

THE DANISH
INSTITUTE FOR
HUMAN RIGHTS

HUMAN RIGHTS AND ECONOMIC GROWTH

AN ECONOMETRIC ANALYSIS OF THE
RIGHTS TO EDUCATION AND HEALTH

SIGRID ALEXANDRA KOOB
STINNE SKRIVER JØRGENSEN
HANS-OTTO SANO

NO. 2018/4

MATTERS OF CONCERN
HUMAN RIGHTS' RESEARCH PAPERS

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Authors: Sigrid Alexandra Koob, Stinne Skriver Jørgensen, Hans-Otto Sano

ISBN: 978-87-93605-53-4
e-ISBN: 978-87-93605-54-1

Graphic design: Hedda Bank

© 2018 The Danish Institute for Human Rights
Denmark's National Human Rights Institution
Wilders Plads 8K
DK-1403 Copenhagen K
Phone +45 3269 8888
www.humanrights.dk

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ABBREVIATIONS

DIHR	Danish Institute for Human Rights
GMM	Generalised method of moments
TFP	Total factor productivity
GDP	Gross domestic product
OLS	Ordinary least squares
ADL	Autoregressive distributed lag model
UNESCO	United Nations Educational, Scientific, and Cultural Organisation
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund



ACKNOWLEDGEMENTS

This working paper is the result of a process of work that started in August 2017. While working on the report, the authors have benefitted from insightful advice from several colleagues. Given that this is not a conventional human rights topic, we have been particularly grateful for comments and suggestions from economist colleagues outside the Danish Institute for Human Rights: Asger Moll Wingender, assistant professor at the University of Copenhagen and Stine Ludvig Bech at the Central Bank of Denmark. We have also benefitted tremendously from constructive suggestions from lead economist Ambar Narayan and Senior Program Officer Dr. Eva Kløve, both at the World Bank. All of the aforementioned have commented from the vantage point of professional experience and not as a representative of their respective institutions. Finally, we would like to thank colleagues at the Danish Institute for Human Rights who have followed the process: Eva Grambye, Birgitte Feiring, Mads Holst Jensen, Janne Bruvoll, Kathrine Storgaard Carlsen, and Maja Meiland Hansen.



EXECUTIVE SUMMARY

This analysis seeks to answer the question: Do human rights have a positive effect on economic growth and, therefore, are not only the right thing to do in normative terms but also the smart thing to do in economic terms? In the context of this working paper, we analyse the question with the point of departure in economic, social, and cultural rights as defined below.

This working paper is the third in the series 'The Economy of Human Rights' that addresses the influence of human rights on economic development. The first working paper, published in 2016 by Sano and Marslev (2016) at the Danish Institute for Human Rights, explored the relationship between human rights and economic development on the basis of a literature study. The second paper, published in 2017 by Koob et al. (2017), was an econometric study that found a positive impact of civil and political rights – more specifically freedom and participation rights – on economic growth.

BACKGROUND

This working paper focuses on one significant element in economic, social, and cultural rights, namely access to education and health services, including whether equal access to primary education and basic healthcare has an impact on economic growth. Research has found that education, health, and several other factors associated with economic and social rights contribute to economic growth. What has been studied less, however, is the effect of the specific human rights dimensions. A human rights-based approach to education and health addresses entitlements to universal and non-discriminatory access to free primary education, affordable healthcare, and availability of high-quality services.

We undertake an empirical, econometric analysis of whether equal access to basic education and healthcare contributes to economic growth, using a dynamic panel data estimation method. We employ indicators from the project 'Varieties of Democracy' that is based on expert assessments of whether basic education and healthcare are guaranteed to all citizens of a given country in a given year. Using a sample of 150 countries between the years 1960-2012, we study how changes in the indicators affect economic growth.

We aim to answer the following questions:

1. Is equal access to education and healthcare a sound investment from a macroeconomic perspective?
2. What is the time horizon for the macroeconomic gains of equal access to education and healthcare?
3. Does the macroeconomic impact of equal access to education and healthcare differ across regions with different levels of equality?

HUMAN RIGHTS ARE THE SMART THING TO DO

The econometric analysis shows that equal access to basic education and healthcare has a significant positive effect on economic growth at a global level in both the medium and long term. Therefore, equal access to basic education and healthcare is a sound investment from a macroeconomic perspective. Including a broader part of the population by ensuring them access to basic education and healthcare can increase the overall level of human capital in a country that is a driver of growth. Furthermore, our results show that equal access to basic healthcare and education contribute to growth in countries with a low degree of equal access to basic education and healthcare; however, in countries which have already reached a high level of access, further equality does not seem to generate growth. In particular, our analysis shows that equal access to basic education and healthcare has a significant and positive impact on growth in Sub-Saharan Africa, and no significant impact in Europe and Central Asia.

STEPPING STONE

It is recognised in the analysis that the data used are based on narrow five-level assessments, and although extensive work has been done to reduce bias and errors in the assessments, they might still be subject to problems such as variation truncation, scale inconsistencies, and so forth. This notwithstanding, it seems relevant to explore further the conclusions of this working paper in more detailed (country) case studies.

Given these caveats, this analysis sheds further light on a very poorly examined subject. First, it supports the claim of Sano and Marslev (2016) that human rights may not only be the right thing to do in normative terms but might be the smart thing to do in economic terms. Moreover, it elaborates on the conclusions of Koob et al. (2017) by focusing on other dimensions of human rights – namely the economic, social, and cultural rights – and their positive impact on growth. Overall, this means that the strengthening of different dimensions of human rights does not represent a cost in terms of long-term economic growth. This analysis can be seen as a stepping stone towards a greater understanding of how human rights affect our societies.

CHAPTER 1

INTRODUCTION

In recent times, many countries have experienced increasing economic inequality with severe consequences for the well-being of people at the bottom, social cohesion in societies, and global migration flows. This has focused the attention on inequality, and economic inequality has increasingly been a subject addressed by economists, especially its effect on economic growth. There is evidence of income inequality impeding growth, which implies that there might be alternative ways to growth – with equality of outcomes and opportunities at the centre. Numerous researchers have, therefore, looked at different channels of transmission between economic inequality and growth. What is less well understood is how human rights play a role in this equation, if at all.

This paper is the third in the paper series “The Economy of Human Rights” that addresses the influence of human rights on economic development. In a desk study of Sano and Marslev (2016), possible pathways through which human rights may affect economic growth were explored: 1) reduced economic inequality, 2) human development, 3) effective institutions and governance, and 4) absence of conflict and political instability. Here, evidence regarding these four themes, which are all potentially related to human rights, led to a hypothesis that human rights conceived broadly as either economic-social or civil and political rights may be a positive factor in engendering economic growth. The second paper was an econometric study in which the linkage between civil and political rights – more specifically freedom and participation rights – and economic growth was explored (Koob et al., 2017). The study shows a significant positive impact of the right to freedom of speech, freedom of assembly and association and electoral self-determination on economic growth.

This paper will focus on crucial elements in economic, social, and cultural rights, namely accessibility to education and healthcare services, including whether and how equal access to primary education and basic healthcare plays a role in the growth equation. Research has found that education, health, and several other factors associated with economic and social rights contribute to economic growth.¹ What has been studied less, however, is the effect of the specific human rights dimensions. A human rights-based approach to education and health addresses entitlements to universal and non-discriminatory access to free primary education, affordable healthcare, and the availability of high-quality services.² Therefore, the education and health systems comprise education and health rights.

This study hypothesises that equal access to education and healthcare may affect economic growth directly or indirectly through income inequality. Ensuring that all children have access to basic education and providing healthcare to the entire population of a given country may increase the economic and social opportunities of people and society.

With this paper we want to answer the following three questions:

1. Is equal access to education and healthcare a sound investment from a macroeconomic perspective?
2. What is the time horizon for the macroeconomic gains of equal access to education and healthcare?
3. Does the macroeconomic impact of equal access to education and healthcare differ across regions with different levels of equality?

We undertake an econometric analysis of the impact of equal access to education and healthcare on economic growth using panel data estimation methods on 151 countries from 1960-2012. One of the main issues when estimating the effect of human rights on economic growth is the measurement of the specific human rights. For this analysis, we use data from the project 'Varieties of Democracy' in which the included variables measure equal access to basic education and healthcare. The empirical strategy of the analysis is inspired partly by the IMF, whose analysis (Ostry et al., 2014) shows that lower net income inequality is robustly correlated with faster and more durable growth. We use the same medium-term model as the IMF, but instead of focusing on income inequality, we investigate the direct effect of equal access to education and healthcare on economic growth when controlling for income inequality and other factors. Moreover, we estimate the long-run effect using the empirical framework in Koob et al. (2017). Furthermore, we examine whether the relationship between equal access to education and healthcare and economic growth differs across regions with different levels of equality

Our main findings are as follows:

- Equal access to basic education and healthcare has a significant positive effect on economic growth in the medium and long term at a global level.
- The positive impact of equal access to basic healthcare and education seems to be stronger in countries with low levels of equality, however, in countries with high levels of equality, further equality does not seem to generate growth.

