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Economic growth dynamics across countries

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Abstract

Economic growth is one of the most important issues discussed worldwide. Its dynamics over time seem to be crucial from the perspective of the ability of poor countries to catch up with highly developed economies. As can be easily noticed in world statistics, both GDP per capita and GDP growth levels vary substantially across countries.

The main purpose of the paper is to analyze GDP PPP per capita growth rates across countries in the period 1980 – 2008, as well as to identify top and bottom country performers. In addition, the author verifies the statistical relationship between GDP PPP per capita and some arbitrary selected social indicators like: school life expectancy, infant mortality rate, life expectancy and Human Development Index.

All data applied in the study are drawn from International Monetary Fund and United Nation databases.

Key words: *economic growth, economic development, HDI*

JEL codes: *011, 047*

Introduction

Gross domestic product growth – shortly defined as an economic growth – lies in the very centre of the economists' interests. It is often perceived as a prerequisite for a country to develop on social, political, technological ground, but at the same time the permanent lack of GDP growth constitutes a main obstacle for a country to enter a path of socio - economic development. The changes in GDP – usually in GDP per capita (per inhabitant), are analyzed as the indicator is thought to be more reliable than just overall GDP growth. Surely each indicator is always expressed in international dollars (GDP expresses in US dollars and corrected by purchasing power parity factor), in order to make possible international comparisons in time and space.

In most common sense the average level of GDP *per capita* is treated as an indicator explaining the overall wealth of nation and inhabitants. However, the main advantage of such approach is its simplicity and comparability among countries, but it has some obvious limitations. As it is widely agreed, the GDP per capita values does not capture some essential aspects of social life, which usually constitute a major part of peoples' general well-being.

However “economic growth” lies in the centre of the author's interest, it is not an aim to discuss the problem of economic growth from purely technical and mathematical point of view. Economic growth theories will not discussed, although the author does not deny their importance. The main target of the paper is to analyze GDP dynamics in time and space for as many economies as possible. The correlation between growth rates and initial GDP level are analyzed. Additionally trends in human development level – defined according to Amartya Sen's concept – are studied. In the final part the author runs a statistical analysis of relationships between GDP levels and level of proxies of social and technological development, as well as between GDP growth rates and level of proxies of social and technological development.

Economic growth and development. Theoretical background and measurement.

“In the history of mankind, attempts to improve living conditions have only very recently superseded the struggle for survival. In all civilizations, progress has been

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exceedingly slow, with abrupt, unexpected downfalls. (...) Today we can estimate that only one fifth of the world population enjoys a standard of life that can be considered acceptable.”²

Economic growth and development have always been in the very centre of economists' interests. For a great majority of countries, entering a stable pattern of economic growth constitutes a main target and is treated as a priority goal of socio-economic policy. It is widely accepted that in a long run perspective, nations can benefit from what they produce – namely from gross domestic product growth.

However, most of world countries in recent decades have experienced economic growth, the process dynamic seems to be very differentiated across countries. Although most of countries experience positive gross domestic product growth rate (expressed as in *per* inhabitant), the growth rates vary significantly in different countries.

In widely understandable sense the term of “growth” is often confused with the term of “development”. However from purely theoretical point of view, these terms are crucially different – “growth” constitutes solely quantitative changes, while “development” states for both quantitative and above all qualitative changes, they are usually used alternatively. World Bank applies a simple methodology of comparing the level of development of countries, by comparison of their per capita income. The gross domestic product per capita is widely applied, or gross national income per capita. In each case the purchasing power parity factor is used to eliminate price differences among countries. As the idea of using International Dollar is applied, thanks to the purchasing power parity (PPP), let us to compare the average living standards among countries which are substantially different. We are able to compare the annual incomes of an average family in Japan and Bolivia – for example. Of course such perception and understanding of development has obvious limitations and can mislead in drawing right conclusions considering general welfare of societies. There are many widely recognized problems with GDP per capita as a proxy of national development. Mainly it is due to lack of reliable information that could be the base to GDP calculation. Often we can only rely on some estimations. Also one must remember that the value of GDP does not cover all market activities. Some obvious mistakes are made.

Having in mind all imitations and constrains of GDP per capita, it is a broadly accepted measure of national development. By many it is perceived as an extremely useful way of measurement development in a country. It is also a measure which enables to compare economies easily. Observing and analyzing changes in GDP per capita over time, give a general idea of “if” and “how” fast countries are changing their development level. It let us to distinguish between countries which are lagging behind – where the level of GDP per capita is accompanied by low (or even negative) growth rates, and – from the opposite sides – countries which leaders on economic world map. The contrasts across countries are clearly visible and easily noticeable. However most of developing countries experience long term positive growth rates, the rates are very volatile. Usually they are rather higher than in high income countries, but at the same time the growth rates vary significantly across time. The spread between the growth rate in two sequent years can be sometime astonishing. It is mainly due to high instability of the internal markets and great vulnerability of the economy – high exposure to all kind of risks associated with operating on global market. However no matter how instable these growth rates are, the general tendency is like low income and developing countries enjoy relatively higher GDP per capita growth rates than high income and highly developed economies. This let these countries to catch up slightly with high income countries. This process of catching up – theoretically – let to diminish the development differences between high and low income countries. However it is hard to deny that low income countries are experiencing relatively higher average annual GDP per capita growth rates, the gulf in wealth between poor and rich is rather widening than narrowing. Mainly it is caused by too low average annual GDP per capita growth rates to catch up effectively and to narrow the gap between rich and poor.

Economic growth has different enhancement factors but it also causes some consequences. Rapid GDP growth is usually enabled by increase in productivity in agriculture and industry, or better and more effective resource extraction. The GDP growth factors surely depend on the current state of national economy. But also, as it can be concluded from analyzing different country case studies, when a poor and low income

² Grandville O., (2009), Economic growth, Cambridge University Press, UK.

country reaches the middle – income level of GDP per capita, it also means that a certain level of industrialization has been achieved. GDP growth generally causes some structural changes in an economy, the structure of consumption is changing and the overall welfare of a society is to increase. However it is thought that GDP growth is “good for all” – especially for low income countries, there are much evidence from developing world that increase in value of national output does necessarily mean that all parts of society benefit equally from it. Although GDP growth usually stands for better and more effective use of resources of all kinds, it does not cause a direct poverty reduction. The extend poverty is very likely to stay at the same level even when a country is experiencing high GDP growth rate, when the distribution of earning is highly unequal. It is very possible that the GDP is growing at high pace but only a small part of a society has effectively benefit from it. It means that GDP growth does not always has to mean reduction in absolute poverty rates. In order to find out how many of the poor benefit from the growth we should analyze the pre and post growth distribution of income. However it is not the purpose of the analysis presented in the paper.

As it was already stated, pure GDP does not reflect entirely a general welfare of societies. Actually it not a perfect gauge for the measurement of societies well-being. A huge number of corrections should be implemented if somebody wanted to treat is a welfare measure. It is mainly because the GDP does not capture numerous elements which can increase or decrease welfare significantly. They are mainly of qualitative kind, which cannot be easily put into numbers.

In time many different and alternative concepts of measuring overall welfare have been developed. One of the most popular are these calculated by United Nation Development Programme³, Human Development Index (HDI). The measurement is mainly based on the assumption that human development goes far beyond simple increase in income and value of final goods. “It is about creating an environment in which people can develop their full potential and lead productive, creative lives in accord with their needs and interests. People are the real wealth of nations. Development is thus about expanding the choices people have to lead lives that they value. And it is thus about much more than economic growth, which is only a means —if a very important one —of enlarging people’s choices⁴”. The concept of human development is much broader and is not limited to incomes. The Human Development Index was firstly introduced in 1990 by Muhamad al Haq and Amartya Sen. Originally the index calculation was based on 4 different components, covering three aspects of life: a decent living standards, knowledge and a long and healthy life⁵.

The decent life was quantified as GDP PPP per capita, the knowledge was quantified as adult literacy rate and gross school enrolment ratio, and finally – a long and healthy life was quantified as life expectancy at birth.

