

Spotlight on human capital

How health, education and income can drive economic prosperity

A report for The Bill & Melinda Gates Foundation by The Economist Intelligence Unit.



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About this report

This report details the methodology and key findings of a research programme undertaken by The Economist Intelligence Unit (The EIU) between November 2019 and January 2020, commissioned by The Bill & Melinda Gates Foundation.

This research programme explores the potential linkages between human capital development and economic development, investigating whether there is a trade-off between human development and economic development, or whether they form a virtuous cycle. The EIU analysis contributes to the debate on the importance of human development and the extent to which countries should prioritise it in their national development strategies. It also contributes towards supporting policymakers to make informed choices about pursuing improvements in health, income and education for their populations.

The report was researched and written by The Economist Intelligence Unit team comprising of Minakshi Barman, William Davis, Ritu Bhandari and Sumer Sharma, with contributions from Simon Baptist, Stefano Scuratti and Michael Frank. Gaddi Tam was responsible for design and layout.

About The Economist Intelligence Unit

The Economist Intelligence Unit (The EIU) is the research arm of The Economist Group, publisher of *The Economist*. As the world's leading provider of country intelligence, it helps governments, institutions and businesses by providing timely, reliable and impartial analyses of economic and development strategies. Through its public policy practice, The EIU provides evidence-based research for policymakers and stakeholders seeking measurable outcomes in fields ranging from gender and finance to energy and technology. It conducts research through interviews, regulatory analysis, quantitative modelling and forecasting, displaying the results of this research via interactive data visualisation tools. Through a global network of more than 350 analysts and contributors, The EIU continuously assesses and forecasts political, economic and business conditions in over 200 countries. For more information, visit www.eiu.com.

Executive summary

A girl born in Japan in 2020 has an average life expectancy of nearly 90 years. She has access to some of the best public schools in the world, which she will attend through to some form of tertiary education—likely a four-year university degree. She will grow up in an increasingly conservationist society that has cut back its greenhouse gas emissions in line with the world’s leading green economies in the past ten years. She is far more likely than her mother or grandmothers to serve in parliament, as a senior manager in business, or as a senior government official. Her life will not be without obstacles, but there are many reasons to feel optimistic about her circumstances and the opportunities that they present in the 21st century.

Quality of life in Japan is good, and getting better. However, that story doesn’t appear in Japan’s GDP per capita, which is broadly stagnant over the past 25 years. That metric suggests the best time to be born in Japan may have been before the growth spurt of the 1980’s, when Japan’s economy doubled—twice—in just over a decade.

This assumption presents challenges: GDP levels or growth rates do not necessarily mean better educational outcomes, healthcare, or opportunity. Yet GDP is a ubiquitous metric that has come to be synonymous with national success. Identifying and prioritising policy issues that matter requires a more nuanced understanding of the linkages between development areas and the indicators that are best placed to capture them.

The United Nations (UN) measures societal progress through the Human Development Index (HDI), a widely recognised metric comprising three components: health, education, and income. Improvements in these areas are seen as important, both independently and collectively.

Development policy demands trade-offs: different goals compete for resources. Decisions on what to prioritise presents challenges. Exploring the extent to which higher levels of human development can support progress towards other goals, such as economic development, can contribute towards a more nuanced understanding of these questions. If evidence suggests that there is a trade-off between human development and economic development, countries may choose to prioritise the latter, framing human development as a luxury that can only be pursued when national income has grown. Conversely, if human development is found to play an essential role in achieving economic development, countries may prioritise human development policies in order to achieve broader goals.

This report examines whether gains in human development support economic development by examining the performance of a subset of countries, thus advancing the dialogue on the prioritisation of development goals. An empirical analysis of the countries—divided on the basis of income—highlights the importance of human capital development. The key findings are summarised below.

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Both GDP and GDP per capita are positively correlated to human development. There is a positive correlation between total GDP and the HDI scores, and between GDP per capita and the HDI scores. Not only are the growth rates of HDI and GDP positively correlated, there is a strong positive correlation between the individual components of the HDI and GDP. The correlation is intuitive—higher education (one of the components of the HDI) improves human capital, enabling workers to produce more, which in turn increases GDP. Additionally, a more productive workforce is more competitive. This increases the competitiveness of a country's firms, raising international demand for the country's output and further boosting GDP. At the same time, a healthier workforce (another component of the HDI) can also produce more, further increasing potential GDP growth.

Countries that prioritise human development are more likely to transition to a virtuous cycle, where sustained growth and human development enhance one other, compared to countries that neglect human development. This finding aligns with endogenous growth theory, which emphasises the importance of dedicating resources to research that produces many technological innovations over time, driving growth in the longer term.

Countries with better HDI scores have higher employment rates. Improvements in human development at the household level lead to better employment prospects, higher wages and increased consumer expenditure. Improved health and education drive higher rates of labour force participation and better employment prospects, as well as higher wages and consumer expenditure.

Improved human development results in higher wages, incomes and consumer expenditure. The impact of educational attainment (level of schooling) on household consumption expenditure per capita is economically and statistically significant. This is mediated by increasing labour market activity, suggesting that education affects consumption expenditure through higher and more successful labour force participation and higher earnings. Improved health and education levels drive better wages, which increases consumer expenditure.

Countries with higher HDI scores tend to display higher levels of industrial competitiveness. Better education, health and income outcomes lead to higher labour productivity, enabling firms to produce better value goods at a given price, and increasing demand for their output. This boosts competitiveness, sales and profits, leading to greater investment.

Methodology

In this report, The EIU looks at the links between human development (measured by the HDI and its components) and economic development (measured by a number of economic development indicators: GDP, employment, wages, consumer expenditure and industrial development). We began by conducting an analysis of how the HDI and its components were correlated with these indicators of economic development, and by reviewing the existing literature on these relationships. While our analysis could only identify correlations (not causation), much of the literature focuses on whether different elements of human development *cause* greater economic development. Our analysis clearly distinguishes between causation and correlation. Chapters 1–4 highlight key findings from this analysis, with a focus on examining how increased human development can spur economic development.

The EIU also examined how relationships between human development and economic development vary across countries in different income groups, conducting a correlation analysis for those income groups. We looked at 81 countries in total: 11 low-income countries, 34 middle-income countries, nine high-income countries and 27 advanced economies. Low-income countries, middle-income countries and high-income countries were classified using the World Bank's method of classification; advanced economies were classified using the International Monetary Fund's (IMF) method of classification. While some of the relationships varied across these country groupings, some were relatively consistent. The report notes where relationships between measures of human and economic development tended to vary.

Country stratification

Based on the assumption that the relationship between human development and economic growth varies across income categories, we grouped countries by income level. We used the World Bank's current method of classification (low, lower middle, upper middle and high income, based on gross national income [GNI] per capita)¹ to create these country groupings, with the following modifications.²

- High-income countries were divided into two groups: advanced economies (using the IMF's classification) and high-income countries. We took this approach because several high-income countries (such as Latin American countries) face development challenges that are different from those encountered in the advanced economies in our sample, such as higher levels of poverty. Resource-rich economies in the Middle East also have quite different economic structures to advanced economies. We would therefore expect the relationship between human development and economic development to be different between high-income but non-advanced economies and advanced economies. The threshold for high-income countries was set in 1989 and is revised upwards based on "international inflation".³ However, some authors have noted that it is not a very reliable parameter as it does not include many relevant emerging economies.⁴
- Upper-middle-income countries and lower-middle-income countries were combined into a middle-income group. This recognises that middle-income countries are structurally similar to one another and are different from low-income and high-income countries.

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Classifying countries: Why use the World Bank's method?

Literature on the taxonomy of countries by level of development usually compares the World Bank's income indicators with the UN's HDI (not the United Nations Conference on Trade and Development's [UNCTAD] categorisation of countries as either developed or developing).⁵ Most studies also use either the World Bank's indicators or the UN's HDI. The World Bank uses GNI per capita to classify countries by income level, which measures the average amount of

resources available to people residing in a given territory. All production of goods and services (with a few exceptions) are included as income-generating activities, regardless of whether they are produced for the market, for people's own use, or to give to others free of charge.

The literature does not tend to use UNCTAD's development classification because it does not clearly define how it differentiates between developed and developing countries.⁶ For instance, UNCTAD classifies Singapore as a developing country despite high levels of economic development.

