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GOVERNANCE, RISKS, AND RETURNS TO HUMAN CAPITAL

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Abstract. This study examines the role of good governance, ethnic diversity, and exposure to environmental risks on the returns to human capital. To estimate country-level returns to education and experience, the analysis uses labor force and household surveys spanning 33 years and from 145 countries at various stages of economic development. The findings indicate that better governance and greater ethnic diversity are associated with both higher returns to human capital and lower overall income inequality, with narrower wage gaps between men and women. Both urban and rural residents benefit similarly from stronger institutions. Quantile regressions also reveal that stronger socioeconomic institutions help lift incomes at the bottom of the distribution relative to the top, leading to lower overall inequality in well-governed and more diverse countries.

JEL: O47, I25, P16, J24

Keywords: heterogeneity in returns to education and experience; economic growth; governance; natural disasters; ethnic fractionalization

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Governance, Risks, and Returns to Human Capital

I. Introduction

Since Solow (1957) developed a method to distinguish between shifts in, versus movements along, the aggregate production function, economists have attempted to identify the causes of economic growth. A common finding of these studies has been that changing the levels of inputs alone does not explain growth well, leaving a substantial residual that seeks an explanation. Total factor productivity (TFP) improvements have explained 61-72 percent of the variance in economic growth across countries since 1950, up from 41 percent in earlier periods (Crafts and Woltjer, 2021).[1] Differences in TFP are the main factor limiting production in poor countries relative to wealthier ones. Consequently, a crucial step in raising incomes in low-income countries is identifying and addressing the obstacles to TFP growth.

One extensively studied factor explaining economic growth is human capital. The discounted stream of returns to skills embodied in a country's people constitutes a significant portion of national wealth (Managi and Kumar, 2018). Although some have argued that the link between human capital and growth is weak (Pritchett, 2006), there is strong evidence on a positive correlation between education and GDP per capita (Barro, 2003; Cohen and Soto, 2007; Ciccone and Papaioannou, 2009; Gennaioli et al., 2013; Manuelli and Seshadri, 2014). The significance of education becomes clearer when measures of the quality of schooling (such as student test scores) are considered besides completed years of schooling (Mulligan and Sala-i-Martin, 2000; Hanushek and Woessmann, 2020). Related to this, World Bank economists developed an education measure termed LAYS (learning-adjusted years of schooling) which

[1] Ironically, TFP is measured as gains in productivity that are not explained by observables, and so using TFP to explain growth is equivalent to explaining growth by growth that one cannot explain.

incorporates years of schooling and student test scores into one measure (Filmer et al., 2020). This expanded measure of human capital shows that the differences among countries are even larger when the quality of education is taken into account. When the measure of human capital also incorporates health metrics, as exemplified by the World Bank's Human Capital Index (Kraay, 2019), investing in human capital becomes more cost-effective than investing in physical capital for achieving income growth or poverty reduction goals (Collin and Weil, 2020).[2]

The allocations of time and resources to education and skills development are the most ubiquitous household investments in rich and poor countries. Over the past three decades, the average educational attainment around the world has increased dramatically, particularly in poorer countries. However, returns to human capital investments differ greatly across countries, reflecting worldwide differences in TFP. As Hsieh and Klenow (2010) have shown, as much as 50-70% of the variation in per capita income across countries is attributable to variation in TFP. A major barrier preventing countries from reaching their full productive potential is the misallocation of labor and capital across firms and industries. This misallocation stems from various factors, including distortions in the relative price of capital versus consumption goods (Hsieh and Klenow, 2009), zoning restrictions that limit labor mobility into high-wage markets (Hsieh and Moretti, 2019), and barriers that prevent qualified individuals from entering certain occupations (Hsieh et al., 2019).

This is consistent with Schultz (1975) who argued that the returns to human capital are greatest when allocating resources in response to disequilibria. Restrictions on the mobility of

[2] Another strand of the literature on human capital also recognizes that socioemotional skills, not just cognitive skills, are part of people's human capital and have their own direct effect on employment and earnings (e.g., King and Gunewardena, 2022; Danon et al., 2024).

labor and capital would limit that ability to allocate resources efficiently, resulting in lower TFP and lower returns to human capital. As an example, political and legal restrictions to individual resource allocation in centrally planned economies in Europe diminished the private returns to schooling. Estimated returns averaged just 4% before the 1991 collapse of the Soviet Union, but averaged 8% during the transition to market over the period 1993-2002 (Fleisher, Sabirianova, and Wang, 2005). Lower individual returns to human capital reflecting relatively low productivity was also evident in China before its economic reforms when labor misallocations decreased (Hsieh and Klenow, 2009). Other potential sources of variation in TFP across countries include the extent of democratic versus dictatorial rule (Acemoglu et. al., 2019; Colagrossi, Rossignoli, and Maggioni, 2020; González and Prem, 2020), the size of the state versus private production (Schmitz, 2001; Afonso and Aubyn, 2013; Wang et al., 2013), legal protection of property rights (Falvey, Foster, and Greenaway, 2006; Horii and Iwaisako, 2007; Dinopoulos and Segerstrom, 2010), the rule of law (Ranasinghe, and Restuccia, 2018; Kariuki, and Kabaru, 2022; Hao et al., 2024), government regulation (Dawson, and Seater, 2013; Xia, and Xu, 2020), and fiscal policy (Everaert, Heylen, and Schoonackers, 2015; Gonseth, et al., 2015). All of these factors fit under the broad umbrella of the extent of the government's protection of, or restrictions on, the individual's freedom to make economic decisions of the sort discussed by Schultz (1975).

Many organizations such as the Heritage Foundation, the Fraser Institute, and the World Bank have developed measures of these institutional factors bundled together as economic freedom. These measures are highly correlated with each other. In this paper, we use the World Bank's Worldwide Governance Indicators, which offer consistent measures of the level of various government policies that enhance or restrict economic freedom. We examine how these

measures affect the returns to human capital, controlling for factors that have been used to explain the variation in economic growth rates across countries. Variation in TFP that derives from different economic freedoms affects the returns to human capital investments.

The Schultz (1975) hypothesis posits that education and accumulated experience help individuals, households and communities prepare for, respond to, and recover from shocks. Those shocks might include a public health crisis like the Covid-19 pandemic of 2020 (Alizadeh and Sharifi, 2021; Lee, Hu, and Kung, 2022), environmental disasters and extreme weather events (Skidmore and Toya, 2002; Toya, Skidmore and Robertson, 2010), and violent conflicts within and between countries (Ghobarah, Huth, and Russett, 2004; Mancini and Bonanno, 2006; Annan et al., 2011). Human capital enables individuals and communities to better allocate resources, helping to mitigate the effects of shocks and to speed recovery. Schultz (1975) argues that countries that promote greater resource mobility in response to economic disruptions achieve the highest returns on human capital.

Country-level estimates of the returns to years of schooling and experience, derived from 1,394 labor force and household surveys representing 145 countries from 1991 to 2023, reveal substantial disparities in returns to human capital. The average return to an additional year of education ranges widely from -6.6% to 20.0%, averaging 9.8%. Similarly, the return to an additional year of experience varies significantly, ranging from -0.6% to 4.5%, with an average of 1.7%. These country-level returns to human capital persist over time, suggesting that they are shaped by long-lasting institutions. Moreover, returns to human capital are highest in countries with strong governance and greater diversity. Furthermore, an analysis of the effects of economic institutions on returns across the returns distribution indicates that low-earners – particularly women and rural residents -- benefit the most from better institutional quality. In an era of

institutions. In a world that is increasingly more aware greater awareness of the possible impact of natural disasters, the estimates also show that, holding constant the quality of institutions, greater exposure to environmental risks diminishes returns to human capital somewhat, especially for women and urban residents.

II. The model: returns to human capital, shocks, and institutions

The return to a person's human capital investment depends on several factors that affect the quality of the match between employee and employer (Petrongolo and Pissarides, 2001). This paper focuses on what happens to those returns to human capital in the presence of supportive or restrictive governmental institutions, demographic diversity, and environmental risks. Economic institutions define the incentives and constraints that influence individual choices, political decisions, and economic outcomes (Acemoglu, Johnson, and Robinson, 2005). Combinations of property rights enforcement, constraints on central authorities, and the lack of monopoly rents are beneficial for growth and benefit returns to human capital, whereas restrictions on labor or capital mobility, limitations on human or physical capital investment, and weak governance reduce returns (Schultz, 1975; King, Montenegro, and Orazem, 2012).

Equations (1) below propose that the average returns to education, r_{jt}, and to work experience, b_{jt}, in country j at year t are modeled as

$$r_{jt} = \gamma_0 + \sum_{l=1}^{L} \gamma_l^I I_{ljt} + \gamma^D D_{jt} + \gamma^N N_{jt} + \nu_{jt}^r \quad (1)$$

$$b_{jt} = \delta_0 + \sum_{l=1}^{L} \delta_l^I I_{ljt} + \delta^D D_{jt} + \delta^N N_{jt} + \nu_{jt}^b$$

where vector, I_{jt}, represents institutional factors such as government policies; D_{jt} measures demographic diversity, and N_{jt} refers to the risk of natural disasters. Unmeasured sources of variation in returns are indicated by $v_{jt}^{k}\ where\ k = r, b.$ We measure diversity using ethnic fractionalization, but exclude ethnic violence, as the rewards from human capital are more likely to stem from peacefully accommodating and leveraging differences rather than rebuilding after conflict. Similarly, we use disaster risk rather than actual occurrences, recognizing that the rewards to human capital arise not only from responding to disasters but also from proactive planning to reduce exposure and mitigate their impact.

