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HUMAN DEVELOPMENT: A KEY DRIVER OF SOCIOECONOMIC DEVELOPMENT IN EU

Abstract:

This paper examines the economic development drivers and the ones of the social development in order to check if there is a potential trade-off between these development forms at the level of European Union, with a focus on human development and technological progress. In this context, I have used panel yearly data covering the period 2010-2018 for EU Member States. Both models were estimated using Panel Estimated Generalized Least Squares and some weighting options as Period SUR and Cros-section weights. However, the specificities of the data led to a different application of the methods in the case of the mentioned models. In this regard, I have run a Fixed Effects Model in studying the determinants of economic development and a None Effects Model when analysing the drivers of social development. The main results of the paper showed a positive relationship between human development and social and economic development. In adition, the study estimated a positive impact of ITC sector on economic development and a negative one on the poverty rate. However, the negative impact of ITC on social development is quite low and it may also include a positive impact on poverty (lower than the one manifested through the opportunities channel) exercised by automation, but this needs to be further explored. Both models provided feasible results which strengthens the confidence in the examined relationships.

Keywords:

human development, growth, poverty, panel, European Union

JEL Classification: O15, C33, P46

Introduction

Economic development is one of the most important forms of development, but in some cases, this process is not sustainable and causes social imbalances or is based on an economic structure that drives ecological degradation. In this context, studying the factors that stimulate economic development, but limit social development becomes very important. European Union is trying to implement a new vision through the objectives of sustainable development that will generate balanced evolutions at the level of all forms of development.

The motivation for choosing the theme lies in the important debates that take place on the concept of sustainable development and the potential trade-offs between some forms of development. At the level of economist communities, some researchers support the negative social effects of technology, while other economists believe that technology generates positive externalities for society. In this context, studying these concepts becomes all the more interesting as the literature in the field does not provide clear and consistent evidences. Given this aspect, many economists recommend stimulating the process of human development, as a means of identifying a balance between these two forms of development, which further motivates the studies on economic and social development from the perspective of human development.

The objective of this paper is to estimate the impact of the determinants of poverty rate in European Union, as well as the effects of the economic development drivers.

In principle, this objective is achieved by meeting the following specific objectives:

a) Determining the impact of human development on economic and social development;
b) Determining the impact of technological development on economic and social development;
c) Identifying other control variables of economic and social development;
d) Checking the validity of the estimators from a statistical point of view.

Literature review

The literature in this field it is very extensive. Many authors elaborated analyses on the determinants of development forms, among them being Hudakova (2018), which assessed the correlation between the human development index and GDP per capita in the Visegrad group of countries (Slovakia, Czechia, Hungary and Poland) and some Balkan states (Bulgaria, Romania, Slovenia, Croatia) in the period 2000-2015 and found a high correlation between these.

Elistia and Syahzuni (2018) analysed the impact of the human development index on GDP per capita in several East Asian countries in the period 2010-2016, concluding that human development drives several opportunities for economic growth. Also, Ranis et al. (2000) proved that there is a dual causal relationship between human development and economic growth. On the other hand, Islam (1995) analysed the relationship between GDP per capita and human development index in developing countries and noticed that there is a ”∩” relationship between the mentioned variables.

Further, Toader et al. (2018) estimated the impact of technology on economic growth in European Union countries in period 2000-2017, demonstrating that the ICT sector has a strong influence on economic growth in EU countries, but the magnitude of the effect differs on the type of technology used. Besides this, the authors also demonstrated that the unemployment rate, economic openness, government expenditure and foreign direct investment positively influences GDP per capita. The authors also stated that all these factors are an important driver of economic growth in EU.

Zagorchev et al. (2011) examined the impact of the ICT sector on economic growth in eight Central and Eastern European countries in period 1997-2004 and showed that investment in this sector contributes significantly to GDP per capita growth, highlighting the fact that governments should provide incentives for technological development and encourage investment in this sector. Moreover, Yousefi (2011) demonstrated that the ICT sector has a higher impact on GDP per capita growth in middle-income states than the one found in low-income countries, emphasizing that GDP growth is not conditioned by investments in the ICT sector in developing countries. Also, Nasab and Aghaei (2009) showed that there is a significant positive impact of investment in the ICT sector on GDP per capita in the OPEC countries during the period 1990-2007. In addition to these authors, there are other researchers who have shown that there is a direct relationship between telecommunications infrastructure and economic growth, as Roller and Waverman (2001), Datta and Agarwal (2004), Shiu and Lam (2008), respectively Czernich et al. (2011).

