COMPREHENSIVE
WEALTH REPORT

Indonesia

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International Institute for Sustainable Development

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Acknowledgements

Dedication

The authors dedicate this report to the memory of Kirk E. Hamilton, whose untimely passing on February 6, 2024, left the world without one of its pioneers in the conceptual and practical development of comprehensive wealth accounts. Hamilton authored or co-authored many of the seminal works in the field and devoted much of his professional career to establishing the Changing Wealth of Nations program at the World Bank. His sharp insights, lucid writing, and careful analysis have, fittingly, created a rich endowment to draw upon. It is up to those who remain to build on this and ensure that comprehensive wealth accounting features prominently in the measurement of progress beyond GDP.

Executive Summary

Ensuring national prosperity requires a shift in thinking from the short term to the long term. This shift must be supported by the right tools to allow policy-makers to make decisions that benefit future generations as much as the current ones. For decades, policy making has focused on growth in gross domestic product (GDP). A growing GDP has been the main standard for deciding how well countries are doing. If GDP is growing, policy is deemed effective, and governments are applauded. If GDP is declining or sluggish, calls will be made for government strategies to be revisited. Yet GDP is a short-term indicator that captures only what is happening in the market economy, ignoring the costs of economic activities on nature, society, and the well-being of future generations. Measuring progress with tools that go beyond short-term indicators such as GDP is therefore essential for assessing the nation's future well-being and sustainability. Here, we discuss how a measure known as comprehensive wealth can serve as an important counterpoint to GDP. We show that it is possible to measure comprehensive wealth for Indonesia and illustrate how it reveals aspects of Indonesia's development that are invisible through the lens of GDP.

Comprehensive wealth comprises five types of assets: produced capital, human capital, natural capital, financial capital, and social capital. Measuring the size of this portfolio provides a fuller understanding of Indonesia's development achievements and prospects, reflecting the diverse assets that contribute to its economic and social well-being.

Our study reveals that over the past 25 years, Indonesia's Comprehensive Wealth Index (CWI)—the inflation-adjusted (real) per capita value[1] of its comprehensive wealth portfolio[2]— nearly tripled, increasing from IDR 404.3 million (USD 86,100) in 1995 to IDR 1.13 million (USD 240,750) in 2020 (Figure ES1). This corresponds to an average annual growth rate of 4.3%. Most of this growth came from increases in the value of Indonesia's human and produced capital, which grew at average annual rates of 4.4% and 5.0%, respectively. Market natural capital,[3] in contrast, hardly grew over the period. Financial capital, for its part, was also flat over the period and (since Indonesia is a net debtor country) was a drag on overall wealth.

In contrast to the CWI's 4.3% annual average growth over the period, Indonesia's GDP grew considerably more slowly. In real per capita terms, Indonesia's GDP grew from IDR 27.5 million (USD 5,860) to IDR 54.1 million (USD 11,500), for an average annual growth rate of just 2.8%. The relatively slow growth of Indonesia's real per capita GDP compared with its CWI suggests that the country is not benefiting as much from its increased wealth as it should. Indeed, in 1995, Indonesia created IDR 68,000 of real GDP for every IDR 1 million in real

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[1] All figures in 2017 prices.

[2] Note that CWI includes only those assets we could place a monetary value on. This model excludes social capital and those forms of natural capital that provide unpriced benefits, such as the climate system. These other forms of capital were also evaluated in the study, but in non-monetary terms.

[3] Market natural capital comprises agricultural land, fossil fuels, minerals, timber, and fisheries (including aquaculture).

wealth (a rate of return on wealth of 6.8%), but this figure had fallen to IDR 47,800 by 2020 (a rate of return of 4.8%).

Assessing the reasons for Indonesia not fully realizing the benefits of the growth in its wealth is beyond the scope of this study. The main benefit of our results is to make this finding apparent, which is possible only when comprehensive wealth accounts are compiled for the country. By showing that Indonesia is not fully benefiting from the growth in its wealth, we provide a window into the possibilities for the country if it were to better manage its assets. Had Indonesia simply maintained the rate of return on the wealth it enjoyed in 1995, it would have earned 42% more income in 2020 than it did. That additional income would have been sufficient to push Indonesia solidly into the World Bank's class of upper-middle-income nations, placing the country closer to achieving its goal of high-income status by 2045.

Figure ES1. Comprehensive wealth in Indonesia, 1995–2020
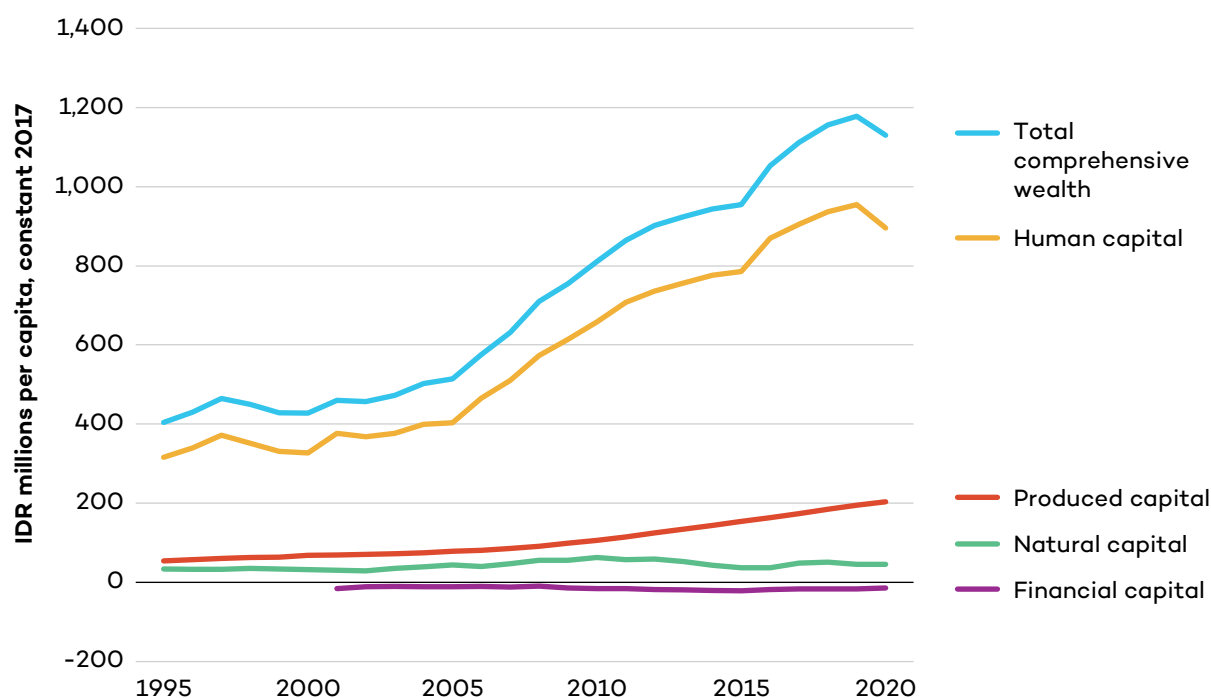
Source: Authors' calculations based on data from BPS-Statistics Indonesia, Bank Indonesia, Ministry of Agriculture, Ministry of Environment and Forestry, Food and Agriculture Organization of the United Nations, World Bank Data Bank, and U.S. Geological Survey.

Although we were not able to fully investigate the reasons for Indonesia's income shortfall, evidence suggests that one concern is the failure of the country to realize the full potential of its natural resource wealth. Based on data from the World Bank and the Food and Agriculture Organization of the United Nations, we find that Indonesia is less successful, for example, in creating wealth from its timber harvesting than other countries. Though Indonesia ranks among the top producers of timber, fish, coal, natural gas, oil, nickel, gold, tin, and copper, it ranked only 14th in terms of aggregate natural resource wealth and 79th in per capita terms in 2018. Brazilians enjoyed almost twice as much natural capital per capita as Indonesians in that

year. Chinese citizens enjoyed nearly six times as much. Malaysia generated six times more wealth for every tree harvested.

These results suggest that Indonesia is "leaving money on the table" by not managing its natural resources as effectively as it might. The extra income it could earn by doing better could help it escape the middle-income trap. Development can be seen as a process of wealth management. Some countries do better at this than others. Those that do, enjoy higher standards of living off the same wealth base. Indonesia could be one of those countries, but currently, it is not. Regularly compiling and using comprehensive wealth accounts to guide policy making would be a wise step in that direction.

Table of Contents

List of Figures

List of Tables

1.0 Introduction

Indonesia, as a nation, is striving to balance economic growth with environmental protection and social development. The primary focus of government policies at all levels remains on improving quality of life. The key indicators commonly used to assess national progress in Indonesia, much like in other nations, tend to concentrate on short-term objectives. However, these indicators, especially gross domestic product (GDP), fail to account for critical issues such as resource depletion, environmental degradation, and social inequalities. While GDP is valuable for assessing short-term conditions in terms of monetary income, it is inadequate for assessing the well-being of future generations (or even that of the current generation in many ways).

Assessing the nation's future well-being and its sustainability requires more than simply relying on short-term indicators. The key to long-term progress lies in the concept of wealth, specifically comprehensive wealth. Comprehensive wealth encompasses five types of assets:

- **produced capital**, which includes buildings, roads, railways, airports, houses, machinery, and other manufactured assets;
- **natural capital**, which includes the wealth derived from natural resources, such as forests, minerals, land, and the overall natural environment;
- **human capital**, which encompasses the wealth embedded in the skills and knowledge of the workforce as a crucial element for the nation's development;
- **social capital**, which is derived from civic engagement, trust, and cooperation among the population; and
- **financial capital**, which includes direct investment, bank deposits, stocks, bonds, and other forms of financial assets and liabilities.

These five components together form the comprehensive wealth portfolio. They serve as the foundation for the production of most of the goods and services that contribute to individual and national well-being. This includes essentials like food, energy, and health care, as well as intangibles like clean air, thriving forests, and safe communities. Consumption of these goods and services significantly contributes to individual and national well-being, underscoring the critical importance of comprehensive wealth.

While comprehensive wealth measurement has yet to be fully embraced by nations worldwide, there is growing recognition, including by the UN Secretary-General (United Nations, 2023), of its significance as an alternative to GDP in assessing progress and sustainability. We believe integrating comprehensive wealth measurement into Indonesia's progress assessment is a critical step toward securing long-term prosperity and well-being for the country (and, indeed, for all countries).

In this report, we illustrate the insights to be gained by incorporating comprehensive wealth into Indonesia's progress assessment. By shedding light on trends that are often obscured by GDP and other conventional indicators, we show how measuring comprehensive wealth provides a more holistic understanding of national prosperity—one that prioritizes broader well-being for current and future generations over short-term economic growth. As Indonesia navigates the complexities of the 21st century, adopting comprehensive wealth measurement will be vital for guiding policy decisions and securing the nation's long-term sustainability and well-being.

2.0 Key Findings

2.1 Indonesia's Comprehensive Wealth Index

The Comprehensive Wealth Index (CWI) measures the real (inflation-adjusted) per capita value of Indonesia's aggregate produced, human, natural and financial capital.[4] CWI grew 2.8 times over the 25 years covering the period 1995 to 2020.[5] As presented in Figure 1, in 1995, the CWI amounted to IDR 404.3 million (USD 86,100 per Indonesian). By 2020, this figure had grown to IDR 1,130 million (USD 240,750) per Indonesian, indicating an average annual growth rate of 4.3%.

Figure 1. Comprehensive wealth per capita, Indonesia, 1995–2020
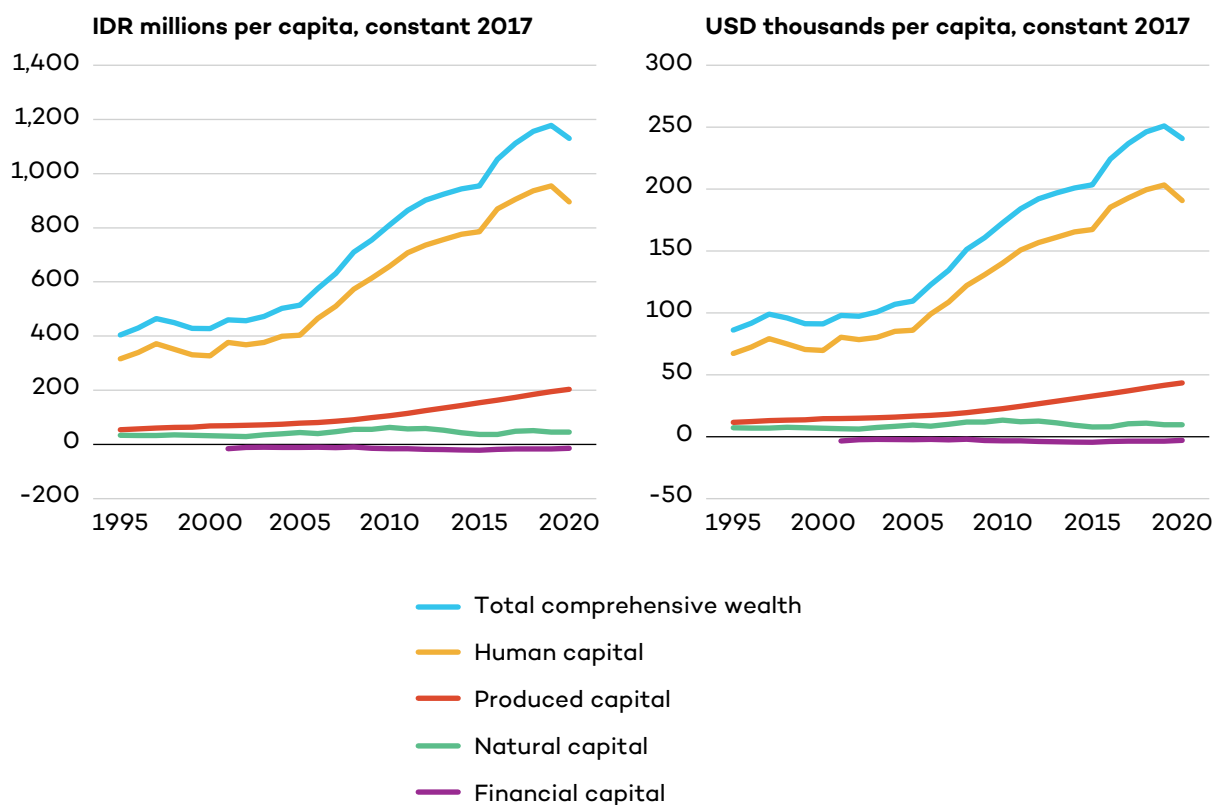
Source: Authors' calculations based on data from BPS-Statistics Indonesia, Bank Indonesia, Ministry of Agriculture, Ministry of Environment and Forestry, Food and Agriculture Organization of the United Nations (FAO), World Bank Data Bank, and U.S. Geological Survey.

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[4] For the CWI methodology, see World Bank (2021) and International Institute for Sustainable Development (2016, 2018).

[5] The period used for the estimation of the CWI was limited to 1995–2020, since human capital, the largest asset that contributes to more than 50% of CWI, could not be estimated prior to 1995 due to a lack of data. Produced capital and natural capital, on the other hand, covered the period 1990–2020, while financial capital was estimated for 2001–2020. Thus, financial capital was omitted in the CWI estimate for the period 1995–2000. This exclusion does not significantly skew the overall results, given that financial capital contributes about 2% to total wealth.

Breaking down the components of the CWI, the **Produced Capital Index** (PCI)[6] showed steady annual growth of 5.3%, increasing from IDR 43.5 million (USD 9,260) per capita in 1990 to IDR 203.7 million (USD 43,380) per capita in 2020, for a total increase of 369%. While growing substantially over the period, Indonesia's investments in produced capital are concentrated in buildings, which accounted for approximately 74% of produced capital in 2020. Machinery and equipment contributed just 10% of produced capital in 2020, raising concerns, given their importance in the production of other economic outputs.

The **Human Capital Index** (HCI), representing the most substantial portion of Indonesia's assets, grew substantially over the period.[7] The average Indonesian experienced an increase in real human capital from IDR 315.8 million (USD 67,260) in 1995 to IDR 895.4 million (USD 190,690) in 2020. The trend in the HCI was generally upward, except for a notable dip from 1997 to 2000. This exception is largely attributed to the economic crisis of the 1990s (Nasution, 2000), which had a profound impact on the value and distribution of labour across various sectors of the economy. During the crisis, there was a shift in labour from higher value-added sectors, such as manufacturing, to those that were less so, like agriculture. The decline of the HCI between 2019 and 2020 was likely due to the global COVID-19 pandemic.

The **Market Natural Capital Index** (MNCI) demonstrated a slight increase in real per capita terms during the 1990–2020 period, despite experiencing fluctuations.[8] The real per capita value of Indonesia's market natural capital increased from IDR 29.9 million (USD 6,380) in 1990 to IDR 45.4 million (USD 9,650) in 2020, a total increase of 51.4% and an average annual increase of 2.2%. The composition of renewable and non-renewable resources in the MNCI shifted over time. Renewable resources dominated the index in 1990 but declined with the rise of non-renewables during the commodity boom of the 2010s. The decline in fossil fuel value after 2010 led to a drop in non-renewables' share, which rebounded in 2016 as fossil fuel value recovered and agriculture value declined.

Our analysis also considered **non-market natural capital**, which was evaluated in non-monetary terms. During that period, Indonesia experienced an erosion in biodiversity and the associated ecosystems. However, there has been some progress in slowing the degradation rate over the past decade. Like many parts of the world, Indonesia is witnessing the effects of climate change, which is evident in rising average temperatures. Precipitation in Indonesia has also increased, albeit more moderately. The adverse effects of these climate changes could impact other capital stocks; for instance, increased precipitation may lead to floods, diminishing the value of physical capital, while rising sea temperatures could result in coral bleaching, adversely affecting Indonesia's biodiversity.

