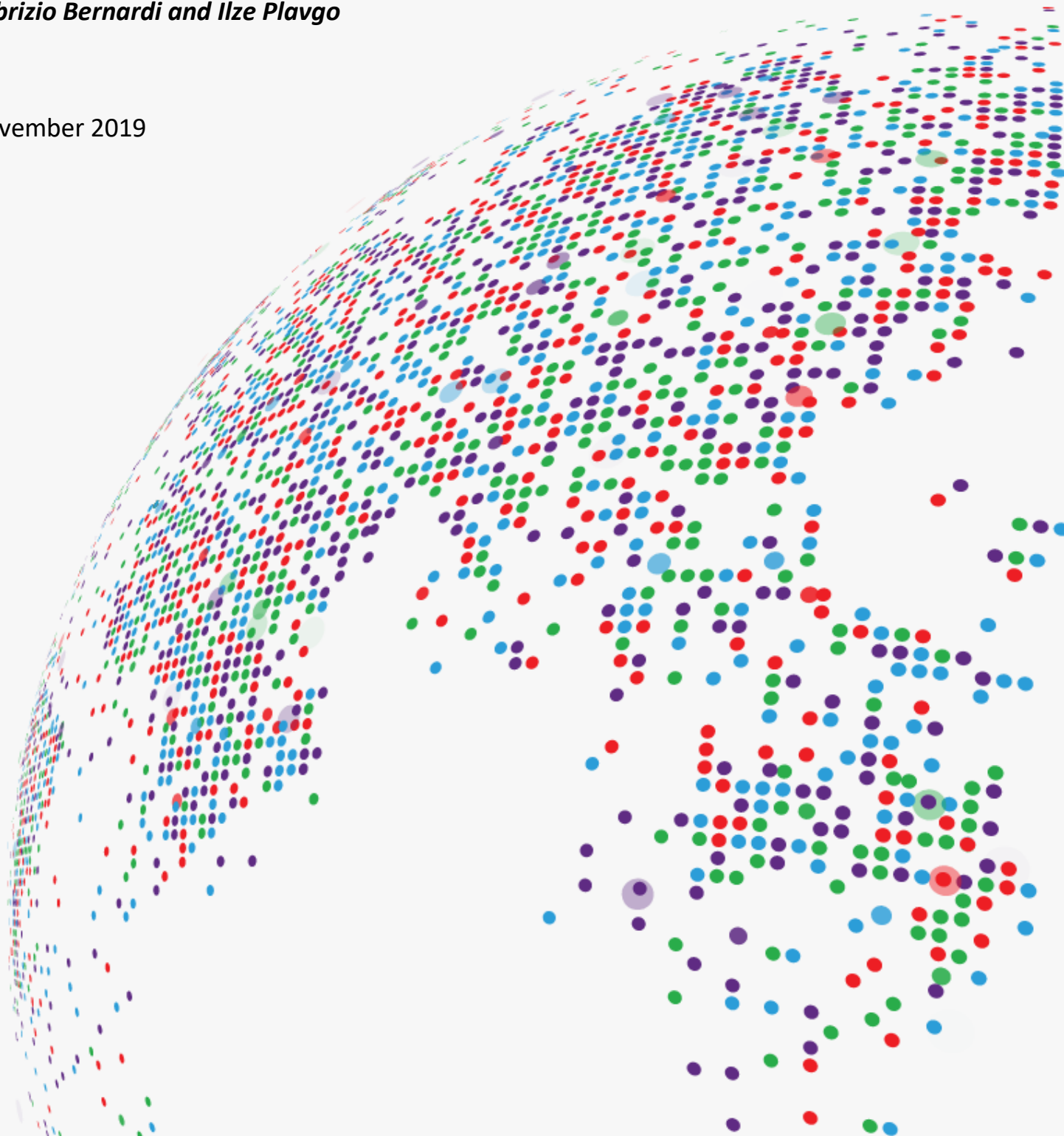




Education as an equalizer for human development?

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ABSTRACT

This paper examines the potential of education to act as the 'great equalizer' and reduce the negative effects of economic inequality on health and other social outcomes, such as crime, educational proficiency and, in particular, social mobility. In the first part, we examine the relationship between economic inequality, education and 10 social outcomes across 153 countries at a macro level. We find that economic inequality is associated with worse outcomes in some but not all health and social problems analysed, and that the relationship is stronger in countries of higher human development. As expected, we find confirmation that societies with higher average education have better outcomes. Nonetheless, education does not moderate the negative effect of economic inequality. In the second part, we discuss to what extent education can be an equalizer of intergenerational mobility chances at an individual level. The available evidence suggests that schooling is indeed an equalizer of cognitive skills, although upper-class families consistently manage to avoid downward social mobility for their children in case of low performance. Education is then the elevator that can move up for children from families with low socioeconomic status. The elevator does not, however, move down in cases of failure for high socioeconomic status families. This result sheds some shadows on the full potential of education to promote social mobility.

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Introduction and background

Inequality and its consequences in people's lives have been the focus of economic and sociological research for a long time. Over the last decade, interest in the study of inequality and its consequences has been strongly revived by debates on the 'Great Gatsby Curve', which suggests that inequality in a country is negatively associated with the chances of social mobility (Corak 2013a), and by the discussion spurred by Thomas Piketty's seminal book *Capital in the 21st Century*, which documents the dramatic rise in inequality over the last century as well as its underlying causes (Piketty 2014). The discussion about the potentially negative effects of inequality has been reinforced by Richard Wilkinson and Kate Pickett's book *The Spirit Level*, which argues that inequality in affluent countries increases socially graded problems related to health, violence, education and social mobility, among others (Wilkinson and Pickett 2009, 2010).

At the same time, a wealth of research across multiple disciplines stresses the importance of education in shaping social and health outcomes, and reducing socioeconomic disparities. Positive returns from education have been identified not only at an individual but also at a societal level. To name a few examples, research shows that more education is associated with better social and health outcomes at an individual and community level (Hannum and Buchmann 2005, Kravdal 2004), and better earnings and macroeconomic growth (Krueger and Lindahl 2001), and in certain contexts can work as an equalizer of socioeconomic opportunities and promote social mobility (Breen 2010, Hout 2012).

In this paper, we combine these two strands of literature and study the relationship between economic inequality and social and health outcomes, testing the thesis of *The Spirit Level* and assessing the potential of education as the 'great equalizer'. The aim of this contribution is then twofold: Firstly, we investigate whether economic inequality is associated with negative health and social outcomes for countries of all levels of development; and secondly, we study whether higher levels of education at a societal level can work as a moderator and offset the identified associations.

In *The Spirit Level*, Wilkinson and Pickett (2009) use bivariate associations between income inequality and social outcomes in affluent countries to show that more unequal societies suffer from worse health outcomes, higher rates of crime, lower levels of educational proficiency, and less social mobility, among other problems. The micromechanism put forth in explaining the association between high inequality and social problems is status competition. The authors argue that in affluent societies where inequality is higher, status differences become more accentuated and relevant, leading to various health and social problems. A high level of inequality enhances status competition, which in turn damages the quality of social relationships, negatively affects trust and cooperation, and increases insecurity. In their more recent book, *The Inner Level*, the same authors underline that inequality can also have negative psychological effects such as elevated levels of stress, anxiety and mental health issues (Wilkinson and Pickett 2018). The main contribution of their work is the argument that

inequality harms not only those who are at the bottom end of the income distribution, but everybody in a society. This theory has significant policy implications, suggesting that once a certain level of economic development is reached, people's well-being depends not so much on their countries' economic growth but rather on countries' capacity to reduce inequality.

The Spirit Level has sparked a vivid debate and a wealth of criticism with regard to some of its methodological choices and theoretical arguments. Firstly, researchers working in the fields of social stratification and inequality point out that it is methodologically challenging to use aggregate data to study the relationship between inequality and social outcomes, as this might lead to an ecological inference fallacy problem. It has been suggested that this relationship should be studied at an individual level, especially if psychosocial theories are used to explain the underlying mechanisms (e.g., Mills 2012).

Secondly, the ways in which inequality is conceptualized, and the theories used for explaining the relationship between inequality and social problems are scrutinized. In particular, the role of psychosocial factors such as status anxiety are questioned, and a shift suggested to paying attention to the more direct effects of material inequalities in nutrition, housing and working conditions associated with social class (Goldthorpe 2010).

Thirdly, some of the methodological choices made by Wilkinson and Pickett (2009) have triggered a debate on the validity of their findings. Critiques point out that bivariate associations between inequality and social outcomes may be spurious due to omitted confounding factors. To avoid spurious effects, researchers emphasize the necessity to control for confounding cultural and institutional factors that may be linked to the level of inequality and that may also be generating the social outcomes analysed (Saunders 2010). In addition to that, sample selection and the exclusion and inclusion of certain countries are scrutinized as the findings appear to be sensitive to outliers and the number and type of countries analysed (ibid.). The debate on the validity of the empirical and theoretical claims of *The Spirit Level* encourages researchers to go beyond bivariate associations, to increase the spectrum of research by moving beyond a selected group of high-income economies, and to study the mechanisms underlying the association between inequality and social outcomes at an individual rather than a macro level.

The role of education as a potential equalizer of social outcomes has been discussed extensively by demographers, economists and sociologists. Previous research has established that higher educational attainment has the capacity to reduce gaps in economic and social outcomes between people of different socioeconomic strata in the short run (Hannum and Buchmann 2005, Hanushek and Woessmann 2008, Hout 2012), and to promote social mobility in the long run (Sorokin 1927). In demography and health economics, findings underline that more educated individuals are better able to obtain necessary information and make informed decisions linked to such important issues as

nutrition, family planning and other factors that have a positive impact on health and other life outcomes (Mirowski and Ross 2003; Herd, Goesling and House 2007). In sociology and labour economics, findings shed light on the importance of education on later occupation and earnings (e.g., Krueger and Lindahl 2001, Goldin and Katz 2009, Brand and Xie 2010). In social stratification research, studies spell out mechanisms through which education can promote social mobility between generations and function as a social elevator (e.g., Breen et al. 2009, Breen 2010, Bernardi and Ballarino 2016).

In addition to individual and intergenerational benefits from education, some recent work in development economics highlights the overall benefits of education at a community level. Research in India, for instance, reveals a positive association between the proportion of literate females at a district level and a child's immunization status, above and beyond the educational attainment of the child's mother, district-level socioeconomic development and health-care facility availability (Parashar 2005). Related literature suggests that children of mothers with no formal education have better health outcomes in communities with higher average education due to the externalities generated by other women's education (Kravdal 2004). Studies on contextuality argue that shared membership of the family, neighbourhood and even area of residence can change individual behaviour and attitudes through information diffusion and social networks, leading to societal transformations (Huckfeldt 1986, p. 13).

In light of these findings, our present contribution aims at combining these two strands of research and expanding its geographic scope to countries of all levels of human development to assess, firstly, whether a higher level of education at a societal level can offset some of the negative social outcomes associated with a high level of economic inequality, and secondly, whether the effect differs for countries of high and low human development.

In the first part of the paper, we build on Wilkinson and Pickett's *The Spirit Level*, and study macro-level associations between economic inequality and the following social problems: bad health outcomes, violence, early pregnancy, low educational proficiency among children and social immobility. Wilkinson and Pickett's analysis is based on a selected number of the most developed countries as the authors hypothesize that this relationship is observed in the more affluent societies once a certain level of economic development is reached. According to the authors, in the most developed economies, health and well-being are no longer related to gross domestic product (GDP) per capita, while in poorer countries, living standards are still highly associated with health and social outcomes. Thus, the association between economic inequality and health and social outcomes has a different meaning in less developed countries, and is expected to be linked with differences in GDP per capita and living standards rather than social status inequality (Wilkinson and Pickett 2010, p. 30). To test this hypothesis and expand the scope of the study, we include countries of all levels of development, and analyse countries with lower and higher levels of development separately. In

In addition to bivariate associations, we control for countries' contextual factors to tackle the issue of possible spurious effects due to omitted variable bias. This approach can help identify the extent to which economic inequality has a direct effect on social outcomes, and the extent to which this effect is absorbed by other underlying factors such as the level of economic development, government spending on welfare, and countries' political and cultural context. Findings reveal that economic inequality is associated with some but not all social problems analysed. For countries of higher human development, we find that inequality (measured by the Gini index) is associated with 4 out of a total of 10 outcomes analysed: homicide rates, adolescent birth rates, share of pupils performing below baseline proficiency in school, and international earnings elasticity. For countries of lower human development, higher economic inequality at a country level is associated with lower life expectancy and higher homicide rates, but not with the other five outcomes analysed. As expected, associations are stronger in countries of higher human development for most outcomes apart from life expectancy and suicide rates.

After establishing the association between economic inequality and social outcomes, we estimate the extent to which education moderates these associations. We find that although higher average education among the adult population tends to be associated with better social outcomes, it has either a very small or no moderating effect on the relationship between economic inequality and social problems. For countries of higher human development, higher average educational attainment at a societal level is associated with a weaker relationship between inequality and 2 out of a total of 10 indicators analysed—life expectancy and homicide rates—implying that economic inequality has a weaker association with these two outcomes in countries where adults on average have a higher level of education. For countries of lower human development, by contrast, no moderating effect is found for any of the seven outcomes analysed.

In the second part of this paper, we look at the relationship between inequality, educational opportunities and social outcomes at an individual level. We present results from the literature on social mobility, and discuss the extent to which schooling and education can be regarded as an equalizer of intergenerational mobility chances in countries of high human development. The available evidence suggests that schooling is indeed an equalizer, although upper-class families consistently manage to avoid downward social mobility for their children. Education is then the elevator that moves up for children from families with low socioeconomic status—if these children succeed in school. The elevator does not, however, move down in cases of failure for children from families with a high socioeconomic status.

The next section describes the data, country classification and indicators that we use in the country level analysis. This is followed by findings on each of the social outcomes analysed. We then proceed with a section analysing the relationship between education and social mobility at an individual level in high human development countries, followed by conclusions.

Data, variables and methods

In the empirical part of this paper, we carry out a country-level analysis on the relationship between inequality and social outcomes, and test whether education moderates these relationships. This section describes the data, variables and methods used for the analysis.

DATA

We mainly use data retrieved from the Human Development Report Office of the United Nations Development Programme (UNDP), which combines a wide range of data from many international organizations. These include the World Bank, the World Health Organization, the Organisation for Economic Co-operation and Development (OECD), the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the United Nations Children's Fund (UNICEF), among others. For some of the contextual factors for which the Human Development Report Office has no available data, we use additional sources. The data refer to 2017 or the most recent year available between 2010 and 2017. The sections below describe each of the indicators in detail and clarify the specific sources.