We divided the countries in our study into the following groups:

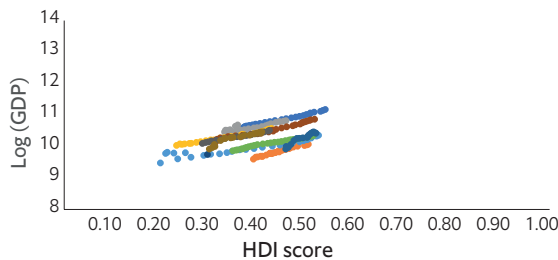
	Low income	Middle income	High income	Advanced
Number of countries	11	34	9	27
Countries	Tanzania, Togo, Congo, Mali, Rwanda, Benin, Burundi, Uganda, Burkina Faso, Chad, Madagascar	Algeria, Bangladesh, Bolivia, Botswana, Brazil, Bulgaria, Cameroon, Colombia, Costa Rica, Dominican Republic, Ecuador, Egypt, El Salvador, Gabon, Guatemala, India, Indonesia, Iran, Jordan, Kenya, Malaysia, Mauritania, Mauritius, Mexico, Morocco, Pakistan, Paraguay, Peru, Philippines, Senegal, South Africa, Sri Lanka, Thailand, Turkey	Brunei Darussalam, Chile, Panama, Uruguay, Bahamas, Bahrain, Saudi Arabia, Oman, United Arab Emirates	Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong (China), Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, United Kingdom, United States of America

Chapter 1: The HDI and growth

The key findings from our correlation analysis and literature review show strong positive correlations between economic growth and human development across a large, cross-country data set. The EIU reviewed literature examining this relationship, including studies that investigate both correlation and the causal impact of human development on growth. Much of the literature examining this causal relationship uses health and education indicators as proxies for human development.

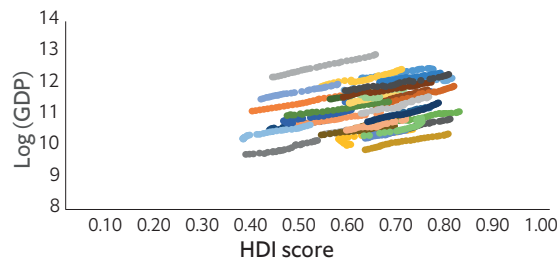
The EIU’s analysis found a positive correlation between GDP and the HDI, and between GDP per capita and the HDI. The majority of the literature supports this finding.

Figure 1: Correlation between HDI score and Log GDP in low-income countries



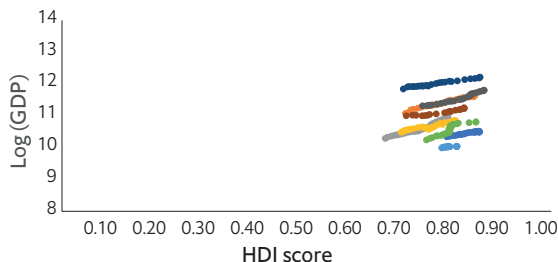
Range of Pearson’s r: 0.99 to -0.44

Figure 2: Correlation between HDI score and Log GDP in middle-income countries



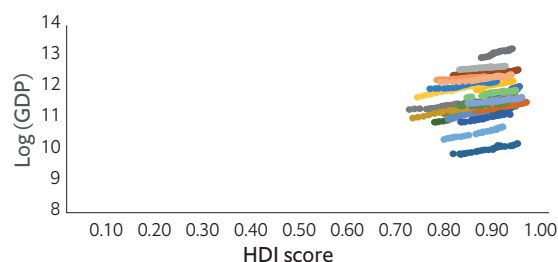
Range of Pearson’s r: 0.99 to -0.67

Figure 3: Correlation between HDI score and Log GDP for high income countries



Range of Pearson’s r: 0.99 to -0.84

Figure 4: Correlation between HDI score and Log GDP for advanced income countries



Range of Pearson’s r: 0.99 to 0.68

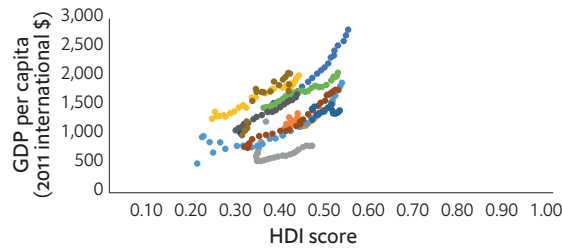
Source: The Economist Intelligence Unit

The EIU’s data analysis also found that the HDI is strongly correlated with GDP (and GDP per capita) across countries in different income groups. The results indicate that a country’s total output over time is closely related to its human development outcomes.

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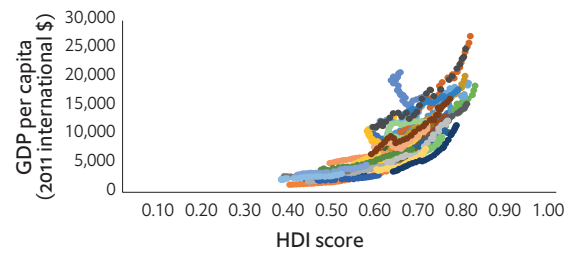
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Figure 5: Correlation between HDI score and GDP per capita for low income countries



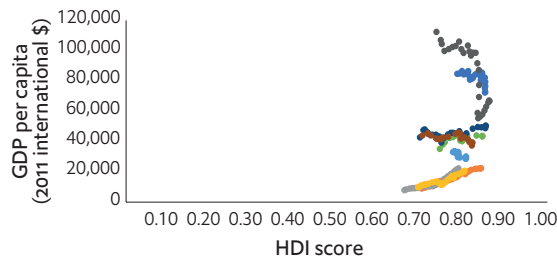
Range of Pearson's r: 0.99 to -0.44

Figure 6: Correlation between HDI score and GDP per capita for middle income countries



Range of Pearson's r: 0.99 to -0.67

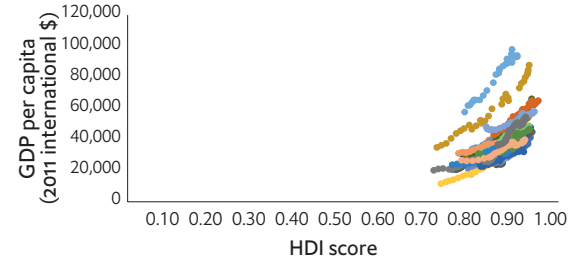
Figure 7: Correlation between HDI score and GDP per capita for High income countries



Range of Pearson's r: 0.99 to -0.84

Source: The Economist Intelligence Unit

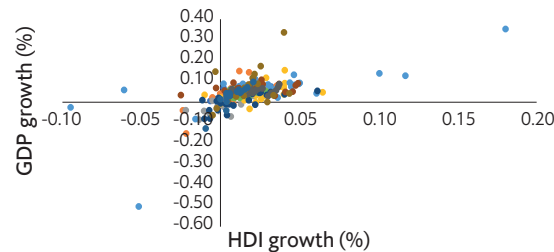
Figure 8: Correlation between HDI score and GDP per capita for advanced income countries



Range of Pearson's r: 0.99 to 0.68

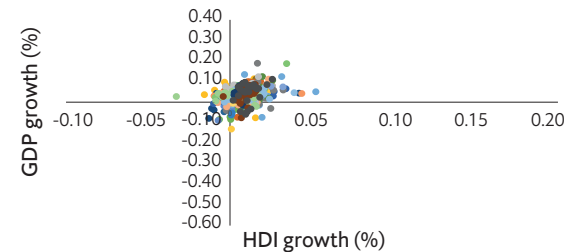
The data analysis also showed a positive correlation between the HDI growth rate and the GDP growth rate.

Figure 9: Correlation between HDI growth and GDP growth rate for low income countries



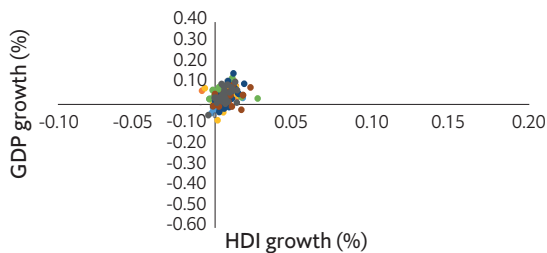
Range of Pearson's r: 0.87 to -0.24

Figure 10: Correlation between HDI growth and GDP growth rate for middle income countries



Range of Pearson's r: 0.75 to -0.27

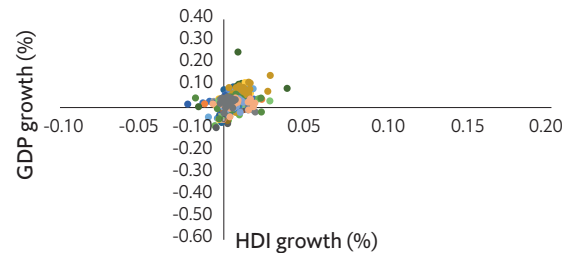
Figure 11: Correlation between HDI growth and GDP growth rate for high income countries



Range of Pearson's r : 0.63 to -0.09

Source: The Economist Intelligence Unit

Figure 12: Correlation between HDI growth and GDP growth rate for advanced income countries



Range of Pearson's r : 0.80 to -0.10

The correlation between the HDI and GDP (and GDP per capita) was strong and positive for the majority of the countries in our sample, with the exception of a few outliers.⁷ For the HDI growth rate and the GDP growth rate, the correlation was moderately positive, with weaker correlations for the high-income group and European countries.

