

## HUMAN DEVELOPMENT INEQUALITIES BY REGIONS IN ROMANIA

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### Abstract

*In order to determine the inequalities in human development by regions in Romania, the human development index adjusted to inequalities will be used. This index is used when there are inequalities in distribution for each value in part across the population and, especially, when there are inequalities between people. It is also based on a distribution-sensitive class of composite indices and is created after a model proposed by Foster et al. (2005), which was built on Atkinson's family of inequality measures (1970). While the Human Development Index is based on country-level aggregates, such as national income accounts, the Inequality-adjusted Human Development Index must rely on additional data sources to obtain distribution information. This article aims to highlight, on the one hand, the inequalities in human development that exist in Romania, and on the other hand the correlation between economic and human development in the eight regions. Therefore, the analysis will be divided into two parts. First, based on empirical data will be calculate the dimension of Inequality-adjusted Human Development Index (IHDI) then, using an econometric analysis, we will determine which is the correlation between human and economic development in each of the eight Romanian regions.*

**Keywords:** human development; economic growth; Inequality-adjusted Human Development Index



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JEL Classification: O15, R11, R15

### *Introduction*

Concerns for human development are not new, the Human Development Report of 1990 (UNDP, Human Development Report 1990. Concept and Measurement of Human Development) clearly outlined the concept of human development, this being the first report introducing a new measurement for welfare levels and progress – Human Development Index (HDI). The first chapter of the Report, Defining and Measuring Human Development, begins with the assertion that people are the true wealth of a nation, and the main objective of development is to create an environment that allows them to live long and creative lives.

The concept of human development, its measurement indices, but also human development itself, have evolved with society. As the basic standard of living gap narrows, with an unprecedented number of people escaping poverty, hunger and disease, the skills that people must compete in the immediate future have evolved. Although we live in a globalized society, the great differences in human development between countries or even within country denote a clear increase in inequalities and a non-functionality of this society.

The 2019 Human Development Report (UNDP, Human Development Report, Beyond income, beyond averages, beyond today: Inequalities in human development in the 21<sup>st</sup> century) focuses on deepening the problems of inequalities in today's society. The Report proposes addressing inequalities beyond incomes, because today's social problems are powered by rooted interests – the social and political norms incorporated in a nation or a group history and culture, the power of the few, the powerlessness of many and the collective power to demand change. This report highlights the emergence of a new generation of inequalities in human development.

This article will focus on the existing inequalities between regions and aims to highlight, on the one hand, the inequalities in human development that exist in Romania, and on the other hand, the correlation between economic and human development in the eight regions. Therefore, the analysis will be divided into two parts. First, based on empirical data will be calculate the dimension of Inequality-adjusted Human Development Index (IHDI) then, using an econometric analysis, we will determine which is the correlation between human and economic development in each of the eight Romanian regions.



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## ***1. Challenges in Identifying and Measuring the New Generation of Inequalities in Human Development***

### **1.1. Evolution of inequalities in human development**

The 2030 Agenda for Sustainable Development [UN, Resolution adopted by the General Assembly on 25<sup>th</sup> of September] – Sustainable Development Goals (SDGs) focus to action in critical areas to humanity and planet. Regarding humanity, we are talking about the aspiration to reduce inequality on several dimensions. According to that, in addressing inequality, revenues must be exceeded, the focus must be on the new inequalities of the 21<sup>st</sup> century, and addressing the capabilities is appropriate to understand and confront these new generations of inequalities. In addressing the capabilities, a distinction must be made between the basic and the enhanced ones.

As can be seen from the recent reports [UNDP, Human Development Report], there was a convergence in the basic capacities that were the main focus of the human development reports in the early 1990s, but divergences in other indicators are opened, both within the country and abroad, such as it would be Life expectancy at older ages which is becoming more unequal, as is access to tertiary education.

In other words, despite the improvement and convergence of the core capabilities, set out in the Millennium Declaration [UN, United Nations Millennium Declaration] and the Millennium Development Goals, however, some gaps remain, and new ones open in capacities that will increasingly determine the differences between those who can and those who cannot fully take advantage of the new opportunities of the 21<sup>st</sup> century. Again, the analysis shows that countries and people at the bottom are capable of basic capabilities, while those above are moving away from improved capabilities. It is expected to reach 2030, with avoidable disparities in child mortality, out-of-school children and extreme income poverty.

