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Fiscal Policy and Development: Human, Social, and Physical Investment for the SDGs

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Fiscal Affairs Department

Fiscal Policy and Development: Human, Social, and Physical Investment for the SDGs

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EXECUTIVE SUMMARY

In September 2015, world leaders gathered at the United Nations endorsed the 17 Sustainable Development Goals (SDGs) as a road map to more inclusive growth and development that respects the limits of nature. In this Staff Discussion Note we focus on investment in human, social, and physical capital, which are at the core of sustainable and inclusive growth and represent an important share of national budgets—specifically, education, health, roads, electricity, and water and sanitation.

The goal of this paper is to estimate the additional annual spending required for meaningful progress on the SDGs in these areas. Our estimates refer to additional spending in 2030, relative to a baseline of current spending to GDP in these sectors. Toward this end, we apply an innovative costing methodology to a sample of 155 countries: 49 low-income developing countries, 72 emerging market economies, and 34 advanced economies. And we refine the analysis with five country studies: Benin, Guatemala, Indonesia, Rwanda, and Vietnam.

Our main finding is that delivering on the SDG agenda will require additional spending in 2030 of US$0.5 trillion for low-income developing countries and US$2.1 trillion for emerging market economies.

There is a sharp contrast between the two groups. For emerging market economies, the average additional spending required represents about 4 percentage points of GDP. This is a considerable challenge, but in most cases these economies can rely on their own resources to achieve these SDGs. How it can be done is illustrated by the country study for Indonesia.

The challenge is much greater for low-income developing countries. Here, the average additional spending represents 15 percentage points of GDP. Some countries in this group—such as Vietnam—have additional spending needs similar to those of Indonesia and other emerging market economies. But others, including Rwanda and Benin, will require additional spending of more than 15 percentage points of GDP in 2030.

Countries themselves own the responsibility for achieving the SDGs, especially through reforms to foster sustainable and inclusive growth that will in turn generate the tax revenue needed. Efforts should focus on strengthening macroeconomic management, combating corruption and improving governance, strengthening transparency and accountability, and fostering enabling business environments.

Raising more domestic revenue is an essential component of this strategy. Increasing the tax-to-GDP ratio by 5 percentage points of GDP in the next decade is an ambitious but reasonable target in many countries.

Addressing spending inefficiencies is also critical—countries need to spend not only more, but better. We estimate that countries could save about as much through efficiency efforts as through tax reforms.

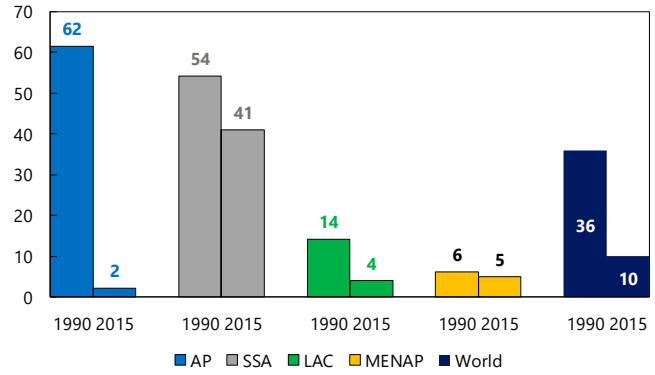
But in addition to domestic resources, the scale of the additional spending needs in low-income developing countries requires support from all stakeholders—including the private sector, donors, philanthropists, and international financial institutions. Delivering on official development assistance targets can help in closing development gaps in many LIDCs. A national reform agenda that maps the SDGs to national circumstances should articulate the complementary role of the various development partners.

I. INTRODUCTION

1. Progress has been achieved in key human development areas over the past few decades, but poverty remains high in some regions. Globally, since 1990, over a billion people have been lifted out of extreme poverty, infant mortality has decreased from 65 to 31 deaths per 1,000 births, and the share of primary-school-age children out of school has fallen from 18 to 9 percent. These developments reflect robust economic growth and coordinated national and global efforts under the United Nations Millennium Development Goals (MDGs). However, global progress masks regional disparities (Figure 1). In eastern and southern Asia, China and India have led a substantial reduction in poverty. In contrast, in sub-Saharan Africa progress has been limited, and countries in this region remain among those in the world with higher poverty. Furthermore, the global decline in poverty rates has slowed (World Bank, 2018).

Figure 1. Extreme Poverty by Region, 1990 and 2015

(Percent of population living on less than US$1.90 a day)



Source: IMF staff calculations using World Bank Poverty and Equity database.
Note: AP = Asia and Pacific; LAC = Latin America and the Caribbean; MENAP = Middle East, North Africa, Afghanistan, and Pakistan; SSA = sub-Saharan Africa.

2. The Sustainable Development Agenda aspires to a world free of poverty and deprivation. In 2015, the global community agreed on implementing a comprehensive development agenda by 2030, building on the substantial progress achieved under the MDGs. The Sustainable Development Goals (SDGs) (1) set wider-ranging targets in the original MDG areas; (2) expand the number of goals from 8 to 17, acknowledging interactions between goals and including issues such as climate change and good governance; (3) apply to every country, including advanced economies; (4) reflect deeper civil society participation compared with the government-led process that begot the MDGs; and (5) expand sources of financing, supplementing aid flows—when needed—with sustainable sources, such as countries' own tax revenues.

3. Fulfilling the 2030 Agenda requires sustainable and inclusive economic growth. On average, countries with higher per capita income have better SDG outcomes (Figure 2). The median composite SDG index score—a measure that tracks performance across all SDG areas—for advanced economies is 78 percent, which implies that they are 22 percent short of reaching

the SDGs.[2] In contrast, the median score for low-income developing countries is 53 percent. The variation in SDG scores is larger within low-income developing countries than within other income groups. Sharing the benefits of growth is also correlated with SDG achievement. Countries with less inequality (lower Gini coefficient) display better SDG performance (Figure 3).

Figure 2. 2017 SDG Composite Index by Income Group

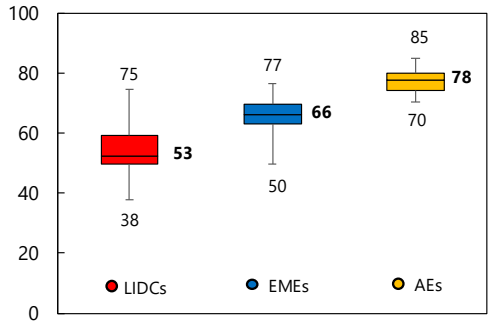
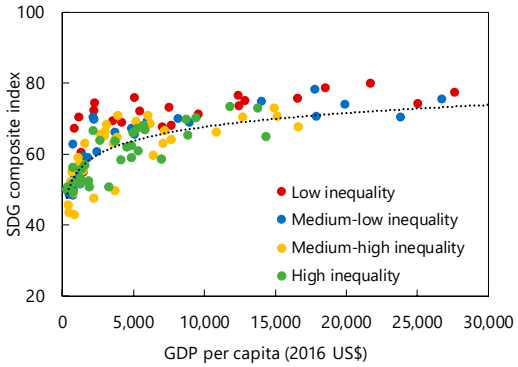


Figure 3. 2017 SDG Composite Index and Gini Coefficient 1/



Source: IMF staff calculations using data from the United Nations 2018 SDG Index and Dashboards Report.
Note: AEs = advanced economies; EMEs = emerging market economies; LIDCs = low-income developing countries.
1/ Low inequality for Gini coefficient less than 0.32; medium-low for Gini between 0.32 and 0.37; medium-high for Gini between 0.38 and 0.43; high for Gini above 0.43. The thresholds correspond to the quartiles of the sample of countries.

4. Fiscal policy has a crucial role for development. Specific SDGs were set in development areas for which public intervention is critical, including ending poverty (SDG1) and hunger (SDG2), improving health (SDG3) and education (SDG4), achieving gender equality (SDG5), reducing inequality (SDG10), and enhancing infrastructure (SDGs 6, 7, 9, 11).[3] The private sector typically plays a limited role in these areas, in part because the returns on investment may be highly uncertain or may take a long time. Public expenditure and tax revenue tend to rise with per capita income (Figure 4),[4] a pattern known as Wagner's Law (Wagner 1958). Thus, the fiscal role for redistribution, through taxes and income-related transfers, and for equalizing opportunity, through in-kind spending—including on infrastructure, education, and health—is higher in advanced economies than in emerging market economies and low-income developing countries (IMF 2017). Compared with advanced economies, low-income developing countries

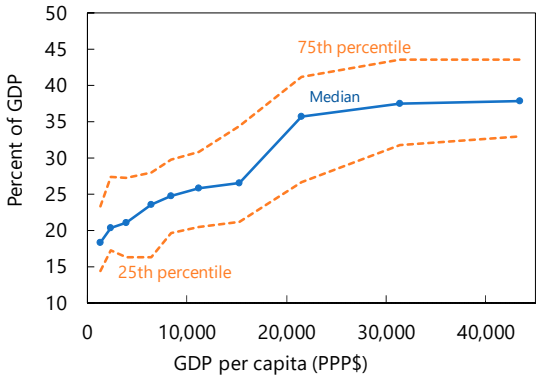
[2] The composite SDG index score is drawn from the United Nations 2018 SDG Index and Dashboards Report. It reflects countries' performance in all 17 SDG areas and ranges between the worst (0) and the best (100). The index measures the gap in achieving SDGs, and it is built using indicators underlying the SDGs, with data drawn mainly from official data sources. For more details about the methodology see Lafortune and others (2018).

[3] For example, the UN's International Covenant on Economic, Social and Cultural Rights recognizes "the right of everyone to the enjoyment of the highest attainable standard of physical and mental health" and "the right of everyone to education."

[4] For example, the median primary expenditure increases by nearly 3 percentage points of GDP from the first to the third decile in the sample.

and emerging market economies on average spend less on education, health, and infrastructure (Table 1), which is consistent with their falling behind in SDG achievement, given the importance of these expenditures for inclusive growth.[5]

Figure 4. Primary Expenditure and Income
(Percent of GDP)



Source: IMF staff calculations using *World Economic Outlook* (WEO) data.
Note: PPP = purchasing-power parity-adjusted 2011 international dollars. Unbalanced sample from the WEO covering 1990–2015.

Table 1. Spending by Functional Classification and Income Group, 2016
(Percent of GDP)

	LIDCs (n=29)	EMEs (n=58)	AEs (n=34)
Education, health, infrastructure	4.9	7.3	15.5
Of which: Education	2.3	3.2	5.2
Health	0.9	2.3	7.8
Transport	0.9	1.5	1.9
Fuel and energy	0.4	0.2	0.3
Water	0.4	0.1	0.3
Social protection	1.6	6.7	13.0
Defense, order, and safety	2.1	2.7	3.9
Other primary spending	7.9	10.6	6.1
Interest	1.4	2.1	2.0
Total	17.9	29.4	40.5

Source: IMF staff calculations using Government Finance Statistics.
Note: AEs = advanced economies; EMEs = emerging market economies; LIDCs = low-income developing countries. Sample size in parentheses. The figures reported correspond to the GDP-weighted average country.

5. This note estimates the additional total—private and public—spending required to make substantial progress toward the SDGs in five areas (education, health, roads, electricity, water and sanitation). Section II summarizes the results for spending estimates in 121 emerging market economies and low-income developing countries and zooms in on five country cases (Benin, Guatemala, Indonesia, Rwanda, Vietnam). Section III makes a case for creating the conditions for growth, raising tax capacity, and enhancing spending efficiency to assist governments in the process of development. It also discusses the potential role of private sector financing and official development assistance in reaching the SDGs. Section IV emphasizes that governance is critical for development. Section V concludes.

