

Human Capital Versus Income Variations: Are They Linked in OECD Countries?

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Abstract

Purpose: The theory of endogenous growth suggests a number of relations between income inequality and human capital. However, empirical evidence in this field is scarce. Therefore, in this paper we aim to demonstrate the existence of interdependencies between income inequality and human capital across OECD countries.

Methodology: We present findings of the endogenous growth theory on the mechanisms linking inequality with human capital. Subsequently, we attempt to verify these links empirically using the regression function estimated by means of the generalized method of moments (GMM). The empirical analysis is based on panel data from 1995–2010.

Findings: The results of the study reveal the existence of a negative relationship between income inequality and health indicators (infant mortality and maternal mortality). However, we did not reach an authoritative conclusion about the relationship between income inequality and quantitative indicators of educational achievement.

Research limitations: Research is limited to the sample of OECD countries. Interdependencies between income inequality and human capital could be captured more clearly using a broader sample.

Originality: This paper presents one of few studies testing the relation between human capital and income inequality. The use of high-quality empirical data on inequality (SWIID data) and the generalized method of moments made it possible to contribute new arguments to the discussion of empirical analyses of these economic categories.

Keywords: income inequality, human capital, OECD countries, GMM estimator

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Introduction

Differences in the distribution of income (i.e., income inequalities) within countries and human capital furnish economists with a popular area of research. The study of personal income inequalities began in the middle of the 20th century with the work of Kuznets (1955). In the 1970s and 1980s, the inequality of personal income distribution was pushed somewhat to the side-lines of economic research, but starting in the 1990s, thanks to Atkinson's (1997) work, it has made a comeback from the backwaters of economic research.³ Growing interest in inequalities was noted at the turn of the 21st century, because, as emphasised by numerous economists (including Stiglitz, 2010, and Stockhammer, 2013), they have reached such a level that they threaten the very stability of real economic processes.

The category of human capital, perceived as the qualifications, skills and health that enable workers to perform their work, stems out from the research of Schultz (1961), Mincer (1958, 1962), Denison (1962), and, in particular, Becker (1962, 1964). However, the research into human capital has been popularised mostly by the ascendance of the endogenous growth theory, according to which the accumulation of this very production factor is critical for explaining output growth in the long term.

Stimulated by the endogenous growth theory, economists have also turned their attention to the relationship between human capital and inequality of income distribution. Consequently, relying on empirical analysis, in the present study we aim to present links between human capital and its accumulation and inequality of income distribution in 34 OECD countries⁴ in 1995–2010.

We chose to use 1995 as the first year of the analysis because this was the year when the OECD was joined by former communist countries in Europe (i.e., the Czech Republic, Estonia, Hungary, Poland, Slovakia and Slovenia). Research into the transition of post-communist economies to the market economy reveals that, in the period of transitional recession, the economic growth in these countries was clearly influenced by the legacy of the period of central planning. Consequently, their economies were

³ The debate about the relationship between economic growth and inequality that began in the 1950s has failed to satisfy wider economic circles. It merely focused on solving the dilemma of equality (egalitarianism) or efficiency (increase). Faced with such a formulation of the problem, economists naturally downplayed the problem of inequality while playing up economic growth (Putterman, Romer and Silvestre, 1998).

⁴ The OECD consists of 34 countries, including 24 European countries (Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Greece, Spain, the Netherlands, Iceland, Ireland, Luxembourg, Germany, Norway, Poland, Portugal, Slovakia, Slovenia, Sweden, Switzerland, Hungary, Great Britain, Italy), 6 of which are post-communist economies (Czech Republic, Estonia, Hungary, Poland, Slovakia, Slovenia), as well as 10 countries from outside the European continent (Australia, Canada, Chile, Israel, Japan, South Korea, Mexico, New Zealand, Turkey and the United States).