COUNTRY CLASSIFICATION

Country classification by level of development is based on the Human Development Index (HDI) developed by UNDP. The HDI is a composite index of three key dimensions of human development: health, education and living standards.¹ Countries are classified into four groups by their level of human development using the following cut-off points in HDI scores: less than 0.550 for low human development, 0.550 to 0.699 for medium human development, 0.700 to 0.799 for high human development, and 0.800 or greater for very high human development (UNDP 2018, p. 17). For ease of reporting, we mainly use a dichotomous classification, grouping together the bottom two groups of countries with low and medium human development (LHD), and the top two groups with high and very high human development (HHD). A general overview of bivariate results across countries of all levels of human development is available in the online Appendix I. A more detailed analysis showing results separately for each of the four human development categories is available in the online Appendix II.

Since some outcome and mediator variables studied in this paper have also been used for constructing the HDI, we replicate the analysis using income classification as defined by the World Bank based on gross national income (GNI) per capita (World Bank Data Help Desk 2018). We do not find significant

¹ The HDI is composed of scores on three dimensions that are normalized into indices and aggregated into a composite index using a geometric mean. The following indicators are used for each of the three dimensions: the health dimension is assessed by life expectancy at birth; the education dimension is measured by expected years of schooling for children of school-entering age and mean years of schooling for adults aged 25 years and more; and the standard of living dimension is measured by GNI per capita, expressed in its natural logarithm to reflect the diminishing importance of income with increasing GNI. For more details on the construction of the HDI, refer to the technical notes of the human development indices and indicators (UNDP 2018).

differences in results.² This was to be expected since the correlation between country classification by UNDP's HDI and the World Bank's classification by income based on GNI per capita is as high as 0.87. The results are reported in the online Appendix III. For the main part of the analysis, we opt for country classification by the HDI rather than GNI per capita³ since the HDI reflects not only the average national income of each country but also the basic dimensions of human development.

SAMPLE

Our analytical sample comprises 153 countries at all levels of human development with non-missing information on the HDI and inequality measures. Of these countries, 71 are classified as LHD, while the remaining 82 belong to the HHD category. We are not able to carry out our analysis on all 189 countries for which the HDI is available given missing information on economic inequality measures for 36 countries. This may potentially bias the results if the countries excluded are not comparable with the ones included in the analysis. A clear majority of countries with missing data on economic inequality measures are classified as countries of high and very high human development (30 in total). These are generally small States and islands with high per capita income, such as Andorra, Barbados, Jamaica and Liechtenstein, as well as countries in the Arab States such as Qatar and the United Arab Emirates (UNDP 2019). Out of a total of 77 countries classified as low and medium human development, only 6 are missing information on economic inequality. Thus, for the interpretation of the findings, it is important to keep in mind that some small States and island States with high development are not included.

The average population size of the 153 countries included in the analysis is 47.5 million. Following the definition of the World Bank, 23 of these countries are considered small States since their population size is below 1.5 million inhabitants. Since small States tend to have distinct characteristics associated with the size of their economies, remoteness and isolation (World Bank 2019a), we also replicated the analysis excluding countries with a population size below 1.5 million to ensure that the results are not driven by the peculiarities of small States. This robustness check is reported in online Appendix IV.

INEQUALITY MEASURE

Following Wilkinson and Pickett (2009), we consider economic inequality based on income and spending as a measure of inequality.⁴ We use the Gini index, which is a measure of the deviation of the

² When using the World Bank's country classification by income, the association between inequality and social outcomes is stronger (the R-squared is higher) for the following outcomes: life expectancy and infant mortality for countries of both low and high human development, and homicide rates for countries of high human development. For the remaining outcomes, the association has the same strength when compared to the analysis based on UNDP's country classification by the HDI.

³ Note that the quality and reliability of income data on GDP and GNI may differ between countries, with countries of lower development having less precise estimates (Jerven 2013, Jerven and Johnston 2015).

⁴ Although Wilkinson and Pickett (2009) use income as a measure of inequality, it must be acknowledged that the theories they use to explain the mechanisms behind the relationship between inequality and social problems concern

distribution of income (or in some cases, consumption expenditure) from a perfectly equal distribution among individuals or households within a country. A value of 0 can be interpreted as absolute equality while a value of 100 represents absolute inequality. In our analytical sample of 153 countries, the Gini index ranges between 16.6 in Azerbaijan⁵ and 63 in South Africa. In LHD countries, inequality tends to be higher, although the difference is not substantial when considering the range of variation of the index across all countries. On average, the Gini index in LHD countries is 41, compared to 36 in HDD countries.⁶

The Gini index has some comparability and quality issues that may affect the robustness of results. Since the underlying household surveys upon which the Gini index is based differ in methods and types of the living standard measures collected, data are not strictly comparable across countries (Atkinson, Rainwater and Smeeding 1994; Moran 2003). The Gini coefficient can be measured using data on gross income, net income or expenditure, and the unit of measurement can be at the individual or household level. Since the distribution of income is generally more unequal than that of consumption, such differences may bias cross-country comparisons (Knowles 2005). Furthermore, the Gini index indicates the spread of an income or expenditure distribution showing the deviation from the global mean, but it says nothing about the shape of the distribution (Moran 2003).

We therefore considered an alternative inequality measure—the quintile ratio—as a robustness check of our findings. The quintile ratio is a ratio of the average income (or consumption) of the richest 20 percent of the population to the average income (or consumption) of the poorest 20 percent of the population, ranging between 2.3 and 28.4 across the countries analysed. Although the quintile ratio measures a different aspect of the income or consumption expenditure distribution compared to the Gini index, both capture the same phenomenon—inequality in income or consumption distribution in each country—and both have the same limitations in terms of cross-country comparability of the data and the methodologies on which they rely. The two measures of economic inequality have a relatively high correlation of 0.93. We do not find any remarkable differences in the findings when using one or the other inequality measure. Results using the quintile ratio are reported in online Appendix V.

social status as a social stratification gradient. Since data on social status are available only for a small number of countries, we follow the approach of *The Spirit Level* and use income and consumption inequality.

⁵ Azerbaijan has one of the lowest Gini coefficients ever observed in any country, and is extremely low also when compared to countries considered as most equal in the world. According to World Bank research, this might be driven by the low participation rates of wealthy households in Azerbaijan’s surveys as well as the availability of targeted public and private transfers (Ersado 2006).

⁶ For the main part of the analysis, we use data from the most recent year available between 2010 and 2017. When studying the effect of economic inequality on social mobility, we also use the average Gini between 1980 and 2000 to measure the effect of inequality during childhood on earnings and educational outcomes later in life. Since information on the Gini coefficient in the 1980s and 1990s is available for fewer countries, we use the Gini from the latest year available for the main results, and replicate the analysis using the average Gini from the 1980s and 1990s as a sensitivity analysis.

SOCIAL OUTCOMES

Following the choice of the social problems analysed in *The Spirit Level* (Wilkinson and Pickett 2009), the effect of inequality is measured on the following outcomes: health, violence, early pregnancy, educational proficiency and social mobility.

For health outcomes, the following two indicators are considered, retrieved from the Human Development Report Office:

- Life expectancy, expressed as the number of years a newborn infant could expect to live if prevailing patterns of age-specific mortality rates at the time of birth stay the same throughout the infant's life; and
- Infant mortality rate, defined as the probability of dying between birth and age 1, expressed per 1,000 live births.

Violence-related outcomes are studied based on three indicators retrieved from the Human Development Report Office:

- Homicide rate, expressed as the number of unlawful deaths purposefully inflicted on a person by another person, expressed per 100,000 people;
- Suicide rate: the sum of the number of male and female deaths from purposely self-inflicted injuries, expressed per 100,000 people in the reference population; and
- Violence against women from a partner: share of female population ages 15 and older that has ever experienced physical and/or sexual violence from an intimate partner.⁷

Educational proficiency is measured using the OECD's Programme for International Student Assessment (PISA) results. Below baseline proficiency in education is defined as the percentage of students performing below Level 2 in mathematics. Level 2 is considered a baseline level for the proficiency required to participate fully in modern society as students are able to use basic algorithms, formulae, procedures and conventions to solve problems involving whole numbers, interpret and recognize situations in contexts that require direct inference, and make literal interpretations of the results (OECD 2016, p. 194).

⁷ Note that results on violence against women should be interpreted with caution since data are not necessarily comparable across countries; data collection methods, age ranges, samples (ever-partnered, married or all women), and definitions of the forms of violence and of perpetrators vary by survey (UNDP 2019).

Social mobility is assessed using the following three indicators:

- Intergenerational elasticity of earnings, which is a summary measure of the degree of earnings persistence across generations (Corak 2013a). A higher elasticity represents higher intergenerational inequality, showing that children's earnings are highly dependent on those of their parents. Elasticity denotes the percentage difference in sons' earnings observed for a 1 percent difference across the earnings of the fathers. Data were retrieved from the World Bank's Equal Chances database (EqualChances 2019).
- Intergenerational elasticity in years of schooling, which measures relative intergenerational persistence in education for cohorts born in 1980. Elasticity coefficients can be interpreted as the estimated effect of one additional year of parents' schooling on the respondents' years of schooling. A high coefficient means that relative educational mobility is low (ibid.).
- Percentage of variation in science performance explained by students' socioeconomic status, measuring the strength of the relationship between performance and socioeconomic status. Student's socioeconomic status is an index estimated by the PISA study, derived from variables related to students' family background: parents' education, parents' occupation, a number of home possessions that can be taken as proxies for material wealth, and the number of books and other educational resources available at home (OECD 2016, p. 205).

For some outcome indicators, data are available only for a limited number of countries. These are: students' educational achievement (proficiency in mathematics), mobility in earnings (degree of earnings elasticity across generations) and students' educational achievement explained by the socioeconomic status of their parents. The analysis for these three outcomes is limited to countries of high and very high human development due to the lack of adequate data for countries of lower human development. Table 1 lists descriptive statistics and the sample size for all outcomes analysed.

EDUCATION AND CONTEXTUAL VARIABLES

To address the main question of interest, namely, whether the associations between inequality and the various social outcomes are attenuated in countries with relatively higher educational attainment, we use the indicator of mean years of schooling. This indicator is expressed as the average number of years of education received by people aged 25 and older, and ranges from 1.5 years in Burkina Faso to 14.1 years in Germany.⁸

⁸ Years of schooling is a measure of educational attainment that has been widely used in the literature, including in comparative studies (e.g., Barro and Lee 1996, Hertz et al. 2007). A year of education, however, is not necessarily comparable across countries as one year of schooling is not equal to the same amount of acquired knowledge between the different educational systems. According to UNESCO, more than half of all school-age children and adolescents worldwide are not reaching the minimum level of proficiency in mathematics and literacy (UNESCO UIS 2017). Thus, the 'years of schooling' indicator is not capturing differences in people's educational achievement between countries,

To avoid spurious results and get closer to identifying the direct effects of inequality, we also control for the following contextual variables: economic development, government health expenditure, level of democratization and ethnic diversity. A more detailed description of each of the contextual variables is provided below.

Countries' economic development is related to the level of industrialization as well as the economic resources available to the population and the government, affecting both the level of inequality and the social outcomes analysed. We therefore control for economic development using per capita gross domestic product in 2017, expressed in 2011 international dollars in purchasing power parity (PPP) rates.

Previous research also shows that the negative effects of inequality can be mitigated by welfare redistribution and investments in social services and health-supportive infrastructures (Lynch et al. 2004). We thus control for government spending on health care measured by domestic general government health expenditure expressed as a percentage of GDP, retrieved from the World Bank Databank (World Bank 2019b).

Since the political context may also affect the level of inequality and social outcomes, we control for the level of democratization. We use the Polity Project's polity score compiled by the Centre for Systematic Peace (Marshall, Gurr and Jaggers 2018) retrieved from the Integrated Network for Societal Conflict Research database. The polity score examines concomitant qualities of authority in governing institutions, capturing the regime authority spectrum on a 21-point scale ranging from -10 (hereditary monarchy) to +10 (consolidated democracy).

Another contextual confounder potentially affecting both inequality and various social outcomes is ethnic composition. Higher heterogeneity within a society is suggested to be related to a higher risk of social division and conflicts (Alesina, Baqir and Easterly 1999). We thus control for ethnic diversity by using Fearon's ethnic fractionalization index (Fearon 2003). Ethnic fractionalization is a measure of aggregate ethnic diversity, defined as the probability that two individuals selected at random from a country will be from different ethnic groups. The average value across the 134 countries of our sample for which this indicator is available is 0.48. This implies that if one were to randomly select two people from a randomly selected country, there is a 48 percent chance that they would come from different ethnic groups.

Table 1 shows descriptive statistics for all variables in their original metric. Table 2 presents correlations among measures of inequality, education and the four contextual variables by level of human development.

but is merely comparing countries by the average time spent in formal education. In countries where grade retention is common, additional years of schooling might indicate poorer achievement.

Table 1: Descriptive statistics

	Obs.	Mean	Std. dev.	Min.	Max.
<i>Inequality measures</i>					
Gini coefficient (2010-2017) ^a	153	38.2	8.2	16.6	63.0
Gini coefficient (1980s and 1990s) ^b	91	42.3	10.2	22.8	65.8
Quintile ratio (2010-2017) ^a	153	7.9	4.2	2.3	28.4
<i>Social outcomes</i>					
Life expectancy at birth, years (2017) ^a	153	71.7	8.0	52.2	83.9
Infant mortality rate per 1,000 live births (2016) ^a	153	24	21	2	89
Homicide rate per 100,000 people (2011-2016) ^a	148	7	11	0	83
Suicide rate per 100,000, male and female (2015) ^a	152	22	12	5	72
Violence against women ever experienced by intimate partner, percentage of female population (2005-2018) ^a	97	28	13	6	68
Adolescent birth rate, births per 1,000 women ages 15-19 (2015-2020) ^a	153	49	41	2	192
Students performing below Level 2 in mathematics, percentage of students aged 15 (2015) ^c	58	36.2	21.3	10.7	90.6
Mobility in earnings: degree of earnings elasticity (persistence) across generations (2006-2014) ^d	26	0.42	0.19	0.11	0.74
Mobility in education: intergenerational elasticity in years of schooling, cohort 1980 (2003-2016) ^d	140	0.42	0.13	0.11	0.84
Science performance explained by students' socio-economic status in percentage of variation (2015) ^c	58	12.3	4.1	1.4	21.6
<i>Contextual variables</i>					
Mean years of schooling among adult population (2017) ^a	153	8.4	3.2	1.5	14.1
GDP per capita, constant 2011 PPP US\$ (2017) ^a	152	15,945	16,335	661	94,278
Domestic general government health expenditure (percentage of GDP, 2015) ^b	152	3.6	2.3	0.4	9.4
Polity score: type of governance ranging from -10 (hereditary monarchy) to +10 (consolidated democracy) (2017) ^e	141	5.2	5.2	-9	10
Ethnic fractionalization (2003) ^f	134	0.48	0.27	0.0	1.0

Sources: ^a UNDP 2019; ^b World Bank 2019b; ^c OECD 2016; ^d EqualChances 2019; ^e Marshall, Gurr and Jaggers 2018; ^f Fearon 2003.

