INCOME INEQUALITY IN HUNGARY

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ABSTRACT

In this article, we describe the income inequality situation in Hungary from two different perspectives: inequalities among income deciles, and regional differences. Both types of inequalities have increased in the last few years due to changes in the tax and benefit system. An important contributing factor of increasing income inequlaties was the introduction of a linear personal income tax, together with the increased role of tax allowances in the family support system. Regional differences have been traditionally significant in Hungary (despite the small size of the country), and the positions of the least developed regions of the country have continued to worsen in the last few years. After assessing the role of the tax and benefit system, we also briefly try to give some insight to possible interventions in order to decrease inequalities among income deciles.

INTRODUCTION

Income inequality is an important determinant of the well-being of a society. Besides promoting economic growth (i.e. the achievement of a higher level of overall welfare), economic policy should also contribute to a fair distribution of the fruits of this growth. The tax system has a vital role in this process; one of its main functions is to redistribute incomes from the richer to the poorer, therefore to decrease income inequality. However, according to the European Commission (2020) income inequality has not only increased in Hungary in the past few years, but "changes in the tax and benefit system … contributed to the increased level of income inequality." (pp. 29-30)

In this paper, we analyse income inequality in Hungary in two perspectives: inequality among high-income and low-income citizens, and regional inequality. We also examine the role of the tax and benefit system in decreasing inequalities. Finally, we calculate the rate of increase of social incomes necessary in order not to have an upward trend in income inequality in the next few years.

We have used data from the Hungarian Central Statistical Office (CSO 2020a) and the National Tax and Customs Administration (NTCA 2019). The two sets of data are not entirely compatible with each other, which restricts our ability to combine them in our simulation. The reliability of these datasets is also somewhat questionable for different reasons. The data of CSO are based on self-reported answers of households, therefore may be subject to either intentional or unintentional distorsions. The NTCA dataset reports information from tax files, and naturally it does not include illegal incomes. Another limitation of our calculations is that they are based on averages, therefore they cannot give proper information about the heterogeneity of the society.

INEQUALITY AMONG INCOME DECILES IN HUNGARY

Measuring inequality

We have calculated the Y90/10 and Y80/20 ratios given by Equations (1) and (2) for earned incomes (including pension benefits) and Equations (3) and (4) for disposable incomes.

$$Y90/10 = \frac{Y_{10}}{Y_1} \quad (1)$$

$$Y80/20 = \frac{Y_{10}+Y_9}{Y_1+Y_2} \quad (2)$$

$$Y90/10_D = \frac{Y_{10}-t(Y_{10})}{Y_1-t(Y_1)} \quad (3)$$

$$Y80/20_D = \frac{Y_{10}-t(Y_{10})+Y_9-t(Y_9)}{Y_1-t(Y_1)+Y_2-t(Y_2)} \quad (4)$$

where Y_i denotes the earned income of *i*-th decile (including pension), and $t(Y_i)$ denotes the net payment for the state (taxes and other charges minus family-related and other social transfers excluding pensions).

We have used data from the Hungarian Central Statistical Office (CSO 2020a). Y90/10 shows the ratio of incomes of the richest and poorest 10 percents of the population. Table 1 summarizes these ratios for disposable incomes.

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Table 1: Social inequality after tax and transfers (own calculation based on data from CSO 2020a)

Year	$Y80/20_D$	$Y90/10_D$
2010	4.65	7.26
2011	4.62	7.39
2012	5.08	8.26
2013	5.21	8.47
2014	5.10	8.34
2015	5.01	8.22
2016	5.08	8.55
2017	4.89	8.19

In 2017, the earned income of the wealthiest 20 percent of the population was 7.74 times higher than that of the bottom 20 percent, meanwhile the difference was 7.63-fold in 2010. That is, inequality increased between these two years, although its value fluctuated during this period. The same ratios in the case of disposable income are 4.89 in 2017 and 4.65 in 2010 (see Table 1). Therefore, a larger increment can be seen in the inequality of disposable income. The Country Report of the European Commission (2020) used different data, but their result is similar: changes in the tax and benefit system have not decreased inequality. What is more, according to the Report, Hungary experienced the largest increase in inequality in the EU (from 3.6-fold to 4.4-fold difference between the top and bottom 20 percents of the population) between 2008 and 2018.