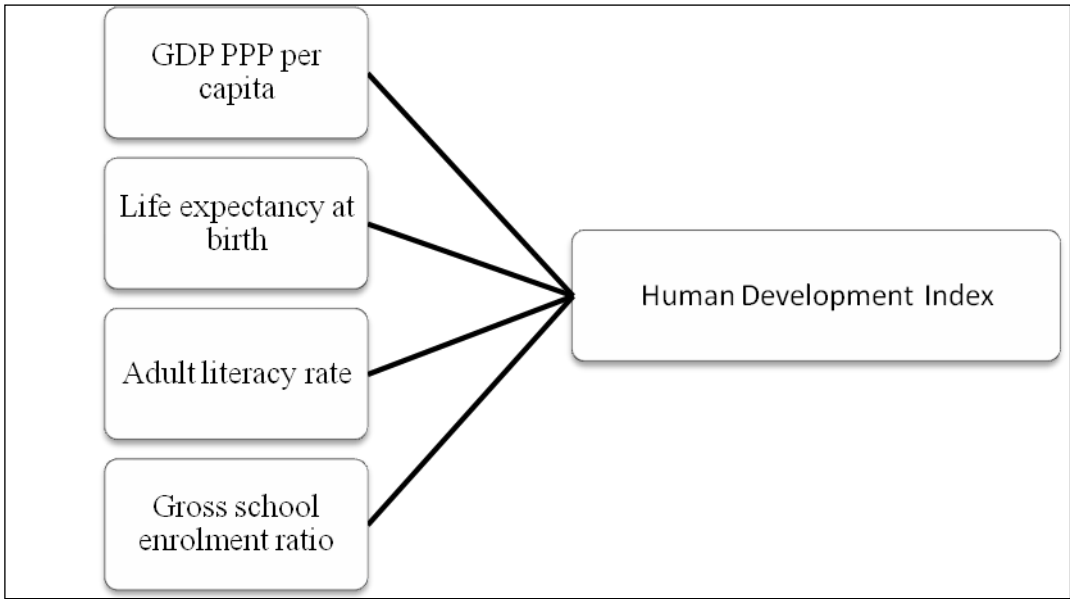
In the diagram 1 (see below), you can see summarized components of Human Development Index.

³ United Nation Development Programme is an United Nation`s Agenda.

⁴ <http://hdr.undp.org/en/humandev/>; Accessed: 1st of Nov 2010.

⁵ Human Development Report 2007/2008, (2008), Technical Note; United Nations.

Diagram 1. Human Development Index components.



Source: Human Development Report 2007/2008, UN 2008.

The mathematical formula for Human Development Index is the following:

$$HDI = \frac{GDP\ Index + Education\ Index + Life\ Expectancy\ Index}{3},$$

where:

$$GDP\ Index = \frac{\log(GDP\ in\ a\ country) - \log(100)}{\log(GDP\ goalpost) - \log(100)},$$

$$Education\ Index = \frac{2}{3}(Adult\ Literacy\ Index) + \frac{1}{3}(School\ Enrolment\ Index)$$

$$Adult\ Literacy\ Index = \frac{Indicator\ value\ for\ a\ country - 0}{100 - 0}$$

$$School\ Enrolment\ Index = \frac{Indicator\ value\ for\ a\ country - 0}{100 - 0},$$

and:

$$Life\ Expectancy\ Index = \frac{Indicator\ value\ for\ a\ country - Min\ value\ in\ a\ country\ set}{Max\ value\ in\ a\ country\ set - Min\ value\ in\ a\ country\ set}$$

Usually HDI is treated as an alternative – for pure income – measure of human welfare. It captures 3 dimensions of human life which are defined as non-income ones. Although we do have in mind that life expectancy and education level are closely related and depended on income and spending possibilities, it is extremely important not to limit the discussion of human welfare to pure income aspects.

However there is a possibility to analyze Human Development Index values changes in time and space, one must note that only GDP PPP per capita is changing relatively fast in different economies. All three non-income indicators are also changing but the changes are not so astonishing and visible. As GDP PPP per capita constitutes only one third of the index value, the overall changes in the index may not be so fast as it would be expected. GDP PPP per capita is much more short-time sensitive to changes than for example life expectancy. The non-income components are to change rather slowly and in long-time perspective. That is an evident limitation of the measure. Also we should mention that it would be perfect to be able observe changes in HDI values in time for specific countries in order to find out whether the country is better or worse off. However while the HDI components are set arbitrary, these may not reflect one`s country priorities in development policies.

In the following parts of the paper, there will be presented current statistics on Human Development Index.

Also in the third section of the paper there also will be analyzed relationships between GDP PPP per capita and 3 different indicators of social kind which can be considered as proxies of general welfare. These will be:

- School life expectancy (in years) – data drawn from World Bank database,
- Infant mortality rate – data drawn from World Bank database,
- Adult literacy rate (for persons of minimum age of 15 years) - data drawn from World Bank database.

Apart from the discussion considering HDI changes over time, the author analyzes the existing relationships between GDP PPP and each one of the 4 indicators mentioned above. The general purpose of the analysis is to learn about whether there is statistically significant relationship between GDP PPP per capita and level of indicators reflecting general welfare and well-being.

Statistical analysis of GDP changes – cross country study.

The main aim of the second part of the paper is to analyze changes in GDP values across nation in time. The period applied for the analysis covers 28 sequent years (1980 – 2008). All data concerning GDP levels were drawn from International Monetary Fund database (IMF Economic Outlook Database, 2010). The sample includes 140 worldwide economies – both low and high developed countries. The starting year for the analysis is 1980 and the final – 2008.

In the first part of the second paragraph, the author calculates and compares average annual GDP per capita growth rates. All values are expressed as Gross Domestic Product in Purchasing Power Parity, so the price differences among countries have been eliminated. The average annual growth rates have been calculated according to the following mathematical formula:

$$aaGDPPPPpgrate = \left[\left(\sqrt[n]{\frac{Y_n}{Y_0}} \right) - 1 \right] * 100\% ,$$

where:

n – number of years

Y_n – GDP PPP per capita values in the end period year,

Y_0 – GDP PPP per capita in the initial year.

The results of the estimations are put in Table 1 (see below). In Annex 1 (at the end of the paper) the table with GDP PPP per capita country levels at put, for years 1980 and 2008.

Table 1. Average annual GDP PPP per capita growth rates. Period 1980 – 2008.

Country	aaGDPPPPpgrate	Country	aaGDPPPPpgrate	Country	aaGDPPPPpgrate
Albania	4,8	Germany	4,7	Nigeria	4,2
Algeria	3,6	Ghana	4,5	Norway	5,3
Angola	4,2	Greece	4,6	Oman	6,2
Antigua and Barbuda	6,7	Grenada	6,4	Pakistan	5,4
Argentina	4,0	Guatemala	2,8	Panama	5,3
Australia	4,9	Guinea-Bissau	2,0	Papua N G	3,2
Austria	4,9	Guyana	4,1	Paraguay	3,3
The Bahamas	3,7	Haiti	1,3	Peru	3,9
Bahrain	4,9	Honduras	3,7	Philippines	3,8
Bangladesh	5,7	Hong Kong	7,0	Poland	5,2
Barbados	4,6	Hungary	4,9	Portugal	5,4
Belgium	4,8	Iceland	4,9	Qatar	1,6
Belize	6,3	India	7,1	Romania	4,6
Benin	3,4	Indonesia	6,3	Rwanda	4,1
Bhutan	8,8	Iran	4,8	Samoa	5,0
Bolivia	2,9	Ireland	6,8	São Tomé and Príncipe	2,6
Botswana	7,9	Israel	5,0	Saudi Arabia	1,2

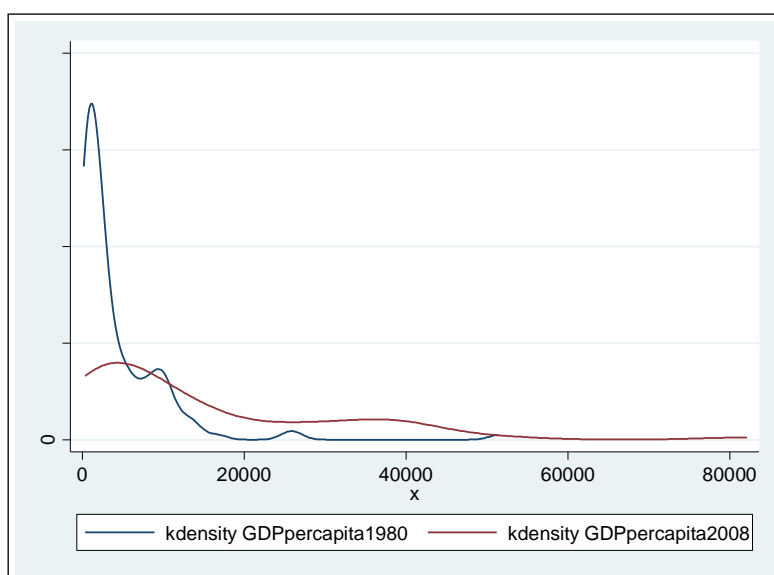
Brazil	3,8	Italy	4,5	Senegal	3,4
Bulgaria	4,4	Jamaica	3,9	Seychelles	5,5
Burkina Faso	4,8	Japan	5,1	Sierra Leone	1,0
Burundi	2,4	Jordan	3,7	Singapore	7,3
Cameroon	2,7	Kenya	3,4	Solomon Isl.	2,5
Canada	4,6	Kiribati	3,4	South Africa	3,6
Cape Verde	6,6	Korea	9,3	Spain	5,3
Cent. African Rep.	2,0	Kuwait	1,5	Sri Lanka	6,7
Chad	5,2	Lao PDR	6,8	St. Kitts and Nevis	6,9
Chile	6,0	Lebanon	3,3	St. Lucia	5,7
China	12,1	Lesotho	4,9	St. Vincent and the Grenadines	7,2
Colombia	4,8	Libya	0,0	Sudan	5,0
Comoros	2,7	Luxembourg	6,7	Swaziland	5,8
Congo, DR	-0,5	Madagascar	1,8	Sweden	4,9
Rep. of Congo	3,8	Malawi	3,2	Switzerland	4,0
Côte d'Ivoire	1,3	Malaysia	6,6	Syrian Arab Rep.	3,9
Cyprus	6,3	Maldives	7,9	Tanzania	4,3
Denmark	4,8	Mali	4,3	Thailand	7,5
Dominican Rep.	5,4	Malta	5,5	Togo	1,1
Ecuador	4,0	Mauritania	3,7	Tonga	6,7
Egypt	5,6	Mauritius	7,0	Tunisia	5,7
El Salvador	4,7	Mexico	3,9	Turkey	5,7
Equ. Guinea	13,9	Morocco	4,9	Uganda	5,3
Ethiopia	4,0	Mozambique	5,5	U A E	1,5
Fiji	4,3	Myanmar	7,2	U K	5,3
Finland	5,3	Nepal	5,4	U S A	4,9
France	4,5	Netherlands	4,9	Uruguay	4,8
Gabon	2,4	New Zealand	4,3	Vanuatu	3,4
The Gambia	3,1	Niger	1,7	Venezuela	3,0
				Vietnam	8,3
				Zambia	2,0

