Sinop Üniversitesi
Sosyal Bilimler Dergisi

Araştırma Makalesi

ISSN
2547-989X

Sinop Üniversitesi Sosyal Bilimler Dergisi, 6 (1), 183-199
Geliş Tarihi:04.03.2022 Kabul Tarihi:24.04.2022
Yayın: 2022 Yayın Tarihi:31.05.2022
https://doi.org/10.30561/sinopusd.1085223
https://dergipark.org.tr/sinopusd

THE EFFECT OF HUMAN CAPITAL ON INCOME EQUALITY: CROSS-SECTIONAL ANALYSIS

Bahar TAŞ[*]

Abstract

The objective of this study is to investigate the effect of human capital on equality of income distribution. To this end, we use cross-sectional data analysis on a sample consisting of 89 countries with data in 2018. We construct an equation of income equality and next empirically estimate that equation. Human capital is proxied by the gross enrolment rate of tertiary education whereas income equality is proxied by the ratio of the income share held by the lowest 10% (of the population) to the income share held by the highest 10% (of the population). In order to control the development level of countries, we added per capita income and its squared term into the equation. Moreover, the variables of technological development, openness and unemployment were added into the equation to control other factors such as demand- and supply-side. The results suggest strong evidence of the significant and positive effect of human capital on income equality. As a policy implication, it is strongly recommended to encourage individuals to invest in their education level, as the results indicate that countries with a high stock of human capital experience a higher level of income equality. In addition, raising the trade volume, increasing the share of research and development expenditures in GDP, and promoting policies to reduce the unemployment rate are other substantial outputs of our empirical analysis.

Keywords: Cross-Sectional Analysis, Human Capital, Equality, OLS

[*] Arş. Gör., Burdur Mehmet Akif Ersoy Üniversitesi, Bucak İşletme Fakültesi Ekonomi ve Finans Bölümü, btas@mehmetakif.edu.tr https://orcid.org/0000-0002-1743-2358

Beşeri Sermayenin Gelir Eşitliği Üzerine Etkisi: Yatay Kesit Analizi

Öz

Bu çalışmanın amacı, beşeri sermayenin gelir dağılımı eşitliği üzerindeki etkisini araştırmaktır. Bu amaçla, 2018 yılı verilerine sahip 89 ülkeden oluşan örneklem üzerinde yatay kesit veri analizi kullanılmaktadır. Öncelikle bir gelir eşitliği denklemi oluşturularak daha sonra bu denklem ampirik olarak tahmin edilmiştir. Beşeri sermaye değişkeni olarak yükseköğretimin brüt okullaşma oranı kullanılırken, gelir eşitliği değişkeni olarak, en düşük gelire sahip nüfusun %10'luk kesiminin gelirden aldığı payın, en yüksek gelire sahip nüfusun %10'luk kesiminin gelirden aldığı paya oranı kullanılmıştır. Ülkelerin gelişmişlik düzeylerini kontrol edebilmek için kişi başına düşen geliri ve gelirin karesini denkleme dahil ettik. Ayrıca, talep ve arz yönlü diğer faktörlerin kontrolünü sağlamak adına teknolojik gelişmişlik, dışa açıklık ve işsizlik gibi değişkenleri de denkleme eklendi. Analiz sonuçları, beşeri sermaye stokunun gelir eşitliği üzerindeki önemli ve olumlu etkisine dair güçlü kanıtlar ortaya koymaktadır. Bu sebeple politika önerisi olarak, bireyleri eğitim seviyelerine yatırım yapmaya teşvik edilmeleri gerektiği öne sürülmektedir. Çünkü analiz sonuçları, yüksek insan sermayesi stokuna sahip ülkelerin daha yüksek düzeyde gelir eşitliği düzeyine sahip olduğunu ortaya koymaktadır. Ayrıca ticaret hacminin artırılması, araştırma ve geliştirme harcamalarının GSYİH içindeki payının artırılması ve işsizliğin azaltılmasına yönelik politikaların teşvik edilmesi gibi öneriler ampirik analizimizin diğer önemli çıktılarıdır.