[5] Public capital spending fosters growth, particularly in developing economies with large infrastructure gaps (Haque and Kim 2003; Bose, Haque, and Osborn 2007; Romp and de Haan 2007; Milbourne, Otto, and Miles Voss 2003). Investment in human capital (such as spending on education and health) can have a positive and significant impact on growth (Lucas 1988; Barro 2001), for instance by promoting technological progress with positive externalities (Baldacci and others 2008; Jamison and Summers 2013; Gerson 1998). Still, some authors have found no effect of human capital in a growth-accounting exercise (for example, Benhabib and Spiegel 1994). Several explanations were suggested, including the role of outliers (Temple 1999), the measurement quantity and quality of human capital (Barro 2001; Hanushek and Woessmann 2008), data quality (de la Fuente and Domenech 2006; Cohen and Soto 2007), and the specification of growth regressions (Hall and Jones 1999; Bils and Klenow 2000).

II. SPENDING ESTIMATES

6. Spending estimates are derived for 155 countries—34 advanced economies, 72 emerging market, and 49 low-income developing countries. The general methodology is described briefly below and in more detail in Annex 1. Spending estimates have been further refined for five country cases—Benin, Guatemala, Indonesia, Rwanda, and Vietnam—after tailoring the methodology to country-specific circumstances (Annex 2). While the methodology accounts for synergies across the sectors analyzed, spending estimates presented in this paper should be viewed with caution, as other SDG areas might involve substantial additional costs.

- *The methodology quantifies the annual cost of achieving high performance across five SDG areas* (education, health, roads, electricity, water and sanitation). For each sector, we assume that performance is a function of a set of input variables. We identify the median level of inputs for countries that perform well today, with performance being measured by SDG index scores. Then, for each country we calculate spending in 2030 by assigning these input levels and controlling for other factors such as demographics and the level of GDP per capita projected in 2030.[6]

- *The estimates are consistent with increasing spending efficiency.* Countries that perform well are also among the most efficient in terms of spending. Thus, when assigning the input levels observed in countries that perform well today to a particular country, our spending estimates for high performance assume not only more but better spending. Should improvements in efficiency not take place, the spending required to reach the SDGs would be larger.

- *We summarize the results as additional spending in 2030.*[7] For education and health care, we report additional spending in percentage points of GDP, corresponding to the difference between the share of GDP in spending consistent with high performance in 2030 and the current level of spending as a share of GDP. For physical capital, additional spending in percentage points of GDP corresponds to the annualized spending required to close infrastructure gaps between 2019 and 2030. We also report additional spending in constant 2016 dollars, derived by multiplying the additional spending in percentage points of GDP by the projected GDP in 2030 expressed in constant 2016 dollars.

- *The variation in additional spending across countries reflects various factors*. One important factor explaining the variation in additional spending is the level of expenditure today. For example, countries that spend relatively little on health usually have fewer doctors per person than countries with good health performance. Raising the number of medical professionals

[6] We focus on the annual expenditures required in 2030, as this is the end year of the SDG agenda.

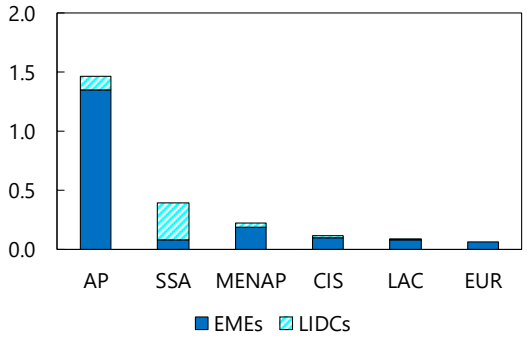
[7] Annual spending flows in 2030 are the focus, rather than stock, up to 2030, because the former is easier to compare with financing flows (such as tax revenue and official development assistance). However, spending would have to rise before 2030, so cumulative expenses up to 2030 would be significantly larger. After 2030, education and health spending would recur, whereas infrastructure spending would be expected to decline to cover depreciation of the capital stock built through 2030.

between now and 2030 accounts for some of the additional spending. Another factor is demographics. For example, countries with a large projected share of school-age children in in 2030 tend to have higher additional education spending. Current outcomes also matter. Countries with poorer roads, lower access to water and sanitation or to electricity today are expected to have higher additional spending on infrastructure.

7. Additional spending in 2030 amounts to 2.6 trillion US dollars (2.5 percent of the 2030 world GDP) in 121 emerging market economies and low-income developing countries. The focus is on these countries.[8] The Asia and Pacific region has the largest global additional spending requirement, estimated at 1.5 percent of 2030 world GDP (Figure 5). Sub-Saharan Africa has the second largest additional spending requirement, estimated at 0.4 percent of 2030 world GDP, reflecting the region's lag in development. Although sub-Saharan Africa has a greater concentration of low-income developing countries than the Asia and Pacific region, the latter accounts for a much larger share of global GDP, which pushes up its additional spending requirement when expressed as a percentage of world GDP.

Figure 5. Additional Spending in 2030 by Region and Income Group

(Percent of 2030 world GDP)



Source: IMF staff calculations.
Note: AP = Asia and Pacific; CIS = Commonwealth of Independent States; EUR = Europe; LAC=Latin America and the Caribbean; MENAP = Middle East, North Africa, Afghanistan, and Pakistan; SSA = sub-Saharan Africa; EMEs = emerging market economies; LIDCs = low-income developing countries.

8. On average, emerging market economies face additional spending of 4 percentage points of their GDP in 2030.[9] The variation in additional spending across countries largely reflects differences in income levels, current government spending, and other country-specific circumstances such as demographics (Figure 6). Emerging market economies with relatively high

[8] For advanced economies, average additional spending for electricity, roads, and water and sanitation is positive, but below 1 percentage point of GDP. In contrast, additional spending for health and education is about –3 and –1.5 percentage points of GDP, respectively. These results reflect particular challenges facing advanced economies. Addressing gaps in infrastructure must be achieved within tight fiscal constraints, while in education and health care, advanced economies must improve outcomes while controlling relatively high levels of spending.

[9] GDP-weighted average of emerging market economies.

estimated additional spending (above 8 percentage points of GDP, 75th percentile of income group) had average GDP per capita spending of US$4,200 in 2016 and additional spending driven mostly by the education sector. Countries around the median for additional spending (4.2 percentage points of GDP) are resource-rich countries whose estimates are driven largely by the health care sector. Countries below the 25th percentile for additional spending are higher-income emerging market economies, with average GDP per capita of US$9,100 in 2016.

9. The country cases for Guatemala and Indonesia illustrate the development challenges faced by emerging market economies (Figure 7). Both countries have a relatively low tax-to-GDP ratio—close to 10 percent of GDP—and large outcome gaps in key indicators. Guatemala faces more than twice the average emerging market economy additional spending, at 8.7 percentage points of GDP in 2030. This largely reflects relatively low enrollment in education and a deficient road network. Indonesia faces additional spending slightly above the emerging market economy average, at 5.6 percentage points of GDP in 2030, mainly as a result of necessary investment in health care.

Figure 6. Variation in Additional Spending Estimates in 2030 for 72 Emerging Market Economies

(Percentage points of GDP)

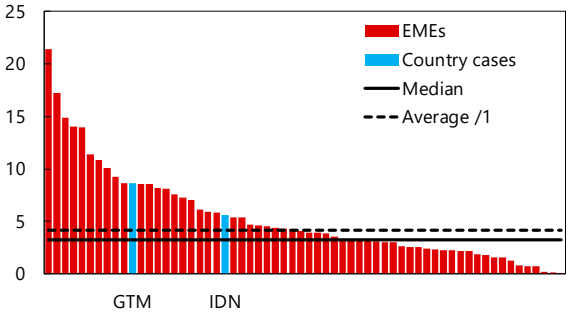
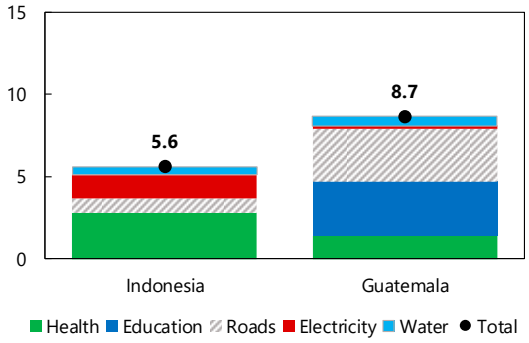


Figure 7. Additional Spending in Indonesia and Guatemala in 2030 by Sector

(Percentage points of GDP)



Source: IMF staff calculations.
Note: EMEs = emerging market economies; GTM = Guatemala; IDN = Indonesia.
1/ GDP-weighted average of emerging market economies.

10. Estimated at 15.4 percentage points of GDP in 2030, the average additional spending is larger in low-income developing countries.[10] Additional spending in these countries in 2030 is split between education and health care (8.3 percentage points of GDP) and

[10] GDP-weighted average of low-income developing countries. This estimate updates the one presented during the 2018 September 24th UN General Assembly. Accounting for the latest IMF *World Economic Outlook* GDP growth projections, additional spending for low-income developing countries in 2030 is estimated at US$528 billion (2016 US dollars), roughly similar to the previous estimate, and increases to 15.4 percentage points of GDP. The previous estimate was 14.4 percentage points of GDP, reflecting the downward revision to GDP projections.

infrastructure (7.1 percentage points of GDP). Across the 49 low-income developing countries included in the analysis, additional spending ranges from about 50 percentage points to about half a percentage point of countries' GDP in 2030 (Figure 8). This diversity in estimates largely corresponds to different development levels across low-income developing countries (Figure 9). Those with additional spending above 22 percentage points of GDP (the 75th percentile of additional spending in low-income developing countries) exhibit low GDP per capita (on average US$580 in 2016) and the need for high investment in health care. Two-thirds of the countries in this group are fragile states, which face even higher spending pressures due to security and institutional challenges.[11] Countries with additional spending near the low-income developing country median (17 percentage points of GDP) have GDP per capita of about US$1,200 in 2016 on average and spending pressure driven by education and roads. Countries with additional spending below 12 percentage points of GDP (25th percentile of additional spending in low-income developing countries) exhibit GDP per capita of about US$1,600 in 2016 on average and must invest heavily in roads.

Figure 8. Variation in Additional Spending Estimates in 2030 for 49 Low-Income Developing Countries

(Percentage points of GDP)

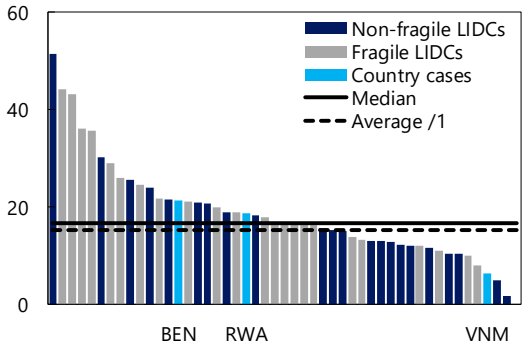
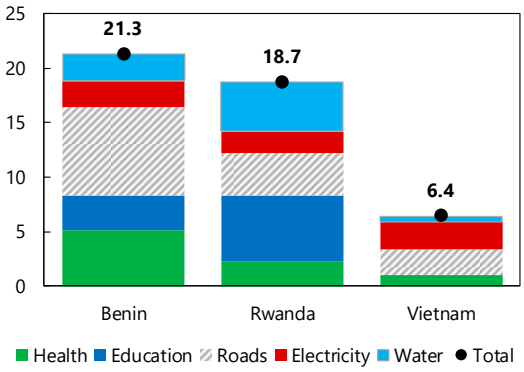


Figure 9. Additional Spending in Benin, Rwanda, and Vietnam in 2030 by Sector

(Percentage points of GDP)



Source: IMF staff calculations.
Note: BEN = Benin; LIDCs = low-income developing countries; RWA = Rwanda; VNM = Vietnam.
1/ GDP-weighted average of low-income developing countries.