Source: own calculation based on data drawn from IMF Economic Outlook Database 2010, IMF 2010.

A simple conclusion can be drawn from the statistics presented in table 1. In the period 1980 – 2008 the average annual GDP PPP per capita growth rates vary significantly across countries. It is not surprising that these the values is not the same in different economies, however such growth pace disparities have some grave consequences. Not only is deepens country differences in income level, but also the income (also development) gap is widening. Its natural cause are growing difference among countries. Countries rather tend to diverge than to converge in terms of GDP PPP per capita level. This is mainly caused by different growth rates but also different birth rate.

In chart 1 (see below), there presents two Kernel densities function for GDP PPP per capita in 1980 and in 2008. As can be concluded from the chart 1, in the year 1980 there were much more countries with relatively low GDP PPP per capita. Actually most of countries could enjoy only the level of per capita income below 20 000 of International Dollars. After 28 years of constant – but also highly uneven growth, the overall all world income is much more distributed. Income inequalities have increased significantly, which can be concluded from the Kernel density function shape for the year 2008. The number of countries with very low per capita income has diminished, but at the same time there are countries with very high – more than 80 000 International Dollars per capita, income. Although the general wealth of nations has grown, the relations in terms of GDP PPP per capita among countries have worsened.

Chart 1. Kernel Gaussian densities. GDP PPP 1980 and 2008.



Source: own elaboration using data drawn from IMF Economic Outlook Database 2010. IMF 2010. Software StataSE 9.

In the table 2, the author presents top and bottom performers in world classification. As the top performers we classify the best performing countries in terms of GDP PPP per capita growth rates – the author has decided arbitrary to be treated as such countries with growth rates higher than 7% per year. These countries are the economies which have greatest possibilities to catch up with the high income countries. On the other side the author has identified the worst performing countries in terms of GDP PPP per capita growth rate – the author has decided arbitrary to be treated as such countries with growth rates lower than 2% per year. These are countries which in the period 1980 – 2008 have achieved relatively lowest growth rate. That implies significant difficulties in catching up with the high income economies.

Table 2. Top and bottom performers. Best and worst performing countries in terms of annual GDP PPP per capita growth rate. Period 1980 – 2008.

Top performers		Bottom performers	
Country	GDP growth rate	Country	GDP growth rate
India	7,15	Congo D.R.	-0,46
St. Vincent and the Grenadines	7,19	Libya	0,02
Myanmar	7,23	Sierra Leone	0,98
Singapore	7,33	Togo	1,07
Thailand	7,50	Saudi Arabia	1,24
Botswana	7,91	Haiti	1,26
Maldives	7,93	Côte d'Ivoire	1,33
Vietnam	8,32	United Arab Emirates	1,50
Bhutan	8,81	Kuwait	1,55
Korea	9,30	Qatar	1,63
China	12,14	Niger	1,68
Equatorial Guinea	13,90	Madagascar	1,79
		Central African Republic	1,96
		Zambia	1,98

Source: own elaboration based on data drawn from IMF Economic Outlook Database 2010, IMF 2010.

As it was expected, mainly low income and relatively poor countries constitute both top and bottom performers groups. There are some exceptions – in both groups we find

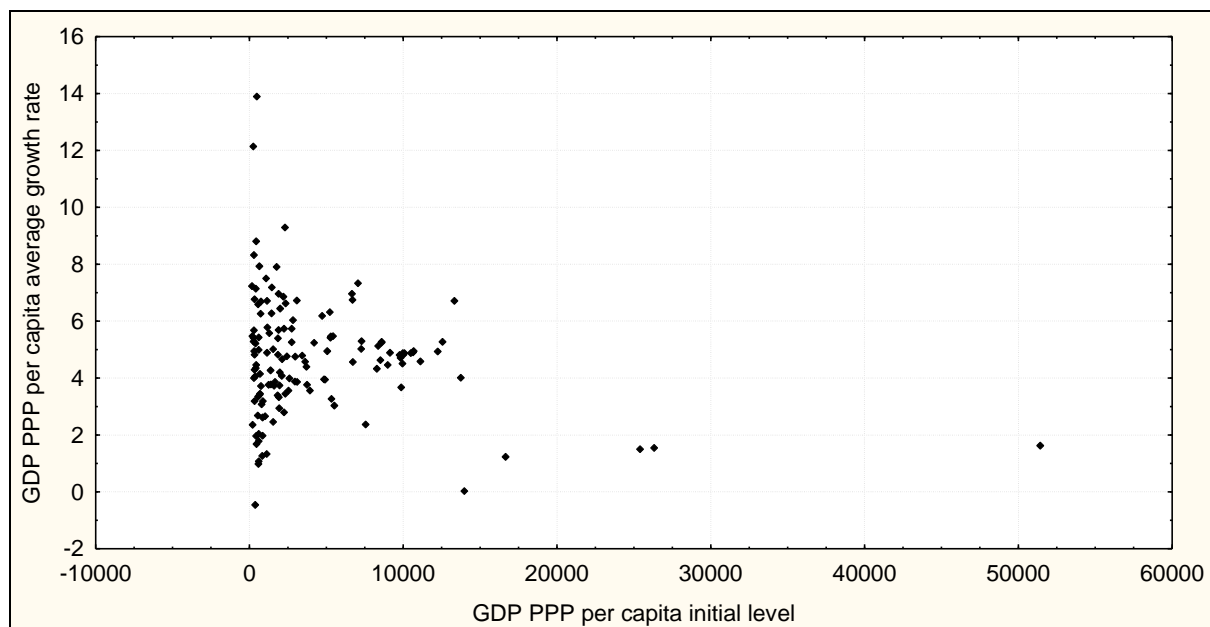
some high income. These are: Saudi Arabia, United Arab Emirates, Kuwait and Qatar.

The lowest average annual GDP PPP per capita growth rate was noted in Democratic Republic of Congo – (-0,46). In fact the growth rate was negative, which means that in year 1980 (it was 372 International Dollars) the GDP PPP per capita was higher than in 2008 (it was 327 International Dollars). As the growth rate is close to zero in the period of 28 years, the Democratic Republic of Congo can be classified as stagnant economy. In Libya the average annual GDP PPP per capita growth rate was also close to zero – (0,02) in the period 1980 – 2008. In 1980 the GDP PPP per capita in Libya was 13970 International Dollars and in after 28 years – in 2008 it was 14068 International Dollars. Based on such results we can treat both countries as stagnant economies. Three of the best performing countries are: Korea, China and Equatorial Guinea. The growth rates are astonishingly high. We must note that all countries with such high GDP growth rates, in the year 1980 were underdeveloped economies with relatively very low income level. Such high growth rates enable to catch up with high income countries. According to the catching up hypothesis it is not rather surprising. In counties with very low initial income per capita level, growth rates shall be far higher than in countries with relatively high per capita income level.

To verify the statement, we estimate statistical relationship between GDP PPP per capita initial level and average annual GDP PPP per capita growth rates. In chart 2 (see below), the author presents the scatter plot where the statistical relationship between GDP PPP per capita initial level (as independent variable) and average annual GDP PPP growth rates (as dependent variable).

The scatter plot (chart 2) explains statistical relationship between GDP PPP per capita growth rate and initial level of GDP PPP per capita. The correlation coefficient for the two variables is $r = (-0,2014)$, the $p\text{-value} = 0,0170$. Rather low and negative value of the correlation coefficient states for weak and negative relationship between the two variables. Based on such statistics it would not be justified to state that there is strong statistical relationship between the initial GDP PPP per capita value and average annual GDP PPP per capita growth rate.

