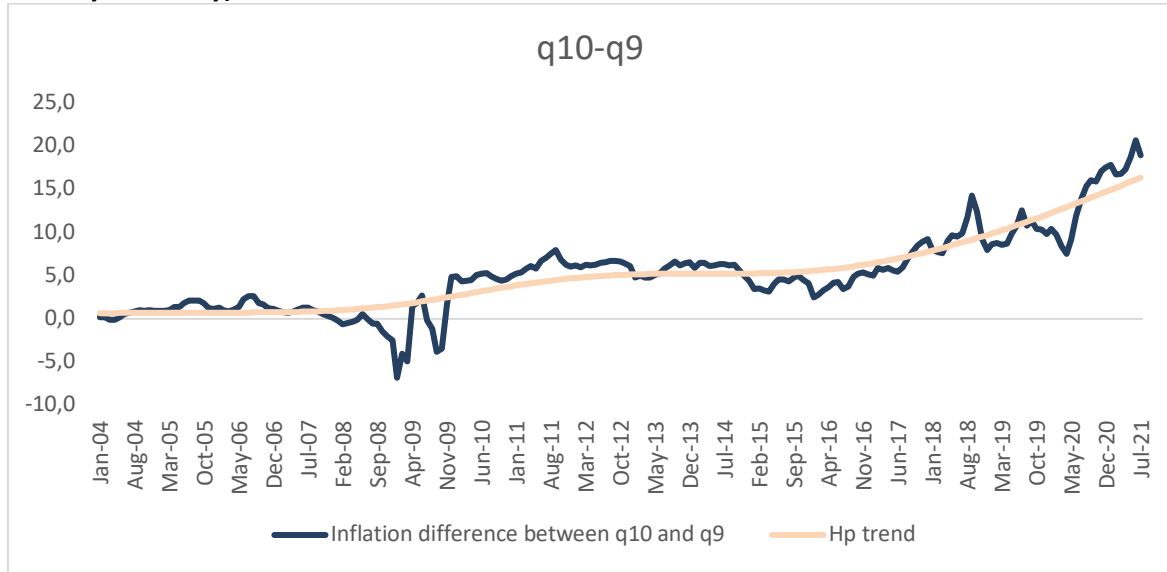


Source: Turkstat, Betam

* In the decomposition of the total inflation rate difference, red bars show the corresponding expenditure groups are against the ninth decile whereas blue bars show the corresponding expenditure groups are against the tenth decile.

The inflation gap which is in favor of “the rich” rather than “the richest” is a recent phenomenon. Figure 10 depicts, before the global crisis (2008-2009), the gap was close to 0, and it turned out to be against the rich as the transportation price remained loose during the crisis. Even though the inflation rate of the richest remained high in the following years, the change in the gap was limited. The gap increased as the price of the items, such as miscellaneous goods and services but primarily transportation, surged because of rising oil price along with the depreciation of Turkish Lira. The gap reached 19 points in July 2021.

Figure 10: Monthly inflation rate difference between the tenth decile and the ninth decile (2004 January-2021 July)



Source: Turkstat, Betam

Conclusion and a notice

The most important finding of this research is that the data does not verify the conventional wisdom which states that the inflation rate of the poor is systematically higher than Turkstat announces, and the inflation rate increases as expenditure level lowers. The analysis in deciles shows there are unexpected and even surprising findings.

We may summarize these findings as follows:

- 1) The great difference among the compositions of the consumption baskets as well as the discrepancy in the price increases of the items, which form the baskets, over time led to differentiation of the inflation rates of each expenditure group. This divergence is neither systematically in the same direction nor is systematically against the poor.
- 2) Using 2003 as the base year, the penultimate richest group (q9) faced the lowest inflation rate as of July 2021. The poorest group (q1) experienced the second-lowest inflation rate.
- 3) The second lowest expenditure group (q2) confronted with the highest inflation rate as of July 2021. The groups q3, q4, and q5, i.e., below-middle expenditure groups, exposed to relatively higher inflation rates. This fact is in line with the conventional wisdom.
- 4) The highest expenditure group (q10) exposed not to the lowest as might be expected but to the third-lowest inflation rate.