11. From a global perspective, additional spending in low-income developing countries in 2030 amounts to about half a trillion US dollars—US$528 billion—equivalent to half a percentage point of 2030 world GDP. These countries' spending requirements as a percentage of world (or advanced economy) GDP help put into perspective the size of the development

[11] The IMF defines fragile states as those having either weak institutional capacity measured by their World Bank Country Policy and Institutional Assessment score (average of 3.2 or lower) and/or an experience of conflict (signaled by the presence of a peace-keeping or peace-building operations in the most recent three-year period).

challenge for this income group.[12] Although the additional spending seems insurmountable for many individual low-income developing countries from a national perspective, it is manageable as a global endeavor.

12. Our additional spending estimates are comparable to estimates in the literature. Reconciling cost estimates across studies, including ours, is complicated given differences in country groupings, sectoral coverage, spending definitions, and years for which estimates are reported. After adjusting for these factors, our estimates—additional spending of US$1.4 trillion on roads, electricity, and water and sanitation and US$1.2 trillion on education and health care—fall in the range of those by other studies (Annex 4). Nevertheless, uncertainty surrounds the estimates presented in this paper as well as those in the literature. First, as noted above, our estimates could be a lower bound of the spending pressures faced by low-income developing countries and emerging market economies, as only 5 sectors out of 17 are included in the exercise. Second, growth projections could deviate from the baseline projections. Other growth paths—as highlighted in the next section—would significantly affect the estimates of additional spending. Last, changes in the underlying assumptions of the methodology could also affect the spending estimates.

III. FINANCING THE SDGs

A. Creating Conditions for Economic Growth

13. Fostering inclusive growth through 2030 would lower the estimates of additional spending. Structural reforms that boost the level and durability of growth can help address development needs.[13] We estimate that doubling projected GDP per capita in 2030 would reduce additional spending by 4.5 percentage points (Figures 10 and 11). The country case of Vietnam illustrates how growth accompanied by a national reform agenda helps in addressing development challenges. Today, Vietnam faces additional spending of 6.4 percentage points in 2030, among the lowest in low-income developing countries and comparable to the development challenge faced by many emerging market economies. The extreme poverty rate is 5 percent, and education and health outcomes are comparable to those in the emerging market economies. Part of this reflects the pace of economic growth (since the 1980s, Vietnam's GDP per capita has increased tenfold), continued fiscal efforts (tax revenue increased from 16 to 19

[12] The estimated additional spending for low-income developing countries is equivalent to 0.9 percent of the 2030 advanced economy GDP.

[13] These reforms encompass a broad set of areas, including labor and product markets, the financial sector, governance, public infrastructure, and public finance management. The potential payoff of different reforms varies across countries (IMF 2015b, 2015c).

percent of GDP during 1998–2017), and inclusive reforms (the Doi Moi program) that have allowed Vietnam to attend to development needs.[14]

Figure 10. Additional Spending and GDP per Capita in 2030

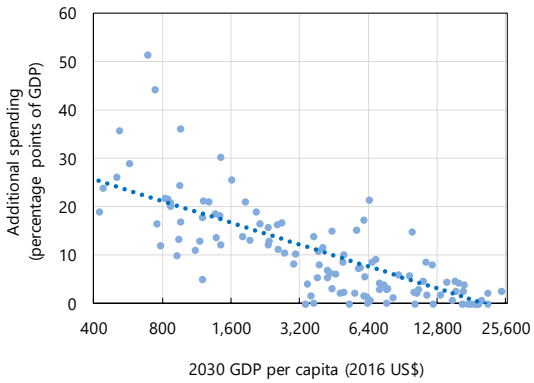
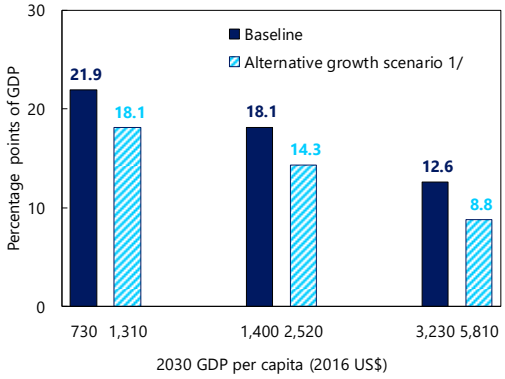


Figure 11. Impact of Growth on Spending Estimates in 2030 in Low-Income Developing Countries



Source: IMF staff calculations.
Note: Low-income developing countries are placed in three groups according to the size of the spending estimates in the baseline scenario. Additional spending in the higher-growth scenario is calculated based on the estimated spending needs in the baseline for countries projected to achieve the corresponding GDP per capita level in the baseline.
1/ Adds to the baseline growth the difference between the 95th percentile and the median of historic GDP growth from Penn World Tables for low-income developing countries. GDP growth in these countries over the projection period of 2018 and 2030 is about 80 percent higher than in the baseline.

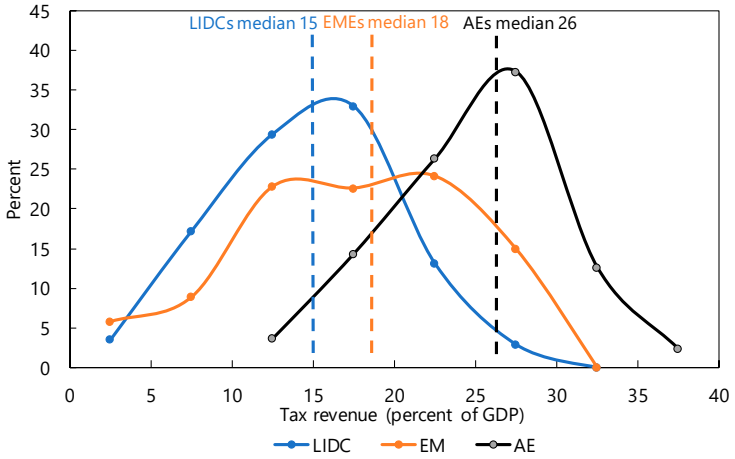
B. Boosting Tax Revenue and Enhancing Spending Efficiency

14. Most emerging market economies and low-income developing countries have room to increase government revenue. Important progress has been made in raising tax-to-GDP ratios. For example, in low-income developing countries tax revenue on average has increased from about 12 percent of GDP in the early 2000s to nearly 15 percent of GDP today. Yet tax revenue varies widely across countries, typically increasing with GDP per capita. At the median, revenue collection as a share of GDP is 15 percent in low-income developing countries, 18 percent in emerging market economies, and 26 percent in advanced economies (Figure 12). About a third of emerging market economies and half of low-income developing countries have tax-to-GDP ratios lower than 13 percent, a threshold documented as a tipping point for development (Gaspar, Jaramillo, and Wingender 2016). While the appropriate level of taxation depends on country characteristics, a sizable increase in tax capacity plays a significant role in

[14] Since 1986 and its Doi Moi program, Vietnam has implemented outward and market-oriented structural economic reforms coupled with a social strategy aimed at "leaving no one behind," starting with expanded access to crucial services such as electricity and education.

attaining the SDGs.[15] Moreover, improvements in tax collection can be achieved without necessarily hurting growth. For example, well-designed tax policies that broaden the tax base and minimize distortions can support growth. But, more important, it is not the impact of a tax instrument in isolation that matters for growth, but the combined effect of all measures, including the spending that additional revenues finance.

Figure 12. Distribution of Tax-to-GDP Ratios across Income Groups in 2016



Source: IMF staff calculations.
Note: Tax revenues exclude social security contributions. AEs = advanced economies; EMEs = emerging market economies; LIDCs = low-income developing countries.

15. Increasing the tax-to-GDP ratio by 5 percentage points of GDP in the next decade is an ambitious but reasonable aspiration in many countries. If countries with tax-to-GDP ratios below the 75th percentile for their income group (which stands at 19 percent in low-income developing countries, 22 percent in emerging market economies, and 29 percent in advanced economies) were to raise their tax-to-GDP ratio to the 75th percentile, such an increase would amount to 5 percentage points of GDP, on average. This is in line with revenue potential estimates from the literature that typically benchmark tax revenue performance across countries, controlling for a range of characteristics, such as per capita income (IMF 2013; Fenochietto and Pessino 2013).[16] Country experiences show that increases of this order have been achieved with a combination of tax policy and administration efforts (IMF 2018a; Akitoby 2018). For example, in

[15] SDG17 refers to the need to "strengthen the means of implementation and revitalize the global partnership for sustainable development." It includes as a target to "strengthen domestic resource mobilization" and as indicators "tax revenue to GDP" and "percent of the budget funded by taxes."

[16] A regression analysis in IMF (2013) finds an average revenue gap (revenue potential minus current revenue) of about 5 percentage points for a sample of advanced economies, emerging market economies, and low-income developing countries. Using a stochastic frontier methodology, Fenochietto and Pessino (2013) finds that the average tax effort (total revenue in percent of the maximum revenue a country could achieve) is 65 percent in low- and middle-income countries and 75 percent in high-income countries.

China the 1994 tax reform contributed to raising revenue from 10 to 15 percent of GDP between 1995 and 2002 (Ahmad 2011), and in Georgia tax reforms contributed to raising revenue by more than 12 percentage points of GDP between 2004 and 2009 (ITC and OECD 2015).

16. Adopting a medium-term approach to raising revenue is critical to achieving and sustaining the much-needed increases in the tax-to-GDP ratios. Mobilizing revenue for development is a central theme of the Addis Ababa Action Agenda (UN 2015). To this end, formulating a medium-term revenue strategy is a promising way forward.[17] Such a strategy frames the tax system reform in four interdependent components: (1) building broad-based consensus for medium-term revenue goals to finance needed public expenditures; (2) designing a comprehensive tax reform covering policy, administration, and the legal framework; (3) committing to sustained political support over multiple years; and (4) securing adequate resources to support coordinated implementation of the medium-term revenue strategy. Indonesia is an example of how articulating a medium-term revenue strategy can help in the progress toward the SDGs (Box 1).

Box 1. Indonesia's Medium-Term Revenue Strategy

Indonesia has made impressive progress in the past 20 years. It has cut the poverty rate by half; increased life expectancy; expanded access to clean water, sanitation, and electricity; and improved educational attainment. Yet with a tax-revenue-to-GDP ratio close to 10 percent, it would be difficult to finance additional expenditures that are critical to unlock Indonesia's development potential. A medium-term fiscal strategy, with a medium-term revenue strategy at its core, is under consideration as part of government reforms started in 2016.

The thrust of the fiscal strategy is to raise revenue by about 5 percentage points of GDP in the medium term, corresponding to the needs identified to finance growth- and equity-enhancing expenditure priorities in infrastructure, health, education, and social assistance. Tax policy reforms could potentially generate up to 3.5 percentage points of GDP, including through new excises and major revisions to value-added and income taxes. Tax administration measures can add 1.5 percentage points of GDP in revenue, including through compliance improvement and institutional reforms. The medium-term revenue strategy should also include efforts to strengthen governance through multiyear commitments with appropriate mandates and monitoring to ensure effective implementation.

Source: de Mooij, Nazara, and Toro (2018).