A new indicator of how opportunities and well-being are distributed among groups of people and even between countries refers to access to health, education, new technologies, green areas and pollution-free areas. Every gap or grow that persists is a call to respond to the injustice of inequality with effective policies. Inequality can take many forms, but with some of these, humanity has been facing for a long time, such as income inequality or gender inequality, and considerable progress has been made in this area across the globe. Namely, inequalities in basic capabilities that reflect extreme shortages are declining, according to the latest reports [UNDP, 2019 Human Development Report]. For instance, the world is moving towards average gender equality in access to primary and secondary



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education. At the same time, inequalities that reflect higher levels of empowerment tend to be larger and, in some cases, increase. One of these concerns the representation of women at the top political level.

Summarizing, it can be said that a comprehensive assessment of inequality should consider income and wealth, but must also understand the differences between other aspects of human development and processes leading to them. Addressing inequalities in human development will have to outline the perspectives of people who could live in the 22<sup>nd</sup> century. A changing world requires consideration of what will shape inequality in the future.

### 1.2. Classifying inequalities – a new approach

The traditional approach to inequalities in human development revolves around income inequalities, obtaining it at the highest level, being regarded as an essential thing in the life of each individual. However, the evolution of human society has led to the opening of a new spectrum of approaches and, consequently, to new inequalities.

Today we can speak about a new gap in tertiary education, for example, opportunities once considered luxuries, are now considered critical to compete and belong, especially in a knowledge economy in which more and more young people are educated and connected to one large scale of elections.

Also, climate change, gender inequalities, healthy life expectancy or violent conflicts are equally required as fundamental and new inequalities.

The analysis of inequalities must exceed their one-size-fits-all approach. In trying to structure inequalities, we will take into account both the past and the present, but especially the future challenges that human society will face, thus:

In terms of capacities, inequalities in human development [UNDP, 2019] can be:

a) inequalities in basic capacities, which in turn are given by: survival in childhood, primary education, access to basic technology, resistance to recurrent shocks;

b) inequalities in enhanced capacities, which refer to: access to quality health at all levels, high quality education at all levels, efficient access to current technologies, resistance to unknown new shocks.

According to the data published by UNDP in the 2019 Report, in all regions of the world, the loss of human development due to inequality decreases, reflecting

the progress in the basic capacities, thus in the region of the Arab States, in 2018 compared to 2010, the loss in human development due to the basic inequalities decreased by 2.9% (from 27.4% to 24.5%). The East Asia and Pacific region recorded the highest decrease of this loss by 5.3%, from 21.9% in 2010 to 16.6% in 2018. In Europe and Central Asia, it decreased by 4.4% (from 16.1 per cent to 11.7 per cent). In Latin America, the reduction was 3%, and in South Asia region - 3.7% (from 29.6% to 25.9%). In the Sub-Saharan Africa region, the loss in human development due to inequalities decreased by 4.6% (from 35.1% to 30.5%), and the world average of the reduction recorded in the 2010-2018 period was 3.2% (from 23.4% to 20.2%) [UNDP, 2019, HDR, p.35].

Depending on the level at which it manifests, inequalities may be:

- a) horizontal inequalities, those inequalities between groups/countries/regions;
- b) vertical inequalities, encountered between individuals within the same group.

According to the data published by UNDP, there are intra-household inequalities, for example, in 30 sub-Arab countries, about three-quarters of underweight women and undernourished children are not in the poorest 20% of households, and about half are not in the poorest 40% [UNDP, 2019, HDR, p. 13].

Inequalities are not necessarily a cause of the economic, political and social situation. Some of the situations/processes that generate inequalities are often seen as unfair and become a legitimate source of anger and frustration. Thus, depending on when they start to manifest, we can talk about:

- a) inequalities acquired through birth;

There are several factors that constitute inequality of birth opportunity, including, but not limited to, family background, gender, race, or place of birth – all essential to explain income inequality. [UNDP, OPHI, 2019].