Table 2: Correlation among inequality, education and contextual variables

	Low and medium human development						High and very high human development					
	Ineq.	School	GDP	Health	Polity	Ethnic	Ineq.	School	GDP	Health	Polity	Ethnic
Inequality (Gini)	1						1					
Schooling	0.13	1					-0.52	1				
GDP pc.	0.05	0.50	1				-0.31	0.64	1			
Health spending	0.38	0.37	0.28	1			-0.27	0.49	0.77	1		
Polity	0.12	0.09	0.07	0.12	1		0.01	0.30	0.39	0.50	1	
Ethnic fr.	0.11	-0.13	-0.19	-0.13	0.18	1	0.31	-0.20	-0.31	-0.35	-0.26	1

Number of countries with data on all contextual variables: 60 and 72 countries of LHD and HHD, respectively.

METHODS

Following the work of Wilkinson and Pickett (2009), we first study bivariate associations of the relationship between economic inequality and each of the social outcomes at the country level. We show these associations for countries of LHD and HHD separately using scatterplots.

Secondly, to address possible spurious relationships, we proceed with a multivariate analysis fitting a set of OLS (Ordinary Least Squares) regression models. We start with Model 0 presenting bivariate associations that correspond to the slopes presented in scatterplots. We then proceed with a multivariate analysis by including each of the country-level contextual variables one at a time (Models 1a to 1e): years of schooling, economic development, government spending on health, level of democratization and ethnic fractionalization. Model 2 controls for all contextual variables. Model 3 introduces an interaction term between mean years of schooling and inequality to study whether education works as a moderator and reduces the effect of inequality on social outcomes.⁹ Model 4 includes all the control variables and two interaction terms: one between inequality and education, and a second one between inequality and GDP per capita. In this way, we study whether the strength of association between inequality and social outcomes changes with the average level of education, net of any other changing effect due to the interaction between inequality and GDP and of the possible confounding effects of the other contextual factors.

The last model takes the following form:

$$O_c = \alpha + \beta_1 I_c + \beta_2 E_c + \gamma X'_c + \beta_3 I_c \times GDP_c + \beta_4 I_c \times E_c + \varepsilon_c \quad (1)$$

where O_c is the social outcome under investigation in a country c ; I_c stands for inequality measured by the Gini index; E_c stands for the national educational attainment measured by mean years of schooling; X'_c is a vector of other control variables including GDP per capita, spending on health, level of democratization and ethnic fractionalization; ε is the error term; β_3 is the regression coefficient showing the estimated difference in the strength of association between inequality and health and social outcomes depending on countries' GDP per capita; and β_4 is the regression coefficient of interest measuring the difference in the strength of association between economic inequality and social outcomes depending on countries' mean years of education, net of all other contextual factors.¹⁰

To enable comparison across models, only countries with information on all contextual variables are included in the multivariate analysis, leaving us with 132 out of 153 countries. Online Appendix VI provides descriptive statistics for each indicator for countries included in the multivariate analysis for

⁹ We use the term 'effect' as a synonym for association. Our findings cannot be given a causal interpretation.

¹⁰ With the inclusion of the interaction terms in Model 1, β_1 is the regression coefficient that shows the direction and strength of association between inequality and each of the social outcomes when E_c and GDP_c are equal to 0 (i.e., at their mean values), and β_2 is the effect of national educational attainment on the social outcome when I_c is equal to 0.

the two groups of countries by human development, in their original metrics. For ease of interpretation of the regression results, the inequality measure and all the control variables are standardized separately for LHD and HHD countries. As an example, in LHD countries, the mean Gini index is 41.6 and one standard deviation is 7.9, while in HHD countries, the mean is 35.7 and one standard deviation is 7.8 (see online Appendix VI). After standardization, the Gini index in each of the two groups of countries is rescaled to have a mean of 0 and a standard deviation of 1.

Finally, we report the statistical significance of our estimates, but in our discussion, we put more emphasis on the effect sizes (Bernardi, Chakhaia and Leopold 2017).¹¹

Findings

This section presents findings from the country-level analysis for each of the social outcomes, distinguishing between results for countries of low and high human development. Throughout the findings section, we consistently report two statistical measures when describing the results: the slope and the strength of association.

The slope measures the direction of the association, indicating whether the predicted association is positive or negative. It does not imply causation. We first plot the data in scatterplots to provide a visual assessment of whether the relationship is approximately linear, and then plot the line that best fits the data (Agresti and Finlay 2009, pp. 255–61). Outcomes are always plotted on the vertical axis (Y), while values of inequality (Gini index) are plotted on the horizontal axis (X), from the lowest to the highest level of inequality. Each of the points in the scatterplots represents a country. The bivariate linear regression slopes are also expressed as coefficients in Model 0 in each of the tables in this section. Multivariate regression coefficients reported in Models 1 to 4 reveal the slope coefficients for each corresponding regressor net of the other covariates. Online Appendix VII plots the coefficients from bivariate and multivariate linear regressions for better visualization.

To report the strength of the association, we use the R-squared measure, also called the coefficient of determination. It is a statistical measure that estimates how close the data are to the fitted regression line. This measure summarizes how well the independent variable (in our case economic inequality measured by the Gini index) can predict the outcome variable (ibid., pp. 273–75). R-squared can be interpreted as the percentage of variation of the outcome variable that is explained by a linear model

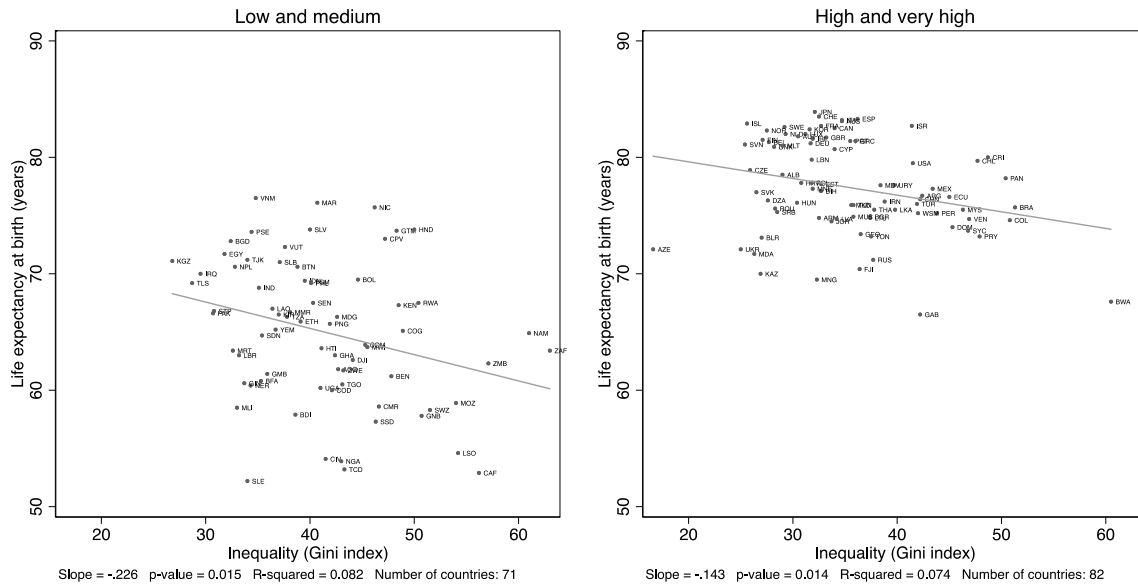
¹¹ The use of statistical significance tests with population data, such as the country-level data we analyse in this paper, is not straightforward (Freedman, Pisani and Purves 1978). To justify the use of statistical significance testing on population data, the common strategy is to invoke the notion of a superpopulation or to refer to the hypothesized error model underlying the observed patterns (Babones 2014). The conditions to justify the notion of superpopulations are, however, rarely fulfilled in social sciences (Berk 2004).

using the explanatory variable (inequality). The closer R-squared is to 1, the stronger the linear association.

HEALTH: LIFE EXPECTANCY

Across the 153 countries with available data, mean life expectancy at birth is 72 years, varying between 52 in Sierra Leone and 84 in Japan. The comparison between the left- and right-side scatterplots in Figure 1 shows that life expectancy is consistently higher in HHD countries. The trend lines in the scatterplots indicate that higher economic inequality is associated with lower life expectancy. This negative association is slightly stronger for LHD countries.

Figure 1: Association between inequality and life expectancy, by level of human development



The coefficients of Model 0 reported in Table 3 correspond to the regression lines in the scatterplots for countries with information on all contextual variables to ensure comparability across all the models in the table. Findings show that in LHD countries, one standard deviation higher in economic inequality is associated with a 1.5 years lower life expectancy, while for HHD countries, the estimated reduction is 0.9 years.

Economic inequality explains a small portion of the overall variation in life expectancy (R-squared is below 10 percent). There is a need to consider other omitted factors that may determine differences in life expectancy across countries. When controlling for countries’ mean years of schooling, the explanatory power of the model increases considerably, especially for LHD countries (Model 1a). Other contextual factors also capture a large part of the cross-country variation in this health outcome

(Models 1b to 1e). Economic development, government health expenditure, ethnic fractionalization, and in the case of HHD countries the level of democratization all have a strong association with life expectancy.

For LHD countries, the negative effect of economic inequality on life expectancy remains when controlling for all other contextual factors (Model 2). We do not find an interaction between mean years of schooling and the effect of inequality (Model 3 and 4). This means that the average level of education at a country level does not seem to moderate the negative association between inequality and life expectancy.

For HHD countries, the effect of economic inequality on life expectancy is small and becomes close to zero and statistically insignificant once the other contextual factors are controlled for. The contextual factors with the largest effect on life expectancy are per capita GDP and government expenditure on health. The interaction term between inequality and schooling shows that educational attainment at a country level may have some moderating role in lowering the effect of inequality on life expectancy (Model 3). The estimates of the constitutive term for inequality and the interaction term are, however, small and statistically insignificant. In Model 4 the estimates for education and inequality switch signs, probably due to collinearity with the other contextual factors.¹²

Table 3: OLS regressions on life expectancy at birth

Countries of low and medium human development									
	M 0	M 1a	M 1b	M 1c	M 1d	M 1e	M 2	M 3	M 4
Inequality (Gini)	-1.5**	-1.9***	-1.6**	-2.3***	-1.5**	-1.3*	-1.8***	-1.9**	-1.6**
Schooling, years		2.8***					1.3*	2.8***	1
GDP pc., log			3.2***				2.1***		2.3***
Gov. health exp.				2.3**			0.6		0.6
Polity					0.2		0.2		0.3
Ethnic diversity						-2.2***	-1.5**		-1.5**
Inequality X school								0	-0.7
Inequality X GDP									0.3
Constant	64.6***	64.8***	64.6***	65.0***	64.6***	64.6***	64.8***	64.8***	64.8***
Observations	60	60	60	60	60	60	60	60	60
R-squared	0.07	0.29	0.37	0.16	0.07	0.20	0.47	0.29	0.48
Countries of high and very high human development									
Inequality (Gini)	-0.9**	-0.2	-0.2	-0.1	-1.0**	-0.5	-0.3	-0.1	0.1
Schooling, years		1.5***					-0.7	1.5***	-0.8*
GDP pc., log			3.1***				1.8***		1.8***
Gov. health exp.				3.1***			1.7***		1.9***
Polity					1.9***		0.5		0.5
Ethnic diversity						-1.5***	-0.4		-0.4
Inequality X school								0.2	1.0**
Inequality X GDP									0
Constant	77.4***	77.3***	77.3***	77.5***	77.4***	77.3***	77.4***	77.5***	77.9***
Observations	72	72	72	72	72	72	72	72	72
R-squared	0.05	0.15	0.52	0.58	0.28	0.17	0.68	0.15	0.71

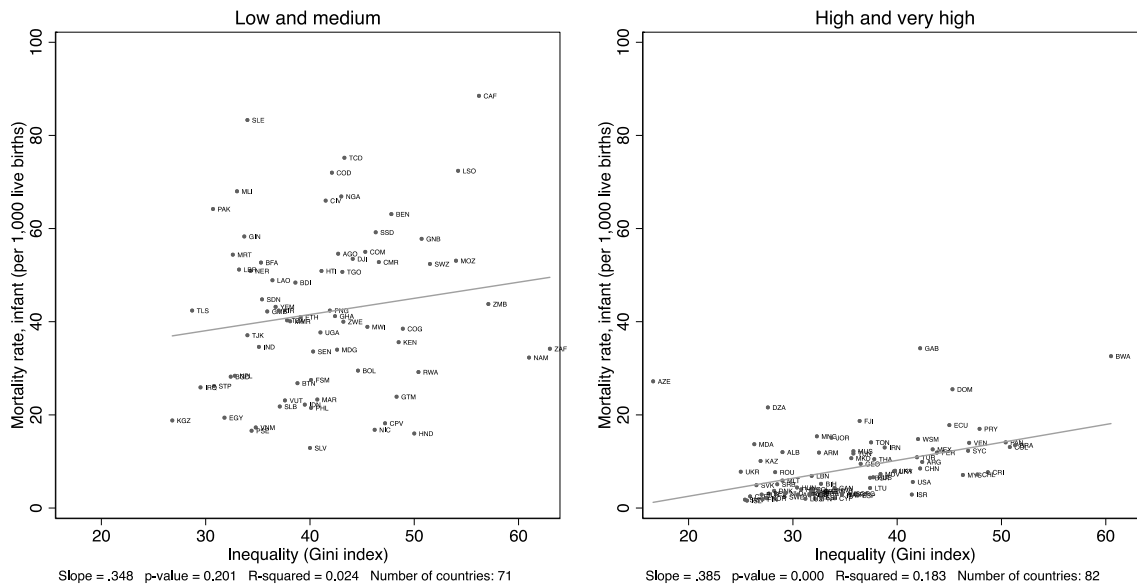
All independent variables are standardized to have a mean of 0 and a standard deviation of 1 for each of the two categories of countries. Significance test: *** p<0.01, ** p<0.05, * p<0.1.

¹² See Table 2 for correlations among the measures of inequality, education and contextual factors.