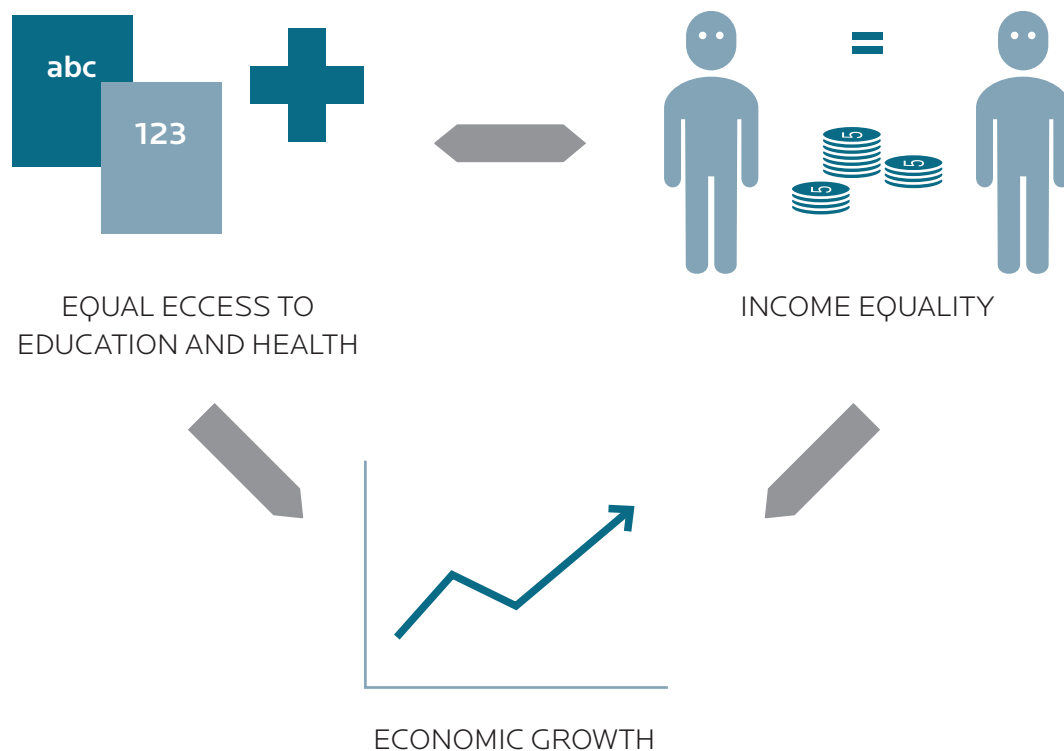
The rest of the paper is organised as follows: Section 2 presents conceptual reflections and a brief literature review. Section 3 describes the data and methodological challenges. In Section 4, the econometric method is described, and section 5 presents our results. Section 6 concludes and reflects on subjects for further research. We present several additional materials in the online annex.

CHAPTER 2

CONCEPTUAL REFLECTIONS AND LITERATURE REVIEW

Our analysis builds on the hypothesis that equal access to education and healthcare affects economic growth directly and indirectly working through economic inequality. The relationships are illustrated in figure 1.

FIGURE 1: THE RELATIONSHIP BETWEEN EQUAL ACCESS TO EDUCATION AND HEALTHCARE, ECONOMIC INEQUALITY AND ECONOMIC GROWTH



The literature linking income equality to economic growth is fairly comprehensive.³ Similarly, the research discussions on the importance of education and health (often termed human capital) in engendering economic growth are also abundant and positive with respect to the role played by human capital.⁴ However, studies on the link between human capital inequality and income inequality are rarer. Also, the literature and empirical evidence concerning how human rights to education and healthcare – especially equal and guaranteed access to education and healthcare – impact economic growth is scarcely available. Furthermore, an also understudied subject is how equal access to education and healthcare interacts with income inequality and economic growth.

In this section, we will give a brief review of the literature concerning these different linkages, summarised in figure 1. First, though, we will discuss the human rights concept of equal access to education and health.

THE HUMAN RIGHTS CONCEPT OF EQUAL ACCESS TO EDUCATION AND HEALTH

A human rights-based approach to education and health sectors implies the ensuring by the government of equal and universal access to quality education and health. Next to equality and non-discrimination, the rights-based approach presupposes adherence to the human rights principles of accountability and to participation. In this paper, we shall not address these principles as we are concerned with the principle of non-discrimination and equality.⁵

Education is both a human right in itself and an indispensable means of realising other human rights. As an empowerment right, education is the primary vehicle by which economically and socially marginalised adults and children can lift themselves out of poverty and obtain the means to participate fully in their communities. Education has a vital role in empowering women, safeguarding children from exploitative and hazardous labour and sexual exploitation, promoting human rights and democracy, protecting the environment, and controlling population growth. Realising the right to education includes the elements of **availability, accessibility, acceptability, adaptability, and quality** which are common to education in all its forms and at all levels. Each of these elements has a specific meaning. **Availability** means that education is permitted and all-encompassing. **Access** ensures that education is accessible to all children (for compulsory education: free of charge). **Acceptability and quality** refer to the fact that a certain quality is guaranteed (health and safety, quality of teachers, etc.). **Adaptability** means that schools must adapt to children, not the other way around.

Health is a fundamental human right equally indispensable for the exercise of other human rights. Every human being is entitled to the enjoyment of the highest attainable standard of health conducive to living a life in dignity. In interpreting the right to health, the Committee on Economic, Social, and Cultural Rights stressed essential elements such as **availability**, the functioning of healthcare services; **accessibility**, ensuring physical information as well as economic accessibility; and

quality, including that goods and services must meet scientifically and medically appropriate standards and quality (Committee on Economic, Social and Cultural Rights, 2000).

Because education and health as human rights are essential for the exercise of all other human rights, a highly unequal distribution of rights and resources can prevent groups in society from exercising other rights, such as the right to political participation or physical security, due to issues with health, poor education, or lack of finances. Quality and equality in rights as well, as resources are, for example, prerequisites for democratic participation. Hence, to understand the implications of underperformance concerning the right to education and health, it goes beyond the education and health sector to examine the right to information or the right to a minimum level of income (to enable access for the poor). This is the indivisibility of human rights. Though duty-bearer obligations entail more elements and attributes than accessibility (Committee on Economic, Social and Cultural Rights, 1999), this analysis will focus mainly on the element of accessibility.

THE RELATIONSHIP BETWEEN ECONOMIC INEQUALITY AND ECONOMIC GROWTH

Both theoretical and empirical studies have extensively explored the relationship between income inequality in particular and economic growth. In a survey of the theoretical and empirical literature on the impact of income inequality on economic growth, Neves and Silva (2014) conclude that empirical evidence does not leave clear-cut conclusions on the sign of the effect, positive or negative. However, most of the theoretical models predict negative effects of inequality on growth (*ibid.*) as do more recent empirical studies (Ostry et al., 2014; Cingano 2014; Dabbla-Norris et al. 2015). Many of the studies argue that the effect runs through human capital formation, that is, education and health (Andersen, 2015).

Moreover, Neves and Silva (2014) conclude how ‘the effect of inequality on growth is subject to some methodological issues and challenges which in part may be responsible for the apparent lack of consensus about the way inequality influences growth’. They arrive at mainly four specific analytical dimensions, which we make use of in our analysis. The first dimension is that country- and region-specific characteristics play an important role in the inequality-growth equation. To account for this, we employ regional regressions to see how the effects differ across regions with different levels of equality. Second, the time horizon often is neglected in the empirical studies. Therefore, we focus on different time horizons to understand how the effect evolves. Third, different estimation techniques produce different results which call for robust testing of results. We account for this by employing two estimation techniques. Fourth, the data measuring inequality are crucial; we have, therefore, made a comprehensive triangulation of our inequality measures to ensure the consistency and validity of our variables of interest.

THE RELATIONSHIP BETWEEN EQUAL ACCESS TO EDUCATION AND HEALTH, AND ECONOMIC GROWTH

According to neoclassical growth theory, human capital – measured by education skills and health – is the fourth⁶ driving force of economic growth rates (Jones, 2002). This means that more schooling and better health increase the income of countries and the global difference of human capital accounts to a large extent for the variation in per capita income across countries. The positive effect of human capital on growth has repeatedly been shown empirically (Andersen, 2015). In growth theory, it is often assumed that there is a diminishing return of these driving forces/input factors, which means that the marginal output of increasing, for example, the level of human capital is decreasing, that is, the gains of increasing human capital are larger when moving from lower levels and the gains may be limited when moving from high levels. This has an interesting theoretical implication for access to human capital: Decreasing returns of education and health imply that the distribution of human capital matters for the overall level of human capital – the gain of investing in human capital is larger if these investments are spread across a population (ibid.). This indicates that equal access to education and health theoretically has a positive effect on growth.

Castelló and Doménech (2002) empirically investigate how human capital inequality affects economic growth. They measure human capital inequality by constructing the Gini coefficient over the distribution of education by quintiles. The education measure combines information of attainment levels and average years of primary, secondary, and tertiary education of the population aged 15 or above. They do the estimations for a panel of 108 countries over five-year intervals from 1960 to 2000 and find that human capital inequality measures provide more robust results than income inequality measures in the estimation of standard growth and investment equations. The result is robust when adding regional dummies. These results are interesting for our study but do not directly address our research questions as they do not take into account the accessibility to education.

From a human-rights point of view, Kaletski and Randolph (2018) discuss whether social human-rights fulfilment can stimulate economic growth (the rights to education, health, housing, food, work, social security, and water). The literature review shows how human development investments stimulate technology development and economic growth. An important argument in the analysis is that human development efforts stimulate growth as documented in several studies, but the growth, in turn, impacts social change. There are the virtuous circles of growth where both growth and human development are stimulated and vicious circles of no growth and no human development, as well as cases in between. Kaletski and Randolph consider growth cases occurring without human development which follows a line already reflected in Ranis and Stewart's study from 2007 quoted in Sano and Marslev (2016). However, Kaletski and Randolph do not cite studies that analyse how the specific rights to education, health, housing, and so forth stimulate economic growth. They conclude their

review by stating that the studies analysed suggest that there is no inter-temporal trade-off between promoting the rights to education and health in the short run and the long-run. They do so by arguing a linkage between economic growth and resource capacity which would raise the obligation of states to realise social rights. They also point to a virtuous relationship between human development and social rights.

Grimm (2011) investigates whether inequality in health impedes economic growth. He uses Demographic and Health Survey (DHS) data to measure inequality in health in low- and middle-income countries. The specific measure used is the absolute difference in the under-five mortality rates experienced by mothers in the lowest education group (no formal education) and mothers with at least secondary education. The empirical part of the paper uses an original cross-national panel data set covering 62 low- and middle-income countries over the period 1985 to 2007. He finds a substantial and relatively robust negative effect of health inequality on income growth. The effect also holds if health inequality is instrumented to circumvent a potential problem of reverse causality. Hence, he finds that reducing inequality in healthcare as measured by child mortality and life expectancy can make a substantial contribution to economic growth with a time lag. Also, this study is interesting in the context of our analysis, but it does not cover the same range of countries and years, and it measures health outcomes rather than access.

