Fiscal Policy for Inclusive Growth in Asia

Benedict Clements, Sanjeev Gupta, and João Tovar Jalles

Abstract

This paper discusses how fiscal policy can help foster more inclusive growth in developing Asia. On average, government expenditures in developing Asia are higher, as a share of gross domestic product, than those in Latin America and the Caribbean. Relative to Latin America, developing Asia spends more on social benefits, but less on education and health. While general government revenues have risen since 2000, they are still not sufficient to fully fund targeted transfer programs and provide adequate in-kind benefits to the population. Against this background, this paper discusses priorities for policy reforms as countries in the region seek more inclusiveness and confront the effects of the coronavirus disease (COVID-19). The paper finds that eliminating inefficiencies in health, education, and public investment, for example, would generate the equivalent of 3 percent of gross domestic product. Savings from curtailing subsidies for fossil fuels would also generate resources for expanding redistributive spending. Reallocating health spending toward primary care, and education spending toward primary and secondary education, would help lead to more equitable growth. There is also scope to raise spending on social benefits and better target them to the poor.

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I. Introduction

In recent decades, inequality in the distribution of per capita income—as measured by the percentage point change in the Gini coefficient—has increased in many countries in developing Asia (Clements et al. 2015, chapter 4). For example, between 1990 and 2010, disposable income Gini increased by more than 5 percentage points in Indonesia, the Lao People's Democratic Republic (Lao PDR), the People's Republic of China (PRC), and Sri Lanka, and by more than 3 percentage points in Bangladesh, Mongolia; and Taipei, China. A survey of policymakers in Asia found that 70% of respondents were concerned about the rising income inequality (Kanbur et al. 2014).

Fiscal policy can be a potent instrument for addressing society's distributive concerns.[1] It affects household welfare through both monetary payments (taxes and transfers) and provision of in-kind benefits (for example, free education and health services). On the revenue side, it can help build reliable tax bases by reducing exemptions, combating tax evasion, and strengthening tax administration, which allows for non-inflationary financing of monetary and in-kind benefits.

This paper discusses how fiscal policy can help foster more inclusive growth in developing Asia and it is structured as follows.[2] First, it provides an overview of trends in aggregate revenues and spending in developing Asia,[3] and then compares them with those countries in Latin American and the Caribbean (LAC) and the advanced economies (AEs). Thereafter, section III discusses the linkages between countries' revenue efforts, and their capacity to expand social spending to promote inclusive growth. A more detailed examination of the redistributive role of fiscal policy is in section IV, including new econometric analysis of the fiscal determinants of inclusive growth episodes.[4] Section V provides a detailed examination of potential reforms in spending on health, education, social benefits, energy subsidies, and public investment to help foster inclusive growth in developing Asia. A summary final section on key findings and recommendations concludes the paper.

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[1] In fact, fiscal policy is the primary tool for governments to affect income distribution (Clements et al. 2015). That said, both tax and expenditure policies need to be designed carefully to balance distributional and efficiency objectives (Scully 2002).

[2] In developing countries and emerging market economies, tax-benefit systems are less developed and, therefore, potentially less redistributive. In the case of Latin America, for example, incidence analysis shows that the redistributive impact of tax-benefit systems varies considerably from country to country, and tends to be stronger in Argentina, Brazil, and Uruguay (Brezzi and De Mello 2016), although they are considerably less redistributive than in advanced economies (AEs). The discussion in our paper does not address how fiscal policies can be used to affect the sectoral pattern of growth.

[3] The list of countries in developing Asia is in Appendix 3.

[4] Bartolini and De Mello (2016) look at the effects of intergovernmental fiscal relations on growth and income distribution within, not only between, countries. However, such an approach goes beyond the scope of this paper.

II. Expenditure trends in developing Asia in comparative perspective

On average, government expenditures in developing Asia are higher as a share of gross domestic product (GDP) than those in LAC, but well below those of the AEs (Figure 1). In the aftermath of the global financial crisis in 2008, government spending rose in all three country groups. In developing Asia, spending continued to trend upward until 2019. In AEs and LAC, spending rose in 2020 in response to the economic downturn and escalation of spending needs related to the coronavirus disease (COVID-19) outbreak. In developing Asia, spending began a gradual upward trend over 2013–19, before rising sharply in 2020—as in other regions—in response to the economic downturn and rise in spending needs related to COVID-19 (Figure 2).

Figure 1. Government expenditure across country groups
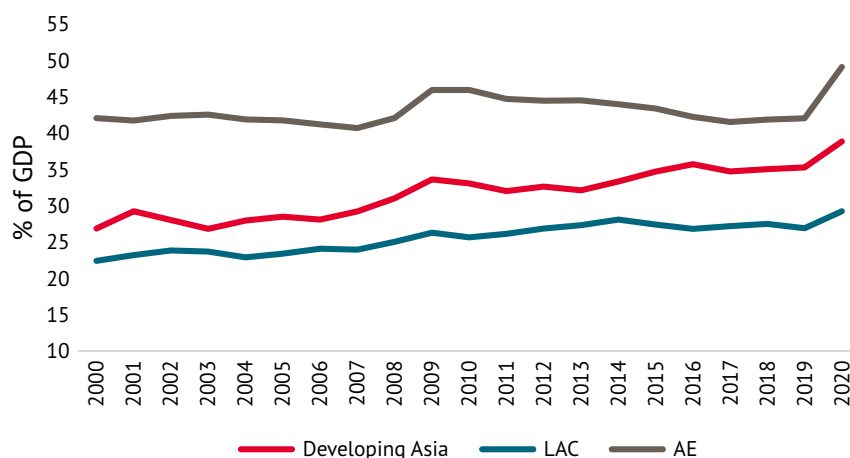
AE = advanced economies, GDP = gross domestic product, LAC = Latin America and the Caribbean.
Notes: In 2000, developing Asia comprises 38 countries, LAC comprises 26 countries and AEs comprises 34 countries. In 2020, developing Asia comprises 43 countries, LAC comprises 26 countries and AEs comprises 35 countries.
Source: Authors' estimates using International Monetary Fund World Economic Outlook data (accessed August 2021).

Figure 2. General government expenditure by economic category in Asia, 2000–2020

GDP = gross domestic product.
Source: Authors' estimates using International Monetary Fund World Economic Outlook data (accessed August 2021).

Fiscal strategies for inclusive growth will need to take account of the significant variation in government expenditures, both across and within regions in developing Asia. On average, spending tends to be highest in the small island economies of the Pacific and lowest in Southeast Asia (Figure 3). In all regions of developing Asia, government spending rose in response to the pandemic.

Figure 3. General government expenditure in Asia
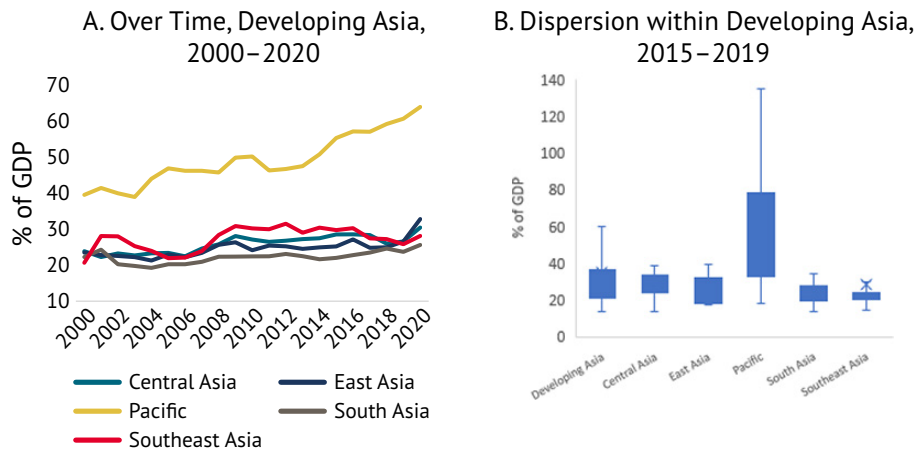
GDP = gross domestic product.
Notes: In 2000, Central Asia comprises 6 countries, East Asia comprises 6 countries, Pacific comprises 10 countries, South Asia comprises 6 countries, and Southeast Asia comprises 10 countries. In 2019, Central Asia comprises 8 countries, East Asia comprises 6 countries, Pacific comprises 12 countries, South Asia comprises 7 countries, and Southeast Asia comprises 11 countries. In 2019, Central Asia comprises 8 countries, East Asia comprises 6 countries, Pacific comprises 12 countries, South Asia comprises 7 countries, and Southeast Asia comprises 10 countries.
Source: Author's estimates using World Economic Outlook and World Development Indicators databases (accessed August 2021).

Relative to LAC, developing Asia spends more on social benefits, [5] but less on education and health (Figure 4).

Figure 4. Government expenditure by function across country groups, 2014–2018
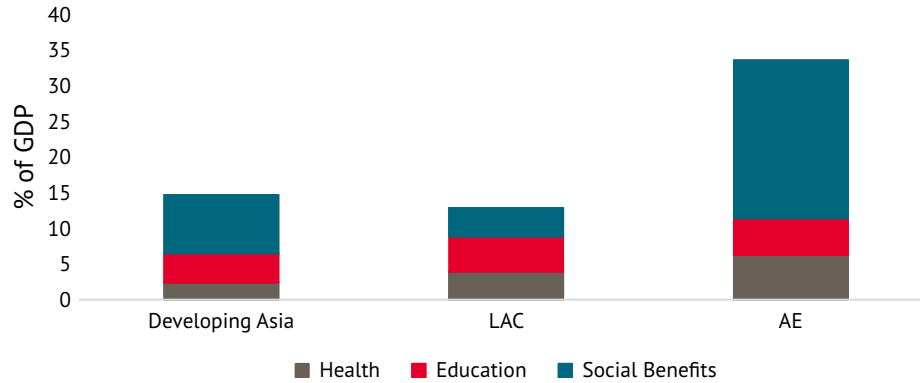
AEs = advanced economies, GDP = gross domestic product, LAC = Latin America and the Caribbean.
Sources: Authors' calculations using World Economic Outlook database; World Development Indicators; and, for advanced economies spending on social benefits, Organisation for Economic Co-operation and Development (accessed August 2021).