The returns to education and experience, r_{jt} and b_{jt}, in equations (1) are generated by estimating individual wage equations using Mincer (1974) earnings functions. The advantage of using the same specification across countries and time is that whatever bias exists due to missing variables or specification error would be common across the country-level estimates. For each country *j* and year *t*, we estimate wage equations of the form,

$$\ln(w_{ijt}) = \alpha_{jt} + r_{jt}S_{ijt} + b_{jt}^{1}Ex_{ijt} + b_{jt}^{2}Ex_{ijt}^{2} + \varepsilon_{ijt} \quad (2)$$

where w_{ijt} is the wage of person *i* in country *j* at year *t*. The estimated return per year of schooling is r_{jt}, the coefficient on years of schooling, S_{jt}. The estimated return per year of experience is $b_{jt} = b_{jt}^{1} + 2b_{jt}^{2}\overline{Ex_{jt}}$, computed at the average years of work experience, which is approximated by age minus years of schooling minus 6.[3]

[3] We also measured the returns to experience at the same fixed age across all countries and time periods. Results were similar.

The regressions also provide a method of correcting for measurement error in the estimated returns.[4] Because the dependent variables in equations (1) are generated regressors, they are estimated by applying a weight computed as the inverse of the standard error of the estimated returns. All standard errors are corrected for clustering at the country level.

Another important advantage of estimating the returns to education and experience separately for each country and year at the individual level is that the estimates of (2) are purged of the year and country fixed effects, α_{jt}. The value of α_{jt} is the expected log wage in country *j* at time *t* at 0 years of education and 0 years of experience. Its value holds constant across all individuals the common returns due to current consumer prices, currency values, country governmental institutions, and educational and economic systems. The estimated returns, r_{jt} and b_{jt}, are purged of theses common fixed effects. As a result, the dependent variables in (1) implicitly control for the country and time fixed effects, α_{jt}. Note that these factors may still affect relative returns across countries, even if they have common effects for all individuals within the country.

Sources of disequilibria

[4] The standard deviation of the estimated return to education is the standard error of the coefficient. The standard deviation of the return to experience is $\sqrt{\sigma^2_{b^1} + 4\overline{Ex_{jt}}^2\sigma^2_{b^2} + 4\overline{Ex_{jt}}COV(b^1, b^2)}$, where $\sigma^2_{b^1}$ is the squared standard deviation of the coefficient, b^1_{jt}, $\sigma^2_{b^2}$ is the square of the standard deviation of the coefficient, b^2_{jt}, and $COV(b^1, b^2)$ is the covariance of two coefficients.

This paper focuses on three sources of disequilibria: lack of political stability, lack of rule of law and corruption, all signifying weak governance; social fractionalization and diversity; and exposure to environmental or natural risks.

Restrictive institutions and weak governance. A general theme in the literature about institutions is that they can exacerbate or mitigate the impacts of environmental, economic and political risks. Djankov et al. (2002) challenge the common assumption that stricter regulations on new business reduce corruption, finding instead that higher regulatory burdens are associated with more, rather than less, corruption. The effects of corruption on growth appears to vary depending on the political and economic contexts. Saha and Sen (2021) argue that corruption can sometimes enhance growth in autocratic regimes, while Gründler and Potrafke (2019) find that corruption tends to be less harmful in democracies. In addition, Köppe Malanski and Santos Póvoa (2021) conclude that the relationship between economic freedom and corruption depends on the economic context. In Latin America, corruption hinders economic growth in countries with higher economic freedom, but facilitates growth in those with lower economic freedom. In contrast, in Asia, corruption only in countries with limited economic freedom.

Political freedoms have also been discussed at length in the literature as being linked to economic growth (Acemoglu, 2012). In theory, more democratic countries grant citizens the freedom to select their own career paths, enabling them to find better job matches and ultimately increasing their returns to human capital. The meta-analysis by Colagrossi, Rossignoli, and Maggioni (2020), covering 36 years of research, concludes that democracy has a positive and direct effect on economic growth, though its effect is only about one-third that of human capital. Illustrating the long-run effect of political regimes, González and Prem (2020) find that Chilean firms with close links to Pinochet retained their advantageous positions even after the political

transition. These results imply that greater political freedoms likely enhance the returns to human capital.

A government's ability to form and implement policies and regulations that foster private sector development can drive economic growth. Efficient public service delivery ensure that firms have access to essential public infrastructure, increasing returns to physical and human capital. The impact of regulations is harder to assess, however. When regulations are predictable and equally administered, they can lower the risk and enable long-term gain. However, excessive and overly stringent regulations may increase the costs of investments that complement human capital.

Enforcing contracts and protecting property rights are crucial for strengthening a country's financial markets by lowering the probability that the investor's returns are expropriated. Hall and Jones (1999), Acemoglu and Johnson (2005), and Alesina and Giuliano (2015) trace low levels of capital investment to the lack of trust in government institutions as indicated by expropriation, corruption, uneven administration of the rule of law, or trade restrictions. By ensuring legal and institutional reliability, contract enforcement and protection of property rights promote investor confidence, stimulate investments, and support economic growth.

A higher level of corruption in a society would imply that there is potential for a country's elites to effectively steal resources from the rest of society. This would imply lower returns to human capital for the broader population given that there is less upside to be gained from an improvement in skill. Méndez and Sepúlveda (2006), Gründler and Potrafke (2019), and Köppe Malanski and Santos Póvoa (2021) find that high levels of corruption diminish growth.

Social fractionalization and diversity. Fractionalization—the extent to which a country's population is divided along ethnic, linguistic, or religious lines—can lead to conflict, segregation, discrimination, and even secessionist movements. These divisions weaken political and economic institutions, undermining stability and threatening economic growth. Long-standing, especially violent, conflicts between competing groups are particularly detrimental to development.

However, diversity can also be an asset. A more heterogeneous society brings a wider range of perspectives, skills, and experiences, potentially fostering specialization and trade based on comparative advantage. This, in turn, can enhance investment returns and stimulate economic growth, provided that the society effectively manages conflicts among its diverse groups (Collier, 2000; Fearon and Laitin, 2003; Alesina and La Ferrara, 2005; Putnam, 2007).

Many studies have explored the economic impact of social fractionalization, beginning with Easterly and Levine (1997) who found that per capita GDP growth is inversely related to ethnolinguistic fractionalization across a broad sample of countries.[5] Sturm and De Haan (2015) conclude that the economic impact of ethno-linguistic fractionalization, however, is conditional on a country's level of economic freedom. Assumed to have more economic freedom, capitalist countries that are more ethnically diverse tend to have less income redistribution, while those that that are less diverse tend to impose more income redistribution. One explanation for this

[5] Other studies have also shown that social fractionalization is negatively correlated with various dimensions of governance (e.g., Alesina et al., 2003; Montalvo and Reynal-Querol, 2005; Esteban, Mayoral, and Ray, 2012; Sturm and De Haan, 2015; Schleussner et al., 2016; Arbatlı et al., 2020). Alesina and Zhuravskaya (2011) find that countries that are segregated on ethnic or language bases have lower quality of governance and less trust among its citizens.

result is that people tend to have more empathy towards the members of their own group than towards others and so are more willing to accept redistribution policies.

Natural hazards. Our hypothesis is that human capital plays a role in decreasing and mitigating the risks to life and work caused by natural hazards. In addition to seasonal environmental disasters, warnings about the dangers from global climate change have been increasing—more frequent and intense droughts, more violent storms, unprecedented heat waves, rising sea levels and ensuing floods that can destroy livelihoods and homes. People's ability to adapt to these natural disasters is one of the most important strategies and mitigate their impact is essential to ensure mankind's survival and economic growth