While the correlation between the HDI and GDP was strong for all income groups, it was strongest for low-income economies. The correlation between the HDI and GDP per capita demonstrated similar results; however, there were some outliers, such as Burundi in the low-income group; Gabon in the middle-income group; and Brunei, Bahamas, Oman and United Arab Emirates in the high-income group.⁸

When looking at HDI growth and GDP growth, there was a stronger correlation for low- and middle-income economies. Among advanced economies, European countries showed a weak correlation, but countries like Japan, Korea, Singapore and Luxembourg showed a stronger correlation (ranging between 0.66 and 0.86).⁹ Countries with higher growth rates showed a stronger relationship than those with lower growth rates, even if the latter had high levels of GDP.¹⁰

A number of studies support this finding. Deb (2015) studied 140 countries and found that the correlation was strongest when all the countries were studied together as a group. Similar to The EIU's analysis, the study also found that the correlation remained comparatively stronger for the low-income group. Susnik and der Zaag (2017) examined 188 countries and found a strong correlation between the HDI and GDP per capita, but a weaker correlation between the HDI and GDP.

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The correlation between the HDI and GDP exists for the following reasons. First, higher education (one of the components of the HDI) strengthens workers' skills and intelligence, enabling a workforce to produce more, which in turn raises GDP. Second, a productive workforce is more competitive, producing a higher quality/lower price output than less-educated workers for the same amount of wages. This increases the competitiveness of a country's firms, raising international demand for the country's output and further boosting GDP. Finally, healthier workers (another component of the HDI) can produce more, and help firms become more competitive, again raising GDP.¹¹ Chapter 2 discusses studies that provide empirical evidence that health and education cause higher GDP.

The third component of the HDI (GNI per capita) may also be related to higher GDP, but for quite different reasons. GNI per capita and GDP per capita are very similar; GNI per capita is simply GDP per capita plus net income from abroad.¹² In other words, GNI is what is earned by a country's nationals, while GDP is produced domestically. In most countries, the vast majority of nationals live and earn domestically, which means that GNI and GDP (and their per-capita equivalents) are very similar and track each other closely across time.¹³ If one compares GNI per capita (the indicator used in the HDI) with GDP absolute levels (i.e. not per capita), the relationship may be much weaker, reflecting differences in country size (population). Many countries have a high GNI per capita and low GDP (e.g. small, rich countries), while others have a high GDP but lower GNI per capita (e.g. developing countries with large populations, such as China and India). For groups of countries that have the same population size, GDP and GNI per capita track one another quite closely. This means that the association between GDP and GNI per capita could be either positive or negative for different groups of countries, depending on the size of their populations.

The literature suggests that countries that prioritise human development are more likely to transition to a virtuous cycle, where sustained growth and human development enhance each other, compared to countries that neglect human development.

Moving beyond correlation analysis, several studies in the literature look at causation between human development and economic growth. The majority of this literature uses education and health variables as proxies for human development; these are discussed in Chapters 2 and 3, which focus on growth, health and education.

However, some studies use the HDI. The EIU found two such studies: a 2017 study by Mustafa et al., and a 2019 study by Chikalipah and Okafor. Using data from 12 developing Asian countries over a period of 41 years, Mustafa et al. (2017) suggest that an improvement in HDI scores causes a higher GDP growth rate. Chikalipah and Okafor (2019), meanwhile, examined the causal relationship between HDI scores and growth in Nigeria and found no such impact. Nigeria may not be a representative case study, however, as it is a highly oil-dependent economy, where international oil prices (rather than human development) are the major cause of changes in GDP. Mustafa et al.'s (2017) study covers more countries and may therefore be more representative of the true relationship between human development and economic growth. However, the general lack of studies investigating the causal impact of a higher HDI score on GDP means that there is ongoing uncertainty about this relationship. One possible strategy for overcoming this uncertainty is to identify the relationship between economic development and the HDI's three components.

Case study: Looking at time-series evidence on the relationship between human development and economic growth in Nigeria

Chikalipah and Okafor (2019) investigated the two-way causality between economic growth and human development in Nigeria between 1961 and 2015. The authors used annual economic growth rates (GDP growth) and annual changes in human development (improvement in HDI scores) to study economic growth and human development, respectively, and found a long-term relationship between the two. However, the study only found that economic growth exercised a positive causal effect on human development; it found no evidence that human development affected economic growth in Nigeria.

There are a few possible explanations for these results. Firstly, Nigeria's economy, and consequently its growth rate, is highly dependent on oil. Oil exports in the country account for 80% of total foreign export earnings, and international oil prices tend to fluctuate significantly. As a result, a fall in international oil prices could cause a significant decline in Nigeria's growth; similarly, rising oil prices would significantly raise the value of Nigeria's economy and its growth rate. This variation in the growth rate, induced by something that has little to do with economic factors in Nigeria (i.e. international oil prices), makes it

difficult for statistical studies to determine what effect human development is having on the growth rate, as swings due to oil price fluctuations will be much greater.¹⁴ In addition to these statistical issues, the primacy of oil in Nigeria's economy may mean that human development is less important to growth in the country, if oil extraction does not benefit from workers having higher levels of human development.

Secondly, it is possible that rapid population growth also played a role. The study looked at the links between HDI scores and growth in total GDP, rather than GDP per capita. Like international oil prices, the population growth rate increases overall economic growth¹⁵ but is not positively linked to human development.¹⁶ This means that Nigeria's rapid population growth would have increased GDP growth, even when human development remained unchanged or began to fall. This weakens the statistical relationship between human development and economic growth in the country and reduces the ability of statistical methods to find any link between the two variables. Nigeria has experienced astronomical population expansion over the last 60 years, growing from 45m people in 1960 to around 181m people by the end of 2015. This represents an increase of over 300%. To provide a point of comparison, the global population increased from 3bn in 1961 to 7.4bn in 2015, representing a 140% increase—less than half the percentage increase experienced by Nigeria.

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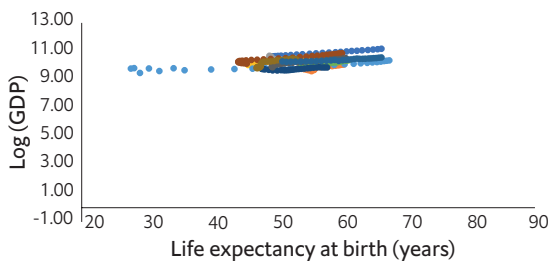
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The EIU's quantitative analysis found a strong correlation between the individual components of the HDI and GDP levels.

As noted previously, there is strong evidence that improved health and education (two of the three pillars of the HDI) have a strong causal impact on growth. While we focused on life expectancy and years of schooling—the indicators used in the HDI—we also included other health and education measures that are used in the literature.

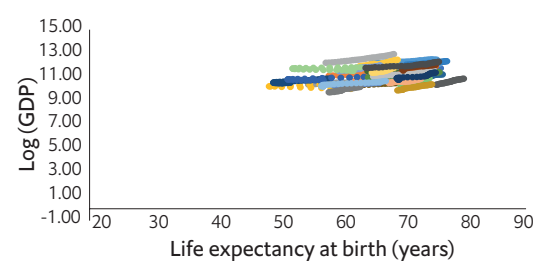
The EIU's quantitative analysis showed a positive correlation between higher life expectancy and GDP. The majority of high-income and advanced economies showed a strong positive correlation (ranging from 0.83 to 1), with the exception of a few outliers, such as Greece.¹⁷

Figure 13: Correlation between Life expectancy at birth and Log GDP for low income countries



Range of Pearson's r: 0.99 to -0.69

Figure 14: Correlation between Life expectancy at birth and Log GDP for low income countries



Range of Pearson's r: 1.00 to -0.2

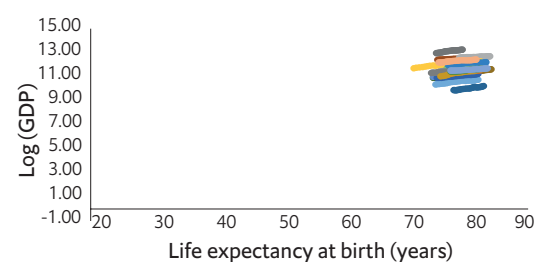
Figure 15: Correlation between Life expectancy at birth and Log GDP for high income countries



Range of Pearson's r: 0.99 to -0.89

Source: The Economist Intelligence Unit

Figure 16: Correlation between Life expectancy at birth and Log GDP for advanced income countries

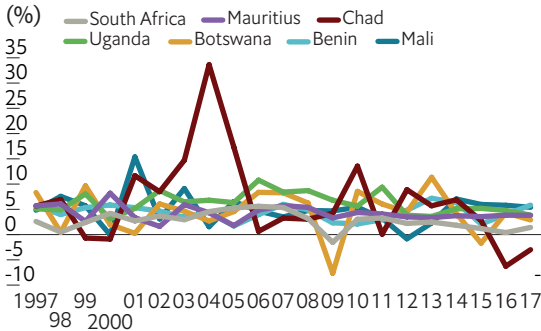


Range of Pearson's r: 1.00 to -0.63

Among low- and middle-income economies, there was a positive correlation overall, with the exception of some African countries, as shown in Figures 17 and 18.