The **Financial Capital Index** (FCI), which is measured by Indonesia's International Investment Position (IIP), was consistently negative over the study period, indicating that the value of financial assets owned by foreigners in Indonesia was consistently higher than the foreign financial assets owned by Indonesians.[9] The changes in the FCI over time were minor,

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[6] See Appendix A for the PCI methodology.

[7] See Appendix B for the HCI methodology and data sources.

[8] See Appendix C for the MNCI methodology.

[9] See Appendix D for the FCI methodology.

fluctuating from negative IDR 16 million (or negative USD 3,420) to negative IDR 14 million (or negative USD 2,970). On average, financial assets represented around 40% of financial liabilities. A higher value of liabilities is not necessarily detrimental to the nation's long-term well-being, so long as the country's foreign debt is effectively managed to create positive economic spillovers and help Indonesia escape the middle-income trap.

Social capital appears to be high in Indonesia based on indices related to participation, trust, and tolerance, even though there have been mixed results for these indicators.[10] While formal political engagement, like party membership or voting, has decreased, there is an increasing trend in participation in group and communal activities. Trust in others has slightly declined but remains high, as evidenced by people's willingness to seek help from their neighbours. In terms of tolerance, data from various sources suggest that Indonesians are becoming more accepting of coexisting with individuals from diverse ethnic and religious backgrounds.

2.2 Comprehensive Wealth Compared to GDP

In contrast to the CWI's 4.3% annual average growth over the period, Indonesia's GDP grew considerably more slowly. In real per capita terms, Indonesian GDP grew from IDR 27.5 million (USD 5,860) to IDR 54.1 million (USD 11,500), for an average annual growth rate of just 2.8% (Figure 2).

The relatively slow growth of Indonesia's real per capita GDP compared with its CWI suggests that the country is not benefiting as much from its increased wealth as it should. GDP can be thought of as the return on a country's investment in its comprehensive wealth portfolio. As wealth increases, GDP should increase along with it at the same rate, or possibly even faster.[11] This is not what we observe in Indonesia, however. In 1995, Indonesia created IDR 68,000 of real GDP for every IDR 1 million in real wealth (a rate of return on wealth of 6.8%). By 2020, this figure had fallen to IDR 47,800 by 2020 (a rate of return of 4.8%). For some reason, Indonesia has become less effective at turning wealth into income as time has gone by.

Assessing why Indonesia has not fully realized the benefits of the growth in its wealth is beyond the scope of this study. The main benefit of our results is in making this finding apparent, which is possible only when comprehensive wealth accounts are compiled for the country. Until now, no estimates of human capital have been compiled for Indonesia. Badan Pusat Statistik BPS-Statistics Indonesia (2019a) has only recently begun compiling produced capital and natural capital figures. Its figures are not complete and do not extend back as far in time as those in this study. Still, they represent an excellent step in the right direction for BPS-Statistics Indonesia, and it should pursue and expand this work.

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[10] See Appendix E for the social capital methodology.

[11] Income can increase faster than wealth because increasing wealth can have spillover effects known as productivity gains. The more comprehensively wealth is measured, the less such spillover effects should emerge since productivity gains are measured as the increase in GDP, which is not explained by increases in wealth. When wealth is incompletely measured, productivity can emerge simply because the input of some unmeasured component of wealth has increased.

By showing here that Indonesia is not fully benefiting from the growth in its wealth, we provide a window into the possibilities for the country if it were to better manage its assets. Had Indonesia simply maintained the rate of return on its wealth that it enjoyed in 1995, it would have earned 42% more income in 2020 than it did. That additional income would have been sufficient to push the country out of its chronic lower-middle-income status and into the group of countries considered to be upper-middle-income by the World Bank, placing the country closer to achieving its goal of high-income status by 2045 (Ministry of National Development Planning/Bappenas, 2019).[12] Realizing this extra income in the future is still possible, but it will require, among others, a new approach to natural resource management. It requires an approach that ensures Indonesia's resources are preserved for future generations and, at the same time, better capitalizes on the economic benefits of using those resources today. Other countries already do this. Based on data from the World Bank (2021) and FAO (2024), we find that Malaysia creates about six times as much wealth for every tree harvested as Indonesia. As the world's fourth-biggest hardwood timber producer and steward of much of the world's tropical forests, Indonesia cannot afford to "leave money on the table" like this.

Though Indonesia ranks among the top producers of timber, fish, coal, natural gas, oil, nickel, gold, tin, and copper, it ranked only 14th in terms of aggregate natural resource wealth and 79th in per capita terms in 2018, according to the World Bank (2021). Brazilians enjoyed almost twice as much natural capital per capita as Indonesians in that year. Chinese citizens enjoyed nearly six times as much.

There is too much at stake for Indonesia not to do a better job managing its natural wealth. For Indonesians, it is a question of escaping, or not, from the middle-income trap.[13] For the rest of the world, it is a question of whether future generations will only know about the wondrous diversity of Indonesia's natural environment through pictures of the past (Brodjonegoro & Smith, 2023).

Development can be seen as a process of wealth management. Some countries are better at this than others. Those that are, enjoy higher standards of living off the same wealth base. Indonesia could be one of those countries, but currently, it is not. Regularly compiling and using comprehensive wealth accounts to guide policy making would be a wise step in that direction. The extra income it could earn by doing better could help it escape the middle-income trap, an outcome that would be more than worth the investment in additional statistical effort.

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[12] The World Bank judges countries' income status on the basis of gross national income (GNI) per capita measured in nominal U.S. dollars converted at market exchange rates (GNI is a measure similar to GDP but accounting for Indonesian income earned abroad). In 2020, Indonesia's GNI per capita by this measure was USD 3,900, which placed it just below the World Bank's threshold of upper-middle-income status for that year (USD 4,096). Had Indonesia maintained its 1995 return on wealth in 2020, its GNI per capita in that year would have been closer to USD 5,500. The World Bank's threshold for consideration as a high-income country in 2020 was USD 12,695, so Indonesia would have been closer to its goal but still a good distance from reaching it.

[13] The middle-income trap is a development scenario where countries that have reached middle-income status due to rapid economic growth fail to take the further steps necessary to achieve high-income status.

2.3 Components of Comprehensive Wealth

2.3.1 Produced Capital

Produced capital is vital for Indonesia. The largest archipelagic state in the world, Indonesia is made up of over 18,000 islands and islets. Roads, ports, and airports help to connect cities and islands, reducing the impacts of natural disasters to which the country is prone, among other benefits. Today, the infrastructure gap remains one of the highest priorities in Indonesia. According to the IMF, the gap remains large compared to peer countries (such as Vietnam, Thailand, Malaysia, and India) (Curristine et al., 2018). The gap is most pronounced in transportation and power, meaning the national road network is poor, leading to weak connectivity among islands. Measuring produced capital will, therefore, help policy-makers to better monitor the country's progress in closing this crucial gap.

Measuring Produced Capital

The PCI is assessed by calculating the aggregate value of real fixed capital and per capita fixed capital owned by households, businesses, and governments. It includes residential and non-residential buildings, machinery, equipment, vehicles, and others. The evolution of the PCI was assessed by type of asset and across sectors of the economy. The index was obtained by accumulating the nominal value of investments in these assets as measured by Gross Fixed Capital Formation (GFCF) from the national accounts and accounting for their depreciation over time. Deflation to real terms was accomplished by applying the Consumer Price Index to the nominal values. The real values were converted to per capita terms by dividing by population. Estimated on an annual basis for 1990–2020, the PCI is measured in 2017 local currency units (IDR) and 2017 USD. Appendix A details the estimation method.

Results

The average annual growth of the PCI stood at 5.3% from 1990 to 2020, as shown in Figure 2. Its value tripled, rising from IDR 43.6 million (USD 9,260) in 1990 to IDR 203.7 million (USD 43,380) in 2020. Several major events affected the accumulation of produced capital. The rate of investment in fixed assets rose rapidly in the early 1990s, followed by a decline caused by the Asian financial crisis in 1997–1998. The crisis had a significant impact on the accumulation of produced capital, leading to a decrease in annual growth from 6% in 1997 to 1% in 1999. In 2020, the produced capital accumulation was also affected by the COVID-19 pandemic, with GFCF declining by 6% (see Appendix Table A1).

The growth of the PCI was driven by an average GFCF contribution of 31% to GDP (Figure 3). Comparing this with other developing and emerging countries (Brazil, China, India, South Africa, and Thailand), Indonesia's average GFCF as a percentage of GDP has been consistently higher in all countries except India and China since the 1998 Asian crisis. The share of GFCF in Indonesia's GDP reached a high of 37% in 1997 but hit a low of 23% in 1999 after the Asian financial crisis. It was not until the end of the study period that it recovered to the levels seen before the financial crisis. Over time, there has been a decline in the proportion of imports used as intermediate inputs in Indonesia's GFCF (Figure 4), marking increasing self-reliance in the country's industries.

Figure 2. Produced capital per capita, Indonesia, 1990–2020
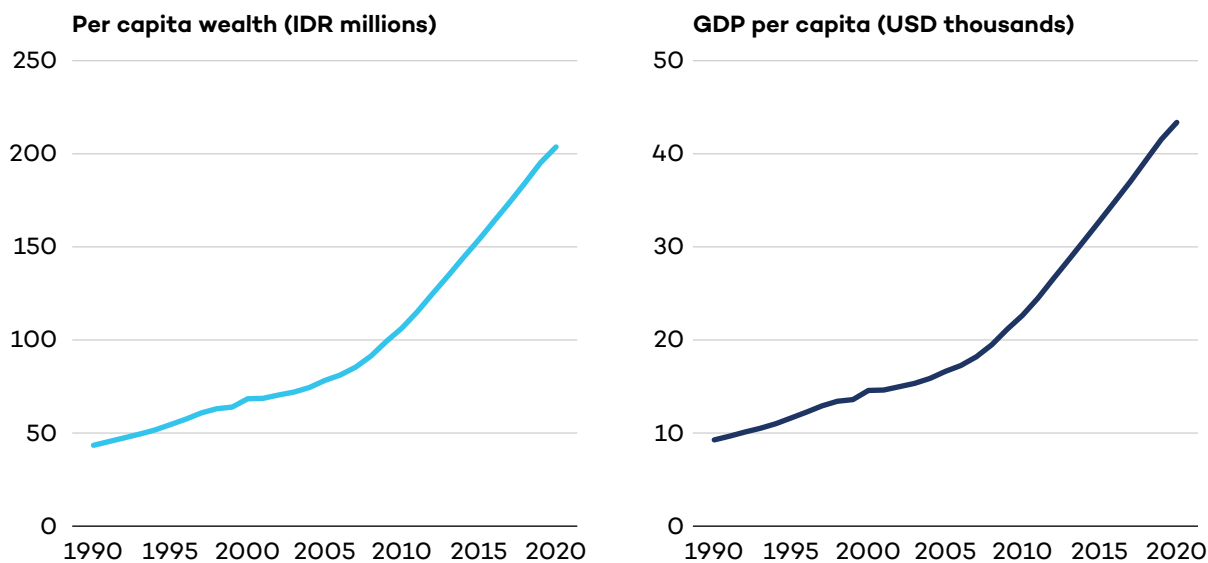
Per capita wealth (IDR millions)

GDP per capita (USD thousands)

Source: Authors' calculation based on data from BPS-Statistics Indonesia and the World Bank Data Bank.

Figure 3. GFCF as percentage of GDP (%), Indonesia, 1990–2022

- China
- Indonesia
- India
- Thailand
- OECD
- Brazil
- South Africa
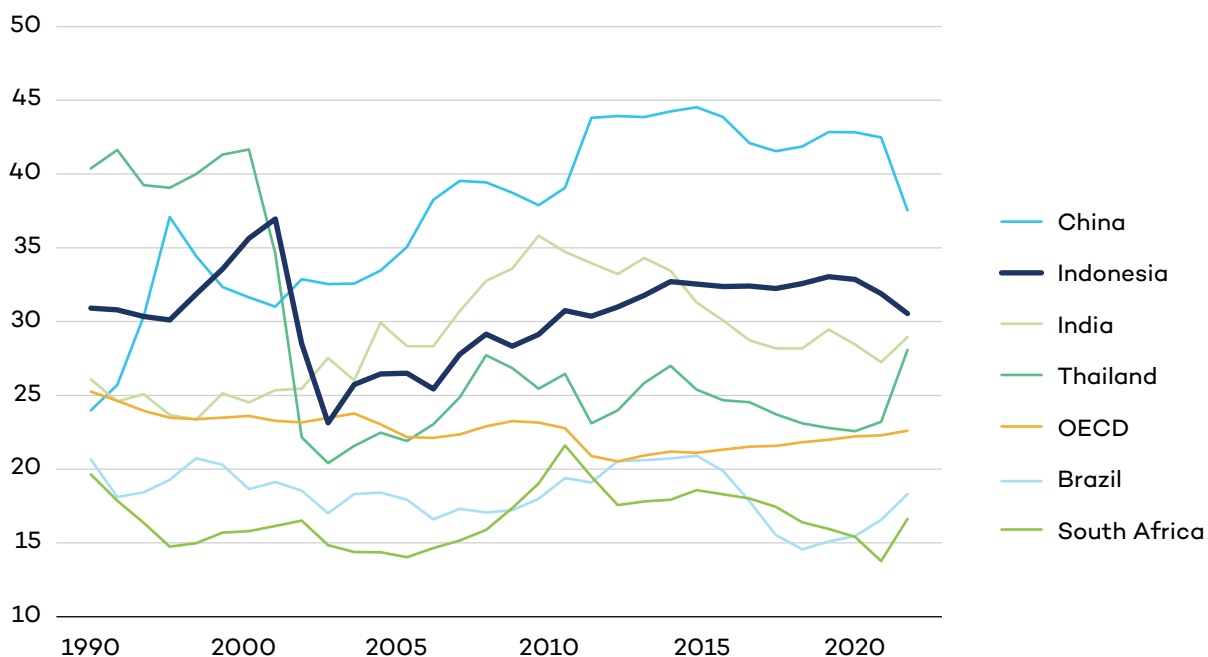
Source: Authors' calculations based on data from the World Bank Data Bank.

Figure 4. Import share of intermediate inputs in Indonesia's GFCF
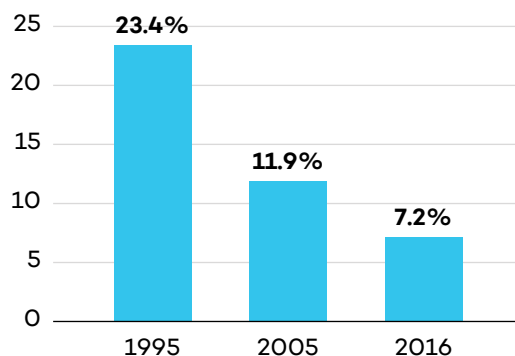
Source: Authors' calculation based on BPS-Statistics Indonesia's input-output (IO) tables (BPS-Statistics Indonesia, n.d.-a).

Produced capital consists of buildings, machinery and equipment, vehicles, and other assets. According to BPS-Statistics Indonesia (2019b), buildings include housing, non-residential buildings, roads, bridges, utility networks, irrigation, and other buildings. Machinery and equipment include power plants, machines, computers, electronic devices, and information communications technology. Vehicles refer to cars, motorcycles, aeroplanes, vessels, and trains (BPS-Statistics Indonesia, 2019b). As Figure 5 shows, buildings account for the largest share of Indonesia's produced capital. In 2000,[14] buildings accounted for 75% of the total produced capital, machinery and equipment contributed 9%, and vehicles contributed 6%. These shares had not changed substantially by 2020, remaining at 74%, 10%, and 6%, respectively. The continuing high share of buildings in the PCI was driven by the country's economic growth in recent years, which created demand for infrastructure development to improve connectivity, increase electrification, and meet the need for housing.

Figure 5. PCI breakdown by asset type, Indonesia, 2000–2020
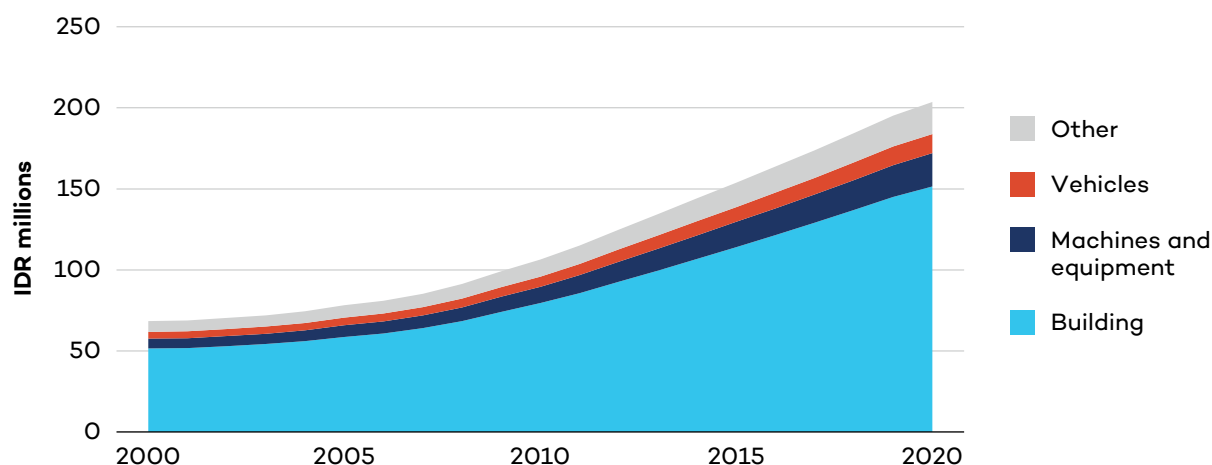
Source: Authors' calculations based on data from BPS-Statistics Indonesia (see Appendix A).