Chart 2. Scatter plot – relationship between GDP PPP pc initial level and average annual GDP PPP per capita growth rates. 140 countries. Period 1980 – 2008.



Source: own elaboration using data drawn from IMF Economic Outlook Database 2010, IMF 2010. Software STATISTICA 8.

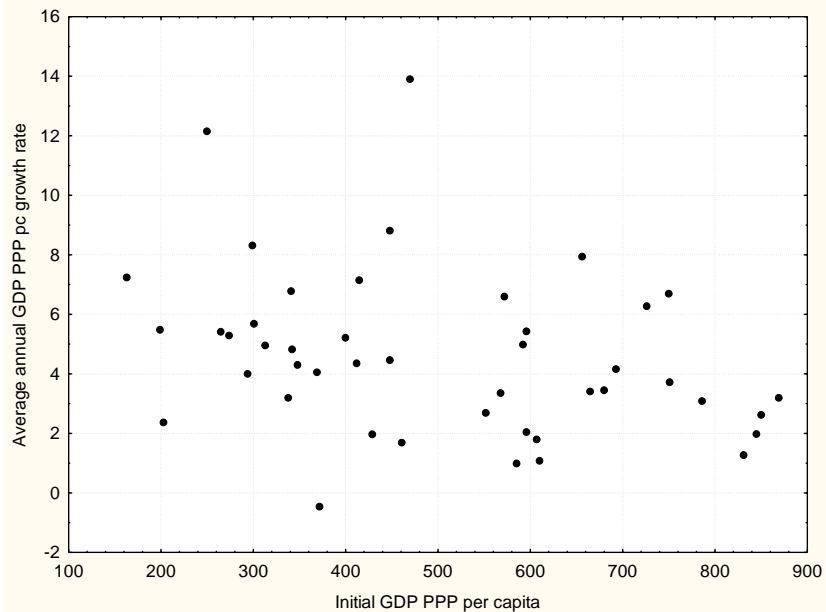
However the $p\text{-value}$ is below 0,05, it is right to conclude that the relationship is statistically significant. From the scatter plot we can conclude that in countries where the

GDP PPP per capita level in the year 1980 was not higher than 10 000 International Dollar, the growth rates vary significantly. Also the higher density is observed in the countries with relatively lowest initial per capita income levels. Consequently, in countries with relatively higher initial per capita income the growth rates are also slightly lower and not so diversified.

In the following part, the author has grouped countries according to their GDP PPP per capita level. The classification has been made relying on the World Bank classification standards. There has been identified 4 different country groups. The analogous analysis (like in the section above) has been run for each country group. The results are presented below. The author puts scatter plot for each country group. After a summary statistics table is presented.

Low-income countries

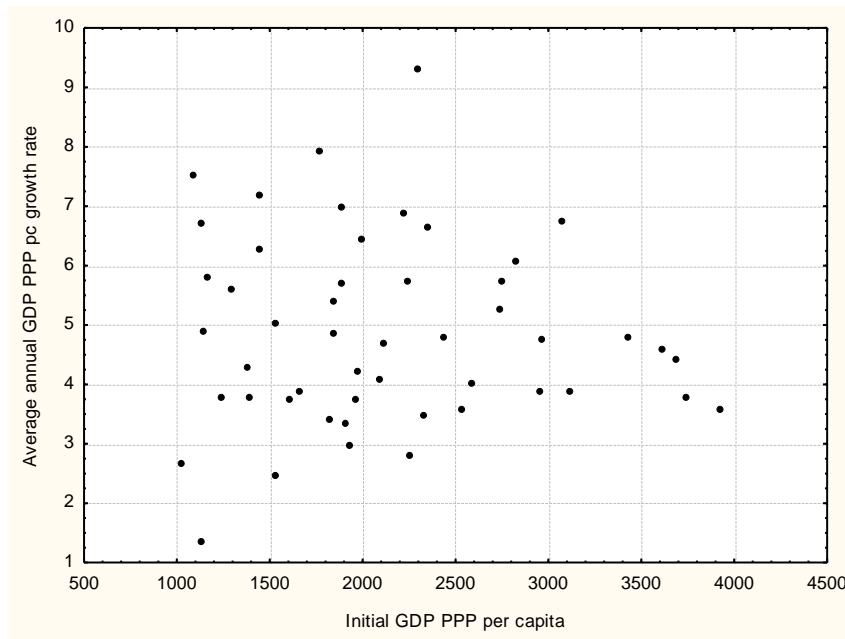
Chart 3. Scatter plot – relationship between GDP PPP pc initial level and average annual GDP PPP per capita growth rates. Low-income countries. Period 1980 – 2008.



Source: own elaboration using data drawn from IMF Economic Outlook Database 2010, IMF 2010. Software STATISTICA 8.

a) Lower medium-income countries

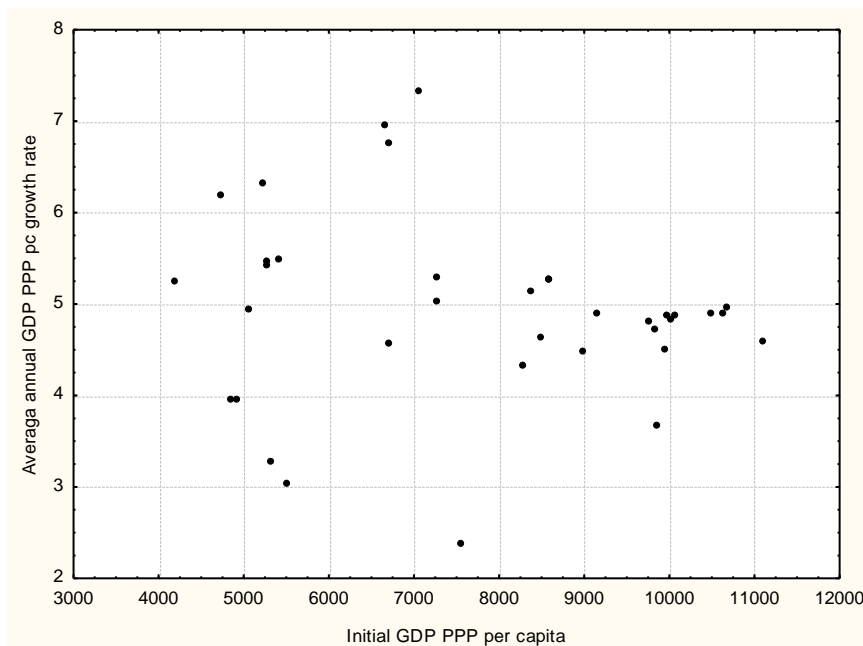
Chart 4. Scatter plot – relationship between GDP PPP pc initial level and average annual GDP PPP per capita growth rates. Lower medium-income countries. Period 1980 – 2008.



Source: own elaboration using data drawn from IMF Economic Outlook Database 2010, IMF 2010. Software STATISTICA 8.

Upper medium-income countries

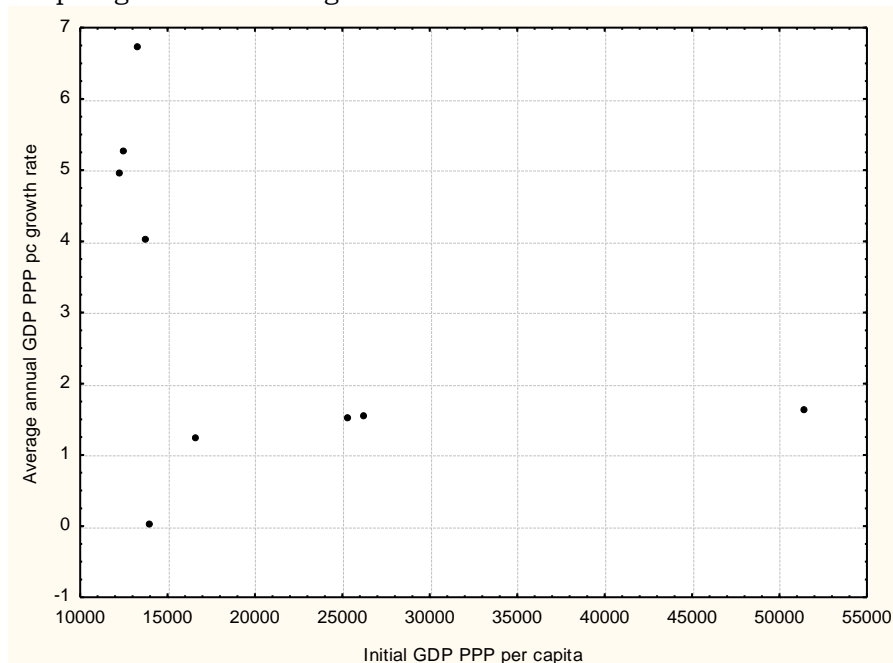
Chart 5. Scatter plot – relationship between GDP PPP pc initial level and average annual GDP PPP per capita growth rates. Upper medium-income countries. Period 1980 – 2008



Source: own elaboration using data drawn from IMF Economic Outlook Database 2010, IMF 2010. Software STATISTICA 8.