There are large differences in social spending (health, education, and social benefits) across regions in developing Asia, with higher levels of outlays on health in East Asia and the Pacific, and notably low spending in South Asia for all categories except education (Figure 5).[6]

Figure 5. Social spending by region in developing Asia, 2014–2018

GDP = gross domestic product.
Source: Authors' estimates using World Economic Outlook database and World Development Indicators (accessed August 2021).

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[5] Social benefits include social assistance and social insurance, such as pensions.
[6] South Asia is not the only region that contributes to the low level of health spending for developing Asia as a whole. Spending is less than 2% of GDP in Central Asia and Southeast Asia as well.

III. Linkages between revenues and expenditures for inclusive growth

As discussed in the background revenue paper (Gupta and Jalles, 2022), general government revenues also show an upward trend from 2000 to 2019 in developing Asia, before the COVID-19 pandemic led to a decline in 2020 (Figure 6). Nevertheless, revenues remain below those of AEs. The composition of revenue in developing Asia has a relatively small impact on inequality, given the high reliance on consumption taxation and relatively small share of taxes garnered from the personal income tax and property taxes (see Gupta and Jalles, 2022).

Figure 6. General government revenues by country group, 2000–2020
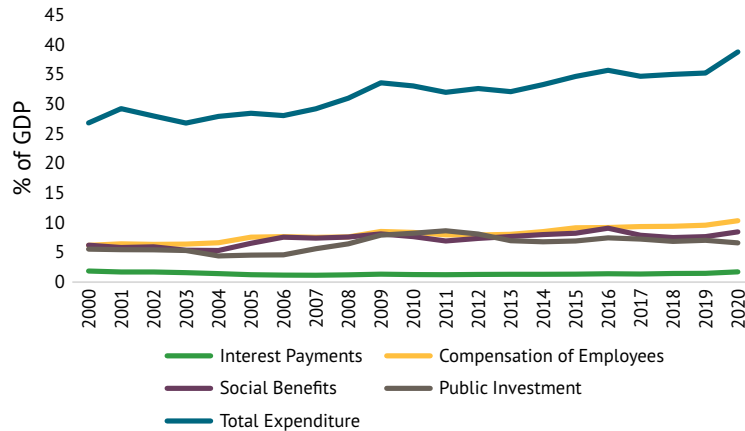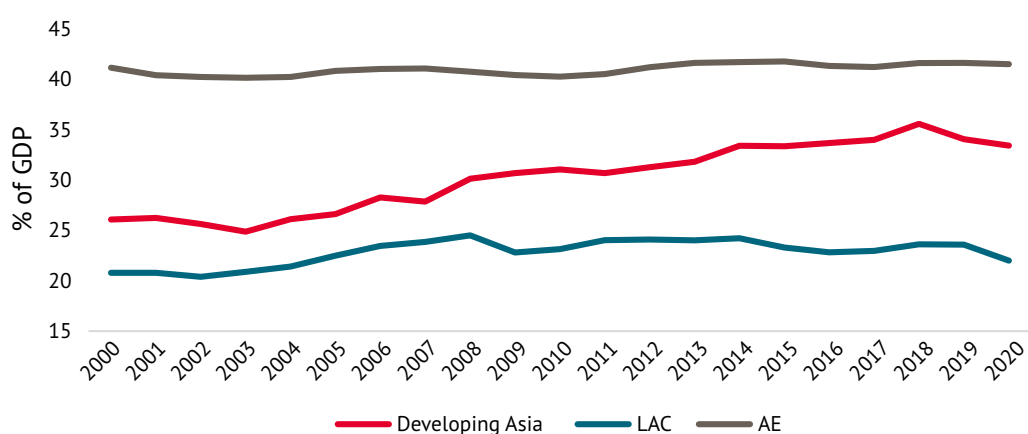

AE = advanced economies, GDP = gross domestic product, LAC = Latin America and the Caribbean.
Notes: In 2000, developing Asia comprises 41 countries, LAC comprises 26 countries, and AEs comprises 34 countries. In 2019, developing Asia comprises 44 countries, LAC comprises 26 countries, and AEs comprises 35 countries. In 2020, developing Asia comprises 43 countries, LAC comprises 26 countries, and AEs comprises 35 countries.
Source: Authors' calculations based on World Economic Outlook database (accessed August 2021).

Low revenues remain an impediment to the expansion of social spending that could make growth more inclusive in developing Asia. There is a correlation between revenues and spending on health, education, and social benefits (Figure 7, panels A–C). For developing economies, scarring from COVID-19 is estimated to have raised, on average, spending needed for the Sustainable Development Goals by more than 2% of GDP (Benedek et al. 2021). This underscores further the need to boost the revenue effort in developing Asia as part of a fiscal strategy to promote more inclusive growth. At the same time, to improve tax compliance, countries will need to improve governance to help raise the revenue effort. This is supported by the positive correlation observed across countries between various proxies for compliance and tax revenues as a share of GDP (Figure 8).

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Figure 7. Total revenue versus social spending components
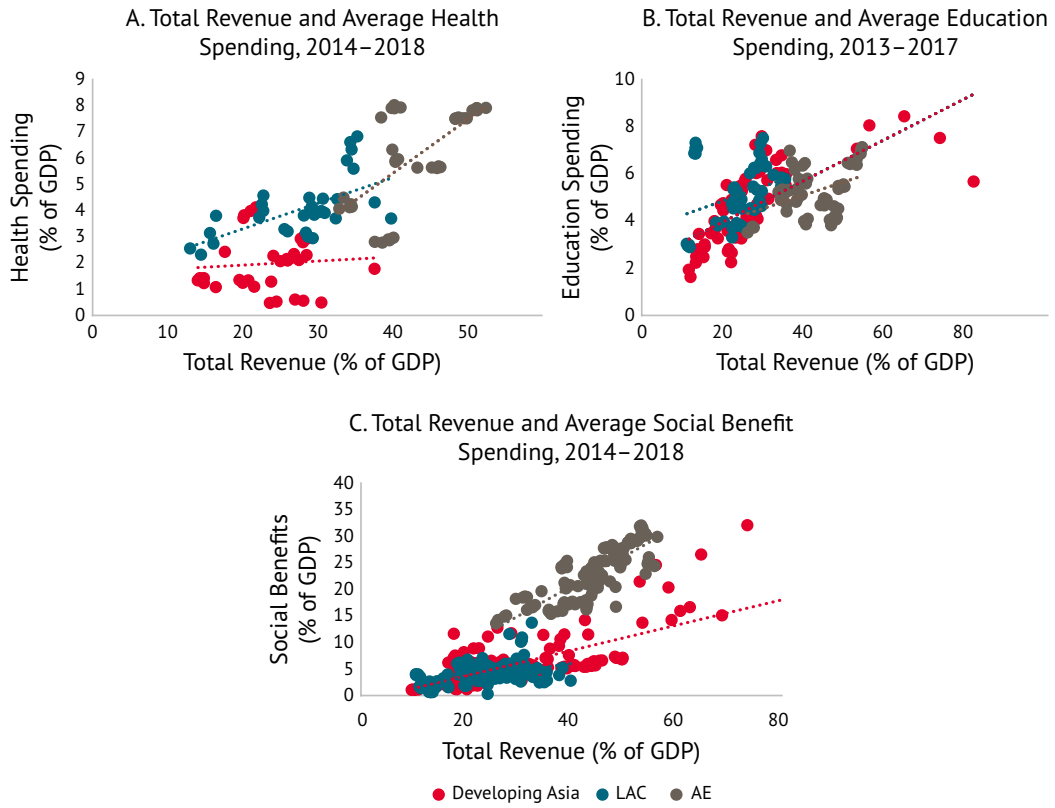
A. Total Revenue and Average Health
Spending, 2014–2018

B. Total Revenue and Average Education
Spending, 2013–2017

C. Total Revenue and Average Social Benefit
Spending, 2014–2018

● Developing Asia   ● LAC   ● AE
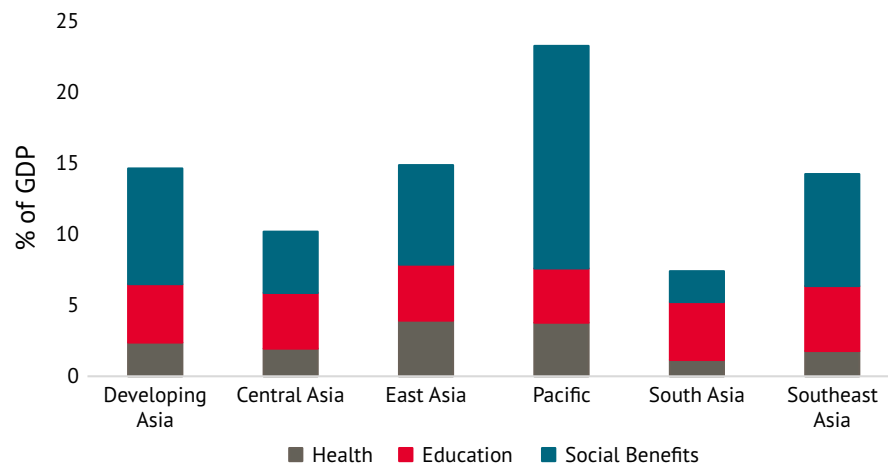
AE = advanced economies, GDP = gross domestic product, LAC = Latin America and the Caribbean.

Sources: World Economic Outlook database; World Development Indicators, and, for social benefits for advanced economies, Organisation for Economic Co-operation and Development (accessed August 2021).