Anahtar Kelimeler: Yatay kesit Analizi, Beşeri Sermaye, Eşitlik, EKK

1. Introduction

The neoclassical theory conjectures that the accumulation of human capital directly influences the income level of people as well as their productivity. As a result, higher levels of human capital ensure both individuals and countries have a higher level of economic welfare and development. Qualified labor force, especially the accumulation of human capital adapted to developing technological changes, has an essential role in determining how countries gain a strong place in the rapidly

growing global competitive environment. Otherwise, it may be challenging for countries with a low level of human capital accumulation to maintain their competitiveness.

Basically, the economic value of talent, knowledge, experience, intelligence and education (of individuals or groups) can be attributed to the concept of human capital. It can be justifiable to suggest that investments made for individuals to increase these acquisitions will increase their productivity. For instance, training that enhances human knowledge or services that support human health can be deemed as significant human capital investments. Adam Smith (1776) is the first economist to incorporate the notion of human capital into the definition of capital. Smith (1776) argues that useful skills and abilities a population acquired overtime should be incorporated into the capital stock of the country in which that population lives. T. W. Schultz (1961) is accepted as the first to theorize the theory of human capital. Schultz (1961) argues that human capabilities enhance public welfare, as well as individual well-being since acquisition of knowledge and skills, has an economic value. Therefore, individuals can be included in an economy's capital stock or classified as a driver of productive services. Schultz (1961) also criticizes why human capital cannot be added to a country's capital stock even though it can be increased at a much higher rate than physical capital.

The formation of human capital usually stems from the self-improvement of an individual by being educated or learning by doing, briefly investing in himself/herself. Also, the accumulation of people who act in accordance with their own interests is considered human capital as well (Schultz, 1961; Becker, 1962; Mincer 1974). In other words, the stock of knowledge and skills possessed by the entire population of a country is also defined as human capital. Therefore, it is a reasonable statement that the term human capital can be used to define these two accordingly to different situations in the literature.

Investments made by individuals to improve their knowledge and skills or to ameliorate their health, which is also the leading factors in human productivity, may cause to increase in the gap of quality between them. The quality gap will affect the relative demand for the qualified labor force and thus the relative wage between qualified and unqualified labor force will change. As previously stated, technological developments requiring a highly educated labor force are one of the significant factors that cause an increase in the relative demand for a skilled workforce. Eicher & García-Peñalosa (2001) state that the rate of technological change plays a major role in determining the relative wage between educated and non-educated workers. Consequently, it is a fact that income inequality may arise between high- and low-qualified workers. Certainly, the demand for labor (or the supply of labor for different cases) is not the only reason that engenders income inequality. The structure of the labor market is also a significant parameter in determining the reasons for income inequality. For example, income inequality is expected to decrease where public employment, labor unionization and collective agreements are more widespread.

Mainly, the primary goal of this study is to investigate especially the effect of human capital on income equality. Income equality has been emphasized by the literature for many years due to its importance to household welfare. An environment with income inequality in a country may trigger a set of problems: political disorder, an increase in crime rates and violence that push the society into unrest. Furthermore, the unequal distribution of education and health services can cause such events. The classical economists suggested that an increase in the education level of the poor would lead to a decrease in crime and disorder (Eckstein & Zilcha, 1994). For certain, a country's economic performance is not solely determined by the quality of its labor force. However, parallel to this, unequal distribution of human capital resources (education, health, etc.) is expected to reduce income equality.

In order to focus on the effect of human capital on income equality, the study exploits education since it is one of the most important components of human capital.