As for the notice... In the inflation analysis we used the most up-to-date micro data available, which is the 2019 HBS, and we had to use the 2019 values as the consumption weights in 2020 and 2021. However, it is evident from the changes in the representative consumption basket which Turkstat announces that pandemic shock significantly altered the composition of the consumption basket. In 2020, it is a fact that the precautionary savings increased because of the cuts in non-mandatory

spending. The weights of "food and non-alcoholic beverages" and "housing, water, electricity, gas and other fuels" in the consumption basket of the representative household increased in 2020 because of the shifts in the consumption pattern. It is also highly possible that the changes in the consumption patterns altered the composition of the baskets of the households with high income and high saving. On the other hand, the changes in the basket of low income and low saving group may be limited.

Nevertheless, it is to remind that the composition of the consumption basket of the representative household reverted to its "normal" as we got back to the "normal" in 2021. At the same time, there were significant year-on-year increases in the prices of items which have high shares in the basket of the high expenditure households, such as transportation, restaurant and hotels, and furniture, in July 2021. These increases will lead to a surge in the inflation rate of high- expenditure households. **The analysis in this research note should be re-conducted with 2020 and 2021 micro data. However, our hunch is that the fact, the inflation rate across expenditure groups does not systematically change, that we documented in the note would remain.**

Table 1: Types of expenditure

1	Food and non-alcoholic beverages
2	Alcoholic beverages, cigarette
3	Clothing and footwear
4	Housing and rent
5	Furniture, house appliances
6	Health
7	Transportation
8	Communication
9	Entertainment and culture
10	Educational services
11	Restaurant and food services, hotels
12	Various goods and services

Table 2: Expenditure weights by expenditure decile for 2019

	Food and non-alcoholic beverages	Alcoholic beverages, cigarette	Clothing and footwear	Housing and rent	Furniture, house appliances	Health	Transportation	Communication	Entertainment and culture	Educational services	Restaurant and food services, hotels	Various goods and services
q1	35.5	3.9	2.2	40.1	4.1	1.5	3.6	3.2	0.8	0.1	2.9	2.0
q2	31.5	4.8	3.1	36.5	4.4	1.6	5.8	3.5	1.4	0.2	4.5	2.6
q9	18.6	3.9	5.8	21.3	7.4	2.4	18.1	3.9	3.3	3.0	7.3	5.0
q1 0	11.8	2.7	5.5	14.6	7.1	2.5	29.2	2.9	4.5	4.8	6.5	8.1

Table 3: Decomposition of Inflation Rate Difference

	q1	q2	q9	q10	Diff.(q1-q2)	Diff.(q1-q10)	Diff.(q2-q10)	Diff.(q9-q10)
1	196,5	191,7	102,9	67,6	4,8	129,0	124.1	35,3
2	19,4	26,3	19,4	13,9	-6,9	5,5	12.4	5,5
3	11,4	17,7	30,0	29,5	-6,3	-18,1	-11.8	0,5
4	221,9	222,0	117,8	83,6	-0,1	138,3	138.4	34,2
5	22,0	25,9	39,6	39,3	-3,9	-17,4	-13.4	0,3
6	8,4	9,8	13,4	14,4	-1,4	-6,1	-4.6	-1,1
7	19,4	34,4	97,6	163,1	-15,0	-143,7	-128.7	-65,5
8	16,1	19,3	19,6	15,1	-3,2	1,0	4.3	4,5
9	4,3	8,2	17,5	24,7	-3,9	-20,5	-16.6	-7,2
10	0,5	1,2	16,2	26,9	-0,6	26,4	-25.7	-10,7
11	16,4	27,9	41,2	38,0	-11,5	-21,6	-10.0	3,2
12	10,6	15,2	26,5	44,4	-4,5	-33,8	-29.3	-18,0
TOTAL	546,9	599,6	541,6	560,6	-52,7	-13,7	39,0	-19,0