HEALTH: INFANT MORTALITY

Figure 2 shows that for HHD countries, economic inequality is positively associated with infant mortality rates: the higher the Gini index, the higher the infant mortality. The level of inequality explains almost one fifth of the variation in infant mortality in HHD countries (R-squared=18 percent). In LHD countries, on the other hand, macro-level differences in inequality do not capture much of the variation in infant mortality rates.

Figure 2: Association between inequality and infant mortality, by level of human development



Multivariate analyses in Table 4 show that accounting for other contextual factors allows us to explain a considerably larger share of cross-country variation in infant mortality rates. In LHD countries, infant mortality tends to be higher in ethnically fractionalized countries, and lower in countries with higher years of schooling, per capita GDP and government spending on health. As an example, net of inequality, one standard deviation higher in mean years of schooling (equal to 2.1 years) is associated with a reduction of infant mortality by 8.7 (Model M 1a). This effect size is substantial as the mean infant mortality rate per 1,000 live births across LHD countries is 43.

In HHD countries, other contextual factors seem to have a more important role in explaining infant mortality rates compared to economic inequality, although we find that inequality still has an effect net of controls (Models M 1a to 1e). When controlling for all contextual factors simultaneously, however, the direct effect of inequality vanishes, while years of schooling and per capita GDP are negatively associated with infant mortality. The interaction term between years of schooling and

inequality in Model 2 is imprecisely estimated but still negative. There is therefore some evidence that average educational attainment might offset the effect of inequality on infant mortality.

Table 4: OLS regressions on infant mortality rates

Countries of low and medium human development									
	M 0	M 1a	M 1b	M 1c	M 1d	M 1e	M 2	M 3	M 4
Inequality (Gini)	1.9	3.0	2.2	4.8**	2.0	1.2	3.6*	3.2	2.9
Schooling, years		-8.7***					-4.1*	-8.8***	-3
GDP pc., log			-9.2***				-5.3**		-6.1***
Gov. health exp.				-8.9***			-4.1*		-3.4
Polity					-1.1		-0.9		-1.2
Ethnic diversity						5.8***	3.5*		3.5*
Inequality X school								-0.3	2.6
Inequality X GDP									-1.8
Constant	43.1***	42.6***	43.2***	41.9***	43.0***	43.1***	42.3***	42.6***	42.2***
Observations	60	60	60	60	60	60	60	60	60
R-squared	0.01	0.27	0.31	0.18	0.02	0.12	0.45	0.27	0.46
Countries of high and very high human development									
Inequality (Gini)	2.8***	0.7	1.8***	1.8**	2.8***	2.3***	0.8	0.6	0.4
Schooling, years		-4.0***					-1.9**	-3.9***	-1.7*
GDP pc., log			-4.3***				-2.0*		-2.1*
Gov. health exp.				-3.7***			-1.0		-1.2
Polity					-2.7***		-0.8		-0.8
Ethnic diversity						1.7**	0.7		0.7
Inequality X school								-0.3	-0.8
Inequality X GDP									-0.3
Constant	8.7***	8.8***	8.8***	8.6***	8.6***	8.7***	8.8***	8.6***	8.3***
Observations	72	72	72	72	72	72	72	72	72
R-squared	0.16	0.38	0.45	0.41	0.31	0.21	0.54	0.39	0.55

All independent variables are standardized to have a mean of 0 and a standard deviation of 1 for each of the two categories of countries. Significance test: *** p<0.01, ** p<0.05, * p<0.1.

VIOLENCE: HOMICIDE RATES

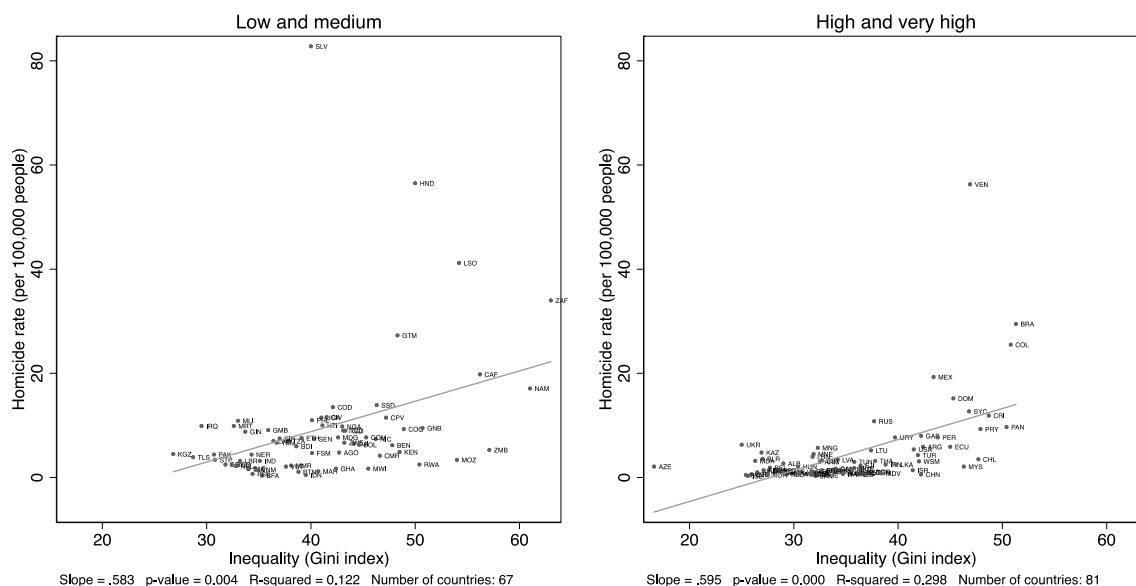
Across most countries with available data (148 in total), homicide rates are below 20 per 100,000 people, with a few exceptions where homicides are considerably higher.¹³ Figure 3 reveals a fairly strong association between economic inequality and homicide rates. This is especially the case in HHD countries where inequality explains almost one third of the overall variation in homicide rates.

Due to a few extreme outliers, for the multivariate analysis we transform homicide rates into their natural logarithmic form. The estimates reported in Table 5 can therefore be interpreted as the percentage change in homicide rates.

Table 5 shows that associations vary depending on countries' level of development. In LHD countries, homicide rates are associated with inequality and no other contextual factor. One standard deviation higher in inequality is associated with a 37 percent increase in homicide rates, also when keeping other country-level characteristics constant at their mean (Model 2).

¹³ These include: El Salvador (83), Honduras (57), Venezuela (56), Lesotho (41), South Africa (34), Brazil (30), Guatemala (27) and Colombia (26).

Figure 3: Association between inequality and homicide rates, by level of human development



In HHD countries, all the contextual factors have a significant association with homicide rates (Models 1a to 1e in Table 5), but economic inequality has the most substantial association. After controlling for all other characteristics such as years of schooling, per capita GDP, level of democratization, and ethnic fractionalization, inequality maintains a positive association with homicide rates (Model 2 in Table 5). The association is substantial as one standard deviation higher in economic inequality (equal to a 7.8 point higher Gini index in HHD countries) is associated with a 53 percent increase in homicide rates.¹⁴

The interaction term with schooling shows that in HHD countries, education has a moderating effect on the relationship between economic inequality and homicide rates. When keeping all other contextual factors constant at their means (M 4), one standard deviation higher in mean years of schooling (equal to 1.8 years in HHD countries) reduces the association between inequality and homicide rates by more than half. In LHD countries, on the other hand, we find no moderating effect from education.

¹⁴ The average homicide rate per 100,000 people in HHD countries is 4.7 (online Appendix VI). At this average value, an increase of 53 percent implies an increase of about 2.5 homicides.

Table 5: OLS regressions on homicide rates

Countries of low and medium human development									
	M 0	M 1a	M 1b	M 1c	M 1d	M 1e	M 2	M 3	M 4
Inequality (Gini)	0.41***	0.40***	0.41***	0.35**	0.40***	0.43***	0.37**	0.36***	0.31**
Schooling, years		0.07					0.05	0.09	0.13
GDP pc., log			0.01				-0.1		-0.16
Gov. health exp.				0.21			0.17		0.19
Polity					0.07		0.07		0.05
Ethnic diversity						-0.17	-0.16		-0.17
Inequality X school								0.1	0.17
Inequality X GDP									-0.09
Constant	1.75***	1.75***	1.75***	1.78***	1.75***	1.74***	1.77***	1.74***	1.76***
Observations	57	57	57	57	57	57	57	57	57
R-squared	0.16	0.17	0.16	0.19	0.17	0.19	0.22	0.18	0.24
Countries of high and very high human development									
Inequality (Gini)	0.71***	0.56***	0.60***	0.60***	0.71***	0.60***	0.53***	0.52***	0.48***
Schooling, years		-0.27**					-0.02	-0.25**	0.01
GDP pc., log			-0.46***				-0.29*		-0.2
Gov. health exp.				-0.39***			-0.11		-0.16
Polity					-0.26**		-0.05		-0.02
Ethnic diversity						0.32***	0.21*		0.20*
Inequality X school								-0.16	-0.39**
Inequality X GDP									0.23
Constant	0.85***	0.85***	0.86***	0.84***	0.84***	0.85***	0.86***	0.77***	0.71***
Observations	71	71	71	71	71	71	71	71	71
R-squared	0.37	0.41	0.51	0.49	0.42	0.44	0.55	0.42	0.59

All independent variables are standardized to have a mean of 0 and a standard deviation of 1 for each of the two categories of countries. Significance test: *** p<0.01, ** p<0.05, * p<0.1.

VIOLENCE: SUICIDE MORTALITY RATES

The mean suicide mortality rate across the 152 countries with available data is 22 deaths per 100,000 people, ranging from 5 in Pakistan to 72 in Sri Lanka. Our findings show that the association between economic inequality and suicide mortality rates is weak and holds only among LHD countries where the slope is positive (Figure 4).

Multivariate analysis in Table 6 shows that for LHD countries, economic inequality is positively associated with suicide rates. This effect remains when controlling for other factors such as years of schooling and per capita GDP. We find an opposite pattern in HHD countries, where inequality has a negative effect on suicide rates, while mean years of education has a positive one. Most cross-country variation remains unexplained when accounting for all other contextual variables (R-squared=15 percent in M 2). We observe no interaction between the average years of schooling and the effect of inequality on suicide rates.

Figure 4: Association between inequality and suicide rates, by level of human development

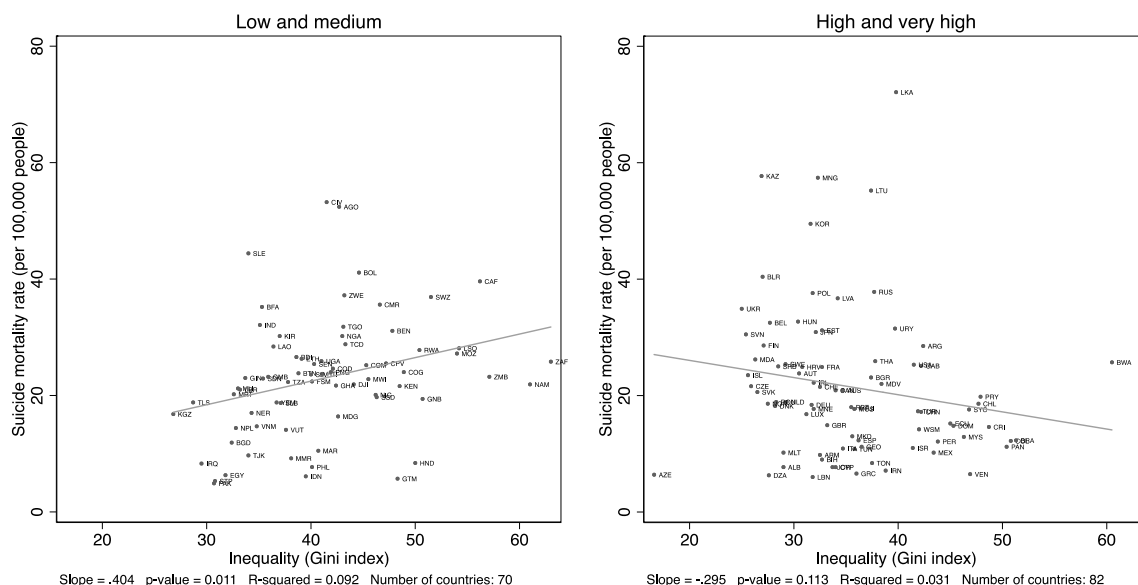


Table 6: OLS regressions on suicide mortality rates

Countries of low and medium human development									
	M 0	M 1a	M 1b	M 1c	M 1d	M 1e	M 2	M 3	M 4
Inequality (Gini)	2.9**	3.3**	3.0**	3.2**	3.1**	2.6*	2.6*	3.3**	2.4
Schooling, years		-2.8**					-1.7	-2.8**	-1.4
GDP pc., log			-2.8**				-1.6		-1.8
Gov. health exp.				-0.8			1.5		1.9
Polity					-1.6		-2.0		-2.1
Ethnic diversity						3.0**	3.0**		3.0**
Inequality X school								0.0	0.8
Inequality X GDP									-0.8
Constant	23.3***	23.1***	23.3***	23.2***	23.2***	23.3***	23.3***	23.1***	23.3***
Observations	60	60	60	60	60	60	60	60	60
R-squared	0.08	0.15	0.15	0.08	0.10	0.16	0.26	0.15	0.27
Countries of high and very high human development									
Inequality (Gini)	-2.5	-0.4	-2.3	-2.8*	-2.5	-2.4	-0.4	-0.8	-1.3
Schooling, years		4.0**					5.2**	4.1**	5.6**
GDP pc., log			0.9				0.7		0.5
Gov. health exp.				-1.0			-4.0*		-4.5*
Polity					0.7		0.6		0.6
Ethnic diversity						-0.3	-0.9		-0.7
Inequality X school								-1.4	-1.7
Inequality X GDP									-0.9
Constant	22.2***	22.1***	22.2***	22.2***	22.2***	22.2***	21.9***	21.3***	20.8***
Observations	72	72	72	72	72	72	72	72	72
R-squared	0.04	0.10	0.04	0.04	0.04	0.04	0.15	0.11	0.17

All independent variables are standardized to have a mean of 0 and a standard deviation of 1 for each of the two categories of countries. Significance test: *** p<0.01, ** p<0.05, * p<0.1.

VIOLENCE AGAINST WOMEN FROM AN INTIMATE PARTNER

In LHD countries, we observe a weak and statistically insignificant association between economic inequality and violence rates against women. In HHD countries, the estimated association is slightly

stronger and positive but not statistically significant (Figure 5). Other macro-level factors such as per capita GDP in LHD countries and ethnic fractionalization in HHD countries explain a higher share of cross-country variation in violence rates against women (Table 7).