Parents, through their actions and decisions, convey to their children the qualities that the labour market values or devalues, partly explaining how the family fund determines personal income. The achievement of the education of the children depends on the socioeconomic status of their parents, which also determines the health of the children, starting before birth and the cognitive capacity, partly through stimuli from childhood. This statute also determines the neighbourhood in which they grow, the schools in which they participate and the opportunities they have in the labour market, partly through their knowledge and networks.

In countries with high income inequality, the association between parents' incomes and their children's incomes is stronger – that is intergenerational mobility



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between incomes is lower. This relationship is known as the Great Gatsby Curve [Corak, 2013], often presented in a cross-country data diagram with income inequality on the horizontal axis and a measure of the correlation between parents' and children's income on the vertical axis.

One of these inequalities, which start before birth, may compound over the person's life and lead to persistent inequalities.

b) lifelong inequalities – inequalities that we acquire throughout our lives. These are due to several factors, such as: the health status throughout the life (which can be connected with another approach of inequalities such as healthy life expectancy or enhanced healthy longevity), the economic and geopolitical characteristics of the region in which an individual chooses to live, the personal way of coping with a certain level of competition, the ability to integrate in different socio-economic environments, pollution, etc.

According to the data published by UNDP, healthy life expectancy index suggests large discrepancies among countries. Healthy life expectancy for very high human development countries is about 68 years, compared to only about 56 years for low human development countries. [UNDP, 2019, HDR, p. 38].

As inequality begins at birth, it defines the freedom and opportunities of children, adults and the elderly and penetrates the next generation, as well as inequality prevention policies can follow the life cycle.

From previous investments in the labour market, in the health and nutrition of young children to investments in the internal and post-labour market around access to capital, minimum wages and social services, politicians and decision-makers have a number of options that, if they are correctly combined for the context of each country or group, it will translate into a lifelong investment in equality and sustainability [Kahneman, & Deaton, 2014].

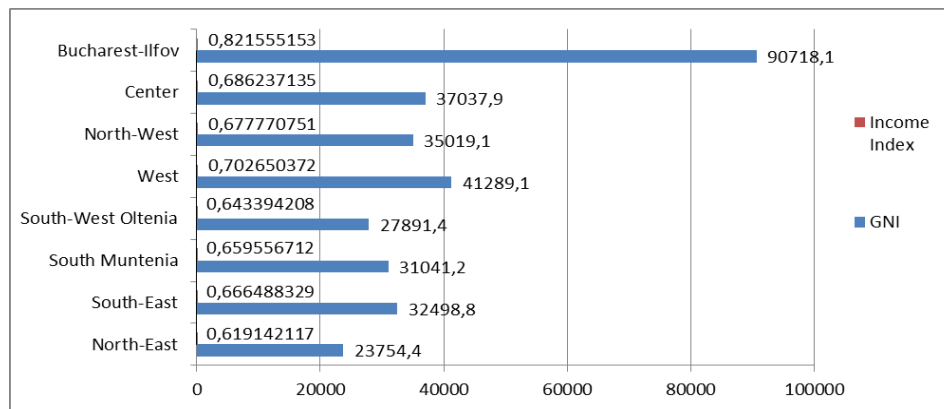
## ***2. Human Development Inequalities in Romania***

### **2.1. Some key aspects of human development inequalities in Romania**

One of the important questions in detecting inequalities in human development concerns the characteristics of the models that lead to them. Another issue, equally important in addressing them, is which and where are the opportunities to rectify these inequalities. The most frequent response to these problems was focused on the income inequality thesis, which has major negative effects on human development.

Therefore, reducing income inequality – mainly through redistribution using taxes and transfers – would also improve capabilities and make them evenly distributed.

Analysing the situation of the eight regions of economic development in Romania, it can be observed very clearly, that in this case, the income inequalities (see fig. 1) are the main cause of the gaps in human development between these regions.