strongly exposed to reallocation processes, rather than to the accumulation of production factors. In turn, the countries put recessionary tendencies behind them at the point at which their economies embarked upon a natural process of growth typical of countries with established market systems (Havrylyshyn, 2008; Popov, 2000, 2006). Therefore, it is assumed that the mid-1990s mark the end of the transformational recession in the post-communist economies of the OECD countries.⁵

The empirical analysis is based on the endogenous growth theory. This is due to the fact that using this methodological basis helps the study to steer clear of the dilemma of equality and efficiency, which has been hitherto unresolved in existing literature (Hoff, 1994). It is worth noting that efficiency, as the foundation of economic growth in the long term, is an inherent feature of economic growth models. Thus, findings on changes in inequality (variations) of income that stem from endogenous growth theory are consistent with the principle of economic efficiency.

The structure of this paper is dictated by the purpose of the research. In section 2 below, we present theoretical issues underlying the interdependencies between income inequality and human capital. Sections 2 and 3, respectively, contain a description of the research method used and the macroeconomic variables and sources of the values used. Section 4 discusses the results of calculations, and section 5 offers a summary and conclusions of the research.

Human capital and inequality in the endogenous growth theory

Existing literature recognises bilateral relationships between human capital and inequality (i.e., the impact of human capital), and in particular the effect of this production factor on inequality of income distribution as well as the opposite direction (i.e., the impact of inequality on human capital).

Methodological studies of the impact of inequality on human capital stem from the discussion of the determinants of human capital accumulation as the driving force of economic growth. It is worth noting that empirical studies bear out quite unambiguous conclusions about this relationship. In particular, most authors concur that greater diversification of income in society has a negative impact on human capital (Perotti, 1996), especially at a higher level of economic development (Battisti, Fioroni and Lavezzi,

⁵ It is worth noting that the shortest and shallowest transformational recessions occurred in the countries of Central Europe. In the Czech Republic, Hungary and Slovakia, recessions lasted until 1993, while in the Baltic states the recession last until the beginning of 1995.

2014; Papageorgiou and Razak, 2009). At the same time, a lot of controversy is caused, on the one hand, by the identification of theoretical channels of the impact of these inequalities on human capital, and on the other, by the lack of a consensus among economists as to which of these channels has the greatest impact on the interdependencies of income inequalities and human capital (Galor, 2011). However, based on pertinent literature, one can indicate several hypothetical channels through which income variations (inequality) determine the level and accumulation of human capital, including the following channels:⁶

- Investment incentives (Bell and Freeman, 2001; Galor and Tsiddon, 1997; Welch, 1999);
- Savings (Bertrand and Morse, 2013; Frank, Levine and Dijk, 2014), especially in the face of imperfections of the credit market (Galor and Zeira, 1993; Galor, 2011; Foellmi and Zweimüller, 2003);
- Public investment in education (Rajan and Zingales, 2006; Anderson, Mellor and Milyo, 2008);
- Demographic processes (Galor and Weil, 2000; Dahan and Tsiddson, 1998; Becker, Murphy and Tamura, 1990);
- Health (Lynch et al., 2004; Leigh, Jencks and Smeeding, 2009).

At the same time, the impact of human capital, or to be more accurate, of investment in human capital on inequality may happen by means of:⁷

- External effects connected with cooperation between business entities (Benabou, 1996a, 1996b; Tamura, 2004) and experience-based learning (Lucas, 1988);
- Public or private financing of education (Glomm and Ravikumar, 1992; Fernandez and Rogerson, 2003);
- Business entities' willingness to invest in human capital (Cardak, 1999);
- Demographic processes including fertility (e.g. De la Croix and Dopeke, 2003) and mortality (Sarkar, 2008).

It is worth noting that the impact of inequality on human capital is a more popular research area than the opposite direction of the relationship. Until the end of the twentieth century, the mechanism of the impact of human capital on inequality was described in economic theory rather unconvincingly (Slottje and Raj, 1998, p. 6). Consequently,

⁶ A detailed explanation of these channels can be found in Bartak (2015).