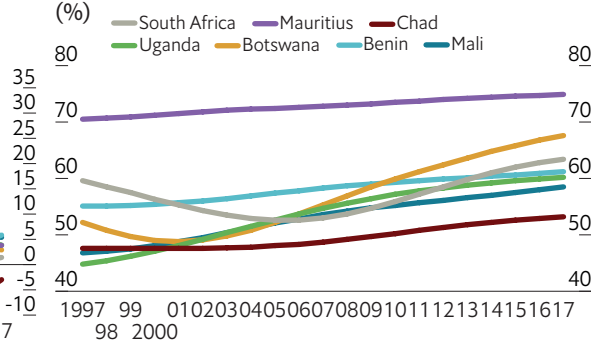
Numerous studies have investigated the relationship between health indicators and GDP. Of the five correlation studies reviewed for this report, four showed a positive strong correlation between life expectancy and GDP, and three provided evidence that health indicators (primarily life expectancy) had a significant causal impact on economic growth. Bloom, Canning and Sevilla (2003) reviewed the literature on life expectancy and economic growth and reported estimates from 13 studies showing that life expectancy had a strong and significant effect on per-capita income growth. While there is

Figure 17: Economic growth rates in African countries showing a negative correlation between growth and life expectancy



Source: The Economist Intelligence Unit

Figure 18: Correlation between life expectancy and growth in African countries



Source: The Economist Intelligence Unit

some disagreement in the literature, the vast majority of studies reviewed by The EIU indicated that better health has a positive impact on GDP. This is most likely because healthier workers have more energy, both physically and mentally, and are therefore able to produce more. They are also less likely to be absent from work because of illness. Strauss and Thomas (cited in Bloom, Canning & Sevilla, 2003) show that there is substantial microeconomic evidence that poor health has a negative impact on productivity and wages.

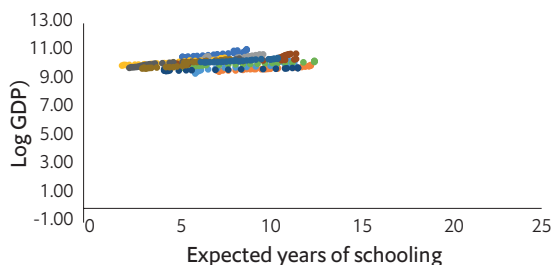
In addition to the research that looks at health directly, Deaton and Dreze (2009) and Fogel (1994) look at the relationship between nutrition and economic growth. One of the studies showed a positive correlation; the other showed a positive causal impact. Fogel (1994) offers an explanation for these results: greater economic output by workers (for a given level of capital) requires greater energy consumption, which means that workers need to consume more calories. As a result, inadequate calorie consumption is particularly detrimental to economic growth. (Adequate calorie consumption is one aspect of appropriate nutrition.) Banerjee and Duflo (2011) support this argument, reporting on microeconomic evidence that shows that inadequate calorie consumption leads to lower worker output. Moreover, as this report explores in Chapter 3, good health and nutrition tend to increase wages, which further supports the argument that better health and nutrition improve productivity, and would therefore be expected to increase GDP. It is worth noting that both our correlation analysis and the literature explore the relationship between nutrition and the level of GDP, rather than the growth rate; as a result, our finding is that better health and nutrition increase the level of output (GDP) in the economy, but do not necessarily lead to continued improvement over time.

The EIU’s data analysis showed a strong correlation between improved educational outcomes—measured through mean and expected years of schooling—and GDP. The correlation range was strongly positive for all countries in the low-income group (ranging from 0.98 to 0.80), and it was also positive for all countries in the middle-income, high-income and advanced economy groups, with the exception of Canada. Higher expected (but not mean) years of schooling was negatively associated with higher GDP ($r = -0.67$) in Canada, making it an outlier in the advanced economy group.

SPOTLIGHT ON HUMAN CAPITAL

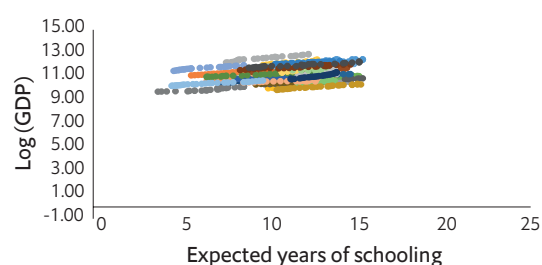
HOW HEALTH, EDUCATION AND INCOME CAN DRIVE ECONOMIC PROSPERITY

Figure 19: Correlation between Expected years of schooling and Log GDP for low income countries



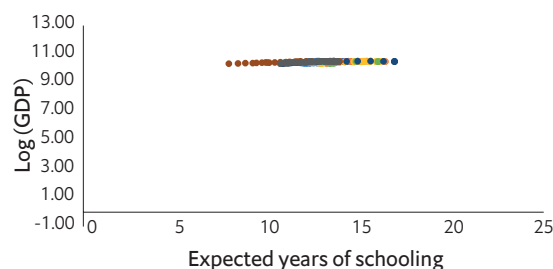
Range of Pearson's r: 0.98 to 0.80

Figure 20: Correlation between Expected years of schooling and Log GDP for middle income countries



Range of Pearson's r: 0.99 to 0.56

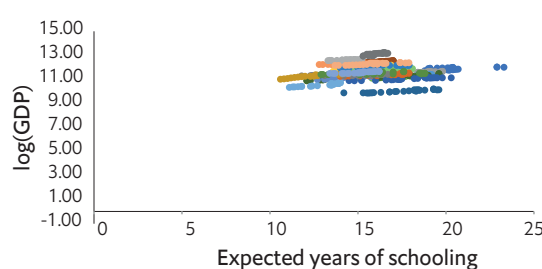
Figure 21: Correlation between Expected years of schooling and Log GDP for high income countries



Range of Pearson's r: 0.99 to 0.44

Source: The Economist Intelligence Unit

Figure 22: Correlation between Expected years of schooling and Log GDP for advanced income countries



Range of Pearson's r: 0.99 to -0.67

The existing literature shows particularly strong evidence that better education causes higher economic growth.

Several studies have confirmed the relationship between education indicators and economic growth for all income groups. Of the five studies that The EIU reviewed on the links between education and economic growth, all but one demonstrated that education had a significant causal effect on growth. Most of these studies used years of schooling or level of education to measure education, although some used proxies such as secondary school enrolment and literacy.

A 2013 study of 20 countries highlighted that both basic literacy and the number of “top performers” have separate and significant impacts on long-term growth.¹⁸ The study also indicated that high performers were more important for growth in developing countries than in OECD countries. The reason for this positive relationship between education and the level of GDP is intuitive: better educated workers approach their work more intelligently, and are able to produce more. Banerjee and Duflo (2011) reviewed microeconomic evidence showing that more educated workers have higher productivity, regardless of occupation. However, the relationship between education and the economic growth rate (i.e. the percentage increase over time) is less clear. Although high levels of education make workers highly productive, it is not clear whether this leads them to dynamically continue to increase their productivity over time.

Endogenous growth theory can help us understand these links between education and long-term economic growth. This theory emphasises the importance of dedicating resources to research that produces many technological innovations over time, driving growth in the longer term. To investigate whether any empirical evidence supports this theory, we reviewed seven papers that tested whether the theory applied in practice. All seven papers concluded that it did, and that investment in human capital positively affected the growth rate. The studies mainly examined advanced economies, although Sequiera and Martins (2007) looked at 57 countries across all income categories, and Abbas and Nasir (2001) looked at Pakistan and Sri Lanka.¹⁹

In summary, the existing literature largely uses health and education as indicators of human development. A strong correlation has also been found between sub-indices of the HDI and economic growth, and there is evidence of causal linkages between education and health and economic growth. The EIU looked at three further indicators of economic development: the employment rate, consumption expenditure and industrial development. The results of this work are detailed in Chapters 2, 3 and 4 of this report.

Case study: What is the role of human development in East Asia's growth "miracle"?

The East Asian tiger economies (Hong Kong, Singapore, South Korea and Taiwan) experienced strong and sustained economic growth between 1965 and 1996, achieving rich-country status in record time (The Economist, 1998). They achieved this by attracting significant foreign direct investment, leading to increasing levels of capital per worker, which supported the development of the manufacturing sector (Qian, 2010). This was enabled by a combination of policies designed to improve the business environment, as well as interventionist policies designed to support key strategic industries (with subsidies and infrastructure investments), and to pressurise them to export by threatening the withdrawal of government support (see Rodrik, 2012, regarding South Korea and Taiwan). These economies also had higher levels of education than many other developing countries, and had invested in developing their levels of human capital (Qian, 2010).

According to the literature, human development played a key role in the East Asian tigers' remarkable economic catch-up. For example, McMahon (1998) applied production functions with education externalities to the rapidly growing countries of East Asia, testing for the net effects of differences in policies concerning education enrolments versus expenditures at each level, and for feedback through the effect of education on rates of physical capital investment. He found that since most countries achieved universal primary education early in their development, the rate at which secondary education expanded (which is necessary to support exports) was crucial in achieving high rates of investment and high per-

capita growth. He therefore argued that secondary education can be regarded as a foundation for the successful export-oriented growth strategy common to East Asian tiger economies. Lee and Hong (2010) similarly found that education was an important contributor to growth in the East Asian tiger economies between 1981 and 2007, although labour and capital accumulation were greater contributors. Improvements in health were also an important contributor to East Asia's growth success. For example, Bloom, Canning and Malaney (1999) found that improvements in life expectancy significantly contributed to growth in East Asia.