**Fig. 1. Income Inequalities by regions in Romania**

Source: Own processing of data available on National Institute of Statistics site ([www.insse.ro](http://www.insse.ro))

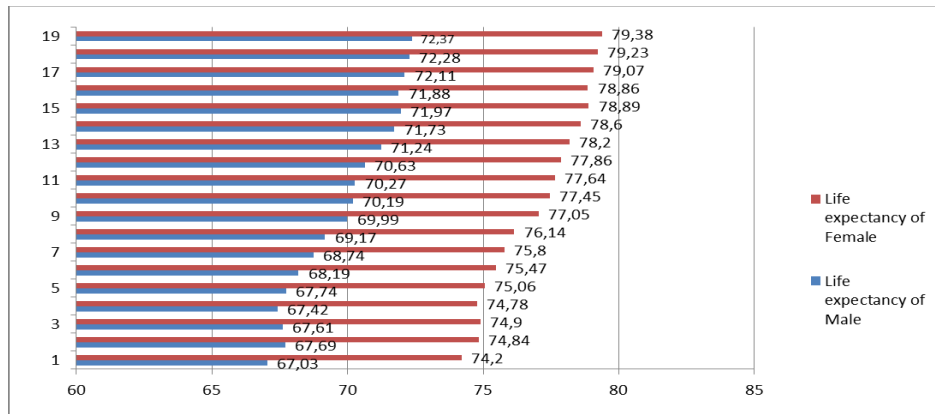
In the figure above (Fig. 1), are presented comparatively two indicators for each of the eight regions, respectively Gross Net Income (GNI) per capita and Income Index. For GNI per capita the data are available on the Romanian Institute of Statistics site, but Income Index was calculated by the author using the methodology proposed by UNDP, which will be detailed in the next sub-chapter.

As is shown in the previous figure, there are some essential gaps between incomes by region. The region with the lowest level of income is the North-East region, closely followed by the South-West Oltenia region. In these two, the income index recorded values of 0.619 (North-East) and 0.643 (South-West Oltenia). The highest value was registered in the Bucharest-Ilfov region, where the income index registered a value of 0.822. The next two regions, West and Center, are at big gaps

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from the first position with index values of 0.703, respectively 0.686. Between the first and the last region there is a difference of 0.203 points between the income indices, which translates to a difference of 66963.7 RON per capita.

Inequalities in human development can also be addressed in terms of gender inequalities, respectively the inequalities between women and men on various indices of human development. From this point of view, we can discuss about gender life expectancy inequalities in Romania.

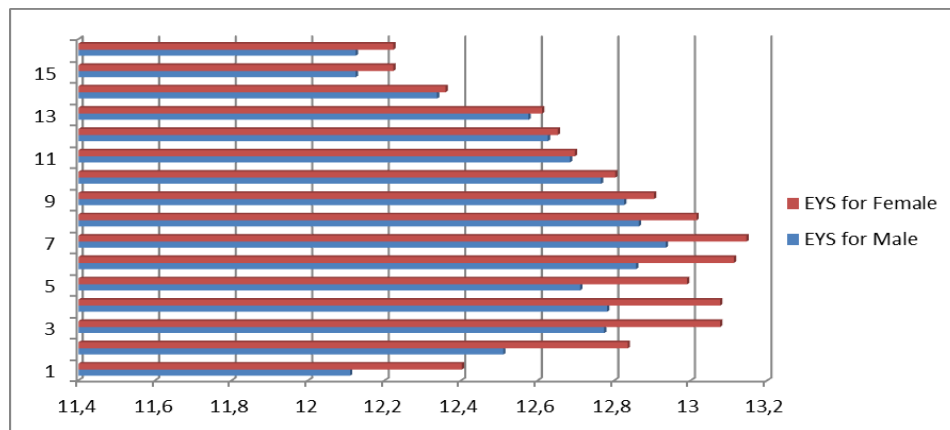


**Fig. 2. Life Expectancy Inequalities by Gender in Romania between 2000 and 2018**  
 Source: Data available on National Institute of Statistics site ([www.insse.ro](http://www.insse.ro))

As it can be seen, there are very big differences in terms of life expectancy at birth between women and men in Romania. For the analysed period, 2000-2018, life expectancy has seen a constant upward trend for both women and men, from 67.03 years in 2000 to 72.37 years in 2018 for men, and for women from 74.2 years in 2000 to 79.38 years in 2018. In the 19 years considered, the Health Index ranged from 0.724 to 0.806 for men, and from 0.834 to 0.914 for women (own processing of data available on the Romanian National Institute of Statistics site using the UNDP methodology). Both indicators (Life expectancy and Health Index) show very large gaps between women and men in terms of life expectancy at birth in Romania. The biggest gap was recorded in 2003 by 7.36 years, which means 0.113 points in terms of Health Index.