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Figure 8. Relationship between proxies for tax compliance and tax revenue
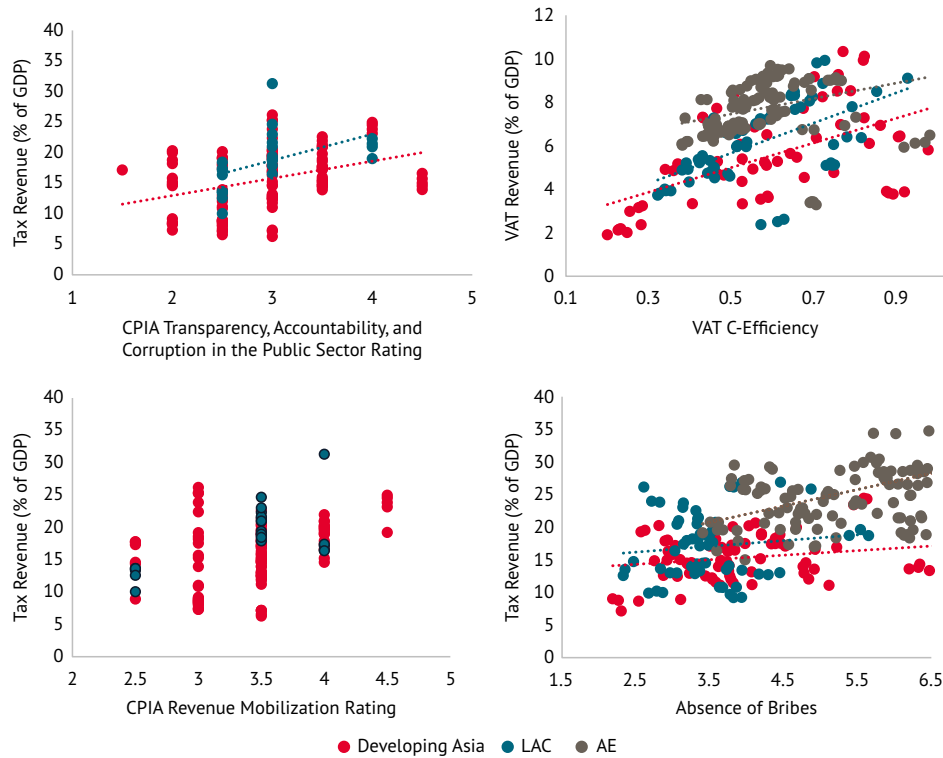
AE = advanced economies, CPIA = country policy and institutional assessment, GDP = gross domestic product, IMF = International Monetary Fund, LAC = Latin America and the Caribbean, VAT = value-added tax.
Notes: Data for tax revenue in percent of GDP are for the average 2015–2019; for the CPIA indexes, average values for 2015–2019; for absence of irregular payments and bribes, the average of 2014–2018; for VAT-revenues, average for 2015–2018; and for VAT C-Efficiency, the average of 2015–2018.
Sources: IMF World Economic Outlook database (tax revenues), World Bank (CPIA ratings), IMF Fiscal Affairs Department (database on VAT efficiency), Global Competitiveness Report database (rating for absence of irregular payments and bribes) (accessed August 2021).

IV. Expenditure policies for inclusive growth: health, education, social benefits

As noted in section I, fiscal policy can be a powerful tool for inclusive growth by redistributing income and helping build human capital for the next generation of workers. In developing Asia, income inequality generated by market forces (that is, without the impact of government taxes and social benefits) is more equal than that of LAC and AEs, as indicated by the lower Gini coefficient in developing Asia (Table 1). In developing Asia, however, taxes and social benefits achieve only a modest level of redistribution, reducing the Gini coefficient by about 4 percentage points, compared to a reduction of about 18 percentage points in AEs.[7] This is

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[7] The impact of social benefits (without the effect of taxes) on income inequality is examined in section V.C. Social Benefits.

because of the limited use of the personal income tax and property taxes in developing Asia, as well as the modest size of social benefits. The limited targeting of social benefits dampens the redistributive potential of expenditures in developing Asia. During the mid-2010s, there have been few changes in the distributive effects of fiscal policy (Figure 9).

Table 1. Redistributive effects of fiscal policy (latest available data)

	Gini Coefficient, Market	Gini Coefficient, Net	Redistributive Effect of Fiscal Policy (Market–Net)
Developing Asia	42.7	38.4	4.2
Latin America and the Caribbean	48.1	45.4	2.6
Advanced economies	48.3	30.4	17.6

Notes: Calculations based on latest available data for each country over the years 2010–2020. Developing Asia comprises 38 countries, Latin America and the Caribbean comprises 26 countries, and advanced economies comprises 30 countries. Redistributive effect of fiscal policy is the difference between the market income Gini coefficient and the net Gini coefficient.
Source: World Income Inequality Database (accessed August 2021).

Figure 9. Reduction in inequality because of fiscal policy, 2013–2016
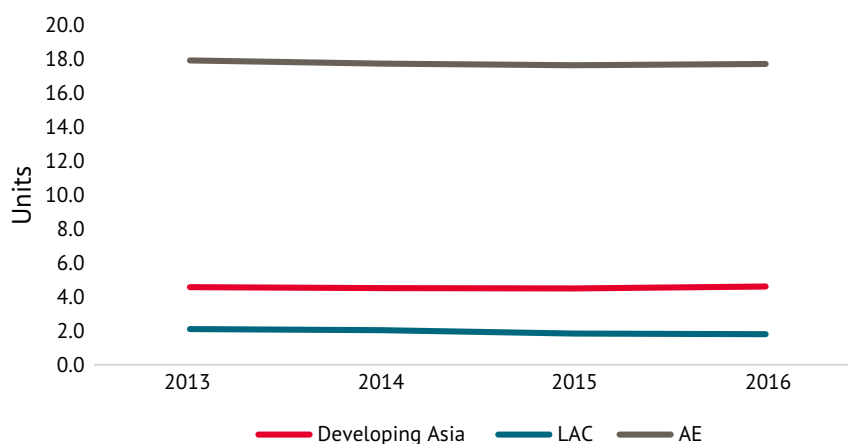
AE = advanced economies, LAC = Latin America and the Caribbean.
Note: Developing Asia comprises 12 countries, LAC comprises 12 countries, and AEs comprises 25 countries.
Source: World Income Inequality Database (accessed August 2021).

Fiscal policies can help ensure that economic growth episodes are inclusive, that is, lead to episodes of economic growth without a worsening of income inequality.[8] Our research indicates that inclusive growth episodes are more likely to occur in developing Asia when the population is better educated and tax-benefit systems are more redistributive (Table 2).[9] Redistribution in our context is defined as "the difference between gross or market Gini and

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[8] More specifically, an inclusive growth episode is the one in which there is simultaneously an increase in level of per capita wealth (measured by real GDP) and a fall in the level of the Gini index between 2 years.
[9] Further technical details are discussed in Appendix 1.

net or disposable Gini" (see Ostry et al. 2014). One interesting aspect of the results is that more redistributive systems have a favorable effect on both the net Gini coefficient (which indicates inequality measured after the effect of government transfers and direct taxes) and the gross Gini coefficient (which measures inequality on the basis of incomes from the market, before the effect of transfers and direct taxes). The latter result is especially noteworthy, as it indicates that more redistributive systems help provide the groundwork for growth episodes where lower-income groups also benefit in the form of wages and other market incomes. As such, fiscal redistribution can be seen as helping economies achieve greater equality of opportunity. Beyond the size of fiscal redistribution (in line with findings of de Mello and Jalles 2019), inclusive growth is more likely also to occur when per-capita spending on health is at high levels, underscoring the importance of improving health indicators for the poor to ensure that they can benefit fully from episodes of economic growth. Social benefits (which form a large part of the size of government redistribution) are also associated with a greater probability of achieving inclusive growth. These results, while suggestive and warranting care in interpretation because of the relatively small size of the panel under scrutiny, seem to underscore the importance of fiscal policy for reestablishing the foundation for inclusive growth.[10]

The COVID-19 pandemic has set back some of the gains achieved by developing Asia in reducing poverty, putting an even greater burden on fiscal policy going forward to address inequality and build human capital. Inequality is also increasing across several dimensions (World Bank 2021). The pandemic has resulted in a large surge in premature deaths, and the slow rollout of vaccines suggests that premature deaths will continue to affect many countries.[11] COVID-19 has also weakened the foundations of inclusive growth by reducing school attendance, primarily because of school closures (International Monetary Fund [IMF] 2021a).[12] The effects of the pandemic on learning in low-income families have been more severe because of their more limited capacity to participate in online learning options. Further, the decline in economic growth has increased unemployment and poverty.

As in many other regions, developing Asia was able to achieve an impressive expansion of the safety net in response to COVID-19 and offset some of these effects (Gentilini et al. 2021). For Asia and the Pacific, the safety net nevertheless covers only about 60% of the eligible population (IMF 2021c) and many of these programs are of a short duration and not well targeted (World Bank 2021).[13] The level of assistance remains low, covering only 10% of pre-transfer income (IMF 2021c). The adverse effects of the COVID-19 pandemic are likely to increase inequality and reduce employment for workers with low levels of education (Furceri et al. 2021).[14]

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[10] The main benefit of further empirical analysis in this area is the identification of those "win–win" or "super pro-poor" policy packages that would enhance growth together with distributive gains and also provide a better understanding of corrective measures when equity–efficiency tradeoffs are identified.

[11] Blundell et al. (2020) documents the adverse effects on health and other socio-demographic indicators in the United Kingdom.

[12] Aucejo et al. (2020) show that the COVID-19 pandemic is widening the achievement gaps in higher education.

[13] In Latin America and the Caribbean, about 80% of the eligible population is covered (IMF 2021a).