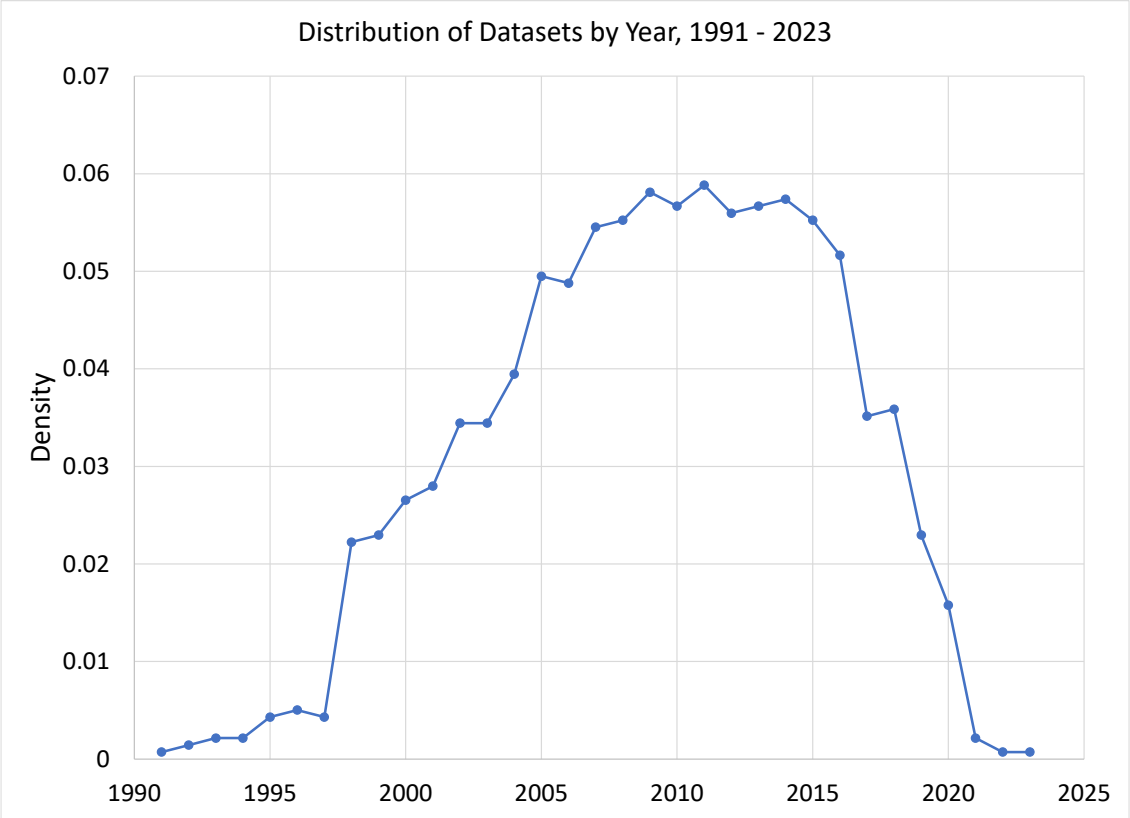
A special issue of *Ecology and Society* featured 11 studies that examine the risks of climate change and the importance of societies' adaptive capacity (Muttarak and Lutz, 2014). The studies provide evidence that education directly influences risk perception, skills and knowledge, and access to information and resources, all of which help societies adapt to, prepare for, and recover from disasters. On the whole, more highly educated people have been found to cope better with both income loss and the health and psychological impacts of natural disasters. Migration from disaster-prone areas is one of the response mechanisms that households choose, especially among those that depend on the land for their livelihood. More educated households are more likely to migrate (Kubik and Maurel, 2016), but they are also more likely to diversify their income sources and adopt production technologies that mitigate income shocks related to weather hazards. For example, Mulwa, Marenya, and Kassie (2017) find that in Malawi one more year of primary schooling increases the probability of farmers switching to drought-tolerant crop varieties, a response that is an information-intensive strategy. Cerulli et al. (2020) conclude that the average scores on the 2018 PISA science test is negatively correlated with people's

vulnerability to natural hazards, suggesting that education enhances people's awareness of, and ability to adapt to, natural hazards.

III. Data

We estimate country-specific returns to education and experience using individual-level data from the International Income Distribution Database (I2D2), an extensive collection of standardized household surveys initiated by the World Bank in 2005. Most surveys in this I2D2 database are labor force surveys, but income and expenditure surveys and other socio-economic surveys are also included. A fundamental criterion for inclusion is that surveys must be nationally representative and must span the entire economy. We also added the Luxembourg Income Study database (LIS), a database similar to I2D2, that expands the number of countries and years covered. The combined data set represents 1,394 surveys spanning 145 countries for various years between 1991 and 2023. The final distribution of surveys by year is shown in Figure 1, and the distribution of the surveys by region and income level is shown in Appendix Table 1.

Figure 1: Distribution of I2D2 and LIS Surveys Used in Our Sample, by Year



Estimates of the returns to education and experience

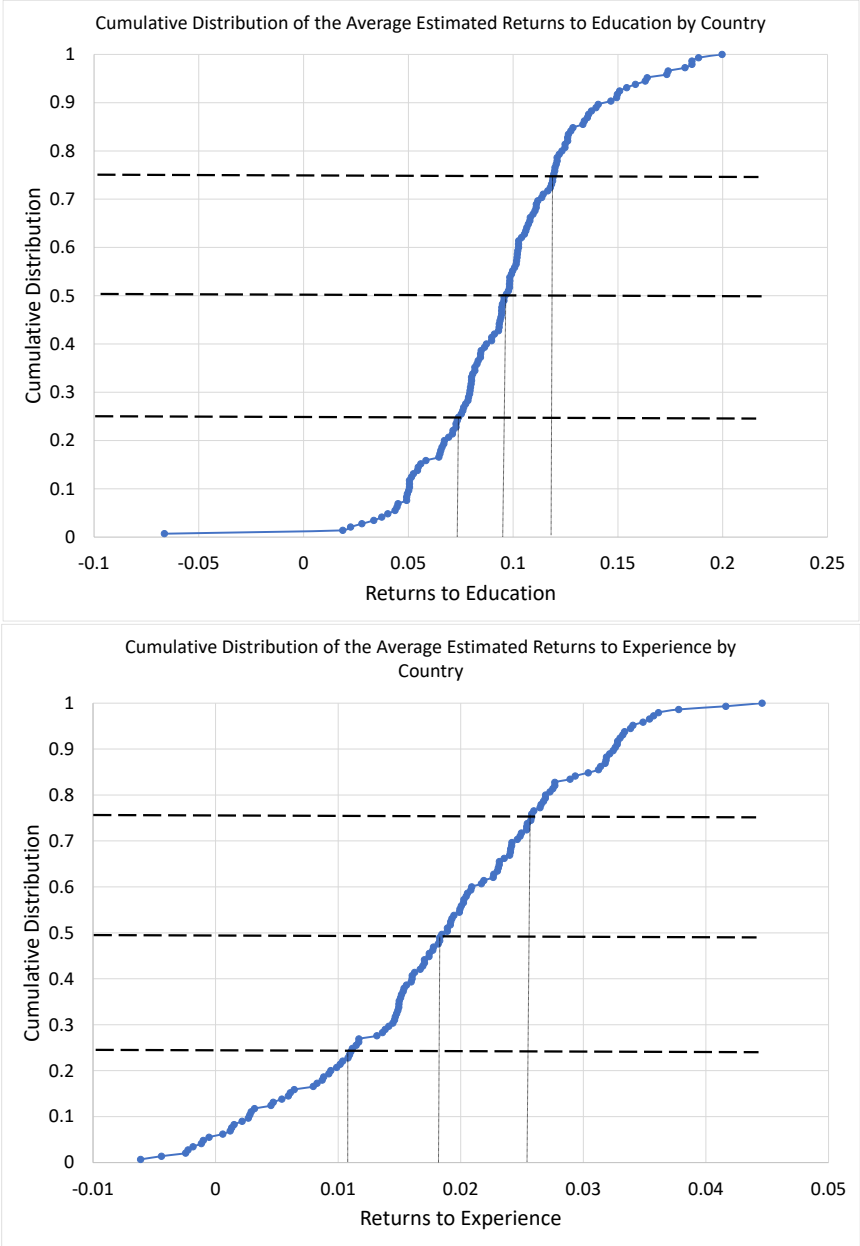
We build on the work by Montenegro and Patrinos (2023) who estimated Mincer's (1974) earnings functions to a wide range of countries at different development levels, but our study applies their approach to an even larger set of countries and datasets covering the period from 1991 to 2023. Our measures of the wages are based on samples of wage workers aged 15 to 65, excluding the self-employed, as we cannot separate returns to capital from returns to labor. We also exclude military personnel, apprentices, family workers, and voluntary workers.

Because some countries have multiple surveys (e.g., a labor force survey and a household survey) in a given year, for consistency, we select only one data source per country per year, prioritizing labor force surveys over other survey types due to their standardized earnings

measures. In countries that conducted a survey multiple times in one year, we choose the data collected at mid-year.

Figure 2 shows the cumulative distributions of average returns to education and experience across 145 countries. The underlying data for these cumulative distributions are averages of each country's returns over time so that individual countries with more data points do not skew the sample. Sixteen countries, mostly small economies or very poor countries, have only one observation each, while 16 other countries, mainly more developed economies, have more than 20 estimates each.

Figure 2: Cumulative distributions of average returns to human capital in 145 countries



Note: The underlying data for this distribution consists of the average of each country's returns over time; individual countries with more data points do not skew the sample.

Returns to human capital vary significantly across countries, leading to considerable income inequality from education, the most common household investment worldwide. Nearly all individual estimated returns to education are positive, and every country's average return is

above zero. Country-level returns to education range from -6.6% to 20.0%, with a median of 9.7% and an interquartile range of 7.4% to 11.9%. The single negative value was for Somalia. Returns to experience also vary widely, ranging from -0.6% to 4.5%, with a median of 1.9% and an interquartile range of 1.1% to 2.6%. All of the negative values pertain to former states of the Soviet Union.[6]

The variance decomposition of the estimated returns shows that 74% of the variation in the returns to education is attributable to between-country factors. At 78%, even more of the variation in returns to experience is attributable to between-country factors. As a result, only about a quarter of the variation of returns to human capital is attributable to within-country factors. The large share of variation in human capital returns associated with between-country factors supports our focus on country-specific factors such as exposure to natural risks and economic, demographic and political institutions.

The measures of the control variables we use in the analysis are summarized in Table 1. The sample statistics are the averages of the 145 country averages. In effect, this weights the statistics so that every country enters with an equal weight to ensure that the sample statistics are not driven by the more developed countries for whom we have more years of data.

[6] The lower returns to experience compared to returns to education will reflect, in part, likely measurement error in work experience. Our measure is potential experience (age minus education minus 6) which will only equal true experience if the individual is employed continuously in all years after leaving school. Measurement error will occur if the individual experiences job loss or has periods outside the labor force, in which case the estimated returns to experience will be likely biased downward, especially for women who experience more frequent spells of nonemployment compared to men.