Pradhan et al. (2014) found that there is a bidirectional causal relationship between infrastructure development in the ICT sector and long-term economic growth in developed and developing countries. Based on their conclusions, the authors emphasized that policymakers should pay more attention to the telecommunications sector if they want to promote long-term economic growth.

Regarding the degree of pollution, Dang et al. (2020) showed that in the period 1990-2016 in all countries there was a direct relationship between greenhouse gas emissions and GDP per capita. Moreover, Cederborg and Snobohm (2016) examined the same relationship in 69 industrialized countries and found the same conclusion.

On the other hand, Dechezlepretre et al. (2019) demonstrated that if greenhouse gas emissions were to be reduced, GDP per capita would increase more than the growth specific to the case of air pollution. Besides that, Vandenbroucke and Zhu (2017) found that pollution is increasing in line with economic activity, which highlights a positive relationship between them.

European Investment Bank (2019) concluded that investments are one of the main driver of long-term GDP growth in the European Union. Also, Kurecic et al. (2015) demonstrated the existence of a positive correlation between investment and GDP per capita for Central and Eastern European which are in the transition period. This positive correlation was also found in other country cases. In this regard, Hakizimana (2015) analysed the relationship between investment and GDP per capita in Rwanda in period 2008-2012 and discovered a positive relationship between the variables. Simultaneously, Chen and Zhu (2008) also found that there is a direct relationship between investment and growth in China.

Regarding the relationship between the unemployment rate and GDP per capita, Villaverde and Maza (2009) examined the Okun's law for all regions of Spain during the period 1980-2004, finding an inverse relationship between the variables. In addition, Dumitrescu et al. (2009) calculated the correlation between the unemployment rate and real GDP in Romania in the period 2002-2008, demonstrating that when the unemployment rate increases by one percentage point, GDP falls by half of a percentage point. Furthermore, Naji Meidani and Zabihi (2011) analysed this relationship in Iran and found a negative correlation between the variables, this hypothesis being also demonstrated by Kitov and Kitov (2011), the analysis being applied at the level of the United States of America.

Furceri and Zdzienicka (2012) demonstrated that social expenditure in OECD countries has an expansionary effect on GDP per capita, especially in times of crisis. Also, Folster and Henrekson (2001) showed that there is a positive relationship between government expenditure on social protection and GDP in 23 OECD countries. Arjona et al. (2002) confirmed the existence of a positive relationship between government expenditure on social protection and GDP per capita in EU countries and USA. In the case of Central and Eastern European states, this hypothesis was also supported by Dincă and Dincă (2013).

Regarding the relationship between the tax burden and GDP per capita, Stoilova and Patonov (2013) discovered a strong negative relationship between these variables in UE-27, in the period 1995-2010. This was also analysed by Stoilova (2017), which stated that, in the period 1996-2013, taxes were detrimental to economic growth at the level of EU-28 Member States.

In OECD countries, Widmalm (2001), as well as Lee and Gordon (2005) demonstrated a negative relationship between budget revenues accrued from income / corporate taxes and economic growth.

With a view to the economic openness, Huchet-Bourdon et al. (2017) proved that countries exporting high-quality goods are growing faster, while states that specialized in lower quality products are negatively affected from the perspective of economic growth. Silajdzic and Mehic (2018) analysed the impact of economic openness on economic growth in Central and Eastern European countries during the period 1995-2013 and concluded that trade intensification measures are associated with economic growth, considering the advantages of trade integration, through the export channel. Alragas et al. (2016) also found a positive relationship between the economic openness and GDP in 182 countries during the period 1971-2011.