In a study on inequality of opportunity in African countries, a group of World Bank scholars (Dabalen et al. 2015) analyse the impact of inequality of opportunity on economic growth, that is, the impact of circumstances that individuals are born into. The human opportunity index (HOI) measures how close a society is to universal coverage of, for instance, primary education along with how equitably coverage of that opportunity is distributed among groups with different circumstances. It measures, therefore, the magnitude of group differentiation in combination with the extent of coverage. They find a positive relationship between GDP/capita and the Human Opportunity Index for school attendance (children 6-11 years) and full immunisation of children. That is, higher universal coverage and lesser inter-group differentiation is associated with economic growth (Dabalen et al. 2015: 138).⁷

THE RELATIONSHIP BETWEEN ECONOMIC INEQUALITY AND EQUAL ACCESS TO EDUCATION AND HEALTH

Since we want to examine the effect of equal access to education and healthcare on economic growth, accounting for income inequality, the relation between income inequality and human capital inequality is also of interest for our analysis. Income inequality and inequality in health and education may be closely related with possible two-way causality. Income inequality can cause inequality in education and health if you have to pay a fee to access education and health as in some countries in, for example, Sub-Saharan Africa where school fees constitute a direct cost and where school uniforms an indirect burden. In this case, the poorer part of the population may have limited access. This is also the argument used

by Galor and Zeira (1993), who theoretically show how individuals with poor initial wealth are unable to invest in human capital due to their credit constraints. Conversely, inequality in education and health may also affect employment and thus income opportunity and income inequality. Thus, access to education affects job opportunities and performance in the labour market and, therefore, income. Similarly, health status is an obvious factor in labour market performances and salaries. This is further established in the model of Jenkins (1995), who shows how unequal formation of human capital increases the inequality of income among different classes of society.

SUMMING UP

Our analysis builds on the hypothesis that equal access to education and healthcare may affect economic growth directly and indirectly through income inequality. There is empirical evidence of a negative impact of income inequality on economic growth. Moreover, the literature has established human capital as a driver of growth. The human opportunity studies by the World Bank examine the distributional aspects of, for example, education and health status and discuss the negative impact of inequality of opportunity on economic growth. However, there is limited empirical evidence on unequal access to basic education and health and the economic impact of specifically the inequality of access. Thus, there are limited studies on the how human rights concepts of equal access affect growth. This is the subject of the next chapters.

CHAPTER 3

DATA

This analysis is based on an unbalanced panel comprising 151 countries from 1960-2012. This section will present and discuss the different variables used for the analysis and show some descriptive summary statistics.

3.1 DATA ON EQUAL ACCESS TO EDUCATION AND HEALTHCARE

Several data sources measure inequality in education and health either directly or indirectly.⁸ However, the data coverage in terms of years and countries is limited. Therefore, this analysis will rely on a measure of equal access to basic education and health that is based on an additive index of educational and health equality. The measurements 'educational equality' and 'health equality' are two index variables collected through the project Varieties of Democracy (V-Dem). The reason for this choice is the data coverage; it covers 177 countries and the years 1900-2016. As the data source is rather new and unexplored, we will introduce the indicators in detail in the next section. Moreover, we will discuss the advantages and disadvantages of the data source and give a summary of the comprehensive data triangulation we have made to ensure the reliability of the data. Furthermore, we will discuss the validity concerning the connection between the V-Dem indicators and the human-rights concept of equal access to education and health.

EDUCATIONAL AND HEALTH EQUALITY FROM V-DEM

As mentioned above, we use an additive index of the indicators 'educational equality' and 'health equality' to measure equal access to education and health⁹ from the V-Dem project (version 7.1). The two are collected through the V-Dem project,¹⁰ where country experts respectively have answered the questions:¹¹

EDUCATIONAL EQUALITY:

'To what extent is high quality basic education guaranteed to all, sufficient to enable them to exercise their basic rights as adult citizens? Clarification: Basic education refers to ages typically between 6 and 16 years of age but this varies slightly among countries.'

RESPONSES:

- 0: Extreme. Provision of high quality basic education is extremely unequal and at least 75 per cent (%) of children receive such low-quality education that undermines their ability to exercise their basic rights as adult citizens.

- 1: Unequal. Provision of high quality basic education is extremely unequal and at least 25 per cent (%) of children ... (as above).
- 2: Somewhat equal. Basic education is relatively equal in quality but 10-25 per cent (%) of children ...
- 3: Relatively equal. Basic education is overall equal in quality but 5-10 per cent (%) of children ...
- 4: Equal. Basic education is equal in quality and less than 5 per cent (%) of children ...

HEALTH EQUALITY:

‘To what extent is high quality basic healthcare guaranteed to all, sufficient to enable them to exercise their basic political rights as adult citizens? Clarification: Poor-quality healthcare can make citizens unable to exercise their basic rights as adult citizens by failing to adequately treat preventable and treatable illnesses that render them unable to work, participate in social or political organizations, or vote (where voting is allowed).’

RESPONSES:

- 0: Extreme. Because of poor-quality healthcare, at least 75 per cent (%) of citizens’ ability to exercise their political rights as adult citizens is undermined.
- 1: Unequal. Because of poor-quality healthcare, at least 25 per cent (%) of citizens’ ... (as above)
- 2: Somewhat equal. Because of poor-quality healthcare, ten to 25 per cent (%) of citizens’ ...
- 3: Relatively equal. Basic health care is overall equal in quality but because of poor-quality healthcare, five to ten per cent (%) of citizens’ ...
- 4: Equal. Basic health care is equal in quality and less than five per cent (%) of citizens cannot exercise their basic political rights as adult citizens.

The responses are on an ordinal scale and are converted to a relative scale by a **Bayesian item response theory measurement model**,¹² where the ratings from multiple country experts are aggregated, disagreement and measurement errors are taken into account, and a probability distribution is produced over the country-year scores on a standardised interval scale to account for bias and uncertainty of expert. The point estimates are the median values of these distributions for each country-year, and the scale runs from -5 to 5 with 0 approximately representing the mean for all country-years in the sample. For most purposes in this analysis, the two indices have been aggregated, and, therefore, the scale runs from -10 to 10, and the scores are available for the entire period of interest (1960 to 2012). The construction of data makes it possible to look at the variation of the scores over time, that is, to track progress and deterioration of the aggregated equality-measure, and to analyse the level of equality in each country.

ADVANTAGES

There are four main advantages to using the measures from V-Dem. First, the most obvious advantage is the data coverage of 177 countries and the period from 1900 to 2016. To our best knowledge, no other dataset dealing with inequality in education and health has this kind of coverage.

Second, compared with other expert-assessment data, V-Dem also has the advantage that multiple experts have rated the same country-year crossing. Our two indices of interest have an average of 5.86 country-experts evaluating each year in each country. The data collection process includes a comprehensive evaluation and selection of country experts, where experts have to meet qualifications specified in a list of criteria such as impartiality and diversity in professional background.

Third, an advantage of using V-Dem is the Bayesian item response theory modelling technique. The measurement model is used to correct for systematic biases across coders and across countries that may result from experts employing varying standards in their understanding of a question. Moreover, each expert has to indicate their level of confidence on how correct their rating is and the questions are available in multiple languages to minimise linguistic misunderstandings. The answers are then processed through the measurement model using patterns of cross-rater (dis)agreement to estimate variations in reliability and systematic bias.¹³ This is performed to identify and correct for measurement error and to quantify confidence in the reliability of each estimate of the indicators. Therefore, the Bayesian item response theory modelling techniques are used to estimate latent characteristics from the collection of expert ratings for each question.

Fourth, another advantage with the V-Dem indicators is that they are multi-dimensional as they account for access, quality, and condition of other rights such as civil and political rights. This is in line with the indivisibility of human rights, cf. section 2, because education and health as human rights are essential for the exercise of all other human rights. However, we interpret the equality/access-aspect of the indicators as being the key dimension for the indicators of educational and health inequality.

DISADVANTAGES

There are mainly two disadvantages associated with the data. First, despite the comprehensive measurement model, errors can still occur due to misunderstandings about the way a question applies to a particular context; for example, it is not exactly clear what is meant by **'high quality basic healthcare'** in the question on health equality. Also, factual errors, errors due to the scarcity or ambiguity of the historical record, differing interpretations about the reality of a situation, different dimensions of the question, variation in standards, coder inattention, errors introduced by the coder interface or the handling of data once it has been entered into the database, or random mistakes might cause bias or inconsistencies (V-Dem, 2017). Using the V-Dem data is, therefore, not without

methodological challenges. Furthermore, the data might suffer from variation truncation since the ordinal 5-step score used in the V-Dem indicators may collapse variation within the countries in a too simplifying manner.

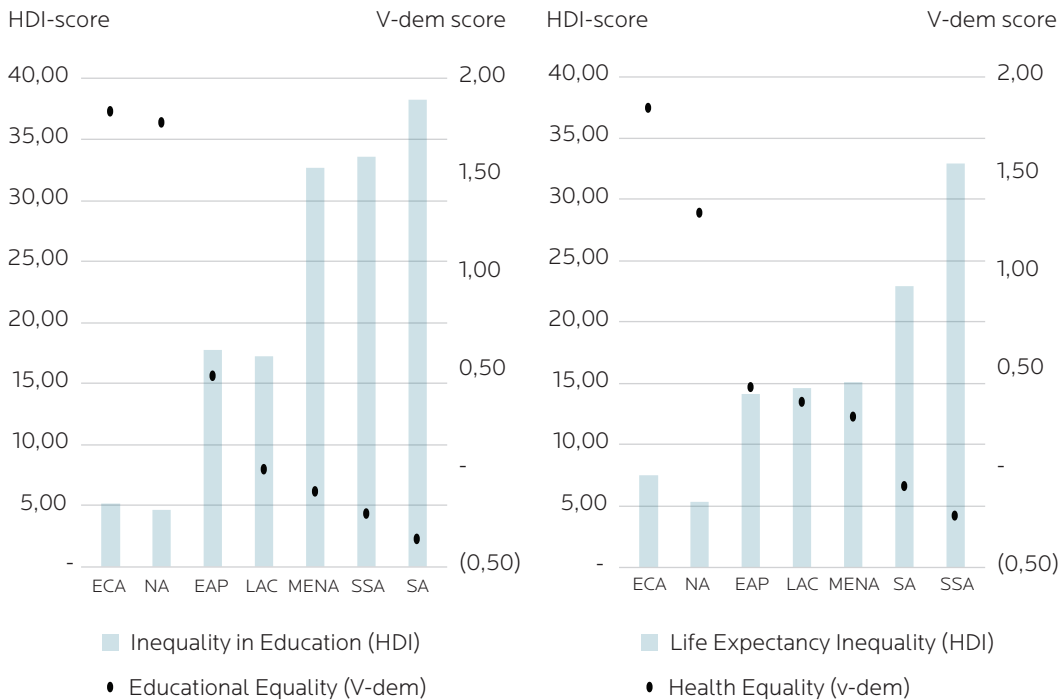
Second, a disadvantage of the data is that a policy of confidentiality of experts together with the use of the measurement model makes the assessment less transparent. The policy of confidentiality means that V-Dem does not reveal the identity of the country experts, both for safety reasons and to ensure that nobody can affect the expert rating through lobbying. This also means that it is not possible to trace specific developments of countries by asking the experts, and since the codebook behind the data does not explain specific drops or increases within countries, the development path of the data might sometimes appear inexplicable.