⁷ A detailed explanation of these channels can be found in Jabłoński (2008).

there existed rather doubtful methodological arguments for formulating a research problem relating to the direction of this interdependency. The situation changed in the first decade of the 21st century, when many researchers presented models of economic growth that exposed the direction of the relationship between the analysed economic categories. These works will form the basis for the argumentations of the present paper, suggesting a strong link between human capital – especially its accumulation – and income inequality. In particular, it can be assumed that higher human capital is associated with lower income inequality. In other words, reduction in income inequality comes with greater accumulation of human capital. Consequently, the accumulation of human capital can be expected, if not to reduce, then at least to stop the progress of income inequality.

Research method

In order to diagnose the links between human capital and inequality of income distribution, we used a tool from the domain of descriptive statistics and econometrics. Our statistical analysis was conducted in two stages. During the first stage, we tried to identify (the direction of) the relationship between the level of income inequality and the variables that illustrate human capital. For this purpose, we analysed correlation ratios between variables that revealed satisfactory statistical significance (i.e. a significance level of less than 0.05; $p < 0.05$).

During the second stage of the study of interdependencies between human capital and income inequalities, we used regression analysis. A review of existing literature indicates that there are reasonable arguments suggesting that human capital is inequality's driving force and that income inequality is the driving force of human capital. Therefore, it is reasonable to use two kinds of regression equations, as follows:

1. To present the role of human capital in explaining inequality:

$$ineq_{i,t} = \alpha_1 + \alpha_2 H_{i,t} + \alpha_3 dev_{i,t} + \varepsilon_{i,t}, \quad (1)$$

2. To present the role of income inequality in explaining human capital:

$$H_{i,t} = \beta_1 + \beta_2 ineq_{i,t} + \beta_3 dev_{i,t} + \varepsilon_{i,t}, \quad (2)$$

where: $ineq_{i,t}$ = inequality variable in i -country in t -time period, $H_{i,t}$ = human capital variable in i -country in t -time period, $dev_{i,t}$ = variable capturing the level of economic

development in i -country in t -time period, $\alpha_1, \alpha_2, \alpha_3, \beta_1, \beta_2, \beta_3$ = regression equation parameters, and $\varepsilon_{i,t}$ = residual factor.

Parameters of regression equations (1) and (2) were calculated by means of the generalized method of moments (GMM) estimation with fixed effects.⁸ In order to reduce the risk of bias of the first differences of the GMM estimation, a dependent variable was lagged not by one period but by five years, and delays in the explanatory variables were used as instrumental variables.

In the context of the second phase of the study (i.e., the phase based on analysis of regression function parameters) it becomes necessary to explain the reasons why, firstly, the variable illustrating the level of economic development of the countries surveyed is used in equations (1) and (2), and secondly, why the GMM with fixed effects is used for calculating the parameters in equations (1) and (2), which are the basis of economic interpretation.

The adoption of the level of economic development as an explanatory variable in equation (2), where the dependent variable represents the level of human capital, does not provoke major doubts. Existing literature furnishes compelling theoretical and empirical arguments suggesting that the level of economic development determines the demand for human capital.⁹ In particular, models exposing threshold externalities and externalities associated with learning-by-doing suggest that the level of economic development can be considered a human capital factor.

Some doubts might arise from the adoption of the level of economic development as an explanatory variable in equation (1), in which income inequality is the dependent variable. In particular, the use of this explanatory variable may suggest that the study deploys Kuznets' (1955) hypothesis, which shows a link between the level of economic development and income inequality within countries in the shape of an inverted 'U'. It must be noted that Kuznet's hypothesis is poorly corroborated by the results of empirical research.¹⁰ Therefore, the majority of authors analysing the forces shaping income

⁸ The Generalized Method of Moments was developed by L.P. Hansen (1982).

⁹ This issue is explained in Jabłoński (2011, p. 94–95).