Figure 5: Association between inequality and violence against women, by level of human development

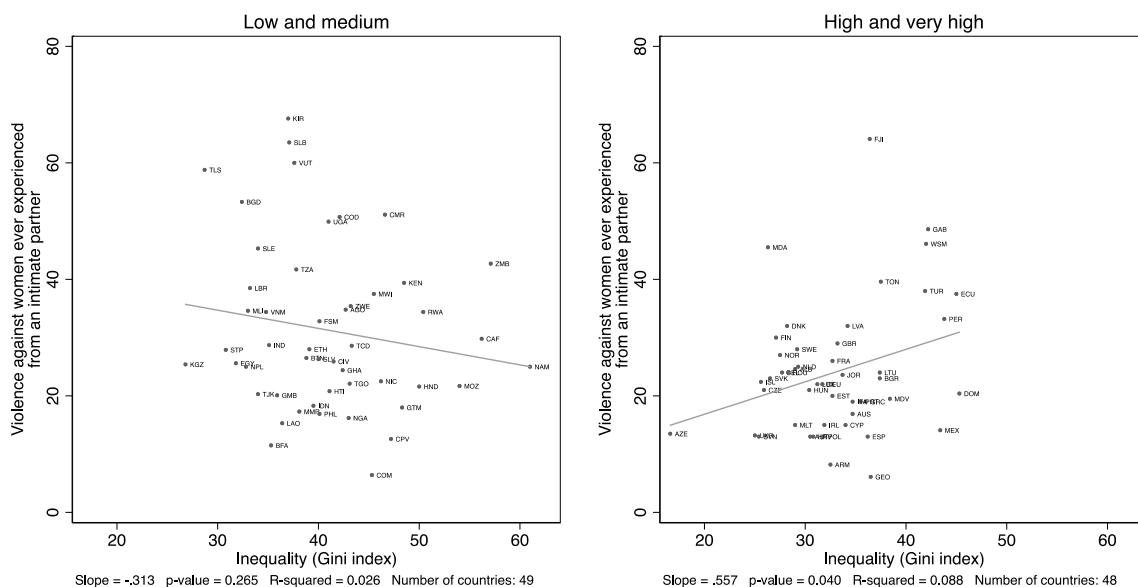


Table 7: OLS regressions on violence against women from an intimate partner

Countries of low and medium human development									
	M 0	M 1a	M 1b	M 1c	M 1d	M 1e	M 2	M 3	M 4
Inequality (Gini)	0.3	0.3	0.1	0.8	0.7	0.1	0.5	0.1	-0.4
Schooling, years		-0.1					2.4	0.6	5.0**
GDP pc., log			-3.8**				-3.4*		-4.6**
Gov. health exp.				-2.6			-0.7		-0.4
Polity					-3.0*		-2.9		-3.3*
Ethnic diversity						2.8*	2.3		2.3
Inequality X school								1.2	4
Inequality X GDP									-0.8
Constant	29.4***	29.4***	29.3***	28.8***	29.3***	29.4***	28.9***	29.4***	29.0***
Observations	41	41	41	41	41	41	41	41	41
R-squared	0.00	0.00	0.12	0.04	0.07	0.07	0.25	0.01	0.33
Countries of high and very high human development									
Inequality (Gini)	3.3	2.0	2.8	3.4	3.3	0.9	1.8	1.7	1.5
Schooling, years		-2.0					-0.8	-1.6	-0.4
GDP pc., log			-2.0				-2.3		-2.9
Gov. health exp.				0.1			4.7*		4.4
Polity					-3.0		-3.0		-3
Ethnic diversity						4.7**	4.4*		4.0*
Inequality X school								-3.2	-1.6
Inequality X GDP									-0.7
Constant	24.8***	24.9***	24.9***	24.8***	25.3***	24.9***	25.7***	23.1***	24.6***
Observations	42	42	42	42	42	42	42	42	42
R-squared	0.06	0.07	0.09	0.06	0.10	0.18	0.27	0.10	0.28

All independent variables are standardized to have a mean of 0 and a standard deviation of 1 for each of the two categories of countries. Significance test: *** p<0.01, ** p<0.05, * p<0.1.

TEENAGE PREGNANCY: ADOLESCENT BIRTH RATE

Adolescent birth rates are considerably higher in countries of low compared to high human development (Figure 6). Among LHD countries, there is a positive but weak and statistically non-significant relationship between economic inequality and adolescent birth rates. Other macro-level factors have a more substantial association with adolescent birth rates, namely, years of schooling, per capita GDP, government health expenditure and ethnic fractionalization.

For HHD countries, the estimated association is much stronger and precisely estimated, with economic inequality explaining as much as one third of the overall cross-country variation in adolescent birth rates (R-squared=33 percent across 82 countries). For our sample of 72 HHD countries, one standard deviation higher in the Gini index is associated with 13 more births per 1,000 women aged 15 to 19 (Table 8, Model o). This is a sizeable difference given that the average adolescent birth rate per 1,000 women aged 15 to 19 across these countries is 26. The association remains strong when controlling for other macro-level factors (Model 2).

In HHD countries, we find a sizeable but statistically insignificant interaction between years of schooling and inequality (Model 4). This finding suggests that education may moderate the association between inequality and teenage pregnancy, but is imprecisely estimated.

Figure 6: Association between inequality and adolescent birth rates, by level of human development

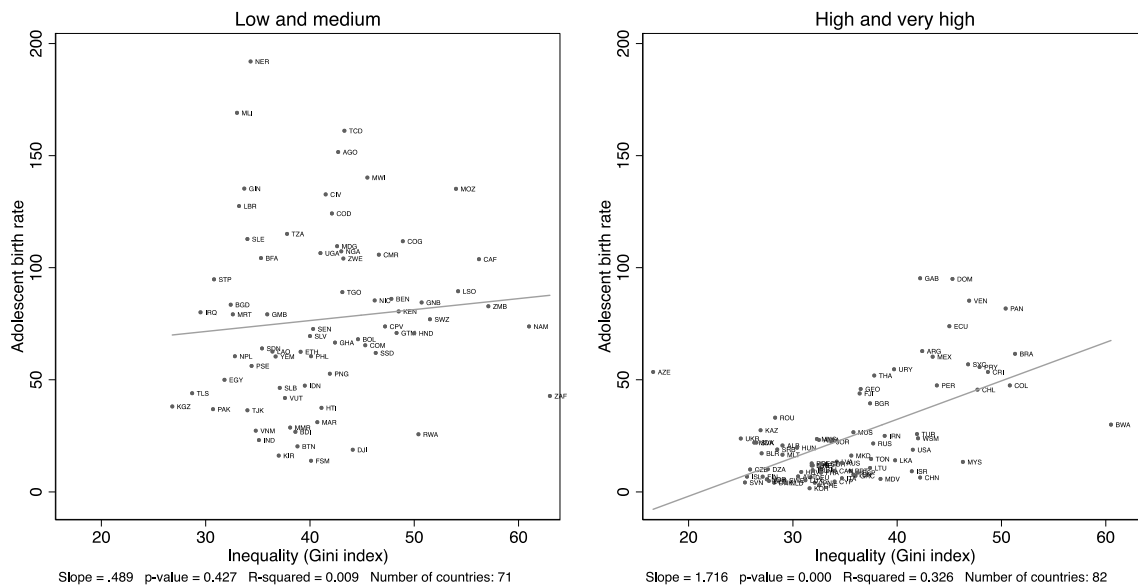


Table 8: OLS regressions on adolescent birth rates

Countries of low and medium human development									
	M 0	M 1a	M 1b	M 1c	M 1d	M 1e	M 2	M 3	M 4
Inequality (Gini)	2.7	4.7	3.2	7.1	2.6	0.9	3.8	4.0	2.5
Schooling, years		-14.8***					-6.3	-14.5***	-4.5
GDP pc., log			-17.2***				-10.4**		-11.7**
Gov. health exp.				-13.5**			-3.6		-4.8
Polity					0.4		-0.6		-1
Ethnic diversity						16.1***	12.2**		11.6**
Inequality X school								1.6	3.8
Inequality X GDP									0.4
Constant	82.1***	81.2***	82.3***	80.2***	82.1***	82.2***	81.3***	81.1***	80.8***
Observations	60	60	60	60	60	60	60	60	60
R-squared	0.00	0.15	0.21	0.08	0.01	0.17	0.34	0.16	0.36
Countries of high and very high human development									
Inequality (Gini)	13.1***	8.9***	10.9***	10.8***	13.2***	11.4***	8.2***	7.6***	6.0**
Schooling, years		-8.1***					-3.9	-7.8***	-3.1
GDP pc., log			-9.5***				-4.1		-3.8
Gov. health exp.				-8.4***			-3.1		-4.3
Polity					-5.4**		-0.4		-0.2
Ethnic diversity						5.7**	3.6		3.9
Inequality X school								-4.0	-5.9
Inequality X GDP									-0.2
Constant	25.6***	25.8***	25.9***	25.4***	25.5***	25.7***	25.9***	23.8***	22.7***
Observations	72	72	72	72	72	72	72	72	72
R-squared	0.32	0.40	0.45	0.43	0.37	0.37	0.49	0.42	0.53

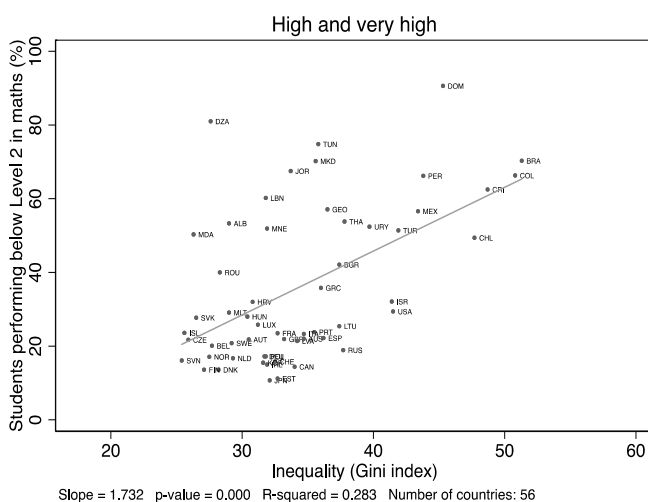
All independent variables are standardized to have a mean of 0 and a standard deviation of 1 for each of the two categories of countries. Significance test: *** p<0.01, ** p<0.05, * p<0.1.

EDUCATION: PROFICIENCY IN MATHEMATICS AMONG CHILDREN

As can be seen from Figure 7, there is a strong and positive association between economic inequality and the share of students performing below the baseline proficiency level in education. The higher the level of inequality, the higher the proportion of students aged 15 performing below Level 2 in mathematics. According to the OECD PISA study, Level 2 is the baseline level of proficiency considered necessary to participate in a modern society (OECD 2016, p. 194). Data on students' proficiency in mathematics are retrieved from the OECD's PISA study and are available only for countries of high and very high development.

Multivariate analyses reveal that when considered together, economic inequality and all other contextual factors explain as much as 85 percent of the overall cross-country variation in the proportion of students at age 15 performing below the baseline proficiency level in mathematics (Model 2 in Table 9). While per capita GDP and the education received by adults are negatively associated with the proportion of children performing below baseline proficiency level, the association with inequality remains positive and substantial, even after controlling for other macro-indicators. Keeping all other contextual factors at their mean (Model 2), a standard deviation higher in inequality is associated with a 4 percentage point higher share of students performing below Level 2 in mathematics. The effect size is considerable given that the proportion of students aged 15 performing below this baseline level across the 52 countries analysed is 36 per cent.

Figure 7: Association between inequality and the proportion of students performing below baseline proficiency level in mathematics, by level of human development



We find no interaction between education among adults and the effect of economic inequality on children's education proficiency (Model 3). A positive interaction shows up in Model 4, suggesting that in a situation of high inequality and high educational attainment in the parents' generation, the proportion of children left behind in school might be higher. The estimate is not very precise, however, and a large confidence interval is associated with it.

Table 9: OLS regressions on the proportion of students of age 15 performing below the baseline proficiency level in mathematics

Countries of high and very high human development									
	M 0	M 1a	M 1b	M 1c	M 1d	M 1e	M 2	M 3	M 4
Inequality (Gini)	13.6***	4.0	7.6***	8.6***	11.8***	11.6***	3.9**	4.9*	4.7**
Schooling, years		-14.8***					-8.1***	-15.0***	-7.5***
GDP pc., log			-17.2***				-12.8***		-15.5***
Gov. health exp.				-11.7***			1.9		2.4
Polity					-11.7***		-1.5		-1.6
Ethnic diversity						4.6	1.4		1.3
Inequality X school								2.6	4.0*
Inequality X GDP									-5.2*
Constant	37.7***	39.1***	41.6***	40.9***	40.8***	38.3***	41.4***	40.5***	42.4***
Observations	52	52	52	52	52	52	52	52	52
R-squared	0.28	0.68	0.77	0.50	0.41	0.32	0.85	0.69	0.86

All independent variables are standardized to have a mean of 0 and a standard deviation of 1. Significance test: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

SOCIAL MOBILITY: INTERGENERATIONAL ELASTICITY OF EARNINGS

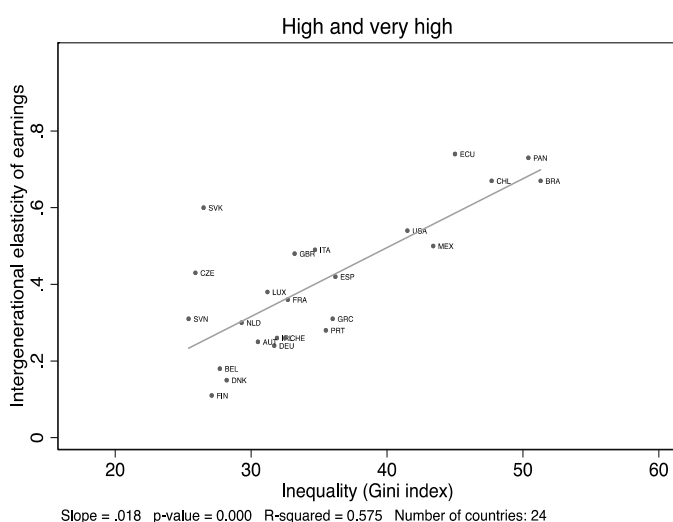
Social mobility is one of the main outcomes of interest of this study as previous research suggests that economic inequality has a negative effect on people's chances of upward mobility (see the previous section for references). We consider intergenerational earnings elasticity as a first indicator of social

mobility. A high level of intergenerational earnings elasticity means that earnings mobility from one generation to the other is low. Like previous research on this outcome, we are only able to analyse HHD countries. Nevertheless, due to new data availability we can cover a larger number of countries compared to previous studies.¹⁵

Findings based on a sample of 24 HHD countries presented in Figure 8 are in line with previous evidence from Wilkinson and Pickett (2009) as well as with evidence known as the ‘Great Gatsby Curve’ (Corak 2013a, 2013b): the higher the level of economic inequality, the higher the intergenerational earnings elasticity. These findings indicate that countries with a high level of inequality also tend to have a high degree of earnings persistence across generations. Associations with inequality (Gini index) in the 1980s and 1990s show a similar pattern and are reported in online Appendix I as they are based on fewer countries due to limited data availability for inequality measures in the 1980s and 1990s.