Table 1: Summary of Variables by country

Variables	Mean	Std. Dev
Returns to Education	0.097	0.038
Returns to Experience	0.018	0.011
Years of education	10.468	2.250
Years of experience	20.830	2.279
WGI: Voice and Accountability (VA)	-0.029	0.942
WGI: Political Stability and Absence of Violence/ Terrorism (PV)	-0.194	0.964
WGI: Government Effectiveness (GE)	-0.099	0.973
WGI: Regulatory Quality (RQ)	-0.027	0.923
WGI: Rule of Law (RL)	-0.120	0.992
WGI: Control of Corruption (CC)	-0.137	0.982
WGI: Principal Component	-0.847	2.312
World Risk Index: Exposure	6.302	11.185
Ethnic Fractionalization	0.440	0.265

Notes: Means and standard deviations of the average values of the 145 countries included in the analysis

Measures of governance, diversity and natural risks

For the quality of governance, we use the Worldwide Governance Indicators (WGI), a database first collected in 1996 by the World Bank on over two hundred countries. The data are the perceptions of knowledgeable individuals from non-governmental organizations, businesses, media, and public sector organizations (Kaufmann, Kraay, and Mastruzzi, 2011). They have been consistently collected over time and have been used to explain variation in growth (Han et al., 2014). The WGI measure consists of six dimensions, each of which has been standardized to have mean zero and variance one.[7]

- *Voice and Accountability* (*VA*) captures the extent to which a country's citizens are able to participate in the selection of their government; it encompasses other political

[7] Because our sample is not the same as the full sample used by the World Bank, our means and variances are not exactly 0 and 1.

freedoms such as freedom of expression, freedom of association, and freedom of the media.

- *Political Stability and Absence of Violence/ Terrorism (PV)* captures the likelihood of a country's government being destabilized or overthrown through unconstitutional or violent means, including politically motivated violence and terrorism.
- *Government Effectiveness* (*GE*) refers to the quality of public services, the quality of the civil service, the independence of the civil service from political pressures, the quality of policy formulation and implementation, and perceptions of the credibility of the government's commitment to its policies.
- *Regulatory Quality* (*RQ*) captures the ability of a country's government to form and implement policies and regulations that allow and promote development in the private sector.
- *Rule of Law* (*RL*) evaluates contract enforcement, property rights, policing, the court system, and the likelihood of crime and violence.
- *Control of Corruption* (*CC*) covers the extent to which public power is used for private gain. This includes petty and grand corruption, along with the "capture" of the state by elites and other private interests.

We find strong correlations among the governance indicators. As shown in Table 2, the lowest simple correlation among them is 0.70, while four—government effectiveness, regulatory quality, rule of law, and control of corruption—have correlations above 0.90, indicating significant overlap and little independent variation. In light of this, we combine the six dimensions into a single measure of governance using the method of principal components. The

first principal component explains 88% of their covariation. The average measure of each country's quality of governance is -0.85.[8]

Table 2: Correlation Matrix of the Worldwide Governance Indicators, 145 countries

	VA	***PV***	***GE***	***RQ***	***RL***	***First Principal Component***
VA						0.40
PV	0.73					0.36
GE	0.83	0.72				0.42
RQ	0.84	0.70	0.95			0.42
RL	0.86	0.80	0.95	0.91		0.43
CC	0.83	0.75	0.94	0.89	0.95	0.42

Notes: The six measures are *Voice and Accountability* (*VA*); *Political Stability and Absence of Violence/ Terrorism* (*PV*); *Government Effectiveness* (*GE*); *Regulatory Quality* (*RQ*); *Rule of Law* (*RL*); *Control of Corruption* (*CC*). We use the average measure for each country over the 1996-2019 period.

To measure social fractionalization or diversity, we use an index of ethnic fractionalization, which is relatively stable over time for each country and is the most relevant for analyzing the returns to human capital. The index is defined as $1 - \sum_{d=1}^{D} S_d^2$, or one minus the Herfindahl Index summing the squared shares of the population in each of *D* ethnic groups. Larger values indicate greater fractionalization. Alesina et al. (2003) estimated the degree of segregation in countries along ethnic, linguistic or religious lines. A more recent data set proposed by Dražanová (2020) called the *Historical Index of Ethnic Fractionalization* (*HIEF*) has the advantage of allowing time variation in ethnic fractionalization for 162 countries over a long period (1945-2013), as compared with the Alesina et al (2003) single cross-section measure. The two series are consistent with each other with a correlation of 0.85. Because of the high level of correspondence, we apply the Allesina (2003) values for two countries that were not included in the *HIEF*.

[8] As an alternative to the principal components method, Alesina and Giuliano (2015) suggest using one of the six measures to measure the quality of governance.

To measure the risk of natural hazards, we use the World Risk Index (WRI) for 193 countries with data for the period 2000 to 2022 (Welle and Birkmann, 2015). The index measures risk as the interaction of exposure to physical hazards and the vulnerability of exposed elements. The exposure to natural hazards consists of five indicators that describe the exposure of people to earthquakes, cyclones, floods, droughts and sea level rise. Vulnerability reflects people's susceptibility, coping capacity and adaptive capacity, and is based on 23 indicators of social, economic and environmental conditions of a society. In this paper, we use only the exposure component which is the exogenous component of the index, as compared to the vulnerability component which reflects endogenous adaptation to natural hazards.[9]

The concern with these three measures is that they may be jointly caused with the returns to human capital. However, the governance, ethnic composition and natural hazards measures are plausibly exogenous in that they hardly change over time. A variance decomposition shows that 98% of the variance of the governance index is attributable to factors varying across countries and only 2% to within-country factors that might reflect endogenous responses. The corresponding across-country variation share is 99% for the ethnic fractionalization measure and 100% for naturally occurring disaster risk. Consequently, very little of the variation is due to changes in the values of these factors within countries over time.

IV. Results and discussion

[9] The methodology of the World Risk Index has been continuously revised and developed by the Institute for International Law of Peace and Armed Conflict (IFHV) since 2018 (https://data.humdata.org).
The WRI demonstrates that "not only the magnitude or intensity of a natural event influence disaster risk" but that many other factors, such as the political and institutional structures, the state of infrastructure, the nutritional situation and the economic and environmental conditions of a country, determine whether a natural hazard will turn into a disaster (Cerulli et al., 2020).

Visualizing the role of governance on human capital returns

Figures 3-4 show how the quality of governance is correlated with returns to education and experience using all the data surveys. We include estimates for the upper and lower quartiles of the weighted sum of the six Worldwide Governance Indicators using the first principal components as weights. In Figure 3, it is apparent that the countries with the best governance also have more years of education. Countries with weaker governance are disproportionately found at the lower end of the education distribution. Where the years of schooling are equal, rates of returns are highest in the best governed countries. The top quartile of countries in governance average 10.8% returns per year of schooling compared to 8.8% in the lowest quartile. The gap in returns widens as years of schooling increase.

Figure 3: Returns to education for countries in the upper and lower quartiles of the quality of governance

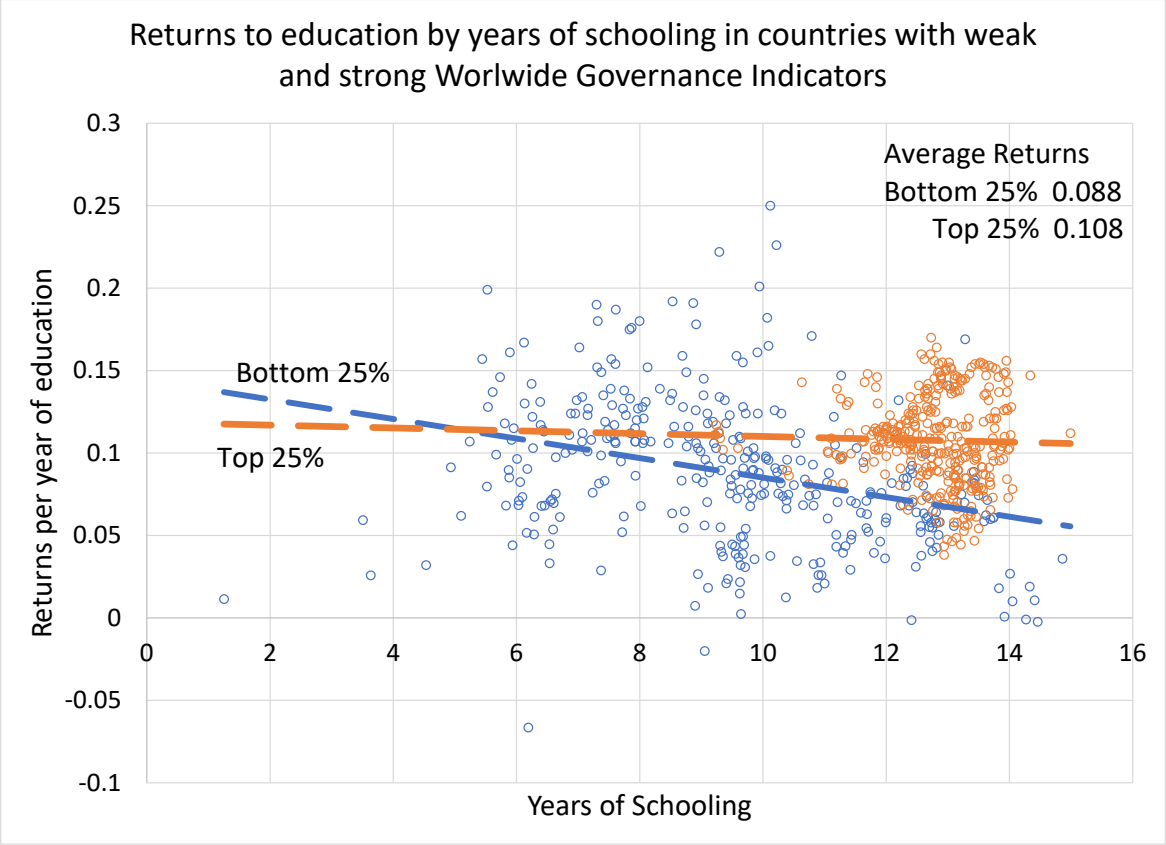


Figure 4 illustrates the relationship between returns to experience in better-governed and worse-governed countries. This graph allows for more meaningful comparisons than Figure 3, as there is greater overlap in average years of potential work experience between these two groups. The data clearly show that returns to experience are higher in the top quartile of well-governed countries, where they average 2.1%, compared to 1.7% in the bottom quartile. The gap in returns due to governance is largest in countries with the least experience and gradually narrows, disappearing entirely at 26 years of average experience, but less than 1% of the countries have 27 or more years of experience.