Measuring the redistributive effectiveness of the tax and benefit system

The ratio of the previously defined measures of inequality, $Y90/10_D$ and $Y90/10$, shows how the tax and benefit system affects inequality: how the difference between the incomes of the top and bottom 10 percents of the population is decreased by redistribution. A similar index can be defined to measure the role of redistribution between the top and bottom 20 percents of the population. These indices are given by Equations (5) and (6):

$$I_{90/10} = \frac{Y90/10_D}{Y90/10} \quad (5)$$

$$I_{80/20} = \frac{Y80/20_D}{Y80/20} \quad (6)$$

These indices can measure the success of the government's redistributional function: the tax and benefit system works better from this point of view, if it significantly decreases the difference between the top and bottom strata.

In Figure 1, we can see that this redistributive role of the Hungarian tax ans benefit system weakened somewhat between 2010 and 2017. The ratios of inequality measures at the level of disposable and earned incomes have not shown a clear trend neither in the case of income deciles, nor in the case of income quintiles, but the indices were higher in 2017 than in 2010 in both cases.

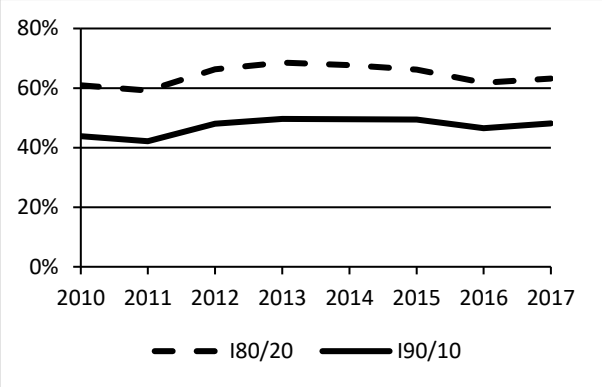

Figure 1: The change in the redistributive role of the tax and benefit system (own calculation and graph based on data from CSO 2020a)

Modelling the effects of a possible restructuring of the transfer system

In this subsection we analyse how the redistributive properties of the tax and benetif system would be affected by a change in the transfer system. We have calculated with a rearrangement of family-related and other social transfers: multiply the actual transfers of the different income deciles with the coefficients in Table 2. (Unfortunately, we cannot calculate with the family tax allowance since there is no data available.)

Table 2: Multiplier of transfer payment in the deciles

1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
1.5	1.4	1.2	1	0.8	0.6	0.4	0	0	0

Figure 2 shows how such a restructured transfer system would affect income inequality. The calculated measures of inequality in the disposable incomes would be significantly lower in the modelled hypothetical case (marked with *) than their actual values. However, the level of inequality would not decrease through the examined period even in this hypothetical scenario.

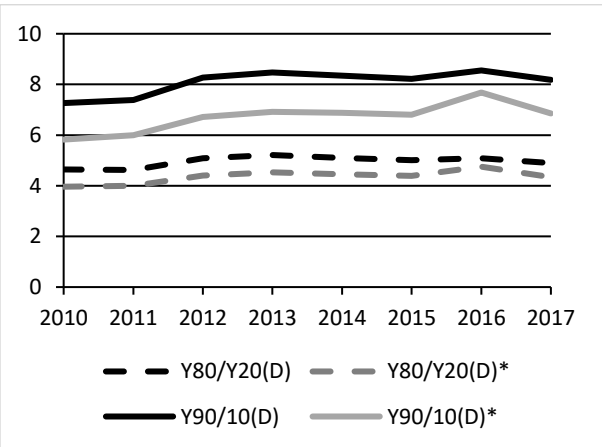

Figure 2: Actual and hypothetical inequality based on the modelled restructuring of the transfer system (own calculation and graph based on data from CSO 2020a)

According to this calculation, a significant improvement of the redistributive effectiveness of the tax and benefit system would make the rethinking of family tax allowances necessary. Table 3 contains the indices of the redistributive effectiveness in the case of the modelled restructuring of the transfer system.