High income countries

Chart 6. Scatter plot – relationship between GDP PPP pc initial level and average annual GDP PPP per capita growth rates. High-income countries. Period 1980 – 2008



Source: own elaboration using data drawn from IMF Economic Outlook Database 2010, IMF 2010. Software STATISTICA 8.

The summary statistics for the 4 country groups are presented in table 3 (see below).

Table 3. Correlation coefficients and p-values for country groups. Relationship between GDP PPP per capita in the year 1980 and average annual GDP PPP per capita in the period 1980 – 2008.

Country group	Correlation coefficient (r)	p-value	Number of countries
Low-income countries (I)	(-0,3107)	0,0378	45
Lower medium-income countries (II)	(- 0,0454)	0,7545	50
Upper medium-income countries (III)	(- 0,133)	0,4394	36
High-income countries (IV)	(- 0,4266)	0,2522	9

Source: own estimations.

As can be concluded from the results in table 3, in each case the correlation coefficients are negative and relatively low. In the group II the results are the worst and the *p-value* indicates no statistical significance of the them. In the group IV, the *r-values* are relatively high, but still not statistically significant. In 3 out of 4 cases the results are not statistically significant.

To draw general conclusions – in the period 1980 – 2008, no statistically significant relationship between GDP PPP per capita and growth rates can be observed. The correlations coefficients are low, and in most of case statistically insignificant (as *p-values* are higher than 0,05). On such basis it is extremely difficult to confirm the hypothesis that in low income countries the GDP growth rates are high, and that the strong correlation between the two variables can be detected.

In the final section of the paper, the author analyses the relationship between GDP

PPP per capita and some social indicators, as well as the Human Development Index.

GDP growth and social progress – statistical analysis

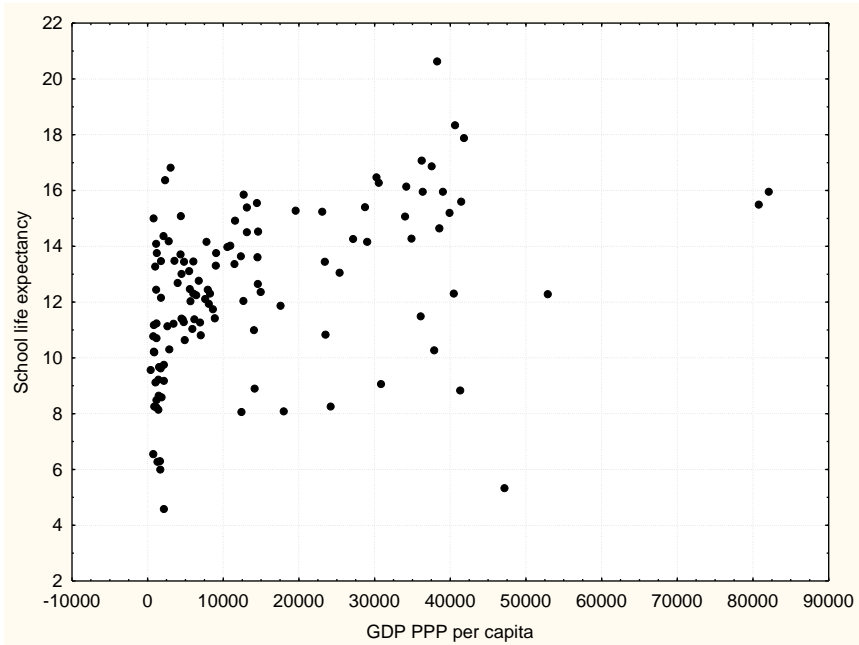
In the final section, there are presented results of statistical analysis concerning both purely income and social progress aspects. The author verifies whether there is any relationship between GDP PPP value (and alternatively GDP growth rates) and social indicators, as well as Human Development Index. The author has arbitrary chosen: school life expectancy (in years), infant mortality rate, adult literacy rate (for persons of minimum age of 15 years).

In 3 sequent charts (chart 7,8,9), there are presented results of the statistical analysis between the three social indicators. In the table 4, the summary statistics are put.

a. School life expectancy and GDP PPP per capita in 2008.

The data applied are drawn from United Nation databases and IMF Economic Outlook 2010. The country set compiles from 122 cases. Full data set is reported in Annex 2.

Chart 7. Scatter plot for relationship between school life expectancy and GDP PPP per capita in 2008. 122 countries.

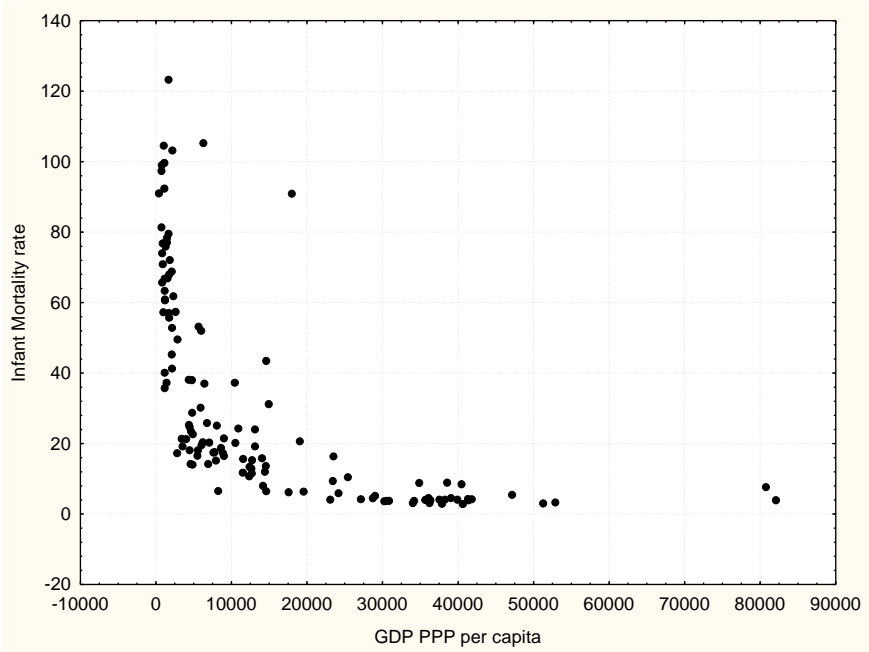


Source: own elaboration using Software STATISTICA 8.

b. Infant mortality rate and GDP PPP per capita in 2008.

The data applied are drawn from United Nation databases and IMF Economic Outlook 2010. The country set compiles from 129 cases. Full data set is reported in Annex 3.

Chart 8. Scatter plot for relationship between infant mortality rate and GDP PPP per capita in 2008. 122 countries.

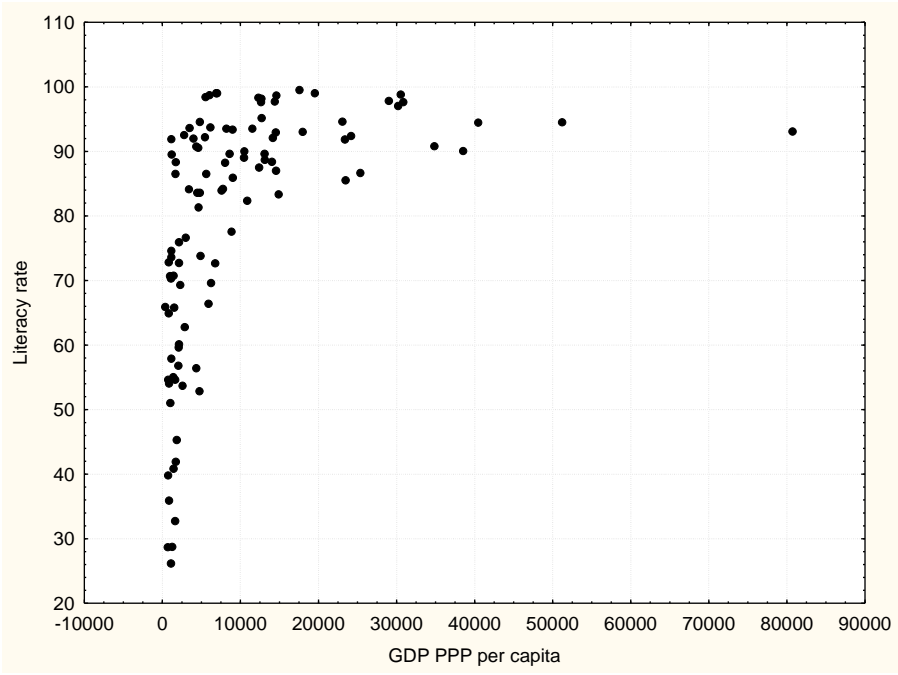


Source: own elaboration using Software STATISTICA 8.

c. Adult literacy rate and GDP PPP per capita in 2008.

The data applied are drawn from United Nation databases and IMF Economic Outlook 2010. The country set compiles from 103 cases. Full data set is reported in Annex 4.