¹⁰ Initial empirical research (Kuznets, 1955; Ahluwalia, 1976) revealed arguments supporting the existence of links between economic growth and inequalities in the shape of an inverted 'U' (Kuznets hypothesis). However, in the late 20th century it was shown that the Kuznets hypothesis was poorly corroborated by empirical studies, and for that reason it is hard to determine unambiguously the nature of the relationships between economic growth and inequalities (e.g. Anand and Kanbur, 1993; Li, Squire and Zou, 1998; Chen and Ravallion, 1997; Easterly, 1999; Barro, 1999; Forbes, 2000; Dollar and Kraay, 2002).

inequality suggest that economic development should be omitted as a potential driver of change in income inequality (Sequeira, Santos and Ferreira-Lopes, 2014).

The omission of economic development as an explanatory variable in equation (1) could suggest that, in our study, we conceive of human capital as the key, if not the only, driver of change in income inequality. However, such oversimplification of the complexity of changes in income inequality in countries at different levels of economic development would be harmful. It is worth noting that existing literature shows that inequalities arise from multiple complex and mutually reinforcing factors and circumstances. In the ensuing discussion about inequality, technological progress, globalisation, financialization and economic integration are increasingly recognised not as factors, but rather as inalienable facts that determine the course of factual economic processes. Moreover, existing literature points to a number of driving forces associated with the factual sphere of the economy and regulations of economies affecting the diversity of income within countries, including economic fluctuation (conjuncture).¹¹ Therefore, G.W. Kołodko's (2008, p. 313) observation that "things happen the way they happen, because many things happen at the same time" gains new importance. Consequently, admission of the level of economic development as a variable explaining inequality appears to be justified.

The use of GMM to calculate the equation parameters stems from the fact that, according to the commonly held view expressed in the existing literature, it is effective in studies where there is a suspicion of endogeneity of the variables examined. Therefore, the classical methods of calculating the equation parameters, such as the ordinary least square (OLS) method or methods with fixed or variable estimators, are not effective, particularly in the case of inequalities (Brzezinski, 2013).¹²

On the other hand, the use of the GMM estimation with fixed effects stems from the desire to take into account the contextual relationship between inequality and human capital. Although, as explained by Malaga (2004, pp. 7-8), OECD countries have many similarities in terms of regulatory, factual and infrastructural solutions, the complete omission of differences between them nonetheless seems to imply a harmful oversimplification.

¹¹ Inter alia Odedokun and Round (2001), Eckwert and Zilcha (2007), Nikoloski (2010), and Ha (2012).

¹² It is emphasised in existing literature that classical methods of econometric analysis (i.e., the least square method (LSM) and fixed effects method as well as random effects methods) are ineffective, particularly as regards research into inequalities. OLS estimations are inconsistent and biased when the equation includes time lags of the analysed variables and fixed effects with a relatively small number of time periods surveyed (Brzeziński, 2013, p. 13–14).

Macroeconomic variables and sources of the figures

The analysis of the relationships between income inequality and human capital has been conducted on the basis of cross-sectional and temporal figures relating to 12 indicators of OECD countries covering the 1995–2010 research timeframe, reflecting income inequality, human capital and the level of economic development.

Income inequality was presented by means of the Gini coefficient of net disposable income taken from the SWIID (Standardized World Income Inequality Database) developed by Solt (2009; 2014). It is worth noting that one can point to other databases containing statistics on income disparities within countries.¹³ However, according to most authors, the SWIID contains the most reliable (i.e., internationally comparable) data on income inequality (e.g., Sequeira, Santos and Ferreira-Lopes, 2014).¹⁴

Human capital is presented in terms of numerical values of indicators illustrating two of its essential components: health (vitality) and level of education. The study uses three measures of the health level of the surveyed countries' inhabitants: life expectancy at birth (*le*), infant mortality per 1,000 live births (*infant*) and mortality of mothers during childbirth per 100,000 live births (*mat*). The figures for these indicators come from the OECD database (2015). On the other hand, the level of education is reflected by means of 7 indicators: the total average number of years of education (*AvYeSch*); total at primary level (*AvYeSch1*), secondary level (*AvYeSch2*) and higher level (*AvYeSch3*) of education; and the percentage of the population over 15 years of age with primary (*prim*), secondary (*secon*) and higher (*tertiar*) education, retrieved from the Barro and Lee (2013) database. The economic development was measured in terms of GDP per capita expressed in constant prices in 2010 at PPP (GDP p.c.) based on OECD data (2015).