[14] The pandemics in their sample, even though much smaller in scale than COVID-19, have led to increases in the Gini coefficient, raised the income share of higher-income deciles, and lowered the employment-to-population ratio for those with basic education compared to those with higher education.

Table 2. Determinants of inclusive growth episodes in developing Asia

Dependent Variable	Inclusive Growth Episode Based on Gross Gini					Inclusive Growth Episode Based on Net Gini				
Variables/Specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Growth real GDPpc (t-1)	−5.745*	1.920	0.567	0.607	−4.443	−4.340	5.566	2.513	0.773	−2.747
	(3.049)	(6.399)	(9.983)	(5.454)	(4.836)	(3.014)	(6.460)	(9.977)	(5.948)	(4.704)
Human capital (t-1)	0.364	0.908**	3.252***	2.298***	0.331	−0.263	0.328	2.449***	2.135***	0.031
	(0.292)	(0.373)	(0.728)	(0.772)	(0.420)	(0.292)	(0.369)	(0.680)	(0.810)	(0.414)
Redistribution (t-1)	4.855**	7.248***	13.154***	−9.210	7.916***	5.696***	8.644***	15.630***	−5.037	10.445***
	(2.135)	(2.543)	(2.897)	(8.433)	(2.755)	(2.122)	(2.515)	(2.952)	(8.720)	(2.870)
Financial openness (t-1)	−0.022	0.005	0.299*	−0.130	−0.159	0.101	0.166	0.387**	0.251	0.061
	(0.116)	(0.138)	(0.182)	(0.238)	(0.200)	(0.115)	(0.135)	(0.187)	(0.282)	(0.198)
Trade openness (t-1)	0.017***	0.016***				0.018***	0.014***			
	(0.004)	(0.004)				(0.004)	(0.004)			
Real GDPpc (t-1)	−0.099**	−0.038	−0.005	−0.899**	−1.404***	−0.068	0.008	−0.052	−1.411***	−1.524***
	(0.045)	(0.056)	(0.072)	(0.339)	(0.328)	(0.044)	(0.056)	(0.071)	(0.463)	(0.338)
Inflation rate (t-1)	0.245	−0.626	−9.149**	−8.219	−4.699	0.151	−1.794	−6.148	−5.388	−5.056
	(1.408)	(2.142)	(4.524)	(6.434)	(4.163)	(1.401)	(2.160)	(4.258)	(6.005)	(4.195)
Employment rate (t-1)	6.842	6.894		2.147	12.208	4.577	10.120		−22.612*	−5.623
	(5.899)	(6.983)		(9.151)	(8.534)	(5.716)	(6.739)		(12.359)	(7.927)
Productivity growth (t-1)		−5.815	−6.254				−7.197	−5.078		
		(5.626)	(8.091)				(5.696)	(8.121)		
Unemployment rate (t-1)			0.105					−0.020		
			(0.259)					(0.252)		
Exchange rate (t-1)				−5.472*	−1.854				−7.471**	−4.257
				(3.411)	(2.703)				(3.587)	(2.791)
Government social benefits pc (t-1)				0.431					0.893***	
				(0.285)					(0.325)	
Government health spending pc (t-1)					1.356***					1.414***
					(0.326)					(0.333)
Observations	*477*	*374*	*186*	*119*	*217*	*477*	*374*	*186*	*119*	*217*
Pseudo R2	*0.136*	*0.183*	*0.272*	*0.216*	*0.179*	*0.122*	*0.165*	*0.262*	*0.290*	*0.206*

GDPpc = gross domestic product per capita.

Notes: Logit estimation. Constant omitted for reasons of parsimony. Standard errors in parenthesis. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Source: Author's estimates.

In section V, we provide a discussion of government spending that can affect these drivers of inclusive growth—health, education, and social benefits—preceded by an overview of the state of human capital in the region. We also discuss the priorities for policy reforms in each of the areas as countries continue to confront the effects of COVID-19.

V. Priorities for reform in human capital in developing Asia

Government spending on health and education can only make growth more inclusive if these services are successful in improving health and education outcomes across a broad spectrum of the population, including lower-income households. How well does developing Asia fare in building human capital? To answer this, we examine the World Bank's Human Capital Index (HCI), which provides a concise scorecard on the prospects for a citizen born today to survive to age 60 and achieve a high-quality education (World Bank 2021).[15] The HCI scale ranges from 0 to 1, with a score of 0.7, for example, indicating that a citizen born today can expect, on average, to reach 70% of that achieved by a citizen that had survived and enjoyed full health and a complete education.

Table 3 indicates that the average human capital index in developing Asia, at 0.55, is broadly equal to that of LAC, but lags well behind that of AEs. The large gap with the latter group indicates that there is considerable room to strengthen human capital in developing Asia. Performance on expected years of schooling and quality of schooling are slightly higher in developing Asia than LAC, although this masks wide variation across regions. On health indicators, developing Asia lags LAC on the fraction of children under 5 not stunted, including in some countries with relatively high incomes (Malaysia, Marshall Islands, and Sri Lanka).

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[15] The indicators included in the HCI are in health, child survival rates, stunting (percentage of children at age 5 that are below a healthy weight), and adult survival rates until age 60; and for education, the quantity of years of schooling achieved by age 18, adjusted for quality. For the latter, achieving 14 years of education by age 18 is considered full schooling. The weight of these factors in the aggregate HCI are based on past research on the economic returns to education and health.

Table 3. Human capital across country groups and regions, 2020

	Human Capital Index	Expected Years of School	Harmonized Test Scores	Probability of Survival to Age 5	Fraction of Children Under 5 Not Stunted	Survival Rate Age 15–60
Developing Asia	0.55	11.6	411.4	0.97	0.77	0.9
Central Asia	0.58	12.3	422.8	0.98	0.87	0.9
East Asia	0.72	13.4	490.4	0.99	0.91	0.9
Pacific	0.49	10.8	376.7	0.97	0.76	0.8
South Asia	0.48	10.8	373.7	0.96	0.69	0.8
Southeast Asia	0.58	11.9	434.3	0.98	0.73	0.9
Latin America and the Caribbean	0.55	11.9	402.6	0.98	0.84	0.9
Advanced economies	0.74	13.4	506.7	1.00	0.93	0.9

Source: World Bank (2021a).

A. Health

In some countries, low public health spending is an obstacle to inclusive growth.[16] In fact, Cole and Neumayer (2006) argue that health is not just significant for development, but is also critical for raising educational attainment. Low public health spending often results in households needing to purchase health services from the private sector. Given the lack of widespread private health insurance, this leads to high out-of-pocket costs (e.g., Armenia, Azerbaijan, Georgia, Kyrgyz Republic, Nepal, and Turkmenistan), making health care unaffordable for some households. It can also make households vulnerable to falling into poverty when catastrophic health events occur.

1. COVID-19 is the immediate priority

Many countries will have to raise or maintain health spending related to the rollout of vaccinations for COVID-19. This should be complemented by policies outside of health to contain COVID-19, such as testing and tracing and efforts to raise regional production of vaccines (World Bank 2021). Containing COVID-19 will allow health indicators to recuperate and could further boost economic growth. Within developing Asia, countries that have made the greatest progress on vaccinations and containment have experienced the highest growth (Asian Development Bank [ADB] 2021). Progress on vaccinations is especially critical, as highly vaccinated countries have been able to impose more targeted containment measures that helped dampen their effects on economic activity (ADB 2021).

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[16] Wang (2015) shows that, when the ratio of health spending to GDP is less than the optimal level of 7.55%, increases in health spending effectively lead to better economic performance. Above this, more spending does not equate to better care.

2. Financing COVID-19 vaccines through enhanced efficiency[17]

To help finance the spending required to roll out vaccines to all, developing Asia could improve the efficiency of existing public health care spending. On average, inefficiency in health spending is about 7%, somewhat better than LAC but less efficient than AEs (Figure 10).[18] The average in developing Asia masks wide variation across countries. Inefficiencies are low (less than 4%) in countries with strong health outcomes (the PRC, the Republic of Korea, and Singapore). Conversely, some countries have high inefficiency (equaling or exceeding 10%), not so much because of high spending but poor health outcomes (Myanmar, 0.7% of GDP; Pakistan, with spending of 1.1% of GDP; Papua New Guinea, 1.7% of GDP; and Turkmenistan, 1.2% of GDP).[19]

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[17] The relevance of public sector efficiency has been a topic of growing interest in the literature (for example, the works by Gupta and Verhoeven 2001, and Tanzi and Schuknecht 1997, 2000). Several studies assess the degree of efficiency of the public sector by looking at different samples and time spans, but most tend to focus on Organisation for Economic Co-operation and Development and European countries (Adam at al. 2011, Dutu and Sicari 2016, and Antonelli and de Bonis 2019).

[18] A description of the methodology used for the inefficiency estimates is in Appendix 2. As a robustness test, we also measured the average inefficiency of health spending by dropping off the three highest and lowest scores. The results indicated that the mean efficiency scores for developing Asia remained at 6.9%. For education and infrastructure, the difference in the inefficiency score was less than 1.5 percentage points.

[19] Data on inefficiencies in spending in health, education, and infrastructure in this paper are drawn from the IMF Fiscal Monitor, 2021a, online data appendix. The regional averages are based on country level estimates from the application of data envelopment analysis (DEA). Under this methodology, an efficiency frontier shows the maximum level of output possible for different levels of inputs. Inefficiency then is defined in terms of how far a country is from the efficiency frontier, which is formed on the basis of data from the most-efficient countries. The different inputs and outputs used for the DEA analysis are indicated in the notes section of the relevant figures.