Figure 4: Returns to experience for countries in the upper and lower quartiles of the quality of governance

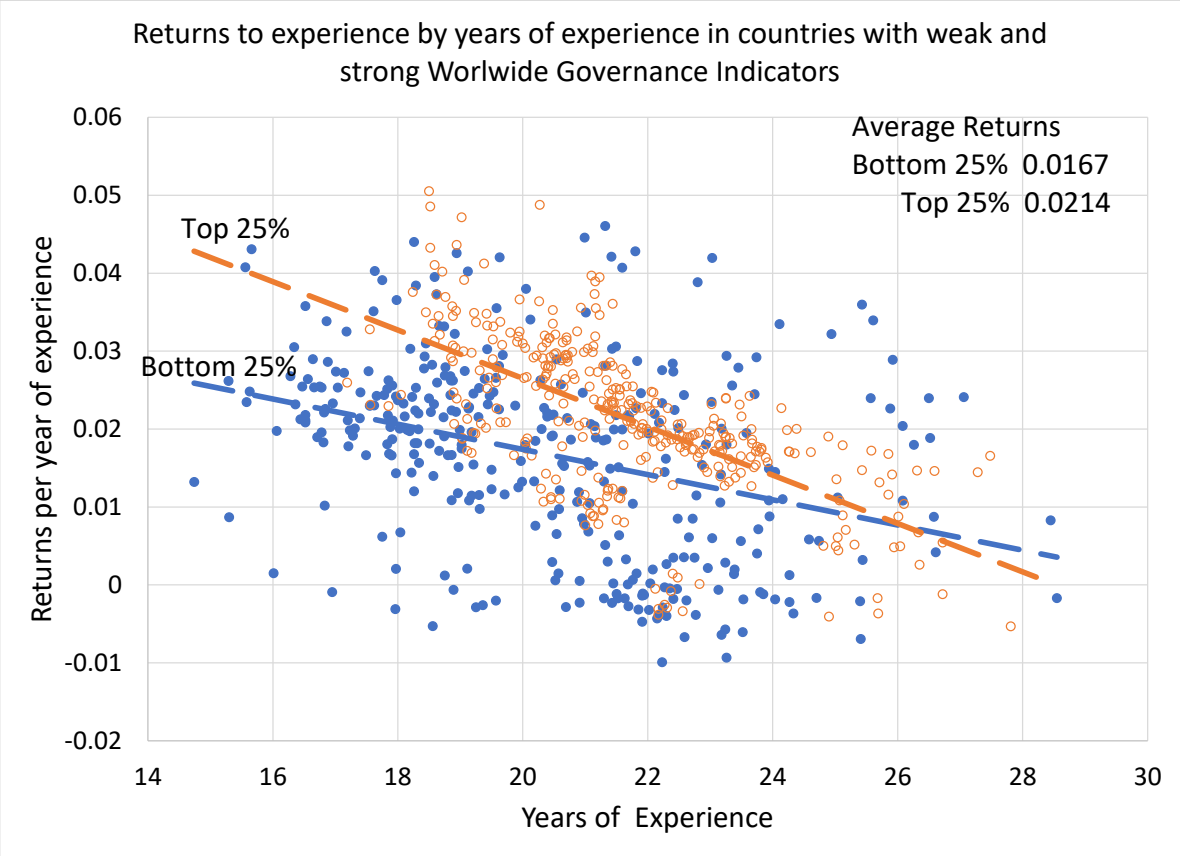
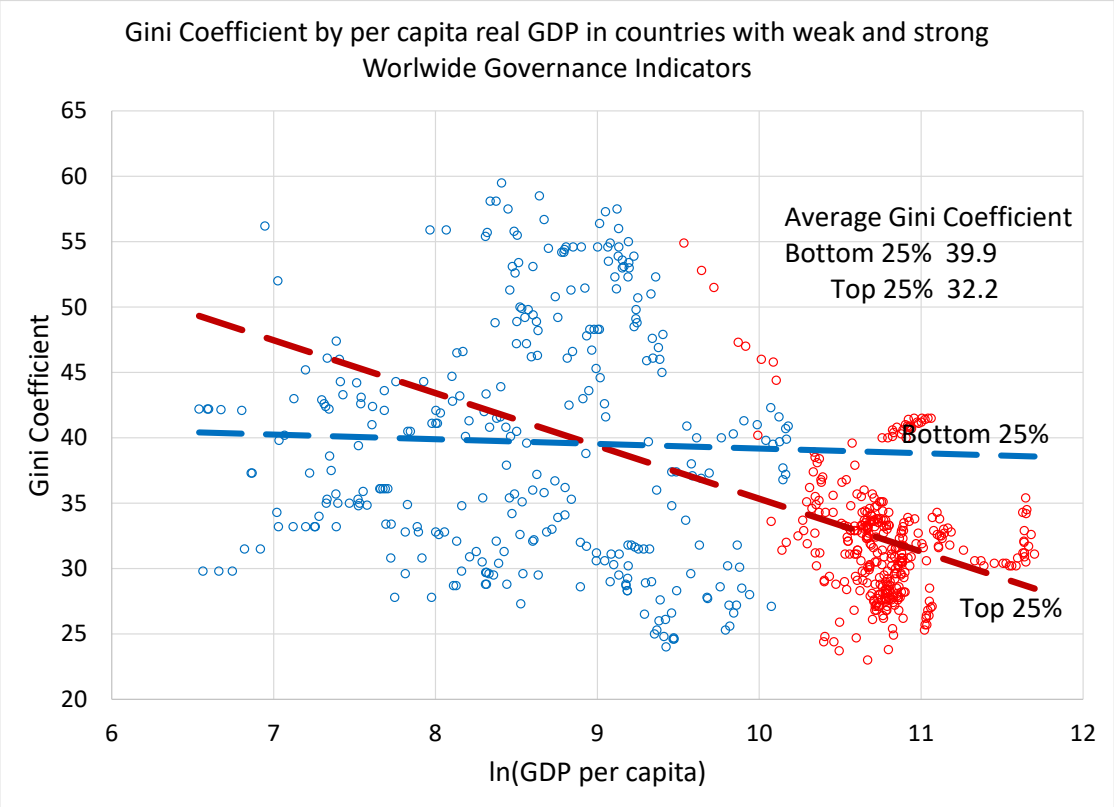


Figure 5 shows the relationship between quality of governance and a country's wage inequality. The best governance is atypically in the more developed countries while the worst governed countries locate disproportionately at lower levels of GDP per capita. In the range where the best governed are located, the best governed have less inequality than the worst governed, suggesting that their higher returns to human capital are distributed more equally. Low returns to human capital in the worst governed countries atypically harm the poor. Hence, the average Gini coefficient for the best governed is 20% below that of the worst governed.

Figure 5: Income Inequality by level of GDP per capita in the upper and lower quartiles of the quality of governance



Regression analysis: OLS results

Our analysis of the institutional factors that affect the returns to human capital is based on a shorter panel (1991-2023) than our estimates of the returns, because of the lack of comparable

country-level institutional data prior to 1994. In addition, to construct yearly data for countries with missing governance, diversity and risk data, we use techniques of interpolation and extrapolation. The natural disaster risk data start in 2000 but never change, and so we use the 2000 values for the years 1991-1999. We extrapolate the slow moving fractionalization measures to generate values for 2014 through 2022. We apply the 1996 World Governance Indicator (WGI) values for the missing 1991 through 1995 values. As noted above, these measures change very slowly over time, if at all, so we feel comfortable using these approximations. As a check, we re-estimated the models using only the data that excluded the extrapolations and obtained comparable results. The cost of the more restricted data is the loss of some countries from the analysis.

Table 3 provides estimates of two specifications each for the returns to education and experience. One specification includes the six WGI measures separately, and the other specification instead includes the weighted sum of the six WGI measures, derived using principal components analysis. Because the indicators are standardized to have mean zero and variance one, their summed effect is that of a simultaneous one-standard deviation increase in all the six governance measures. We report the summed effect at the bottom of the table.

In the first specification, political stability has a significant positive effect and effective governance has a significant negative effect on the returns to education. Political stability and regulatory quality reduce the return to experience. The estimates for the other governance indicators are not statistically significant. However, given the high correlation among the six indicators that was shown in Table 2, it is more reasonable to sum the effects of the 6 governance indicators and assess their joint significant. A joint 1 standard deviation change in the 6 governance measures results in a 0.024 increase in returns to education, or a 24.7% increase in

returns relative to the mean. The joint effect on returns to experience is positive but not statistically significant. Using the weighted average of the governance indicators based on the first principal component, we find that a one standard deviation increase in governance raises returns to education by 0.025 or 25.8%. The joint governance effect on returns to experience is 0.0055 or 30.6% of the mean return to experience. Both estimates are statistically significant.