RELIABILITY OF DATA

To somehow account for the above-mentioned challenges and since V-Dem data is a somewhat new and unexplored data source, we have scrutinised the methods through correspondence with the persons responsible for V-Dem, but also by a rather comprehensive triangulation of data from V-Dem to other data sources. Furthermore, this has been done to assess the consistency and validity of the human-rights concept of equal access to health and education, which will also be discussed in the next sub-section. We have compared data from multiple data sources such as UNDP, UNICEF, UNESCO, and the World Bank all of which examine the effect of equality or quality of education and health. We compare data both on a regional and a country level. The full data triangulation is available in annex A.2. In the remaining sub-section, we summarise our findings.

When we compare regions across all data sources, we find that the ranking is more or less the same, as illustrated in figure 1, where we compare the UNDP Human Development Indicator of inequality in education (inequality in average years of schooling) and health (inequality in life expectancy) with the V-Dem indicators of equality in education and health. All sources agree that Europe, Central Asia, and North America are most equal in education and health, whereas Sub-Saharan Africa and South Asia rank as the most unequal. What is apparent from figure 1 is the differences in the levels of (in)equality depending on the data source. This is due to the actual subject of measure, that is, there will be differences since, for example, the HDI looks only at the inequality of education and health, whereas V-Dem also includes the elements of accessibility and quality in the measures. Moreover, we find a close connection between the ratings of the specific countries between data sources, with only a few outliers. Again, we find that the main reason for these outliers is also due to the subject of measure.

FIGURE 1: SCORE OF THE HDI INEQUALITY IN MEAN YEARS OF SCHOOLING AND LIFE EXPECTANCY INEQUALITY COMPARED TO V-DEM EDUCATIONAL AND HEALTH EQUALITY



Note: Data from V-Dem is average from 2010-2012 (shown on the right axis), and data from the HDI is from 2015 (shown on the left axis). The graph contains only countries that exist in both data-collections.
Data source: V-Dem v. 7.1, UNDP.

When we look at the development over time of regions and countries across data sources, all sources agree that, in general, there has been a decline in educational and health inequality over the years. Dabla-Norris et al. (2015) also confirmed this. We find that the sources might differ in the short-term, due both to the subject of measurement and differences in variation over time of the measures. V-Dem mostly catches the effect of structural changes in society, which is apparent when one investigates the development on a country level.

We conclude that the ranking and development over time of V-Dem reflects to a high degree the same trends as other better-known measures but also have the advantage of taking both equality/accessibility and quality into account. Therefore, despite the above-mentioned challenges, we find that the V-Dem indicators are the most accurate and comprehensive data on the subject of equal access to basic education and healthcare. Nonetheless, we will bear the data challenges in mind and moderate our results accordingly. In the remaining part of the paper, we will refer to the indicator as 'equal access to basic education and healthcare'.

VALIDITY OF DATA

Equal access to basic education and healthcare captures a significant part of the right to education and the right to the highest attainable standard of health. When the Committee on Economic, Social, and Cultural Rights interpreted the right to education, the committee stated that education in all its forms and at all levels should exhibit essential features such as availability, accessibility, acceptability, and adaptability.¹⁴ In its General Comment 14 on the Right to the Highest Attainable Standard of Health, the committee expressed that the right to health entails the following interrelated and essential elements availability, accessibility, acceptability and quality.¹⁵ While the elements of availability and acceptability relate to the institutional supply factors, accessibility (and the integral element of affordability) pertains strongly to rights attributes of rights-holders. Accessibility relates, therefore, to core interests of most rights-holders, and by referring to equal access, the element of non-discrimination is included with an emphasis. Thus, when the Office of the High Commissioner for Human Rights produced its human rights indicator guide in 2012, accessibility was emphasised in the illustrative sheets for both of these rights as a key attribute. Thus, while access to basic education and healthcare is not covering every dimension of these rights, it measures very important aspects of both rights (ONHCR, 2012, p. 90-93).

3.2 ECONOMIC GROWTH AND COVARIATES

The outcome variable is **economic growth** measured by **GDP per capita growth** in constant prices from the World Development Indicators. The data are available for the entire period (1960-2012). To take account of convergence¹⁶ **initial income level** is also included, measured by 'initial' **log GDP pr. Capita** (level of GDP).

To check the robustness of the relationship between educational- and health equality and growth, we add several control variables to the analysis. Our choice of covariates is based on the discussions of intermediate pathways in Sano and Marslev (2016), on the controls used by the IMF (Ostry et al., 2014), and on the additional existing literature outlined in Section 1.

INCOME INEQUALITY

We include net income inequality as a control in the analysis. We apply data from the standardised world income inequality database (Solt, 2009), which is probably the most the influential and comparable assembling of income inequality data (Gini coefficient) so far. Data is available for the entire period of interest (1960-2012) and all 151 countries. Income inequality is a central factor when analysing the relationship between educational and health equality and growth. Moreover, it is documented that that net income inequality has a negative effect on growth (Ostry et al., 2014). To capture the direct effect of educational and health equality on growth, we control for income inequality in all our estimations.

ECONOMIC FACTORS

Furthermore, we include some economic factors as controls in the analysis. These include **total factor productivity** from Penn World Table available from 1960-2012, **total investment** (as a percentage of GDP) from the IMF available from 1980-2012, **trade** (as a percentage of GDP) available from 1960-2012, and **unemployment** (as a percentage of total labour force, national estimate) from the World Development Indicators. These are all factors that are important for economic growth and somehow also may be related to inequality. For example, ensuring equal access to education and health may improve productivity and employment opportunities at an individual level, and a more equal society may decrease social frustrations and thereby improve the climate for investments and trade.

HUMAN DEVELOPMENT FACTORS

We include human development factors in the analysis. These are represented by **life expectancy** and **infant mortality** from the World Development Indicators. All data are available from 1960-2012. Equal access to education and health services may lead to a healthier population that furthermore contributes to growth.¹⁷

INSTITUTIONAL FACTORS

We also include factors of effective institutions and good governance as controls in the analysis. These include **government effectiveness** and **control of corruption** from the World Governance Indicators only available from 1996-2011. Inequality may form the basis for a bad institutional environment in which power tends to accrue to higher income groups (Grigoli et al., 2016), and institutional quality is important for growth.

3.3 SUMMARY STATISTICS

Summary statistics of our sample are reported in table 1 for all variables used in the analysis. We report the summary statistics for the entire sample as well as for Europe and Central Asia (ECA) and Sub-Saharan Africa (SSA) as the analysis also focuses on these two regions. The table summarises the number of observations per variable, the mean value across countries and years, and the standard deviation across countries and years.

TABLE 1: SUMMARY STATISTICS

	NO. OF OBSERVATIONS			MEAN			STANDARD DEVIATION		
	Global	ECA	SSA	Global	ECA	SSA	Global	ECA	SSA
GDP per capita growth	6,306	1,531	1,963	2.03	2.49	1.16	5.79	5.46	6.53
GDP per capita	6,378	1,576	1,975	8,423	20,343	1,592	13,223	17,471	2,215
Equal access to basic education and healthcare	7,410	1,841	2,278	0.77	4.02	-0.93	2.94	1.73	2.05
Net income inequality	4,205	1,385	929	38.16	30.14	41.94	8.90	5.65	7.64
Trade	6,304	1,558	1,896	66.48	76.21	65.14	35.93	33.79	34.96
Investment	4,073	1,134	1,165	22.50	23.47	20.43	8.59	6.47	10.27
TFP	4,499	1,439	924	0.95	0.87	0.98	0.26	0.17	0.21
Life expectancy	7,923	2,347	2,241	62.20	71.32	50.07	11.60	5.37	8.13
Infant mortality	7,226	1,975	2,089	59.48	22.74	99.70	48.35	23.34	41.59
Government effectiveness	2,561	765	729	-0.10	0.55	-0.72	0.99	1.08	0.64
Control of corruption	2,561	765	729	-0.13	0.44	-0.61	1.01	1.19	0.61

Note: Number of observations are year x countries.

Data sources: See subsection 3.1 and 3.2.

First, the table shows that Sub-Saharan Africa and Europe and Central Asia together make up more than 50% of our total sample. Therefore, the global estimates should be interpreted with this in mind. Moreover, it is important to note the smaller sample for net income inequality is due mainly to the fact that not all countries have data for the entire period. Europe and Central Asia is slightly better covered than Sub-Saharan Africa.

Second, the means in the table display several well-known patterns. The global mean of equal access to basic education and healthcare is 0.77, but there are relatively large variations across the two regions – the average is -0.93 for Sub-Saharan Africa and 4 for Europe and Central Asia. Similarly, the global mean of net income inequality is 38, and Europe and Central Asia has a lower income inequality

with a mean value of 30, and Sub-Saharan Africa a higher income inequality with a mean value of 42. The global mean of life expectancy (over the entire sample) is 62 years, and almost 12 years lower in Sub-Saharan Africa with a mean value of 50 years, and 71 years in Europe and Central Asia. The same patterns hold for infant mortality, where Europe and Central Asia is above the global mean and Sub-Saharan Africa below.