One drawback of DEA is that it works best using a limited number of inputs, and therefore may not capture all the factors that determine outcomes. An approach commonly employed in the literature is to undertake a second step to assess the role of some of these factors (such as the size of the public sector wage bill) that could have an impact on the efficiency scores (Gupta and Verhoeven 2001). An exploration of these determinants would be a fruitful line of additional research. It would be useful also to assess whether inefficiency scores have changed over time to assess which countries were increasing or decreasing spending efficiency over time. Changes in efficiency scores over time are likely to be modest, however, considering the persistence in country rankings in terms of level of spending inputs and outcomes. For example, the rank correlation coefficient for life expectancy in our sample between 2010 and 2018 is 0.99, and the rank correlation between health spending per capita in 2010 and 2018 is 0.97.

Figure 10. Inefficiency in government health expenditure
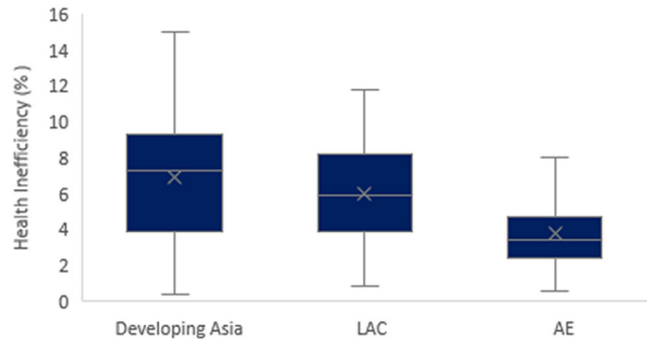
AE = advanced economies, LAC = Latin America and the Caribbean.
Notes: Figures based on estimates of inefficiency by country derived from data envelopment analysis. Inefficiency is measured in terms of the percentage increase in life expectancy that could be achieved—if the country was efficient—relative to a country's per capita public spending on health. X represents the mean and the middle line represents the median. Developing Asia comprises 37 countries, LAC comprises 30 countries, and AEs comprises 35 countries.
Source: International Monetary Fund. 2021a. *Fiscal Monitor.* Online data appendix accessed August 2021.

Even for countries with low levels of spending, there is scope to improve efficiency and health outcomes. This is evident from the studies carried out by the World Bank on the health sector in developing Asia. For example, in many countries, including those that are geographically dispersed (e.g., Pacific islands, Indonesia), there is the possibility to better target spending to poorer regions or those regions where the private sector is not present (World Bank 2016, 2020a). In addition, there is room to improve the coordination of services across levels of government (Indonesia, Mongolia, Nepal, and Pakistan) (World Bank 2018c, 2020a, 2020b, 2021b). In some cases, this will mean giving more autonomy to health care providers so that they can allocate resources efficiently (the PRC, World Bank, and World Health Organization 2019). Strengthening public financial management systems to fully execute health budgets in developing Asia should be a priority. Developing countries execute their budgets by at least 15% and the level of budget execution can be even higher in some countries (Barroy and Gupta 2020). A better communication of budget rules, timely cash requests, enhancing credibility of revenue forecasts, and preparing realistic cost estimates are some examples of improvements in public financial management practices that can expand budget space for the health sector in a relatively short period of time.

While improving the efficiency of spending could help countries improve health outcomes, the sector will also need more resources to help foster more inclusive growth. The savings that can be generated by reducing inefficiencies is relatively modest considering the small level of spending.

3. Providing resources for preventive and primary care

More generally, there is a need not only for more resources for the health sector but to reallocate a larger share of spending to preventative and primary care, and less to curative care (Azerbaijan, the PRC, Georgia, Indonesia, Kazakhstan, Kyrgyz Republic, Myanmar,

Tajikistan, and Pacific islands).[20] Primary health care should play a gatekeeping role to determine whether more expensive, curative health care is needed to address patient needs (Bhutan, World Bank 2013; and Kyrgyz Republic, World Bank 2021e). Improving the quality of primary care is critical to attract a larger share of patients who often perceive that better quality care is available at hospitals (the PRC, World Bank and World Health Organization 2019). In the Pacific islands, health facilities that provide primary care exist in the remote islands, but their poor quality and high user fees result in low usage (World Bank 2016). Thus, for many countries, improving the quality of primary care will be necessary to increase the population's demand for these services and successfully achieve a reallocation of spending away from curative, hospital-based care. For countries that suffer from high levels of childhood malnutrition (leading to a high level of stunting), resources should be allocated to programs that address this problem.

4. Examining sector's input use and practices

Beyond the shift in spending toward primary care, there are several other steps that countries could take to make their health systems support inclusive growth better. First, they could examine the composition of spending between wages and nonwage inputs, such as pharmaceuticals. In some cases, the large share of health budget absorbed by the wage bill is squeezing out other needed inputs, such as medicines (Tajikistan, World Bank 2018c). Second, there needs to be room to better manage staff in the health sector by paying appropriate salaries while monitoring performance more rigorously. For instance, in Pakistan, high absenteeism in both health and education has reduced the efficiency of public spending (World Bank 2020b). In some cases, salaries can be too low, leading to shortages in staffing health personnel and the use of informal payments by health care providers, further reducing access to health (Azerbaijan, World Bank 2015). Third, there is scope for better health outcomes by improving value for money in procurement, including for pharmaceuticals (Georgia, World Bank 2017; Mongolia, World Bank 2018b; and Micronesia, World Bank 2016). Finally, at a system-wide level, there is a need to strengthen incentives for a more cost-effective use of resources and greater efficiency (e.g., Micronesia, World Bank 2016; and Turkmenistan, World Health Organization 2019). Some of these reforms could include, for example, capitation payments that reduce the incentive to overprescribe treatments or medicines (the PRC, World Bank 2019).[21]

B. Education

Household surveys in developing Asia—as in the rest of the developing world—indicate a strong correlation between educational achievement and income. In this context, making growth more inclusive in developing Asia will require raising the educational attainment of

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[20] For example, World Bank (2015) for Azerbaijan, World Bank (2016) for Pacific Islands, and World Bank and World Health Organization (2019) for the PRC.

[21] Clements et al. (2012) further discuss options to improve the efficiency of spending in the health sector in emerging market economies.

children from low-income households, who are much more likely to drop out of school and face a lifetime of low earnings. It will also require that the quality of education is sufficiently high that it leads to an increase in learning. Learning-adjusted schooling shows a stronger relationship with earnings than education levels alone (World Bank 2018b and World Bank 2020c).

Improving educational outcomes in developing Asia may not require an increase in education spending if countries are able to reduce inefficiency. Generally, inefficiencies in education spending are higher than those for health and, in developing Asia, average 16% (Figure 11). This is higher than in AEs but are still about a third lower than those of LAC. In part, this reflects the relatively lower level of spending in developing Asia and slightly better performance on educational achievement. Figure 12, which plots years of effective learning and spending per student around the world, suggests that higher spending is no guarantee of better educational performance.

Figure 11. Inefficiencies in education spending
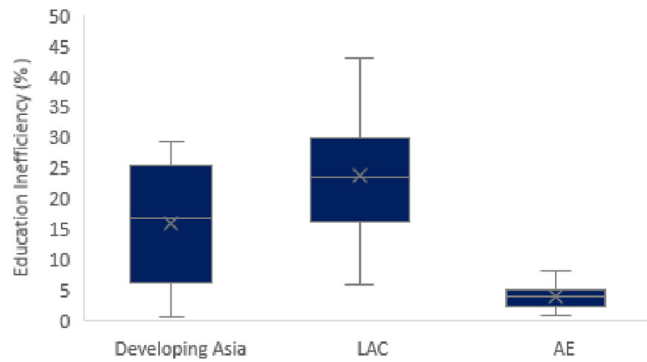
AE = advanced economies, LAC = Latin America and the Caribbean.
Notes: Figures based on estimates of inefficiency by country derived from data envelopment analysis.
X Inefficiency is measured in terms of the percentage increase in test scores and net enrollment rates that could be achieved—if the country was efficient—relative to the country's public per-student spending at the secondary level. X represents the mean and the middle line represents the median. Developing Asia comprises 6 countries, LAC comprises 13 countries, and AEs comprises 28 countries.
Source: International Monetary Fund. 2021. *Fiscal Monitor.* April. Online data appendix accessed August 2021.

Given the drop-off in school attendance during the pandemic, efforts to facilitate the attendance, especially for low-income families, should be a priority. COVID-19 learning losses are already expected to have an adverse effect on future earnings of today's cohort of students (World Bank 2021). This may require additional investment in schools to make them safer and reduce the risk of disease transmission, as well as adjustments in curriculum to address the needs of students that have fallen behind during the pandemic (World Bank 2021).

Figure 12. Learning-adjusted years of schooling versus spending per student at the secondary level
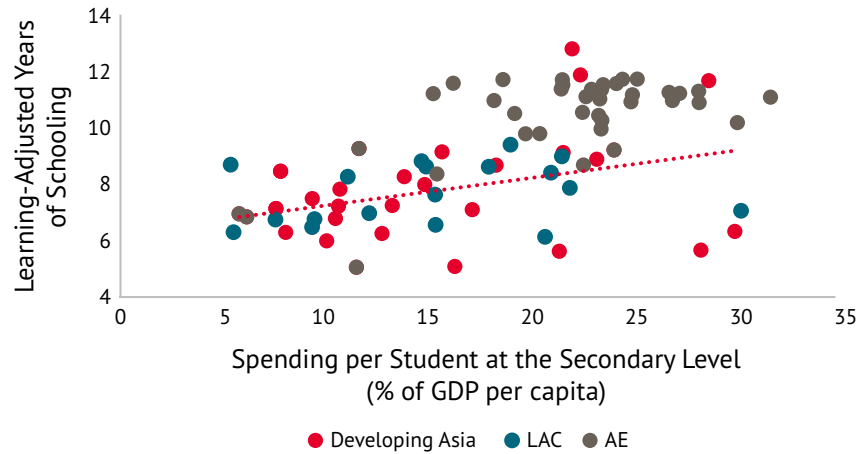
AE = advanced economies, GDP = gross domestic product, LAC = Latin America and the Caribbean.
Note: Developing Asia comprises 40 countries, LAC comprises 20 countries, and AEs comprises 35 countries.
Sources: World Bank (2021a) and World Development Indicator (accessed August 2021).