In this study, the gross enrollment rate of tertiary education is taken as a proxy for human capital stock. Besides, the factors that shape the demand for the labor force have an impact on wages, thus they affect income equality as well. For example, the trade openness of a country can be regarded as one of these factors. According to Heckscher-Ohlin-Samuelson theorem, openness leads to an increase in production of labor-intensive sectors in developing countries whereas it leads to an increase in production of capital-intensive sectors in developed countries. The increase in production of labor-intensive sectors causes an increase in the demand for labor, especially for low-qualified labor. In such a case, income equality will increase due to upward labor demand. The increase in the production of capital-intensive sectors causes a decrease in the demand for labor. Hence, income equality will decrease because of downward labor demand. In this study, openness is proxied by trade volume. Due to the aforementioned effects of technological changes, the percentage of research and development expenditure in GDP is taken as a proxy for technological development. The significance of publicly funded research and development is supported by strong evidence, especially for developing countries (Rustichini & Schmilz, 1991). Per capita income is used in order to control the development levels of countries. Lastly, the unemployment rate is used as one of the control variables. We performed our analysis on a cross-sectional dataset covering data from 89 countries in 2018 (depending on data availability). Firstly, we construct an income equality equation and next, we estimate this equation by utilizing the Ordinary Least Squares method (hereafter OLS). Our main finding is that the gross enrolment rate of tertiary education has a positive impact on income equality. For example, a 1% increase in the gross enrollment rate of tertiary education raises income equality by 0.027%. This implies that a country with a higher gross enrollment rate of tertiary education has a higher level of income equality, ceteris paribus. Second of all, while per capita income affects income equality negatively up to a point, it has a positive effect after that point.

The remainder part of the paper is organized as follows: the literature review of the study is represented in Section 2. The data and methodology used to observe the effect of human capital on income equality are presented and the empirical findings are discussed in Section 3, followed by concluding remarks and policy implications in Section 4.

2. Literature Review

Several studies have investigated the impact of human capital on issues such as economic growth (Glomm & Ravikumar,1992; Gylfason & Zoega, 2003), distribution of earnings (Becker & Chiswick, 1966), income distribution (Park, 1996; Eckstein & Zilcha, 1994; Marin & Psacharopoulos, 1976), and wage inequality (Lemieux, 2006). For example, Schultz (1961) argues that a change in human capital investments is an important factor in reducing inequality in personal income distribution. In fact, a very obvious cycle reveals here. Increased human capital investment will lead to a decrease in human capital inequality and hence a reduction in income inequality. Park (1996) argues that there is a direct expected relationship between educational inequality and income inequality in accordance with traditional human capital theory. In other words, any inequality in education level directly affects income inequality as well.

Fundamentally, the concept of income inequality refers to the difference between employees in terms of qualification level in the labor market. Employers generally tend to employ labor-force with certain qualification levels, which affects labor demand and income distribution. An increase in the demand for a high-qualified labor force results in a rise in the wage amounts of high-qualified workers. Similarly, a decrease in the demand for a low-qualified labor force reduces the wage amounts for low-qualified workers. In consequence, the wage differences regarding the qualification level of the labor force yield income inequality.

Individuals who are willing to increase their income will tend to invest in their human capital accumulation. The aggregate tendency of investing in human

capital induces a decrease in the wage differences and an increase in the population of qualified workers as well. For instance, Eckstein & Zilcha (1994) show that a certain level of compulsory schooling reduces the level of inequality in income distribution. Marin and Psacharopoulos (1976) show that one extra year of schooling for the population is associated with a 10% fall in the measure of income inequality that is proxied by the variance of the log of earnings. Fields (1980) suggests that education attained is positively correlated with income distribution and better working conditions. The economic benefits of education can be split into two groups employment and income benefits (Fields, 1980). Therefore, an additional increase in education level is anticipated to lead to a fall in the level of income inequality.

Human capital investments cannot be limited only to the education attained. Human health is also one of the most important components of human capital investment. Chokraborty & Das (2005) underline the significant role of health in determining earning differences and inequality across society. Investment in the health of human capital is directly associated with labor productivity and working capacity (Chokraborty & Das, 2005). Individuals need at least a minimal health level to find the strength to work. People who cannot properly invest in their health capital will not be able to properly invest in their human capital either. Consequently, it is highly expected that human capital inequality will yield less income and finally income inequality.