Third, the standard deviations in the table tell us something about the variation across and within countries in each region. However, when looking at standard deviation, it is interesting to separate variation between countries from variation within countries in the region. Table 2 summarises between (across countries) and within (over time) standard deviations for selected variables.

TABLE 2: BETWEEN AND WITHIN VARIATION (STANDARD DEVIATION)

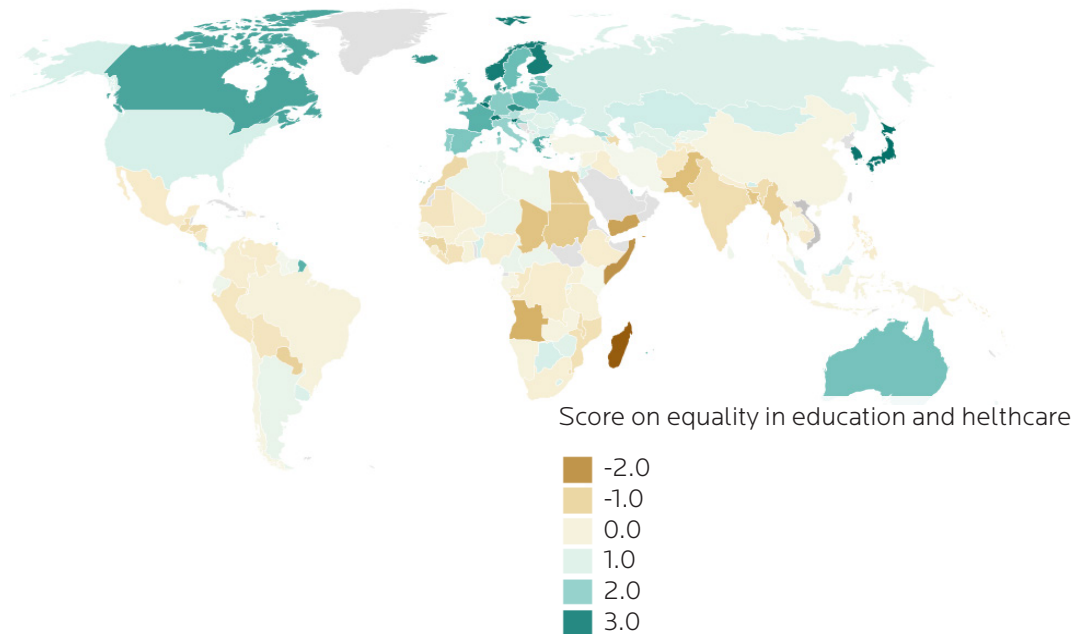
	GLOBAL		ECA		SSA	
	Between	Within	Between	Within	Between	Within
GDP per capita growth	1.64	5.59	1.37	5.34	1.56	6.35
Equal access to education and healthcare	2.77	1.01	1.65	0.9	1.67	1.21
Net income inequality	8.38	2.29	5.52	2.01	7.06	2.68

Note: Within variation is the variation over time, and between variation is the variation across countries.

Data source: See subsection 3.1 and 3.2.

The variation in growth seems to be due mainly to variation over time rather than across countries in the regions as the within variation is higher than the between variation. This seems plausible as growth rates can be volatile from year to year. In contrast, variation in net income inequality is due mainly to variation across countries rather than over time. Equal access to basic education and healthcare varies both across countries and years. However, the variation across countries is slightly higher than over time. The two regions have the lowest variation across countries compared to other regions of the world (see annex A.4). Figure 3 illustrates the score of equality in education and healthcare across countries of the world in 2012 (or latest available).

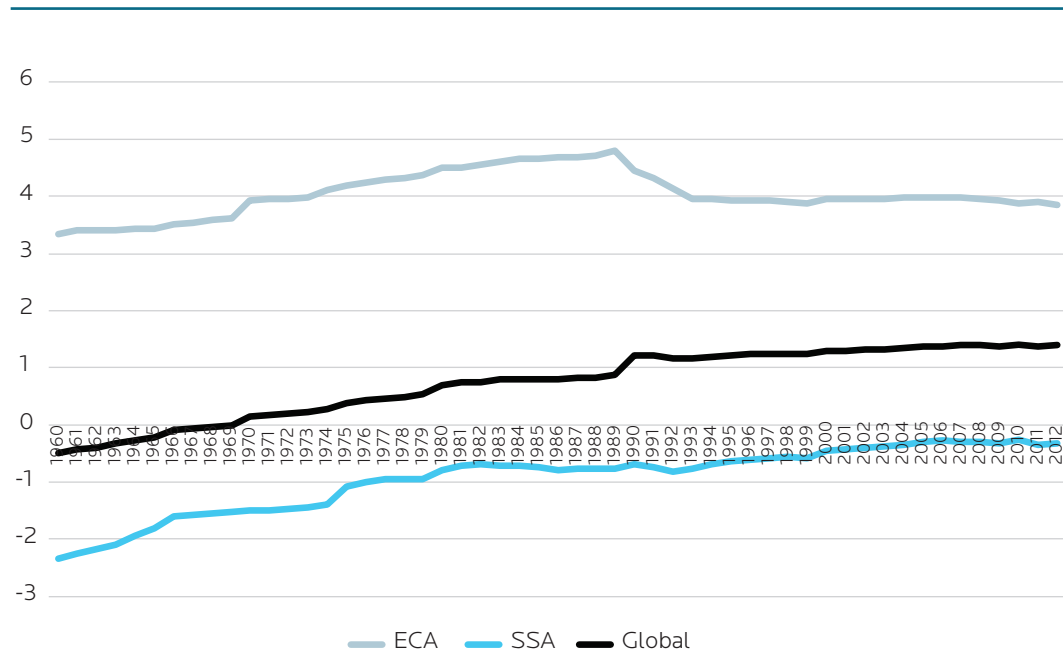
FIGURE 3: EQUAL ACCESS TO BASIC EDUCATION AND HEALTHCARE, 2012
(OR LATEST AVAILABLE)



Note: The map illustrates countries score in the V-Dem index of equal access to education and healthcare in 2012 (or latest available), where a green colour indicates a high degree of equal access and a brown colour indicates a low degree of equal access. See annex A.1 table 1 for a country list of the ratings.
Data source: V-Democracy (cf. subsection 3.1)

The world map illustrates how Europe seems to be the region with the most equal access to basic education and healthcare and Sub-Saharan Africa a region with low levels. Figure 4 illustrates the development over time in the index averaged over countries.

**FIGURE 4: EQUAL ACCESS TO BASIC EDUCATION AND HEALTHCARE,
AVERAGE SCORE, 1960-2012**



Data source: V-Democracy (cf. sub-section 3.1).

Figure 4 confirms the fact that Europe and Central Asia is above the global average and Sub-Saharan Africa below. Europe and Central Asia has experienced an increase in equality up until end-1980s, a decrease in the early-90s and a stable level ever since. The decrease is because the former Soviet countries enter the sample in 1990 with lower average values. Sub-Saharan Africa has experienced a general increase in the index over the period but remains at a low level.

CHAPTER 4

ECONOMETRIC METHOD

In line with Koob et al. (2017), the empirical strategy of the analysis is to model and test how equal access to basic education and healthcare affects per capita GDP growth by means of regression analysis with panel data models. To account for the dynamics of GDP, the general model for the empirical analysis is an autoregressive model with distributed lags $ADL(p,r)$ in a panel data framework

$$y_{it} = \sum_{k=1}^p \gamma_k y_{i,t-k} + \sum_{k=0}^r \beta_k x_{i,t-k} + \sum_{k=0}^q \varphi_k z_{i,t-k} + u_{it} \quad (1)$$
$$u_{it} = \alpha_i + \varepsilon_{it}$$

where $t = 1, \dots, T$ are years (1960-2012) and $i = 1, \dots, N$ are countries (151 countries). y_{it} is the dependent variable, GDP growth per capita, $x_{i,t-k}$ is the explanatory variable, the index for equal access to basic education and healthcare, and $z_{i,t-k}$ the covariates accounting for indirect effects such as economic and human development factors, as discussed in section 3.2. u_{it} , are the unobserved error term that is decomposed into country-specific effects, α_i , and an idiosyncratic term $\varepsilon_{it} \sim (0, \sigma_\varepsilon^2)$. GDP growth per capita is assumed and tested to be a stationary process.

The choice of estimation method depends on the behaviour of unobserved country-specific effects α_i . If fixed effects are present, that is, the country-specific effects are correlated with the regressors, the pooled OLS estimation will be inconsistent. This is the case in this study. Therefore, we eliminate α_i by modelling variables in deviation from their time-averaged values, that is, within transformation (Cameron and Trivedi, 2005). However, due to endogeneity of the lagged dependent variable, the within estimates have an asymptotic bias of order $1/T$. This is known as the Nickell bias (Nickell, 1981), and the system-GMM estimator developed by Blundell and Bond (1998)¹⁸ deals with the Nickel bias. We estimate both the medium- and the long-term relationship between equal access to education and healthcare and growth.

4.1 MEDIUM-TERM ESTIMATIONS

We follow the methodology in Ostry et al. (2014) and estimate our model (1) with $r = q = 0$ using data averaged over a five-year period. In particular, we examine how growth over a five-year period is affected by equal access to education and healthcare.