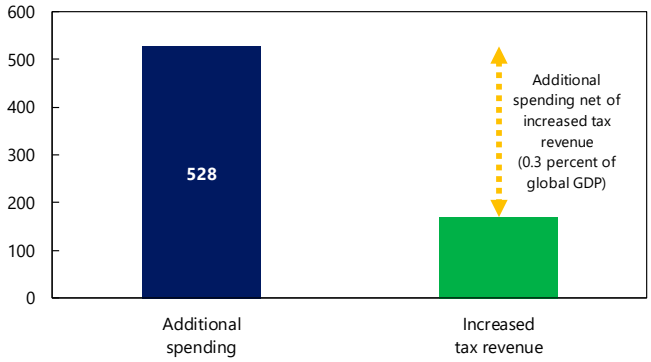
[17] The medium-term revenue strategy approach was developed by the Platform for Collaboration on Tax (IMF, OECD, UN, and World Bank 2016). Thus far, the IMF has engaged in dialogue with 15 countries about medium-term revenue strategies (Egypt, Ethiopia, Indonesia, Georgia, Ghana, Guatemala, Lao P.D.R., Liberia, Mongolia, Myanmar, Papua New Guinea, Rwanda, Senegal, Thailand, Uganda).

17. Greater efficiency of spending is crucial to reach the SDGs. A large portion of the expected returns from spending on health, education, and infrastructure is lost as a result of spending inefficiencies.[18] In many countries, public investment does not lead to productive capital (Pritchett 1996). Addressing such inefficiencies—at least to some extent—is necessary for development and thus, as noted earlier, is embedded in our baseline estimates for additional spending. In an alternative scenario in which countries fail to improve spending efficiency, additional spending will increase from 15 to 25 percentage points of GDP in low-income developing countries and from 4 to 6 percentage points of GDP in emerging market economies. Alternatively, if countries were to spend more efficiently than assumed in the baseline scenario, additional spending requirements will decline.

18. Most emerging market economies would be able to rely on their own resources to finance the SDGs, but the challenge is much greater for low-income developing countries. Assuming countries spend efficiently, raising tax revenues by 5 percentage points of GDP should be sufficient to finance the additional spending required in most emerging market economies. However, for low-income developing economies, the mobilization of taxes will not be enough to finance the ambitious SDG agenda. For this group of countries, the additional spending net of the tax increase amounts to US$358 billion (equivalent to 0.3 percent of global GDP) (Figure 13).

Figure 13. Low-Income Developing Countries: Additional Spending and Increased Tax Revenues in 2030

(Billions of 2016 US$)



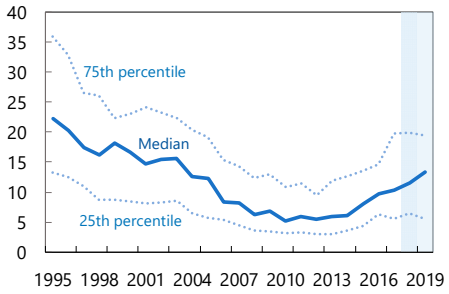
Source: IMF staff calculations.

[18] In the area of health, Grigoli and Kapsoli (2018) find that countries in the bottom quartile of efficiency could raise healthy life expectancy by up to five years by addressing inefficiencies. For education, Grigoli (2015) finds that addressing inefficiencies alone could help increase enrollment more than 30 percentage points in emerging market economies and low-income developing countries. Regarding infrastructure, IMF (2015a) finds that more than 30 percent of investment is lost through inefficiency, with larger losses in emerging market economies and low-income developing countries.

C. Other Financing Options

19. Low-income developing countries and some emerging market economies have limited room to finance the SDGs through debt financing. Some infrastructure projects could be financed by public debt or guarantees. However, in many low-income developing countries high public debt and increasing reliance on nonconcessional lending expose vulnerabilities that constrain the role of debt for development. Since 2013, debt service costs have been increasing rapidly (Figure 14), and the share of countries at high risk or in debt distress has doubled to 40 percent (IMF 2018b). But even when fiscal space is available, projects need to be vetted carefully to ensure that public investment translates into productive capital. This requires strengthening the various legal, institutional, and procedural elements of public investment management, particularly in low-income developing countries with poor governance (IMF 2014, 2015a).

Figure 14. Low-Income Developing Countries: Interest Expense as a Share of Tax Revenue, 1995–2019
(Percent)



Source: IMF, *World Economic Outlook*.

20. Private financing can play a role. Private flows—particularly in the form of foreign direct investment—could make a significant contribution to economic growth. Foreign private investment can also support faster transfer of technology and skills, job creation, and innovation. In Guatemala, for instance, the new public-private partnership law could help mobilize additional private financing for road infrastructure. In certain projects, there may be scope for cost recovery. For instance, in relation to roads, the private sector could collect fees directly from the asset's users (for example, tolls). But given the relevance of private financing, countries must ensure that, regardless of the financing program, projects deliver value for money while limiting fiscal risk.[19] More broadly, public policies should support a favorable investment climate. These include efforts to strengthen governance, build fair and predictable tax systems, efficient and transparent regulatory frameworks, and rule of law. In addition, through blended financing, development partners can catalyze additional private capital (OECD 2018a).

21. Delivering on existing official development assistance targets would make a substantial contribution to closing financing gaps. Although net inflows of official development assistance to low-income developing countries as a percentage of their GDP have declined during the past decade (Figure 15), it still accounts for the largest share of concessional

[19] Strong governance institutions are needed to manage risk and avoid unexpected costs from public-private partnerships, which could undermine fiscal sustainability (Irwin, Mazraani, and Saxena 2018).

financial flows to developing economies (Figure 16).[20] In some low-income developing countries that are able to attract only limited foreign private capital, official development assistance accounts for a very large share of their total external capital inflows. Funding of key SDG sectors (education, health, water and sanitation, transportation and communication, energy) accounts for about 40 percent of total aid. Meeting the 0.7 percent of gross national income target would provide about US$230 billion in additional funding to contribute to closing development gaps. This can have a transformative impact on development, particularly if better targeted to countries most in need of such assistance.

Figure 15. Net Official Development Assistance, 1970–2016
(Percent)

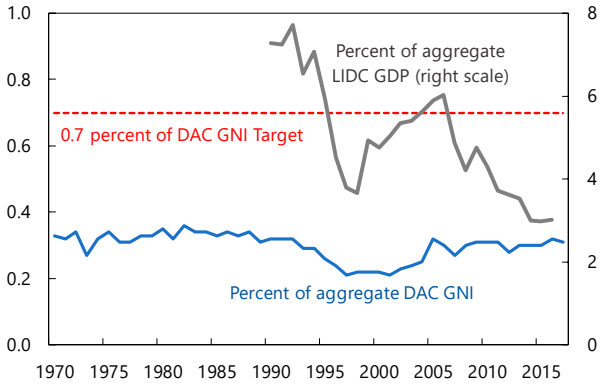
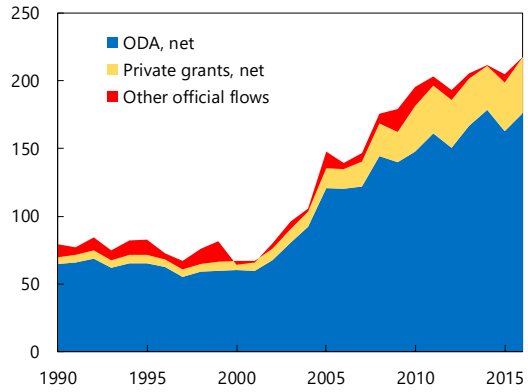


Figure 16. External Concessional Financing Flows to Developing Economies
(Billions of US dollars)



Source: IMF staff calculations using data from the Organisation for Economic Co-operation and Development and the United Nations Conference on Trade and Development.
Note: DAC = Development Assistance Committee of the Organisation for Economic Co-operation and Development; GNI = gross national income; LIDC = low-income developing country; ODA = official development assistance.

22. Private philanthropy can be a useful source of funding. Although philanthropic flows are only about 5 percent of official development assistance, they can have an important impact on key sectors, for instance in health care (OECD 2018c).[21] Annual philanthropic flows are equivalent to 0.02 percent of the estimated global wealth held by individuals with investable assets greater than US$1 million (Capgemini 2018). Private foundation funding targets largely middle-income economies, and only about a third of flows go to the least developed economies. Further resources from philanthropy could be tapped for development. Beyond funding, private

[20] A UN resolution adopted October 24, 1970, stated that "each economically advanced country will progressively increase its official development assistance to the developing countries and will exert its best efforts to reach a minimum net amount of 0.7 per cent of its gross national product at market prices by the middle of the decade." In 2017, five countries met the target of 0.7 percent (OECD 2018b).

[21] For example, in health, philanthropy is the third largest provider of aid after the United States and the Global Fund to Fight AIDS, Tuberculosis and Malaria.

philanthropic efforts can spur innovation in service delivery and help build capacity in recipient countries together with other development partners.

IV. CHALLENGES BEYOND RESOURCES

23. Success in achieving the SDGs requires strong national ownership.[22] The SDGs can be a guiding force in delivering development outcomes if they are set as government objectives, incorporated into the budget process, reliably monitored, and transparently reported. Many countries have started to incorporate the SDGs into their budget process.[23] Anchoring development plans to a medium-term revenue strategy is a promising way forward. For example, in Indonesia the SDGs have been mainstreamed into national development plans, and the Indonesian authorities are considering a medium-term revenue strategy to raise revenue by about 5 percentage points of GDP over the medium term (Box 1).

24. Building an investment-friendly environment can help. Governments should decrease indirect costs to business by providing public infrastructure, enforcing contracts and regulations, strengthening financial systems, and increasing the flexibility of labor markets. Development partners can also help private entrepreneurship thrive. This is, for example, the objective of the Compact with Africa, which brings together governments, Group of Twenty economies, international organizations, and the private sector to scale up private investment in support of national development. The private sector also has an important role to play through willingness to take a more long-term investment perspective and support government efforts to improve the business environment.

25. Managing potentially large inflows can be challenging. Fiscal and monetary authorities should anticipate large inflows and coordinate responses with potential pressure on the real exchange rate that could crowd out private investment and harm growth (Berg, Portillo, and Zanna 2015). For donors, longer-term commitment and coordination—for example, through pooling of funds—may help reduce the volatility of these flows (Isard and others 2006). Large inflows can also affect the ability to raise tax revenue and spend the proceeds efficiently (Morrissey 2015; Crivelli and Gupta 2017). Strengthening public financial management frameworks can contribute to improving the allocation and efficient use of public resources. Donors can help through technical assistance and policy support for reforms aiming at increasing

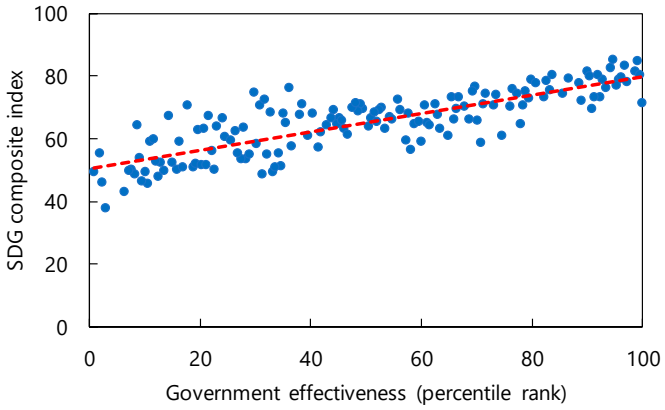
[22] The 2030 Agenda for Sustainable Development encourages countries to conduct reviews to summarize the link between the SDGs and countries' national development priorities and plans. In 2018, 46 countries have done so.