International Growth Centre (2020) stated that the relationship between population growth and GDP per capita is inverse because, according to Thomas Malthus, a high increase in population leads to a reduction in the standard of living. This hypothesis was also supported by Riad and Islam (2016) which used several factors as the level of education, the standard of living, the healthcare expenses and other factors capturing the ecological situation.

Regarding the determinants of the poverty rate, Streeten (1999) stated that human development enables people to have productive and fulfilling lives, by increasing income and improving living standards. Demery (1999) stated that countries with high levels of investment in education, health and nutrition, which have reduced military spending and promoted human development strategies, have succeeded to reduce poverty rate. Arimah (2004) showed that investment in education and health (and other components of the human development index) led to poverty reduction.

According to Mogers (2013) and Narayan et al. (2013), economic growth is not enough to reduce poverty and must be accompanied by sustainable government policies. In this context, Caminada and Goudswaard (2009), Kenworthy (1999) and Behrendt (2000) found an inverse relationship between government expenditure on social protection and poverty rate. Also, Caminada et al. (2011) demonstrated that poverty is influenced by government expenditure on social protection, unemployment rate and GDP per capita. In this regard, Sinn (1995) stated that the purpose of government expenditure on social protection is to increase the well-being of citizens in order to overcome the challenges posed by poverty. Brady (2003) concluded that social policies must be used to eradicate poverty in short and long term, while Spicker (2002) noted that poverty can be eliminated through specific political choices. Therefore, the government must perform various social functions in order to provide to their citizens a minimum standard of living, using tax instruments as welfare tools. Odekon (2015) confirmed that the state must provide a minimum income to citizens in order to reduce poverty.

Even if there is an inverse relationship between the poverty rate and government expenditure on social protection, Anderson et al. (2018) mentioned that the impact between the two variables may fluctuate depending on the expenditure destination, given that some expenses have an immediate impact, such as transfers and grants, and others have visible long-term effects, such as spending on education, health, infrastructure etc.

One of the most vulnerable categories of poverty is the ageing population, people who have no savings or no pension being extremely vulnerable to economic insecurity and the spread of poverty (UNDESA, 2016). In OECD countries, the poverty rate of the people aged 66-75 is 11.2%, and that of the people over the 75 age is 14.7% (UNDESA, 2015). These categories of people also experiencing increasing needs for health care services, given the higher risks they face in terms of falling into the category of poor classes.

Nasar (2014) argued that technology and education increase productivity and incomes, while Deaton (2017) showed that investment in technology and human capital is needed for all countries to grow and to escape from poverty challenges. On the other hand, Jaumotte et al. (2008) found that increasing inequality and poverty is a consequence of technological progress.

Methodology

In this section I described the methods used to estimate the impact of human and technological development on economic development (captured through the GDP per capita indicator, *Model 1*) and on social development (captured in terms of the population at risk of poverty, *Model 2*).

Thus, in both models I used panel data with annual frequency for the period 2010-2018, except for one possible determinant of economic development, namely the percentage change in greenhouse gas emissions, since in this case, I used the period 2010-2017 due to the lack of data for 2018. I chose this period of time to capture the post-economic crisis, a crisis that has emerged from the real estate bubble since the end of 2006 and has turned into an international financial crisis. In this context, data were used for all 28 Member States (in the form of cross-sections) of the EU, taking into account the United Kingdom, given that it is currently in the period of transition in the context of Brexit.

Both models were estimated using the method Estimated Generalized Least Squares (EGLS). In the context of verifying the compatibility with a method for estimating the effects, I have used

Redundant Fixed Effects Test to check the compatibility with the fixed effects method and the Hausman test to check the compatibility with the random effects method. Both tests indicated the use of a Fixed Effects Model. *Model 1* did not faced obstacles in the process of confirming the verisimilitude of the estimators, but in the case of *Model 2*, the residuals proved to be autocorrelated. In order to solve this issue that alters the confirmation of the hypothesis regarding the maximum verisimilitude of the estimators, the method has been changed to one that controls for heteroskedasticity and autocorrelation. In order to be able to implement this option, I used the Period SUR option, but this cannot be applied to a model with fixed effects. The only option is a model without effects, as Cros-section SUR is not compatible with a fixed effects model due to the fact that the number of cross-sections is higher than the number of observations.