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[14] 2000 is the first year for which a breakdown of the PCI by asset type is available.

Turning to the distribution of the PCI by sector (Figure 6), manufacturing, real estate activities, agriculture, and mining accounted for the majority share. In 2010,[15] the PCI of these sectors amounted to IDR 64 million (USD 13,730), representing 61% of the overall index. By 2018, their combined value had increased to IDR 89 million (USD 19,000), but their overall share had dropped to 48%.

Figure 6. PCI breakdown by sector, Indonesia, 2010–2018
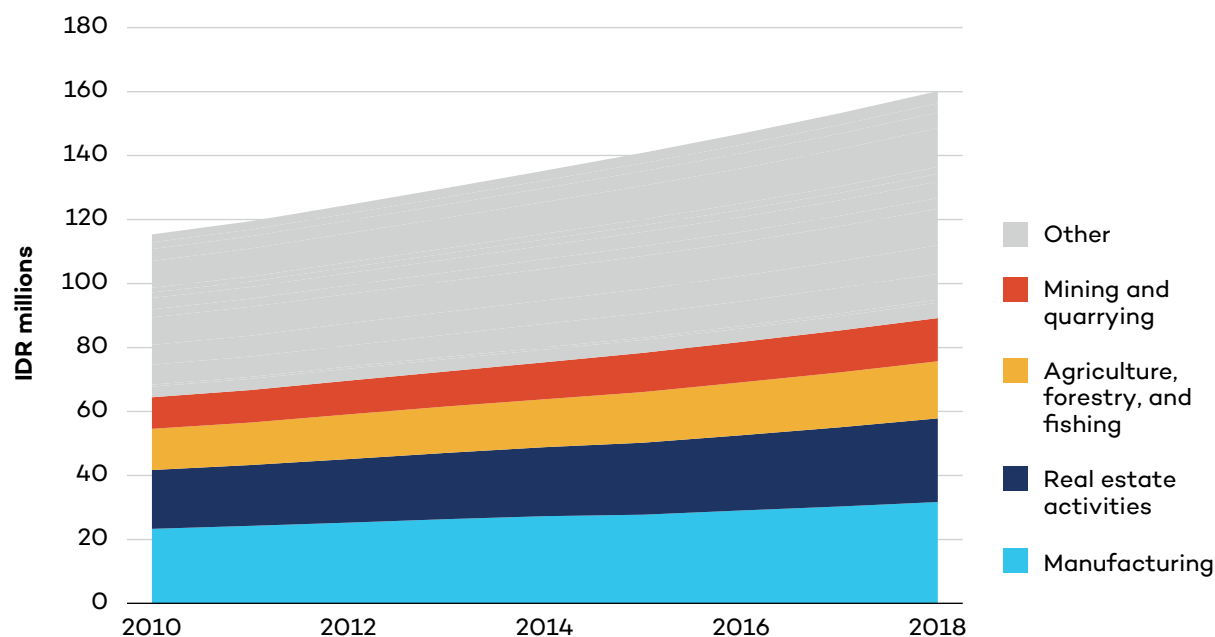
Source: Authors' calculations based on data from BPS-Statistics Indonesia (see Appendix A).

Although the manufacturing sector accounted for the highest share in the PCI (17%) in 2018, the sector's contribution to the index has been declining since 2010. In 2010, the sector contributed 22% to the index. Compared to China, the manufacturing sector's share of value added is lower (Ministry of National Development Planning/Bappenas, 2020). The characteristics of the manufacturing sector in Indonesia have remained relatively consistent over time, even compared to the pre-crisis period. First, the sector lacks diversification, producing only a few products with a comparative advantage for export. Second, it mainly manufactures products of low complexity that are also produced by many other countries. Third, the sector makes a relatively modest contribution to job creation.

The second-largest contributor to produced capital was the real estate sector. The PCI of the sector increased by IDR 7.8 million (USD 1,660) from 2010 to 2018. This growth can be attributed to the increasing demand for housing and other infrastructure driven by the expansion of middle-class households, which grew from 9% in 1993 to over 20% in 2019 (Pratomo et al., 2020). Given the demographic composition, with millions of potential first-time home buyers, Indonesia's residential property sector has plenty of room for growth in the decades to come.

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[15] The breakdown of the PCI by sector is available only for the period 2010-2018.

2.3.2 Human Capital

Human capital plays an important role in countries' well-being (World Bank, 2021), and Indonesia is no exception. Investing in human capital generates both economic and non-economic benefits. As people develop their skills, experience, and competencies, they become more employable and attract higher wages. Industries can increase productivity by tapping into a more skilled and productive labour force. Additionally, individuals and communities receive non-economic benefits from human capital, such as improved subjective well-being and higher levels of civic engagement (United Nations University International Human Dimensions Programme on Global Environmental Change & UN Environment Programme, 2014). One challenge Indonesia faces is domestic financing in key sectors such as health, education, and social assistance, which are crucial in driving human capital. According to the World Bank (2020), expenditures as a share of GDP in these sectors in 2017/2018 were relatively lower than both the regional average and the average for the country's income group (upper-middle income). Recent data do not contradict this trend. For instance, in 2020, the country spent 3.41% of its GDP on health, while the average for the East Asia and Pacific region was close to 7% (World Bank, n.d.). Measuring and monitoring human capital will support policy-makers in better understanding how much is being invested in human capital and what the returns of those investments are for national prosperity.

Measuring Human Capital

The HCI measures the aggregate value of real (inflation-adjusted) per capita human capital, representing the skills, experiences, and competencies embodied in the population. Increased levels of human capital increase a person's productivity, which in turn yields higher incomes. The HCI presented here is based on the discounted flow of total market labour compensation. First, we calculated the total market labour compensation for each year. This was obtained from the IO tables prepared by BPS-Statistics Indonesia for 1995, 2000, 2005, 2010, and 2016 (BPS-Statistics Indonesia, n.d.-a). For other years, we interpolated labour compensation based on the average share of labour income to GDP. Labour compensation is composed of two elements: formal wages paid to employed workers and earnings of the self-employed. Data on formal wages were taken directly from the national accounts prepared by BPS-Statistics Indonesia, while earnings of the self-employed were estimated to be a varying share of mixed income, also from the national accounts. Mixed income is the surplus or deficit accruing from production by unincorporated enterprises owned by households. It implicitly contains an element of remuneration for work done by the owner or other members of the household (UN Statistics Division, n.d.). Depending on the industry in question, we assumed that the remuneration of owners represented between 0% and 95% of mixed income. Properly estimating the share of mixed income that represents the remuneration of owners is especially relevant in countries where informal enterprises make up a high proportion of the economy, such as Indonesia. See Appendix B for a detailed description of the methodology used to compile the HCI.

Results

The average Indonesian experienced important increases in human capital over the study period. The HCI increased from IDR 315.8 million (USD 67,260) in 1995 to IDR 895.4 million (USD 190,690) in 2020. Except for a notable dip from 1997 to 2000 due to the Asian financial crisis, the index grew consistently until 2019. The downturn witnessed after 2019 was likely related to the global COVID-19 pandemic. Further analysis would be required to determine whether the decline was reversed as the world recovered from the pandemic.

The growth in the HCI was closely linked to improvements in educational attainment and the enhancement of net enrolment rates (NERs) in primary and secondary education. In terms of educational attainment, there was a decline in the population without any kind of school diploma, from 26.83% in 2009 to 19.6% by 2018. The proportion of individuals with tertiary education increased from 5.61% to 8.14% within the same time frame (BPS-Statistics Indonesia, n.d.-b). Meanwhile, the period between 2003 and 2020 saw considerable improvements in NER, with elementary school enrollment increasing from 93% to 98%, junior high school enrolment increasing from 63% to 80%, and senior high school enrolment increasing from 41% to 61% (BPS-Statistics Indonesia, n.d.-c).

Figure 7. HCI, Indonesia, 1995–2020
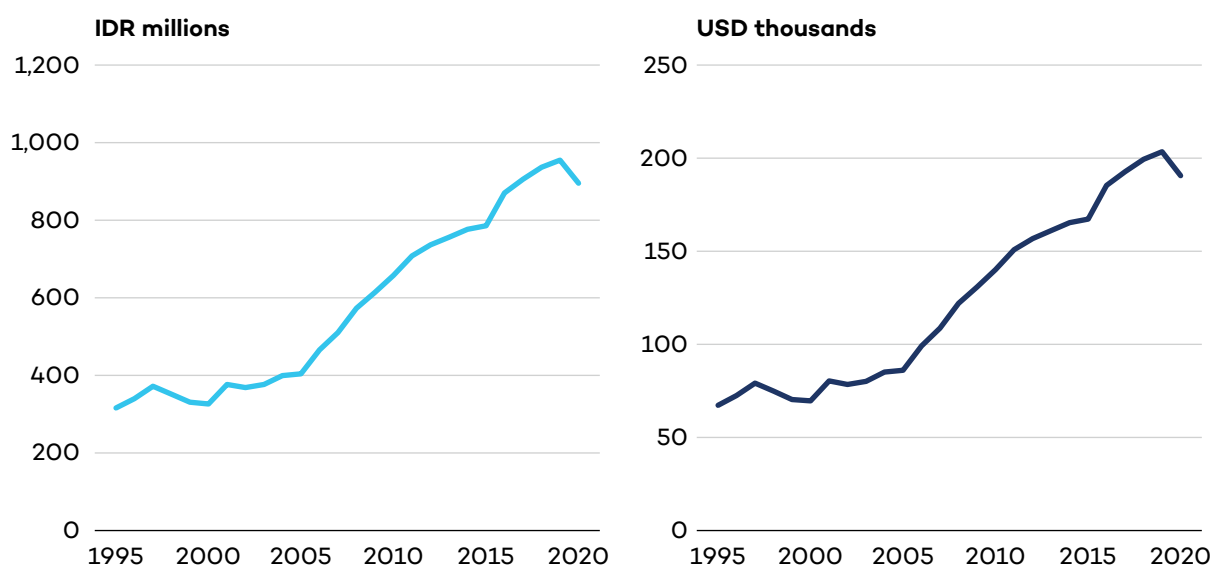
Source: Authors' calculations based on data from BPS-Statistics Indonesia and the World Bank DataBank.

Examining the sectoral breakdown of the HCI, the proportion of human capital in the agriculture sector, which contributes relatively little to Indonesia's GDP, unfortunately, remains significant. In 1995, this sector's share of the HCI was 22%, about equal to that of manufacturing. Although decreasing over time, it was still notably high (15%) in 2020. According to the World Bank (2019), the real value added per worker in the agricultural sector was only USD 3,601 in 2019, or roughly half of that of the services sector (USD 7,287) and about a quarter of that in manufacturing (USD 13,791). According to McMillan and Rodrik (2011), the labour productivity of a nation can be enhanced in two ways, either through growth within economic sectors via capital accumulation and technological advancements or

by labour transitioning from low-productivity to high-productivity sectors. In the context of Indonesia, it is essential to pursue both strategies. This will require enhancing productivity within the agricultural sector to reduce labour requirements, accompanied by policies designed to expedite the transfer of human capital from agriculture to higher value-added sectors.

Figure 8. Share of the HCI by sector, Indonesia, 1995–2020
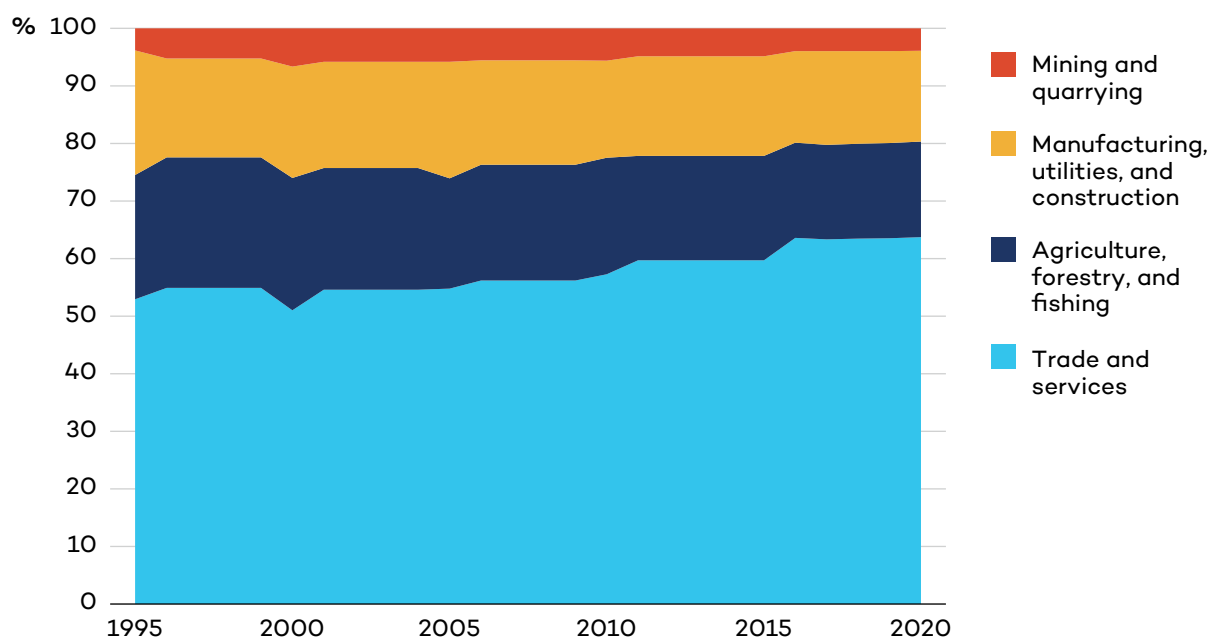
Source: Authors' calculations based on data from BPS-Statistics Indonesia.

2.3.3 Natural Capital

The role of natural resources, the environment, and ecosystems in supporting sustainable development cannot be understated. These resources include renewable and non-renewable assets sold on the market, such as timber, fisheries, or minerals. They also include ecosystems that provide valuable non-market goods and services, such as recreation, clear air, and a stable, predictable climate. Some of these assets are inputs to producing other goods and services, while others are directly consumed for well-being.

Given Indonesia's rich and diverse natural resources, the assessment of natural capital is essential to ensuring its preservation and the optimization of revenues from its exploitation. With over 18,000 islands and islets, Indonesia is considered the second most biologically diverse country in the world. The abundance of fossil fuel reserves makes Indonesia an important energy exporter. The country was the seventh-largest exporter of liquefied natural gas in 2021 and 2022, behind Qatar, Australia, the United States, Russia, Malaysia, and Nigeria (PwC, 2023). With nickel production in 2022 reaching around 3.3 million tonnes, Indonesia has become the world's largest nickel producer (Belakang, 2023).

Natural capital was assessed in the study using the MNCI, which was quantified in monetary terms, and non-monetary measures of non-market natural capital. Non-market natural capital was assessed in non-monetary terms because some forms of natural assets are essential to well-being but are not traded—for example, the climate. Table 1 shows the list of natural capital considered in the study.

Table 1. Natural capital considered in the study

Category	Natural capital	Component
Market natural capital	Fossil fuels	Oil, natural gas, and coal
	Minerals	Nickel, gold, copper, and tin
	Agriculture	Palm oil, rubber, coffee, tea, cocoa, coconut, coconut, rice, corn, green beans, cassava, sweet potatoes, and peanuts
	Plantation	Bananas, mangoes, oranges, cabbage, shallots, and chillies
	Forestry	Industrial plantation forest and forest concession rights
	Fisheries	Marine aquaculture and freshwater aquaculture
	Livestock	Buffalos, pigs, milk, eggs, cows, and chickens
Biodiversity and land cover	Biodiversity	
	Land cover	
Climate	Precipitation	
	Temperature	

Source: Authors' elaboration.

Measuring Natural Capital

Market Natural Capital

To calculate the MNCI, the study adopted the concept of resource rent as presented in the System of Environmental-Economic Accounting (UN Statistics Division, 2011). Rent is calculated as the difference between the revenues and the costs of resource extraction activity in a particular year. Costs include materials, energy, labour, and produced capital inputs. Nominal asset values were estimated as the present value of expected rent flows over the remaining lifetime of the resource under the simplifying assumption that rent does not grow in real terms in the future. Real asset values were compiled by deflating with the Consumer Price Index. Division by population gave the desired real per capita values for the MNCI. The details of the calculation are presented in Appendix C.

Non-Market Natural Capital

Ideally, the measurement of non-market natural capital is carried out through the assessment of ecosystems from two key perspectives: ecosystem extent and ecosystem condition (United Nations, 2021). Ecosystem extent is the size of an ecosystem asset in terms of spatial area, while ecosystem condition is the quality of an ecosystem measured in terms of its abiotic and biotic characteristics. This study did not measure the quality of ecosystems due to data challenges.

Results

Market Natural Capital

The MNCI increased slightly between 1990 and 2020, with considerable fluctuations over the period. The value of the index increased from IDR 29.9 million (USD 6,380) per capita in 1990 to IDR 45.4 million (or USD 9,650) per capita in 2020, for a total increase of 51.4% and an average annual growth of 2.2% (Figure 9).