Chart 9. Scatter plot for relationship between adult literacy rate and GDP PPP per capita in 2008. 103 countries.



Source: own elaboration using Software STATISTICA 8.

In table 4, the author has collected results of all three analysis.

Table 4. Statistical relationship between selected social indicators and GDP PPP per capita. Year 2008.

Relationship	Correlation coefficient	<i>p-value</i>
School life expectancy vs. GDP PPP per capita	R = 0,4138	p-value = 0,000
Infant mortality rate vs. GDP PPP per capita	R = - 0,6098	p-value = 0,000
Adult literacy rate vs. GDP PPP per capita	R = 0,4801	p-value = 0,000

Source: own calculations.

As we can conclude from the results presented in the table 4 (above), there are some significant statistical relationships between selected social indicators and GDP per capita. The correlation coefficients are rather high in each case, and in case of infant mortality rates the $r = -0,6098$. The r is also negative which indicates that higher GDP PPP per capita states for lower infant mortality. In all three cases the *p-values* are zero, which proofs statistical significance of the estimations. In the first case (school life expectancy), the relationship is the weakest and the point on the chart are highly scattered. The highest density is observed in the interval of income (0 – 10.000) PPP Dollars. We can find within countries where school life expectancy vary from 4 to 16 years. That proofs a great diversity of countries within this income group. In countries with higher per capita income, the school life expectancy is also highly scattered but the differences are not visibly. This – on the other side – proofs relatively higher cohesion among these economics. However the results are the lowest (out of the 3 presented), they are still statistically significant.

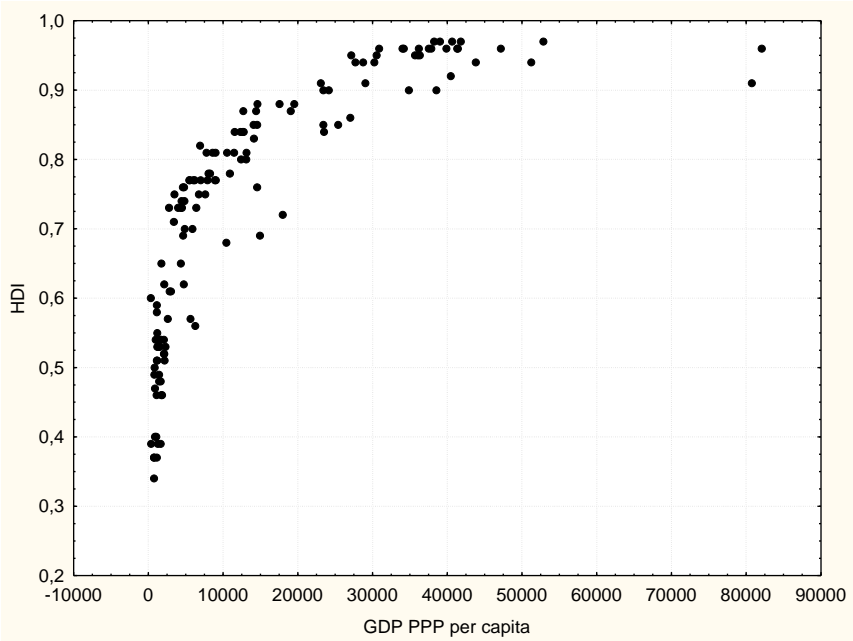
In the case of infant mortality, the correlation coefficient is negative but rather high. This proofs that GDP per capita influences positively reduction in infant mortality. The highest divergence we observe once again within the country group of relatively low per capita income – between 0 and 10.000 PPP Dollars. The diversification of countries within the group is substantial. There countries with infant mortality close to zero (Thailand – 7 per 1000 live births), but also with the highest one – the case of Chad where we count for 120 infant deaths per 1000 live births. In countries where per capita income is over 20.000 PPP Dollars, the infant mortality is no higher than 20 infant deaths per 1000 live births. As we can also conclude from the chart 8, in high-income economies there is no such strong relation between GDP PPP per capita and infant mortality like in lower income countries.

Finally, in the last case of adult literacy rate, the $r = 0,48$, and *p-value* = 0,000. That proofs that these results indicate relatively high relationship between the two variables and its statistical significance. Again in the low-income country group the points are pretty scattered which suggests high diversification of countries within the income group. In countries with per capita income higher than 20.000 PPP Dollars, the adult literacy is no lower than 80%. Like in the previous cases, the higher per capita income enables better achievements on broadly understandable social ground.

As the final analysis, the author correlates GDP PPP per capita in 2008 with values of Human Development Index. The estimation is reported for 135 economies. All data were drawn from Human Development Report 2010 and IMF Economic Outlook Database 2010. The main purpose of the analysis it find the strength of the relationship between GDP PPP per capita and HDI values in the year 2008. The GDP PPP constitutes a part of HDI, but as it is solely less than 30%, the possibility of high autocorrelation is rejected.

In the chart 10 (see below), there is presented statistical relationship between HDI and GDP PPP per capita in the year 2008.

Chart 10. Scatter plot for relationship between HDI and GDP PPP per capita in 2008. 135 countries.



Source: own elaboration using Software STATISTICA 8.

Analyzing the points distribution on the chart 10, we can say that there the two variables are highly correlated. The $r = 0,7697$ and the $p\text{-value} = 0,000$. That proofs high statistical relationship and its statistical significance. Again the low income country group is strongly diversified. We can find that countries with very low HDI value – for Niger the HDI = 0,34, as well as countries with rather high HDI – like for example Colombia, Ecuador or Peru where GDP PPP per capita is still below 10.000 PPP Dollars. Countries where HDI is at very high level, the per capita income is highly diversified. That suggest that in high-income countries the GDP growth has no substantial significance for basic well being improvement.

Conclusions

The main purpose of the study was to present some basic results on the global GDP PPP per capita growth trends and distribution. As we can conclude from the first part of the paper, the GDP growth rates among countries are highly uneven. Also the author has not found any confirmation of the hypothesis of the catching up process. There is no statistical relationship between initial GDP PPP per capita and average annual GDP growth rates. Countries with low GDP per capita should potentially enjoy faster GDP growth than high-income countries. However such relationship was not detected. Secondly the author has analyzed existing statistical relationships between 3 arbitrary selected social indicators and Human Development Index vs. GDP PPP per capita in the year 2008. In each case there were found some statistically significant relationships. Also the correlation coefficients were relatively high. Surely it is not fully justified to state that GDP growth enhances directly increase in value of social indicators. It is highly possible that there exist causal chains between these variables, but the visible outcomes of economic growth can be revealed in long-time perspective. What can be concluded from the analysis in low-income countries (countries where GDP PPP per capita is lower than 10 000 PPP Dollars), these economies are highly diversified. In the same country group there countries with comparable per capita income level and – at the same time – extremely high differences in values of social indicators. That proofs that in low-income countries the influence of variables different from GDP is very high and significant.

However, in the period 1980 – 2008, the statistical relationships among the variables applied in the study are not very strong, we need to take into account that GDP value and growth often plays a crucial role in country`s possibility to improve general well-being. GDP

growth is perceived as a prerequisite to increase overall society's welfare.

Comprehension Check

- 1) Explain how we can compare national welfare across countries.
- 2) Explain the role GDP growth in generating human welfare.
- 3) Chose two different countries – one low income and another one high income. Try to compare their GDP growth and overall level of society's welfare. Chose adequate variables and try to explain the differences in their level.
- 4) Using statistics of Penn World Tables, prepare a complete study on GDP growth over time in as many countries as possible.
- 5) Learn more about the catching up hypothesis. Find and explain some statistics according to the concept.

Recommended Readings

- 1) Fei C.H. John, Ranis G., (1999), Growth and development from an evolutionary perspective, Blackwell Publishing, UK.
- 2) Grandville de la, Oliver, (2009), Economic growth. A unified approach. Cambridge University Press, UK.
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- 4) Mookherjee D., Ray D., (2002), Readings in the Theory of Economic Development, Blackwell Publishing, UK.
- 5) Wolff N.E., (2009), Poverty and Income Distribution, Wiley-Blackwell, UK.

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9. Owen D.L., Videras J., (2008), Do all countries follow the same growth process? MPRA Paper No. 11589.
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ANNEX 1. GDP PPP per capita. Years 1980 and 2008.