Consistent with previous findings, the association between economic inequality and intergenerational earnings elasticity is strong. The R-squared is equal to 0.58 which implies that inequality explains 58 per cent of the overall variation in the level of earnings elasticity across the 24 countries analysed.

Figure 8: Association between inequality and intergenerational elasticity of earnings



Multivariate analysis reveals that the negative effect of economic inequality on social mobility in earnings remains substantial and statistically significant when controlling for other macro-level contextual characteristics (Model 2 in Table 10). A coefficient of 0.10 means that, keeping all other

¹⁵ Wilkinson and Pickett (2009) based their findings on eight high-income countries (Canada, Denmark, Finland, Norway, Sweden, the United Kingdom, the United States of America and West Germany); Corak’s Great Gatsby Curve is based on 13 (Corak 2013a) and 22 high-income countries (Corak 2013b). We use the EqualChances dataset, which provides estimates of earnings elasticity for a total of 24 high-income countries (EqualChances 2019).

factors at their means, one standard deviation higher in inequality as measured by the Gini index is associated with a 10 percentage point higher earnings elasticity between parents and children. This is substantial as the mean earnings elasticity across the 23 countries analysed is 0.40.

Table 10: OLS regressions on intergenerational elasticity of earnings

Countries of high and very high human development									
	M 0	M 1a	M 1b	M 1c	M 1d	M 1e	M 2	M 3	M 4
Inequality (Gini)	0.14***	0.14***	0.10***	0.11***	0.12***	0.11***	0.10**	0.14***	0.06
Schooling, years		0.0					0.09	0.00	0.07
GDP pc., log			-0.09*				-0.12		-0.13
Gov. health exp.				-0.06			-0.05		-0.04
Polity					-0.14		0.03		-0.04
Ethnic diversity						0.05	0.03		0.03
Inequality X School								0.02	-0.03
Inequality X GDP									0.10
Constant	0.41***	0.42***	0.47***	0.46***	0.48***	0.42***	0.50***	0.40***	0.57***
Observations	23	23	23	23	23	23	23	23	23
R-squared	0.58	0.58	0.65	0.63	0.60	0.62	0.73	0.59	0.76

All independent variables are standardized to have a mean of 0 and a standard deviation of 1. Significance test: *** p<0.01, ** p<0.05, * p<0.1.

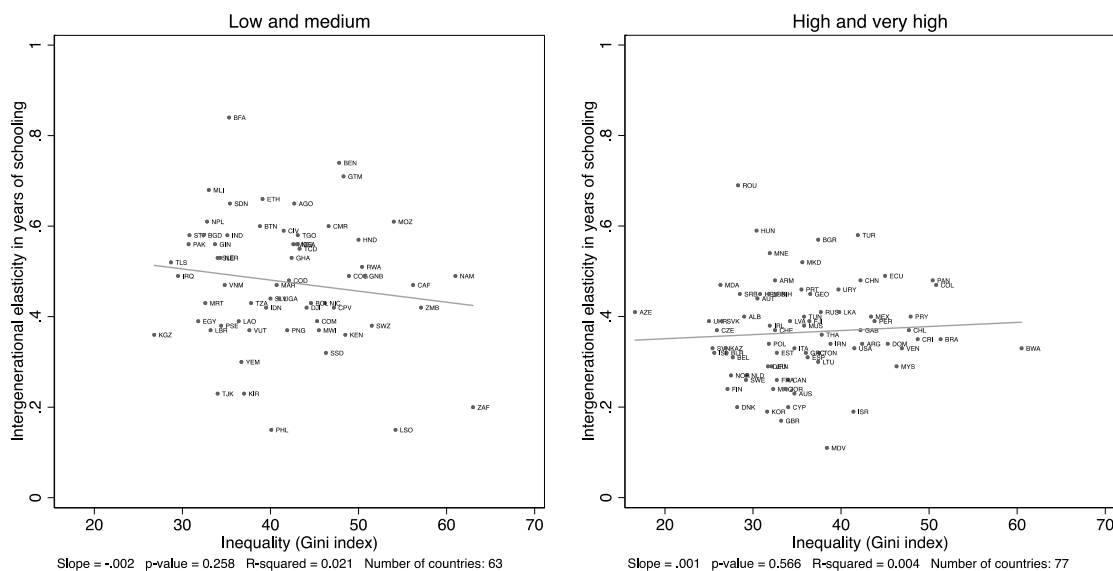
We find no moderating effect of education on the association between economic inequality and intergenerational earnings elasticity (Models 3 and 4). The association between inequality and earnings elasticity disappears when controlling for interaction with years of schooling and GDP per capita (Model 4). The results of Model 4, however, should be interpreted with caution as the final sample has only 23 countries, providing a limited number of degrees of freedom.

SOCIAL MOBILITY: INTERGENERATIONAL ELASTICITY IN YEARS OF SCHOOLING

The intergenerational inequality measure presented here shows the intergenerational persistence in educational attainment between people born in 1980 and their parents (Figure 9). It is expressed as a regression coefficient representing the strength of association between respondents' and their parents' years of schooling.

Both bivariate and multivariate analyses below show a small and statistically insignificant association between economic inequality and relative intergenerational elasticity in education. Associations have the same pattern when considering inequality in the 1980s and 1990s, as reported in online Appendix II.

Figure 9: Association between inequality and intergenerational elasticity in years of schooling



For LHD countries, just over one third of cross-country variation in intergenerational educational elasticity is explained by average years of schooling among adults (R-squared = 0.34, Model 1a in Table 11), followed by government spending on health care and ethnic fractionalization (Models 1c and 1e). When keeping all contextual variables at their means (Model 2), average years of schooling retain a negative relationship with intergenerational elasticity in education, with a standard deviation higher in mean years of schooling (equal to 2.1 years among LHD countries) associated with a 9 percentage point lower strength of association between parent’s and children’s schooling attained. This is substantial as the overall educational elasticity coefficient among these countries is 0.49.

Similarly, for HHD countries, when keeping all contextual variables constant at their means, the only factor with a direct effect indicating lower intergenerational elasticity in education is average years of schooling among adults. The strength of association, however, is small. The estimates show no association between inequality and intergenerational elasticity in education, and no interaction effect between years of schooling and the effect of inequality.

Table 11: OLS regressions on intergenerational elasticity in years of schooling

Countries of low and medium human development									
	M 0	M 1a	M 1b	M 1c	M 1d	M 1e	M 2	M 3	M 4
Inequality (Gini)	-0.02	-0.01	-0.02	0.00	-0.02	-0.02	0.00	-0.01	0.01
Schooling, years		-0.08***					-0.09***	-0.08***	-0.10***
GDP pc., log			-0.02				0.04**		0.06***
Gov. health exp.				-0.06***			-0.03		-0.04*
Polity					0.00		0.00		0.01
Ethnic diversity						0.04*	0.03*		0.03*
Inequality X school								-0.01	-0.03*
Inequality X GDP									0.02
Constant	0.49***	0.49***	0.49***	0.48***	0.49***	0.49***	0.48***	0.49***	0.48***
Observations	54	54	54	54	54	54	54	54	54
R-squared	0.02	0.34	0.05	0.15	0.02	0.09	0.44	0.34	0.48
Countries of high and very high human development									
Inequality (Gini)	0.01	-0.01	0.00	0.00	0.01	0.01	-0.02	-0.01	-0.01
Schooling, years		-0.05***					-0.03*	-0.05***	-0.03*
GDP pc., log			-0.05***				-0.03		-0.02
Gov. health exp.				-0.03***			-0.01		-0.01
Polity					-0.01		0.01		0.01
Ethnic diversity						0.01	0.00		0.00
Inequality X school								0.01	0.00
Inequality X GDP									0.01
Constant	0.36***	0.37***	0.37***	0.36***	0.36***	0.36***	0.37***	0.37***	0.37***
Observations	71	71	71	71	71	71	71	71	71
R-squared	0.01	0.15	0.17	0.11	0.02	0.02	0.22	0.16	0.22

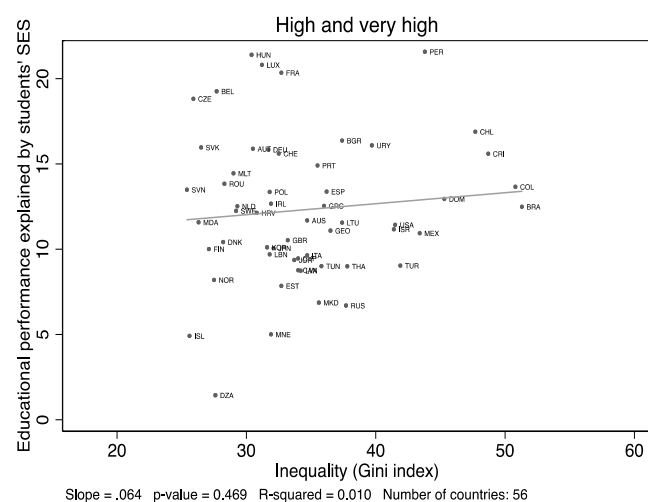
All independent variables are standardized to have a mean of 0 and a standard deviation of 1 for each of the two categories of countries. Significance test: *** p<0.01, ** p<0.05, * p<0.1.

SOCIAL MOBILITY: VARIATION IN PUPILS' TEST SCORES EXPLAINED BY SOCIOECONOMIC STATUS

To capture the most recent patterns in educational inequality, we use data from the OECD's PISA study carried out in 2015. Among other indicators, it presents the percentage of variation in science performance among 15-year-old students that is explained by their parents' socioeconomic status. A high share of performance variation explained by socioeconomic status means that students' performance is stratified by their parents' socioeconomic status. The data for this indicator have been collected mainly for OECD member states, limiting this specific analysis to HHD countries.

Figure 10 shows that the association between economic inequality and variation in students' educational performance by socioeconomic status is weak. We do not identify any relationship between macro-level inequality and the level of social stratification in students' science test scores.

Figure 10: Association between inequality and variation of students' performance by socioeconomic status



Multivariate analyses confirm that the effect of economic inequality on social stratification of students' school performance by socioeconomic status is small (Table 12). One standard deviation higher in inequality is associated with a less than 1 percentage point increase in the variation of students' performance in science explained by socioeconomic status. This is a small and statistically insignificant effect given that the overall proportion of variance in pupils' test scores explained by their socioeconomic background is 12.4 percent.

Table 12: OLS regressions on variation of students' performance in science explained by socioeconomic status

Countries of high and very high human development									
	M 0	M 1a	M 1b	M 1c	M 1d	M 1e	M 2	M 3	M 4
Inequality (Gini)	0.4	0.8	0.6	0.9	0.7	0.4	0.8	0.4	0.4
Schooling, years		0.7					-0.1	0.9	0.2
GDP pc., log			0.7				-0.3		-0.5
Gov. health exp.				1.2*			0.8		0.7
Polity					2.5***		2.3**		2.0**
Ethnic diversity						-0.2	0.3		0.3
Inequality X School								-1.6**	-1.0
Inequality X GDP									-0.3
Constant	12.4***	12.3***	12.2***	12.1***	11.8***	12.4***	11.7***	11.5***	11.2***
Observations	52	52	52	52	52	52	52	52	52
R-squared	0.01	0.03	0.03	0.08	0.18	0.01	0.20	0.14	0.25

All independent variables are standardized to have a mean of 0 and a standard deviation of 1. Significance test: *** p<0.01, ** p<0.05, * p<0.1.

The interaction term with years of schooling shows that the average level of educational attainment among adults has a small moderating effect on the association between economic inequality and the level of social stratification in students' school performance (Model 3). This interaction disappears when controlling for other contextual factors (Model 4).

Education as the great equalizer?

Among the findings presented in the first part of this background paper, two stand out as particularly puzzling. On the one hand, we find that there is no association between the level of income or consumption inequality and measures of inequality in educational attainment by social background at the country level. On the other hand, we provide evidence in line with the ‘Great Gatsby Curve’ (Corak 2013a, 2013b), and document a positive and fairly strong association between economic inequality and intergenerational social immobility. Why, then, do the results for educational inequality not seem to go hand in hand with those on social mobility?

In more general terms, education has long been conceived as the great equalizer of social mobility chances and the key social elevator in modern societies (Sorokin 1927).¹⁶ The idea that equalizing educational opportunities is the crucial solution to achieve more intergenerational equality and social mobility has been particularly popular in political debates, and shared by both left and right.¹⁷

In this second part of the paper, we provide a short discussion of the extent to which schooling and education are equalizers of intergenerational mobility chances in HHD countries. We first review the existing evidence on education and schooling as equalizers. We then point to a number of factors that posit some limits to their equalizing potential.

EDUCATION AS THE GREAT EQUALIZER

The evidence supporting the view of education as the great equalizer comes from the social stratification and mobility literature, and from studies on learning progression during the school year and summer vacations.

Social mobility

Social mobility studies have now reached a consensus that inequality in educational attainment by social background has declined over time in the 20th and early 21st century in most HHD countries (Barone and Ruggera 2018, Breen et al. 2009, Bernardi and Ballarino 2014, Hout and Janus 2011, Hertel and Pfeffer 2016). Moreover, more equal access to higher education has fostered more social mobility. This is because the association between social background and the type of occupation achieved (in terms of social class and socioeconomic status) by a given individual becomes weaker among those with higher education (Breen and Jonsson 2007). These important findings support the

¹⁶ More critical views have also been common in academia, particularly in the 1960s and 1970s. These stressed the active role played by the educational system in reproducing inequalities and legitimizing the capitalist order (see, for instance, Althusser 1972; Bourdieu 1974, pp. 32–46; Bowles and Gintis 1976).

¹⁷ George H. W. Bush is quoted in Ruane and Cerulo as having characterized education as “the lifting mechanism of an egalitarian society. It represents our most proven pathway to a better life” (2008, p. 274). A strong defender of the idea of education as “the great equalizer” is Arne Duncan, Secretary of Education of the United States during Barack Obama’s presidency (Duncan 2018).

view that educational expansion matched with increased equality in attainment by social background has translated into more intergenerational social mobility in HHD countries. There are, however, three important caveats to consider.