Figure 9. MNCI, Indonesia, 1990–2020
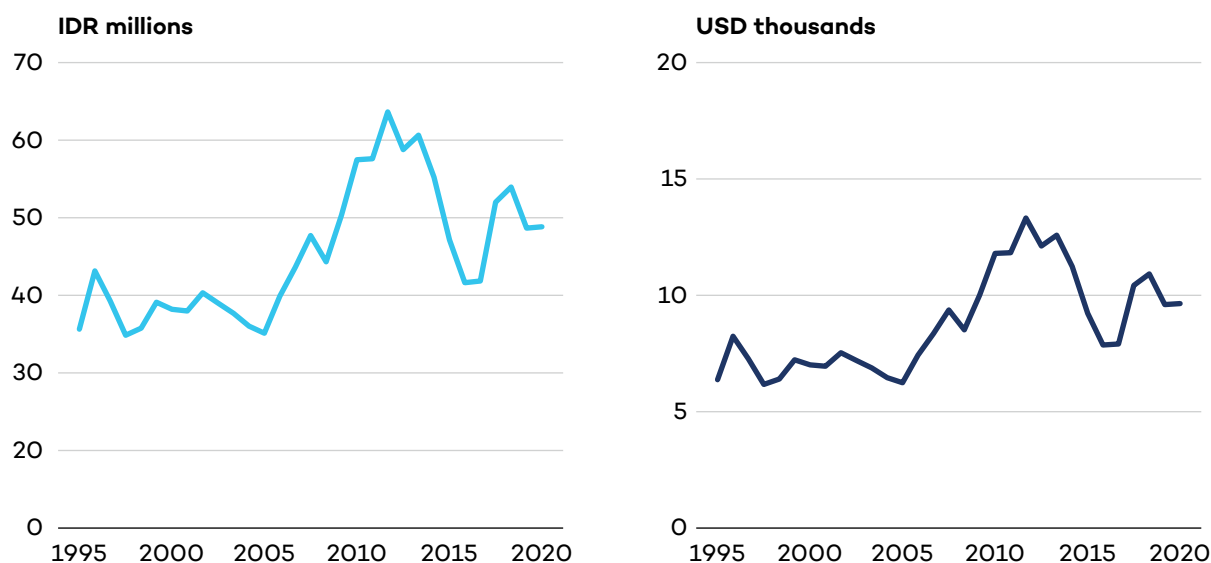
Source: Authors' calculation based on data from BPS-Statistics Indonesia, Ministry of Agriculture, FAO, and U.S. Geological Survey.

In 1990, renewable resources comprised 76% of market natural capital and were largely dominated by agriculture and livestock. However, the share of minerals and fossil fuels increased during the commodity boom in the mid-2000s to mid-2010s. At the peak of the commodity boom in 2010, non-renewables collectively formed 55% of Indonesia's MNCI. With the decline in the value of fossil fuels, the share of non-renewables in the MNCI fell to a low of 28% in 2016. However, the increased value of fossil fuels, coupled with the decline of agricultural wealth in the following years, increased the share of non-renewable resources to 44% in 2020.

Figure 10. Natural capital by sector, Indonesia, 1990–2020
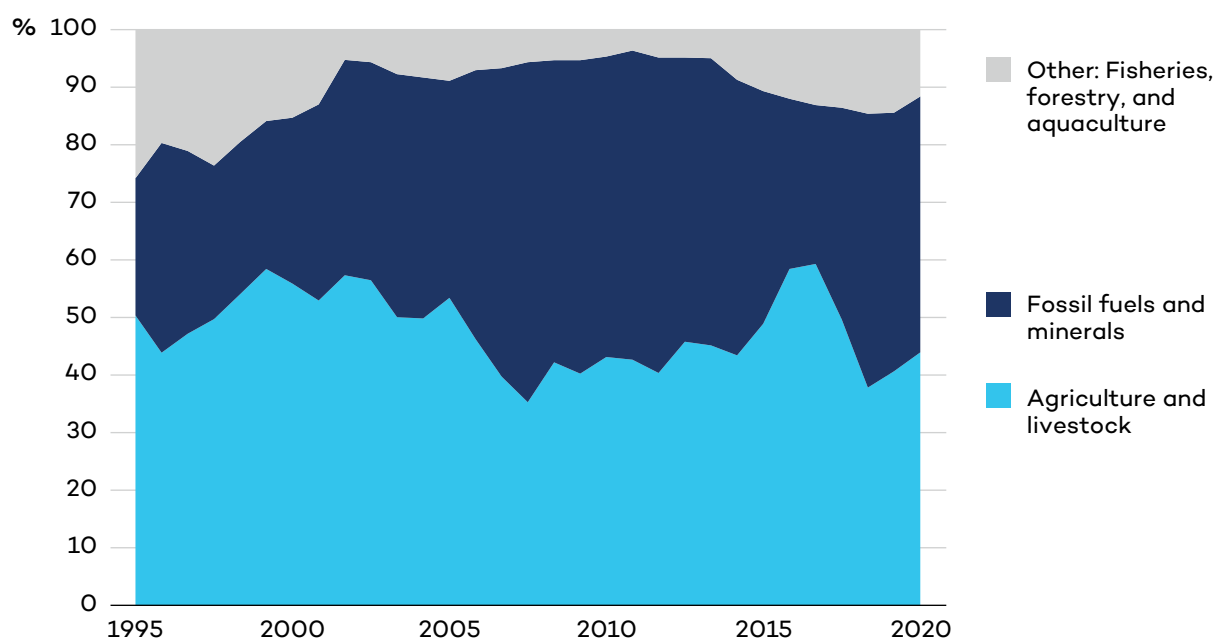
Source: Authors' calculation based on data from BPS-Statistics Indonesia, Ministry of Agriculture, FAO and the U.S. Geological Survey.

Non-Market Natural Capital

Land cover and biodiversity: With its 17,000 islands, Indonesia is a biodiversity powerhouse, home to diverse ecosystems across seven major biogeographic regions. It boasts two of Conservation International's 25 biodiversity hotspots, 18 World Wildlife Fund Global 200 ecoregions, and 24 BirdLife International Endemic Bird Areas (UNEP GRID Geneva & European Commission, n.d.). According to the *Sixth National Report for the Convention on Biological Diversity,* Indonesia hosts 31,750 plant species, 732 mammals (14% of the world's total), 1,711 birds (17%), 750 reptiles (8%), 403 amphibians (6%), and 1,236 freshwater fish (9%) (UN Environment & Convention on Biological Diversity, 2019). Unique species like the giant Rafflesia flower, the Komodo dragon, orangutans, and the Javan rhinoceros thrive here, thanks to the unique biogeographic, geological, climatic, and ecological conditions that favour high endemism.

In 2022, Indonesia had 125.76 million ha of forest, covering 62.97% of its land, including 46.9 million ha of untouched primary forests and 43.1 million ha of secondary forests impacted by deforestation (Ministry of Environment and Forestry, 2022). Despite a history of forest loss, recent efforts have seen a 75% reduction in deforestation rates in 2019–2020 (Ministry of Environment and Forestry, 2021b), the lowest since 1990, indicating a positive shift toward sustainability. This progress is supported by Global Forest Watch (n.d.), which shows a slowdown in tree cover loss from 2016 to 2021, largely due to reduced commodity-driven deforestation. To further protect its natural heritage, Indonesia has established 560 conservation areas, spanning 22.1 million ha on land and 5.3 million ha in marine environments, in an effort to preserve its unique ecosystems.

Indonesia's natural wealth extends to its coastal and underwater ecosystems. The nation's mangrove coverage is substantial, with 3.3 million ha, accounting for 20.37% of the world's total mangrove areas (Ministry of Environment and Forestry, 2021a). Additionally, Indonesia lies within the Coral Triangle, a region renowned for its marine biodiversity, including approximately 76% of the global coral species (World Wildlife Fund, n.d.). Of 798 known coral species, 605 are found in this biodiverse hotspot.

Precipitation and temperature: Precipitation and temperature in Indonesia are influenced by the country's position in the inter-tropical convergence zone, where the northeast and southeast trade winds penetrate the doldrums. Located in the zone, Indonesia has several climate characteristics, such as strong ascending motion, overcast skies, strong squalls, heavy rainfall, and severe local thunderstorms with variable intensities (World Bank, 2022).

Precipitation and temperature trends were measured in the study in terms of departures from their historical normal levels. The normal corresponds to the average temperature and precipitation over the 30 years covering the reference period (1980–2010) set by the World Meteorological Organization (2017). The departure for precipitation was measured as the percentage change of annual precipitation from the 30-year normal. For temperature, the departure was computed as the difference between the average annual temperature and the 30-year normal.

Figure 11 shows that since 1990, precipitation in Indonesia has shown an upward trend, with a high degree of variability from year to year. The wettest year took place in 2010, at 20% above the normal, while the driest year was 1997, at 17% below the normal. Having high precipitation levels, Indonesia has high potential exposure to all types of flooding. The population exposed to an extreme river flood could grow by an estimated 1.4 million by 2035–2044 (World Bank & Asian Development Bank, 2021).

Figure 11. Precipitation departure from normal, Indonesia, 1990–2021
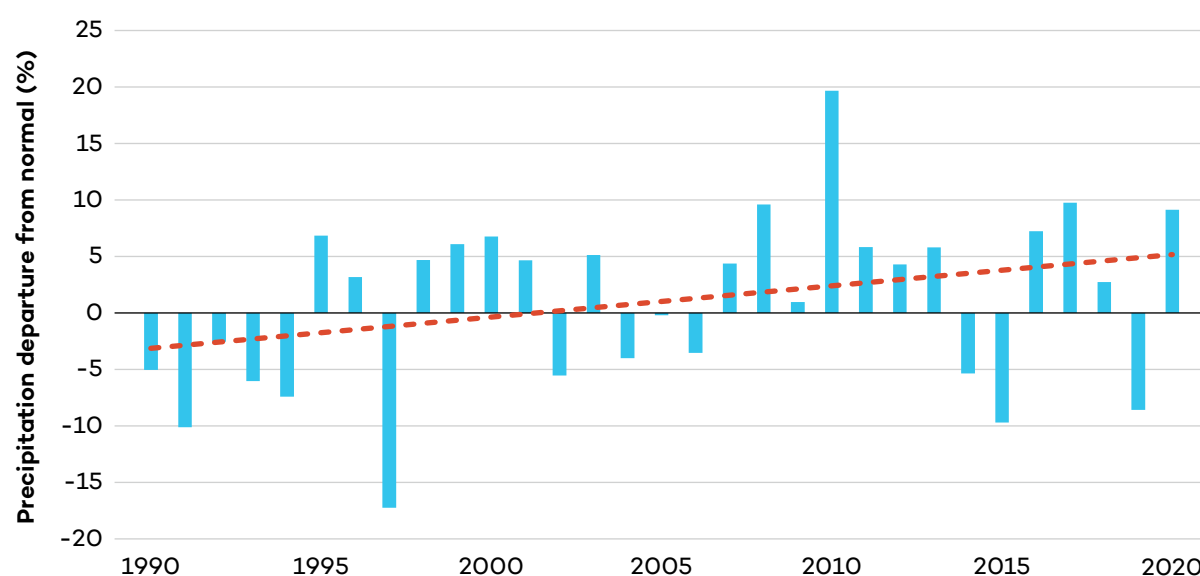
Source: Authors' calculations based on data from the World Bank DataBank.

The 1981–2010 temperature normal based on the 89 observation stations of the Meteorological, Climatological, and Geophysical Agency in Indonesia (*Badan Meteorologi, Klimatologi, dan Geofisika*/BMKG) was 26.6°C. Figure 12 shows that since 1990, temperature has been higher than normal in all years after 2000, except 2008. The hottest year was 2016, with an increase of 0.8°C above the normal, followed by 2020 and 2019 (0.7°C and 0.6°C, respectively). Like countries across the world, Indonesia is experiencing the negative effects of global warming. The discomfort caused by increased temperatures is made worse by the high level of air pollution in the country—particularly in the capital—which further deteriorates the atmosphere.

Figure 12. Temperature departure from normal, Indonesia, 1981–2020
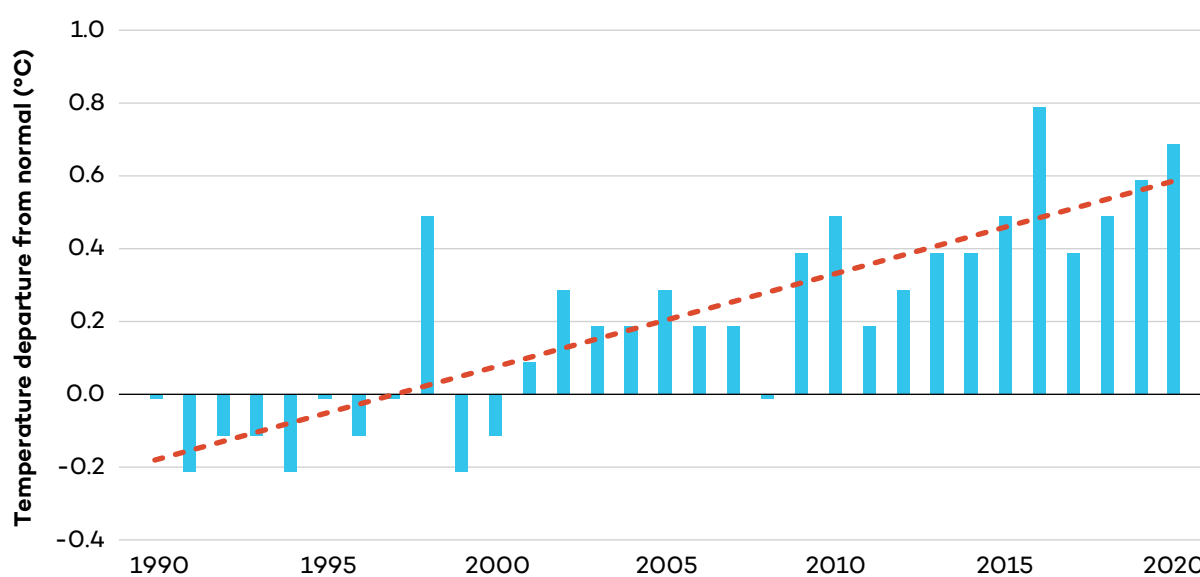
Source: Authors' calculations based on data from BMKG, n.d.

2.3.4 Financial Capital

Financial capital is the difference between the value of foreign financial assets owned by Indonesians and Indonesian financial assets owned by foreigners. Each financial asset, whether held by households, corporations, or governments, is accompanied by a corresponding liability of an equivalent amount. For instance, when an Indonesian resident holds an account in a non-Indonesian bank, the funds placed in the bank are deemed a foreign financial asset for Indonesia, while a foreign financial liability is registered for the other country. Conversely, if a non-resident deposits their money in an Indonesian bank, it will be counted as a liability for Indonesia and an asset in the account holder's home country. A similar concept also applies to share ownership in foreign companies or ownership of foreign government bonds. As a result, the only financial capital contributing to the comprehensive wealth at the national level is the net foreign financial assets owned by Indonesian citizens. This net figure represents the difference between the value of foreign financial assets held by Indonesians and the domestic financial assets owned by foreigners. This net value is referred to as the international investment position (IIP; in Indonesian: *Posisi Investasi Internasional*). A positive IIP indicates that the foreign financial assets held by Indonesians are worth more than the Indonesian financial assets held by foreigners, while a negative IIP indicates the opposite.

Measuring Financial Capital

Here, the FCI is measured by applying the Consumer Price Index to the IIP to bring it to real terms and then dividing it by population. Appendix D provides further details of the measurement of the FCI.

Results

From 2001 to 2020,[16] Indonesia's FCI consistently remained negative, implying that foreign financial liabilities exceeded foreign financial assets. On average, assets represented around 40% of liabilities. The 2007 Law No. 25 regarding capital investment[17] could be a factor in the noticeable decrease in FCI post-2008. This legislation marked a significant turning point in the country's business landscape by introducing incentives for foreign investment (Hafiluddin & Patunru, 2022; U.S. Department of State, 2021). Provisions under this law encompassed a range of measures, including granting foreign and domestic investors equal legal rights; safeguarding foreign investments from nationalization; allowing investments in all sectors, excluding those detrimental to national safety, health, environment, and morality; enhancing the property rights of foreign investors; offering flexibility in terms of entry and exit of foreign investors; and providing tax incentives for sectors that contribute significantly to the economy.

Figure 13. International investment position, Indonesia, 2001–2020
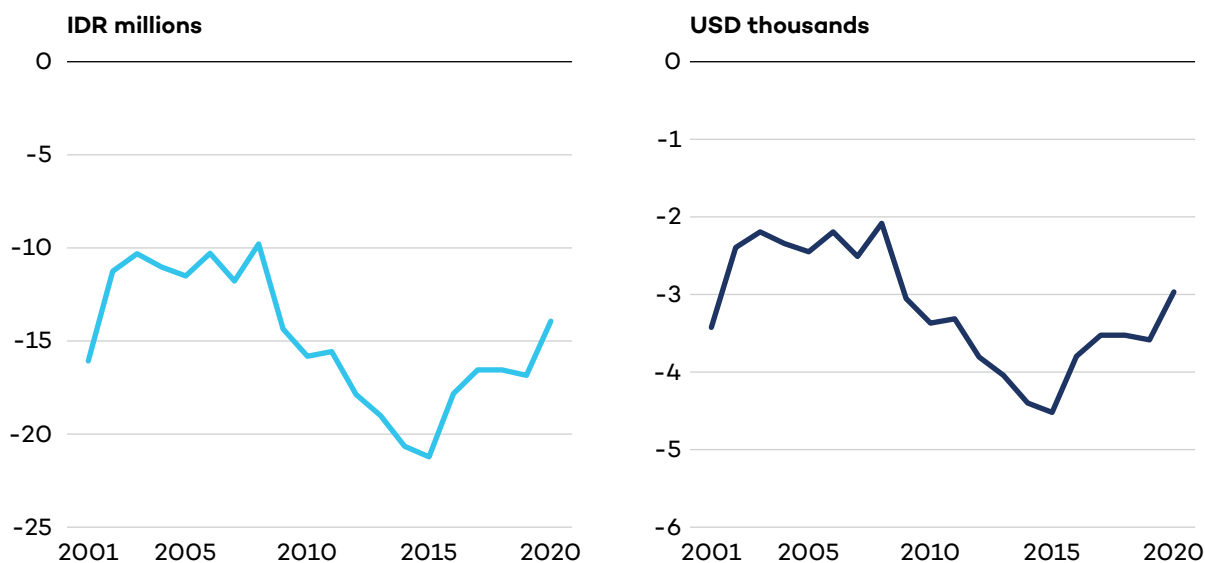
Source: Authors' calculations based on Indonesia's IIP dataset (Bank Indonesia, n.d.).