Following the processing of data specific to *Model 1*, it has been resulted 196 observations and I have applied the EGLS method on the following equation:

$$gdpcapitaper = \alpha + \beta_0 hdi100_{(-1)} + \beta_1 itcper + \beta_2 ghg + \beta_3 gcfper + \beta_4 unemployment + \beta_5 taxburden + \beta_6 socialprotection_{(-1)} + \beta_7 openness + \beta_8 popchange_{(-1)} + \varepsilon_t \quad (1)$$

where, $gdpcapitaper$ represents the percentage change of real GDP per capita, $hdi100_{(-1)}$ is the human development index multiplied by 100 lagged by 1 year, $itcper$ represents the percentage change of gross value added from ICT sector, ghg reflects the percentage change of greenhouse gas emissions, $unemployment$ is the unemployment rate, $taxburden$ reflects the tax burden expressed as a share of GDP, $socialprotection_{(-1)}$ is the government expenditure on social protection expressed as a share of GDP lagged by 1 year, $openness$ represents the economic opennes [calculated as a share of trade (exports + imports) in GDP)], and $popchange_{(-1)}$ is the percentage change of population lagged by 1 year.

In *Model 2*, I used a number of 224 observations, the structure of the equation on which I applied the EGLS method being the following:

$$povertyrate = \alpha + \beta_0 povertyinwork + \beta_1 hdi100_{(-1)} + \beta_2 socialprotection + \beta_3 itcper_{(-1)} + \beta_4 agedependency + \varepsilon_t \quad (2)$$

where, $povertyrate$ represents people at risk of poverty rate, $povertyinwork$ is reflects the poverty rate among working population, $hdi100_{(-1)}$ is the same indicator from equation (1), $socialprotection$ is government expenditure on social protection expressed as a share of GDP, $itcper_{(-1)}$ represents the percentage change of gross value added from ICT sector lagged by 1 year and $agedependency$ is the age dependency ratio (the share of population aged 0-14 and 65 and more in the population aged between 15-64).

In order to verify the maximum verisimilitude of the estimators and the correctness of the model, I examined the following hypotheses: (i) significance of parameters; (ii) absence of multicollinearity; (iii) absence of heteroskedasticity - Breusch-Pagan-Godfrey test; (iv) absence of autocorrelation - Breusch-Pagan test; (v) the absence of dependence at the level of cross-sections - Breusch-Pagan LM, Pesaran scaled LM, Pesaran CD and Bias-corrected scaled LM tests; (vi) normal distribution of residuals - Jarque-Bera test.

Regarding statistical data sources, it is worth noting that, I have used the statistics provided by the following three main providers of official statistics, as follows:

- Eurostat: percentage change of real GDP per capita, percentage change of greenhouse gas emissions, percentage change of real gross capital formation, unemployment rate, economic openness (using imports, exports and GDP data), percentage change of population, people at risk of poverty rate, in work at risk of poverty rate, government expenditure on social protection (% of GDP), percentage change of gross value added from ICT sector, age dependency ratio;
- United Nations: human development index;
- AMECO database: tax burden (as a % of GDP).

Results and interpretations

In this section, I have analysed the impact of human and technological development on economic and social development in the 28 Member States of the European Union. At the same time, I verified the plausibility of the results obtained after estimating the two models.

Regarding *Model 1*, I calculated the impact of the determinants of the percentage change of GDP per capita, results that were attached in *Figure 1*. As shown in the figure, except for the indicator capturing economic openness, all estimators are statistically significant at 5%. The value of the coefficient of determination (85.691%) indicates the right choice of regressors; regarding the statistical validity of the model, Fisher test confirms this hypothesis taking into consideration its specific probability of 0.00%.

Further, I presented the impact of exogenous variables on economic development. Therefore, according to the results presented, the increase by 1 deviation point of the human development index lagged by 1 year leads to an increase of the actual percentage change of real GDP per capita by 0.403930 pp. This is caused by the fact that human development stimulates economic activity by improving the quality of education and health systems.