Barro and Lee's (2013) data on educational attainment are available for five-year periods (intervals). Therefore, for the remaining indicators used in the study, a five-year moving average was calculated for the years for which figures were available for the 1995–2010 period in the Barro and Lee (2013) database. Thus constructed, the data set was used in the empirical study.

¹³ LIS (*Luxembourg Income Study*) and WIID (*World Income Inequality Database*) developed by K. Deininger and L. Squire (1996) and recently updated by WIDER (*World Institute for Development Analysis*); WTID (*World Top Incomes Database*) developed by Atkinson, Piketty (2007; 2010) and Atkinson, Piketty, Saez (2011).

¹⁴ It should be added that the discussion about the quality of individual databases is still on-going. Considerations of the strengths and weaknesses of the individual databases, including the SWIID database, can be found inter alia in papers by Atkinson and Brandolini (2006), Jenkins (2015) and Solt (2015).

Results

The correlation analysis was conducted to identify the direction of the interdependency between income inequality measured by means of the Gini index and selected measures of human capital in 34 OECD countries in 1995–2010. Table 1 contains figures on the coefficients of correlation between the Gini index and certain macroeconomic variables that revealed satisfactory statistical significance (i.e., a significance level of less than 0.05).¹⁵

Table 1. The correlation coefficients between the Gini index and selected variables in 34 OECD countries in 1995–2010

Variable	Gini _{i,t}		
	Correlation coefficient	Significance level	Sample size
AvYeSchi _t	-0.427	0.0000	134
AvYeSch1 _{i,t}	-0.389	0.0000	134
AvYeSch2 _{i,t}	-0.290	0.0006	134
Infanti _t	0.576	0.0000	134
Mati _t	0.573	0.0000	132
Lei _t	-0.250	0.0033	134
Primi _t	0.210	0.0140	134
Seconi _t	-0.452	0.0000	134
GDPp.c.i _t	-0.407	0.0000	134

Key: significance level = significance level of t-Student.

Source: own elaboration.

Relying on statistically significant correlation coefficients, we can draw some conclusions concerning the countries surveyed.

- The values of the correlation coefficients between the Gini variable and indicators of educational attainment show that:
 - an increase (decrease) in income disparity was accompanied by a decrease (increase) in the total number of years of education (*AvYeSch*), as well as primary (*AvYeSch1*) and secondary (*AvYeSch2*) levels of education;

¹⁵ Statistically insignificant correlations occurred between the Gini coefficient and the average number of years in higher education (*AvYeSch3*) and the ratio of population with higher education (*tertiar*). The results of these calculations are presented in Table 1.

- an increase (decrease) in income inequality (*Gini*) was accompanied by an increase (decrease) in the rate of population above 15 years of age with elementary education (*prim*) and a decrease in the rate of population with secondary education (*secon*).
2. The values of correlation coefficients between Gini and measures of human capital in the area of health reveal that higher income inequality was accompanied by a deterioration of health in OECD countries, demonstrated by:
- increasing infant mortality per 1,000 live births (*infant*);
 - increasing mortality of mothers giving birth per 100,000 live births (*mat*);
 - reduction in life expectancy at birth (*le*).