On the other side, Becker (1962) states that if everyone invests in human capital requiring the same amount of effort, the distribution of earnings will ultimately equal the distribution of ability. However, since technological developments increase the need for a qualified labor force in a growing competition environment, firms will tend to demand an educated labor force more. As a result, inequality in the distribution of earnings is once again in question. Meanwhile, it is a fact that efforts toward equal distribution of human capital can reduce income inequality.

There are also numerous studies that argue the reverse argument which says increasing income inequality triggers inequality in education and health services, and negatively affects the social order. This implies that income inequality is the cause and human capital is the result. Galor (2011) asserts that income distribution has an important effect on human capital structure and the process of development. As a result of inequality in income distribution, individuals may decide to participate in the labor force as unqualified workers and earn fewer wages instead of the difficulties they may undertake to acquire relatively costly human capital. Under the circumstance of capital market imperfections, income distribution has a long and essential effect on total income, investments in human capital and the process of development. (Galor, 2011). Chiu (1998) asserts that greater income equality implies higher human capital accumulation and economic performance. His study indicates that, under the conditions of capital market imperfections, greater income inequality can mean lower human capital accumulation and a deterioration in the initial income distribution of subsequent generations if some level of education is necessary to acquire innate talent. Chiu (1998) states that the link between a more equal initial income distribution and higher long-term growth has been empirically demonstrated by this.

The contribution of this study to the related literature is two-fold. Firstly, this is the first study that uses the gross enrolment rate of tertiary education as human capital stock. In the previous literature, the level of educational attainment such as compulsory schooling (Eckstein & Zilcha, 1994), and secondary schooling (Bourguignon & Morrisson, 1990) is considered as a proxy of human capital. In some studies, the dispersion of educational attainment is chosen as an independent variable (Chiswick, 1971). However, nowadays, higher education has gained importance. Lemieux (2006) emphasizes the importance of post-secondary education by stating that the return on post-secondary education is much higher than the return on elementary and secondary education. Therefore, the effects of higher education on

macro indicators (such as income inequality, economic growth, etc.) need to be discussed. In this study, this need has been tried to be met by examining the effect of higher education on income equality rather than income inequality. The reason for this is to give a different perspective to the study. In the literature, mostly income inequality measures (especially the Gini coefficient) are used. For example, Park (1996) uses the income share of the top 20% and the bottom 40% of the population, and the Gini coefficient as three alternative measures of inequality in income. Actually, we don't do anything different, we just reverse the income inequality variable and create a new index and we call it the income equality index. This can be accounted for as our second contribution to the literature.

3. Data, Methodology, and Empirical Results

The focus of our empirical analysis is to explore the effect of human capital on income equality. To this end, we employ Ordinary Least Squares (hereafter OLS) analysis using a cross-sectional dataset of 89 countries with data from 2018 depending on data availability (see Appendix A). Our dependent variable is income equality. As a measurement of income equality, we used the ratio of the income share held by the lowest 10% (of the population) to the income share held by the highest 10% (of the population). The higher this ratio, the higher the income equality. Unless otherwise mentioned, the data were compiled from the World Bank's World Development Indicator (WDI) database (World Bank, 2021). Our explanatory variables are human capital and per capita income. We also utilized technological development, openness and unemployment rate as control variables. Per capita income is represented by GDP per capita calculated as a gross domestic product at constant 2015 U.S. dollars divided by midyear population. Per capita income was used in order to control the development levels of countries. As a measurement of human capital, we used the gross enrollment rate of tertiary education. The percentage of research and development expenditure in GDP was used as an indicator of technological development. Openness is proxied by trade volume measured by the sum of all imports

and exports divided by GDP. Lastly, the unemployment rate was given as a percentage of the unemployed labor force (available for and seeking employment) to the total labor force.