Other inequalities in human development may refer to the expected years of school (EYS), which in Romania is manifested, according to data processed by the World Bank, also between men and women, but the differences are not as great as in the case of life expectancy. Thus, between 2002 and 2017, these inequalities were as follows:



**Fig. 3. Expected Years of School Inequalities by Gender in Romania between 2002 and 2017**

Source: Data available on World Bank site  
 (<https://data.worldbank.org/country/romania?view=chart>)

During the analysed period, this index reached the maximum value in 2008 for both women (13.145 years) and for men (12.934 years), after which it started to fall steadily, reaching in 2017 lower values than in 2002 in the case of women (12.22 years in 2017 compared to 12.40 years in 2002).

Even if inequalities are registered in other aspects of human development in Romania as well, the biggest problem is still income inequalities, this being the main cause that leads to inequalities in human development in our country.

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## 2.2. Measuring Inequality-adjusted Human Development Index in Romania

### 2.2.1. Methodology

Both the Human Development Index (HDI) and the Inequality-adjusted Human Development Index (IHDI) are calculated using the methodology proposed by UNDP (United Nations Development Programme) in 2018. The IHDI adjusts the HDI to the inequalities of the distribution between the populations and is based on a class sensitive to the distribution of composite indices proposed by Foster et al (2005), which is based on the Atkinson family (1970) of inequality measures.

The Inequality-adjusted Human Development Index (IHDI) is calculated as a geometric mean of the inequality-adjusted dimensional indices:

$$IHDI = \sqrt[3]{I_{Health}^* \cdot I_{Education}^* \cdot I_{Income}^*} = [(1 - A_{Health}) \cdot (1 - A_{Education}) \cdot (1 - A_{Income})]^{1/3} \cdot HDI \quad (1)$$

IHDI accounts for inequalities in HDI dimensions by reducing the average value of each dimension according to its level of inequality. IHDI equals HDI when there is no inequality between people, but falls under HDI as inequality increases. In this sense, IHDI measures the level of human development when inequality is accounted for.

Based on the Atkinson family (1970) of unequal measures, IHDI sets the aversion parameter  $\epsilon$  equal to 1. In this situation, the measure of inequality is  $A = 1 - g / \mu$ , where  $g$  is the geometric mean and  $\mu$  is the arithmetic mean of the distribution. This can be written as:

$$A_x = 1 - \frac{\sqrt[n]{X_1 \cdot \dots \cdot X_n}}{\bar{X}} \quad (2)$$

where  $\{X_1, \dots, X_n\}$  represents the basic distribution in the index size.

$A_x$  is calculated for each variable (life expectancy, years of schooling and household disposable income). According to the methodology proposed by UNDP, the geometric mean in equation 2 does not allow zero values. For mean years of schooling, one year is added to all valid observations to calculate inequality. Outside values per capita – extremely high incomes, as well as negative and zero incomes – were treated by truncating the upper 0.5 per cent of the distribution to

reduce the influence of extremely high incomes and by replacing negative incomes and zero with the minimum value of 0.5 lower percentile of positive income distribution.

Inequality dimension indices are obtained from HDI dimension indices,  $I_x$ , by multiplying them with  $(1 - A_x)$ , where  $A_x$ , defined by equation 2, is the corresponding Atkinson measure:

$$I_x^* = (1 - A_x) \cdot I_x \quad (3)$$

For instance, the income index adjusted for inequality,  $I_{income}^*$ , is based on the index of recorded income values,  $I_{income}$  and inequality in the distribution of income calculated using income at levels. This allows IHDI to take into account the full effect of income inequality.