Table 3: Redistributive effectiveness in the case of a restructured transfer system (own calculation based on data from CSO 2020a)

Year	$I^*_{80/20}$	$I^*_{90/10}$
2010	52%	35%
2011	51%	34%
2012	57%	39%
2013	60%	41%
2014	59%	41%
2015	58%	41%
2016	58%	42%
2017	56%	40%

Why does it seem essential to change the existing system of family tax allowances? In Hungary, it is increasing steeply with the number of children. In case of 1 or 2 children the first decile's average family cannot exploit the whole amount of the tax allowance. In the case of three children, the bottom 8 deciles' average families would not be able to exploit totally the tax base allowance. (The unusable tax allowance of average families for each deciles in case of 1, 2 or 3 children is summarized in Table 4.) However, averages do not represent the society properly. The average household size is 2.3 persons, while those families that are entitled to higher levels of allowances are naturally larger. Actually, a family of 2 earners and 3 children in and above the third income decile is able to exploit the whole tax allowance.

Table 4: Unused family tax base allowance for an average household at different number of children (estimated data for 2018)

Decile	Average earned income of the household	Unused tax base allowance 1 child	Unused tax base allowance 2 children	Unused tax base allowance 3 children
1	736 717	63 283	249 839	957 839
2	1 826 846	0	0	623 518
3	2 529 075	0	0	392 750
4	2 561 783	0	0	385 660
5	2 413 206	0	0	425 652
6	2 693 192	0	0	339 360
7	2 695 343	0	0	336 660
8	3 460 831	0	0	98 345
9	4 032 049	0	0	0
10	6 626 559	0	0	0

REGIONAL INEQUALITIES IN HUNGARY

Although Hungary is a relatively small country, significant regional differences can be seen within its borders. According to the latest Eurostat (2020) data, the per capita GDP in Budapest is approximately 4.5 times higher than in the poorest county (Nógrád). Taking into account purchasing power parity, Budapest is at 145 percent of the post-Brexit EU27 average, while Nógrád is at only 32 percent. Per capita GDP in Hungary as a country is at 71 percent of the EU27 average. If we concentrate on the level of regions (mostly meaning the NUTS-2 statistical regions), we can find Central Hungary (including Budapest) at 108 percent of the EU average, and the Northern Great Plain region at 46 percent.

Table 5: Regional differences in per capita GDP (source of data: Eurostat 2020)

Region	Per capita GDP in purchasing power standards (% of the EU27 average)
Central Hungary	108
Western Transdanubia	72
Central Transdanubia	66
Southern Great Plain	52
Northern Hungary	49
Southern Transdanubia	49
Northern Great Plain	46

As can be seen from Table 5, the regions of Hungary can be classified into three clusters. The first cluster contains only Central Hungary, which is much more developed than the other parts of the country. The second cluster includes two regions: Western and Central Transdanubia. In comparison, the third cluster consists of the remaining four regions, all of which are among the 25 poorest ones within the European Union.

Regional inequalities based on tax and income data

A similar picture of significant regional differences arises if we analyse the data from personal income tax statistics. The National Tax and Customs Administration of Hungary regularly publishes the most important tax statistics in a statistical yearbook. These yearbooks contain the main data about the personal income tax filers from a regional aspect as well. The latest available yearbook (NTCA 2019) covers the year 2017.