Table 3: Regression Results - Returns to Education and Experience – Total Sample

Variables	**Returns to Education**		**Returns to Experience**	
	(1)	**(2)**	**(3)**	**(4)**
WGI: VA	0.0130		0.0033	
	(1.51)		(1.20)	
WGI: PV	0.0127***		-0.0029***	
	(2.59)		(2.90)	
WGI: GE	-0.0264*		-0.0019	
	(1.96)		(0.37)	
WGI: RQ	0.0018		-0.0071*	
	(0.18)		(1.82)	
WGI: RL	0.0084		0.011***	
	(0.54)		(3.06)	
WGI: CC	0.0155		-0.0002	
	(1.23)		(0.04)	
WGI: Principal component		0.0106***		0.0024***
		(6.20)		(3.90)
Ethnic fractionalization	0.0583***	0.053***	0.0165***	0.0203**
	(3.39)	(3.20)	(3.16)	(2.97)
WRI: Exposure	0.0009***	0.0007***	0.0001	-0.00003
	(5.43)	(4.18)	(1.32)	(0.26)
Constant	0.0632***	0.062***	0.0108***	0.0096***
	(7.45)	(6.52)	(4.50)	(2.29)
Observations	1,394	1,394	1,394	1,394
Clusters	145	145	14 5	145
R-Squared	0.64	0.60	0.41	0.31
Joint Tests: $F(6, N)_{.05} \approx 2.15$	19.48***		9.51***	
Joint WGI Effect:	0.024***	0.025***	0.0022	0.0055***
	(5.92)	(6.20)	(1.54)	(3.90)

t-statistics corrected for clustering at the country level are reported in parentheses *** p<0.01, ** p<0.05, * p<0.1

Ethnic fractionalization raises the returns to both education and experience. A one-standard deviation increase in ethnic diversity in a country increases the returns to education by 0.015 (15.9%) in the first specification and by 0.014 (14.5%) in the second. The corresponding effects on returns to experience are 0.004 (24.3%) in the first specification and 0.005 (29.9%) in the second. The implication is that returns to human capital are increased when facing greater variation in ethnicities, cultures or languages in the population. Higher risk of natural disaster also increases the returns to education, albeit by smaller amounts. A one-standard increase in disaster risk increases the returns to education by 0.01 (10.4%) to 0.008 (8.1%). Returns to experience are not affected by risk of natural disasters.

Previous studies on earnings have consistently found systematic gender differences in the returns to human capital (among others, Schultz, 1993; Blau and Kahn, 2017). These gender differences, in fact, also vary with the quality of governance, level of diversity and exposure to natural risks (Table 4). Focusing on the specification with the principal component measure of the quality of governance, we find that a one-standard deviation improvement in governance raises the average returns to education by 23.3% for men and 24.7% for women. Ethnic diversity also has a larger effect on women than on men. A one-standard deviation rise in ethnic diversity increases the return to education by 15.9% for men but by 18.9%% for women. The results for risk of natural disaster are much smaller, although still statistically significant: 8.1% for men and 5.8% for women.

Table 4: Regression Results - Returns to Education and Experience, by Gender and Urban/ Rural Residence

VARIABLES	Total	Male	Female	Urban	Rural
A. Returns to Education					
WGI: Principal component	0.0106***	0.0098***	0.0103***	0.0102***	0.0134***
	(6.20)	(5.17)	(5.10)	(6.03)	(6.19)
Ethnic fractionalization	0.053***	0.0583***	0.0692***	0.0589***	0.0.0626***
	(3.20)	(3.36)	(3.58)	(5.12)	(2.86)
WRI: Exposure	0.0007***	0.0007***	0.0005**	0.0004**	-0.0004
	(4.18)	(2.88)	(2.13)	(2.48)	(1.62)
Constant	0.062***	0.0521***	0.0711***	0.0594***	0.0606***
	(6.52)	(5.95)	(8.16)	(9.38)	(6.19)
Observations	1,394	1,394	1,394	1,277	1,223
Clusters	145	145	145	134	131
R-squared	0.60	0.58	0.52	0.49	0.68
Joint WGI Effect:	0.025***	0.0226***	0.024***	0.024***	0.031***
	(6.20)	(5.17)	(5.10)	(6.03)	(5.01)
B. Returns to Experience					
WGI: Principal component	0.0024***	0.0020**	0.0007	0.0017**	0.0023***
	(3.90)	(2.49)	(0.86)	(2.63)	(3.89)
Ethnic fractionalization	0.0203**	0.0168**	0.0129	0.0085	0.0207***
	(2.97)	(2.33)	(1.43)	(1.11)	(3.40)
WRI: Exposure	-0.00003	-0.00005	0.00001	0.0002**	-0.0002*
	(0.26)	(0.40)	(0.11)	(2.29)	(1.68)
Constant	0.0096***	0.0113***	0.0094***	0.0089***	0.0119***
	(4.48)	(3.45)	(2.69)	(3.31)	(3.83)
Observations	1,394	1,394	1,394	1,277	1,223
Clusters	145	145	145	134	131
R-squared	0.31	0.23	0.38	0.34	0.38
Joint WGI effect	0.0055***	0.0046**	0.0021	0.0039**	0.0053***
	(3.90)	(2.49)	(0.86)	(2.63)	(3.89)

t-statistics corrected for clustering at the country level are reported in parentheses *** p<0.01, ** p<0.05, * p<0.1

A subset of the countries has separate data on urban and/or rural returns. These estimates are reported in the last two columns of Table 4. A one-standard deviation improvement in governance would raise the returns to education for urban residents by 24.7%, and by 32% for

rural residents. A one standard deviation increase in ethnic diversity increases return to education by 16.1% for urban residents and by 17.1% for rural residents. Rising risk of natural disaster raises urban returns by 4.6% per unit increase in the standard deviation, but does not affect returns in rural areas.

As to experience, women's mean return to experience is not affected by any of the institutional, environmental, or demographic factors. In contrast, men experience higher returns in countries with better governance and greater ethnic diversity. Residence also plays a key role. A one-standard deviation improvement in the quality of governance raises returns to experience in rural areas by 29.4% compared to a 21.7% gain in urban areas. Greater ethnic diversity leads to significantly higher return to experience in rural areas of 30.5%, but a small and insignificant effect in urban areas. The risk of natural hazards raises returns to experience in urban areas by 12.4% per standard deviation, but lowers returns to experience in rural areas by the same magnitude.

Results of quantile regressions

There are many reasons to expect the returns to human capital to be different across the conditional wage distribution. If factors other than those we have controlled for affect the returns or cost of education across that distribution, then the return to education or experience is unlikely to be a single parameter, varying according to differences in unmeasured characteristics. More generally, any uncontrolled effect that is systematically correlated with an individual's position in the wage distribution but is correlated with educational attainment will likely produce a different return to education or experience across that distribution. To account for this heterogeneity, we use quantile regression analysis. Previous studies have argued for considering

the entire distribution as average effects may mask significant variations at different wage levels (Buchinsky, 1994; Martins and Pereira, 2004; Machado and Mata, 2005; Lemieux, 2006; Tansel and Bodur, 2012).

Figure 5 showed that the best governed countries had lower income inequality than the poorest governed countries. It is plausible that individuals with atypically poor draws on returns to human capital will benefit more from economic or political institutions that provide greater freedom to pursue individual returns. Quantile earnings regressions of the form in (2) will generate measures of returns to education and experience for individuals at different points on their country's distribution of unexplained wages. The resulting predicted returns to human capital are then applied as the dependent variables in equation (1). We can find if variation in country institutions are more important for the returns of individuals at the lower or upper tail of their country's unexplained wage distribution. The pattern of lower wage inequality in better governed countries would be consistent with a finding that individuals with atypically low returns to human capital benefit more from good governance than do those with better draws on returns.

Tables 5-7 summarize the results from estimating equation (1) using returns to human capital measured at the second, fifth and eighth deciles of the country earnings distribution.[10] We evaluate the results overall, for males and females, and for urban and rural residents. There are slight differences in sample sizes in the male-female and urban-rural regressions that occur

[10] The second and eighth deciles instead of the bottom and top deciles provide a cleaner test of the hypothesis that the returns to education for those with lower wages benefit more from better governance than those with the higher wages. The bottom and top deciles include individuals with extremely low or extremely high wages that may be reflecting transitory or idiosyncratic unobservable factors that are correlated with wages.

when we were unable to generate returns estimates for some of the quantiles that are used as dependent variables.

Table 5 shows the results from the quantile returns estimated over the entire workforce. Overall, the estimates indicate that better governance and greater diversity benefit more those at the lower end of the distribution of human capital returns. Our interpretation is that, by giving individuals greater freedom to seek the best returns for their skills, better institutions tend to equalize returns to human capital investments from the lowest to the highest. In more poorly governed countries, there is less opportunity for those with poor draws on their returns to seek better options which atypically disadvantages those at the bottom of the unexplained wage distribution. A one-standard deviation improvement in governance increases the rate of return to education by 37.8% at the lower tail of the wage distribution (20th Quantile), but only by 13.8% for those at the upper tail (80th Quantile). Increased ethnic diversity also boosts the returns to education most for those with the poorest draws on returns to education. A one-standard deviation increase raises returns to education by 20.1% at the lower tail of the distribution, but by 14.2% at the upper tail. Greater exposure to natural disasters does not change the return to education across the returns distribution.

