CHAPTER 1

SPENDING SMARTER: HOW EFFICIENT AND WELL-ALLOCATED PUBLIC SPENDING CAN BOOST ECONOMIC GROWTH

Introduction

Economic growth has remained persistently subdued since the COVID-19 pandemic, with growth in labor productivity having slowed in about 70 percent of economies (April 2025 *World Economic Outlook*, Chapter 1). Compounding this challenge are substantial strains on public finances, driven by elevated and rising debt levels, as well as increased demands for spending on defense, aging populations, and economic development. In addition, low-income developing countries are bracing for a reduction in foreign aid (April 2025 *Fiscal Monitor*, Chapter 1).

This constrained fiscal environment demands that governments deliver greater value for money and strategically adjust expenditures to support economic growth. Revitalizing growth not only improves living standards but also eases fiscal pressures by increasing public revenues and making public debt more sustainable, thereby creating additional space for other priority spending.[1] Although public spending serves many objectives—such as providing public goods, ensuring a fair distribution of income, and stabilizing economic cycles (Musgrave and Peacock 1958)—the current context underscores the need to prioritize policies that reinvigorate economic growth and mitigate fiscal risks.

This chapter examines how policymakers can change the composition of public spending within a fixed total spending envelope to lift economic growth. It focuses on the potential gains to output from actions in two complementary areas. The first, technical efficiency, maximizes output for a given level of resource use, focusing on broad categories of expenditure. The second, allocative efficiency, assigns priorities to spending items and directs resources toward programs that promote growth. Actions in both areas are essential because they complement each other—increased efficiency amplifies the effects of pro-growth spending.

This chapter addresses three key sets of questions:

1. How have the composition and efficiency of public spending evolved over time, and how do they compare across country groups? What are the "efficiency gaps" that indicate how far the efficiencies of countries' spending are from those of the most efficient countries?
2. What factors, including policies and institutions, influence the efficiency and composition of public spending? Does the degree of "rigidity" of public spending—defined as institutional, legal, contractual, or other constraints that limit a government's ability to change the size and structure of public spending in the short term—hinder a government's ability to adjust spending for growth and efficiency?
3. If countries close the gaps in the efficiency of their public spending, how much could output increase in the medium to long term? Does pro-growth spending within a fixed spending envelope yield greater benefits in countries with higher levels of spending efficiency? What mechanisms drive this output impact?

To answer these questions, this chapter introduces novel global data sets on the efficiency and rigidity of public spending since 1980 and 2000, respectively. Combining these data sets with empirical and theoretical models, as well as with country case studies, leads to the following main findings:

- *Many countries have significant scope to reallocate public spending toward areas that enhance economic growth.* Current public spending allocations do not effectively promote growth. For instance, public investment has declined globally to 18 percent of total expenditure, whereas the share of public education spending in total expenditure has remained modest at about 11 percent. Public wage bills are particularly high, accounting for about one-quarter of total expenditure.

[1]The easing in fiscal pressures would also help stabilize bond markets (October 2025 *Global Financial Stability Report*, Chapter 1). Spreads or premiums between interest rates on swap contracts and government bonds have been widening in the *euro area*, *Japan*, the *United Kingdom*, and the *United States* in line with expected future fiscal deficits.