We use system-GMM estimation technique as λ is small due to the transformation of our data. This is also in line with Ostry et al. (2014). The choice of lag length is based on the absence of serial correlation in the panel residuals (i.e., we include lags to control for the dynamics in growth). A test for serial correlation developed by Arellano and Bond (1991) is performed as a specification test.¹⁹ Moreover, the Sargan test of over-identified restrictions is performed. Roodman (2009a) point out that a large instrument collection in system GMM can overfit endogenous variables. Moreover, Roodman (2009b) provides guidance on the use of system GMM to deal with the challenge of too many instruments. The econometric analysis in this study is based on this guidance provided by Roodman (2009b).²⁰

4.2 LONG-TERM ESTIMATIONS

Second, we estimate the long-run effects of a permanent increase in the index for equal access to basic education and healthcare x on GDP growth using our annual data. The long-run effect can be derived by rewriting the above model (1)

$$\lambda = \frac{\sum_{k=0}^r \beta_k}{1 - \sum_{k=1}^p \gamma_k}$$

We calculate the point estimates of the nonlinear combination of parameter estimates λ and corresponding standard errors, test statistics, and significance levels, where the squared standard errors are computed by means of the Delta method (Cameron and Trivedi, 2009). When using our annual data, T is of moderate size ($T = 43$), and the Nickel bias should be of smaller size. Therefore, we choose the within estimation technique when estimating the long-term relationship.

4.3 REGIONAL ANALYSIS

Furthermore, the empirical analysis aims at estimating the relationship between equal access to education and healthcare and growth at a regional level. To capture possible different relations for the regions, dummies and interaction terms are included in the regression analysis. In particular, the model includes a dummy D_i for the regions Sub-Saharan Africa and Europe and Central Asia, respectively, and an interaction term between these dummies and x_{it} . Both contemporary and lagged values of the time-varying variables are included.

$$y_{it} = \sum_{k=1}^p \gamma_k y_{i,t-k} + \sum_{k=0}^r (\beta_{1k} + \beta_{2k} D_i) x_{i,t-k} + \beta_{3k} D_i + \sum_{k=0}^q \varphi_k z_{i,t-k} + u_{it} \quad (3)$$

For each region, we estimate both the medium- and long-term relationship using the estimation techniques explained above.

CHAPTER 5

RESULTS

5.1 GLOBAL ANALYSIS

We formulate a model for all countries in our sample to determine the impact of equal access to basic education and healthcare on growth at a global level. As outlined in Section 4, we model both the **medium-term** and the **long-term** relationship. Our baseline model includes lagged GDP per capita in levels to account for convergence, that is, that poorer countries tend to grow faster than richer countries. Moreover, our baseline model includes net income inequality to obtain the direct effect of equal access to education and healthcare (as discussed in Section 3). Finally, the model includes lags of the dependent variable per capita GDP to account for the dynamics in GDP and to remove serial correlation in the model. Furthermore, we extend our baseline model by adding a range of covariates.

MEDIUM-TERM EFFECT OF EQUAL ACCESS TO EDUCATION AND HEALTHCARE ON GROWTH

First, we examine the **medium-term** relationship. In particular, we follow the methodology in Ostry et al. (2014) and estimate how average growth over a five-year period depends on equal access using system GMM estimation technique. Moreover, we include a range of covariates to see how this affects our baseline model. Table 3 summarises the results.

TABLE 3: MEDIUM-TERM EFFECT OF EQUAL ACCESS TO EDUCATION AND HEALTHCARE ON GROWTH

	Baseline	Baseline + controls		
	(1)	(2)	(3)	(4)
GDP per capita	-1.50*** (0.43)	-2.11*** (0.48)	-2.53*** (0.39)	-4.21*** (0.92)
Equal access to education and healthcare	0.51* (0.29)	0.63** (0.31)	0.62*** (0.23)	0.81* (0.45)
Net income inequality	-0.13** (0.06)	-0.05 (0.06)	0.01 (0.05)	-0.04 (0.13)
Trade		0.01 (0.01)		
Investments		0.15*** (0.05)		
Unemployment		-0.13** (0.07)		
Life expectancy			0.16*** (0.06)	
Infant mortality			-0.02 (0.01)	
Control of corruption				-2.54** (1.23)
Government effectiveness				4.78*** (1.6)
N	871	584	870	531
No. of countries	147	128	147	147
Time periods	10	7	10	4
AR2 test	0.07	0.20	-0.05	-0.67
Instruments	118	136	174	60
Sargan test	112.53	118.82	136.70	86.53
Time dummies	Yes	Yes	Yes	Yes

Note: The medium-term effect is estimated using system GMM estimation technique. The dependent variable is GDP per capita growth. Time dummies and a constant are included in the model. Lagged GDP per capita in levels is also included in the model. Every regressor is in some form included in the instrument matrix. Number inside () are standard deviations and *: $P < 0.1$, **: $P < 0.05$, ***: $P < 0.01$. N is the total number of observations. The AR2 test denotes the test statistics of serial uncorrelated residuals of the second order, and the Sargan test denotes the test statistics for the test of overidentified restrictions.

In our baseline model, column (1) of table 3, the medium-term effect of equal access to education and healthcare on growth is positive and significant. A one-unit increase in the index for equal access (in a given country) will increase average growth over a five-year period (in that country) by approximately 0.51 percentage points. The size of the estimates is difficult to interpret as an increase in the index can vary a lot from country to country within a given sub-indicator because very different circumstances may cause an increased rating of the given country. Nonetheless, with this in mind, we provide an example for an illustrative purpose: A one-unit increase in the indicator would, in theory, mean moving from the average level of the index in 2012 of South Africa to the average level of Kenya in 2012. However, we will focus on the sign and significance of the estimates. Net income inequality is negative and significant in accordance with Ostry et al. (2014). The level of GDP per capita income is significant and negative as expected – the lower GDP per capita, the higher growth rate and vice versa. Finally, the model is well specified according to the specification tests. Summing up, equal access to basic education and healthcare seems to increase per capita growth in the medium-term.²¹

Furthermore, we add several controls to our baseline model to check the robustness of our baseline results. First, we add **economic factors**, including trade, investment, and unemployment, summarised in column (2) of table 3. The effect of equal access to education and healthcare on growth remains positive and significant, and the sign of the included covariates are as expected. Next, we add **human development factors** as covariates, including life expectancy and infant mortality, summarised in column (3). The signs of the human development factors are as expected, and the effect of equal access on growth remains significant and positive. Finally, we add institutional factors to the baseline model that include an indicator of government effectiveness and an indicator for control of corruption. The estimates are summarised in column (4). The sign of government effectiveness is positive, whereas the sign of control of corruption is negative.²² The effect of equal access remains positive and significant.²³

Moreover, we estimate the medium-term effect of equal access to basic **education** and the effect of equal access to basic **healthcare** in two separate models (estimation results are in annex A.6, tables 1-2). The estimations show that the medium-term impact of both education and healthcare on growth is positive and significant. Therefore, education and healthcare are both important for the medium-term effect estimated in the above.

LONG-TERM EFFECT OF EDUCATIONAL AND HEALTH EQUALITY ON GROWTH

Next, we examine the **long-term** relationship. We follow the methodology in Koob et al. (2017) and examine how a permanent increase in the index for equal access to education and healthcare affects growth, accounting for the development in access equality in educational and health over the past 10 years. Moreover, we add a range of covariates to see how this affects our baseline model. Results are summarised in table 4.

TABLE 4: LONG-TERM EFFECT OF EQUAL ACCESS TO EDUCATION AND HEALTHCARE ON GROWTH

	Baseline	Baseline + controls		
	(1)	(2)	(3)	(4)
Equal access to education and healthcare	2.07** (0.94)	2.58** (1.26)	2.00** (0.93)	1.75** (0.72)
Long-run effect of equal access to education and healthcare	0.67*** (2.86)	0.98*** (3.63)	0.41** (2.02)	0.83** (2.06)
GDP per capita	-2.22*** (0.49)	-2.96*** (0.65)	-3.00*** (0.43)	-2.02** (0.88)
Net income inequality	0.03 (0.05)	0.05 (0.05)	0.05 (0.04)	-0.04 (0.06)
Trade		0.03*** (0.01)		
Investments		0.14*** (0.03)		
TFP		3.36** (1.6)		
Life expectancy			0.12*** (0.04)	
Infant mortality			-0.01 (0.01)	
Control of corruption				0.63 (0.57)
Government effectiveness				1.44** (0.71)
N	3537	2388	3533	2048
No. of countries	147	102	147	147
Time periods	43	33	43	17

Note: The long-term effect is estimated using within estimation technique (fixed effects). The dependent variable is GDP per capita growth, and 2 lags of the dependent variable are included to remove serial correlation. GDP per capita in levels is included as lag 10 according to the number of lags of the index for equal access to basic education and healthcare. Number inside () are standard deviations except for long-run effects where numbers in () are z-values and *: $P < 0.1$, **: $P < 0.05$, ***: $P < 0.01$. N is the total number of observations.

In our baseline specification in column (1) of table 4, the long-term effect of equal access to education and healthcare on growth is positive and significant. A permanent one-unit increase in the index (in a given country) will increase growth (in that country) by approximately 0.67 percentage points in the long run. The short-run effect of equal access to education and healthcare is also positive and significant. However, we focus on only the long-run effects as we are mainly interested in permanent changes and it is difficult to say whether short-run effects are temporary fluctuations or sustained over time. Net income inequality is insignificant, and the level of GDP per capita income is significant and negative. Finally, the model is well specified according to the specification tests. Therefore, ensuring children equal access to basic education as well as guaranteeing basic healthcare to the population can contribute to economic growth in the long-term.

Again, we add several controls to check the robustness of our baseline model. We add **economic factors** in column (2), **human development factors** in column (3) and **institutional factors** in column (4). The effect of equal access to education and healthcare on growth remains positive and significant in all specifications, and the sign of the included covariates are as expected.²⁴ Moreover, estimations of the separate effect of **education** and **healthcare** show that both education and healthcare are equally important for the total long-term effect estimated in the above (see annex A.6, tables 3-4 for estimation results).

SUMMING UP

Summing up, we find that equal access to basic education and healthcare contribute positively to economic growth in both the medium- and long-term. The findings are robust to the inclusion of economic, human development and institutional factors. Moreover, we find that basic education and healthcare are each significantly important for economic growth. Our results show that investing in equal access to education and healthcare can yield macroeconomic gains in terms of increased growth. Including a broader part of a population by ensuring them access to basic education and healthcare can increase the overall level of human capital in a country that is a driver of growth.