Table 5: Quantile Regressions of Returns to Education and Experience

VARIABLES	Returns to Education			Returns to Experience		
	20th Quantile	50th Quantile	80th Quantile	20th Quantile	50th Quantile	80th Quantile
WGI: Principal component	0.0159***	0.0105***	0.0058**	0.0029***	0.0011	0.0001
	(3.56)	(5.10)	(2.36)	(2.70)	(1.29)	(0.11)
Ethnic fractionalization	0.0736**	0.0473***	0.0518**	0.0503***	0.0323***	0.0245***
	(2.59)	(3.04)	(2.16)	(4.50)	(4.70)	(5.94)
WRI: Exposure	0.00003	0.0003	0.0003	0.00004	-0.00002	-0.0001
	(0.07)	(1.24)	(1.30)	(0.59)	(0.35)	(0.82)
Constant	0.0868***	0.0733***	0.0733***	-0.0024	0.0062	0.0148***
	(3.21)	(6.44)	(5.52)	(0.40)	(1.60)	(2.62)
Observations	1,394	1,394	1,394	1,394	1,394	1,394
Clusters	145	145	145	145	145	145
R-squared	0.46	0.45	0.28	0.60	0.53	0.38
Joint WGI effect	0.0367***	0.0245***	0.0134**	0.0067***	0.0025	0.0002
	(3.56)	(5.10)	(2.36)	(2.70)	(1.29)	(0.11)

t-statistics corrected for clustering at the country level are reported in parentheses *** p<0.01, ** p<0.05, * p<0.1

We get a consistent story with the returns to experience. Returns to the lowest quantile individuals are significantly larger in countries that have better governance. A one-standard deviation increase in the quality of governance boosts returns to experience by 37.2% for the 20^{th} quantile returns, but has virtually no effect on returns at for the 80^{th} quantile. Ethnic diversity has twice the effect at the lower tail as the upper tail—a one-standard deviation increase being associated with 74.0% greater returns at the 20^{th} quantile compared to 36.1% at the 80^{th} quantile. Greater exposure to natural disasters does not change the return to experience among low- or high-return individuals.

Table 6 reports the estimates using quantile measures of returns to education by gender and region. Regression estimates by gender and residence reveal even more variation in the returns to human capital along the wage distribution, reflecting how shifts in institutional, demographic and environmental factors could mitigate existing inequalities between men and women and between urban and rural residents. Better governance, for instance, increases the return to education more for low-earners than high-earners among men and among women, although the male returns are somewhat imprecisely estimated. The gains from better governance are consistently larger for women than for men. A one-standard deviation improvement in the quality of governance raises returns at the 20^{th} quantile by 15.5% for men, although only significant at the 11^{th} percentile, but by twice that for women. The greater effect for women than men exists across the entire returns distribution, and so better governance lowers wage inequality between men and women.

Table 6: Quantile Regressions of Returns to Education, by Gender and Urban/Rural Residence

Variables	20th Quantile	50th Quantile	80th Quantile	20th Quantile	50th Quantile	80th Quantile
A. Gender	**Male**			**Female**		
WGI: Principal component	0.0065	0.0058*	0.0053*	0.0131**	0.0135***	0.0086***
	(1.62)	(1.96)	(1.79)	(1.98)	(5.27)	(5.84)
Ethnic fractionalization	0.1042***	0.0673**	0.0703**	0.1747***	0.0848***	0.0596***
	(2.98)	(2.06)	(2.16)	(2.76)	(3.93)	(3.83)
WRI: Exposure	-0.00002	0.0002	0.0002	-0.00002	0.0003**	0.0004**
	(0.04)	(0.59)	(0.82)	(0.04)	(2.04)	(3.83)
Constant	0.0645***	0.0644***	0.0624***	0.0489	0.0604***	0.0717***
	(2.63)	(3.71)	(3.51)	(1.29)	(6.30)	(10.88)
Observations	1,392	1,394	1,394	1,393	1,393	1,393
Clusters	144	145	145	144	144	144
R-squared	0.29	0.29	0.27	0.50	0.63	0.52
Joint WGI effect	0.015	0.013*	0.012*	0.030**	0.031***	0.020***
	(1.62)	(1.96)	(1.79)	(1.98)	(5.27)	(5.84)

Variables	20th Quantile	50th Quantile	80th Quantile	20th Quantile	50th Quantile	80th Quantile
B. Residence	**Urban**			**Rural**		
WGI: Principal Component	0.0173***	0.0123***	0.0085***	0.0171***	0.0128***	0.0083***
	(5.32)	(8.41)	(3.44)	(5.01)	(5.36)	(4.03)
Ethnic fractionalization	0.0648**	0.0508***	0.0673***	0.0956***	0.0553***	0.0430***
	(2.08)	(3.24)	(2.96)	(4.05)	(3.14)	(2.62)
WRI: Exposure	0.0007***	0.0005***	0.0004**	-0.0006*	-0.0002	-0.0002
	(3.84)	(5.92)	(2.05)	(1.77)	(0.88)	(0.74)
Constant	0.0558	0.0066	0.0596***	0.00296	0.0674***	0.0185***
	(4.00)	(9.53)	(4.77)	(0.555)	(5.15)	(2.934)
Observations	1,277	1,277	1,277	1,218	1,223	1,216
Clusters	134	134	134	131	131	131
R-squared	0.65	0.65	0.46	0.52	0.53	0.50
Joint WGI effect	0.040***	0.028***	0.020***	0.040***	0.030***	0.019***
	(5.32)	(8.41)	(3.44)	(5.01)	(5.36)	(4.03)

t-statistics corrected for clustering at the country level are reported in parentheses *** p<0.01, ** p<0.05, * p<0.1

Greater ethnic fractionalization lowers wage inequality among both men and women by giving a greater benefit to those at the lower tail of the returns distribution. The effect of a one-standard deviation increase in diversity is to raise returns to schooling by 28.5% for men and 47.7% for women at the 20^{th} quantile, but by only 19.2% for men and 16.3% for women at the 80^{th} quantile. Only women gain from the risk of natural disasters with the greatest gains at the upper tail of the female returns distribution.

With respect to residence, better governance would bring about nearly equal gains in the return to education of urban and rural residents, but low-earners in both areas would benefit more than high-earners. A one-standard improvement in governance raises returns to schooling by 41.2% at the 20^{th} quantile in both areas, but half that at the 80th percentile. Gains to exposure to natural disasters only occur in the urban markets and benefit the bottom of the distribution most.

The consistent conclusion derived from Table 6 is that socioeconomic institutions benefit the lower tail of the returns to education distribution most, lowering inequality in the country. They also lower gaps in returns to schooling between men and women, while having mixed implications for returns gaps between urban and rural residents.

Table 7 repeats the exercise at the upper and lower tails of the returns to experience distribution. Similar to the estimates for the return to education, the quantile regression results for returns to experience demonstrate consistently larger gains from socioeconomic institutions at the lower quantiles that reduce inequality overall and between men and women. As with returns to education, there is a mixed message on the effects on urban-rural wage gaps, but less inequality within both urban and rural labor markets.

A one-standard deviation improvement in governance boosts the return to experience by 38.9% for men and women at the 20th quantile. At the other tail of the wage distribution, the gains are negligible, and so better governance lowers inequality for both genders. A one-standard deviation increase in ethnic diversity increases the returns from experience by about 75% for both men and women at the 20th quantile. The effect falls to 30.6% for men and 49.3% for women at the 80th quantile. Turning to variation between urban and rural residents, a one-standard deviation improvement in governance raises returns to experience by 33.3% for urban residents and 44.4% for rural residents at the 20th quantile. The gains dissipate for higher quantile urban workers, but remain significant, though smaller, for rural residents. Ethnic fractionalization raises returns to experience most for the lower tail earners in both areas with the greatest gains to urban workers. Natural hazards do not have an appreciable effect in either market.

Table 7: Quantile Regressions of Returns to Experience, by Gender and Urban/Rural Residence

Variables	20th Quantile	50th Quantile	80th Quantile	20th Quantile	50th Quantile	80th Quantile
A. Gender	**Male**			**Female**		
WGI: Principal component	0.0029**	0.0013**	0.0010	0.0029***	0.0007	-0.0015*
	(2.48)	(2.11)	(1.65)	(4.73)	(0.84)	(1.77)
Ethnic fractionalization	0.0525***	0.0288***	0.0208***	0.0498***	0.0404***	0.0335***
	(3.71)	(5.46)	(9.59)	(9.20)	(4.88)	(4.62)
WRI: Exposure	0.0001	-0.00003	-0.00002	-00006	-0.0001*	-0.0002
	(1.31)	(0.50)	(0.22)	(0.81)	(1.95)	(4.10)
Constant	-0.0056	0.0092**	0.0127***	-0.0018	0.0019	0.015***
	(0.83)	(2.55)	(3.09)	(0.41)	(0.59)	(4.057)
Observations	1,392	1,394	1,394	1,393	1,393	1,393
Clusters	144	145	145	144	144	144
R-squared	0.49	0.60	0.46	0.69	0.60	0.51
Joint WGI effect	0.007**	0.003**	0.002	0.007***	0.002	-0.003*
	(2.48)	(2.11)	(1.65)	(4.73)	(0.84)	(1.77)