- *Almost all countries have the potential to increase the efficiency of their public spending.* Although there has been some progress in increasing spending efficiency, progress has stalled and gaps in spending efficiency persist at about 31 percent in advanced economies, 34 percent in emerging markets, and 39 percent in low-income developing countries. This means that countries could get 30 to 40 percent more value for money by adopting the practices of the best performers. These gaps are particularly pronounced in public spending on investment and research and development (R&D).
- *Stronger institutional frameworks are associated with higher levels of efficiency in public spending and a composition of spending that is more favorable to growth.* Countries with lower levels of corruption, stronger rule of law, and more effective processes to manage public investment spend more efficiently and exhibit lower degrees of spending rigidity. Well-designed reviews of spending—that is, systematic analyses of public expenditure to evaluate its consistency with policy priorities and identify savings opportunities—can be effective tools to optimize public spending. Following these reviews, countries often successfully reduce their public wage bills and increase the efficiency of their public spending.
- *Redirecting public spending can deliver significant gains in output.* For instance, increasing investment in infrastructure by 1 percent of GDP, while holding spending constant overall, is associated with an increase in output of about 1½ percent in advanced economies and 3½ percent in emerging market and developing economies over the long term. Similarly, public spending on education can have substantial long-term benefits. Reallocating 1 percent of GDP from government consumption (for example, spending on administrative overhead) to public human capital (for example, enhancing national curriculums and equipping schools) can lift output by 3 percent in advanced economies and 6 percent in emerging market and developing economies.
- *Closing gaps in the efficiency of public spending magnifies these gains in output.* Gradually closing such gaps could lift output by a further 1½ percent in advanced economies and 2½ to 7½ percent in emerging market and developing economies over the long term. Accelerating the closure of these gaps could further increase the gains in long-term output by 2 percent.
- *Complementary policies can augment these gains.* Reallocating public spending toward both R&D and human capital investment maximizes output gains in advanced economies. In emerging market and developing economies, a combination of investment in human capital and infrastructure is beneficial to harness both the short-term gains from investment in infrastructure and the longer-term gains from development of human capital.

Developments in Public Spending

This section presents stylized facts regarding developments in public spending and examines the potential to adjust the composition and efficiency of public spending to promote economic growth.

Pro-Growth Public Spending

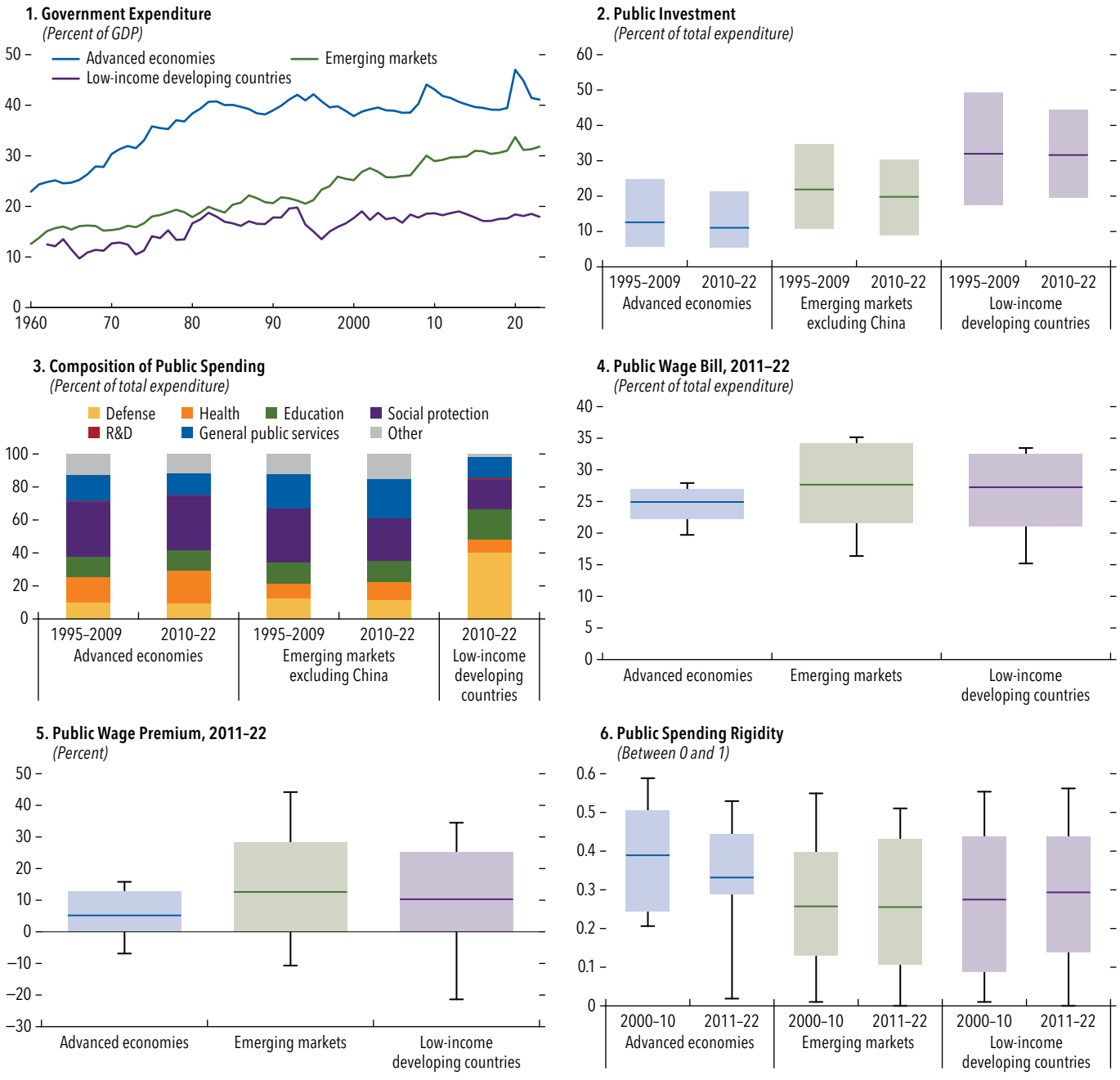
Government expenditure globally has increased substantially over the past several decades. Since the 1960s, general government spending relative to GDP has doubled in advanced and emerging market economies, reaching 42 and 32 percent of GDP in 2023, respectively (Figure 1.1, panel 1). In low-income developing countries, levels of public spending are lower and have grown less substantially, reaching 18 percent of GDP in 2023. These patterns are consistent with Wagner's law, which posits that public spending increases as economies develop and citizens demand more public services. The patterns also reflect lower capacity for generating revenue in low-income developing countries (Benitez and others 2023).