Table 4: Distribution of employment status of “the poorest” and “the poor” by sector (%)

	The poorest	The poor
Agriculture	46,5	29,4
Manufacturing	11,4	16,4
Construction	8,5	9,4
Service	33,7	44,8
Total	100,0	100,0

Table 5: Distribution of educational background of “the poorest” and “the poor” (%)

	The poorest	The poor
Less than high school	89,6	82,4
High school	7,1	12,0
Higher than high school	3,3	5,6
Total	100,0	100,0

Box 1: The methodology of calculating the price index of expenditure group

We followed TurkStat's methodology in calculating the price indexes of different expenditure groups. Choosing 2003 as the base year (2003=100) and weighting indices of sub-groups by deciles, we calculated a price index for each group. We used weights of expenditure groups calculated by Betam for years between 2003 and 2019. However, we used weights of 2019 for the last 19 months since Household Budget Survey micro data for 2020 and 2021 are not available.

We used Laspeyres formula to measure price indexes of each group. We modified the formula, which we present below, to separately calculate the inflation rates of the poorest and the richest.

Inflation of the poorest expenditure group	Inflation of the richest expenditure group
$E_t / E_{December(t-1)} = \sum_{i=1}^{12} E_{it} / E_{i, December (t-1)} \times \alpha_{it}$	$E_t / E_{December(t-1)} = \sum_{i=1}^{12} E_{it} / E_{i, December (t-1)} \times \beta_{it}$

E_t : Index at time t

$E_{December(t-1)}$: Index at December (t-1)

E_{it} : : Indexes for each item. For example i=1, denotes index of food and non-alcoholic beverages

α_{it} : Subgroup weights of the poorest decile's budget at time t

β_{it} : Subgroup weights of the richest decile's budget at time t

These weights are specific to 2019 and we show subgroups indexes in the table below. For instance, the calculation of CPI July 2021 for both the poorest and the richest households by using CPI December 2020 is as follows:

		1	2	3	4	5	6	7	8	9	10	11	12	
2020 December (Turkstat)		608.06	872.31	264.54	534.18	440.4	302.38	514.86	161.14	318.72	437.14	737.25	738.27	
2021 July (Turkstat)		686.41	886.10	279.67	602.77	480.72	343.74	566.77	165.00	345.42	482.69	849.27	798.23	
1.Grup	α_i	35.5%	3.9%	2.2%	40.1%	4.1%	1.5%	3.6%	3.2%	0.8%	0.1%	2.9%	2.0%	
10.Grup	β_i	11.8%	2.7%	5.5%	14.6%	7.1%	2.5%	29.2%	2.9%	4.5%	4.8%	6.5%	8.1%	
1.Grup	$\sum_{i=1}^{12} E_{it} / E_{i, December(t-1)} * \alpha_{it}$	0.40	0.04	0.02	0.45	0.04	0.02	0.04	0.03	0.01	0.00	0.03	0.02	1.12
10.Grup	$\sum_{i=1}^{12} E_{it} / E_{i, December(t-1)} * \beta_{it}$	0.13	0.03	0.06	0.16	0.08	0.03	0.32	0.03	0.05	0.05	0.07	0.09	1.10

To obtain July 2021 CPI for the poorest and the richest expenditure groups, we multiplied $E_{it} / E_{i, December(t-1)} * \alpha_{it}$ and $E_{it} / E_{i, December(t-1)} * \beta_{it}$ for each subgroups with the chained December 2020 CPI calculated by Betam

$$TÜFE_{\text{poorest (July 2021)}} = \left(\sum_{i=1}^{12} E_{it} / E_{i, December(t-1)} \times \alpha_{it} \right) \times E_{December(t-1)} = 1,12 \times 490,5 = 546,9$$

$$TÜFE_{\text{richest (July 2021)}} = \left(\sum_{i=1}^{12} E_{it} / E_{i, December(t-1)} \times \beta_{it} \right) \times E_{December(t-1)} = 1,10 \times 507,4 = 560,6$$