Higher levels of education and health contributed to the tigers' overall growth story by improving worker productivity, enhancing competitiveness, and enabling these countries to boost their exports and attract further foreign investment. Bloom, Canning and Malaney (1999) also found that higher individual income levels in the region boosted growth by lowering fertility, which in turn lowered the youth dependency ratio (i.e. the share of dependent young people in the population). This again raised incomes, which further lowered both fertility and mortality rates, driving a demographic transition. Lee and Hong (2010) highlight the role of this demographic transition in boosting the tigers' growth.

While improved human development played an important role in the success of the East Asian tigers, other policies (in particular, industrial policies) were just as important. This suggests that in order to achieve economic development of similar speed and scale, countries need to combine human development policies with other policies that not only improve individuals' productive capacities but ensure that they have the necessary regulatory frameworks and physical capital to succeed.

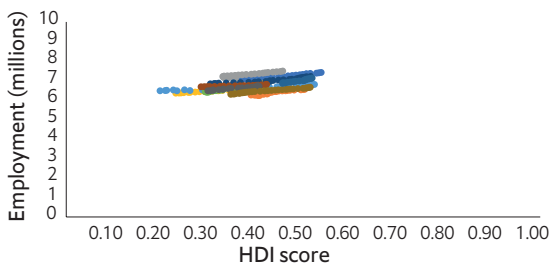
Chapter 2: The HDI and employment

According to The EIU’s correlation analysis, the employment rate is strongly correlated with the HDI and its components. This suggests that better human development outcomes are associated with higher employment rates.

The EIU’s data analysis also found that the HDI is strongly correlated with GDP (and GDP per capita) across countries in different income groups. The results indicate that a country’s total output over time is closely related to its human development outcomes.

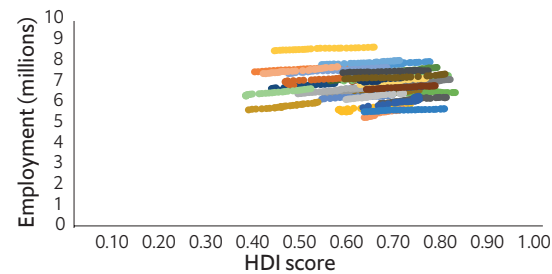
The EIU found that the employment rate was strongly correlated with the HDI, life expectancy, mean and expected years of schooling, and GNI per capita for nearly all countries across income categories. (The only exceptions were Bulgaria, which showed a negative correlation; and Japan, which showed no correlation.) This is because improved health and education tend to increase employees’ productivity. All else being equal, this should encourage firms to use more workers in production (as opposed to other factors of production), increasing demand for labour and resulting in higher employment levels. (As more jobs are available at higher wage rates, more workers will find opportunities that make it worthwhile to be employed.)

Figure 23: Correlation between HDI score and Log Employment for low income countries



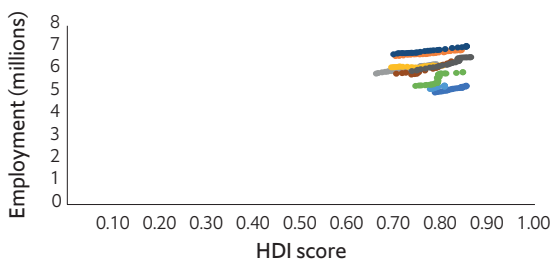
Range of Pearson’s r: 0.99 to 0.91

Figure 24: Correlation between HDI score and Log Employment for middle income countries



Range of Pearson’s r: 1.00 to -0.15

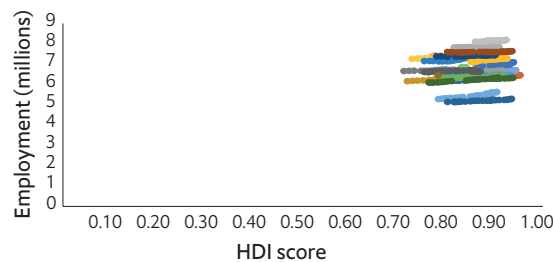
Figure 25: Correlation between HDI score and Log Employment for high income countries



Range of Pearson’s r: 0.99 to 0.69

Source: The Economist Intelligence Unit

Figure 26: Correlation between HDI score and Log Employment for advanced income countries



Range of Pearson’s r: 0.98 to 0.00

The existing literature does not adequately demonstrate that higher levels of human development lead to higher rates of employment; there are too few studies that examine this question, and those that do have produced ambiguous results. However, the literature does show that improvements in human development at the individual household level lead to better employment prospects, higher wages and increased consumer expenditure for household members. It is not clear whether this, in turn, leads to higher employment overall, or whether it simply increases the likelihood of employment for individuals with higher levels of human development.

Very little research looks at whether human development improves the employment rate.²⁰ For this reason, it remains unclear whether the demonstrated correlation between the HDI (and its components) and the employment rate is due to (a) a causal impact of human development and its components, (b) causation running in the other direction, or (c) some third factor that is related to both human development and employment.

The literature shows that improved health and education result in stronger labour force participation and better employment prospects. Improvements in health and education also lead to higher wages and consumer expenditure.

Extensive literature on individual employment and labour force participation (i.e. an individual's decision to search, or not search, for employment) shows that improved health and education levels for particular individuals result in a higher likelihood of being employed. Madrian and Currie's (1999) review highlights 12 studies demonstrating that health has a positive and significant causal impact on both employment and labour force participation. However, the magnitude of this impact is highly contested, as is the question of which health indicator matters most; life expectancy shows little impact, while disability, disease and self-reported health all show large effects.²¹ Similar results were obtained from a review of 11 studies on health and labour supply (measured as hours of work), which suggests that higher levels of human development not only increase individuals' ability and willingness to work, but also the average number of hours they work. Faridi et al.'s (2010) study of Pakistan supports this finding, demonstrating that educational level has a strong impact on an individual's employment. Chou and Staiger (2001) also found that educational qualifications had a significant positive impact on individuals' employment (including self-employment), and that the strength and significance of this effect rose sharply as qualification levels increased.

The EIU cannot be certain whether improvements in employment and labour force participation for individuals with better education and health translate into higher employment levels across the whole economy, or if they simply improve individual employment prospects. As noted earlier, neoclassical economic theory posits that higher productivity tends to lead to higher wages, so one would expect economies that are rich in human development to provide more *decent* jobs with adequate wages. Moreover, rising income levels may create more jobs in the export sector by boosting national competitiveness. On the other hand, however, high levels of human development and productivity may mean that the economy can achieve the same level of production with fewer workers, reducing employment levels. The macroeconomic impact of human development on employment therefore

remains ambiguous. Nonetheless, the fact that our correlation analysis showed that human development and employment are positively correlated suggests that the positive effect of improved human development on employment (through substitution towards workers) may outweigh the “labour-saving effect” and lead to an increase in employment overall.

Case study: Ethiopia’s rapid economic growth and human development

After facing famine and civil war in the 1980s and war with Eritrea from 1998 to 2000, Ethiopia has experienced rapid economic development in recent years, averaging annual growth of over 10% from 2004 onwards (7.5% per capita in real terms). Remarkably, this economic growth was not driven by the boom in global commodity prices that boosted other African countries’ growth from 2004 onwards; indeed, commodity exports’ share of GDP actually declined in Ethiopia over this period. Instead, public-led investment has been the main driving force behind Ethiopia’s growth (United Nations Economic Commission for Africa, 2018).

Over the same period, Ethiopia also improved the level of education among its population. The average Ethiopian received 1.5 years of education in 2000; by 2017 this had risen to 2.7 years, and literacy rates had significantly improved (United Nations Economic Commission for Africa, 2018). Life expectancy also rose steadily, from 47 years in 1990 to 66 years in 2017; and individual incomes increased at a rate of around 8% in real terms, slightly faster than the growth in GDP per capita. As such, Ethiopia has shown broad-based improvements in human development.

Although public investment has been an important driver of Ethiopia’s economic growth, the evidence indicates that human development has also made a significant contribution, and may even have been the main driving force. Gebrehiwo

(2016) conducted a quantitative study and found that, in the long term, health and education were the main contributors to the rise in real GDP per capita. The author used the ratio of public health expenditure to GDP as a proxy for health, and secondary school enrolment as a proxy for education. The study also found that education was the main contributor to real GDP per capita in the short term, and that health had no significant impact on short-term economic growth. The author argued that this could be because health expenditure benefits people who do not have a positive impact on the economy. Netsanet (1997) and Seid (2000) found similar results for earlier time periods, and Ramesh and Abebe (2016) found evidence of a strong correlation between economic growth and human development in Ethiopia between 2000 and 2012. The latter study showed that income, life expectancy and school attainment moved in tandem in the country, although life expectancy progressed faster than educational attainment. The United Nations Development Programme (UNDP, 2013) also points to an increase in public expenditure on education as a key driver of the decline in urban inequality in Ethiopia. As expenditure on education allowed education coverage to expand—including for low- and middle-income groups—the supply of skilled workers increased.