A factor that may contribute to an increase in financial liabilities in the coming years is the Indonesia sovereign wealth fund, which launched in early 2021 (International Forum of Sovereign Wealth Funds, 2024). In contrast to numerous sovereign wealth funds that are

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[16] 2001 is the earliest year for which the FCI is available.

[17] See: http://www.flevin.com/id/lgso/translations/Laws/Law%20No.%2025%20of%202007%20on%20Investment%20(BKPM).pdf

typically employed as savings or for holding portfolio investments in international markets, Indonesia's sovereign wealth fund is geared toward direct investment. This approach is designed to lure additional co-investors, thereby supporting the nation's developmental objectives (Daga & Ngui, 2022).

Whether a low FCI is a good or bad thing depends on several factors, such as the conditions for optimizing the financial returns of these investments, including the regulatory framework, accountability measures, and efforts to combat corruption. It also depends on how effectively the returns from capital inflows are utilized to expand the economy and whether these inflows are directed toward sustainable, productive, and high-impact sectors. Effective liability management can lead to positive spillover effects from capital inflows, such as job creation, increased exports (thereby boosting foreign reserves), environmental sustainability, and overall economic and wealth improvement.

2.3.5 Social Capital

Social capital is the only capital type not included in the calculation of the CWI, as it cannot yet be valued monetarily. However, it holds value, as other activities would not happen without the elements of social capital: formal norms (rule of law), informal interactions between individuals and companies (networks), and trust between parties. Much of the economy depends on the trust, credibility, and culture that underlie social capital (Dasgupta, 2005).

Several characteristics of social capital are particular to Indonesia. One is a localized form of mutual assistance known as *gotong royong*, where individuals help one another to achieve a common goal. Here, the legitimacy of local authorities and trust between the authorities and local communities play an essential role in ensuring the success of development projects (Bowen, 1986). Furthermore, certain local values or "wisdom" (*kearifan lokal*) play key roles in regulating society's members on various issues. For example, local communities in Bali adhere to the *Tri Hita Karana* philosophy, which emphasizes the importance of maintaining a harmonious relationship between humans, nature, and the gods. In terms of tolerance, Indonesia's national motto, *Bhinneka Tunggal Ika*, means "unity in diversity." Despite many ethnicities, all share the common identity and values of the national family of Indonesia, where diversity is viewed as a strength, not a weakness. That perspective becomes the foundation of Indonesia's solid social capital. Even more than that, the national ideology of *Pancasila* (five principles) is also incorporated into the regional cultures of Indonesia. Consequently, it creates a unifying effect for national development (Juhro et al., 2022).

The concepts, methods, and data necessary to value social capital are still in their infancy; consequently, social capital is not monetized here. Instead, this study assesses social capital based on non-monetary indicators grouped into civic engagement and trust (International Institute for Sustainable Development, 2018):

- **Civic engagement** – trends in key variables reflecting the actions and behaviours that can contribute positively to the collective life of a community or society.

- **Trust and cooperative norms** – trends in key variables reflecting how people behave and expect others to behave.

Measuring Social Capital

Social capital is assessed through various measures derived from multiple datasets. The main source is the World Values Survey (WVS) (Inglehart et al., 2022). Additional data were taken from the Indonesian Family Life Survey (IFLS) carried out by the Rand Corporation (2007, 2014) and the Socio-Economic Surveys carried out by BPS-Statistics Indonesia (2012, 2014a). Table 2 compares the three data sources. Further details of the measurement of social capital are provided in Appendix E.

Table 2. Comparison of the main data sources

	WVS	IFLS	Socio-Economic Survey (Social Resilience)
Temporal coverage	2001, 2006, 2018	2007, 2014	2012, 2014
Sample size	2001: n = 1,000 2006: n = 2,015 2018: n = 3,200	2007: 29,000 2014: 31,000	2014: 75,000
Regional coverage	2001: 5/34 provinces 2006: 10/34 provinces 2018: 20/34 provinces	13/34 provinces	34/34 provinces with sampling in all cities/regencies
Intended represented population	Adult population of Indonesia	Adult population of the 13 provinces sampled	Adult population of Indonesia
Covered items	Group membership, political actions, trust, confidence in institutions, as well as tolerance	Trust, tolerance	Community participation, trust, tolerance
Advantage	Extensive list of questions and objects, extensive temporal coverage, key items are consistent over waves, open access	Adequate list of questions, possibility to conduct cross-section and longitudinal analysis	Large sample size, large population size, several key items are covered
Disadvantage	Sample size and regional coverage are relatively small, different surveying standards between waves	Regional coverage is relatively small, temporal coverage is relatively small (only 7 years)	Questions differ over waves, consistency between waves is not as robust as IFLS or WVS, limited temporal coverage, limited access

Sources: BPS-Statistics Indonesia, 2012, 2014a; Inglehart et al., 2022; Rand, 2007, 2014.

Results

Review of Civic Engagement

Membership in an organization: Public participation in organizations has seen a slight improvement over the past two decades. The percentage of adults who are active members of at least one organization increased from 58% in 2006 to 69% in 2018, although this is largely explained by the relative reduction of inactive members (which declined around 7%) rather than people not being members of any organization. Religious groups enjoy a higher rate of participation, with 69% of people claiming membership.

Figure 14. Public participation in an organization, Indonesia, 2006 and 2008
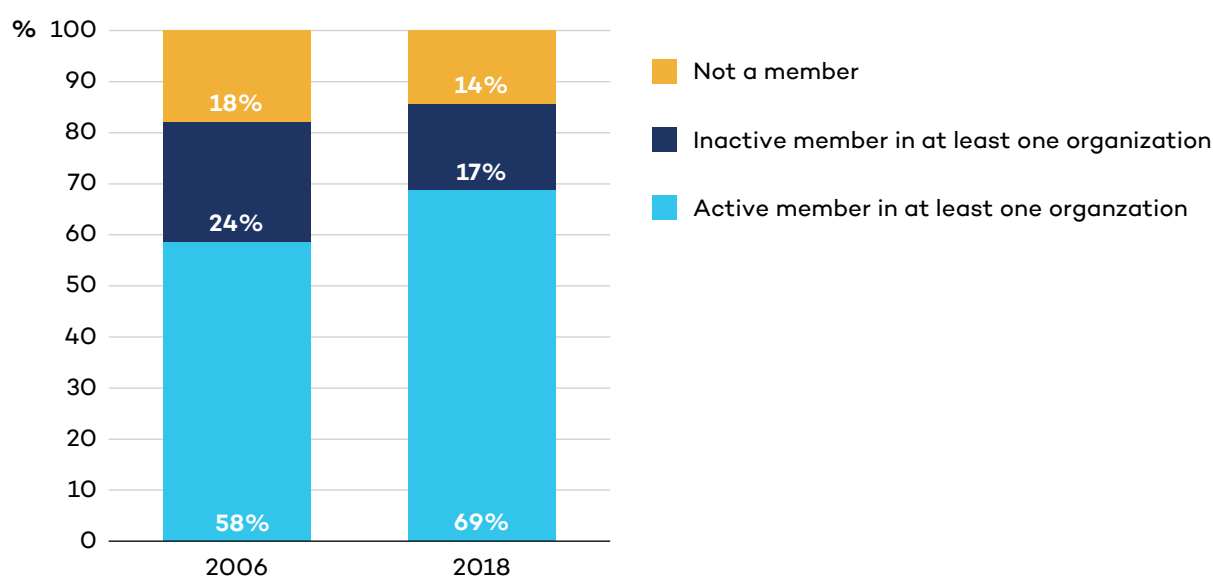
Sources: Authors' calculations based on data from Inglehart et al., 2022.

Participation in collective action: Civic engagement is also captured through the participation of households in collective actions (*gotong royong*). According to the 2014 Podes data, as many as 90.93% of villages/neighborhoods in Indonesia still engage in *gotong royong* activities for public benefit (BPS-Statistics Indonesia, 2014b). This figure represents an increase compared to the data from 2011, when only 88.80% of villages/neighborhoods engaged in such activities (BPS-Statistics Indonesia, 2011). However, when analyzed based on types of activities at the household level, there has been a decline in household participation in nearly all categories of actions from 2012 to 2014, with the exception of assisting disaster victims. In the two waves of the Socio-Economic Survey, household participation exhibited a decline from 44% in 2012 to 29% in 2014. When viewed based on types of activities, a higher participation rate was observed in assisting those affected by disasters and in religious activities. Although there was a decline in household participation rates in collective actions, the order remained consistent.

Figure 15. Household participation in activities around their neighbourhoods, Indonesia, 2012 and 2014
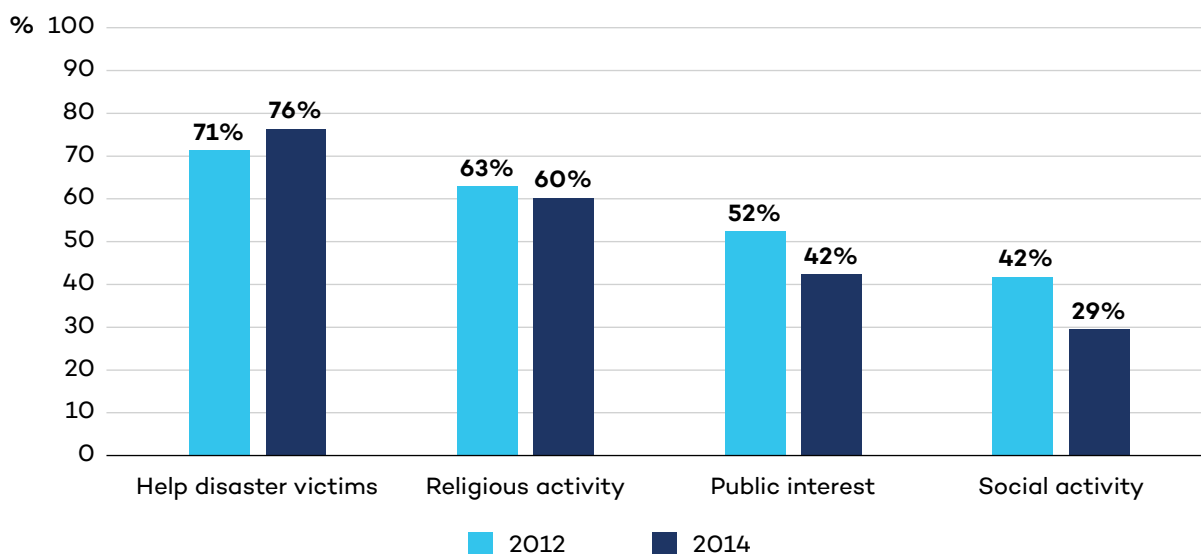
Source: Authors' calculations based on data from BPS-Statistics Indonesia, 2012, 2014b.

Participation in political actions: Trends for political participation are more mixed. Based on the WVS (Inglehart et al., 2022), people claiming membership in political parties fell from 15.9% in 2006 to 9.6% in 2018. Meanwhile, the percentage of respondents who have or are willing to strike, sign petitions, and attend peaceful demonstrations increased between 2001 and 2018. Inversely, the percentage of people willing to join in boycotts had slightly declined.

Figure 16. Willingness to engage in certain political actions, Indonesia, 2001, 2006, and 2018
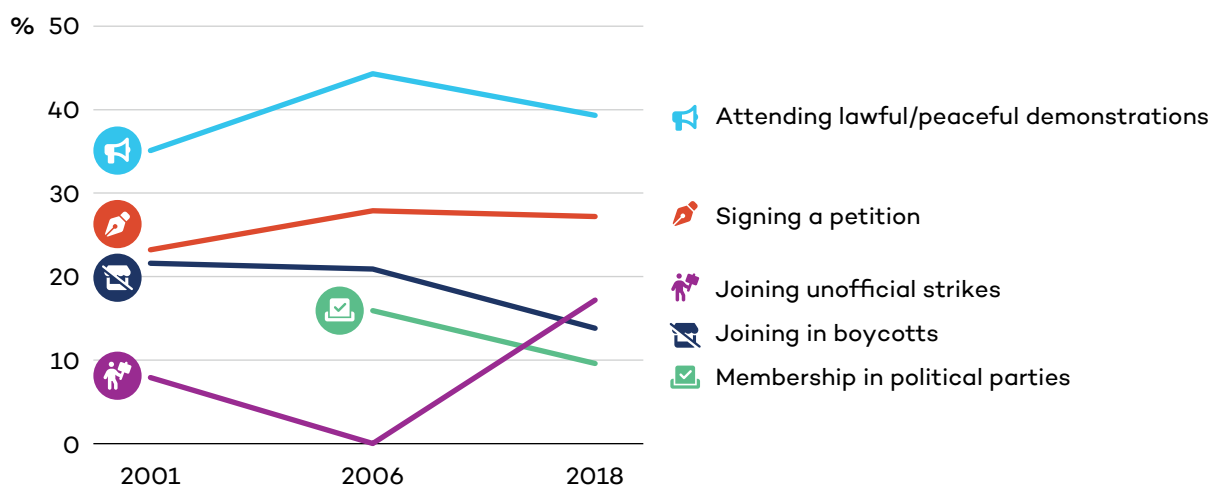
Source: Authors' calculations based on data from Inglehart et al., 2022.

Voter turnout: Voter turnout data were sourced from the International Institute for Democracy and Electoral Assistance (International IDEA, n.d.), an intergovernmental organization that provides data on democracy worldwide. There were high voter turnouts for parliamentary elections during the New Order era (prior to 1998) before they declined following the first post-reform parliamentary election in 1999. Presidential elections have occurred periodically since 2004 (prior to that, presidents were elected by the members of the House of Representatives and the Regional Representative Council), and voter turnout in these elections has shown a nearly continuous increase. Both parliamentary and presidential elections had relatively high turnout by international standards, though considerably lower than in the pre-reform period in Indonesia. In the most recent election in 2024, parliamentary election turnout was recorded at 83.55%, while the turnout for the presidential election reached a record high of 82.39% International IDEA (n.d.).

Figure 17. Voter turnout in presidential and parliamentary elections, Indonesia, 1971–2024
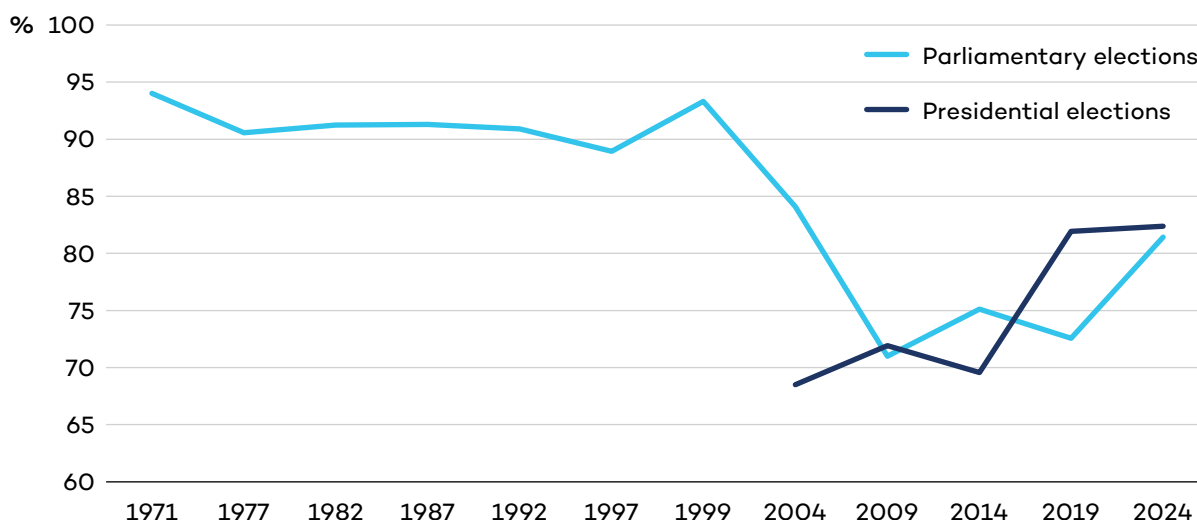
Source: Authors' calculations based on data from International IDEA, n.d.

Review of Trust and Cooperative Norms

Trust: The IFLS-5 survey shows that in 2014, 86.7% of respondents believed it likely that others would take advantage of them, a decrease from 92.6% in 2007, which indicates an improvement in trust (Rand, 2014). Conversely, data from the WVS survey reveals that in 2018, 95% of participants felt one must be very cautious with most people, a significant rise from just 51% in 2006 (Inglehart et al., 2022). Additionally, the WVS survey points to a widespread decline in trust toward others, encompassing neighbours, acquaintances, and strangers who met for the first time (Figure 18). These apparently contradictory results are an example of the challenge in trying to measure and report on social capital.