The increase by 1 pp of the percentage change of gross value added from ICT sector leads to an increase in the percentage change of real GDP per capita by 0.089063 pp. The ICT sector generates added value to the economy through digitisation and digitalisation, but also through industrial robots that increase productivity, which drives the increase of GDP.

According to the estimates, when percentage change of the greenhouse gas emissions increase by 1 pp, the percentage change of real GDP per capita reacts by increasing with 0.064467 pp. Since the beginning of the first industrial revolution and the migration of the population from the agricultural to the industrial sector, some issues related to air and environmental pollution started to appear. The more the industrial sector grew, greenhouse gas emissions started to increase stronger, which led to a world in which economic activity became dependent, to some extent, on these negative externalities of some economic activities.

Also, an increase by 1 pp of the percentage change of the real gross capital formation leads to an increase by 0.134133 pp percentage change of the real GDP per capita, which can be explained by the fact that new investments generate additional GDP growth (the calculation of GDP using expenditures method is the main argument).

On the other hand, if unemployment rate increase by 1 pp, percentage change of the real GDP per capita decrease by 0.179387 pp. This effect can be argued by the fact that the reduction of the employed population and the increase in the number of unemployed affect the productivity of companies and, implicitly, their gross operating surplus.

Simultaneously, as estimated, the increase of the tax burden by 1 pp leads to a decrease of percentage change of real GDP per capita by 0.356054 pp. Essentially, when taxes increase, companies costs are rising, which leads to a reduction in production and GDP, respectively.

Moreover, when the government expenditure on social protection lagged by 1 year increase by 1 pp, the percentage change of the real GDP per capita increase by 0.260272 pp in current year. Government expenditure on social protection is a part of government expenditure, and its growth also favors the increase of GDP.

Another finding is that the increase by 1 pp of the economic openness leads to an increase in the percentage change of the real GDP per capita by 0.013135 pp. The effect is explained by the fact that the increase in economic openness reflects an increase in exports and imports, exports directly linked to GDP by its calculation formula. On the other hand, although imports have a negative impact on GDP, they facilitate the transfer of know-how and technology and the most part of it is consumed by residents, which favors the increase of GDP.

In addition, when percentage change of population lagged by 1 year increase by 1 pp, the actual percentage change of the real GDP per capita decrease by 0.050299 pp, this being explained by its calculation formula.

Among the exogenous variables used in the model, the highest positive impact was found in the case of human development index lagged by one year, which shows that human development has a high contribution to economic development. On the other hand, the highest negative impact was identified in the case of the tax burden, fiscal policy being an important tool for designing the economic cycle.

By the way, in *Model 2*, I calculated the impact of the determinants of the poverty rate (*Figure 2*) and I obtain significant coefficients at 5%, excepting the percentage change of gross value added from ITC sector, which is significant at 10%. The coefficient of determination proves that the selected exogenous variables explain 57.47% from the evolution of the people at risk of poverty rate. The statistical validity of the model has been confirmed given that the specific probability of the Fisher test is less than 5% (0.00%).

Further, I maintained the approach followed in the case of Model 1 and I presented how exogenous variables influence the poverty rate. Thus, when the poverty rate among occupied population increase by 1 pp, poverty rate reacts by increasing with 0.624220 pp, which highlights the important dimension of this component.

On the other hand, the increase by 1 deviation point of the human development index lagged by one year leads to a decrease of people at risk of poverty rate by 0.170268 pp. If the quality of the health sector improves and educational outcomes are on an upward trajectory, the number of people at risk of poverty will decrease as a result of the capacity of human capital to reduce the gap between social status.

Also, when the government expenditure on social protection increase by 1 pp, the poverty rate reacts by decreasing with 0.245144 pp. Government expenditure on social protection have the role of helping certain groups of disadvantaged people (the elderly, children, people with disabilities) and providing benefits to such categories of people can help them escaping from poverty.

I have also found that the increase of the percentage change of gross value added from ICT sector lagged by 1 year by 1 pp leads to a decrease of the actual poverty rate by 0.010055 pp. This effect can be explained by the fact that technology, among other positive externalities, gives citizens faster access to information, which can generate new opportunities for the population, including for people in the lower or middle classes, the main opportunities being related to new jobs, training programs etc. However, technology can increase access to education, but it must take into account that there are other components of technological development, such as automation, which limits the usefulness of working population, this being also the reason why the impact of technology on poverty reduction is quite low, since there is another component of it, which increases poverty, even if, its specific impact is much lower in this case.