Ethiopia has experienced remarkable growth in the last 15 years, driven by multiple factors including years of investment and reform in pursuit of economic, social and political stability. Developing human capital played a major role in this growth.

Chapter 3: The HDI and consumer expenditure

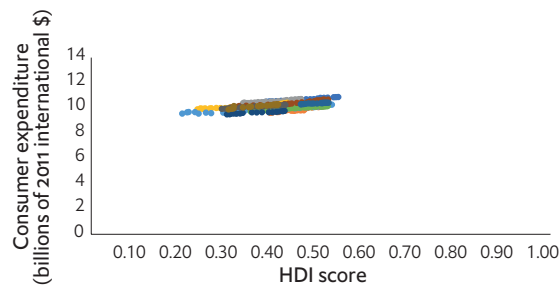
The EIU’s analysis found that consumption was strongly correlated with the HDI and its sub-indices across income groups, although these relationships were stronger in low-income countries and weaker in advanced economies.

United Arab Emirates was the only country that showed a negative correlation, and Bahamas (another high-income country) was the only country that showed no correlation.

During the literature review, The EIU looked at consumer expenditure and related variables such as household income and wages. In the absence of studies using the composite HDI indicator, it focused on studies that explored the relationships between these variables and health and education.

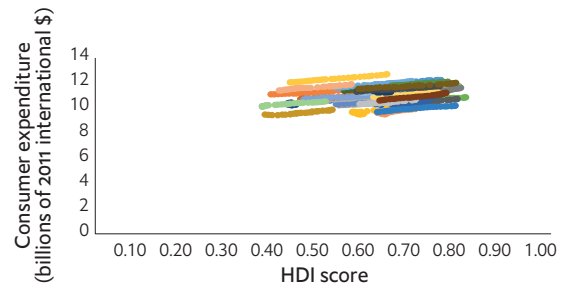
The studies reviewed by The EIU showed that stronger education leads to higher consumption expenditure and incomes. Kinh and Westbrook’s (2011) study showed that educational attainment (level of schooling) had an economically and statistically significant impact on household consumption

Figure 27: Correlation between HDI score and Log Consumer expenditure for low income countries



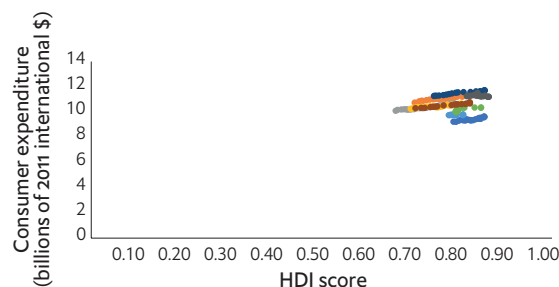
Range of Pearson’s r: 0.99 to 0.91

Figure 28: Correlation between HDI score and Log Consumer expenditure for middle income countries



Range of Pearson’s r: 1.00 to 0.57

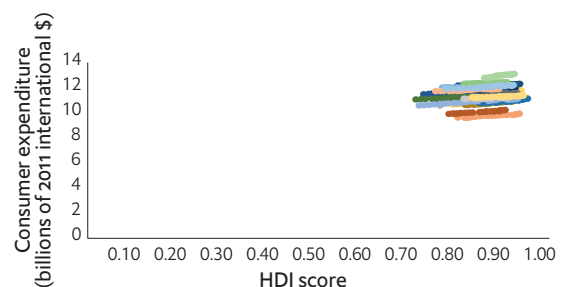
Figure 29: Correlation between HDI score and Log Consumer expenditure for high income countries



Range of Pearson’s r: 0.99 to -0.36

Source: The Economist Intelligence Unit

Figure 30: Correlation between HDI score and Log Consumer expenditure for advanced income countries



Range of Pearson’s r: 0.99 to 0.79

expenditure per capita. It also showed that this effect was mediated by increasing labour market activity, suggesting that education affects consumption expenditure through higher and more successful labour force participation and higher earnings. Diacona and Mahab (2015) found a close correlation between per-capita income and consumption, providing support for the argument that improved educational outcomes drive income growth and, in turn, consumption growth. This is unsurprising; as discussed previously, the evidence indicates that higher education levels increase both the level of GDP and its growth over time, and we would expect higher GDP to be associated with higher individual incomes. Literature demonstrating the impact of human development on wages further substantiates this. Psacharopoulos and Patrinos' (2018) review of 705 studies on returns from schooling showed a substantial (8.8%) return on investment in education in terms of lifetime earnings, while Schultz (1998) showed that increases in years of schooling were associated with higher wages.

Madrian and Currie (1999) reviewed 13 studies and showed that health and nutrition had a positive causal impact on wages, although the size of the impact varied depending on the indicator used. The EIU reviewed a further seven studies that reached a similar conclusion on the positive impact of health and nutrition on wages. Certain indicators, particularly body mass index (BMI), are measures of both health and nutrition, which can make it difficult to determine whether improved health or improved nutrition is driving the effect, especially as improved nutrition contributes to better health. As noted earlier, healthier and better nourished workers are in better physical condition and are therefore better equipped to attain peak performance, leading to higher productivity. According to microeconomic theory, employers compete for more productive workers so that they earn their marginal product, which means that healthier, more productive workers earn more.

Kinh and Westbrook (2012) focused on Vietnam during its transition to a market economy. They found that developing countries, in particular, see improving returns on education as their labour markets develop and improve their capability to match skills acquisition with job requirements.

Despite a dearth of studies looking at the HDI and per-capita consumer expenditure, the literature provides sufficient evidence at the macroeconomic level to show that improved health and education drive better wages, and that this increases consumer expenditure.

The explanation for this is again intuitive: gains in human development increase wages and incomes, which means that consumers can afford to spend more (Kinh & Westbrook, 2012). The broader literature demonstrates that consumers have a “marginal propensity to consume”—i.e. they will use a certain proportion of any additional income for additional consumption, and will therefore increase their consumption spending.

Case study: Human and economic development in post-Soviet Russia

The post-Soviet Russian economy has not experienced straightforward, uninterrupted growth. The 1990s were marked by a deep output contraction, resulting from structural and institutional distortions that accumulated during several decades of a centrally planned economy, macroeconomic disequilibria in the initial period of transition, and the slow pace of economic reform. The economy then experienced rapid growth between the late 1990s and early 2000s, further stimulated by soaring oil prices. However, the global financial crisis of 2008 hit the Russian economy hard, leading to a dramatic GDP decline of 7.8% in 2009 (Dabrowski, 2019). Although the economy recovered in the next three years, the country faced a currency crisis in 2014. This crisis caused a two-year recession, from which the economy continues to recover.

In 1991 Russia inherited two areas of comparative advantage from the former Soviet Union: the resource extraction sector and the human capital sector. Algieri (2006) argues that while the resource extraction sector has made great strides in the world market, the human capital sector has not kept pace with international standards, resulting in a decline in Russia's competitiveness in this area. In the early 1990s Russia had 200 university and college students per 10,000 population, similar to most developed countries. About 20% of workers had a university degree, and less than 3% had not graduated from high school. Economic turmoil in post-Soviet

Russia affected the education sector, however, with public expenditure on education declining by 55%. Expenditure on basic science was particularly affected, which has had serious implications for the high-tech sector, pushing research institutes and scientific centres into severe crisis due to underfunding (Algieri, 2006). More recent studies argue that high military spending in Russia has crowded out expenditure on public services such as education and healthcare, negatively contributing to potential economic growth (Kudrin & Sokolov, 2017).

Shkolnikov (2019) analysed the relationship between GDP per capita and life expectancy in Russia, in comparison with 61 countries. The study found that life expectancy in Russia did not necessarily increase with the national income, although there was an increase in health expenditure and general health standards. The study also found that the period of rapid growth in Russia, between 2005 and 2010, was accompanied by a gain of six additional years of life expectancy. However, the authors observed a deficit in life expectancy relative to countries with similar levels of GDP per capita.

Post-Soviet Russia placed natural resources at the centre of its economy. Algieri (2004) found that its rapid economic growth was fuelled primarily by energy exports, particularly by a boom in the country's oil production and relatively high oil prices. This suggests that human capital development did not play a key role in the country's growth. Although human capital currently accounts for the largest share of wealth in Russia (at 46%), it remains much lower than the OECD average of 70% (World Bank, 2019).

Chapter 4: The HDI and industrial development

The EIU reviewed a number of papers that suggest that gains in human development are correlated with and/or cause (depending on the study) improvements in industrial competitiveness and structural transformation towards industry and services. The literature also shows that human development—measured by the HDI—increases labour productivity, which one would expect to boost industrial development.

A number of studies have examined the relationship between human development and industrial development. These studies have found that human development has a significant positive impact on various indicators of industrial development, including growth in both manufacturing exports and industry and services' share of GDP. Human development is also associated with economic competitiveness and foreign direct investment. These studies all demonstrate a positive impact on the international competitiveness of industry. (An increase in exports or investment indicates greater firm competitiveness.) As noted previously, improvements in human capital development enhance labour productivity, enabling firms to produce better value goods at a given price, and increasing demand for their output. This boosts competitiveness, sales and profits, leading to greater investment.