Firstly, equalization has occurred mostly at the lower levels of primary and secondary education and to a lesser degree at the university level. Secondly, the largest part of the decline in educational inequality has occurred for cohorts born in the aftermath of the World War II. These cohorts benefitted from a huge educational expansion matched with very favourable economic conditions at entry into the labour market and relatively low income inequality (of course, with some variation in timing and patterns across countries). Thirdly, with the levelling off of educational expansion at the university level that has occurred in some countries in recent years (for instance, in Finland and the United States) there are theoretical arguments and preliminary evidence that educational inequality might raise again (Bernardi, Hertel and Yastrebov 2018).

On balance, educational expansion and equalization have been the main channels of upward social mobility for current HHD countries, mainly in the second half of the last century. These same results, however, warn against a too simplistic interpretation that directly equates more education to more social mobility.

Summer and school year learning

The literature that compares learning progression during the school year and during the summer holidays relies on a kind of a ‘natural experiment’ (Raudenbush and Eschmann 2015). During the school year, learning is affected by school and non-school factors such as the family and the neighbourhood where a subject lives. During the summer holidays, schools are closed and learning is solely affected by non-school factors. Learning progression during the summer holidays is then used as a baseline counterfactual for how learning would evolve in the absence of schooling. Results from studies based on this research design convincingly show that inequality in achievement by social background grows more during the summer holidays than during the school year (Downey and Condron 2016; Downey, von Hippel and Broh 2004; Alexander, Entwisle and Olson 2007; Heyns 1978; Quinn et al. 2016; von Hippel, Workman and Downey 2018). The reduction in inequality during the school year reported by these studies is usually mild. Still, this finding suggests that formal education reduces inequalities associated with socioeconomic differences in the learning environment at home, and that in the absence of schooling, socioeconomic inequality in achievement would be larger.

LIMITS TO THE EQUALIZING EFFECT OF SCHOOLING¹⁸

Several factors limit the equalizing potential of schooling. We refer here to the literature on inequalities in school readiness and compensatory advantage in educational transition and in the labour market.

Early inequalities

Although schooling might reduce inequalities in achievement related to social background, a large gap between children from different social backgrounds is already present before schooling even starts (Merry 2013, Bradbury et al. 2015, Heckman 2006). Students from low socioeconomic status families enter school with lower average pre-reading and mathematics skills than their peers from high socioeconomic status families. In other words, social background inequality in achievement exists before the start of schooling, and the equalizing effect of schooling reported by the research reviewed in the previous section is small compared to the size of early gaps in competences.

Compensatory advantage in school and the labour market

Previous research on what has been labelled ‘compensatory advantage’ has consistently shown that social background inequality in final educational attainment is particularly large among students who perform poorly in school (Bernardi 2014, Bernardi and Triventi 2018). This result has been found for Germany (Hartlaub and Schneider 2012), France (Bernardi and Boado 2014) and other European countries (Blossfeld et al., eds. 2016), and also in very different institutional and political contexts, such as Soviet Leningrad in the late 1960s (Yanowitch 1977) and the United States in the late 1970s (Carneiro and Heckman 2005). In case of low performance in schools, children from high socioeconomic status families have nevertheless much higher chances to move on and progress towards the highest level of education. In that case, parents of high socioeconomic status can provide direct help, pay for private tutoring, move their children to a remedial school or a less demanding school, and guarantee them a second chance in case of failure (Yastrebov, Kosyakova and Kurakin 2018). All in all, they dispose of the cultural and social resources to navigate the educational system and to prevent their low performing children from dropping out.

A similar pattern has been observed in cases of relatively low final educational attainment. When someone from a high socioeconomic status family fails to attain a university degree or even an upper secondary diploma, he or she has much higher chances of attaining a non-manual relatively well-paid job and avoiding unskilled manual occupations. In case of failure at school, those who come from high socioeconomic status families manage to avoid downward occupational mobility with respect to their parents (Bernardi and Ballarino 2016).

If one brings together studies on remedial strategies in the educational system and in the labour market, there is evidence that parents of high socioeconomic status are effective in preventing their

¹⁸ For a more in-depth discussion of limits to the equalization potential of schooling, see Holtmann and Bernardi (2019), on which this section partly draws.

children from experiencing educational and occupational downward mobility, even when their children perform poorly in school.

Summary and conclusions

In this paper, we re-examined the empirical claims by Wilkinson and Pickett in their book *The Spirit Level* (2009, 2010), in which they concluded that countries with higher inequality tend to have worse social outcomes related to health, violence, education and social mobility. In addition, we studied whether higher educational attainment at a national level can offset some of the effects of economic inequality on social outcomes. In doing so, we addressed some of the main criticisms put forth by other researchers regarding the methodological approach used in *The Spirit Level*. Firstly, we studied countries at all levels of human development with available data to avoid sample selection bias, and analysed countries of low and high development separately to see if the findings differ depending on level of development. Secondly, to account for possible spurious effects, in addition to bivariate associations, we also fitted multivariate models to control for other contextual factors that may affect both inequality and the outcomes analysed.

Our empirical analysis was carried out at a macro-level, studying associations between economic inequality and the various social outcomes using aggregate national data to re-examine the associations previously identified by *The Spirit Level*, and to study the role of education as a potential moderator in reducing the negative effects of inequality.

In the country-level analysis, we find some support for the hypothesis that economic inequality is associated with worse social outcomes. In HHD countries, inequality is associated with a higher number of social outcomes than in LHD countries, and the association is generally stronger. We also find that higher average education among the adult population tends to be associated with better social outcomes. There is mild or no evidence that education has a moderating effect on the relationship between inequality and social problems. For highly developed countries, a moderating effect of education in reducing the negative effect of inequality is identified for 2 out of a total of 10 outcomes analysed. For less developed countries, no moderating effect is found for any of the seven outcomes analysed.

The following are the main conclusions from the county-level analysis. Table 13 summarizes the main findings.

- For LHD countries, we find evidence of an association between economic inequality and three out of a total of seven outcomes analysed: life expectancy, homicide rates and suicide rates. When controlling for possible confounders, the estimate of the association between inequality

and suicide rates becomes statistically insignificant, while for the other two outcomes, the estimates remain substantial and significant.

- For HHD countries, we find evidence of an association between economic inequality and 6 out of a total of 10 outcomes analysed: life expectancy, infant mortality, homicide rates, adolescent birth rates, share of pupils performing below baseline proficiency in school and intergenerational earnings elasticity. After controlling for contextual factors, two of the six estimated associations become smaller and statistically insignificant: those of life expectancy and infant mortality. This suggests that poorer health outcomes in the more affluent countries might be brought about not by the direct effect of inequality, but rather by lower investments in public services and health-supportive infrastructure, as well as by pre-existing social structures shaped by countries' political and ethno-cultural contexts.
- Association between economic inequality and social outcomes is generally stronger in HHD countries. Two notable exceptions are life expectancy and suicide rates, for which the association with inequality is stronger in LHD countries.
- The effect of inequality is mediated by contextual factors, and mediation differs depending on the outcome analysed and the countries' level of development. Public spending on health care, for instance, is relevant for health outcomes in both LHD and HHD countries; ethnic fractionalization explains some of the cross-country variation in life expectancy, suicide rates, adolescent birth rates and intergenerational educational inequality in LHD countries, and homicide rates in HHD countries. Economic development measured by GDP per capita also explains some of the cross-country variation in social outcomes, especially for LHD countries.
- We do not find evidence for an association between inequality and the following two outcomes for countries of all levels of development: violence against women from an intimate partner, and intergenerational inequality in education. In addition to these, inequality (measured by the Gini index) does not seem to be associated with suicide rates and educational performance by socioeconomic background in HHD countries, and with infant mortality and adolescent birth rates in LHD countries.
- Higher average education at a macro level is generally associated with better social outcomes. For instance, net of other contextual factors, countries in which adults on average have more years of schooling tend to have lower mortality rates, a lower share of pupils with below-baseline proficiency in school and lower intergenerational inequality in education.
- In HHD countries, we find a moderating effect of education reducing the strength of association between economic inequality in 2 out of a total of 10 outcomes analysed: life expectancy and homicide rates. This finding implies that in HHD countries, higher inequality

is associated with lower life expectancy (without accounting for confounders) and higher homicide rates, but these effects of inequality are lower in countries where adults have a higher level of education.

- In LHD countries, education has no observed moderating effect on the relationship between economic inequality and any of the seven social problems analysed.

Despite the methodological improvements in the empirical part of the analysis, the main criticism of the approach applied here is the threat posed by ecological inference fallacy as aggregate data are used to infer micro-level explanations. Thus, in the second part of the background paper, we addressed the question of the relationship between inequality, educational opportunities and social outcomes by turning to existing empirical sociological research that has examined these micro-level mechanisms, and tested the relevant social stratification theories using individual-level data. Research that we summarize in the second part of the paper moves beyond macro-level data and disentangles the mechanisms behind inequality, educational opportunities and social outcomes at an individual level.

Previous research shows that the position that individuals hold within a socially stratified society are important determinants of their life chances. Such outcomes as unemployment, poverty, precarious housing and poor health, to name just a few, do not strike individuals at random, but are socially structured. Unlike Pickett and Wilkinson's *The Spirit Level*, which has been criticized for treating social class and social status as synonymous forms of social stratification (Goldthorpe 2010, p. 737), social stratification researchers make a clear distinction between the two. It is now well established that individuals' current and future economic prospects are more strongly correlated with social class, while cultural and social choices have a higher association with social status (Chan and Goldthorpe 2007).

The lesson we can learn from the relationship between education and social mobility from countries of high human development described in the second part of this paper is twofold.

Firstly, schooling has represented a channel of unprecedented upward social mobility for millions of children born in families with low socioeconomic status, particularly those belonging to the cohorts born in the 1940s to the 1960s. Not incidentally, one might also note that the years when these cohorts grew up was characterized by a sharp reduction in income inequality and sustained occupational upgrading. Secondly, the scope of education as an equalizer is reduced by the fact that children in families of high socioeconomic status consistently manage to avoid downward educational and social mobility.

Table 13: Summary findings

Social outcome	Association between economic inequality and social outcome ^a		Effect of education on the association between economic inequality and social outcome ^b	
	Level of human development		Level of human development	
	Low/medium	High/very high	Low/medium	High/very high
HEALTH				
Life expectancy	NEGATIVE	Ins.*	Ins.	POSITIVE
Infant mortality	Ins.	Ins.*	Ins.	Ins.
VIOLENCE				
Homicide rates	POSITIVE	POSITIVE	Ins.	NEGATIVE
Suicide mortality rates	Ins.*	Ins.	Ins.	Ins.
Violence against women from an intimate partner	Ins.	Ins.	Ins.	Ins.
TEENAGE PREGNANCY				
Adolescent birth rate	Ins.	POSITIVE	Ins.	Ins.
EDUCATION				
Students aged 15 performing below baseline proficiency level in mathematics	n/a	POSITIVE	n/a	Ins.
SOCIAL MOBILITY				
Intergenerational earnings elasticity	n/a	POSITIVE	n/a	Ins.
Intergenerational elasticity in years of schooling	Ins.	Ins.	Ins.	Ins.
Variation in school test scores explained by students' socioeconomic status	n/a	Ins.	n/a	Ins.

Summary findings presented here are net of the following contextual factors: ^a mean years of schooling, economic development, government expenditure on health, democratization and ethnic fractionalization (Model 2 in the tables presented in the findings section), and ^b the same as ^a, with an interaction term between inequality and economic development (Model 4). Findings are reported as positive/negative if the coefficient p-value is $p < 0.05$, and as insignificant (Ins.) otherwise. * indicates that the association is statistically significant without controls.

In sum, schooling has been and still is a social elevator that moves up for children of low socioeconomic status families. The same elevator does not move down, however, for children of high socioeconomic families who fail in school. As we have pointed out, a large part of the reproduction process of intergenerational inequality takes place even before schooling starts, and outside school during schooling years. High socioeconomic status families have the social, cultural and economic resources to prevent their children from dropping out of the educational system in case of low performance at school, and falling down the occupational ladder in case of low educational attainment.

The important lesson we can, therefore, learn from the experience of HHD countries in more recent years is that schooling alone is not enough to break the Gordian knot of intergenerational transmission of privilege. Educational expansion, particularly at the highest level, is not a guarantee of more intergenerational equality by itself if it is not also coupled with corresponding occupational upgrading. In countries such as Italy and Spain, for instance, the proportion of those leaving the educational system with a university degree is now higher than the proportion of those employed in upper-class

occupations.¹⁹ When the number of highly qualified school leavers exceeds the number of highly qualified occupations, the equalizing potential of education is likely to further diminish, and the role of family origin is enhanced. Further research at the individual level and using longitudinal data is needed for countries of all levels of human development to investigate both the evolution of inequalities over time and the equalizing potential of education on the type of social outcomes considered in this paper.

There are other positive implications of educational expansion beyond its equalizing potential for social mobility chances. Education gives individuals more control over their own lives and empowers them as citizens. Even from a strict economic perspective, some might argue that a rise in the stock of human capital will induce an increase in economic productivity and, ultimately, an occupational upgrading at the country level. Still, one should also not forget that when education is not matched by adequate skilled occupations, educational expansion might induce frustration and resentment on the side of qualified school leavers who do not find occupations that match their expectations. Especially during periods of economic downturn such as the oil crisis in the 1990s and the great recession in the late 2000s, political instability may be partly attributed to the overqualification of segments of the population (see, for instance, Heinemann 2018 for countries in North Africa, Giugni and Grasso 2016 for European countries, and Milkman 2017 for the United States).

To conclude: the experience of HHD countries since the 1980s suggests that educational expansion and equality in educational attainment are not a panacea that automatically guarantees more intergenerational socioeconomic equality. Making the starting positions more equal—i.e., reducing inequality in the parents' generation, and imaginative industrial and post-industrial employment policies to support the creation of both low- and high-skilled occupations—might have to go hand in hand with educational expansion to make countries of all levels of human development intergenerationally more equal.

¹⁹ This is class I and II in Erikson and Goldthorpe's class scheme. Broadly speaking, it includes liberal professions, and high-level managerial and high-tech occupations (Erikson and Goldthorpe 1992).