[23] Hege and Brimont (2018) document 23 countries' integration of SDGs into their budget process.

institutional capacity and government effectiveness.[24] Building such capacity and accountability can mobilize diverse stakeholders, including the private sector and civil society organizations.[25]

26. These efforts need to be supported by a strong governance framework. Adequate governance among all actors—that is, international financial institutions, donors, the private sector, civil society, and national governments—is key to ensure that the available financing for the SDG agenda is effectively and efficiently spent. Transparency and accountability are an integral part of the necessary governance. Countries with strong institutional capability and accountability deliver high development outcomes (Figure 17).[26] Furthermore, the allocation of aid should reflect recipients' SDG needs rather than the foreign policy priorities of the countries providing aid. Another challenge is to set the global conditions that help all countries generate and sustain stable growth. This requires a variety of global public goods, including stability, open trade, adequate international taxation, fair regulations, climate initiatives, and access to technology.

Figure 17. SDG Composite Index and Government Effectiveness



Source: IMF staff calculations using World Bank Worldwide Governance Indicators and the 2018 SDG Index and Dashboards Report.
Note: The government effectiveness indicator ranges from 0 (lowest) to 100 (highest). The indicator "reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies."

[24] The IMF and other partners have developed the Tax Administration Diagnostic Analysis Tool (TADAT), which helps governments design tax institution reforms tailored to their characteristics and administrative needs.

[25] Rajkumar and Swaroop (2008); Savoia and Sen (2015).

[26] Strong accountability could help avoid "white elephants"; that is, large public investment projects that generate unproductive capital (Pritchett 1996).

V. CONCLUSIONS AND POLICY OPTIONS

27. Considerable resources are needed to deliver on the SDGs agenda. Building on global progress in key human development areas over the past few decades, the SDGs aim at advancing by 2030 toward a world free of poverty and deprivation, where all children, wherever they are born, are given a fair chance. To get there, countries need to unlock large amounts of resources. Improving outcomes in five key areas (education, health, roads, electricity, water and sanitation) would require additional spending in 2030 of about US$0.5 trillion (0.5 percent of 2030 global GDP) for low-income developing countries and US$2.1 trillion in emerging market economies.

28. Financing the SDGs will be challenging, particularly for low-income developing countries. For emerging market economies the average additional spending required represents about 4 percentage points of GDP. Raising this amount is a considerable task, but in most cases these countries can rely on their own resources to finance the SDG targets. However, the challenge is much greater for low-income developing countries, where the average additional spending represents 15 percentage points of their GDP.

29. As a necessary step, countries need to own responsibility for achieving the SDGs. Country efforts should focus on strengthening macroeconomic management, enhancing tax capacity, tackling spending inefficiencies, addressing the corruption that undermines inclusive growth, and fostering business environments where the private sector can thrive. Action in these areas will support the sustainable and inclusive growth that is fundamental to SDG progress.

30. Raising revenue is one important pillar for development. An ambitious but appropriate target for many countries is to increase their tax ratio by 5 percentage points of GDP —several countries have achieved this in the past. This requires strong administrative and policy reforms. A recommended starting point for many countries would be to adopt a medium-term revenue strategy to develop multiyear, holistic, and realistic plans for revenue reform in line with the countries' development.

31. Countries need to spend not only more, but better. Today, a large portion of investments is lost to inefficiency. Enhancing the efficiency of spending is thus crucial to reaching the SDGs. We estimate that countries could save about as much through efficiency efforts in education, health care, and infrastructure as they could raise through tax reform.

32. Contributions to development from the private sector, official development assistance targets, philanthropists, and international financial institutions will also be essential. Some infrastructure projects could be financed with public debt or guarantees, but this would be difficult in countries with already high public debt levels. The private sector is well placed to contribute to development in areas that blend with private investment, such as infrastructure and clean energy—the Compact with Africa points in this direction. Regardless of the financing method—for example, through public-private partnerships—it is critical to ensure

that these investments deliver value for money, while limiting contingent fiscal risk. Foreign aid remains crucial in supporting the development efforts of poorer countries. Indeed, the economic returns on well-targeted aid—in terms of poverty reduction, health and education outcomes, job creation, and improving security and stability—are high. All these efforts need to be articulated within countries' national plans.

33. Beyond resources, developing political and civil society consensus, enhancing state capacity, and promoting good governance are needed to achieve the SDGs. An important aspect of the broader challenge is the environment in which countries seek to generate and sustain stable growth. This requires a variety of global public goods including geopolitical stability, open trade, and climate initiatives, as well as good governance, which depends on tackling both the supply and demand elements of corruption. These important foundations for development underscore the need for joint action by all stakeholders for the SDGs to be realized.

ANNEX 1. Costing Methodology[27]

The methodology is based on an input-outcome approach, which assumes that development outcomes are a function of a mix of inputs (Annex Table 1.1). For each country, the methodology sets the levels of key inputs and the associated unit costs at the values observed in countries with similar levels of GDP per capita that reach *high* development outcomes. Annex Table 1.2 summarizes the main data sources.

More specifically, let spending in one SDG sector in country i in 2016 be $s(b_i, x_i^{2016})$, a function of cost drivers b_i (for example, teacher-student ratio, teacher salaries) and other factors x_i (for example, school-age population, GDP per capita). We identify the levels of the cost drivers in countries with high scores in the respective SDG index (b^*). Then we calculate 2030 spending in country i, given b^* and the values of other factors that we project in country i for 2030, or $s(b^*, x_i^{2030})$. To summarize the results, we define the following:

$$\text{Additional spending in percentage points} \equiv \frac{S(b^*, x_i^{2030})}{GDP_i^{2030}} - \frac{S(b_i^{2016}, x_i^{2016})}{GDP_i^{2016}}$$

$$\text{Additional spending in constant 2016 dollars} \equiv GDP_i^{2030} * \left[\frac{S(b^*, x_i^{2030})}{GDP_i^{2030}} - \frac{S(b_i^{2016}, x_i^{2016})}{GDP_i^{2016}}\right] * \frac{GDPdeflator_i^{2016}}{GDPdeflator_i^{2030}}$$

Annex Table 1.1. Input-Outcome Approach in Five Sectors

	Education	Health	Roads	Electricity	Water and Sanitation
Outcome indicator 1/	SDG4 index	SDG3 index	SDG9.1.1 index (Rural Access Index)	SDG7.1.1 index	SDG6.1 and 6.2 indices
Inputs	Number of teachers Other current and capital spending	Number of health care workers (doctors/others)	Kilometer of all-weather road	On/off grid mix 2/	Households with safely managed water and sanitation
Unit cost	Teacher wage	Health care workers wage	Unit cost of all-weather road kilometer	Unit cost of access to a certain consumption level	Unit cost of access
Other factors	Demographics Enrollment rates GDP per capita	Demographics GDP per capita	Topography GDP per capita Population density	Demographics GDP per capita	Demographics GDP per capita

Source: IMF staff.
1/ Outcomes are proxied with the relevant SDG index for education and health (2018 SDG Index and Dashboards Report), the Rural Access Index for roads, and share of population with access to electricity and water and sanitation. These indicators take values between 0 (lowest outcome) and 100 (highest outcome). SDG4 index summarizes outcomes for three education variables, while the SDG3 index reflects outcomes in fourteen health variables. For education and health, we validate the importance of the inputs using regression analysis: controlling for GDP per capita, both teacher-to-student ratio and teacher salary to GDP are significant on SDG4. Similarly, controlling for GDP per capita, both doctor-to-population ratio and doctor's wages to GDP per capita are significant on SDG3.
2/ The on/off grid mix corresponds to the respective shares of electricity connections directly to the power grid (on) and indirectly to "individual" power generators (off)—for example, solar panels.

[27] The costing methodology for roads and electricity was developed by Yuan Xiao and Devin D' Angelo.

Annex Table 1.2. Data Sources

Education	Health	Roads	Electricity
World Bank Edstats database (number of teachers, teacher to student ratio, enrollment rates)	WHO Global Health Observatory (doctor density, ratio of doctors to all other medical staff)	World Bank (Rural Access Index, population density, economic shares of manufacturing and agriculture)	World Bank World Development Indicators (current access to electricity, per capita electricity consumption)
UNESCO (share of non-teacher wages in current spending, shares of current noncompensatory and capital spending)	World Bank (share of doctor and non-doctor compensation in total spending)	CIA Factbook and International Road Federation World Road Statistics (current number of road kilometer, country area)	
	OECD Health statistics (ratio of non-doctor compensation to doctor compensation)		

Source: IMF staff.

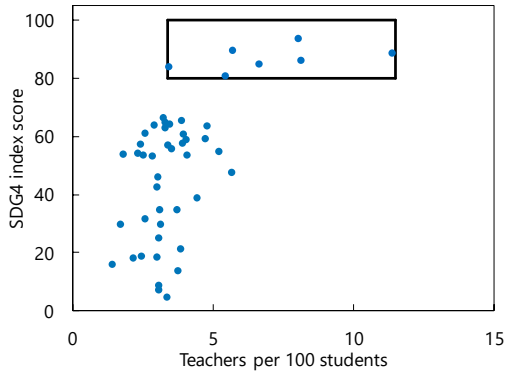
Education

Total spending for education can be expressed as

$$Education\ total\ spending = (AWAGE * TSR * ER * SAP)/(1 - y - z),$$

in which main costing parameters include number of teachers, which is derived as the product of the teacher-to-student ratio *(TSR),* enrollment rates *(ER),* and school-age population *(SAP);* teacher salaries *(AWAGE);* share of noncompensatory current expenses *(y);* and share of capital expenses *(z).* The methodology sets values for *TSR, AWAGE, y, and z* at the median values observed today in countries with high education outcomes, separately by income group (Annex Figure 1.1 illustrates the benchmarking for *TRS*).[28] Next, for each country, we estimate the education spending in 2030 using the corresponding benchmarked key inputs and unit costs and the country's projections for economic growth and school-age demographics. We assume in 2030 full enrollment for at least 2 years of preprimary and tertiary education and 12 years of primary and secondary education.[29] We find that the median country with relatively high education outcomes tends to have fewer students per

Annex Figure 1.1. Derivation of the Benchmarked Value for Teacher-Student Ratio Input



Source: IMF staff calculations.
Note: The chart displays countries with GDP per capita below US$3,000. The seven countries in the box are the ones with high education performance, proxied with the SDG4 index, and therefore used to benchmark the number of teachers per 100 students consistent with high education outcomes for countries with GDP per capita under US$3,000.

[28] Benchmarks are set at the median for the parameters averaged from preprimary to tertiary levels. Countries' GDP per capita in 2030 is used for mapping to the income groups and benchmarked parameters. Three groups are considered by GDP per capita (less than US$3,000; between US$3,000 and US$6,000; and between US$6,000 and US$18,000). High-performing countries are those with an SDG4 education index above 80 in the low-income group, above 82 in the middle-income group, and above 84 in the high-income group. The thresholds are chosen to allow for a representative sample size of high-performing countries in each group.

[29] Target enrollment rates are 50 percent for preprimary and tertiary and 100 percent for primary and secondary.

teacher and pay relatively lower wages (expressed as a ratio to GDP per capita) than other countries of the same income group.

Health

Total spending for health can be expressed as

$$Health\ total\ spending = (DPR * pop * (1 + \alpha/\rho) * DAWAGE\ )/(1 - x - y),$$

in which key costing inputs and unit costs include doctor salaries *(DAWAGE);* number of doctors and other medical personnel (derived using doctor density *(DPR),* total population *(pop),* and ratio of doctors to all other health staff *(ρ)*); the ratio of all non-doctor wages to doctor wages (*α);* the share of noncompensatory current expenses *(y);* and the share of capital expenses *(z).*[30] The derivation of the benchmarks for *DAWAGE, DPR,* and *ρ* is done separately by income group, setting their values at the median observed today in countries with high health outcomes.[31] Then, for each country, we estimate the health spending in 2030 based on the benchmarked parameters, using country-specific projections for economic growth and demographics. For countries with lower levels of GDP per capita, we find that the median country with relatively high health outcomes tends to have more medical personnel and pay relatively lower wages than other countries of the same income group. This difference between the median high performer and other income group peers disappears for medium to high levels of GDP per capita.