1. Allocating more resources towards primary and secondary education

In some countries, education spending can be made more efficient, and more supportive of inclusive growth, by allocating a larger share of educational resources towards primary and secondary education. Indeed, the highest performing countries in developing Asia have generally placed an emphasis on improving primary and secondary spending before investing heavily in tertiary education and have emphasized expanding access to high quality education for low-income groups (World Bank 2018). Indonesia, the Lao PDR, Malaysia, and the Philippines, for example, could make education spending more inclusive by allocating a larger share of outlays to primary and secondary education (World Bank 2018). More generally, the scope for expanding private sector provision of higher education could be explored, combined with an expansion of scholarships for students from lower-income families. According to United Nations Educational, Scientific and Cultural Organization data, in Latin America and the Caribbean, more than 50% of tertiary enrollment is with private schools, compared with 31% in developing Asia.

2. Lowering costs per student

In some countries, efficiency can be improved by reorganizing the education system and merging small schools (Armenia, World Bank 2014; and Thailand, World Bank 2019) to reduce costs per student. For Pacific island countries, more efficient education spending would require the use of more regional facilities, rather than replicating the same system

across several small countries (World Bank 2016). Where student/teacher ratios are low (for example, below the Organisation for Economic Co-operation and Development average), countries could allow for a gradual increase also, which would reduce costs per student. The productivity of education spending can be strengthened by greater efforts to monitor and reduce teacher absenteeism (Cambodia, World Bank 2019b; and Pakistan, World Bank 2018b).

3. Other efficiency-enhancing measures

There is scope to improve the efficiency of education spending by allocating a larger share of the education budget to school infrastructure, maintenance, and classroom materials.[22] The absence of these essential inputs adversely affects the quality of education in many countries (Armenia, Indonesia, Kyrgyz Republic, the Lao PDR, Mongolia, Nepal, Pakistan, the Philippines, and Tajikistan (World Bank 2014–2021). Greater attention needs to be paid to measuring student achievement and learning as the output of the education system, rather than enrollment rates. In many countries, performance on international tests is low (Azerbaijan, World Bank 2015; Papua New Guinea, World Bank 2021; and the Philippines, World Bank 2018), and a greater focus on boosting effective learning, especially in poorer areas of the countries, should be a priority. In other countries, there is no participation in international exams or a system of national examinations, making it difficult to assess the quality of education (Mongolia, World Bank 2018d; Tajikistan, World Bank 2018c; and Turkmenistan, World Bank 2020b).

The high level of inefficiency (on average) in education outlays does not imply that new spending to address key areas of weaknesses in educational performance is of low priority. For example, increases in maintenance spending, or improvements in access to quality education in poor areas, could be highly productive. Rather, the efficiency scores point to the possibility of boosting educational performance by reallocating resources within the sector or improving the productivity of these outlays more generally (for example, by putting more emphasis on learning outcomes).

C. Social benefits

As noted in section IV, social benefits (comprising social assistance and social insurance, such as pensions) can reduce poverty and inequality by directly transferring cash benefits to lower-income groups. This can help low-income families maintain adequate nutrition levels for young children to prevent stunting, which remains a problem in several countries in developing Asia. They can help lower-income families cope with income shocks and keep their children in school. As such, an effective system of social protection is an essential building block for inclusive growth.

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[22] A recent international benchmarking exercise on public spending efficiency in the education sector is in Herrera and Ouedraogo (2018).

Social benefit programs absorb a large share of government budgets in developing Asia. On average, this spending is higher than in LAC. However, the effect on poverty and inequality is muted by the incomplete coverage of low-income groups in these programs and the modest size of benefits. About 43% of households in the lowest quintile (poorest 20%) of the population are covered by social protection and labor programs in developing Asia, as defined by the World Bank's ASPIRE database, based on a sample of 25 countries (Table 4).[23] Social protection and labor programs are more expansive in Central Asia, with 58% of households receiving benefits, compared with 38% in the rest of developing Asia. For developing Asia as a whole, the average benefit paid by social protection programs is only 31% of the post-transfer income of the poorest quintile, which means that the total effect on the poverty (in terms of poverty reduction) is limited. The poor targeting of this spending also contributes to its modest effects on inequality in developing Asia. The poorest 20% of the population only receives about 10% of total spending on these programs (Figure 6). This poor targeting is also reflected in the low ratio of benefits that accrue to the poor per dollar spent on these programs. For developing Asia, this ratio is 19% and is identified in Table 4 as the benefit/cost ratio of social protection and labor programs.

The distributive impact on social assistance and social insurance programs differs in developing Asia (Table 5). Social insurance spending (such as that for pensions) is larger than spending for social assistance. Reflecting the larger size of spending, the impact of social insurance on the Gini coefficient and poverty rates is higher. However, social assistance is better targeted to low-income groups. The share of social assistance benefits captured by the poor is about 28%, compared with 16% for social insurance programs.

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[23] Social protection and labor programs only differ from this paper's definition of social benefits by the inclusion of labor-training programs. The World Bank's ASPIRE database is the best available information on the nature of developing countries' social benefit programs (social assistance and social insurance). The ASPIRE database does not provide data on the levels of spending on different social benefits.

Table 4. Performance of social protection and labor programs in developing Asia and Latin America and the Caribbean

	Developing Asia	Central Asia	Other Developing Asia	Latin America and the Caribbean
Coverage (poorest quintile)	43.4	57.6	38.9	66.3
Adequacy (poorest quintile)	31.4	49.1	26.1	26.6
Gini inequality reduction because of social protection and labor programs	6.1	15.6	3.2	1.8
Poverty headcount reduction because of social protection and labor programs	18.8	36.8	13.1	14.4
Benefit-cost ratio of social protection and labor programs	0.19	0.32	0.15	0.10
Benefit incidence poorest quintile	10.3	15.7	8.4	5.6

Notes: Developing Asia comprises 26 countries and Latin America and the Caribbean comprises 20 countries. Latest available data for each country are included in the calculations.

Variable definitions: Coverage (poorest quintile): Percentage of population participating in social protection and labor programs (includes direct and indirect beneficiaries). The indicator is reported for the entire population and for the poorest quintile of the post-transfer income distribution. Specifically, the indicator is computed as (number of individuals in the quintile who live in a household where at least one member receives the transfer)/ (number of individuals in that quintile).

Adequacy (poorest quintile): The total transfer amount received by all beneficiaries in a quintile as a share of the total income of beneficiaries in that quintile. The indicator includes both direct and indirect beneficiaries and is reported for all population and the poorest quintile.

Gini inequality reduction because of social protection and labor (SPL) (% of population): Gini inequality index reduction because of SPL programs as % of pre-transfer Gini index. Gini inequality reduction is estimated as (inequality pre-transfer-inequality post-transfer)/inequality pre-transfer.

Poverty headcount reduction because of SPL (% of population): Poverty headcount reduction because of SPL programs as percent of pre-transfer poverty headcount. Poverty headcount reduction is estimated as (poverty headcount pre-transfer-poverty headcount post-transfer)/poverty headcount pre-transfer.

Benefit- cost ratio of SPL programs: Percent reduction in poverty gap obtained for each $1 spent in SPL programs. Benefit-cost ratio is estimated as (poverty gap pre-transfer-poverty gap post-transfer) total transfer amount.

Benefit incidence: Percent of benefits going to the poorest quintile of the post-transfer welfare distribution relative to the total benefits going to the population. Specifically, benefit incidence is (sum of all transfers received by all individuals in the quintile)/(sum of all transfers received by all individuals in the population). The indicator includes both direct and indirect beneficiaries.

Source: Author's calculations based on World Bank ASPIRE database (accessed August 2021).

Table 5. Performance of social assistance and social insurance programs in developing Asia and Latin America and the Caribbean

	Developing Asia	Central Asia	Other Developing Asia	Latin America and the Caribbean
Social assistance: Gini inequality index (% reduction)	2.1	5.0	1.2	1.7
Social assistance: Poverty headcount (% reduction)	7.5	12.8	5.7	7.1
Social assistance: Benefit-cost ratio (% reduction)	0.28	0.33	0.27	0.34
Social insurance: Gini inequality index (% reduction)	3.5	10.6	1.8	0.2
Social insurance: Poverty headcount (% reduction)	12.1	27.0	8.4	9.4
Social insurance: Benefit-cost ratio (% reduction)	0.16	0.28	0.12	0.06

Note: Description of variables is in Table 4.
Source: World Bank ASPIRE database and authors' calculations accessed August 2021.

These results suggest that expansion of social assistance programs, rather than social insurance, would be the most promising route for making growth more inclusive in the near term.[24] There is scope to both expand coverage (which remains under the LAC average) and benefit levels. Over the longer term, it will be important also to improve targeting.

In 2020, social benefit spending rose markedly in some countries as part of country efforts to address the effects of COVID-19 on households. Countries with existing social benefit programs and delivery systems were able to expand and react quickly to the crisis, while some of those that did not were unable to mount much of a response (Bangladesh, the Lao PDR) (World Bank 2021a). Many central Asian countries expanded social protection coverage (Armenia, Azerbaijan, Georgia, Kyrgyz Republic, Tajikistan, and Uzbekistan; World Bank 2020c). In other parts of Asia, there was expansion of programs to increase coverage (Cambodia, the PRC, Indonesia, Myanmar, the Philippines, Myanmar, and Tuvalu) or top-ups of existing programs (Indonesia, Mongolia, and Myanmar) (World Bank 2021a). New cash transfer programs were also introduced (Indonesia and Viet Nam), and Nepal introduced temporary in-kind food transfers (IMF 2020). Some of these COVID-19-related programs were designed to be of short duration, and spending in 2021 is expected to decline in many of them (World Bank 2021b).