Table 6 shows the average yearly taxable income per filer in the different regions. The table also provides the data expressed as a percentage of the national average. Although the exact ranking of the regions is slightly different from what we have seen in Table 5, the general picture is similar. Average personal incomes in Central Hungary are significantly higher than in any other part of the country. Central and Western Transdanubia are around the national average, while the remaining four regions are clearly below it and relatively close to each other.

Table 6: Average taxable income per filer in the regions of Hungary, 2017 (source of data: NTCA 2019)

Region	HUF	% of national average
Central Hungary	3,384,168	125.0%
Central Transdanubia	2,704,610	99.9%
Western Transdanubia	2,556,155	94.4%
Southern Transdanubia	2,243,705	82.9%
Southern Great Plain	2,241,577	82.8%
Northern Hungary	2,205,389	81.5%
Northern Great Plain	2,109,121	77.9%

These regional differences have been fairly stable in the last few years. If we compare the data from the NTCA yearbooks, we can see, that in the period between 2010 and 2017, per capita taxable income in Central Hungary has always varied between 125 and 130 percent of the national average, while on the other hand, the Northern Great Plain region has always been between 77 and 80 percent.

According to the Hungarian tax legislation, taxable income consists of two main groups: consolidated incomes (consisting mainly of salaries and incomes from self-employment) and separately taxed incomes (including e.g. capital gains or income from private businesses). On average, more than 90 percent of the incomes are in the first group. Besides reporting average incomes, the NTCA yearbooks also provide data about the distribution of consolidated incomes. Figure 3 shows this distribution in the three aforementioned clusters. The first cluster (Central Hungary) is characterized by a significantly higher share of yearly incomes above 20 million HUF, and between 10 and 20 million HUF (9.6 and 14.4 percent, respectively). In the second cluster (Central and Western Transdanubia), the share of high incomes is lower, and the overall distribution is fairly similar to that of the national level. The third cluster (the remaining four regions) has still lower average incomes, and the share of yearly incomes below 2 million HUF is significantly higher than in the more developed parts of the country (25.2%).

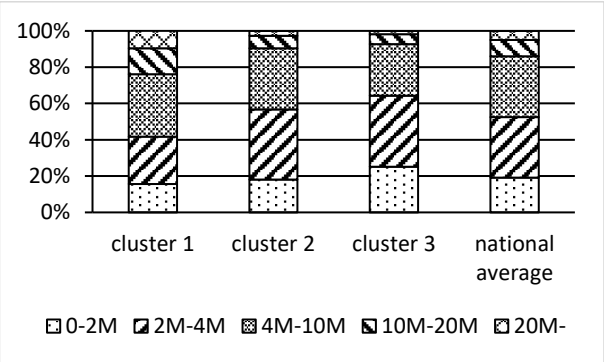

Figure 3: Distribution of consolidated incomes, 2017 (own calculation and graph based on data from NTCA 2019)

Income inequalities are frequently described by the Lorenz curve and the Gini coefficient. The available data from the personal income tax statistics make it possible to graph a Lorenz curve using county-level aggregate data. Figure 4 shows this Lorenz curve for the 20 Hungarian counties (including Budapest). The Lorenz curve itself graphs the cumulative incomes of the counties as a function of the cumulative number of tax filers in the counties (to do that, counties have to be ranked from lowest to highest average income per filer). As a comparison, the 45-degree straight line also appears on the figure – this would be the Lorenz curve in the case of no difference among the counties in per capita incomes.