Figure 18. Trust toward other people, Indonesia, 2006 and 2018
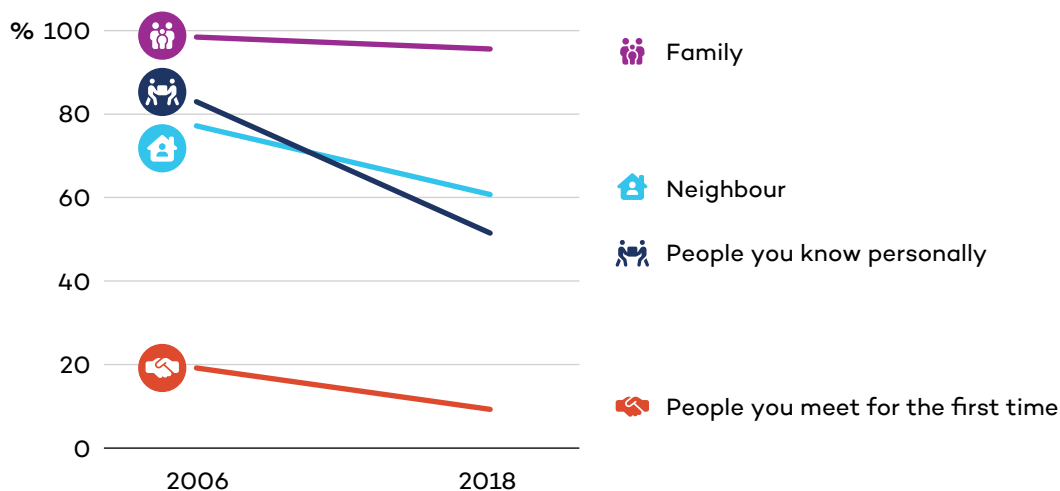
Source: Authors' calculations based on data from Inglehart et al., 2022.

Figure 19. Confidence in government and parliament, Indonesia, 2001, 2006, and 2018
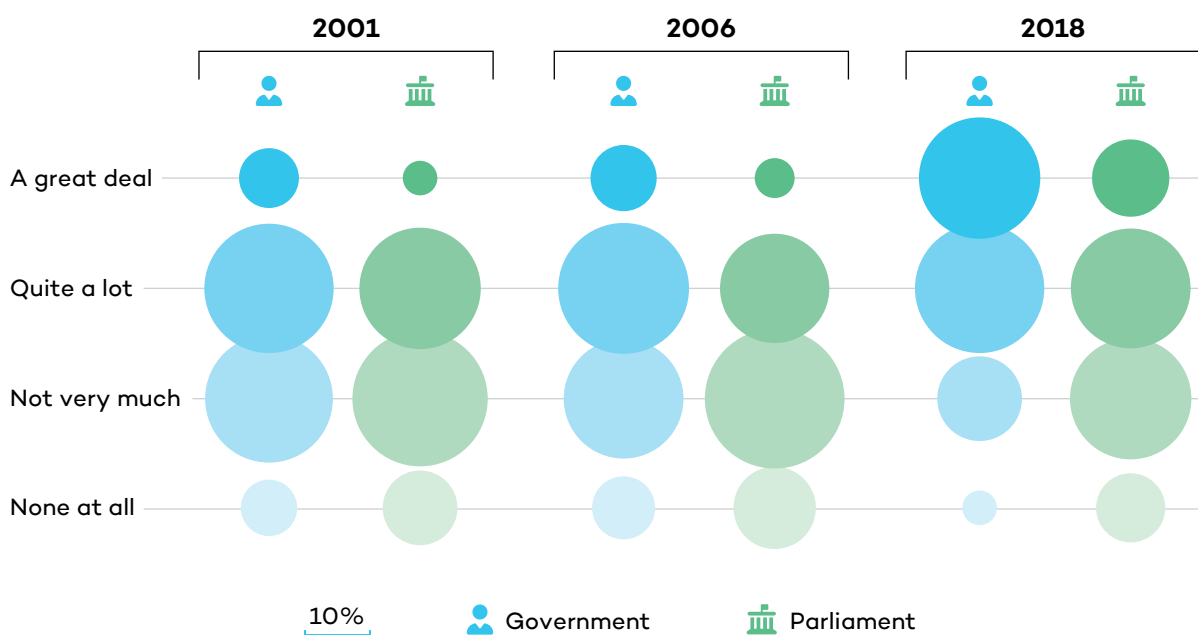
Source: Authors' calculations based on data from Inglehart et al., 2022.

Confidence in institutions appears to be increasing and to be high. The BPS-Statistics Indonesia's *Statistics of Social Capital 2014* report suggested that the majority placed great confidence in community leaders, religious figures, and village apparatus. According to the WVS, the percentage of people placing "quite a lot" or "a great deal" of confidence in the government and parliament noticeably increased between 2001 and 2018, reaching highs of 79% and 51% in 2018, respectively (Figure 19) (Inglehart et al., 2022). Confidence in political parties was at 37% in 2018, not much different than it had been in 2001 (Inglehart et al., 2022). In line with high participation in religious organizations, confidence in religious

institutions also remained high at 98%. Confidence in the press (51%) and television (48%) in 2018 slightly declined from 2001 levels (Inglehart et al., 2022).

Review of Tolerance

Coexistence with different ethnicities and religions seems to be high, with some indices suggesting improvements in the last 20 years. According to the WVS, 30% of the population in 2018 was uncomfortable with neighbours from different races, nationalities, ethnicities, or religions, down from 49.8% in 2001 and 54.5% in 2006 (Inglehart et al., 2022).

However, there might be limits to how accepting people of different religions are. Interfaith marriage seems to be one of those limits, as 82% of the population in the 2014 IFLS-5 would object to someone with a different faith marrying a close relative or child (BPS-Statistics Indonesia, 2014a). This was up by 36 percentage points from 2007. Similarly, BPS-Statistics Indonesia also reported that only 7.9% of households in 2014 would agree to their child marrying someone of a different faith, compared to 70% of households who would agree to their child having friends of a different faith (BPS-Statistics Indonesia, 2014a).

Furthermore, IFLS-5 suggests that 59% of the population in 2014 would object to groups of different faiths building a place of worship in their community (BPS-Statistics Indonesia, 2014a). While this was a steep decline from 2007, where 78% would object, the figure remained high. Similarly, BPS-Statistics Indonesia reported that only 43% of the population in 2014 would agree if other religions had activities in their neighbourhood, a decrease from 62% in 2012 (BPS-Statistics Indonesia, 2012, 2014a). Meanwhile, more of the population stated that they are more likely to choose candidates with the same religion in elections, with the share of those answering "very likely" reaching 51.12% in 2014 (BPS-Statistics Indonesia, 2014a).

Figure 20. Likelihood to vote for a candidate with the same religion, Indonesia, 2007 and 2014
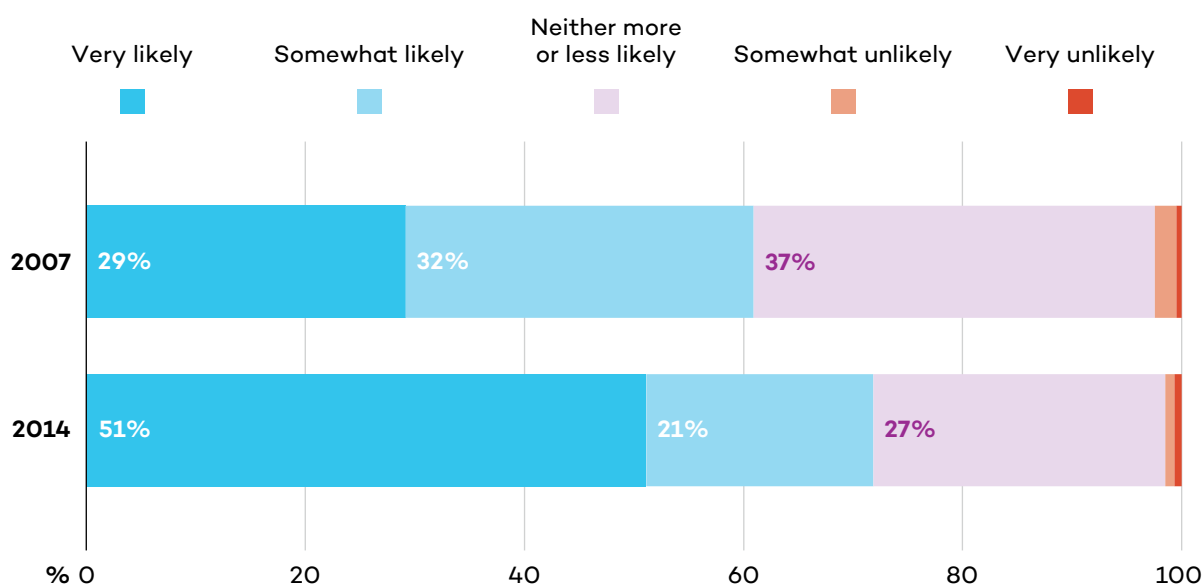
Source: Authors' calculations based on data from IFLS-5 (BPS-Statistics Indonesia, 2014a).

3.0 Conclusion and Recommendations

Over the 25-year period from 1995 to 2020, Indonesia's CWI has seen a remarkable average annual growth of 4.3%. This growth, however, has been uneven across different types of capital. While produced and human capital have flourished, contributing significantly to the nation's wealth, natural capital has not kept pace, leaving room for improvement for the Indonesian government to enhance productivity and resource rent from natural resources. Although still negative, financial capital has seen modest improvement, while social capital shows a positive trend based on indices related to participation, trust, and tolerance.

Produced capital increased by an average annual growth of 5.3%. Four sectors dominate produced capital, namely manufacturing, real estate activities, agriculture, and mining, with the first two contributing the most. Investments are increasingly concentrated in buildings, with a minor contribution from machinery, equipment, and vehicles. Notably, the country has made little investment in renewable energy generation capacity, which represents a missed opportunity to engage in the transition away from fossil fuels.

Human capital, which represents the most substantial portion of Indonesia's assets, also consistently grew over time, except from 1997 to 2000, when the indicator dropped due to the economic crisis of the 1990s. The crisis impacted the value and distribution of labour across various sectors and shifted labour from high-value-added sectors, such as manufacturing, to sectors like agriculture. Trade and services are the top contributors to human capital, followed by agriculture. The share of human capital in the relatively low value-added agriculture sector remains high at 17%. Value added per worker in agriculture is just one fifth of what it is elsewhere in the economy (World Bank, 2019).

Market natural capital increased, on average, by 2.2% annually. Renewable assets (agriculture, fisheries, aquaculture, forestry, and livestock) dominated natural capital in 1990 but declined with the rise of non-renewable assets (minerals and fossil fuels) during the commodity boom from the mid-2000s to mid-2010s. At the peak of the commodity boom in 2010, non-renewables collectively formed more than half of Indonesia's market natural capital. There is considerable risk in such dependence on non-renewable resource wealth, especially since much of this wealth derives from fossil fuels the world has committed to moving away from. The country should carefully review its policies around natural resource management to ensure its vast wealth is maximized for both the current and future generations. In addition to concerns about the over-dependence on non-renewable resource wealth, Indonesia is experiencing an erosion of its biodiversity. The country is also facing the effects of climate change through the rise of precipitation and temperature. These adverse effects may lead to more frequent floods and rising sea temperatures that can result in coral bleaching and the deterioration of the country's biodiversity.

Financial capital has been negative throughout the period studied, indicating that the country was accumulating more foreign liabilities than foreign assets. The accumulation of liabilities is the result of investment policy choices made by the country to support its effort to escape the middle-income trap. High liabilities are not necessarily detrimental so long as they are effectively managed and lead to positive economic spillovers.

The country is generally doing well in terms of social capital despite some mixed results in some parts. While formal political engagement, like party membership or voting, has decreased, participation in group and communal activities has increased. Trust in others has slightly declined but remains high, as evidenced by people's willingness to seek help from their neighbours. In terms of tolerance, Indonesians are becoming more accepting of coexisting with individuals from diverse ethnic and religious backgrounds.

In contrast to the CWI's 4.3% annual average growth over the period, Indonesia's GDP grew considerably more slowly. In real per capita terms, Indonesian GDP grew from IDR 27.5 million (USD 5,860) to IDR 54.1 million (USD 11,500), for an average annual growth rate of just 2.8% (Figure 3). This relatively slow growth of Indonesia's real per capita GDP compared with its CWI suggests that the country is not benefiting as much from its increased wealth as it should. As reported in this study, in 1995, Indonesia created IDR 68,000 of real GDP for every IDR 1 million in real wealth (a rate of return on wealth of 6.8%). By 2020, this figure had fallen to IDR 47,800 (a rate of return of 4.8%). For some reason, Indonesia has become less effective at turning wealth into income as time has gone by.

Assessing why Indonesia is not fully realizing the benefits of the growth in its wealth is beyond the scope of this study. The main benefit of our results is making this finding apparent, which is possible only when comprehensive wealth accounts are compiled for the country. By showing that Indonesia is not fully benefiting from the growth in its wealth, we provide a window into the possibilities for the country if it were to better manage its assets. Had Indonesia simply maintained the rate of return on its wealth that it enjoyed in 1995, it would have earned 42% more income in 2020 than it did. That additional income would have been sufficient to push the country out of its chronic lower-middle-income status and into the group of countries considered to be upper-middle-income by the World Bank, placing the country closer to achieving its goal of high-income status by 2045 (Ministry of National Development Planning/Bappenas, 2019). Realizing this extra income in the future is still possible, but it will require a new approach to natural resource management. It will require an approach that ensures Indonesia's resources are preserved for future generations and, at the same time, better capitalizes on the economic benefits of using those resources today. Development can be seen as a process of wealth management, and there is too much at stake for Indonesia not to do a better job managing its natural wealth, not to mention its human and produced capital. For Indonesians, it is a question of escaping, or not, from the middle-income trap. For the rest of the world, it is a question of whether future generations will know about the wondrous diversity of Indonesia's natural environment or if it will remain a feature only of the country's past (Brodjonegoro & Smith, 2024).

Regularly compiling and using comprehensive wealth accounts to guide policy making would be a wise step for Indonesia. The extra income it could earn by better managing its wealth could help it escape the middle-income trap, an outcome that would be more than worth the investment in additional statistical effort. The enhancement of Indonesia's comprehensive wealth measurement would require concerted efforts from the government, particularly in fortifying the capabilities of the national statistics agency for more effective data collection. It is critical to address the limitations in data collection, especially in areas such as natural capital, which is still limited to several commodities, and social capital, which mainly still uses WVS data. Encouragingly, strides are being made in this direction, with BPS-Statistics

Indonesia embracing this initiative for comprehensive wealth calculation and also initiating its own work on natural and produced capital valuation (BPS-Statistics Indonesia, 2019a). Similarly, the Directorate General of State Assets Management (*Direktorat Jenderal Kekayanan Negara*/[DKJN]) under the Ministry of Finance is broadening its assessment of national assets, with a special focus on natural capital and is adapting regulations to support this expanded asset evaluation scope. Moreover, while the National Development Planning Agency (*Badan Perencanaan Pembangunan Nasional* [Bappenas]) may not be directly focused on comprehensive wealth, it is contributing to the effort by developing indices that extend beyond GDP, such as the Green Economy Index, the Economy Inclusive Index, and the Indonesia Blue Economy Index.

All in all, the success of improving Indonesia's comprehensive wealth calculation hinges on sustained advocacy and collaborative support from various ministries and agencies, which will not only refine the measurement of comprehensive wealth but also push its implementation and utilization into broader decision-making processes.

References

Bank Indonesia. (n.d.). *Statistik Ekonomi dan Keuangan Indonesia* (in Bahasa). https://www.bi.go.id/id/statistik/ekonomi-keuangan/seki

Bappenas. (2020). *Independent assessment of Indonesia's energy infrastructure sector.* https://perpustakaan.bappenas.go.id/e-library/file_upload/koleksi/migrasi-data-publikasi/file/Policy_Paper/Independent%20Assesment%20of%20Indonesia_s%20Energy%20Infrastructure%20Sector.pdf

Belakang, L. (2023). *Peluncuran Studi Transisi Berkeadilan di daerah Penghasil Batu Bara di Indonesia: Studi Kasus Kab. Muara Enim dan Kab Paser* (in Bahasa). Institute for Essential Services Reform. https://iesr.or.id/agenda-iesr/peluncuran-studi-transisi-berkeadilan-di-daerah-penghasil-batu-bara-di-indonesia-studi-kasus-kab-muara-enim-dan-kab-paser

BMKG. (n.d.). *Temperatur: Maksimum, Minimum, Rata-rata* (in Bahasa). Data Online Pusat Database BMKG. https://dataonline.bmkg.go.id/data_iklim

Bowen, J. R. (1986). On the political construction of tradition: Gotong royong in Indonesia. *Journal of Asian Studies, 45*(3), 545–561. https://doi.org/10.2307/2056530

BPS-Statistics Indonesia (n.d.-a). *Input-output (IO) tables.* https://www.bps.go.id/en/statistics-table?subject=531

BPS-Statistics Indonesia. (n.d.-b). *Penduduk Berumur 10 Tahun ke Atas menurut Jenis Kelamin dan Ijazah/STTB Tertinggi yang dimiliki, Perkotaan+Perdesaan* (in Bahasa). https://www.bps.go.id/id/statistics-table/2/NTM4IzI=/penduduk-berumur-10-tahun-ke-atas-menurut-jenis-kelamin-dan-ijazah-sttb-tertinggi-yang-dimiliki--perkotaanperdesaan.html

BPS-Statistics Indonesia. (n.d.-c). *Angka Partisipasi Murni (APM) Menurut Provinsi dan Jenjang Pendidikan* (in Bahasa). https://www.bps.go.id/id/statistics-table/2/MzA0IzI=/angka-partisipasi-murni--apm--menurut-provinsi-dan-jenjang-pendidikan.html

BPS-Statistics Indonesia. (2011). *Statistik Potensi Desa Indonesia 2011.* https://www.bps.go.id/id/publication/2011/11/22/f0f9b7483c34df5e5ae96be2/statistik-potensi-desa-indonesia-2011.html

BPS-Statistics Indonesia. (2012). *Statistics of social capital 2012.* https://www.bps.go.id/en/publication/2013/12/11/456a955a0562653f2f751c0f/statistics-of-social-capital-2012.html

BPS-Statistics Indonesia. (2014a). *Statistics of social capital 2014.* https://www.bps.go.id/en/publication/2016/10/03/67e4fcc2bf295324013567c7/statistics-of-social-capital-2014.html

BPS-Statistics Indonesia. (2014b). *Statistik Potensi Desa Indonesia 2014.* https://www.bps.go.id/id/publication/2014/12/16/7107f6b0f1a6f3e4619a2e0e/statistik-potensi-desa-indonesia-2014.html

BPS-Statistics Indonesia. (2019a). *Integrated system of environmental-economic accounts of Indonesia 2014–2018.* https://www.bps.go.id/en/publication/2019/12/27/53e7360b49c122c58475d2c9/sistem-terintegrasi-neraca-lingkungan-dan-ekonomi-indonesia-2014-2018.html

BPS-Statistics Indonesia. (2019b). *Buku Pedoman Pencacah Survei Penyusunan Disagregasi PMTB 2019* (in Bahasa).