The IHDI is based on the Atkinson index, which satisfies the subgroup's consistency. This property ensures that the improvements (deteriorations) of the distribution of human development within a certain group of society involve improvements (deteriorations) in the distribution throughout the society. The main disadvantage is that IHDI is not sensitive to association, so it does not surprise the overlapping inequalities. In order to raise awareness of the association, all data for each person must be available from a single survey source, which is currently not possible for a large number of countries. (UNDP)

Also, HDI is a summary measure of the achievements in three key dimensions of human development: a long and healthy life, access to knowledge and a decent standard of living. HDI is the geometric mean of the normalized indices for each of the three dimensions:

$$HDI = \sqrt[3]{I_{Health} \cdot I_{Education} \cdot I_{Income}} \quad (4)$$

### 2.2.2. Results

Using the methodology proposed by UNDP for the calculation of IHDI and HDI, the following results were obtained for the eight regions of economic development in Romania:

**Table 1. HDI Values by Regions in Romania**

Region	Health Index	Expected Years of School Index	Mean Years of School Index	Education Index	Income Index	HDI
North-East	0.859	0.794	0.733	0.7638	0.619	0.741
South-East	0.859	0.794	0.733	0.7638	0.666	0.759
South Muntenia	0.859	0.794	0.733	0.7638	0.659	0.756
South-West Oltenia	0.859	0.794	0.733	0.7638	0.643	0.750
West	0.859	0.794	0.733	0.7638	0.702	0.773
North-West	0.859	0.794	0.733	0.7638	0.677	0.763
Centre	0.859	0.794	0.733	0.7638	0.686	0.767
Bucharest-Ilfov	0.859	0.794	0.733	0.7638	0.821	0.814

Source: Own processing data available on Romanian National Institute of Statistics ([www.insse.ro](http://www.insse.ro))

Because, for indicators such as life expectancy, expected years of school and mean years of school, the data did not vary across the eight regions, according to the National Institute of Statistics, the differences in value in HDI between regions are given by income inequalities.

As we discussed previous (see subchapter 2.1), there are important gaps between incomes, gaps that are reflected in the values of HDI. For this reason, the lowest level of human development was registered in the North-East region (0.741), followed by the South-West Oltenia region (0.750), and the highest level was registered in the Bucharest-Ilfov region (0.814), region with the highest level of income per capita.

To determine the value of IHDI, the calculation methodology proposed by UNDP was used, and the results are as follows:

**Table 2. Inequality-Adjusted Human Development Index**

Indicator	Value	Dimension Index	Inequality Measure ( $A_x$ )	Inequality-adjusted Index ( $I^*_x$ )
Life Expectancy (years)	75.85	0.859	0.000417	0.858
Expected Years of School (years)	14.3	0.794	-	-
Mean Years of School (years)	11	0.733	0.0127	0.724
Education Index	-	0.7639	0.0127	0.7542
Gross National Income per capita	39,906.25	0.6846	0.0819	0.6285
<b>Human Development Index</b>			<b>Inequality-Adjusted Human Development Index</b>	
0.7659			0.73115	
<b>Loss due to Inequality (%)</b>			<b>Coefficient of Human Inequality (%)</b>	
$\text{Loss (\%)} = \left(1 - \frac{\text{IHDI}}{\text{HDI}}\right) \cdot 100 = 4.54\%$			$\frac{A_{\text{Health}} \cdot A_{\text{Education}} \cdot A_{\text{Income}}}{3} * 100 = 3.17\%$	

Source: Own processing data available on Romanian National Institute of Statistics (www.insse.ro)

The loss suffered by human development as a result of the income inequalities registered in the eight regions of economic development in Romania was 4.54%, leading to a coefficient of human inequality of 3.17%. The value of IHDI (0.731) does not have a significantly lower value than that of HDI (0.766) due to the fact that only one of the three dimensions recorded significant variations in the regions considered. Both values, including the one adjusted for inequality, indicate a high level of human development, according to the UNDP classification.

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### 2.3. Correlation between HDI and Economic Growth by Regions in Romania

An original and perhaps most lasting contribution of HDI to our thinking about development is to show that the levels and trends of human development can differ significantly from income levels and GDP growth trends. For example, one of the most surprising results of human development research in recent years, confirmed in UNDP 2010 Human Development Report, is the lack of a significant correlation between economic growth and improving health and education, at least in the medium term.