On the other hand, if the age dependency ratio increase by 1 pp, the people at risk of poverty rate increase by 0.171748 pp, which can be explained by the fact that social benefits received by the elderly and children cannot compete with wages or other forms of income earned by the employed population. Thus, a higher share of pensioners and children in the total population will also lead to an increase in the poverty rate.

In this case, the greatest positive impact on the dependent variable is exercised by the poverty rate among occupied population. On the other hand, government expenditure on social protection % of GDP have the strongest negative impact on the endogenous variable, given that these incentives help the vulnerable groups to escape from poverty (however, the discussion on their efficiency could be further extended).

In the case of both models, Breusch-Pagan-Godfrey test confirms their homoskedastic feature (BPG probability - 37.13% - *Model 1*; BPG probability - 13.90% - *Model 2*). In order to verify the autocorrelation of the residuals, I used Breusch-Pagan test which indicates the absence of autocorrelation (BP probability - 6.33% - *Model 1*; BP probability - 23.20% - *Model 2*).

Regarding the testing of the normality of the residuals, I used Jarque-Bera test for *Model 1* and *Model 2* (*Figure 3* and *Figure 4*). In the case of both models, the associated probability Jarque-Bera test was greater than 5% (*Model 1* - 12.71%; *Model 2* -26.43%), which confirms that the errors are normally distributed.

In addition, in the case of *Model 1*, *2* of the 4 tests performed confirmed the hypothesis of no cross-section dependence, while, in the case of *Model 2*, this hypothesis was confirmed by all the tests performed (*Table 1*). However, it should be noted that the Breusch-Pagan LM test, which checks the cross-section dependence hypothesis does not provide appropriate results if the time period on each cross-section is less than the number of cross-sections, a reason for which I focused my attention on the results provided by the other tests (Pesaran scaled LM, Pesaran CD and Bias-corrected scaled LM, the application of the latter is possible only in the case of a fixed effects model).

Finally, Pearson correlation coefficients between independent variables were found to be lower than the coefficient of determination, which demonstrates the absence of multicollinearity. In this context, it was confirmed the statistical validity of the estimates and the maximum verisimilitude of the coefficients.

Figure 1. Model 1 estimation using the EGLS Panel component with Cros-section weights option (Fixed Effects Model)

Dependent Variable: GDPCAPITAPER
Method: Panel EGLS (Cross-section weights)
Date: 05/23/20 Time: 09:00
Sample (adjusted): 2011 2017
Periods included: 7
Cross-sections included: 28
Total panel (balanced) observations: 196
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HDI100(-1)	0.403930	0.142372	2.837147	0.0051
ITCPER	0.089063	0.020023	4.448123	0.0000
GHG	0.064467	0.013517	4.769286	0.0000
GCFPER	0.134133	0.011742	11.42364	0.0000
UNEMPLOYMENT	-0.179387	0.065664	-2.731901	0.0070
TAXBURDEN	-0.356054	0.094515	-3.767155	0.0002
SOCIALPROTECTION(-1)	0.260272	0.113358	2.296019	0.0230
OPENNESS	0.013135	0.009950	1.320072	0.1887
POPCHANGE(-1)	-0.050299	0.025242	-1.992643	0.0480
C	-25.25670	10.46477	-2.413498	0.0169

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.856913	Mean dependent var	2.860213
Adjusted R-squared	0.824516	S.D. dependent var	3.880326
S.E. of regression	1.653628	Sum squared resid	434.7831
F-statistic	26.45040	Durbin-Watson stat	2.096543
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.741122	Mean dependent var	1.863776
Sum squared resid	469.4056	Durbin-Watson stat	2.462240

Source: Own calculations using Eviews 9.0, Eurostat, United Nations and Ameco database

Figure 2. Model 2 estimation using the EGLS Panel component with Period SUR option (Non Effects Model)