BPS-Statistics Indonesia. (2023). *Query builder.* https://www.bps.go.id/en/query-builder

Brodjonegoro, B. & Smith, R. (2023, November 21.). GDP is way short of a comprehensive wealth measurement of a country. *The Jakarta Post.* https://www.thejakartapost.com/opinion/2023/11/21/gdp-is-way-short-of-a-comprehensive-wealth-measurement-of-a-country.html

Curristine, T. R. (2018). Developing Infrastructure. In L. E. Breuer, J. Guajardo, & T. Kinda (Eds.), *Realizing Indonesia's economic potential.* International Monetary Fund. https://doi.org/10.5089/9781484337141.071

Daga, A. & Ngui, Y. (2022). *Indonesian sovereign wealth fund draws $20 bln in co-investments.* Reuters. https://www.reuters.com/markets/asia/indonesian-sovereign-wealth-fund-draws-20-bln-co-investments-2022-09-29/

Dasgupta, P. (2005). Economics of social capital. *Economic Record, 81*(s1), S2–S21. https://doi.org/10.1111/j.1475-4932.2005.00245.x

FAOSTAT. (2024). Forestry production and trade. https://www.fao.org/faostat/en/#data/FO

Food and Agriculture Organization of the United Nations. (2024). *Statistics.* https://www.fao.org/statistics/en

Global Forest Watch. (n.d.). *Interactive world forest map.* https://www.globalforestwatch.org/

Hafiluddin, N., & Patunru, A. A. (2022). The impact of foreign investment on firm performance: Indonesia after the 2007 FDI reform. *Economics and Finance in Indonesia, 68*(1), Article 4, 1–14. https://scholarhub.ui.ac.id/cgi/viewcontent.cgi?article=1003&context=efi

Inglehart, R., Haerpfer, C., Moreno, A., Welzel, C., Kizilova, K., Diez-Medrano, J., Lagos, M., Norris, P., Ponarin, E., & Puranen, B. (Eds.). (2022). *World values survey: All rounds–country-pooled datafile* (Dataset version 3.0.0). JD Systems Institute & WVSA Secretariat. https://doi.org/10.14281/18241.17

International Forum of Sovereign Wealth Funds. (2024). *Indonesia.* https://www.ifswf.org/members/indonesia-investment-authority#:~:text=Indonesia%20Investment%20Authority%20(INA)%20is,for%20the%20country's%20future%20generations.

International IDEA. (n.d.). *Voter turnout database.* https://www.idea.int/data-tools/data/voter-turnout-database

International Institute for Sustainable Development. (2016). *Comprehensive wealth in Canada: Measuring what matters in the long run.* International Institute for Sustainable Development. https://www.iisd.org/publications/comprehensive-wealth-canada-measuring-what-matters-long-run

International Institute for Sustainable Development. (2018). *Comprehensive wealth in Canada 2018: Measuring what matters in the long term.* https://www.iisd.org/system/files/publications/comprehensive-wealth-canada-2018.pdf

Juhro, S. M., Narayan, P. K., Iyke, B. N., & Trisnanto, B. (2022). Social capital, R&D and provincial growth in Indonesia. *Regional Studies, 56*(12), 2117–2132. https://doi.org/10.1080/00343404.2022.2042469

McMillan, M., & Rodrik, D. (2011). Globalization, structural change and productivity growth. In M. Bacchetta & M. Jansen (Eds.), *Making globalization socially sustainable* (pp. 49–84). WTO Secretariat. https://www.wto.org/english/res_e/booksp_e/glob_soc_sus_e.pdf

Ministry of Agriculture. (n.d.). Home. https://www.pertanian.go.id/home/

Ministry of Environment and Forestry. (2021a). *Peta Mangrove Nasional 2021* (in Bahasa). https://pdasrh.menlhk.go.id/vo/download.php?id=59&token=gWBCAzL6ACrzQ9GlgO35AljlLpXwRdgK

Ministry of Environment and Forestry. (2021b). *Siaran Pers Nomor: SP (062/HUMAS/PP/HMS.3/3/2021)* (in Bahasa). Pejabat Pengelola Informasi dan Dokumentasi Kementerian Lingkup Hidup dan Kehutanan. https://ppid.menlhk.go.id/berita/siaran-pers/5848/laju-deforestasi-indonesia-turun-7503

Ministry of Environment and Forestry. (2022). *The state of Indonesia's forests 2022.* https://backpanel.kemlu.go.id/Shared%20Documents/The%20State%20of%20Indonesias%20Forest%202022.pdf

Ministry of National Development Planning/Bappenas. (2019). *Visi Indonesia 2045* (in Bahasa). https://perpustakaan.bappenas.go.id/e-library/file_upload/koleksi/migrasi-data-publikasi/file/Policy_Paper/Dokumen%20lengkap%202045_final.pdf

Nasution, A. (2000). The meltdown of the Indonesian economy: Causes, responses and lessons. *ASEAN Economic Bulletin, 17*(2), 148–162. http://www.jstor.org/stable/25773625

Organisation for Economic Co-operation and Development. (2009). *Measuring capital: OECD handbook.* https://www.oecd.org/sdd/productivity-stats/43734711.pdf

Pratomo, D. S., Syafitri, W., & Anindya, C. S. (2020). Expanding middle class in Indonesia. *The Journal of Indonesia Sustainable Development Planning, 1*(3), 307–312. https://doi.org/10.46456/jisdep.v1i3.103

PwC. (2023). *Oil and gas in Indonesia: Investment and taxation guide 2023* (12th ed.). https://www.pwc.com/id/en/pwc-publications/industries-publications/energy--utilities---mining-publications/oil-gas-guide-2023.html

Rand. (2007). *Indonesian family life survey (IFLS-4)*. https://www.rand.org/well-being/social-and-behavioral-policy/data/FLS/IFLS/ifls4.html

Rand. (2014). *Indonesian family life survey (IFLS-5)*. https://www.rand.org/well-being/social-and-behavioral-policy/data/FLS/IFLS/ifls5.html

Sigit, H. (2004). *Total factor productivity growth: survey report.* Asian Productivity Organization. https://www.apo-tokyo.org/wp-content/uploads/2014/07/ind-04-tfpg.pdf

UN Environment & Convention on Biological Diversity. (2019, October 14). *Sixth national report for the Convention on Biological Diversity.* https://asean.chm-cbd.net/sites/acb/files/2020-04/6NR_IDN.pdf

UNEP GRID Geneva & European Commission. (n.d.). *Interactive country fiches: Indonesia.* https://dicf.unepgrid.ch/about-and-terms

United Nations. (2021). *System of Environmental-Economic Accounting: Ecosystem Accounting (SEEA EA)* (White cover publication, pre-edited text subject to official editing). https://seea.un.org/ecosystem-accounting.

United Nations. (2023). *Valuing what counts: Framework to progress beyond Gross Domestic Product* (Our Common Agenda Policy brief 4). https://www.un.org/sites/un2.un.org/files/our-common-agenda-policy-brief-beyond-gross-domestic-product-en.pdf

United Nations University International Human Dimensions Programme on Global Environmental Change and UN Environment Programme. (2014). *Inclusive wealth report 2014: Measuring progress toward sustainability.* Cambridge University Press. https://www.greengrowthknowledge.org/research/inclusive-wealth-report-2014-measuring-progress-toward-sustainability

UN Statistics Division. (n.d.). *Glossary of the 1993 SNA.* https://unstats.un.org/unsd/nationalaccount/glossary.asp

UN Statistics Division. (2011). *Revision of the System of Environmental-Economic Accounting (SEEA).* https://unstats.un.org/unsd/envaccounting/seearev/Chapters/chapters1-6v4.pdf

U.S. Department of State. (2021). *Investment climate statements: Indonesia.* https://www.state.gov/reports/2021-investment-climate-statements/indonesia/

U.S. Geological Survey. (n.d.). *Data.* https://www.usgs.gov/products/data

World Bank. (n.d.). Current health expenditure (% of GDP) – Indonesia, East Asia & Pacific. https://data.worldbank.org/indicator/SH.XPD.CHEX.GD.ZS?locations=ID-Z4

World Bank. (2019). Agriculture, forestry, and fishing, value added per worker (constant 2015 US$) – Indonesia. World Bank Data. https://data.worldbank.org/indicator/NV.AGR.EMPL.KD?locations=ID

World Bank. (2020). *Revealing how Indonesia's subnational governments spend their money on education: Subnational education public expenditure review 2020.* https://www.worldbank.org/en/country/indonesia/publication/subnational-education-public-expenditure-review-2020

World Bank. (2021). *The changing wealth of nations 2021: Managing assets for the future.* https://openknowledge.worldbank.org/entities/publication/e1399ed3-ebe2-51fb-b2bc-b18a7f1aaaed

World Bank. (2022). *Indonesia.* Climate Change Knowledge Portal. https://climateknowledgeportal.worldbank.org/country/indonesia

Word Bank. (2024). DataBank. https://databank.worldbank.org/

World Bank & Asian Development Bank. (2021). *Climate risk country profile: Indonesia 2021.* https://www.adb.org/publications/climate-risk-country-profile-indonesia

World Meteorological Organization. (2017). *WMO guidelines on the calculation of climate normals* (WMO-No. 1203). https://library.wmo.int/idurl/4/55797

World Wildlife Fund. (n.d.). *Coral Triangle facts.* https://wwf.panda.org/discover/knowledge_hub/where_we_work/coraltriangle/coraltrianglefacts/#:~:text=76%25%20(605)%20of%20the,%25%20of%20the%20world's%20total)

Appendix A. Produced Capital

A.1 Details of Produced Capital Index Measurements

For estimating produced capital stocks time-series data, a simplified approach was adapted from the *Measuring Capital* handbook (Organisation for Economic Co-operation and Development [OECD], 2009). It consists of three main steps. First, for economic growth, Gross Fixed Capital Formation (GFCF) and its breakdown are deflated using an appropriate price index. Second, the initial capital stock of 1990 is estimated. Third, a time series of produced capital stocks from 1990 to the most recent year in real prices is estimated by accumulating GFCF and considering depreciation.

Adopting the OECD approach, a reasonable estimate of the stock of any produced asset in any year is derived by dividing the value of the gross investment in that asset in that year by the sum of the asset's deprecation rate plus the long-term growth rate of real GDP. Equation 1 expresses this approach in algebraic notation:

$$K_0^{ij} = \frac{I_0^{ij}}{(\partial^{ij} + \theta)}$$

$$\boxed{1}$$

where,

- K_0^{ij} is the real value of the produced capital stock of type i ($i \in$ machinery, buildings, etc.) in industry j ($j \in$ agriculture, forestry, mining, manufacturing, etc.) in the base year
- I_0^{ij} is the real value of GFCF of capital type i in industry j in the base year
- ∂^{ij} is the annual rate of depreciation of capital type i in industry j (a constant)
- θ is the long-term annual growth of real GDP in the economy (a constant).

In implementing Equation 1, we want to avoid situations in which an outlier GFCF value for 1990 would unduly influence the value of I_0^{ij}. To avoid this, we propose to average GFCF from 1988 to 1992 to estimate the value of I_0^{ij}. Equation 2 expresses this in algebraic terms:

$$I_0^{ij} = \frac{\sum_{t=1988}^{1992} I_t^{ij}}{5}$$

$$\boxed{2}$$

where I_t^{ij} is the real value of GFCF of capital type i in industry j in year t ($t \in \{1988,1989,1990,1991,1992\}$).

Values for the annual rate of depreciation of produced capital by type and industry (∂^{ij}) and for long-term real economic growth (θ) are employed. We applied a deprecation rate of 3%, as suggested by the survey report of the Asian Productivity Organization, specifically for the Indonesia case (Sigit, 2004).

Once initial capital was obtained, a time series of real capital stock estimates for 1990 to the present for each industry and capital type was estimated. This was accomplished by using a

simple approach of accumulating real GFCF each year and depreciating the capital stock of the previous year. This is shown algebraically in Equation 3:

$$K_t^{ij} = K_{t-1}^{ij} + GFCF_t^{ij} - (\partial^{ij} \times K_{t-1}^{ij})$$

<div style="text-align:right">**3**</div>

where,

- K_t^{ij} is the real value of the produced capital stock of type i in industry j in year t

- K_{t-1}^{ij} is the real value of the produced capital stock of type i in industry j in year $t-1$

- $GFCF_t^{ij}$ is the real value of GFCF of produced capital of type i in industry j in year t

- and other variables are as previously defined.

Annual data covering the period 1990–2020 are utilized in this produced capital estimation. Data for economic growth, investment, GFCF, and its sectoral breakdown are derived from BPS-Statistics Indonesia. BPS-Statistics Indonesia provides GFCF and GDP in local currency, based on different System of National Account (SNA), SNA 1968 Seri 1983 (1990–1993), SNA 1968 Seri 1993 (1993–2000), SNA 1993 Seri 2000 (2000–2010), SNA 2008 (2010–2020). We also calculate the Produced Capital estimation in USD.

A.2 Data Overview of Produced Capital Index

Table A1. Data used in the calculation of the Produced Capital Index

Fiscal year	Produced capital (billion IDR)	Produced capital per capita (IDR)	Produced capital (USD billion)	Produced capital per capita (USD)	Nominal GDP (GDP at current market prices) in IDR billion	Real GDP (GDP at constant market prices) in IDR billion	Real GDP growth (%)	Consumer Price Index (CPI), 2017=100	Gross fixed capital formation in IDR billion	Gross fixed capital formation in USD billion	Gross fixed capital formation as % GDP	Population in millions	Population growth rate (%)
1990	7,789,955	43,459,142	1,659	9,255	249,843	2,807,571	7.2	9	713,556	151.96	31	179.25	0.06
1991	8,305,216	45,398,556	1,769	9,668	290,596	2,984,427	6.9	10	748,960	159.50	31	182.94	2.06
1992	8,828,124	47,452,136	1,880	10,106	331,959	3,170,677	6.5	10	772,064	164.42	30	186.04	1.70
1993	9,341,043	49,388,072	1,989	10,518	385,778	3,359,765	6.5	11	777,763	165.63	30	189.14	1.66
1994	9,932,166	51,671,764	2,115	11,004	447,127	3,587,941	7.5	12	871,354	185.57	32	192.22	1.63
1995	10,610,667	54,482,185	2,260	11,603	531,699	3,899,255	8.2	14	976,467	207.95	34	194.75	1.32
1996	11,395,718	57,461,262	2,427	12,237	623,008	4,231,487	7.8	15	1,103,370	234.98	36	198.32	1.83
1997	12,224,536	60,711,933	2,603	12,929	734,290	4,695,002	4.7	16	1,170,690	249.31	37	201.35	1.53
1998	12,868,395	62,959,232	2,740	13,408	1,118,058	4,511,670	-13.1	25	1,010,595	215.22	29	204.39	1.51
1999	13,246,716	63,858,954	2,821	13,600	1,286,486	4,308,946	0.8	30	764,373	162.78	23	207.44	1.49
2000	13,767,599	68,417,180	2,932	14,570	1,479,725	4,779,867	4.9	31	918,285	195.56	26	201.23	-2.99
2001	14,321,418	68,708,685	3,050	14,632	1,752,882	5,078,230	3.6	35	966,847	205.90	26	208.44	3.58
2002	14,836,081	70,292,190	3,160	14,970	1,939,754	5,021,989	4.5	39	944,305	201.10	26	211.06	1.26
2003	15,372,544	71,927,655	3,274	15,318	2,144,012	5,199,466	4.8	41	981,546	209.03	25	213.72	1.26
2004	16,125,629	74,512,493	3,434	15,868	2,444,427	5,589,078	5.0	44	1,214,261	258.59	28	216.42	1.26

Fiscal year	Produced capital (billion IDR)	Produced capital per capita (IDR)	Produced capital (USD billion)	Produced capital per capita (USD)	Nominal GDP (GDP at current market prices) in IDR billion	Real GDP (GDP at constant market prices) in IDR billion	Real GDP growth (%)	Consumer Price Index (CPI), 2017=100	Gross fixed capital formation in IDR billion	Gross fixed capital formation in USD billion	Gross fixed capital formation as % GDP	Population in millions	Population growth rate (%)
2005	17,040,843	78,156,478	3,629	16,644	2,953,850	6,114,675	5.7	48	1,398,983	297.93	29	218.03	0.75
2006	18,049,217	81,030,159	3,844	17,256	3,555,352	6,506,862	5.5	55	1,519,599	323.62	28	222.75	2.16
2007	19,254,582	85,332,437	4,101	18,173	4,206,620	7,235,255	6.3	58	1,746,841	372.01	29	225.64	1.30
2008	20,880,895	91,373,158	4,447	19,459	5,268,999	8,221,707	6.0	64	2,203,951	469.36	31	228.52	1.28
2009	22,941,332	99,154,521	4,886	21,116	5,969,072	8,922,710	4.6	67	2,686,863	572.20	30	231.37	1.25
2010	25,278,507	106,372,523	5,383	22,653	6,864,133	9,759,590	6.2	70	3,025,415	644.30	31	237.64	2.71
2011	27,829,113	115,000,754	5,927	24,491	7,831,726	10,569,243	6.2	74	3,308,961	704.69	32	241.99	1.83
2012	30,642,507	124,854,769	6,526	26,589	8,615,705	11,150,087	6.0	77	3,648,267	776.94	33	245.43	1.42
2013	33,434,374	134,372,755	7,120	28,616	9,546,134	11,609,735	5.6	82	3,711,142	790.33	33	248.82	1.38
2014	36,359,996	144,191,403	7,743	30,707	10,569,705	12,081,942	5.0	87	3,928,654	836.66	32	252.16	1.35
2015	39,333,683	153,894,932	8,377	32,774	11,526,333	12,387,222	4.9	93	4,064,486	865.58	32	255.59	1.36
2016	42,347,757	163,823,329	9,018	34,888	12,401,729	12,874,085	5.0	96	4,194,085	893.18	32	258.50	1.14
2017	45,447,899	173,893,027	9,679	37,033	13,589,826	13,589,826	5.1	100	4,370,575	930.77	33	261.36	1.11
2018	48,727,183	184,459,752	10,377	39,283	14,838,756	14,378,870	5.2	103	4,642,721	988.73	33	264.16	1.07
2019	52,082,043	195,128,216	11,092	41,555	15,832,535	14,890,578	5.0	106	4,816,675	1,025.77	33	266.91	1.04
2020	55,039,154	203,694,878	11,721	43,379	15,434,152	14,242,306	-2.1	108	4,519,572	962.50	32	270.20	1.23

Source: Authors' calculation based on data from BPS-Statistics Indonesia and the World Bank DataBank.