	20th Quantile	50th Quantile	80th Quantile	20th Quantile	50th Quantile	80th Quantile
B. Residence	**Urban**			**Rural**		
WGI: Principal component	0.0026**	0.0004	0.000001	0.0033***	0.0021***	0.0013***
	(1.99)	(0.50)	(0.00)	(4.04)	(3.20)	(3.51)
Ethnic fractionalization	0.0534***	0.0353***	0.0271***	0.0390***	0.0247***	0.0198***
	(3.85)	(4.90)	(5.01)	(4.71)	(4.90)	(8.80)
WRI: Exposure	-0.00005	-0.0002***	-0.0002	0.00002	0.00004	0.00001
	(0.90)	(3.42)	(1.58)	(0.41)	(0.73)	(0.33)
Constant	0.003	0.0135***	0.0185***	-0.0011	0.0025	0.0049***
	(0.55)	(4.28)	(2.93)	(0.26)	(0.96)	(2.90)
Observations	1,277	1,277	1,277	1,218	1,223	1,216
Clusters	134	134	134	131	131	131
R-squared	0.69	0.67	0.50	0.49	0.48	0.55
Joint WGI effect	0.006**	0.001	<0.00001	0.008***	0.005***	0.003***
	(1.99)	(0.50)	(0.00)	(4.04)	(3.20)	(3.51)

t-statistics corrected for clustering at the country level are reported in parentheses *** p<0.01, ** p<0.05, * p<0.1

V. Conclusions

This paper reexamines the role of human capital in economic growth. While some studies observe a weak link, others, particularly those that focus on the quality of education, find stronger evidence. Schultz's (1975) hypothesis posits that human capital enables individuals and communities to allocate resources more effectively, especially during times of disequilibria. This suggests that the impact of human capital varies across institutional settings. Countries that give its residents to reallocate their resources and skills in response to social, economic, or environmental changes will reap higher returns on human capital investments than those that impose restrictions.

Using an unbalanced panel of labor force and household surveys covering 145 countries from 1991 to 2023, we find that returns to education and experience are highest in countries with strong governance as measured by the World Bank's Worldwide Governance Indicators. Better governance, as characterized by protection of individual freedoms and voting rights, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption, are consistently correlated with higher returns to education and experience overall, for both men and women, and for both urban and rural residents.

Returns to human capital are also higher in countries with greater ethnic diversity. There is less consistent evidence that returns to human capital are higher when countries face higher risks of natural disasters. These effects are substantial enough to help explain the variation in Total Factor Productivity across countries. Additionally, well-governed countries will derive more output from its citizenry than poorly-governed ones.

Our findings also indicate that better governance and greater ethnic diversity are associated with lower overall income inequality and narrower wage gaps between men and women. Both urban and rural residents benefit similarly from stronger institutions, meaning that governance improvements do not systematically affect urban-rural wage gaps. Quantile regressions reveal that the benefits of better governance and increased ethnic fractionalization are greatest at the lower end of the unexplained wage distribution, where individuals experience unusually poor draws in their human capital returns. Stronger socioeconomic institutions help lift incomes at the bottom of the distribution relative to the top, leading to lower overall inequality in well-governed countries.

These findings have important policy implications. Enhancing the quality of governance and removing institutional barriers can significantly enhance returns to human capital investments, thereby fostering economic growth and reducing income inequality. Key priorities include to improve political stability, reduce corruption, and strengthen the rule of law are particularly crucial. Moreover, the results about social fractionalization argue for supporting investments in education in countries that are more diverse, especially among lower-earning women.

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APPENDIX

Appendix Table 1 reports the sources of the 1,394 surveys used in the analysis. Our estimated returns to human capital are derived from surveys representing 145 countries that span all stages of development and all areas of the world. Since the estimates in Table 3 may be clouded by the exclusion of factors that also affect the returns to human capital, in this appendix, we examine the robustness of our findings by including those additional factors.

The Extent and Pace of Economic Growth

Some models (e.g., Rosen 1983; Murphy et. al. 1991) suggest that larger markets enhance returns to entrepreneurial skills compared to smaller ones. When combined with the endogenous growth theory which links skills and knowledge accumulation to higher productivity and higher rewards for innovation, one can expect increased returns to schooling as societies become more technologically advanced. To account for economic development, we use the log of real gross domestic product per capita and its growth rate to capture both the level and pace of economic development. Additionally, we include the log of country population as a proxy measure for market size. These measures come from the World Development Indicators.

Skilled vs. Unskilled Labor

Capital and advancements in information technology have tended to shift the demand for labor toward more highly skilled workers, and the speed at which the supply of these skills catches up to rising demand will affect returns (Goldin and Katz, 2009; Acemoglu and Autor, 2011). In most developed countries, returns to education have risen for the most educated due to skill-based technical change. The rising returns appear to have persisted in part because technologies have tended to substitute for lower skilled workers and because they create new types of jobs for

the most skilled (Arntz et. al., 2016; Acemoglu and Restrepo, 2019). We use the mean years of schooling for the population aged 15-65 to control for this source of rising returns to skill.

Life Expectancy

As life expectancy increases, perceived benefits of additional schooling rise, as individuals have a greater number of years of higher earnings to recoup the educational investment. Hoque et. al. (2019) found a strong link between life expectancy and schooling across countries at all stages of development. However, the effect of life expectancy on marginal pecuniary returns to schooling is unclear – while better health may increase productivity, additional years of schooling face diminishing returns. Regardless, life expectancy is likely correlated with the quality of governance so excluding it could introduce bias. Life expectancy is sourced from the World Development Indicators.

In Appendix Table 2, we report the correlations between these measures and the measure of governance, ethnic fractionalization, and disasters, used in the text. Several of these control variables (life expectancy, GDP per capita, and average schooling) are moderately to highly correlated with the quality of governance, so excluding them could bias our estimates of the relationship between governance and returns to human capital. It is worth noting that these control variables may themselves be subject to reverse causality with returns to human capital affecting level and growth of production per capita, schooling, and life expectancy.

We report the results of the estimates, including these additional factors in Appendix Table A3. The governance measures remain as or more important for explaining variation in returns to human capital. Ethnic fractionalization remains as important, while exposure to natural disasters falls out of significance.

Appendix Table 1: Distribution of Surveys Used in Our Sample, by Region and Level of Development

Region	Unclassified	Low Income	Lower-Middle Income	Upper-Middle Income	High Income	TOTAL
East Asia & Pacific	0	0	70	16	35	121
Europe & Central Asia	0	0	22	187	397	606
Latin America & the Caribbean	9	0	69	219	34	331
Middle East & North Africa	0	3	19	13	28	63
North America	0	0	0	0	48	48
South Asia	0	2	50	0	0	52
Sub-Saharan Africa	0	85	51	36	1	173
TOTAL	9	90	281	471	543	1,394

The 9 unclassified data sets are for Venezuela for which the World Bank has not designated for an income classification

Appendix Table 2: Correlation Matrix of Regressors

	WGI Principal component	WRI: Exposure	Ethnic fractionalization	GDP per capita	GDP per capita growth	Population	Life expectancy
WGI Principal component							
WRI: Exposure	-0.07						
Ethnic fractionalization	-0.35	0.18					
GDP per capita	0.84	0.03	-0.42				
GDP per capita growth	-0.14	-0.005	0.03	-0.12			
Population	-0.19	0.61	0.16	-0.08	-0.01		
Life expectancy	0.74	0.10	-0.49	0.87	-0.11	-0.06	
Mean years of education	0.53	-0.09	-0.32	0.65	-0.04	-0.14	0.57

Appendix Table 3: Regression Results - Returns to Education and Experience – Total sample

	Returns to Education		Returns to Experience	
Variables	**(1)**	**(2)**	**(3)**	**(4)**
WGI: VA	0.0147		0.00233	
	(1.506)		(0.861)	
WGI: PV	0.0137**		-0.00285***	
	(2.437)		(2.721)	
WGI: GE	-0.0193		-0.000187	
	(1.461)		(0.0417)	
WGI: RQ	0.00837		-0.00706	
	(0.723)		(1.539)	
WGI: RL	0.00153		0.0102**	
	(0.0890)		(2.256)	
WGI: CC	0.0159		0.000421	
	(1.297)		(0.117)	
WGI: Principal Component		0.0159***		0.00194***
		(6.112)		(2.697)
WRI: Exposure	0.000619*	0.000666**	0.000113	-0.000121
	(1.783)	(2.086)	(1.035)	(1.247)
Ethnic Fractionalization	0.0591***	0.0557***	0.0144**	0.0204***
	(3.480)	(3.167)	(2.407)	(4.217)
Log of Real GDP Per Capita	-0.00795	-0.0115	0.00497	0.00361
	(0.792)	(1.071)	(1.436)	(1.173)
GDP Per Capita Growth	5.22e-05	-0.000273	8.86e-05	-1.53e-06
	(0.122)	(0.557)	(0.611)	(0.0177)
Log of Population	0.00413	0.000234	-0.000462	0.00162**
	(0.911)	(0.0626)	(0.397)	(1.996)
Life Expectancy	-0.000762	-0.00134	-0.000545	0.000328
	(0.860)	(1.279)	(1.358)	(0.903)
Mean Years of Education	0.000490	0.000198	-0.00164**	-0.00287***
	(0.267)	(0.0908)	(2.477)	(4.764)
Constant	0.119	0.270***	0.0291	-0.0454**
	(1.400)	(4.499)	(1.310)	(2.084)
Observations	1,381	1,381	1,381	1,381
Clusters	141	141	141	141
R-squared	0.658	0.634	0.458	0.461
Joint Tests: $F(6, N)_{.05} \approx 2.15$	11,4		3.94	
+1 SD: $F(1,N)_{.05} \approx 3.90$	27,79		1,12	
Joint WGI Effect:	0		0,2926	

t-statistics corrected for clustering at the country level are reported in parentheses *** p<0.01, ** p<0.05, * p<0.1