To show the relation between human development and economic development in the eight regions of Romania, we started from the hypothesis that the level of income, at least in our country, has a significant influence on the level of human development. In this case, we used an econometric model with a simple linear regression equation, of the form:

$$HDI_{Region\ x} = c(1) + c(2) \cdot GDP_{Region\ x} \quad (5)$$

where:  $HDI_{Region\ x}$  = is the value of human development index for one of the eight Romanian development region

$GDP_{Region\ x}$  = is regional gross domestic product

$x$  = Romanian development regions

$c(1), c(2)$  = are the regression equation parameters.

In this case, HDI it was considered as dependent variable, and the economic growth as an independent variable, reflected by regional gross domestic product (RGDP). This equation has to show the influence of economic growth on HDI by regions in Romania in the last 7 years.

The results are presented in table 3.

The results of the regression equation show us that at a change with a percentage of RGDP, regional HDI changes in the same sense with values between 17.7% (Western Region) or 13.8% (Center) and 5.1% (South-West Oltenia Region) or 6.02% (South-East Region). This means that, for the analysed period, in the western and central regions, the regional level of economic development had a greater impact on the level of human development. At the opposite pole are the South-West Oltenia Region and the South-East Region.

**Table 3. Correlation between Human Development Index and Economic Growth by Region**

Region	C(1)	C(2)	Std. Error	t-Statistic	Prob.	R-squared	Adjusted R-squared
North-East	0.046913	0.067762	0.143862 0.014879	0.326101 4.554262	0.7576 0.0061	0.805760	0.766912
South-East	0.135720	0.060187	0.106337 1.276326	0.010926 5.508583	0.2579 0.0027	0.858535	0.830242
South Muntenia	0.070202	0.065585	0.106557 0.658824	0.010801 6.072198	0.5391 0.0017	0.880587	0.856705
South-West Oltenia	0.226112	0.051923	0.227257 0.994965	0.3654 0.024273	2.139162 0.0854	0.477862	0.373435
West	0.11293	0.17738	0.636679 0.5523	0.064492 0.018452	3.495145 0.0174	0.709573	0.651488
North-West	0.063927	0.100980	0.633064 0.5545	0.067329 0.010328	6.518920 0.0013	0.894729	0.873674
Center	0.100271	0.138756	0.722645 0.5023	0.064180 0.014219	4.513756 0.0063	0.802948	0.763537
Bucharest-Ilfov	0.17846	0.08584	2.079088 0.0922	0.056048 0.008080	6.936808 0.0010	0.905872	0.887047

Source: Own processing data available on Romanian National Institute of Statistics ([www.insse.ro](http://www.insse.ro)), UNDP ([www.undp.org](http://www.undp.org)), National Bank of Romania ([www.bnr.ro](http://www.bnr.ro)) sites

The coefficients of determination for regressions (R-squared and Adjusted R-squared) signify the fact that a percentage between 48% (South-West Oltenia Region) and 91% (Bucharest-Ilfov Region) of the regional HDI variation is explained by the modification of the economic growth.

Those results show that, on the short term, it is a positive direct correlation between human development and economic growth.

### **Conclusions**

Addressing human development, the following aspects should be taken into account:

- inequalities in human development remain widespread, despite the reduction of inequalities in primary needs;



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- the new generation of inequalities leads to a divergence in the increased capacities, despite the convergence in the basic capacities;
- inequalities accumulate throughout life, leading to profound power imbalances, gender and chance inequalities;
- inequalities can be corrected if they act promptly, before the economic power imbalances will be anchored in political.

Regarding the results of the studies carried out in this article, it can be said that:

- the inequality-adjusted human development index suffered a loss of 4.54% compared to HDI, mainly due to the income inequalities between the eight regions in Romania;
- according to the regression equations results, on the short term (seven years), there is a positive direct connection between HDI and EG in the eight regions considered.

It is certain that the evaluation, analysis and reaction to the new generations of inequalities, requires a revolution in the metric. It is necessary to consider now aspects that can affect the generations that will live in the next century.

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