Dependent Variable: POVERTYRATE
Method: Panel EGLS (Period SUR)
Date: 05/09/20 Time: 22:24
Sample (adjusted): 2011 2018
Periods included: 8
Cross-sections included: 28
Total panel (balanced) observations: 224
Linear estimation after one-step weighting matrix
Period SUR (PCSE) standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
POVERTYINWORK	0.624220	0.041873	14.90756	0.0000
HDI100(-1)	-0.170326	0.070268	-2.423938	0.0162
SOCIALPROTECTION	-0.245144	0.062437	-3.926240	0.0001
ITCPER(-1)	-0.010055	0.005201	-1.933417	0.0545
AGEDEPENDENCY	0.171748	0.045864	3.744720	0.0002
C	22.01864	5.618169	3.919184	0.0001

Weighted Statistics

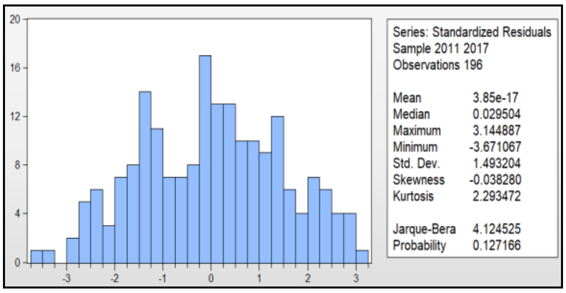
R-squared	0.574760	Mean dependent var	2.501796
Adjusted R-squared	0.565007	S.D. dependent var	3.304934
S.E. of regression	0.976141	Sum squared resid	207.7214
F-statistic	58.93043	Durbin-Watson stat	1.882047
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.692010	Mean dependent var	16.71875
Sum squared resid	955.8236	Durbin-Watson stat	0.112189

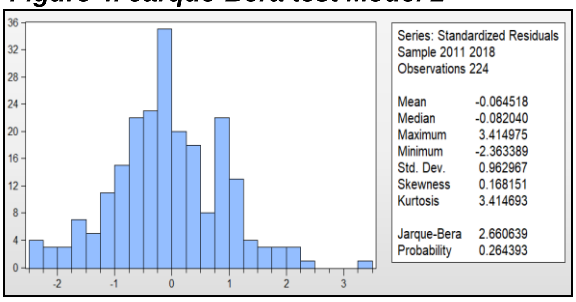
Source: Own calculations using Eviews 9.0, Eurostat and United Nation database

Figure 3. Jarque-Bera test Model 1



Source: Own calculations using Eviews 9.0

Figure 4. Jarque-Bera test Model 2



Source: Own calculations using Eviews 9.0

Table 1. Cross section dependence tests

Hypothesis: no cross-section dependence	Breusch-Pagan LM	Pesaran scaled LM	Pesaran CD	Bias-corrected scaled LM
Model 1 - prob.	0.0017	0.0353	0.8191	0.1342
Model 2 - prob.	0.6948	0.1223	0.4757	NA

Source: Own calculations using Eviews 9.0

Conclusions

The analysis showed that percentage change of real GDP per capita is positively influenced by increasing the human development index lagged by one year, the gross value added generated by the ICT sector, but also by the increase in other factors such as: percentage change of greenhouse gas emissions, percentage change of real gross capital formation, government expenditure on social protection lagged by one year and economic opennes.

On the other hand, unemployment rate, tax burden and percentage change of population lagged by one year negatively influences percentage change of real GDP per capita. Regarding poverty rate, its increase is driven by increasing the poverty rate among working population and the age dependency ratio, while its reduction is influenced by the increase of human development index lagged by one year, and that of the percentage change of gross value added from ICT sector or the government expenditure on social protection.

The paper highlights the important role of human development in determining social and economic development, but also that of other factors such as social spending (with bringing up that their effectiveness can be guaranteed by conditioning the access to these social support instruments on the integration into the labour market or into the educational system, depending on the age group) and gross value added generated by the ICT sector which, overall, reduces poverty, but, to a small extent, considering the negative effects of some components of technological progress on social development.

Following an extensive procedure to test the maximum verisimilitude of estimators, the paper confirms the reliability of the results.

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