Table 1 reports descriptive statistics of the variables. As can be seen, some variables such as education variable, income per capita, and trade volume have very high standard deviations. The higher the standard deviation, the greater the spread in the data. They are also considerably higher than other variables in the dataset. Therefore, we used them in the form of natural logarithms. In this way, we also obtained more smoothed variables.

Table 1: Descriptive Statistics

Variables	Obs.	Mean	Std. Dev.	Min.	Max.
$Index_i$	148	0.097	0.044	0.018	0.201
$Education_i$	100	50.388	30.144	4.058	142.852
$GDPPC_i$	148	13084.87	18910.19	281.970	104261.9
$Trade_i$	142	88.595	52.261	21.835	387.103
RD_i	112	0.921	1.005	0.011	4.941
$Unemployment_i$	144	7.131	5.364	0.47	26.91

Initially, income equality is regressed on the gross enrollment rate of tertiary education, per capita income, and its squared term and afterward trade openness, technological development, and unemployment rate are added into regression one by one. Thus, our estimated equations are as follows:

$$Index_i = \beta_0 + \beta_1 ln(Education_i) + \beta_2 ln(GDPPC_i) + \beta_3 ln(GDPPCSQ_i) + u_i \quad (1)$$

$$Index_i = \beta_0 + \beta_1 ln(Education_i) + \beta_2 ln(GDPPC_i) + \beta_3 ln(GDPPCSQ_i) + \beta_4 ln(Trade_i) + u_i \quad (2)$$

$$Index_i = \beta_0 + \beta_1 ln(Education_i) + \beta_2 ln(GDPPC_i) + \beta_3 ln(GDPPCSQ_i) + \beta_4 ln(Trade_i) + \beta_5 (RD_i) + u_i \quad (3)$$

$$Index_i = \beta_0 + \beta_1 ln(Education_i) + \beta_2 ln(GDPPC_i) + \beta_3 ln(GDPPCSQ_i) + \beta_4 ln(Trade_i) + \beta_5 (RD_i) + \beta_5 (Unemp_i) + u_i \quad (4)$$

where i represents country i, $Index$ stands for the income equality index, $ln(Education)$ denotes the natural logarithm of the gross enrollment rate of tertiary education, ln$(GDPPC)$ and ln$(GDPPCSQ)$ are per capita income and its squared term in natural logarithm form, respectively. Ln$(Trade_i)$ represents the natural logarithm of trade openness, RD_i stands for the percentage of research and development expenditure in GDP, and $Unemp_i$ indicates the rate of unemployment, and u is the error term.

The OLS estimation results are reported in Table 2. The estimations are implemented using Stata statistical software. We find a crucial positive effect of human capital on income equality. In Table 2, the estimated coefficients of human capital variable are positive and statistically significant at 10% level in the first model and significant at 5% level in the last three models. A 1% increase in the gross enrollment rate of tertiary education raises income equality by 0.027%. This implies that a country with a higher gross enrollment rate of tertiary education has a higher level of income equality, ceteris paribus.

The estimated coefficients of GDP per capita, which are included in the equation to control the development level of countries, are negative and statistically

significant at %5 level in the first regression, at %1 level in the second regression, at %5 level in the third regression, and insignificant in the last one. However, the estimated coefficients of squared GDP per capita are positive and statistically significant in the first three regressions. The negative signs of the coefficients of GDP per capita and the positive signs of the coefficients of squared GDP per capita can be interpreted as that income equality will decrease as per capita income increases, but after a point, it will start to increase as per capita income continues to increase.

The other potential determinant of equality is openness which has a positive effect and is statistically significant at 1% in all regressions. The inclusion of trade volume in the second regression has a considerable contribution to the estimated coefficient of human capital, which rises from 0.027 to 0.032. On the other hand, the estimated coefficient of the measurement of technological development is not significant even though it has a slightly positive effect. As expected, the unemployment rate has a significant negative effect on income equality. A 1% increase in the unemployment rate reduces income equality by 0.002%. After the inclusion of the unemployment rate into the regression, the estimated coefficient of human capital drops slightly from 0.032 to 0.031.