Case study: Oil, growth and human development in Ecuador

Ecuador's early growth is usually attributed to oil revenues following the discovery of oil in 1967, which transformed the country into Latin America's second largest oil producer (McNeill & Engelke, 2016). It experienced another period of rapid growth after the commodities boom in 2003, only to suffer a crisis in 2014 when oil prices crashed. Its growth story is therefore a tumultuous one, with the only period of sustained growth occurring in the 1960s and 1970s; since then, growth has been cyclical at best (Gachet et al., 2011). The country's inability to sustain growth for extended periods is most commonly attributed to its dependency on oil, which renders the economy extremely sensitive to oil price volatility. However,

human capital development has also influenced Ecuador's growth trajectory in the long term.

Our analysis shows that the HDI and GDP (and GDP per capita) are extremely strongly correlated in Ecuador, with a Pearson's coefficient of 0.99 (0.96). The coefficient for the correlation between GDP growth and HDI growth is also relatively strong, at 0.69. These findings are confirmed by Rivera (2016), using cointegration and a vector correction model. Using cointegration, Rivera demonstrated that the HDI scores and GDP tracked each other closely over long periods of time, but that the effect was not visible in the short term. He suggests that policies that aim to improve human development (such as dramatic increases in the national budget for education since 2004) have paved the way for economic development.

The above analyses show a correlation but do not address the directionality of the relationship.

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Andrango (2016), however, demonstrates that there is a virtuous cycle between human development and growth, and that the effect of human development on growth is stronger than the effect in the opposite direction. She also shows that even though short-term changes in the growth rate match changing oil prices, human development is a much better predictor of growth trajectory in the long term. Suri et al. (2003) similarly observe that the impact of growth on human development in Ecuador is quite weak, suggesting that the close correlation is accounted for by the effect of human development on growth. However, Rivera (2016) conducted a Granger causality test that contradicted this result, suggesting that the effect of growth on human development (through expanded government exchequer spending on social services) accounts for the relationship.

While the directionality of the relationship remains contested in the literature, Jimenez and Alvarado (2018) provide compelling evidence that human development is driving the relationship. This study used the case of Ecuador to examine the relationship between human development and per-capita income at a sub-national level, analysing how level of schooling influenced a canton's per-capita income level. The authors used spatial econometric techniques to show that disparities in regional economic development were caused, at least in part, by human development. Using

gross value added as a proxy for income, their results suggest that differing levels of industrial development across Ecuador are driven by variations in human development levels. They also report that these effects are particularly strong in a middle-income economy like Ecuador because industrial development is weak and concentrated in particular regions, creating a vicious cycle of interregional disparity. Their findings corroborate our finding at the national level for sub-national units, opening new avenues for research and investigation.

Both oil revenues and human development have a role to play in Ecuador's growth story, albeit in different ways. Drawing on Suri et al.'s (2003, 2011) framework, the distinction between short-term and long-term effects can be understood as a distinction between the growth variable and a country's growth trajectory. While growth is often possible even at low levels of human development, a successful growth trajectory requires high levels of human development. In Ecuador's case, Andrango (2016) and Rivera (2016) show that when high growth rates are driven by growth in oil revenues in the short term, the effect disappears in the long term. However, there is a long-term convergence between human development and growth, suggesting that growth could not be sustained without investments in human development.

Conclusion

The EIU's analysis demonstrates that human development and economic development are closely correlated across countries in different income groups. The analysis also shows a strong correlation between the sub-indices of the HDI—mean and expected years of schooling, life expectancy at birth and GNI per capita—and economic growth. These findings are substantiated by the literature, which shows that human development plays a causal role in furthering economic growth and broader economic development (primarily using health and education indicators as proxies for human development to demonstrate this causality). In particular, the literature demonstrates that education has a strong causal impact on economic growth. While there is insufficient evidence that human development causes higher employment rates or consumption expenditure in an economy, the existing literature provides a compelling case that improved health and education enable individuals to consume more, although the effect on employment is more ambiguous.

The EIU's quantitative analysis found a strong correlation between human development and employment rates. While the existing literature does not demonstrate whether higher levels of human development cause higher employment at the macro level, evidence shows that improvements in human development at the individual household level lead to better employment prospects, higher wages and increased consumer expenditure for household members. The literature also shows that higher levels of human development correlate with industrial competitiveness and structural transformation towards industry and services; and that human development has a positive impact on labour productivity, which can be expected to boost industrial development.

This report identifies useful avenues for further research on the impact of human development on economic development, and on the magnitude of that impact. It also demonstrates that human development is important for economic growth and should be prioritised as a development goal by policymakers.

Footnotes

¹ Valued annually in US dollars using a three-year average exchange rate. See: <http://documents.worldbank.org/curated/en/408581467988942234/pdf/WPS7528.pdf>

² A full list of countries can be found in the annexure.

³ This “Special Drawing Rights (SDR) deflator” is calculated as a weighted average of the GDP deflators of China, Japan, the United Kingdom, the United States and the Euro area (the currencies currently used in the SDR).

⁴ <https://ojs.uniroma1.it/index.php/PSLQuarterlyReview/article/view/13886>

⁵ <https://www.imf.org/external/pubs/ft/wp/2011/wp1131.pdf>

⁶ <https://stats.unctad.org/handbook/Annexes/Classifications.html>

⁷ Six countries showed a negative correlation between the HDI and GDP per capita.

⁸ All of these economies (with the exception of Burundi) are or have been dependent on oil or, in the case of Bahamas, tourism. This means that their economic success is highly dependent on demand from world markets, and, for the oil-dependent countries, the price of oil. This causes a high degree of economic volatility that is not driven by changes in human development. As explained in the Nigeria case study later in the report, this volatility can weaken the correlation between growth and human development in these countries. These countries are all high-income countries (with the exception of Gabon and Burundi) that may be able to maintain investment in human development even when facing an economic downturn.

⁹ The weaker correlation between the HDI and GDP growth among European countries, compared with Korea, Luxembourg and Singapore, appears to be explained by the fact that European countries generally experienced slow and steady improvements in HDI scores over this period (even though economic growth was more variable), while Korea, Luxembourg and Singapore experienced variability in both HDI improvements and economic growth, which tended to track one another. In the case of Korea, this may be because the country was still developing at the beginning of the data collection period (1990), meaning that increases in individual incomes played a greater role in the country’s human development than in Europe, and that episodes of recession were more disruptive to human development than in Europe. In the case of Singapore, the state provided less of a social safety net than many European countries (even with a high level of development), which meant that human development was not as “protected” from the economic cycle, leading to stronger correlation. In the case of Japan, the stronger correlation appears to be due to the fact that both GDP and human development showed slow and steady improvements over time, leading to stronger correlation than in Europe (where growth was more variable).

¹⁰ Suri et al. (2011) suggest that initial human development levels have a stronger effect on growth trajectories than changes in human development levels.

¹¹ Improvements in nutrition also contribute to the positive relationship between health and GDP, because better nutrition contributes to both growth and GDP. This is explored later in this chapter.

¹² GNI is equal to GDP plus primary income from abroad (employees’ compensation plus property income) minus payment of primary income to other countries.

¹³ The academic literature—for example, Ranis (2004) and Sen (1999)—supports this explanation for this correlation.

¹⁴ It may be easier to discern the effects of higher GDP on human development in this context because (to the extent that higher GDP increases human development) one would expect human development to improve following increases in oil prices, making the impact of GDP on human development easier to discern from data. However, the impact of human development on GDP tends to be hidden by the variability introduced by oil price fluctuations.

¹⁵ With more workers, output would increase, assuming a given level of output per worker. Larger countries also tend to grow faster, other things being equal, perhaps due to a larger internal market (Sachs, 2006).

¹⁶ Population growth rates could be negatively correlated with human development, as richer countries tend to have both higher human development and lower population growth rates. Increased female education tends to decrease fertility rates.

¹⁷ The weak correlation between life expectancy and GDP in Greece is due to the fact that the country experienced a large recession following the global financial crisis of 2008 and subsequent sovereign debt crisis. However, life expectancy continued to grow steadily throughout the study period (1990 onwards). This reflects the fact that Greece's recession was not due to low levels of human development, but rather to external factors and unsustainable national debt. Due to the country's high income level, the recession did not lower life expectancy, as the country did not face factors such as famine or drought, nor did medical services become unaffordable.

¹⁸ The study defines basic literacy as a score of 400 on the Programme for International Student Assessment (PISA) scale, which is one standard deviation below the OECD mean. "Top performing" is defined as a score of 600 or above on the PISA scale, which is one standard deviation above the OECD mean.

¹⁹ For example, see Abbas and Nasir (2001); Aghion, Boustan, Hoxby and Vandenbussche (2009); Asteriou and Agiomirgianakis (2001); Blankenau and Simpson (2004); Narayana and Kei-Mu (1997); Sequiera and Martins (2007); and Tallman and Wang (1994).