Table 2. The results of unit root tests for variables examined across 34 OECD countries in 1995–2010

Variable	Test name		
	Levin, Lin, Chu	ADF	PP
Gini _{i,t}	-20.201 (0.0000)	109.079 (0.0012)	142.852 (0.0000)
AvYeSch _{i,t}	-56.235 (0.0000)	86.309 (0.0475)	122.217 (0.0000)
AvYeSch1 _{i,t}	-16.969 (0.0000)	132.156 (0.0000)	164.327 (0.0000)
AvYeSch2 _{i,t}	-28.496 (0.0000)	110.790 (0.0000)	152.332 (0.0000)
Infant _{i,t}	-13.333 (0.0000)	183.589 (0.0000)	273.795 (0.0000)
Mat _{i,t}	-6.642 (0.0000)	131.297 (0.0000)	155.902 (0.0000)
Prim _{i,t}	-34.596 (0.0000)	151.897 (0.0000)	206.567 (0.0000)
GDPp.c. _{i,t}	-67.4056 (0.0000)	133.804 (0.0000)	196.945 (0.0000)

Key: LLC = Levin, Lin, Chu; ADF = Dickey-Fuller; PP = Phillips-Perron; parentheses show t-Student significance levels
Source: own elaboration.

The use of the generalized method of moments to calculate regression parameter values requires stationarity of numerical values of diagnostic variables (i.e., of explanatory and dependent variables). Therefore, to study the relationships between income inequality and human capital based on regression analysis, we admitted all variables

with satisfactory results of the unit root test (stationarity). Table 2 presents the results of variable stationarity tests, which justify the use of the variables in the study based on regression analysis.

Table 2 shows that the stationarity of the variables surveyed is not confirmed by all test results. This applies especially to the ADF and PP tests. However, as explained by Strzała (2009, p. 59), the Levin, Lin and Chu test (LLC) is one of the most commonly used, as it was the first unit root test for panel data and is relatively easy to use.¹⁶ Therefore, it is assumed that the variables in Table 2, with the notable exception of *AvYeSch3*, *le*, *secon* and *tertiar* are stationary and as such have been admitted into subsequent research.

For the purpose of examination of the relationships between income inequality and human capital in OECD countries based on regression analyses (1) and (2), we have used data from five-year intervals. The parameters of equations (1) and (2) were calculated using the GMM estimation with the fixed effects for all alternative measures illustrating human capital in OECD countries. After the results were examined, we chose two estimations for equation (1) (Table 3) and one for equation (2) (Table 4).

The calculations presented in Tables 3 and 4 are characterised by a satisfactory statistical significance of explanatory variables' parameters, as reflected by the values of significance levels of Student's t-test (p-value). At the same time, the high values of determination coefficients (R^2 and adjusted R^2) illustrate a good fit of the equations to the distribution of empirical variables. Some doubts may arise from the Durbin-Watson statistics; however, it was assumed that the results of the calculations constitute a sufficient basis to subject them to economic interpretation, even if this should be done with some caution.

Of all the tested variables, only the numerical values of indicators of the health level in OECD countries revealed statistically reliable links with income variations. Hence, even if the numerical values of some indicators of educational attainment were stationary, poor statistical significance of the equations made it impossible to offer a credible economic interpretation of the results.

¹⁶ Strzała (2009, s. 58–59) explains that their key drawback is the restrictiveness of hypotheses involving the assumption of homogeneity of the autoregressive parameter in the null and alternative hypothesis and omission of simultaneous correlation. That is why these tests are dubbed “all or nothing” tests.

Table 3. Results of calculation of parameters of GMM equations (1) with fixed effects for 34 OECD countries in 1995–2010

Variable	Dependent variable: $Gini_{i,t}$	
Constant	23.627 (0.0000)	25.564 (0.0000)
$Infant_{i,t}$	0.2948 (0.0003)	—
$Mat_{i,t}$	—	0.1500 (0.0009)
$GDPp.c.i,t$	0.0001 (0.0001)	0.0001 (0.0010)
R^2	0.9735	0.9710
Adjusted R^2	0.9638	0.9600
Durbin-Watson	1.7491	1.7319
J-statistic	13.1429 (0.0002)	10.8150 (0.0010)
Instrumental variables	$Gini_{t-5}$, $PKBp.c.t-5$, $Infant_{t-5}$	$Gini_{t-5}$, $PKBp.c.t-5$, Mat_{t-5}
Number of observations	132	128
Number of countries	34	34

Note: Student's t-test significance level is indicated in parentheses.