A key challenge will be how to utilize the expansion in administrative capacity and data on poor and vulnerable households to expand targeted social assistance programs in a durable manner. Some of the spending on COVID-19 programs has not been well targeted and should be replaced with better-targeted instruments; in Indonesia, Mongolia, and the Philippines, for example, households that did not experience any drop in their incomes because of COVID were just as likely to receive assistance as those that did not (World Bank 2021c). In countries with limited social benefit programs, the priority is to expand administrative capacity and information on vulnerable households to better prepare for future shocks of the magnitude of COVID-19. In countries that rely on informal family

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[24] A detailed study of social policies, specifically looking at Brazil's "Bolsa Familia" success story in improving income distribution, is in Arnold and Jalles (2014).

networks to provide a safety net (such as some Pacific islands), greater preparation for social assistance in times of natural disasters is a priority, as family networks are unlikely to be adequate in the face of large economic shocks.

1. Reducing energy subsidies to finance higher social spending

Cutting energy subsidies in developing Asia could provide resources to help fund better-targeted social spending to buttress inclusive growth. Energy subsidies are an inefficient and inequitable tool for supporting the consumption of low-income groups, as most of the benefits of cheap energy accrue to upper income groups (Clements et al. 2013 and Coady et al. 2019). Some energy subsidies have a direct effect on the budget, either as a transfer to loss-making public enterprises in the energy sector, or through the loss of potential revenues when energy is sold below international prices. As indicated in Figure 13, these budgetary subsidies are substantial in Central Asia, averaging about 4% of GDP. The other way in which energy is subsidized is when the taxes that are added on to the cost of energy do not capture all the negative externalities that arise from energy consumption, including the negative health externalities from local pollution, and when energy prices do not include the adverse effects on global warming. These subsidies (which arise when the price of energy does not incorporate these externalities) are considerable in all regions of developing Asia.

Figure 13. Energy subsidies, 2017
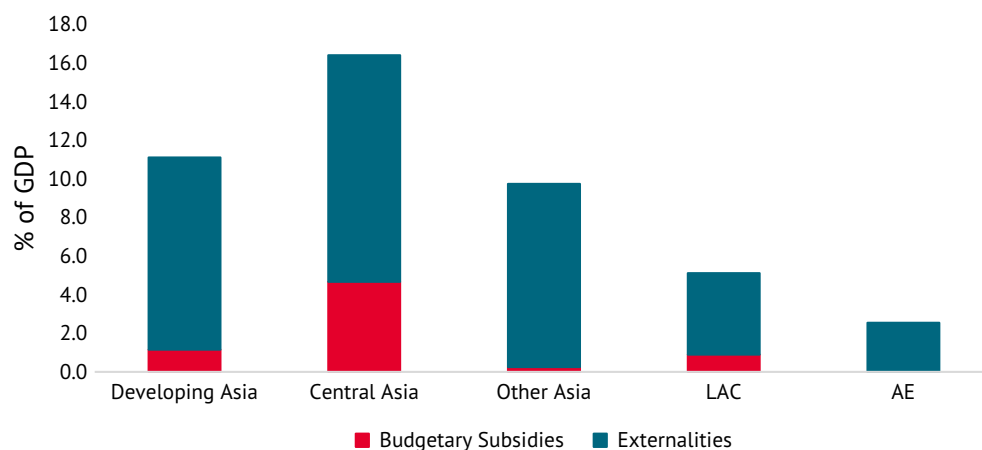
AE = advanced economies, GDP = gross domestic product, LAC = Latin America and the Caribbean.
Note: Externalities also include implicit tax subsidies when the value-added tax is not applied to energy products.
Source: International Monetary Fund, Fiscal Affairs Department, energy subsidies database (accessed August 2021).

2. Public investment to support inclusive growth

In the pre–COVID-19 era, developing Asia spent significantly more (about 7% of GDP) on public investment than LAC or AEs (Figure 14). On average, public investment declined in 2020 by about 0.5% of GDP, slightly less than the decline in LAC and AEs. The high share of the budget allocated to public investment has been one of the strong points of the region's fiscal strategy and has contributed to high rates of economic growth.

Public investment could contribute even more to inclusive growth, if inefficiencies were reduced. On average, infrastructure inefficiencies are smaller than LAC, but greater than in AEs (Figure 15). Within developing Asia, there is nevertheless a wide dispersion in efficiency, with Cambodia, Myanmar, Nepal, Pakistan, and the Philippines having inefficiencies greater than 50%, while central Asian economies (Georgia, Kazakhstan, and Tajikistan) have inefficiencies below 20%.

Figure 14. Public investment, 2015–2019 (percent of gross domestic product and of total government expenditure)
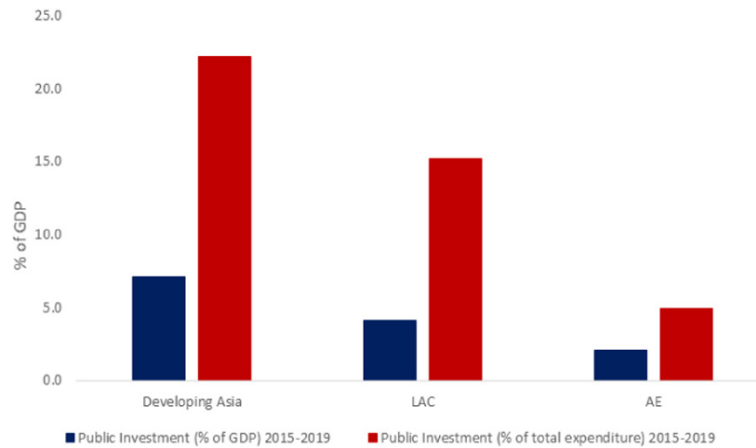
AE = advanced economies. GDP = gross domestic product, LAC = Latin America and the Caribbean.
Note: Developing Asia comprises 29 countries, LAC comprises 26 countries, and AEs comprises 34 countries.
Source: World Economic Outlook database (accessed August 2021).

Figure 15. Inefficiencies in infrastructure efficiency
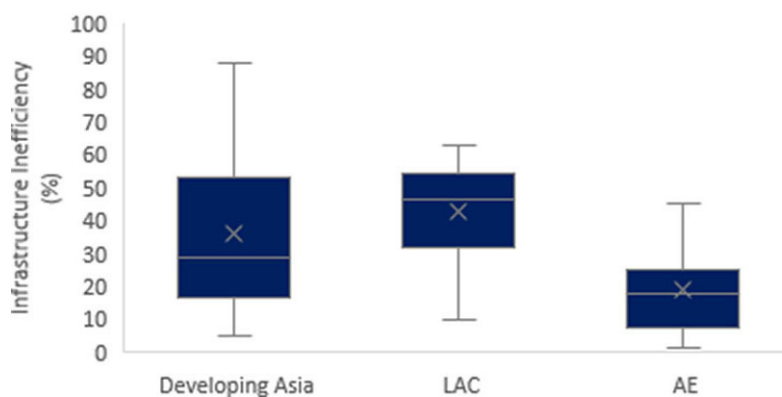
AE = advanced economies, LAC = Latin America and the Caribbean.
Notes: Figures based on estimates of inefficiency by country derived from data envelopment analysis. Inefficiency is measured in terms of the percentage increase in the volume and quality of public infrastructure that could be achieved—if a country was efficient—relative to the country's public capital stock and GDP per capita. X represents the mean and the middle line represents the median. Developing Asia comprises 19 countries, LAC comprises 20 countries, and AEs comprises 28 countries.
Source: International Monetary Fund. 2021a. *Fiscal Monitor.* April, online data appendix.

Despite the high level of public investment, survey-based indicators of the quality of infrastructure in emerging and developing Asia have stagnated (Vu et al. 2021), which suggests considerable inefficiencies in public investment. Tackling these inefficiencies could boost the quality of public investment and increase its contribution to inclusive growth. Public investment management reviews undertaken by the IMF over 2015–2019 for 11 countries in developing Asia suggest that improvements in project appraisal, project selection, and budgeting for maintenance spending are high priorities (Vu et al. 2021).[25]

VI. Summary of findings and recommendations

In the past three decades, income inequality has worsened in several countries of developing Asia. Fiscal policy remains a crucial policy instrument in the hands of policymakers to influence income distribution. In developing Asia, however, taxes and social benefits achieve only a modest level of redistribution. This is because of the limited use of the personal income tax and property taxes, as well as the modest size of social benefits. The limited targeting of social benefits and education and health spending has dampened the redistributive potential of government expenditures. These considerations have prevented th benefits from growth from spreading to all population groups more widely and evenly.

On average, government expenditures in developing Asia are higher, as a share of GDP, than those in Latin America and the Caribbean. Spending tends to be highest in the small island economies of the Pacific and lowest in Southeast Asia. Developing Asia spends more on social benefits, but less on education and health, relative to Latin America. While general government revenues have risen since 2000, they are still not sufficient to fund targeted transfer programs and provide adequate in-kind benefits to the population. Poor tax compliance, which has lowered the tax take, is correlated with the provision of public services.

Against this background, this paper discussed priorities for policy reforms in health, education, and social benefits as countries in the region seek more inclusiveness and confront the effects of COVID-19. The paper finds that improvements in the efficiency of spending could play an important role in generating resources to finance inclusive growth in developing Asia. Eliminating inefficiencies in health, education, and public investment, for example, would generate the equivalent of 3% of GDP. Besides efficiency and system enhancements indicated below in each area, savings from curtailing subsidies for fossil fuels would generate resources for expanding redistributive spending.