Country	GDP PPP per capita level in 1980	GDP PPP per capita level in 2008	Country	GDP PPP per capita level in 1980	GDP PPP per capita level in 2008
Albania	1845	6911	Kuwait	26325	40470
Algeria	2535	6761	Lao P. D. R.	341	2138
Angola	1980	6267	Lebanon	5319	13104
Antigua and Barbuda	3073	19031	Lesotho	313	1210
Argentina	4857	14410	Libya	13970	14068

Australia	10081	38245	Luxembourg	13329	82092
Austria	10488	39889	Madagascar	607	997
The Bahamas	9859	27025	Malawi	338	815
Bahrain	9148	34868	Malaysia	2350	14149
Bangladesh	301	1414	Maldives	656	5560
Barbados	6719	23417	Mali	348	1129
Belgium	9759	36339	Malta	5431	24167
Belize	1446	7942	Mauritania	751	2086
Benin	568	1430	Mauritius	1886	12401
Bhutan	448	4760	Mexico	4926	14545
Bolivia	1930	4352	Morocco	1147	4367
Botswana	1772	14925	Mozambique	199	886
Brazil	3741	10525	Myanmar	163	1152
Bulgaria	3697	12337	Nepal	265	1159
Burkina Faso	342	1279	Netherlands	10686	41322
Burundi	203	390	New Zealand	8286	27139
Cameroon	1027	2142	Niger	461	735
Canada	11109	39031	Nigeria	693	2164
Cape Verde	572	3417	Norway	12558	52870
C. African Rep.	429	739	Oman	4729	25380
Chad	400	1660	Pakistan	596	2617
Chile	2824	14607	Panama	2744	11532
China	250	6187	Papua New G.	869	2095
Colombia	2446	8995	Paraguay	1916	4793
Comoros	552	1158	Peru	2963	8606
Congo D.R.	372	327	Philippines	1247	3514
Rep. of Congo	1392	3924	Poland	4205	17581
Côte d'Ivoire	1135	1644	Portugal	5269	23081
Cyprus	5227	29022	Qatar	51420	80760
Denmark	10028	37511	Romania	3615	12644
Dominican Rep.	1849	8062	Rwanda	369	1122
Ecuador	2597	7774	Samoa	1536	6039
Egypt	1293	5904	São Tomé and Príncipe	850	1753
El Salvador	2120	7608	Saudi Arabia	16654	23495
Equat. Guinea	470	17980	Senegal	680	1757
Ethiopia	294	881	Seychelles	5284	23426
Fiji	1381	4460	Sierra Leone	585	769
Finland	8598	36205	Singapore	7069	51246
France	9958	34177	Solomon Isl.	1532	3019
Gabon	7565	14580	South Africa	3927	10454
The Gambia	786	1840	Spain	7280	30858
Germany	9834	35655	Sri Lanka	750	4594
Ghana	448	1520	St. Kitts and Nevis	2221	14237
Greece	8509	30227	St. Lucia	2250	10723
Grenada	1998	11478	St. Vincent and the Grenadines	1453	10144
Guatemala	2255	4882	Sudan	592	2312
Guinea-Bissau	596	1049	Swaziland	1172	5646
Guyana	2096	6425	Sweden	9984	37877
Haiti	831	1181	Switzerland	13748	41404
Honduras	1608	4476	Syria	1669	4821
Hong Kong	6664	43816	Tanzania	412	1355
Hungary	5062	19544	Thailand	1089	8242
Iceland	10642	40634	Togo	610	822
India	415	2867	Tonga	1140	7030
Indonesia	726	3985	Tunisia	1888	8890
Iran	2973	10907	Turkey	2756	13123
Ireland	6711	41827	Uganda	274	1158
Israel	7278	28714	Un. Arab Emir.	25402	38556
Italy	8993	30558	United Kingdom	8601	36078
Jamaica	3115	9019	United States	12249	47155
Japan	8377	33996	Uruguay	3430	12704
Jordan	1964	5491	Vanuatu	1828	4650
Kenya	665	1700	Venezuela	5515	12733
Kiribati	2331	6019	Vietnam	299	2800
Korea	2301	27716	Zambia	845	1462

Source: Own compilation based on data drawn from IMF Economic Outlook Database 2010,

IMF 2010.

ANNEX 2. School life expectancy and GDP PPP per capita. Year 2008.

Country	School life expectancy (years)	GDP PPP per capita	Country	School life expectancy (years)	GDP PPP per capita
Albania	11	6911	Kuwait	12	40470
Algeria	13	6761	Lao P. D. R.	9	2138
Argentina	16	14410	Lebanon	15	13104
Australia	21	38245	Lesotho	14	1210
Austria	15	39889	Libya	11	14068
Bahrain	14	34868	Luxembourg	16	82092
Bangladesh	8	1414	Madagascar	13	997
Belgium	16	36339	Malawi	10	815
Belize	12	7942	Malaysia	9	14149
Benin	9	1430	Maldives	12	5560
Bhutan	11	4760	Mali	12	1129
Bolivia	14	4352	Malta	8	24167
Botswana	12	14925	Mauritania	14	2086
Brazil	14	10525	Mauritius	8	12401
Bulgaria	14	12337	Mexico	14	14545
Burkina Faso	6	1279	Morocco	15	4367
Burundi	10	390	Mozambique	10	886
Cameroon	10	2142	Myanmar	8	1152
Canada	16	39031	Nepal	8	1159
Cape Verde	11	3417	Netherlands	9	41322
C. African Rep.	7	739	New Zealand	14	27139
Chad	6	1660	Niger	11	735
Chile	15	14607	Nigeria	5	2164
China	11	6187	Norway	12	52870
Colombia	13	8995	Oman	13	25380
Comoros	11	1158	Pakistan	11	2617
Côte d'Ivoire	6	1644	Panama	15	11532
Cyprus	14	29022	Paraguay	13	4793
Denmark	17	37511	Peru	12	8606
Dominican Rep.	12	8062	Philippines	13	3514
Ecuador	14	7774	Poland	12	17581
Egypt	11	5904	Portugal	15	23081
El Salvador	12	7608	Qatar	15	80760
Equat. Guinea	8	17980	Romania	12	12644
Ethiopia	8	881	Rwanda	14	1122
Fiji	13	4460	Samoa	13	6039
Finland	17	36205	Sao Tome and Principe	12	1753
France	16	34177	Saudi Arabia	11	23495
Gabon	13	14580	Senegal	13	1757
Gambia	9	1840	Seychelles	13	23426
Ghana	10	1520	Sierra Leone	15	769
Greece	16	30227	Solomon Isl.	17	3019
Grenada	13	11478	Spain	9	30858
Guatemala	11	4882	Sudan	16	2312
Guinea-Bissau	9	1049	Swaziland	12	5646
Guyana	12	6425	Sweden	10	37877
Honduras	11	4476	Switzerland	16	41404
Hungary	15	19544	Thailand	12	8242
Iceland	18	40634	Togo	11	822
India	10	2867	Tonga	11	7030
Indonesia	13	3985	Tunisia	11	8890
Iran	14	10907	Turkey	15	13123
Ireland	18	41827	Uganda	11	1158
Israel	15	28714	Un. Arab Emir.	15	38556
Italy	16	30558	United Kingd.	11	36078
Jamaica	14	9019	United States	5	47155
Japan	15	33996	Uruguay	16	12704
Jordan	13	5491	Vanuatu	11	4650
Kenya	10	1700	Viet Nam	14	2800
Kiribati	12	6019	Zambia	9	1462

Source: Own compilation based on data drawn from IMF Economic Outlook Database 2010, and United Nation database.

ANNEX 3. Infant mortality rate and GDP PPP per capita. Year 2008.

Country	Infant mortality rate	GDP PPP per capita	Country	Infant mortality rate	GDP PPP per capita
Albania	14	6911	Kuwait	9	40470
Algeria	26	6761	Lao P. D. R.	41	2138
Angola	105	6267	Lebanon	19	13104
Antigua and Barbuda	21	19031	Lesotho	61	1210
Argentina	12	14410	Libya	16	14068
Australia ¹	4	38245	Luxembourg	4	82092
Austria	4	39889	Madagascar	57	997
Bahrain	9	34868	Malawi	74	815
Bangladesh	37	1414	Malaysia	8	14149
Barbados	9	23417	Maldives	18	5560
Belgium	4	36339	Mali	100	1129
Belize	15	7942	Malta	6	24167
Benin	77	1430	Mauritania	69	2086
Bhutan	38	4760	Mauritius ⁷	13	12401
Bolivia	38	4352	Mexico	14	14545
Botswana	31	14925	Morocco	25	4367
Brazil	20	10525	Mozambique	77	886
Bulgaria	11	12337	Myanmar	63	1152
Burkina Faso	76	1279	Nepal	36	1159
Burundi	91	390	Netherlands	4	41322
Cambodia	53	2142	New Zealand	4	27139
Canada	5	39031	Niger	81	735
Cape Verde	21	3417	Nigeria	103	2164
C.African Rep.	97	739	Norway ⁸	3	52870
Chad	123	1660	Oman	11	25380
Chile	6	14607	Pakistan	57	2617
China ³	20	6187	Panama	16	11532
Colombia	17	8995	Papua New G.	45	2095
Comoros	40	1158	Paraguay	29	4793
Côte d'Ivoire	80	1644	Peru	19	8606
Cyprus	5	29022	Philippines	19	3514
Denmark	4	37511	Poland	6	17581
Dominican Rep.	25	8062	Portugal	4	23081
Ecuador	18	7774	Qatar	8	80760
Egypt	30	5904	Romania	13	12644
El Salvador	18	7608	Rwanda	92	1122
Equat. Guinea	91	17980	Samoa	20	6039
Ethiopia	71	881	Sao Tome and Principe	68	1753
Fiji	18	4460	Saudi Arabia	16	23495
Finland ⁶	3	36205	Senegal	56	1757
France	4	34177	Sierra Leone	99	769
Gabon	43	14580	Singapore	3	51246
Gambia	72	1840	South Africa	37	10454
Germany	4	35655	Spain	4	30858
Ghana	67	1520	Sri Lanka	14	4594
Greece	4	30227	Sudan	62	2312
Grenada	12	11478	Swaziland	53	5646
Guatemala	23	4882	Sweden	3	37877
Guinea-Bissau	105	1049	Switzerland	4	41404
Guyana	37	6425	Syria	14	4821
Haiti	61	1181	Thailand	7	8242
Honduras	25	4476	Togo	66	822
Hungary	6	19544	Tonga	20	7030
Iceland	3	40634	Tunisia	17	8890
India	50	2867	Turkey	24	13123
Indonesia	21	3985	Uganda	67	1158
Iran	24	10907	U. Arab Emir.	9	38556
Ireland	4	41827	United King.	5	36078
Israel	4	28714	United States	6	47155
Italy	4	30558	Uruguay	12	12704