Roads

A regression is used to derive the determinants of network needs. Road density is regressed on variables capturing the size and composition of the economy, including GDP per capita, population density, agriculture and manufacturing sector shares in the economy, and urbanization rate, as well as the Rural Access Index (RAI), for a cross-section of low-income developing countries and emerging market economies.[32] Using the regression results, for each country, we estimate the additional kilometers of roads needed to ensure road access for all (proxied by raising the RAI to at least 75 percent), accounting for projected changes in population and GDP per capita through 2030.[33] We then estimate the total cost of the additional road network by multiplying the estimated additional kilometers by the unit cost of constructing one kilometer, which is set at a minimum of US$500,000, as indicated in Iimi and others (2016). To account for depreciation, we increase the total cost of the additional kilometers by 5 percent.

[30] We assume that the ratio of all non-doctor wage to doctor wage to is 0.5. Shares of capital (*x*) and other current spending (*y*) in total spending are imputed using World Bank regional and income group averages.

[31] Countries are grouped into three income groups using the same income ranges for education. High performing countries are those with an SDG3 health index above 70 in the lowest income group, above 78 in the median income group, and above 84 in the highest income group.

[32] This approach is similar to Fay and Yepes (2003) and assumes that shocks to road density do not affect the explanatory variables (such as per capita income, and population density) contemporaneously.

[33] Regression analysis shows that countries with relatively high road access tend to have greater road density.

Electricity

For each country, we estimate the additional electricity network needed to provide electricity access to 100 percent of the projected population by 2030, while accounting for an increase in per capita consumption in line with real GDP per capita.[34] We then estimate the total cost of the additional electricity network by multiplying it by the unit cost per kilowatt, which is set at US$2,250, following World Bank (2013a).

Water

The estimates of the cost to provide basic and improved access to water and sanitation are derived using the WASH World Bank methodology (Hutton and Varughese 2016). The model has unit costs calibrated at the country level.

Efficiency and Interactions across SDGs

Our estimates account for spending efficiency as high-performing countries used as benchmarks spend more efficiently than other countries in the same income group. Therefore, our costing estimates assume better-than-average spending efficiency, which implies that most countries should improve their expenditure efficiency while they ramp up their spending to achieve the SDGs at the estimated cost. Our estimates also account to some extent for intersectoral synergies, since high performers in one sector (such as education) are likely to achieve high outcomes in others (such as health and infrastructure).

Summary of Results

Estimates of additional spending are reported as of 2030, in percentage points of GDP and in 2016 US dollars (Annex Table 1.3). For education and health, we report the difference between the share of 2030 GDP in spending consistent with high performance and the current level of spending as a share of 2030 GDP. For physical capital, we annualize the spending to close the infrastructure gap between 2019 and 2030 and express the result in percent of 2030 GDP. After 2030, education and health spending would be recurrent, while infrastructure spending would decrease to about 60 percent to cover depreciation of the capital stock built through 2030.

Annex Table 1.3. Low-Income Developing Countries and Emerging Market Economies: Additional Spending Estimates in 2030

		Health and Education	Roads, Electricity, and Water and Sanitation	Total Additional Spending
LIDCs	Billion 2016 US$	284	244	528
	Percentage points of GDP	8.3	7.1	15.4
EMEs	Billion 2016 US$	1,011	1,048	2,059
	Percentage points of GDP	2.0	2.1	4.1

Source: IMF staff calculations.
Note: For education and health, we report the difference between the share of GDP in spending consistent with high performance and the current level of spending as a share of GDP. For physical capital, we report the annualized spending needed to close the infrastructure gap between 2019 and 2030 and express the result in percent of 2030 GDP. EMEs = emerging market economies; LIDCs = low-income developing countries.

[34] Currently, median electricity access is below 50 percent in low-income developing countries, and it is close to 100 percent in emerging market economies.

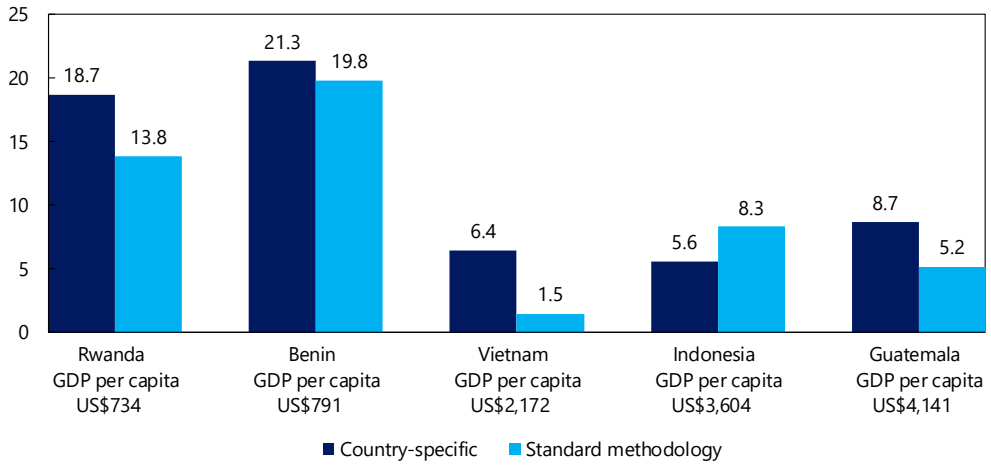
ANNEX 2. Country Case Studies

For five countries (Benin, Guatemala, Indonesia, Rwanda, Vietnam), estimates of spending were refined to account for country-specific circumstances. These countries represent diverse levels of development (three low-income developing countries and two emerging market economies) and regions. The standard methodology was adjusted following discussions with the authorities, local experts, and development partners. The refinements include updating the latest values (education enrollment rates in Benin), unit costs (cost per kilometer of road was revised upward in all countries but Indonesia; electricity cost adjusted in Rwanda and Vietnam), and targets in line with national circumstances (Guatemala, Indonesia, Vietnam).

We find no systematic bias in the estimates resulting from the standard methodology. In line with the standard methodology, the refined additional spending estimates tend to decline with GDP per capita (Figure 2.1). Benin and Rwanda, with GDP per capita currently less than US$800, have large estimated additional spending (19–21 percentage points of GDP in 2030), reflecting large current development gaps. Vietnam (a low-income developing country under the IMF's classification), as well as Indonesia and Guatemala (both emerging market economies) have additional spending in the single digits. The country-specific estimates are within 3 percentage points of GDP of the standard methodology estimates for all countries but Rwanda (largely due to higher costs for roads) and Guatemala (largely due to an extensive road infrastructure gap).

Annex Figure 2.1. Country-Specific and Standard Methodology Additional Spending Estimates 1/

(Percentage points of GDP)



Source: IMF staff calculations.

1/ For the country-specific estimates, the standard methodology was adjusted following discussions with the authorities, local experts, and development partners, including modifying input levels, unit cost parameters, and targets. GDP per capita refers to 2016.

BENIN[35]

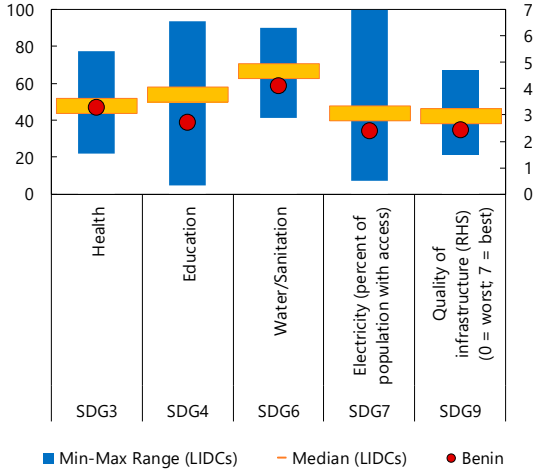
Benin has put the SDGs at the heart of its development plans. Three key programs formalize the government's commitment to SDGs: Programme d'Actions du Gouvernement (PAG, 2016–21), the Plan National de Développement (PND, 2018–25), and the Programme de Croissance pour le Développement Durable (PC2D, 2018–21). The authorities have prioritized 49 SDG targets. A general directorate was established in August 2016 to coordinate and monitor SDG progress (Direction Générale de la Coordination et du Suivi des ODD).

Substantial additional resources are needed to approach the SDGs. Benin is making progress in the SDGs, including in primary education enrollment, maternal and child health care, access to water, and paved roads. Yet the task ahead is significant, with additional annual spending of more than 21 percentage points of GDP for the SDGs. This estimate is slightly higher than the one from the standard methodology, reflecting adjustments in the cost per kilometer of road (from US$500,000 to US$610,000) and in the targets of education (in line with local plans).

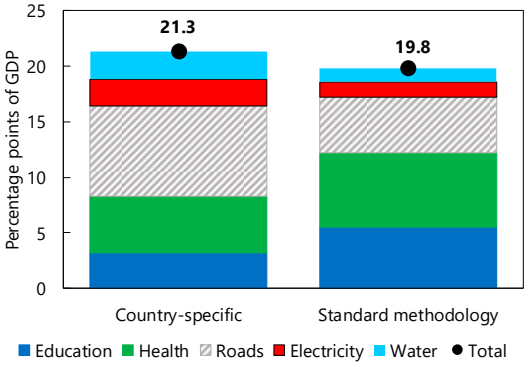
The authorities aim to raise revenue and promote private sector involvement. To provide financing for development, the authorities are mobilizing revenue by curbing tax exemptions—for instance, the 2019 Budget Law envisions a cut in tax exemptions. The government is also anticipating private sector involvement under the PAG, after establishing the legal and regulatory framework for public-private partnerships to attract private financing in 2017. In addition, since October 2017, Benin has been a full participant in the G20 Compact with Africa.

Benin: Performance across Selected SDGs

(Indices)



Benin: Country-Specific and Standard Methodology Estimates in 2030



Sources: IMF staff calculations, SDG Index and Dashboards Report 2018, World Economic Forum.
Note: LIDCs = low-income developing countries; RHS = right scale.

[35] Prepared by Mouhamadou Sy.

RWANDA[36]

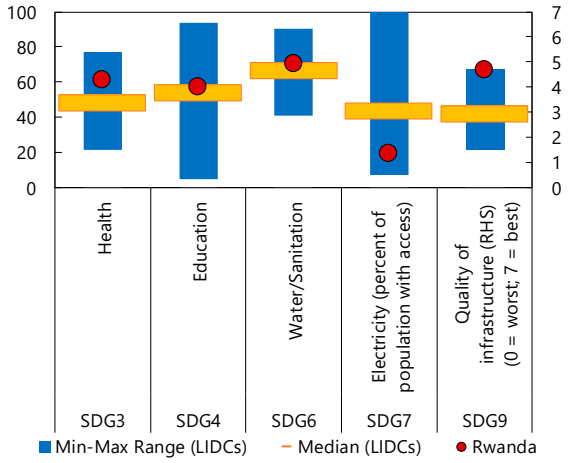
The National Strategy for Transformation (NST) is explicitly formed by the SDGs and linked to the budget. SDG targets have been integrated into the NST, which runs from 2018 to 2024. Line ministries have produced sectoral strategies and preliminary estimates of sectoral spending needs for achieving the NST, in close dialogue with development partners (United Nations International Children's Emergency Fund, United Kingdom Department for International Development, Enable, World Bank, World Health Organization).