Governments allocate modest shares of total expenditure to categories of spending that enhance an economy's productive capacity—and those shares have declined over time.[2]

- Public investment accounts for a relatively low share of total expenditure and that share has declined globally (Figure 1.1, panel 2).

[2]This chapter analyzes four key elements of pro-growth spending—public spending on investment, education, health, and R&D—which in standard economic growth models are directly linked to input of production and productivity. Other categories of spending can be growth-enhancing in certain settings, such as spending on public order and safety in low-security contexts.

Figure 1.1. Developments in Public Spending



Sources: IMF, FAD Government Compensation and Employment Dataset; IMF, Government Finance Statistics; IMF, Public Finances in Modern History database; IMF, World Economic Outlook database; and IMF staff calculations.

Note: Spending refers to general government spending. In panel 1, country group averages are weighted by nominal GDP measured in constant international dollars at purchasing power parity. In panel 2, the boxes show the simple average within each income group and 10th–90th percentile ranges. Panels 2 and 6 depict annual averages in the indicated periods. Panel 3 presents US dollar GDP-weighted averages within each income group. "Defense" includes spending on public order and safety. In panels 4–6, the boxes show simple averages and interquartile ranges; whiskers show 10th–90th percentile ranges. In panel 6, the highest level of rigidity is a value of 1. R&D = research and development.

From 1995–2009 to 2010–22, the public investment share fell from 13 to 11 percent in advanced economies and from 22 to 20 percent in emerging markets (excluding *China*) and stayed at 32 percent in low-income developing countries. Countries such as *Japan* and *Portugal* substantially reduced their allocations for public investment between the two time periods. Globally, underinvestment and depreciation have caused public capital stocks to decline relative to GDP (October 2020 *Fiscal Monitor*, Chapter 2). In advanced economies, public investment now accounts for about one-third of spending on social protection, with the shift partly reflecting better infrastructure, higher levels of investment in infrastructure by the private sector, and population aging. Low-income developing countries, however, have higher shares of public investment in total expenditure, with significant infrastructure needs driving the greater allocations.

- Public spending on health, education, and R&D combined accounted for 32 percent of total spending for advanced economies, 24 percent for emerging markets, and 27 percent for low-income developing countries, on average, in 2010–22 (Figure 1.1, panel 3). Although public spending on health and R&D has increased slightly relative to total public expenditure in the last decade, public spending on education has either declined or remained stagnant in most countries. Although the decline in education spending is partly explained by the declining school-age population in advanced economies, it has fallen even on a per-pupil basis in emerging markets.