Jamaica	21	9019	Vanuatu	23	4650
Japan	3	33996	Venezuela	15	12733
Jordan	17	5491	Viet Nam	17	2800
Kenya	57	1700	Zambia	78	1462
Kiribati	52	6019			

Source: Own compilation based on data drawn from IMF Economic Outlook Database 2010, and United Nation database.

ANNEX 4. Adult literacy rate and GDP PPP per capita. Year 2008.

Country	Adult literacy rate	GDP PPP per capita	Country	Adult literacy rate	GDP PPP per capita
Albania	99	6911	Malawi	73	815
Algeria	73	6761	Malaysia	92	14149
Angola	70	6267	Maldives	98	5560
Argentina	98	14410	Mali	26	1129
Bahrain	91	34868	Malta	92	24167
Bangladesh	55	1414	Mauritania	57	2086
Benin	41	1430	Mauritius	88	12401
Bhutan	53	4760	Mexico	93	14545
Bolivia	91	4352	Morocco	56	4367
Botswana	83	14925	Mozambique	54	886
Brazil	90	10525	Myanmar	92	1152
Bulgaria	98	12337	Nepal	58	1159
Burkina Faso	29	1279	Niger	29	735
Burundi	66	390	Nigeria	60	2164
Cameroon	76	2142	Oman	87	25380
Cape Verde	84	3417	Pakistan	54	2617
C. African Rep.	55	739	Panama	94	11532
Chad	33	1660	Papua New G.	60	2095
Chile	99	14607	Paraguay	95	4793
China	94	6187	Peru	90	8606
Colombia	93	8995	Philippines	94	3514
Comoros	74	1158	Poland	100	17581
Côte d'Ivoire	55	1644	Portugal	95	23081
Cyprus	98	29022	Qatar	93	80760
Dominican R.	88	8062	Romania	98	12644
Ecuador	84	7774	Rwanda	70	1122
Egypt	66	5904	Samoa	99	6039
El Salvador	84	7608	Sao Tome and Principe	88	1753
Equat. Guinea	93	17980	Saudi Arabia	86	23495
Ethiopia	36	881	Senegal	42	1757
Gabon	87	14580	Seychelles	92	23426
Gambia	45	1840	Sierra Leone	40	769
Ghana	66	1520	Singapore	95	51246
Greece	97	30227	Solomon Isl.	77	3019
Guatemala	74	4882	South Africa	89	10454
Guinea-Bissau	51	1049	Spain	98	30858
Honduras	84	4476	Sri Lanka	91	4594
Hungary	99	19544	Sudan	69	2312
India	63	2867	Swaziland	87	5646
Indonesia	92	3985	Syria	84	4821
Iran	82	10907	Thailand	94	8242
Italy	99	30558	Togo	65	822
Jamaica	86	9019	Tonga	99	7030
Jordan	92	5491	Tunisia	78	8890
Kenya	87	1700	Turkey	89	13123
Kuwait	94	40470	Uganda	75	1158
Lao P. D. R.	73	2138	U. Arab Emir.	90	38556
Lebanon	90	13104	Uruguay	98	12704
Lesotho	90	1210	Vanuatu	81	4650
Libya	88	14068	Venezuela	95	12733
Madagascar	71	997	Viet Nam	93	2800
			Zambia	71	1462

Source: Own compilation based on data drawn from IMF Economic Outlook Database 2010, and United Nation database.

ANNEX 5. Human Development Index and GDP PPP per capita. Year 2008.

Country	HDI	GDP PPP per capita	Country	HDI	GDP PPP per capita
Albania	0,82	6911	Korea Rep.	0,94	27716
Algeria	0,75	6761	Kuwait	0,92	40470
Angola	0,56	6267	Lao P. D. R.	0,62	2138
Antigua and Barbuda	0,87	19031	Lebanon	0,8	13104
Argentina	0,87	14410	Lesotho	0,51	1210
Australia	0,97	38245	Libya	0,85	14068
Austria	0,96	39889	Luxembourg	0,96	82092
Bahamas	0,86	27025	Madagascar	0,54	997
Bahrain	0,9	34868	Malawi	0,49	815
Bangladesh	0,54	1414	Malaysia	0,83	14149
Barbados	0,9	23417	Maldives	0,77	5560
Belgium	0,95	36339	Mali	0,37	1129
Belize	0,77	7942	Malta	0,9	24167
Benin	0,49	1430	Mauritania	0,52	2086
Bhutan	0,62	4760	Mauritius	0,8	12401
Bolivia	0,73	4352	Mexico	0,85	14545
Botswana	0,69	14925	Morocco	0,65	4367
Brazil	0,81	10525	Mozambique	0,4	886
Bulgaria	0,84	12337	Myanmar	0,59	1152
Burkina Faso	0,39	1279	Nepal	0,55	1159
Burundi	0,39	390	Netherlands	0,96	41322
Cameroon	0,52	2142	New Zealand	0,95	27139
Canada	0,97	39031	Niger	0,34	735
Cape Verde	0,71	3417	Nigeria	0,51	2164
C. African Rep.	0,37	739	Norway	0,97	52870
Chad	0,39	1660	Oman	0,85	25380
Chile	0,88	14607	Pakistan	0,57	2617
China	0,77	6187	Panama	0,84	11532
Colombia	0,81	8995	Papua New G.	0,54	2095
Comoros	0,58	1158	Paraguay	0,76	4793
Congo	0,6	327	Peru	0,81	8606
Côte d'Ivoire	0,48	1644	Philippines	0,75	3514
Cyprus	0,91	29022	Poland	0,88	17581
Denmark	0,96	37511	Portugal	0,91	23081
Dominican Rep.	0,78	8062	Qatar	0,91	80760
Ecuador	0,81	7774	Romania	0,84	12644
Egypt	0,7	5904	Rwanda	0,46	1122
El Salvador	0,75	7608	Samoa	0,77	6039
Equatorial Guinea	0,72	17980	Sao Tome and Principe	0,65	1753
Eritrea	0,47	881	Saudi Arabia	0,84	23495
Fiji	0,74	4460	Senegal	0,46	1757
Finland	0,96	36205	Seychelles	0,85	23426
France	0,96	34177	Sierra Leone	0,37	769
Gabon	0,76	14580	Singapore	0,94	51246
Gambia	0,46	1840	Solomon Islan.	0,61	3019
Germany	0,95	35655	South Africa	0,68	10454
Ghana	0,53	1520	Spain	0,96	30858
Greece	0,94	30227	Sri Lanka	0,76	4594
Grenada	0,81	11478	Sudan	0,53	2312
Guatemala	0,7	4882	Swaziland	0,57	5646
Guinea-Bissau	0,4	1049	Sweden	0,96	37877
Guyana	0,73	6425	Switzerland	0,96	41404
Haiti	0,53	1181	Syria	0,74	4821
Honduras	0,73	4476	Tanzania	0,53	1355
Hong Kong	0,94	43816	Thailand	0,78	8242
Hungary	0,88	19544	Togo	0,5	822
Iceland	0,97	40634	Tonga	0,77	7030
India	0,61	2867	Tunisia	0,77	8890
Indonesia	0,73	3985	Turkey	0,81	13123
Iran	0,78	10907	Uganda	0,51	1158
Ireland	0,97	41827	U. Arab Emir.	0,9	38556
Israel	0,94	28714	United King.	0,95	36078
Italy	0,95	30558	United States	0,96	47155
Jamaica	0,77	9019	Uruguay	0,87	12704

Japan	0,96	33996	Vanuatu	0,69	4650
Jordan	0,77	5491	Venezuela	0,84	12733
Kenya	0,54	1700	Viet Nam	0,73	2800
			Zambia	0,48	1462

Source: Own compilation based on data drawn from IMF Economic Outlook Database 2010, and United Nation database.