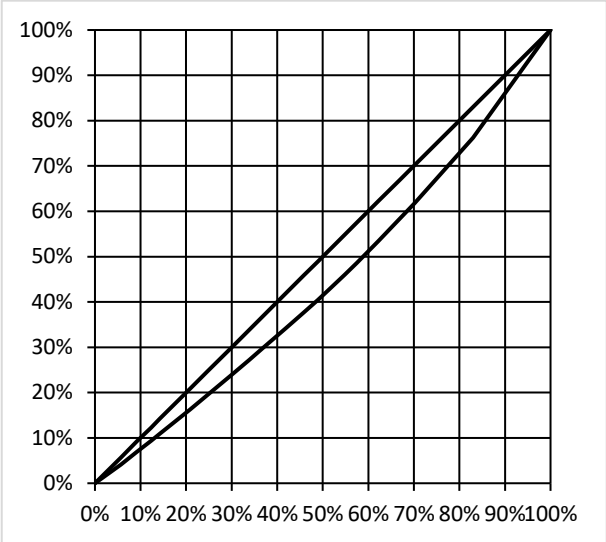

Figure 4: The Lorenz curve of Hungarian counties (own calculation and graph based on data from NTCA 2019)

The Gini coefficient measures the area between the 45-degree straight line and the Lorenz curve, relative to the area of the whole triangle below the 45-degree straight line. In the case of the Lorenz curve on Figure 4, the value of the Gini coefficient is 11.6 percent. According to World Bank data, Hungary's overall Gini coefficient is 30.9 percent, i.e. we can say that the regional differences can explain a significant share of overall income inequalities in Hungary.

Taxes and social incomes

An important question about regional inequalities and the tax system is whether the tax and benefit system decreases the inequalities or not. One way to assess this issue is by comparing income tax payments and social incomes (including pension, child-related benefits etc.). The Central Statistical Office of Hungary publishes data about the latter.

Regions with higher taxable incomes pay more taxes, but also tend to receive more social incomes as well. However, if the ratio of income tax payment and social incomes (on regional level) is higher in regions that have higher taxable incomes, then we can say that the tax and benefit system decreases regional inequalities somewhat. As it can be seen in Figure 5, this is the case in Hungary.

In Central Hungary, where per capita taxable income is much higher than in other parts of the country, the ratio of tax payments and social incomes is 49.1%, significantly above the similar ratios in other regions. Generally, we can also see the positive relationship between the per capita average taxable income and the tax-to-social income ratio among the regions.

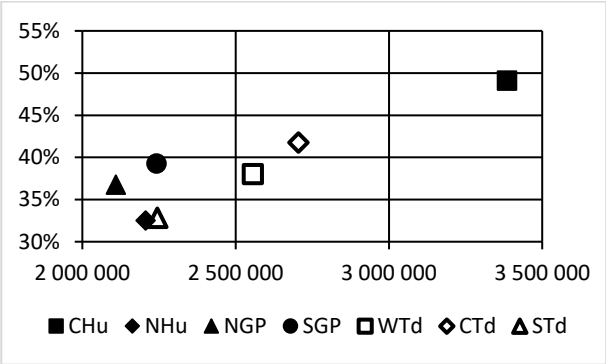

Figure 5: The ratio of income tax payments and social incomes in Hungarian regions, as a function of the average per capita taxable income (own calculation and graph based on data from NTCA 2019 and CSO 2020)

However, it is also true that the role of regional redistribution has significantly decreased since 2010. In that year, the tax-to-social income ratio was 57.9 percent in Central Hungary, 37-38 percent in Western and Central Transdanubia, and only 25-26 percent in the remaining four, more deprived regions of the country.

SIMULATION OF THE REDUCTION OF INEQUALITY

In the following simulation, we are looking for the necessary raise in social transfers to avoid a further increase in inequality. We calculate the future incomes based on those of 2017 as the latest reliable data. Taking into consideration that we are in 2020, but we do not have a long enough time series of comparable data, we determined the last year of our simulation to be 2024.

Before completing the simulations, we converted income data for 2010-2017 to 2018 prices by using the consumer price index reported by the CSO (2020b). Expressed in 2018 prices, we found that the real value of social transfers excluding pensions has decreased in the examined period regarding the lower deciles (see Table 7).

According to the statistical data, social transfers have decreased significantly in 2012 in the bottom 6 deciles, while they have increased in the 7th, 9th, and 10th deciles, especially in the wealthiest decile. The general increase of social incomes in the later years was not able to compensate for this change.