Service delivery has improved greatly in the past two decades, but gaps remain. Since 1995, Rwanda has experienced rapid and inclusive growth. Health is a bright spot, reflecting an extensive level of primary care by rural clinics. Yet stunting affects 38 percent of children, and access to qualified staff is low. Education enrollment is nearly universal at the primary level, but less than 40 percent at the secondary level. Access to water and sanitation remains a challenge. The electricity sector has excess on-grid capacity, but only 46 percent of households have access. Closing development gaps requires an additional 19 percentage points of GDP in spending. The estimates are higher than in the standard methodology, reflecting higher unit cost for roads (US$1.1 million a kilometer) and water (local annual estimates of about 4 percent of GDP).

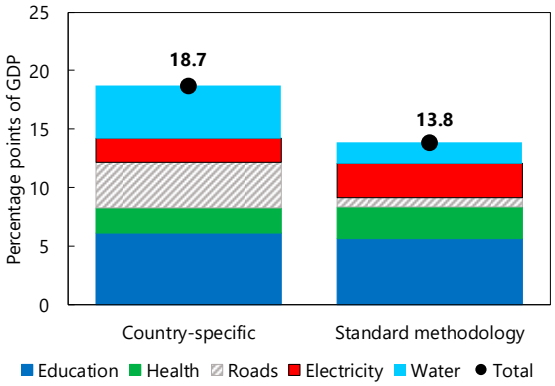
The government expects that two-thirds of the additional spending will be public. The country's current medium-term fiscal framework relies on buoyant revenue from growth and remittances, with the remainder covered by private sector borrowing.

Rwanda: Performance across Selected SDGs

(Indices)



Rwanda: Country-Specific and Standard Methodology Estimates in 2030



Sources: IMF staff calculations, SDG Index and Dashboards Report 2018, World Economic Forum.
Note: LIDCs = low-income developing countries; RHS = right scale.

[36] Prepared by Delphine Prady.

VIETNAM[37]

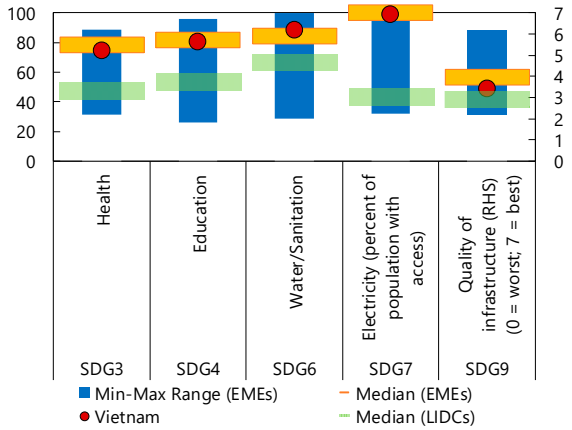
National development and economic plans feature the SDGs prominently. Following Millennium Development Goals (MDGs) progress, Vietnam has mapped the 17 SDGs into 115 Vietnam SDG goals in its "National Action Plan for Implementation of the 2030 Agenda for Sustainable Development" to suit the country's context and socioeconomic conditions. SDGs have been integrated into the Socio-Economic Development Strategy 2011-20 and the Socio-Economic Development Plan 2016-20. The efforts related to the SDGs are led by the Ministry of Planning and Investment.

Vietnam has made great strides toward the SDG goals. Strong inclusive growth—associated with the 1986 Doi Moi reforms that opened up the economy along with a social agenda—contributed to the achievement of several MDGs, including poverty reduction, universal primary education, and reducing maternal and child mortality. Today, the country outcomes are superior to those of median low-income developing countries and rank well relative to emerging market economies, across several dimensions. Thus, the country-specific estimates use the higher-income group of countries as a benchmark, which explains some of the difference from the standard methodology estimates. In addition, the country-specific estimates use a higher unit cost for roads (US$1.1 million a kilometer).

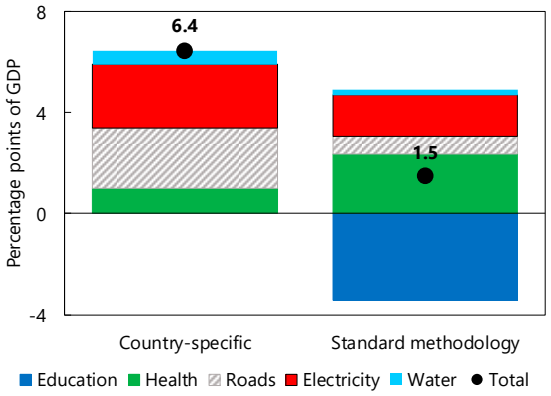
Financing for additional public spending for SDGs is limited. The revenue ratio is high for its income group, and public debt is approaching the statutory limit of 65 percent. Tax policy changes under discussion are needed offset declining oil revenue. Vietnam's 2010 graduation to lower-middle-income status has led to a dramatic decline in official development assistance. Thus, the government is targeting efficiency gains in public spending and aiming at increased private sector participation.

Vietnam: Performance across Selected SDGs

(Indices)



Vietnam: Country-Specific and Standard Methodology Estimates in 2030



Sources: IMF staff calculations, SDG Index and Dashboards Report 2018, World Economic Forum.
Note: EMEs = emerging market economies; LIDCs = low-income developing countries; RHS = right scale.

[37] Prepared by Anja Baum.

INDONESIA[38]

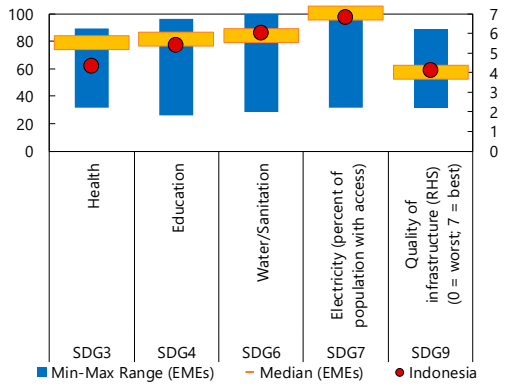
The SDGs have been mainstreamed into national development plans. The 17 SDGs have been mapped to the National Visions of Indonesia and into the National Medium-Term Development Plan (RPJMN) 2015-2019. A presidential decree was issued in 2017 to guide SDG implementation, followed by the publication in 2018 of the National Action Plan SDGs 2017-2019, the SDGs Road Map 2017-2030, and the Regional Action Plan of SDGs 2017-2019.

Indonesia has made impressive progress in the past 20 years, but still lags peers in health, education, and infrastructure. In the past two decades, poverty and infant mortality rates fell; life expectancy increased; access to clean water, sanitation, and electricity expanded; and educational attainment improved. But considerable gaps remain in education (secondary enrollment is 74 percent, and Program for International Student Assessment performance is lower than that of east Asian economies), health (rates of maternal and under-five mortality remain well above SDG targets), and transportation infrastructure (identified by the authorities as a bottleneck for sustainable growth). The country-specific estimates reflect the local strategy, aiming to increase the efficiency of education spending, raise health care expenditure, and enhance road and electricity infrastructure.

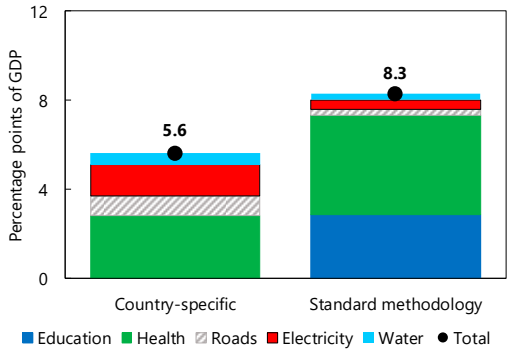
Indonesia has little space to expand spending, but there is room to increase revenue. The government deficit has inched toward the 3 percent ceiling, providing little slack to finance the SDGs. But the tax-revenue-to-GDP ratio is close to 10 percent, well below that of emerging market economies. Other financing options could be considered, including Islamic community contributions and improving existing spending efficiency, although their magnitude will be much smaller than revenue mobilization. The private sector can also play an important role in achieving the SDGs, especially on infrastructure.

Indonesia: Performance across Selected SDGs

(Indices)



Indonesia: Country-Specific and Standard Methodology Estimates in 2030



Sources: IMF staff calculations, SDG Index and Dashboards Report 2018, World Economic Forum.
Note: EMEs = emerging market economies; RHS = right scale.

[38] Prepared by Hui Jin.

GUATEMALA[39]

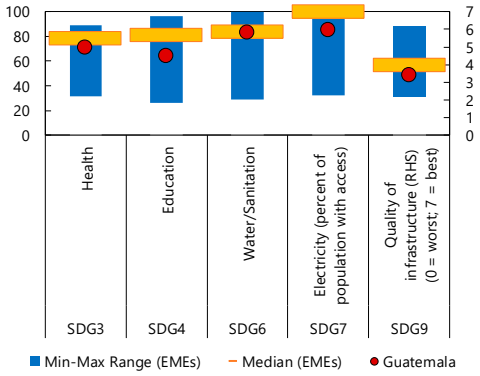
Guatemala has embraced the SDGs as part of its national development strategy. Through consultation within the public sector and with civil society, the Ministry of Planning has mapped the key elements of the K'atun 2032 national development plan into the SDGs and into 10 National Priorities. However, moving from planning to executing policies remains challenging.

Guatemala's development outcomes lag those of countries at a similar level of development. Poverty and extreme poverty, at 60 and 23 percent of the population, respectively, are among the highest in the region and have been increasing. The prevalence of stunting in children under five years old is among the highest in the world. Infant and maternal mortality rates are well above Latin American and Caribbean averages, and more than 40 percent of the population does not have access to safe water. Preprimary education and secondary school enrollment rates are relatively low. Social outcomes are markedly worse in rural areas and for indigenous populations. At 8.7 percent of GDP, additional spending is relatively large for an emerging market economy. The main difference from the standard methodology is on road infrastructure, reflecting a more ambitious local plan and higher cost per kilometer (US$800,000) and health care (updating the inputs).

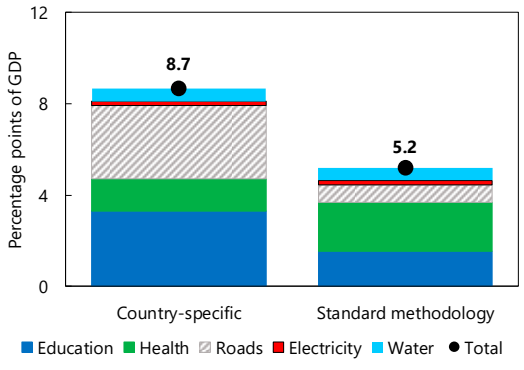
Guatemala can use existing fiscal space to accommodate higher spending, but integral fiscal reform is needed to durably address development needs. Financing the additional spending calls for an integrated fiscal package encompassing continued tax administration efforts, tax policy changes to raise tax revenue (currently at 10 percent of GDP), and greater spending flexibility and efficiency. However, higher spending alone is unlikely to lead to better outcomes given significant provision challenges. Spending should be scaled up along with improvements in the provision of public goods.

Guatemala: Performance across Selected SDGs

(Indices)



Guatemala: Country-Specific and Standard Methodology Estimates in 2030



Sources: IMF staff calculations, SDG Index and Dashboards Report 2018, World Economic Forum.
Note: EMEs = emerging market economies; RHS = right scale.

[39] Prepared by Mauricio Soto.

Annex 3. Countries in the Sample

The sample includes 155 countries (34 advanced economies, 72 emerging market economies, and 49 low-income developing countries) (Annex Table 3.1). These countries represent 99 percent of the population and 98.5 percent of the aggregate GDP for the 193 IMF economies. Annex Table 3.2 displays the descriptive statistics for the sample. Countries were excluded when lacking data on the SDG Indices.