5.2 REGIONAL ANALYSIS

Next, we formulate a regional model to determine whether the effect of equal access to education and healthcare differ in specific regions. We focus on two regions: Europe and Central Asia (ECA) and Sub-Saharan Africa (SSA). The two regions each represent different levels of access equality in basic education and healthcare. Europe and Central Asia is the region with the highest mean value of access equality in basic education and healthcare, and Sub-Saharan Africa the region with the lowest mean value.²⁵ Moreover, the two regions each have the lowest variation across their countries, meaning that each region represents a relatively homogenous group of countries with regard to basic educational and healthcare access equality. This forms the basis for analysing how equal access to education and healthcare affects economic growth in countries with both a high and a low degree of equality.

As with our global analysis, we estimate both the **medium-term** and the **long-term** effect of equal access to education and healthcare in Europe and Central Asia and Sub-Saharan Africa, respectively. We use the methodology outlined in Section 4.

MEDIUM-TERM EFFECT OF EQUAL ACCESS TO BASIC EDUCATION AND HEALTHCARE ON GROWTH IN EUROPE AND CENTRAL ASIA AND SUB-SAHARAN AFRICA

First, we examine the **medium-term** relationship between equal access to education and healthcare in Europa and Central Asia and Sub-Saharan Africa, respectively. We follow the methodology in Ostry et al. (2014), but now we use interaction terms to separate out the regional effect (as outlined in Section 4). As in the global analysis, we estimate the baseline model and include several controls to see how this affects our baseline results. The choice of controls is based on data availability as the regional analysis is more sensitive to missing data, and specifically if the data is systematic missing in a region.²⁶ Results for Europe and Central Asia are summarised in panel A of table 5, and for Sub-Saharan Africa in panel B of table 6.

TABLE 5: MEDIUM-TERM EFFECT OF EQUAL ACCESS TO BASIC EDUCATION AND HEALTHCARE ON GROWTH IN EUROPE AND CENTRAL ASIA

	Baseline	Baseline + controls	
	(1)	(2)	(3)
GDP per capita	-1.49*** (0.43)	-1.52*** (0.42)	-2.35*** (0.46)
Equal access to education and healthcare (ECA)	0.03 (0.07)	0.42 (0.86)	0.55 (1.29)
Net income inequality	-0.18** (0.07)	-0.04 (0.07)	0 (0.06)
Trade		0.01 (0.01)	
Foreign direct investments		-0.01 (0.04)	
Life expectancy			0.16*** (0.06)
Infant mortality			-0.02 (0.01)

N	871	713	870
No. of countries	147	138	147
Time periods	10	9	10
AR2 test	-0.02	-1.04	0.00
Instruments	147	128	142
Sargan test	130.13	113.26	127.30
Time dummies	Yes	Yes	Yes

Note: The medium-term effect is estimated using system GMM estimation technique. The dependent variable is GDP per capita growth. Time dummies and a constant are included in the model. Lagged GDP per capita in levels are also included in the model. Every regressor is in some form included in the instrument matrix. Numbers inside () are standard deviations and *: $P < 0.1$, **: $P < 0.05$, ***: $P < 0.01$. N is the total number of observations. The AR2 test denotes the test statistics of serial uncorrelated residuals of the second order, and the Sargan test denotes the test statistics for the test of overidentified restrictions.

In the baseline model for Europe and Central Asia in column (1) of table 5, the medium-term effect of equal access to education and healthcare is positive, but insignificant. Net income inequality is negative and significant, and the level of GDP per capita income is significant and negative as expected. Finally, the model is well specified according to the specification tests. Furthermore, the estimates are robust to the inclusion of controls in columns (2)-(4). Therefore, there does not seem to be a medium-term relationship between access equality in basic education and healthcare and economic growth in Europe and Central Asia.

TABLE 6: MEDIUM-TERM EFFECT OF EQUAL ACCESS TO BASIC EDUCATION AND HEALTHCARE EQUALITY ON GROWTH IN SUB-SAHARAN AFRICA

	Baseline	Baseline + controls		
	(1)	(2)	(3)	(4)
GDP per capita	-1.52*** (0.43)	-1.58*** (0.45)	-1.99*** (0.42)	-3.49*** (1.07)
Equal access to education and healthcare (SSA)	1.23*** (2.85)	1.51*** (2.65)	1.38*** (3.14)	1.25 (1.61)
Net income inequality	-0.18*** (0.05)	-0.13** (0.07)	-0.07 (0.05)	-0.16* (0.09)
Trade		0.01 (0.01)		
Foreign direct investments		-0.01 (0.04)		
Life expectancy			0.18** (0.09)	
Infant mortality			-0.01 (0.02)	
Government effectiveness				2.69 (1.86)
Control of corruption				0.09 (1.25)
N	871	713	870	531
No. of countries	147	138	147	147
Time periods	10	9	10	4
AR2 test	0.01	-1.05	0.05	-0.45
Instruments	147	126	142	52
Sargan test	127.66	117.03	132.56	66.80
Time dummies	Yes	Yes	Yes	Yes

Note: The medium-term effect is estimated using system GMM estimation technique. The dependent variable is GDP per capita growth. Time dummies and a constant are included in the model. Lagged GDP per capita in levels is also included in the model. Every regressor is in some form included in the instrument matrix. Numbers inside () are standard deviations and *: $P < 0.1$, **: $P < 0.05$, ***: $P < 0.01$. N is the total number of observations. The AR2 test denotes the test statistics of serial uncorrelated residuals of the second order, and the Sargan test denotes the test statistics for the test of overidentified restrictions.

In the baseline model for Sub-Saharan Africa in column (1) of table 6, the medium-term effect of equal access to basic education and healthcare is both positive and highly significant. A one-unit increase in the index (in a given country) will increase average growth over a five-year period (in that country) by approximately 1.23 percentage points. Net income inequality is negative and significant, and the level of GDP per capita income is significant and negative as expected. Moreover, the model is well specified according to the specification tests.

Again, we include several controls to check the robustness of our baseline results. The medium-term effect is robust to the inclusion of the **economic factors** in column (2) and the **human development factors** to the model in column (3). Finally, government effectiveness and control of corruption are included in column (5), turning the medium-term estimates slightly insignificant (significant at a 10.8 pct. level). However, this is also affected by the reduced sample size.²⁷ Thus, in Sub-Saharan Africa, we find that equal access to basic education and healthcare has a positive effect growth in the medium term.

LONG-TERM EFFECT OF EQUAL ACCESS TO BASIC EDUCATION AND HEALTHCARE ON GROWTH IN EUROPE AND CENTRAL ASIA AND SUB-SAHARAN AFRICA

Next, we examine the **long-term** relationship in Europe and Central Asia and Sub-Saharan Africa. We follow the methodology in Koob et al. (2017) and examine how a permanent increase in the index for equal access to education and healthcare affects growth, accounting for the development in educational and health access equality over the past 10 years. We estimate the regional effect with interaction terms as outlined in Section 4. Results for Europe and Central Asia are summarised in panel A of table 5, and for Sub-Saharan Africa in panel B of table 6.

TABLE 7: LONG-TERM EFFECT OF EQUAL ACCESS TO BASIC EDUCATION AND HEALTHCARE ON GROWTH IN EUROPE AND CENTRAL ASIA

	Baseline	Baseline + controls	
	(1)	(2)	(3)
Equal access to education and healthcare	2.43** (1.19)	0.85** (0.39)	2.38** (1.19)
Equal access to education and healthcare (ECA)	-1.6 (1.3)	-0.14 (0.74)	-1.61 (1.31)
Long-run effect of equal access to education and healthcare (ECA)	0.33 (0.98)	0.21 (0.77)	0.18 (0.55)
GDP per capita	-2.19*** (0.48)	-2.37*** (0.45)	-3.00*** (0.42)
Net income inequality	0.03 (0.05)	0.03 (0.04)	0.05 (0.04)
Trade		0.03*** (0.01)	
Foreign direct investment		0 (0.01)	
Life expectancy			0.13*** (0.04)
Infant mortality			-0.01 (0.01)
N	3537	2865	3533
No. of countries	147	137	147
Time periods	43	43	43

Note: The long-term effect is estimated using within estimation technique (fixed effects). The dependent variable is GDP per capita growth, and 2 lags of the dependent variable are included to remove serial correlation. GDP per capita in levels is included as lag 10 according to the number of lags of the index for equal access to basic education and healthcare. Numbers inside () are standard deviations except for long-run effects where numbers in () are z-values and *: P < 0.1, **: P < 0.05, ***: P < 0.01. N is the total number of observations.

In the baseline specification for Europe and Central Asia in column (1) of Table 7, the long-run effect of equal access to education and healthcare on growth is positive but insignificant. The baseline results are robust to the inclusion of controls in columns (2)-(4), where the long-term effect of equal access to education and healthcare is positive but remains insignificant in all estimations. Therefore, there does not seem to be a long-term relationship between equal access to basic education and healthcare and economic growth in Europe and Central Asia.

TABLE 8: LONG-TERM EFFECT OF EQUAL ACCESS TO BASIC EDUCATION AND HEALTHCARE ON GROWTH IN SUB-SAHARAN AFRICA

	Baseline	Baseline + controls		
	(1)	(2)	(3)	(4)
Equal access to education and healthcare	0.60* (0.36)	0.48 (0.39)	0.43 (0.35)	0.85 (0.66)
Equal access to education and healthcare (SSA)	3.49* (2.09)	0.9 (0.79)	3.68* (2.12)	2.07 (1.46)
Long-run effect of equal access to education and healthcare (SSA)	0.75** (2.04)	0.63** (2.41)	0.63*** (2.82)	1.00* (1.72)
GDP per capita	-2.11*** (0.48)	-2.26*** (0.49)	-2.83*** (0.44)	-2.25** (0.89)
Net income inequality	0.03 (0.04)	0.03 (0.04)	0.05 (0.04)	-0.03 (0.06)
Trade		0.03*** (0.01)		
Foreign direct investment		0 (0.01)		
Life expectancy			0.12*** (0.04)	
Infant mortality			-0.01 (0.01)	
Government effectiveness				1.56** (0.7)

Control of corruption				0.61 (0.57)
N	3537	2865	3533	2048
No. of countries	147	137	147	147
Time periods	43	43	43	17

Note: The long-term effect is estimated using within estimation technique (fixed effects). The dependent variable is GDP per capita growth, and 2 lags of the dependent variable are included to remove serial correlation. GDP per capita in levels is included as lag 10 according to the number of lags of the index for equal access to basic education and healthcare. Numbers inside () are standard deviations except for long-run effects where numbers in () are z-values and *: $P < 0.1$, **: $P < 0.05$, ***: $P < 0.01$. N is the total number of observations.