²⁰ One study (Sharma, 2017) suggests that when we control for other factors, the effect of HDI scores on employment disappears. Another study (Samiullah, 2014) suggests that human development indicators positively impact employment, but the methodology is somewhat weak.

²¹ The authors argue that the effect of health indicators on participation is "mediated by social institutions". For instance, they suggest that stigma associated with disability and discrimination based on body type are partially responsible for the impact of these health indicators.

References

- Abbas, Qaisar, and Zafar Mueen Nasir. "Endogenous growth and human capital: A comparative study of Pakistan and Sri Lanka [with comments]." *The Pakistan Development Review* (2001): 987-1007.
- Aghion, Philippe, Leah Boustan, Caroline Hoxby, and Jerome Vandenbussche. "The causal impact of education on economic growth: evidence from US." *Brookings papers on economic activity* 1 (2009): 1-73.
- Algeri, Bernardina. "Human capital in Russia." *The European Journal of Comparative Economics* (2006).
- Algeri, Bernardina. "The effects of the Dutch Disease in Russia". *ZEF Discussion Papers on Development Policy* (2004).
- Andrango Brito, Johanna. "Social progress, democracy, and economic growth a case study of Ecuador." Thesis, Quito: Universidad San Francisco de Quito (USFQ), 2016.
- Asteriou, Dimitrios, and G. Myron Agiomirgianakis. "Human capital and economic growth: time series evidence from Greece." *Journal of Policy Modeling* 23, no. 5 (2001): 481-489.
- Banerjee, Abhijit V., and Esther Duflo. *Poor economics: A radical rethinking of the way to fight global poverty*. Public Affairs, 2011.
- Blankenau, William F., and Nicole B. Simpson. "Public education expenditures and growth." *Journal of development economics* 73, no. 2 (2004): 583-605.
- Bloom, David E., David Canning and Jaypee Sevilla. "The Effect of Health on Economic Growth: A Production Function Approach." *World Development*, (2004).
- Bloom, David, David Canning, and Pia N. Malaney. "Demographic change and economic growth in Asia." *CID Working Paper Series* (1999).
- Chikalipah, Sydney, and Godwin Okafor. "Dynamic linkage between Economic growth and human development: time series evidence from Nigeria." *Journal of International Development* 31.1 (2019).
- Chou, Yiing-Jenq, and Douglas Staiger. "Health insurance and female labor supply in Taiwan." *Journal of Health Economics* (2001).
- Currie, Janet, and Brigitte C. Madrian. "Health, health insurance and the labor market." *Handbook of labor economics* (1999).
- Dabrowski, Marek and Antoine Mathieu Collin. "Russia's growth problem". Policy Contribution (2019)
- Deaton, Angus, and Jean Dreze. "Food and Nutrition in India: Facts and Findings." *Economic & Political Weekly*, (2009).
- Deb Surajit, "Gap between GDP and HDI: Are the Rich Country Experiences Different from the Poor?", *International Association for Research in Income and Wealth* (2015)
- Diacon, Paula-Elena, and Liviu-George Maha. "The Relationship between Income, Consumption and GDP: A Time Series, Cross-Country Analysis." *Procedia Economics and Finance* (2015)
- Fogel, Robert W. *Economic growth, population theory, and physiology: the bearing of long-term processes on the making of economic policy*. No. w4638. National Bureau of Economic Research, 1994.
- Gachet, I. Maldonado, D. "Stylized Facts of the Ecuadorian economy: The Economic Circle 1965-2008". *Centro de Estudios Fiscales* (2011).

- Gebrehiwot, Kidanemariam Gidey. "The Impact of Human Capital Development on Economic Growth in Ethiopia: Evidence from ARDL Approach to Co-Integration." *Bahir Dar Journal of Education* (2016).
- Hanushek, Eric A. "Economic growth in developing countries: The role of human capital." *Economics of Education Review* (2013).
- Jiménez, Silvana and Alvarado, Rafael. "Sectorial Specialization, human capital and regional income in Ecuador". *Revista de Estudios Regionales*; Cadiz Iss. 111, (Jan-Apr 2018): 99-128.
- Kinh, Hoang Van, and Daniel Westbrook. "Labor market transition and the impact of education on real per capita household consumption expenditure in Vietnam: 1993–2004." *Journal of Macromarketing*. (2012).
- Kocherlakota, Narayana R., and Kei-Mu Yi. "Is There Endogenous Long-Run Growth? Evidence from the United States and the United Kingdom." *Journal of Money, Credit and Banking* 29, no. 2 (1997).
- Kudrin, A. and I. Sokolov. "Fiscal maneuver and restructuring of the Russian economy", *Russian Journal of Economics* (2017).
- Lee, Jong-Wha and Kiseok Hong. "ADB Economics Working Paper Series No. 220 Economic Growth in Asia: Determinants and Prospects". *Asian Development Bank*, Manila (2010).
- McMahon, Walter W. "Education and growth in East Asia." *Economics of Education Review* (1998).
- McNeill, J. R. and Peter Engelke. *The Great Acceleration: An Environmental History of the Anthropocene since 1945*. Cambridge, MA: Belknap Press of Harvard University Press, 2016. Pp. 288
- Mustafa, Ghulam, Marian Rizov, and David Kernohan. "Growth, human development, and trade: The Asian experience." *Economic Modelling* (2017): 93-101.
- Netsanet Walegn; Human Resource Development and Economic Growth in Ethiopia, Msc. Thesis, School of Graduate Studies, A.A.U (1997)
- Pervaiz, Zahid and Chani, Muhammad Irfan and Jan, Sajjad Ahmad and Chaudhary, Amatul R. "Gender inequality and economic growth: a time series analysis for Pakistan." *Middle-East Journal of Scientific Research*, Vol. 10, No. 4 (2011): pp. 434-439
- Psacharopoulos, George, and Harry Anthony Patrinos. "Returns to investment in education." (2018).
- Qian, Joe. "Should South Asia Emulate the East Asian Tigers?" *The World Bank*, 2010.
- Ramesh, R., & Abebe, A. "Has Economic Growth Contributed to Human Development in Ethiopia?" *Journal of Asian and African Studies* (2016).
- Ranis, Gustav. "The Evolution of Development Thinking: Theory and Policy, Center Discussion Paper, No. 886", Yale University, *Economic Growth Center*, New Haven, CT (2004).
- Rivera, Manuel A. "The synergies between human development, economic growth, and tourism within a developing country: An empirical model for Ecuador." *Journal of destination marketing & management* 6.3 (2017).
- Rodrik, Dani. "Getting Globalization Right: The East Asian Tigers". *OECD* (2012)
- Sachs, Jeffrey D. *The end of poverty: Economic possibilities for our time*. Penguin, 2006.
- Schultz, T. Paul. "Productive benefits of health: Evidence from low-income countries." *Health and Economic Growth: Findings and Policy Implications*. MIT Press, Cambridge MA (2005).

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HOW HEALTH, EDUCATION AND INCOME CAN DRIVE ECONOMIC PROSPERITY

- Seid Nuru. The Determinants of Economic Growth in Ethiopia, Msc. Thesis, School of Graduate Studies, A.A.U (2000).
- Sen, Amartya. "Development as freedom" *Anchor Books, New York* (1999).
- Sequeira, T.N., Martins, E.V. Education public financing and economic growth: an endogenous growth model versus evidence. *Empir Econ* 35, 361–377 (2008).
- Sharma, Anand. "Dynamic externalities and regional manufacturing growth: Evidence from India." *Studies in Business and Economics* (2017).
- Shkolnikov, V. M., Andreev, E. M., Tursun-Zade, R., & Leon, D. A. "Patterns in the relationship between life expectancy and gross domestic product in Russia in 2005–15: a cross-sectional analysis." *The Lancet Public Health* (2019).
- Strauss, John, and Duncan Thomas. *Health and labour productivity: sorting out the relationships*.1995.
- In G. H. Peters and D. D. Hedley, eds., *Agricultural Competitiveness:Market Forces and Policy Choice: Proceedings of the Twenty-Second International Conference of Agricultural Economists*. International Association of Agricultural Economists Series. Aldershot, U.K.: Dartmouth, 1995
- Suri, Tavneet, Ranis, Gustav, Michael A. Boozer and Frances Stewart, "Paths to Success: The Relationship Between Human Development and Economic Growth", *World Development*, Volume 39, Issue 4, 2011, Pages 506-522.
- Sušnik, Janez, and Pieter van der Zaag. "Correlation and causation between the UN Human Development Index and national and personal wealth and resource exploitation." *Economic research-Ekonomska istraživanja* (2017).
- Tallman, Ellis W., and Ping Wang. "Human capital and endogenous growth evidence from Taiwan." *Journal of Monetary Economics* 34, no. 1 (1994): 101-124.
- The Economist. "Tigers adrift: Special Report." *The Economist*, 5 Mar 1998.
- The World Bank. "Weaker global outlook sharpens focus on domestic reforms".The World Bank (2019)
- UNDP. "Ethiopia offers a good example of fast growth, rapid poverty reduction and stable inequality". UNDP (2013)
- United Nations Economic Commission for Africa. "Structural transformation, employment, production and society (STEPS) profile – Ethiopia" (2018)

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