Annex Table 3.1. Countries Included in the Analysis

Advanced Economies		Emerging Market Economies			Low-Income Developing Countries	
Australia	Korea	Albania	Eswatini	Pakistan	Afghanistan	Liberia
Austria	Latvia	Algeria	Gabon	Panama	Bangladesh	Madagascar
Belgium	Lithuania	Angola	Georgia	Paraguay	Benin	Malawi
Canada	Luxembourg	Argentina	Guatemala	Peru	Bhutan	Mali
Cyprus	Malta	Armenia	Guyana	Philippines	Burkina Faso	Mauritania
Czech Republic	Netherlands	Azerbaijan	Hungary	Poland	Burundi	Moldova
Denmark	New Zealand	Bahrain	India	Qatar	Cambodia	Mozambique
Estonia	Norway	Barbados	Indonesia	Romania	Cameroon	Myanmar
Finland	Portugal	Belarus	Iran	Russia	Central African Republic	Nepal
France	Singapore	Belize	Iraq	Saudi Arabia	Chad	Nicaragua
Germany	Slovak Republic	Bolivia	Jamaica	Serbia	Congo, Dem. Rep.	Niger
Greece	Slovenia	Bosnia and Herzegovina	Jordan	South Africa	Congo, Rep.	Nigeria
Iceland	Spain	Botswana	Kazakhstan	Sri Lanka	Côte d'Ivoire	Rwanda
Ireland	Sweden	Brazil	Kuwait	Suriname	Djibouti	Senegal
Israel	Switzerland	Bulgaria	Lebanon	Thailand	Ethiopia	Sierra Leone
Italy	United Kingdom	Chile	Macedonia, FYR	Timor-Leste	Gambia, The	Sudan
Japan	United States	China	Malaysia	Trinidad and Tobago	Ghana	Tajikistan
		Colombia	Mauritius	Tunisia	Guinea	Tanzania
		Costa Rica	Mexico	Turkey	Haiti	Togo
		Croatia	Mongolia	Turkmenistan	Honduras	Uganda
		Dominican Republic	Montenegro	Ukraine	Kenya	Uzbekistan
		Ecuador	Morocco	United Arab Emirates	Kyrgyz Republic	Vietnam
		Egypt	Namibia	Uruguay	Lao P.D.R.	Yemen
		El Salvador	Oman	Venezuela	Lesotho	Zambia
						Zimbabwe

Source: IMF staff.

Annex Table 3.2. Sample Descriptive Statistics

	Count	2016 GDP (billion 2016 US$)	2016 Population (million)	GDP per Capita (2016 US$)			
				P5	P50	P95	Mean
Low-income developing countries	49	1,761	1,873	231	755	2,025	900
Emerging market economies	72	27,377	5,366	2,375	5,317	18,151	7,954
Advanced economies	34	45,391	1,069	15,906	38,046	66,010	37,928

Source: IMF staff calculations.
Note: P5 = 5th percentile; P50 = median; P95 = 95th percentile.

ANNEX 4. Comparison of SDG Spending Assessments

Controlling for differences in country grouping, sectoral scope, and definitions, IMF cost estimates of reaching the SDGs are comparable to those from UNCTAD (2014), Schmidt-Traub (2015), and Manuel and others (2018). The range of headline estimates is wide (US$1.4–US$3.9 trillion) (Annex Table 4.1). The variation reflects differences in (1) country groupings (that is, developing economies, low-income countries, and lower-middle-income countries in the World Bank classification;[40] or low-income developing countries and emerging market economies in the IMF classification); (2) sectorial coverage (that is, infrastructure, health, education, social protection, climate change); (3) definition of spending (that is, total spending, additional spending, financing gaps); and (4) reference years. Nevertheless, when comparing specific sectors for the same country groupings and harmonizing definitions of additional spending, IMF estimates are comparable to those from the literature.

Infrastructure: We estimate additional annual spending of about US$1.4 trillion for roads, electricity, and water and sanitation in low-income countries and emerging market economies. UNCTAD (2014) estimates about US$1.8 trillion a year in the same sectors (US$2.0 trillion, including telecommunications) in developing economies. The main difference is in water, for which IMF estimates are about US$300 billion lower. For low-income and lower-middle-income countries, Schmidt-Traub (2015) finds annual infrastructure spending of US$660 billion, compared with our estimates of US$725 billion for the same country grouping.

Education and health care: In these sectors, the IMF estimates additional spending of US$1.2 trillion in 2030 in low-income developing countries and emerging market economies (of which US$600–US$700 billion in low-income and lower-middle-income countries). Schmidt-Traub (2015) reports lower education and health additional spending (US$200–US$300 billion) in low-income and lower-middle-income countries. The difference is largely because of the definition of additional spending: Schmidt-Traub reports average additional spending through 2016–30. Assuming countries increase spending gradually between 2019 and 2030 to reach the IMF spending level, the average IMF annual additional spending is less than US$400 billion. The United Nations Conference on Trade and Development reports capital spending in these sectors at a level equivalent to a reasonable share (20 percent) of the IMF's total current and capital spending estimates. Our estimates are also comparable to those by Manuel and others (2018).[41]

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[40] The World Bank refers to LICs for low-income economies, and LMICs for lower-middle-income economies.

[41] Manuel and others (2018) finds that for 48 "under resourced countries," the annual financing gap (spending minus half of potential tax revenue) is about US$150 billion, of which two-thirds is in education and health (US$100 billion, or 5.7 percent of low-income developing countries' GDP in 2018). IMF estimates aggregate additional spending for low-income developing countries of 15 percent of their GDP in 2030 and potential additional revenue of 5 percent of GDP. Thus, the additional spending net of potential tax revenue is 10 percent of GDP in 2030. Of this, about half is in education and health (5 percent of low-income developing countries' GDP), which is comparable to the Overseas Development Institute's 5.7 percent of 2018 GDP.

Climate mitigation and adaptation costs are about 20–40 percent of infrastructure spending. UNCTAD (2014) estimates these costs to be about US$800 billion a year in developing economies (40 percent of their infrastructure spending estimate). Schmidt-Traub (2015) estimates mitigation and adaptation costs of about US$130 billion for low-income countries and lower-middle-income countries (20 percent of the infrastructure spending estimate). The IMF does not include the cost of climate mitigation and adaptation in the analysis.

Annex Table 4.1. SDG Spending Estimates

	IMF	UNCTAD (2014)	ST (Schmidt-Traub 2015)	ODI (Manuel and others
Sources	Own methodology for education, health, power, and roads; WASH model for water 1/	Literature review 2/	Literature review 3/	Literature review for health and education; ODI's own estimates for social protection 4/
Sectors	Education Health Power Roads Water and sanitation	Education Health Power Roads Water and sanitation Agriculture and food security Telecommunications Ecosystems	Education Health Power Roads Water and sanitation Agriculture and food security Telecommunications Ecosystems	Education Health Social protection
Climate	No	Yes, adaptation and mitigation	Yes, adaptation and mitigation	No
Countries	155 countries, with emphasis on *low-income developing countries* (49 countries) and *emerging market economies* (72 countries)	Estimates for *developing economies* as a group; extrapolates results to the UN's least developed countries, comprising 47 low-income countries	Results using the World Bank's *low-income countries* (27 poorest countries) and *lower-middle-income countries* (38 countries) classification	145 countries, with emphasis on 48 "*under resourced*" countries. The sectors include education, health, and social protection.
Definitions	*Additional spending* to today's spending, reported as of 2030 in 2016 dollars and percent of 2030 GDP	*Total investment required*: annual investments needed for sustainable development; *spending gap:* total investment required minus current spending, reported in 2013 dollars	*Incremental investment needs:* spending additional to today's spending, reported as average incremental needs between 2016 and 2030 in 2015 dollars	*Social sector costs:* total annual costs; *financing gap:* costs minus potential tax revenues (assuming half of revenues devoted to these sectors), reported in 2018 dollars
Headline results	Additional spending of US$528 billion for low-income developing countries and US$2.1 trillion for emerging market economies in 2030	*Total annual investment* of US$3.9 trillion in developing economies (US$120 billion in least developed countries). The *gap* is US$2.5 trillion in developing economies (US$80 billion in least developed countries). Extrapolating to all countries, UNCTAD estimates *total global investment* at US$5-$7 trillion a year.	Total incremental investment of US$1.4 trillion a year (US$400 billion in low-income countries and US$1 trillion in lower-middle-income countries)	The annual financing gap (needs minus half of potential tax revenues) is about US$150 billion for *under resourced countries*.

	IMF	UNCTAD (2014)	ST (Schmidt-Traub 2015)	ODI (Manuel and others 2018)
Comparability		*Total investment* for roads, power, and water (US$1.8 trillion a year) is higher than IMF *additional spending* in these sectors (US$1.2 trillion). Main difference is water (UNCTAD estimates are about US$300 billion higher a year). Health and education investment *gap* (US$390 billion) is about 20 percent of IMF *additional spending* in these areas. This seems reasonable since UNCTAD includes only infrastructure (hospitals and schools).	In the sectors that overlap with IMF, *average incremental investments* of US$930 billion, excluding climate mitigation and adaptation. Assuming countries increase spending gradually between 2019 and 2030 to reach the IMF *additional spending* (similarly to ST's definition), IMF *average additional spending* would be US$1.1 trillion. Main difference is health (ST is lower by US$100 billion), explained by the flat per capita cost assumed in ST's references.	The US$150 billion *gap* in 2018 (8.5 percent of LIDC GDP in 2018) is roughly comparable to the IMF US$340 difference between additional spending and potential additional revenue in 2030 (9.9 percent of low-income developing country GDP in 2030).

Source: IMF staff compilation.

Note: ODI = Overseas Development Institute; UNCTAD = United Nations Conference on Trade and Development.

1/ IMF: *Education and health*—Benchmarking exercise, assigning inputs (teachers per student, doctors per capita, teacher and doctor wages) observed in well-performing country today to countries in 2030; *roads*—cost of additional kilometers of roads that will be needed to ensure access to quality roads for all, assumes cost per all-weather-road kilometer of US$500,000; *electricity*—cost of increasing universal access to electricity by 2030, assuming consumption per capita increases with real GDP per capita, generation and distribution costs of US$2,250 a kilowatt; *water*: World Bank Water Supply, Sanitation, and hygiene (WASH) model (Hutton and Varughese 2016).

2/ UNCTAD: *Infrastructure*—References roughly follow Fay and Yepes (2003), who use regressions to forecast infrastructure demand and apply unit costs. Infrastructure spending needs are 6 percent of GDP for developing economies (half for new investments and half for maintenance). UNCTAD also cites McKinsey's results (global needs of about US$60 trillion by 2030, estimated benchmarking historical spending; assuming a needed stock of 70 percent of GDP; and reviewing other estimates of needs); *education*—UNESCO; *health*: World Health Organization.

3/ Schmidt-Traub: *Infrastructure* (excluding water)—References roughly follow work by Fay and Yepes (2003), as presented in World Bank (2013b) and UNCTAD (2014); *education*—UNESCO (2015); *health*—following aggregate (not country-specific) estimates from the World Health Organization (spending per capita to ensure achievement of SDG) and the World Bank (spending per capita for essential universal health coverage)*; water:* World Bank Water Supply, Sanitation, and hygiene (WASH) model.

4/ ODI: *Education*—UNESCO (2015); *health*—aggregate (not country-specific) estimates from the World Health Organization (spending per capita to ensure achievement of SDG) and the World Bank (spending per capita for essential universal health coverage); *social transfers*—transfers to individuals with disabilities, the young (ages 0–14), and the elderly (ages 65 and older) based on projected poverty gaps by 2030, working-age population (15–64 years old) eligible for smaller transfers and public workfare.

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