In our baseline specification for Sub-Saharan Africa in column (1) of Table 8, the long-run impact of equal access to education and healthcare on growth is positive and significant. A permanent one-unit increase in the index (in a given country) will increase growth (in that country) by approximately 0.75 percentage points in the long run. As mentioned in the above, a one-unit increase in the indicator would, in theory, mean moving from the average level of the index in 2012 of South Africa to the average level of Kenya in 2012. However, this example is only for illustrative purposes as it is difficult to interpret the size of the estimate. The short-run effect is positive and significant as well, GDP per capita negative and significant as expected, and net income inequality is insignificant. Furthermore, the baseline results are robust to the inclusion of controls in columns (2)-(4) of Table 8. Therefore, ensuring children in sub-Saharan African countries equal access to basic education as well as guaranteeing basic healthcare to the population can contribute to economic growth in the long-term.

SUMMING UP

Summing up, equal access to basic education and healthcare does not seem to generate growth in Europe and Central Asia, whereas in Sub-Saharan Africa, equal access seems to increase growth. It is important to bear in mind that the indicator for equal access to basic education and healthcare of this analysis measures 'to what extent is high quality basic education guaranteed to all' and 'to what extent is high quality basic healthcare guaranteed to all', that is, the access to **basic** education and healthcare. Europe and Central Asia, as a group, represents a region with a relatively high level of equality in **basic** education and healthcare, whereas Sub-Saharan Africa represents a region with a relatively low level of equality in **basic** education and healthcare. Therefore, for regions with low levels of equality, our results show that further equality increases per capita growth both in the medium- and long-term. Whereas, when a region has reached a high level of access and equality in basic education and healthcare, our results indicate that further equality does not generate further growth. However, these results do not say anything about the relationship between growth and equality in 'above basic' education and healthcare. This is beyond the scope of this analysis and would be an interesting topic for further research.

CHAPTER 6

CONCLUSION

This study aims at answering three questions:

1. Is equal access to education and healthcare a sound investment from a macroeconomic perspective?
2. What is the time horizon for the macroeconomic gains of equal access to education and healthcare?
3. Does the macroeconomic impact of equal access to education and healthcare differ across regions with different levels of equality?

To answer these questions, we have made use of econometric methods. First, we have formulated a global panel data model to estimate the impact of equal access to healthcare and education on economic growth both in the medium-term and the long-term. Second, we have examined whether these relationships differ across regions with different levels of equality.

Is equal access to education and healthcare a sound investment from a macroeconomic perspective? Our econometric analysis shows that equal access to basic education and healthcare has a significant positive effect on economic growth at a global level. When a broader part of the population gets access to education and healthcare, the average level of human capital increases, which in turn may increase productivity and thereby growth. The results are robust to the inclusion of a wide range of controls. Investing in equal access to basic education and healthcare is thus a sound investment from a macroeconomic perspective.

What is the time horizon for the macroeconomic gains of equal access to education and healthcare? Our analysis shows that widening access to basic education and healthcare contributes positively to economic growth in the medium- and the long-term. As both access to education and healthcare are structural elements of the society, it makes no sense to investigate the short-run effects, as the effects of more, broader, and better education and healthcare for the population would not be visible on the economic growth path overnight. There are thus macroeconomic gains from investing in equal access to education and healthcare in both the medium and long term.

Does the macroeconomic impact of equal access to education and healthcare differ across regions with different levels of equality? Equal access to basic healthcare and education seems to generate growth in countries with low levels

of equality; however, in countries with high levels of equality, further equality does not seem to generate growth. In particular, our analysis shows that equal access to basic education and healthcare has a positive impact on growth in Sub-Saharan Africa that is a region with a low level of equality. In Europe and Central Asia, a region with a higher level of equality, there is no significant impact on growth. Here, it is important to bear in mind that the indicator for access equality in education and healthcare of this analysis measures access to **basic** education and healthcare. Europe and Central Asia represents a region with a relatively high level of equality in **basic** education and healthcare, which has been the case for decades, where the opposite is the case for Sub-Saharan Africa. This might indicate that when a region has reached a high level of access equality in basic education and healthcare, further equality does not generate further growth. However, these results do not say anything about the relationship between growth and equality in “above basic” education and healthcare.

All our results should be interpreted with the data challenges in mind. First of all, data is based on narrow five-level assessments, and though extensive work has been done to reduce bias and errors of the assessments, they might still be subject to problems such as variation truncation, scale inconsistencies, and so forth. Hence, it seems relevant to further explore the conclusions of this working paper in more quantitative and detailed (country) case studies. Moreover, this also points to the need for further development of appropriate and accountable human-rights measures.



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NOTES

- 1 The role of education and learning (the quality of education) is documented in the most recent World Development Report 2018 by the World Bank (World Bank 2018a), Hanushek (2013), and Bloom et al. (2004).
- 2 The universal declaration of human rights states as follows:
Article 25: (1) Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control. Article 26: (1) Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory. Technical and professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit.
- 3 For an overview, see Kristoffer Marslev and Hans-Otto Sano (2016).
- 4 Ibid. Also Bloom et al. (2004). The authors conclude that a one-year improvement in life expectancy of the population will increase economic growth by 4%. See also R.J. Barro (2003).
- 5 For an analysis of how these principles can be implemented, see Sano (2013).
- 6 The other three are labour, capital, and technology.
- 7 See also the study by Narayan et al. (2018).
- 8 These include inequality in mean years of schooling and inequality in life expectancy from the Human Development Index (HDI) from UNDP, and data from the Demographics and Health Surveys (DHS) from ICF International, Multiple Indicator Cluster Surveys (MICS) from UNICEF and the Human Opportunity Index (HOI) from the World Bank.
- 9 We add the two indices for mainly two reasons. First, we want to measure the effect of the economic, social, and cultural human rights that comprise both rights to education and rights to health. Second, we want to limit the number of estimations in the paper and include instead the separate estimations in our annex.
- 10 The measures of V-Dem are a collaboration among more than 50 scholars worldwide which is co-hosted by the Department of Political Science at the University of Gothenburg, Sweden, and the Kellogg Institute at the University of Notre Dame, USA. A total of 2,800 country experts have contributed to the evaluation of the measures.
- 11 See annex A.1 for the full description of the questions.
- 12 For in-depth information on the method, see: https://www.v-dem.net/media/filer_public/f2/82/f282f504-c3c8-4fff-8277-e9fda9d54934/methodology_v71.pdf.

- 13 The ratings of the experts are further exposed to bridge coding in which an expert has to do coding of more than one country through time and lateral coding in which the expert has to do coding across countries limited to a single year. The purpose of this additional coding is to assure cross-country equivalence by forcing coders to make explicit comparisons across countries.
- 14 Committee on Economic, Social, and Cultural Rights (1999). While availability referred to supply of functional educational institutions and services, accessibility comprised access by everyone to educational institutions in a non-discriminatory manner and covering physical as well as economic accessibility. Acceptability refers to relevance of educational curricula and programs and to culturally appropriate and quality methods. Adaptability referred to flexibility also with respect to different groups in society.
- 15 Committee on Economic, Social, and Cultural Rights (2000). With respect to accessibility, the committee emphasized physical as well as economic accessibility and with that stressed the importance of non-discrimination, but the committee added information accessibility as essential for the realization of the right to health. Quality replaced adaptability.
- 16 The idea of convergence in economics (also sometimes known as the catch-up effect) is the hypothesis that poorer economies' per capita incomes will tend to grow at higher rates than richer economies.
- 17 Moreover, it could be relevant to account for the educational aspect of human development. However, measures such as average years of school may be too closely related to the measure of equal access to education to separate out the effect of interest. An alternative could be the adult literacy rate, but the data coverage is insufficient.
- 18 The system GMM framework addresses endogeneity problem by formulating valid moment conditions using lagged levels of the dependent variable as instruments for the model in differences and differences of the dependent variable as instruments for the model in levels.
- 19 The test examines serial correlation in the differenced residuals. If the residuals are serially uncorrelated, there should be evidence of first-order serial correlation and no evidence of second-order serial correlation.
- 20 The guidance that we have followed includes: The estimator is only applied to "small T, large N"; we include time dummies; we put every regressor into the instrument matrix (in some form); we report the number of instruments (and aim at having the number of instruments below the number of countries) and report all specification choices.
- 21 The positive and significant medium-term effect remains when we estimate a model without net income inequality, cf. annex A.5, table 1. See annex A.5 tables, 2-3 for further robustness checks of the baseline model.
- 22 The negative effect of control of corruption is difficult to interpret. When we estimate the baseline model with control of corruption only, we find an insignificant effect of control of corruption, cf. annex A.5, table 4. The negative and significant effect can therefore be attributed to high correlation between the two governance indices.

23 It is important to note that the inclusion of the institutional factors affect the sample size due to the data availability of the indices (cf. section 3). However, baseline estimations on the reduced sample size produce the same results (cf. annex A.5, table 5).

24 Again, it is important to note that the inclusion of the institutional factors affect the sample size due to the data availability of the indicators (cf. section 3). However, baseline estimations on the reduced sample size produce the same results (cf. annex A5, table 6).

25 ECA has a mean score of 4.02, and SSA a score of -0.93. The global mean is 0.77. Moreover, ECA and SSA has a between variation of 1.65 and 1.67, respectively. The global between variation is 2.77.

26 See Section 3 for an overview of data availability.

27 However, the effect is also affected by the reduced sample size as the medium-term effect turns insignificant in the baseline model based on the reduced sample size, cf. annex A.7, table 1. This may also be due to the limited data availability in the SSA-region.

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