First, many countries will have to raise or maintain health spending, also to support a rollout of vaccinations for COVID-19. To help finance additional spending, developing Asia could improve the efficiency of existing public health care spending. In this regard, they could

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[25] The 11 public investment management reviews s covered in Vu et al. (2021) comprise Bangladesh, Indonesia, Kiribati, Malaysia, Maldives, Mongolia, the Philippines, Sri Lanka, Thailand, Timor-Leste, and Viet Nam.

reallocate a larger share of spending to preventative and primary care and less to curative care. In addition, there is scope to better target spending to poorer regions or those regions where the private sector is not present and improve the coordination of services across levels of government. Improvements in the mix of wages with other inputs as well as in systems to procure medical supplies can save resources. While improvements in the efficiency of spending will be helpful, this should not overshadow efforts to increase resources for the sector, which will be needed to achieve significantly better health outcomes in developing Asia. Improving capacity to execute health spending is also a priority.

Second, inefficiencies in education spending are generally higher than those for health in developing Asia and, therefore, improving educational outcomes may not require an increase in education spending, if countries are able to reduce existing inefficiencies so as to do more with the same amount of resources. Cost per student can be lowered in some countries by merging schools and increasing class size. Given the drop-off in school attendance during the COVID-19 pandemic, efforts to facilitate attendance, especially for children from low-income families, should be a priority. In some countries, education spending can be made more efficient, and more supportive of inclusive growth, by allocating a larger share of educational resources towards primary and secondary education. Governments need to pay more attention to the quality of learning rather than increasing enrollment. Expanding private sector provision of higher education could be explored, combined with an expansion of scholarships for students from lower-income families.

Third, social benefit programs absorb a large share of government budgets in developing Asia. However, because this spending is not well targeted, it has a relatively modest effect on poverty and inequality, in part because of the incomplete coverage of the poor in these programs and the modest size of benefits that the poor receive. Poor targeting of these programs has meant that the ratio of benefits (in terms of poverty reduction) relative to each dollar spent is only 0.2. Expansion of both coverage and targeting of social assistance programs, rather than social insurance, would be the most promising route for making growth more inclusive. Some spending on COVID-19 programs has not been well targeted and should be replaced with better targeted instruments.

Finally, in the pre–COVID-19 era, developing Asia spent significantly more on public investment than LAC or AEs. This investment could contribute even more to inclusive growth, if inefficiencies were reduced. Improvements in project appraisal, project selection, and budgeting for maintenance spending are areas that deserve particular attention in public investment management.

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Technical appendixes

Appendix 1: Inclusive growth in Asia

Widening income disparities and slow productivity growth in most advanced, and several emerging-market, economies have rekindled interest in the empirical analysis of the determinants of inclusive growth. In what follows, we define an inclusive growth episode (*IG*) for country *i* at time *t* as the combination of growth in real gross domestic product (GDP) per capita without a concomitant deterioration in the distribution of household disposable income (net Gini index) between $t-1$ and t.[1] In other words, an inclusive growth episode is one in which, between two consecutive years, there is simultaneously an increase in level of per capita wealth (measured by real GDP) and a fall in the level of the Gini index. Based on this bivariate characterization, we estimate logistic regressions to assess the likelihood of an inclusive growth episode between 1970 and 2017 for a sample of 16 Asian countries. Simultaneously, we control for other determinants of growth and income distribution.[2] The list of controls includes human capital (from Penn World Tables); redistribution (from Solt's (2009) database, and it is defined as market minus net Gini); financial openness (Chinn-Ito measure of capital account openness); trade openness (defined as exports plus imports over GDP and retrieved from the World Bank's World Development Indicators [WDI]); real GDPpc (real GDP per capita from the World Bank's WDI); inflation rate (based on CPI from the World Bank's WDI); employment rate (from the World Bank's WDI); productivity growth (defined as the growth rate of output per worker computed as nominal GDP over employment, from the World Bank´s WDI), unemployment rate (from the World Bank's WDI). All these variables are lagged 1 year to reduce potential reverse causation. We estimate the following model:[3]

$$\text{Prob}(IG = 1 \,|\, X) = \Phi(\lambda_i + X'\boldsymbol{\alpha}) \tag{A1}$$

where $\boldsymbol{\alpha}$ is a vector of the parameters to be estimated, X is a vector of exogenous variables, and $\Phi(\cdot)$ is the logistic function.[4]

The structural model associated with model (A1) can be written as:

$$\text{IG}^*_{it} = \lambda_i + \boldsymbol{\alpha} X_{it} + \varepsilon_{it},$$

$$\text{IG}_{it} = 1 \ \text{if} \ \text{IG}^*_{it} > 0, \ \text{and} \ 0 \ \text{otherwise}.$$

with $i = 1, \dots, \text{N}; t = 1, \dots, \text{T}; \lambda_i$ captures the unobserved individual effects; and ε_{it} is an error term.

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[1] This analysis draws from de Mello and Jalles (2019) whose original dataset includes 78 countries.

[2] This is akin to the methodology proposed by Aoyagi and Ganelli (2015).

[3] For details on this binary choice model refer to Greene (2012, chapter 17), for example.

[4] We should note that, as probit models do not render themselves well to the fixed-effects treatment because of the incidental parameter problem (Wooldridge 2002, chapter 15, p. 484), we estimate a logit model with fixed-effects.

The results of the logit estimation of model (A1) are reported in Tables 2 and 3 in the main text.

To test for the robustness of the results of the logit regressions, we re-estimated the baseline model by OLS and a rare events logit (or relogit) estimator.[5] In a logistic regression, the maximum likelihood estimates are consistent but only asymptotically unbiased. The basic problem is having a number of units (inclusive growth episodes) in a panel that has no events. This means that the country-specific indicators corresponding to the all-zero countries perfectly predict the zeroes in the outcome variable (Gates 2001 and King 2001). This is a well-known phenomenon in the statistical literature (for an overview, refer to Gao and Shen 2007). The simplest way of dealing with this problem is decreasing the rareness of the event of interest by lowering the threshold of what constitutes the event of interest or expanding the data selection period. For example, there is less of a need to correct for rareness. Alternatively, there is King and Zeng (2001) bias correction method, the relogit estimator. Results remain qualitatively unchanged.

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[5] These are available upon request.

Appendix 2: Methodology used for inefficiency of spending estimates[1]

The production function approach has been widely used in the literature to measure the efficiency of spending. Using this approach, inputs (for example, government spending on health care) can be thought of as producing outputs. Given the difficulty of directly measuring these outputs, indicators related to these outputs (for example, life expectancy) are often used for this type of analysis.

Based on the relationship between inputs and outputs, a production function can be derived, which indicates a technical efficiency frontier. For a given technology, the frontier represents the maximum level of the output that is possible for a given level of the input. When a country is at a point below the frontier (for example, point P below), there is inefficiency in public spending.

Inefficiency in spending can be measured on the basis of inputs (how much spending could be reduced for a given level of output) or on the basis of outputs (how much more output could be achieved for a given level of spending). In terms of Figure A1, input inefficiency is measured by segment BP, while output inefficiency is measured by segment PD. For this study, inefficiency is measured in terms of output efficiency. In this case, the inefficiency numbers indicate the percentage increase in the output that could be achieved if spending was efficient.

Figure A1. Input and output inefficiency: a graphical illustration
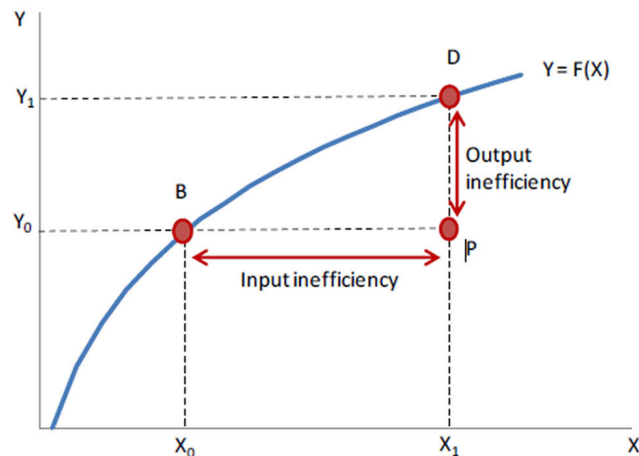
The inefficiency estimates in this paper are based on data envelopment analysis. This is a nonparametric method—drawing from Farrell (1957) seminal work and that was further developed by Charnes et al. (1978)—that calculates the efficiency frontier on the basis of data points that indicate countries that are able to achieve the greatest level of output for a

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[1] This section of Appendix 2 is drawn from IMF (2015). The description of the data and results is in IMF (2021a).

given level of input.[2] Linear approximations are used to connect points on the frontier and form a continuous production function so that all data points are effectively "enveloped" by the production frontier. This approach compares each observation with an optimal outcome. This is a suitable approach for several reasons: (i) it does not impose an underlying production function, and (ii) it allows deviations from the efficient frontier and it examines the efficiency of a country relative to its peers.

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[2] Coelli et al. (2002) and Thanassoulis (2001) offer introductions to data envelopment analysis.

Appendix 3: ADB's developing member countries and subregions

Central Asia (8)

Armenia

Azerbaijan

Georgia

Kazakhstan

Kyrgyz Republic

Tajikistan

Turkmenistan

Uzbekistan

East Asia (5)

Hong Kong, China

Mongolia

People's Republic of China

Republic of Korea

Taipei, China

South Asia (8)

Afghanistan

Bangladesh

Bhutan

India

Maldives

Nepal

Pakistan

Sri Lanka

Southeast Asia (11)

Brunei Darussalam

Cambodia

Indonesia

Lao People's Democratic Republic

Malaysia

Myanmar

Philippines

Singapore

Thailand

Timor-Leste

Viet Nam

The Pacific (14)

Cook Islands

Federated States of Micronesia

Fiji

Kiribati

Marshall Islands

Nauru

Niue

Palau

Papua New Guinea

Samoa

Solomon Islands

Tonga

Tuvalu

Vanuatu

Source: Asian Development Bank.