Table A2. Produced capital by asset type in billions of IDR

	Building	Machines and equipment	Vehicles	Others	Total
2000	10,367,003	1,232,069	840,539	1,327,988	13,767,599
2001	10,766,981	1,278,658	888,715	1,387,064	14,321,418
2002	11,151,935	1,327,808	925,828	1,430,510	14,836,081
2003	11,594,515	1,363,345	940,852	1,473,832	15,372,544
2004	12,141,855	1,447,558	978,052	1,558,164	16,125,629
2005	12,789,681	1,563,137	1,039,644	1,648,381	17,040,843
2006	13,548,335	1,645,624	1,103,196	1,752,062	18,049,217
2007	14,451,428	1,764,416	1,160,272	1,878,465	19,254,582
2008	15,623,808	1,945,537	1,260,001	2,051,549	20,880,895
2009	17,164,317	2,141,556	1,376,934	2,258,526	22,941,332
2010	18,900,793	2,382,564	1,512,361	2,482,789	25,278,507
2011	20,746,563	2,682,700	1,669,761	2,730,089	27,829,113
2012	22,762,534	3,024,283	1,860,459	2,995,230	30,642,507
2013	24,792,898	3,352,178	2,030,461	3,258,837	33,434,374
2014	26,944,259	3,671,397	2,189,130	3,555,210	36,359,996
2015	29,157,027	3,981,084	2,341,575	3,853,998	39,333,683
2016	31,418,445	4,254,695	2,509,221	4,165,396	42,347,757
2017	33,747,452	4,546,875	2,687,005	4,466,566	45,447,899
2018	36,173,515	4,905,461	2,878,666	4,769,541	48,727,183
2019	38,684,492	5,273,918	3,053,321	5,070,311	52,082,043
2020	40,937,654	5,568,344	3,186,624	5,346,532	55,039,154

Source: Authors' calculation based on data from BPS-Statistics Indonesia.

Table A3. Produced capital by sector in billions of IDR

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Agriculture, forestry, and fishing	3,061,424	3,220,328	3,434,216	3,616,199	3,782,827	4,036,101	4,267,876	4,501,593	4,724,544
Mining and quarrying	2,356,480	2,465,704	2,590,460	2,729,440	2,911,837	3,134,847	3,283,007	3,423,209	3,576,246
Manufacturing	5,539,278	5,873,011	6,208,521	6,560,387	6,875,398	7,096,765	7,503,223	7,918,014	8,364,045
Electricity and gas	786,910	846,227	919,142	960,196	1,000,887	1,036,877	1,078,870	1,166,454	1,269,003
Water supply, sewerage, waste management, and remediation activities	140,393	148,012	159,115	165,002	169,982	180,038	200,076	218,161	240,646
Construction	1,476,952	1,536,947	1,604,742	1,731,634	1,865,644	1,945,278	1,993,005	2,088,792	2,139,187
Wholesale and retail trade, repair of motor vehicles and motorcycles	1,487,496	1,581,616	1,709,139	1,774,167	1,833,846	1,939,835	2,051,843	2,181,544	2,350,919
Transportation and storage	2,039,099	2,165,150	2,256,924	2,380,189	2,518,265	2,651,165	2,745,488	2,859,386	3,012,080
Accommodation and food service activities	594,495	625,618	657,116	694,712	746,580	786,682	820,811	849,578	882,958
Information and communication	844,804	879,852	933,754	990,877	1,056,239	1,128,174	1,202,281	1,260,867	1,365,948
Financial and insurance activities	398,599	422,647	441,942	470,894	499,335	538,147	573,859	603,453	632,916
Real estate activities	4,364,272	4,589,374	4,862,306	5,144,727	5,438,944	5,747,116	6,083,126	6,462,608	6,910,015

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Business activities	354,598	375,246	399,239	409,247	445,949	481,040	515,531	551,673	584,845
Public administration and defence, compulsory social security	1,997,347	2,107,963	2,223,987	2,374,220	2,500,615	2,673,040	2,829,189	3,024,919	3,187,161
Education	885,731	927,201	968,892	1,034,881	1,103,066	1,176,871	1,236,912	1,264,696	1,288,741
Human health and social work activities	487,579	512,490	538,959	566,052	603,128	632,836	685,350	727,554	766,956
Other services activities	604,250	636,091	665,348	708,138	761,563	817,227	893,113	950,918	999,913
Total	**42,741,164**	**28,916,739**	**30,573,801**	**32,310,962**	**34,114,104**	**36,002,037**	**37,963,560**	**40,053,416**	**65,870,974**

Source: Authors' calculation based on data from BPS-Statistics Indonesia.

Appendix B. Measuring Human Capital

The Human Capital Index presented here is based on the discounted flow of total market labour compensation. Conceptually, we value human capital for a particular year based on the accumulated present value of its expected future returns (i.e., labour income).

First, we calculate the total market labour compensation for each year. This is obtained from input/output (IO) tables for 1995, 2000, 2005, 2010, and 2016. For other data points, we interpolate based on the average share of labour income to GDP for each of the nine sectors. We consider what part of Indonesia's GDP is attributed to labour, which in this case are wages, and what parts of operating surplus are considered as mixed income. The latter is relevant in a country where informality is high and there is a considerable number of unincorporated enterprises, such as in Indonesia. We assume the proportion of operating surplus is mixed income, as detailed in Table B1.

Table B1. Proportion of gross operating surplus considered as mixed income

Sector	% of gross operating surplus considered mixed income
Agriculture, forestry, and fisheries	0.8
Mining and quarrying	0.2
Processing industry	0.2
Electricity, gas, and water	0
Construction	0.2
Wholesale and retail trade; car and motorcycle repair	0.8
Transportation and communication	0.3
Financial, real estate, corporate services	0.95
Services	0.95

Source: Authors' assumptions.

The second step is to take the net present value of expected future labour income, assuming the current total market labour compensation is reflective of future earnings. We utilize the following formula, where we set the discount rate (r) at 4%, as used for other accounts.

$$HC_t = LC_t/r \qquad \boxed{4}$$

where,

- HC_t is the Human Capital Index of time t
- LC_t is the labour compensation of time t
- r is the discount rate

Appendix C. Natural Capital

C.1 Details of Natural Capital Index Measurements

For each type of market natural capital, the valuation process involves three steps. Initially, the annual resource rent for each type of capital is determined by considering the generated revenue and all associated costs. Following this, the present value of the expected future rent generated from its use can be calculated by considering the first step and the asset life. The asset life is the expected time over which an asset can be used in production, considering the available physical stock of the asset. Finally, to adjust the annual resource rent for inflation, a suitable price index is applied, enabling the derivation of a real per capita measure of market natural capital wealth.

Step 1: Estimating the annual resource rent

Estimating resource rent requires data on revenues, costs, interest rates, produced assets used in the production, and the depreciation rate of produced assets. The rent is derived from the equation below:

$$RR_t^i = TR_t^i - C_t^i - (r_K K_t^i + \partial^i)$$

<div style="text-align:right">**5**</div>

where,

- RR_t^i = rent of market natural asset i in year t
- TR_t^i = total revenue from resource extraction (net of subsidies) of market natural asset i in year t
- C_t^i = total extraction costs (materials, energy, labour) of the market natural asset i in year t
- r_K = rate of return to capital
- K_t^i = the value of the Produced Capital stock used in the extraction process of market natural capital asset i in year t
- ∂^i = depreciation of produced assets used in the production of market natural capital asset i, assumed constant.

Step 2: Estimating the present value of the expected future rent

The monetary value (wealth) of a market natural asset i is computed as the present value of the expected future rent generated from its use:

$$V_t^i = \sum_{t=1}^{T} \frac{RR_t^i}{(1 + r_d)^t}$$

<div style="text-align:right">**6**</div>

where,

- V_t^i = in situ value of the market natural asset i in year t
- T = the expected remaining asset life (infinity in the case of renewable resources)
- r_d = discount rate
- RRt = annual resource rent (in equation 5).

Step 3: Aggregation and deflation

The final estimated series of natural capital values should be deflated since comprehensive wealth is measured in real (or inflation-adjusted) terms. Prior to deflating, the total value of all natural assets in year t is estimated by summing all individual V_t^i calculated in equation 6:

$$V_t^T = \Sigma_{i=1}^{N} V_t^i$$

| 7 |

where,

- V_t^T is the total value of natural capital in year t
- N is the number of individual natural assets.

To deflate the nominal value of natural capital, the overall GDP implicit price index is applied. The overall implicit price index for GDP can be derived by dividing the nominal value of GDP by its real value. This study uses 2017 as the base year.

C.2 Data Sources of Natural Capital Measurements

The index is created by combining the BPS-Statistics Indonesia quantity index of fossil fuels, minerals, and agricultural land with estimates of commercial timber volumes and built-up land into an annual quantity index for 1990 to 2020.

Table C1. Natural capital components: Data sources

Component	Variables	Data sources	Notes
Market assets			
Agriculture	Cost	BPS-Statistics Indonesia	Survey of Farmer Business (1990–2018), Interpolated for other years and several commodities
	Production	Ministry of Agriculture	
	Price	FAO and Ministry of Agriculture	Producer price data, interpolated for missing data

Component	Variables	Data sources	Notes
Aquaculture	Cost	BPS-Statistics Indonesia	Survey of Aquaculture Business (1993 & 2014), Others interpolated
	Production	BPS-Statistics Indonesia	Statistics of Aquaculture (1990–2020)
	Revenue	BPS-Statistics Indonesia	Statistics of Aquaculture (2000–2020), 1990–1999 Interpolated
Fisheries	Cost	BPS-Statistics Indonesia	Survey of Fisheries Business (1993 & 2014), Others Interpolated
	Production	BPS-Statistics Indonesia	Statistics of Fisheries (1990–2020)
	Revenue	BPS-Statistics Indonesia	Statistics of Fisheries (2000–2020), 1990–1999 Interpolated
Forestry	Cost	BPS-Statistics Indonesia	Statistics of Forest Concession Establishment 1990–2020, Statistics of Timber Culture Estate 1993–2020 (Timber Culture is Interpolated from 1990–1992)
	Production	BPS-Statistics Indonesia	Statistics of Forest Concession Establishment 1990–2020, Statistics of Timber Culture Estate 1993–2020 (Timber Culture is Interpolated from 1990–1992)
	Revenue	BPS-Statistics Indonesia	Statistics of Forest Concession Establishment 1990–2020, Statistics of Timber Culture Estate 1993–2020 (Timber Culture is Interpolated from 1990–1992)
Livestock	Cost	BPS-Statistics Indonesia	Livestock Business Cost Structure 2014 & 2017 (Cost is interpolated for other data points)
	Production	BPS-Statistics Indonesia	Statistics of Livestock 2000–2020 (Production is Interpolated from 1990–1999)
	Price	BPS-Statistics Indonesia	Consumer and producer price statistics 2009-2020 (Price is interpolated based on export/import prices for 1990–2009)

Component	Variables	Data sources	Notes
Fossil	Cost	BPS-Statistics Indonesia	Mining Statistics of Petroleum and Gas (1990–2020)
	Depreciation	BPS-Statistics Indonesia	Mining Statistics of Petroleum and Gas (1990–2020)
	Production	BPS-Statistics Indonesia	Mining Statistics of Petroleum and Gas (1990–2020)
	Rate of return	Financial Services Authority of Indonesia (2019)	
	Reserve	U.S. Energy Information Administration (2022)	
	Revenue	BPS-Statistics Indonesia	Mining Statistics of Petroleum and Gas (1990–2020)
Minerals	Cost	BPS-Statistics Indonesia	Mining Statistics of Non-Petroleum and Gas (1990–2020)
	Depreciation	BPS-Statistics Indonesia	Mining Statistics of Non-Petroleum and Gas (1990–2020)
	Production	BPS-Statistics Indonesia	Mining Statistics of Non-Petroleum and Gas (1990–2020)
	Rate of return	Financial Services Authority of Indonesia (2019)	
	Reserve	BPS-Statistics Indonesia and USGS	
	Revenue	BPS-Statistics Indonesia	Mining Statistics of Non-Petroleum and Gas (1990–2020)
Non-market assets			
Precipitation		BPS-Statistics Indonesia	
Temperature		BPS-Statistics Indonesia	

Source: Authors' elaborations.

Appendix D. Measuring Financial Capital

In this study, the Financial Capital Index (FCI) is represented by the international investment position (IIP), which is calculated as follows:

$$\textit{Net foreign assets} = \textit{total foreign assets} - \textit{total foreign liabilities}$$

$$\boxed{8}$$

Total foreign assets consist of direct investment, portfolio investment, financial derivatives, other investments, and reserve assets, whereas total foreign liabilities comprise the exact same components, with the exception of reserve assets, as the nature of reserve assets does not entail corresponding liabilities.

Note that Indonesia's IIP does not yet include the international investment activity of households. Other noteworthy points include:

- The direct investment position is based solely on data from companies participating in the direct investment survey and the Foreign Exchange Transactions in the International Transactions Reporting System, as well as contractors in the oil and gas sector.
- In terms of financial derivatives, it exclusively encompasses the banking sector.
- Finally, the international investment activities of the general government may not be fully accounted for by the existing sources and methodologies.

These nuances should be considered when utilizing Indonesia's IIP data for analysis and decision making. The IIP values were obtained from Bank Indonesia for the period 2001–2020. Financial capital is calculated by deflating the nominal values of Bank Indonesia's IIP using the Indonesian Consumer Price Index (constant 2017) and dividing it by the population.

Appendix E. Measuring Social Capital

Social capital is assessed through various measures derived from multiple datasets. The main source is the World Values Survey (WVS) (Inglehart et al., 2022), conducted in Indonesia in 2001 (Wave 4, n = 1,000), 2006 (Wave 5, n = 2,015), and 2018 (Wave 7, n = 3,200). The WVS contains questions related to group membership, political actions, trust, confidence in institutions, and tolerance. It also covers the widest time length compared to other possible data sources, with many questions comparable across waves. However, its sample size is relatively small, and its regional sampling is not as thorough as other samples (despite being designed to represent Indonesia). This study utilized the individual-level sections from the 2007 and 2014 iterations of the Indonesian Family Life Survey (IFLS). Results from the IFLS can be seen as representative of the Indonesian population living in the 13 IFLS provinces in 2007 and 2014. Lastly, the calculation also utilized BPS-Statistics Indonesia (2014a), which reports the results of the social resilience modules in the 2012 and 2014 Socio-Economic Surveys (n = 75,000 in 2014). While the BPS-Statistics Indonesia data uses a larger sample size drawn from all provinces of Indonesia, it lacks the time span to cover the period of interest. Table E1 compares the three data sources:

Table E1. Comparison of the main data sources

	WVS	IFLS	Socio-Economic Survey (Social Resilience)
Temporal coverage	2001, 2006, 2018	2007, 2014	2012, 2014
Sample size	2001: n = 1,000 2006: n = 2,015 2018: n = 3,200	2007: 29,000 2014: 31,000	2014: 75,000
Regional coverage	2001: 5/34 provinces 2006: 10/34 provinces 2018: 20/34 provinces	13/34 provinces	34/34 provinces with sampling in all cities/regencies
Intended represented population	Adult population of Indonesia	Adult population of the 13 provinces sampled	Adult population of Indonesia
Covered items	Group membership, political actions, trust, confidence in institutions, as well as tolerance	Trust, tolerance	Community participation, trust, tolerance

	WVS	IFLS	Socio-Economic Survey (Social Resilience)
Advantage	Extensive list of questions and objects, extensive temporal coverage, key items are consistent over waves, open access	Adequate list of questions, possibility to conduct cross-section and longitudinal analysis	Large sample size, large population size, several key items are covered
Disadvantage	Sample size and regional coverage are relatively small, different surveying standards between waves	Regional coverage is relatively small, temporal coverage is relatively small (only 7 years)	Questions differ over waves, consistency between waves is not as robust as IFLS or WVS, limited temporal coverage, limited access

Sources: BPS-Statistics Indonesia, 2012, 2014a; Inglehart et al., 2022; Rand, 2007, 2014.

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