Table 7: Changes in the real value of social transfers (in 2018 prices) in the bottom 2 and top 2 deciles (own calculation based on data from CSO 2020a and 2020b)

	Deciles			
	1	2	9	10
2011	-8.2%	-0.3%	-0.5%	1.7%
2012	-14.1%	-23.7%	4.2%	13.5%
2013	0.8%	2.7%	2.2%	0.0%
2014	0.2%	-3.8%	1.9%	4.0%
2015	2.7%	2.2%	2.7%	2.4%
2016	0.8%	0.8%	1.5%	2.4%
2017	2.5%	-0.7%	1.0%	-0.6%
mean	*-2.2%*	*-3.2%*	*1.9%*	*3.3%*

Because of the abovementioned situation, we decided to simulate in two different ways: first, we use the average rate of change of social transfers for each decile experienced between 2010-2017 to determine the surplus rate by which the tendency has to be modified to reach our goal. Second, because the average rates of change are highly distorted by the data of 2012, i.e. they do not properly represent the whole time period, we also calculated a general annual growth rate for social transfers that would be necessary in the entire society in order to avoid the worsening of the inequality situation.

First of all, we calculated the rate of inequality in disposable income between the highest and the lowest quintiles. In the calculation of disposable income, we used the following equation:

$$Y_D = Y \cdot (1 - t_e) + TR \qquad (7)$$

where Y is the earned gross income including pensions, t_e is an effective tax rate determined by different assumptions (see below), and TR denotes social transfers excluding pensions. Table 8 shows the $Y80/20_D$ rates depending on whether we include the experienced trend of social incomes in the calculation, or not. In this case, we used the effective tax rate of 2017 in the calculation of Y_D of each decile.

Table 8: The projected changes in the rate of disposable income ($Y80/20_D$) in two different approaches

	w/o tendency	with tendency
2017	4.89	4.89
2018	5.01	5.05
2019	5.12	5.20
2020	5.24	5.36
2021	5.36	5.53
2022	5.49	5.69
2023	5.61	5.86
2024	5.74	6.04

In the simulation, we calculated the following cases, while the growth rate of the gross income is fixed at the average level of the 2010-2017 period:

a. the tax rate is at the level of 2017 in each decile;
b. the tax rate is at the minimum level of the period in each decile;
c. the tax rate is at the maximum level of the period in each decile;
d. in the lowest five deciles, the tax rate is at the minimum level, while in the highest five deciles, it is at the maximum level (something like a system of progressive taxation).

We were searching for the necessary growth rate of social transfers to keep income inequality at its 2017 level. We calculated our results both if there is a trend in social transfers and if there is not. So, these results can be interpreted as a minimum goal of the government in influencing social transfers if its objective is not to let the Hungarian income inequality situation worsen.

Table 9: The result of the simulation in different cases (goal is $Y80/20_D(2024) = Y80/20_D(2017)$)

	Growth rate (no trend)	Growth rate (above trend)
t(2017)	7.64%	10.90 %
t_{min}	9.87%	13.21%
t_{max}	11.20%	14.56%
$t(min_{(1-5)}, max_{(5-10)})$	7.64%	10.90%

CONCLUSION, FURTHER RESEARCH

We have examined the topic of income inequalities in Hungary from different perspectives: we analysed inequalities among income deciles and also regional differences. As we have seen, there are significant inequalities in Hungary, and the changes in the tax and benefit system since 2010 have contributed to increased inequalities. In our opinion, this tendency should be turned (or at least moderated), since larger inequalities lead to both social tensions and economic problems. In this article, we also briefly gave some insight to possible interventions in order to decrease inequalities.

We plan to further examine income inequalities, including a simulation about how regional differences can be expected to change and how they can be affected by government redistribution. We also would like to incorporate a more detailed analysis of economic policy measures, including the system of family tax allowances and family related social transfers.

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