Table 2: Basic OLS estimates of the effects of human capital on income equality

Variables	(1)	(2)	(3)	(4)
Ln(Education)	0.027*	0.032**	0.032**	0.031**
	(0.014)	(0.014)	(0.014)	(0.013)
Ln(GDPPC)	-0.129**	-0.149***	-0.136**	-0.090
	(0.057)	(0.056)	(0.056)	(0.054)
Ln(GDPPCSQ)	0.007**	0.008***	0.007**	0.004
	(0.003)	(0.003)	(0.003)	(0.003)

Ln(Trade)		0.027***	0.030***	0.030***
		(0.009)	(0.010)	(0.01)
RD			0.006	0.004
			(0.005)	(0.005)
UNEMP				-0.002***
				(0.0008)
Constant	0.591**	0.567**	0.508**	0.327
	(0.230)	(0.218)	(0.217)	(0.212)
Observations	89	89	89	89
F-statistics	3.58 (3:85)	4.06 (4:84)	3.33 (5:83)	5.15 (6:82)
Prob(F)	0.0171	0.0047	0.0086	0.0002
R^2	0.1057	0.1954	0.2045	0.2644
Root MSE	0.04304	0.04107	0.04108	0.03975

Robust standard errors in parentheses

The superscripts ***, ** and * denote the significance levels at 1%, 5% and 10%, respectively.

This paper empirically supports the significance of human capital stock on income equality. The validity of results can be inferred from given statistics. Firstly, in order to avoid heteroscedasticity, we used "robust" command in Stata software for all estimates, which allows robust estimation of coefficients and standard errors. Secondly, the explanatory power of the models can be confirmed by the R^2 – values. Moreover, our linear regression model and independent variables are significantly useful to predict the dependent variables. The p-values associated with the F-statistics are smaller than 0.05, which provides evidence that the model containing the independent variables is more useful than a model containing only the constant term. As a result, we can say that at least one of the independent variables in the model is

significantly related to the dependent variable and is important in estimating the dependent variable.

Conclusions

This study sheds light on the effect of human capital on income equality. It does so by estimating cross-sectional OLS regression for 89 countries with data in 2018. The regression results show that countries with a higher gross enrollment rate in tertiary education experience higher levels of income equality. This finding demonstrates that human capital is a great predictor of income equality. Moreover, technological development and openness variables that control demand-side factors were added to the regression. The results indicated that countries with a higher level of trade volume and the share of research and development expenditure in GDP have a higher level of income equality. Additionally, the inclusion of these variables contributed to the estimated coefficient of human capital.

Furthermore, the estimated coefficient of income per capita is strongly negative whereas the estimated coefficient of the squared term of income per capita is strongly positive. This means that while income equality decreases as income increases, it will begin to decrease after a particular point. The economic growth of countries is an important factor for a more egalitarian society. Therefore, as suggestions for future studies, the estimations can be repeated with more homogenous samples (such as samples of high-income, upper-middle, lower-middle, and low-income countries, separately). For sure, economic growth should be supported by human capital stock. Our empirical findings confirm that countries with a higher human capital stock are closer to achieve a higher level of income equality for their society.

This study contributes to the related literature in two-fold. Firstly, it defines human capital stock as the gross enrollment rate of tertiary education which enables individuals to develop themselves at a higher level. This feature of the study differs from the previous literature. Secondly, instead of using the income inequality index,

the study reverses this index by using the ratio of the income share held by the lowest 10% (of the population) to the income share held by the highest 10% (of the population). This is not a commonly used ratio in the literature. The purpose of using this ratio is to give a different perspective to the interpretation. It is completely open to criticism.

Lastly, we recommend countries to increase their human capital investments and educated worker populations as policy implications. In addition to human capital, which has a significant and positive effect on income equality, which is also one of the most important indicators of development, increasing the trade volume, increasing the share of the expenditure on research and development in GDP, and preventing unemployment will be effective policies to reinforce income equality.