Source: own elaboration.

The results of the calculations in Tables 3 and 4 warrant a number of conclusions, as follows:

- Improvement of health as reflected by a decrease in infant mortality per 1,000 live births ($infant_{i,t}$) and mortality of mothers in childbirth per 100,000 live births ($mat_{i,t}$) explained a decrease in income inequality in the OECD countries surveyed.
- Decrease in income disparity seemed to explain improvement of the level of health in OECD countries as measured by mortality of mothers while giving birth per 100,000 live births ($mat_{i,t}$).
- In all reliable results of calculations of economic development, per capita GDP explained changes in the level of human capital and income inequality with weak positivity.

Table 4. Results of calculation of parameters of GMM equations (2) with fixed effects for 34 OECD countries in 1995–2010

Variable	Dependent variable: $Mat_{i,t}$
Fixed	-81.51515 (0.0011)
$Gini_{i,t}$	3.470134 (0.0001)
$GDPp.c._{i,t}$	-0.000467 (0.0014)
R^2	0.853199
Adjusted R^2	0.797350
Durbin-Watson	1.734
J-statistic	15.214 (0.0001)
Instrumental variable	Mat_{t-5} , $Gini_{t-5}$, $PKBp.c._{t-5}$
Number of observations	128
Number of countries	34

Note: Student's t-test significance level is indicated in parentheses.

Source: own elaboration.

Conclusions

This paper aims to show relationships between human capital and income inequality in OECD countries in 1995–2010. Several conclusions can be drawn, as follows:

- There are legitimate theoretical arguments to suggest a strong link between human capital and inequality. In particular, the endogenous growth theory shows that greater income disparity creates barriers to the accumulation of human capital. There are also indications that the accumulation of human capital, accompanied by sufficiently strong externalities relating to the cooperation between economic entities, may reduce individual income inequality within countries.
- Correlation and regression analysis illustrates that changes in the level of human capital and inequality are beneficial, in the sense that an increase

(decrease) in the level of human capital is associated with a decrease (increase) in inequality.

- Regression analysis allows for capturing only the relationship between the level of health and income inequalities. In particular, it was shown that improvement of health explains the reduction in income inequality in the countries surveyed. Moreover, it is reasonable to suggest that improvement (i.e., decrease) in income disparities explains improvement of the health of OECD countries' residents. The use of high-quality empirical data (SWIID data) and the generalized method of moments made it possible to provide new evidence confirming the existence of a link between income inequality and the level of health. This study thus brings new arguments into the broad discussion of empirical analyses of these economic categories (for a review of previous studies, see Leigh, Jencks and Smeeding, 2009).

Importantly though, the results do not justify a firm conclusion that human capital, and in particular its accumulation, is conducive to reducing income disparities within countries. It is worth noting that the empirical research of other authors leads to two conclusions. Firstly, research conducted by Sequeira, Santos and Ferreira-Lopes (2014) illustrates that human capital deepens income inequality in most countries of the world. Secondly, many authors agree that since the end of the twentieth century, we have been faced with deepening income disparities within countries. Therefore, this study can be seen as an argument suggesting that the accumulation of human capital can encourage, if not a reduction in income disparities within countries, then at least an end to their further deepening. Moreover, our analysis is limited to OECD countries only, as we were interested in relations between human capital and income inequality in relatively advanced economies. Such relations may be different (possibly stronger) in less advanced economies. On the other hand, the sample of OECD countries includes observations that may be considered outliers (e.g., Mexico, Turkey and Chile). In GMM estimation, the presence of outliers may drive results towards a stronger relationship. However, we perceive these observations not as outliers but rather as a result of country-specific characteristics, which are controlled in computations with fixed effects. Nonetheless, in future research it would be useful to use a different empirical approach, namely to conduct estimations on a broader sample and to control for interactions of level of development, human capital and income inequality.

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