References

- Agresti, A., and B. Finlay. 2009. *Statistical Methods for the Social Sciences*. 4th ed. Pearson Education.
- Alesina, A., R. Baqir and W. Easterly. 1999. "Public Goods and Ethnic Divisions." *The Quarterly Journal of Economics* 114(4): 1243–84.
- Alexander, K. L., D. R. Entwisle and L. Steffel Olson. 2007. "Summer Learning and Its Implications: Insights from the Beginning School Study." *New Directions for Youth Development* 2007(114): 11–32.
- Althusser, L. 1972. "Ideology and Ideological State Apparatuses." In L. Althusser, ed., *Lenin and philosophy, and other essays*. Monthly Review Press.
- Atkinson, A. B., L. Rainwater and T. M. Michael Smeeding. 1994. *Income Distribution in Advanced Economies: The Evidence from the Luxembourg Income Study (LIS)*. Luxembourg: Luxembourg Income Study.
- Babones, S. J. 2014. *Methods for Quantitative Macro-Comparative Research*. Thousand Oaks, CA: Sage Publications.
- Barone, C., and L. Ruggera. 2018. "Educational Equalization Stalled? Trends in Inequality of Educational Opportunity between 1930 and 1980 across 26 European Nations." *European Societies* 20(1): 1–25.
- Barro, R. J., and J. W. Lee. 1996. "International Measures of Schooling Years and Schooling Quality." *The American Economic Review* 86(2): 218–23.
- Berk, R. A. 2004. *Regression Analysis: A Constructive Critique*. Thousand Oaks, CA: Sage Publications.
- Bernardi, F. 2014. "Compensatory Advantage as a Mechanism of Educational Inequality: A Regression Discontinuity Based on Month of Birth." *Sociology of Education* 87(2): 74–88.
- Bernardi, F., and G. Ballarino. 2014. "Participation, Equality of Opportunity and Returns to Tertiary Education in Contemporary Europe." *European Societies* 16(3): 422–42.
- . 2016. *Education, Occupation and Social Origin: A Comparative Analysis of the Transmission of Socio-Economic Inequalities*. Cheltenham: Edward Elgar Publishing.
- Bernardi, F., and H.-C. Boado. 2014. "Previous School Results and Social Background: Compensation and Imperfect Information in Educational Transitions." *European Sociological Review* 30(2): 207–17.
- Bernardi, F., L. Chakhaia and L. Leopold. 2017. "'Sing Me a Song with Social Significance': The (Mis)Use of Statistical Significance Testing in European Sociological Research." *European Sociological Review* 33(1): 1–15.
- Bernardi, F., F. R. Hertel and G. Yastrebov. 2018. "A U-Turn in Inequality in College Attainment by Parental Education in the US?" *Research in Social Stratification and Mobility* 58: 33–43.
- Bernardi, F., and M. Triventi. 2018. "Compensatory Advantage in Educational Transitions: Trivial or Substantial? A Simulated Scenario Analysis." *Acta Sociologica* 3 July.

Education as an equalizer for human development?

- Blossfeld, H.-P., S. Buchholz, J. Skopek and M. Triventi, eds. 2016. *Models of Secondary Education and Social Inequality: An International Comparison*. Edward Elgar Publishing.
- Bourdieu, P. 1974. "The School as a Conservative Force: Scholastic and Cultural Inequalities." In J. Eggleston, ed., *Contemporary research in the sociology of education*. London: Methuen.
- Bowles, S., and H. Gintis. 1976. *Schooling in Capitalist America: Educational Reform and the Contradictions of Economic Life*. New York: Basic Books.
- Bradbury, B., M. Corak, J. Waldfogel and E. Washbrook. 2015. *Too Many Children Left Behind: The U.S. Achievement Gap in Comparative Perspective*. Russell Sage Foundation.
- Brand, J. E., and Y. Xie. 2010. "Who Benefits Most from College? Evidence for Negative Selection in Heterogeneous Economic Returns to Higher Education." *American Sociological Review* 75(2): 273–302.
- Breen, R. 2010. "Educational Expansion and Social Mobility in the 20th Century." *Social Forces* 89(2): 365–88.
- Breen, R., and J. O. Jonsson. 2007. "Explaining Change in Social Fluidity: Educational Equalization and Educational Expansion in Twentieth-Century Sweden." *American Journal of Sociology* 112(6): 1775–1810.
- Breen, R., R. Luijkx, W. Müller and R. Pollak. 2009. "Nonpersistent Inequality in Educational Attainment: Evidence from Eight European Countries." *American Journal of Sociology* 114(5): 1475–1521.
- Carneiro, P., and J. J. Heckman. 2005. "Human Capital." In J. J. Heckman, A. B. Krueger and B. M. Friedman, eds., *Inequality in America: What Role for Human Capital Policies?*, pp. 77–239. The MIT Press.
- Chan, T. W., and J. H. Goldthorpe. 2007. "Class and Status: The Conceptual Distinction and Its Empirical Relevance." *American Sociological Review* 72(4): 512–32.
- Collins, R. 1979. *The Credential Society: An Historical Sociology of Education and Stratification*. New York: Academic Press.
- Corak, M. 2013a. "Income Inequality, Equality of Opportunity, and Intergenerational Mobility." *The Journal of Economic Perspectives* 27(3): 79–102.
- . 2013b. "Inequality from Generation to Generation: The United States in Comparison." In R. S. Rycroft, ed., *The Economics of Inequality, Poverty, and Discrimination in the 21st Century*. Santa Barbara, CA: ABC-CLIO.
- Downey, D. B., and D. J. Condron. 2016. "Fifty Years since the Coleman Report: Rethinking the Relationship between Schools and Inequality." *Sociology of Education* 89(3): 207–20.
- Downey, D. B., P. T. von Hippel and B. A. Broh. 2004. "Are Schools the Great Equalizer? Cognitive Inequality during the Summer Months and the School Year." *American Sociological Review* 69(5): 613–635.
- Duncan, A. 2018. "Education: The 'Great Equalizer'." *Encyclopedia Britannica*. www.britannica.com/topic/Education-The-Great-Equalizer-2119678. Accessed 29 March 2019.
- Erikson, R., and J. H. Goldthorpe. 1992. *The Constant Flux: A Study of Class Mobility in Industrial Societies*. Oxford: Clarendon Press.

- EqualChances. 2019. "Equal Chances: The World Database on Equality of Opportunity and Social Mobility." *EqualChances*. www.equalchances.org/web/index.php?r=measures%2Findex. Accessed 26 February 2019.
- Ersado, L. 2006. *Azerbaijan's Household Survey Data : Explaining Why Inequality Is So Low*. The World Bank.
- Fearon, J. D. 2003. "Ethnic and Cultural Diversity by Country." *Journal of Economic Growth* (8): 195–222.
- Freedman, D., R. Pisani and R. Purves. 1978. *Statistics*. New York: WW Norton.
- Giugni, M., and M. T. Grasso. 2016. *Austerity and Protest: Popular Contention in Times of Economic Crisis*. Routledge.
- Goldin, C., and L. F. Katz. 2009. *The Race between Education and Technology*. Harvard University Press.
- Goldthorpe, J. H. 2010. "Analysing Social Inequality: A Critique of Two Recent Contributions from Economics and Epidemiology." *European Sociological Review* 26(6): 731–44.
- Hannum, E., and C. Buchmann. 2005. "Global Educational Expansion and Socio-Economic Development: An Assessment of Findings from the Social Sciences." *World Development* 33(3): 333–54.
- Hanushek, E. A., and L. Woessmann. 2008. "The Role of Cognitive Skills in Economic Development." *Journal of Economic Literature* 46(3): 607–68.
- Hartlaub, V., and T. Schneider. 2012. *Educational Choice and Risk Aversion: How Important Is Structural vs. Individual Risk Aversion?* Working paper 433. SOEP papers on multidisciplinary panel data research.
- Heckman, J. J. 2006. "Skill Formation and the Economics of Investing in Disadvantaged Children." *Science* 312(5782): 1900–1902.
- Heinemann, T. 2018. *Unemployment in North Africa – Men without Jobs Are Not the Only Problem*. KfW Research.
- Herd, P., B. Goesling and J. S. House. 2007. "Socio-economic Position and Health: The Differential Effects of Education versus Income on the Onset versus Progression of Health Problems." *Journal of Health and Social Behavior* 48(3): 223–38.
- Hertel, F. R., and F. T. Pfeffer. 2016. *The Land of Opportunity? Trends in Social Mobility and Education in the United States*. 22. MWP Working Paper Series.
- Hertz, T., T. Jayasundera, P. Piraino, S. Selcuk, N. Smith and A. Verashchagina. 2007. "The Inheritance of Educational Inequality: International Comparisons and Fifty-Year Trends." *The BE Journal of Economic Analysis & Policy* 7(2): 1–46.
- Heyns, B. 1978. *Summer Learning and the Effects of Schooling*. New York: Academic Press.
- Holtmann, A. C., and F. Bernardi. 2019. "The Equalizing Effect of Schools and Its Limits." In R. Becker, ed., *Research Handbook on the Sociology of Education*.
- Hout, M. 2012. "Social and Economic Returns to College Education in the United States." *Annual Review of Sociology* 38(1): 379–400.
- Hout, M., and A. Janus. 2011. "Educational Mobility in the US since the 1930s." In G. J. Duncan and R. J. Murnane, eds., *Whither opportunity? Rising inequality, schools, and children's life chances*. Sage Foundation.

Huckfeldt, R. R. 1986. *Politics in Context: Assimilation and Conflict in Urban Neighborhoods*. New York: Agathon Press.

Jerven, M. 2013. *Poor Numbers: How We Are Misled by African Development Statistics and What to Do about It*. Cornell University Press.

Jerven, M., and D. Johnston. 2015. "Statistical Tragedy in Africa? Evaluating the Data Base for African Economic Development." *The Journal of Development Studies* 51(2): 111–15.

Knowles, S. 2005. "Inequality and Economic Growth: The Empirical Relationship Reconsidered in the Light of Comparable Data." *The Journal of Development Studies* 41(1): 135–59.

Kravdal, Ø. 2004. "Child Mortality in India: The Community-Level Effect of Education." *Population Studies* 58(2): 177–92.

Krueger, A. B., and M. Lindahl. 2001. "Education for Growth: Why and for Whom?" *Journal of Economic Literature* 39(4): 1101–1136.

Lynch, J., G. Davey Smith, S. Harper, M. Hillemeier, N. Ross, G. A. Kaplan and M. Wolfson. 2004. "Is Income Inequality a Determinant of Population Health? Part 1. A Systematic Review." *The Milbank Quarterly* 82(1): 5–99.

Marshall, M. G., T. R. Gurr and K. Jagers. 2018. *Polity IV Project: Political Regime Characteristics and Transitions, 1800-2017: Dataset Users' Manual*. Center for Systemic Peace.

Merry, J. J. 2013. "Tracing the U.S. Deficit in PISA Reading Skills to Early Childhood: Evidence from the United States and Canada." *Sociology of Education* 86(3): 234–52.

Milkman, R. 2017. "A New Political Generation: Millennials and the Post-2008 Wave of Protest." *American Sociological Review* 82(1):1–31.

Mills, C. 2012. "Open Letter to Prof. Richard Wilkinson & Prof. Kate Pickett." *Oxford Sociology*. <http://oxford-sociology.blogspot.com/2012/11/open-letter-to-prof-richard-wilkinson.html>. Accessed 27 February 2019.

Mirowski, J., and C. Ross. 2003. *Education, Social Status, and Health*. Hawthorne, NY: Aldine de Gruyter.

Moran, T. P. 2003. "On the Theoretical and Methodological Context of Cross-National Inequality Data." *International Sociology* 18(2): 351–78.

OECD (Organisation for Economic Co-operation and Development). 2016. *PISA 2015 Results (Volume 1): Excellence and Equity in Education. Text*. New York: OECD.

Parashar, S. 2005. "Moving beyond the Mother-Child Dyad: Women's Education, Child Immunization, and the Importance of Context in Rural India." *Social Science & Medicine* 61(5): 989–1000.

Piketty, T. 2014. *Capital in the 21 Century*. Trans. Arthur Goldhammer. Belknap Press.

Quinn, D. M., N. Cooc, J. McIntyre and C. J. Gomez. 2016. "Seasonal Dynamics of Academic Achievement Inequality by Socioeconomic Status and Race/Ethnicity: Updating and Extending Past Research With New National Data." *Educational Researcher* 45(8): 443–53.

Raudenbush, S. W., and R. D. Eschmann. 2015. "Does Schooling Increase or Reduce Social Inequality?" *Annual Review of Sociology* 41(1): 443–70.

- Ruane, J. M., and K. A. Cerulo. 2008. *Second Thoughts: Seeing Conventional Wisdom through the Sociological Eye*. Pine Forge Press.
- Saunders, P. 2010. *Beware False Prophets: Equality, the Good Society and The Spirit Level*. Policy Exchange.
- Sorokin, P. A. 1927. *Social Mobility*. New York, London: Harper & Brothers.
- UNDP (United Nations Development Programme). 2018. *Human Development Indices and Indicators 2018: Statistical Update*. New York: UNDP.
- . 2019. “Human Development Data (1990-2017), Human Development Reports.” hdr.undp.org/en/data#. Accessed 28 January 2019.
- UNESCO UIS (United Nations Educational, Scientific and Cultural Organization Institute for Statistics). 2017. “More Than One-Half of Children and Adolescents Are Not Learning Worldwide.” Fact Sheet No. 46.
- von Hippel, P. T., J. Workman and D. B. Downey. 2018. “Inequality in Reading and Math Skills Forms Mainly before Kindergarten: A Replication, and Partial Correction, of ‘Are Schools the Great Equalizer?’” *Sociology of Education* 91(4): 323–57.
- Wilkinson, R., and K. Pickett. 2009. *The Spirit Level. Why More Equal Societies Almost Always Do Better*. London: Penguin.
- . 2010. *The Spirit Level: Why Equality Is Better for Everyone*. Penguin.
- . 2018. *The Inner Level: How More Equal Societies Reduce Stress, Restore Sanity and Improve Everyone’s Well-Being*. Penguin.
- World Bank. 2019a. “The World Bank in Small States.” www.worldbank.org/en/country/smallstates. Accessed 26 February 2019.
- . 2019b. “World Development Indicators.” databank.worldbank.org/data/source/world-development-indicators/preview/on. Accessed 28 January 2019.
- World Bank Data Help Desk. 2018. “World Bank Country and Lending Groups: Historical Classification by Income.” datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups. Accessed 27 November 2018.
- Yanowitch, M. 1977. *Social and Economic Inequality in the Soviet Union: Six Studies*. White Plains: Shape.
- Yastrebov, G., Y. Kosyakova and D. Kurakin. 2018. “Slipping Past the Test: Heterogeneous Effects of Social Background in the Context of Inconsistent Selection Mechanisms in Higher Education.” *Sociology of Education* 91(3): 224–41.

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