References

Becker, G. S. (1962). Investment in human capital: A theoretical analysis. Journal of political economy, 70(5, Part 2), 9-49.

Becker, G. S., & Chiswick, B. R. (1966). Education and the Distribution of Earnings. The American Economic Review, 56(1/2), 358-369.

Bourguignon, F., & Morrisson, C. (1990). Income Distribution, development and foreign trade: A cross-sectional analysis. European Economic Review, 34, 1113-1132.

Chakraborty, S., & Das, M. (2005). Mortality, Human Capital and Persistent Inequality. Journal of Economic Growth, 159-192.

Chiswick, B. R. (1971). Earnings inequality and economic development. The Quarterly Journal of Economics, 85(1), 21-39.

Chiu, W. H. (1998). Income inequality, human capital accumulation and economic performance. The Economic Journal, 108(446), 44-59.

Eckstein, Z., & Zilcha, I. (1994). The effects of compulsory schooling on growth, income distribution and welfare. Journal of Public Economics, 54(3), 339-359.

Eicher, T. S., & Garcia-Penalosa, C. (2001). Inequality and growth: the dual role of human capital in development. Journal of Development Economics, 66(1), 173-197.

Fields, G. S. (1980). Education and income distribution in developing countries: A review of the literature. Washigton, DC: The World Bank, 231-315.

Galor, O. (2011, May). Equality, human capital formation and the process of development. NBER Working Paper Series, 1-62.

Glomm, G., & Ravikumar, B. (1992). Public versus private investment in human capital: endogenous growth and income inequality. Journal of political economy, 100(4), 818-834.

Gylfason, T., & Zoega, G. (2003). From Education to Equality and Growth. CEPR Discussion Paper.
Lemieux, T. (2006). Postsecondary education and increasing wage inequality. American Economic Review, 96(2), 195-199.
Marin, A., & Psacharopoulos, G. (1976). Schooling and income distribution. The Review of Economics and Statistics, 332-338.
Mincer, J. (1974). Progress in human capital analysis of the distribution of earnings. (No. w0053): National Bureau of Economic Research.
Park, K. H. (1996). Educational expansion and educational inequality on income distribution. Economics of education review, 15(1), 51-58.
Rustichini, A., & Schmilz Jr, J. A. (1991). Research and imitation in long-run growth. Journal of Monetary Economics, 27(2), 271-292.
Schultz, T. (1961). Investment in human capital. The American Economic Review, 51(1), 1-17.
Smith, A. (1776). Of the division of labour. Classics of organization theory, 40-45.
World Bank, World Development Indicators. (2021). https://data.worldbank.org/

APPENDIX A

Table A.1: List of the sample countries

Albania	Colombia	Hungary	Malta	Romania
Algeria	Costa Rica	Iceland	Mauritania	Russian Federation
Argentina	Croatia	India	Mauritius	Rwanda
Armenia	Cyprus	Indonesia	Mexico	Senegal
Australia	Czech Rep.	Iran, Islamic Rep.	Moldova	Serbia
Austria	Denmark	Ireland	Mongolia	Slovak Rep.
Belarus	Ecuador	Israel	Montenegro	Slovenia
Belgium	Egypt, Arab Rep.	Italy	Morocco	South Africa
Bosnia and Herzegovina	El Salvador	Japan	Mozambique	Spain
Botswana	Estonia	Jordan	Myanmar	Sri Lanka
Brazil	Ethiopia	Kazakhstan	Namibia	Sweden

Bulgaria	Finland	Korea, Rep.	Nepal	Switzerland
Burkina Faso	France	Kyrgyz Rep.	Netherlands	Tunisia
Burundi	Georgia	Latvia	North Macedonia	Turkey
Cabo Verde	Germany	Lithuania	Norway	United Kingdom
Canada	Ghana	Luxembourg	Pakistan	United States
Chile	Greece	Madagascar	Poland	Uruguay
China	Honduras	Malaysia	Portugal	