A substantial portion of public spending consists of wage bills, which account for about 25 percent of total expenditure in advanced economies and 28 percent in emerging market and developing economies, on average (Figure 1.1, panel 4). Regional differences are notable, with spending on the compensation of public sector workers ranging from 22 percent of total expenditure in the *Caucasus and Central Asia* to 33 percent in the *Middle East and North Africa*. In addition, there are large differences within country groups. For example, the wage bill in *Denmark* is high relative to total public expenditure, whereas *Germany* and *Japan* allocate significantly less to public wages because lower percentages of their workforces are employed in the public sector.

Public wage bills overlap substantially with certain functional categories of spending such as education. Wages account for about 69 percent of public spending on education globally. For example, tackling teacher shortages in lower-income countries or attracting higher-skilled teachers might increase spending on public wages. In general, if public compensation is uncompetitive, governments might be unable to attract adequately skilled workers to provide quality services (IMF 2016). However, rising public sector wages might pressure wages across the economy, because public wages often serve as benchmarks for private sector compensation. Premiums on public sector wages—the difference between wages earned by workers in the public sector and the wages of similarly qualified workers in the private sector—average about 13 percent in emerging markets and 10 percent in low-income developing countries (Figure 1.1, panel 5).[3] These wage premiums can distort labor markets by restricting the labor supply available to the private sector (IMF 2016).

Rigidity in Public Spending

A lack of flexibility to adjust public spending from one year to the next—that is, the rigidity of public spending—partly results from the nature of budget cycles, which involves a number of different actors from all levels of government (Herrera and Olaberria 2020). Rigidity in public spending can stem from different sources, including characteristics of budget processes, structural developments within an economy, and forces relating to the political economy. Although some degree of spending rigidity can be beneficial—such as that arising from commitments to multiyear investment projects or the pursuit of long-term goals—rigidity may also arise from legally mandated expenditures, such as spending on pensions for aging populations. During periods of macroeconomic volatility, fiscal pressures, or crises, a high degree of spending rigidity may hinder needed expenditure reforms. It is also often linked to inefficient processes for budgeting, especially in

[3]Wages in the private sector might be underreported in emerging markets and low-income developing countries because of a higher level of informality (IMF 2016).

emerging market and developing economies. Stronger medium-term budgetary frameworks can allow for more opportunities to shift spending into different, more strategic areas (Harris and others 2013).

This chapter provides a novel data set of estimates of the rigidity of public spending for 151 countries between 2000 and 2022.[4] The estimates suggest that public spending has a higher degree of rigidity in advanced economies, even though the degree has declined slightly in recent years. The estimates are 0.33 for advanced economies, 0.26 for emerging markets, and 0.29 for low-income developing countries, on average, during 2011–22 (Figure 1.1, panel 6). This indicates that in advanced economies, approximately one-third of spending is unlikely to change in the short term. Spending in economies such as *China*, *New Zealand*, the *United Kingdom*, and the *United States* is particularly rigid, whereas spending is relatively flexible in *Iceland* and *Thailand*. Economies such as *Canada*, *Estonia*, and *Sweden* have reduced their spending rigidity over time, in line with strengthening multiyear fiscal frameworks that require new spending to be offset in future years and implementing performance-based budgeting.

The higher degree of rigidity in public spending in advanced economies is not solely attributable to entitlements such as pensions or social assistance. Rather, rigidity is evident across all categories of public spending in these economies. The most rigid categories of public spending in advanced economies are health, education, and social protection, whereas in emerging markets, they are public investment and defense and public order.

Efficiency of Public Spending

This chapter also introduces a novel global data set of estimates of public spending efficiency that vary over time and account for structural differences across countries, as well as uncertainty regarding the number and choice of key variables used.[5] The efficiency of public spending is defined as how effectively governments maximize outputs (or outcomes) using a fixed level of inputs (public expenditure). It measures the gap between observed outcomes and those that could be achieved under the best management practices, technology, and institutions. This "production possibility frontier" illustrates the highest level of output attainable from given public spending inputs, thereby reflecting the performance of the most efficient countries within the sample. The data set benchmarks public spending on investment, health, education, and R&D for 174 countries between 1980 and 2023.

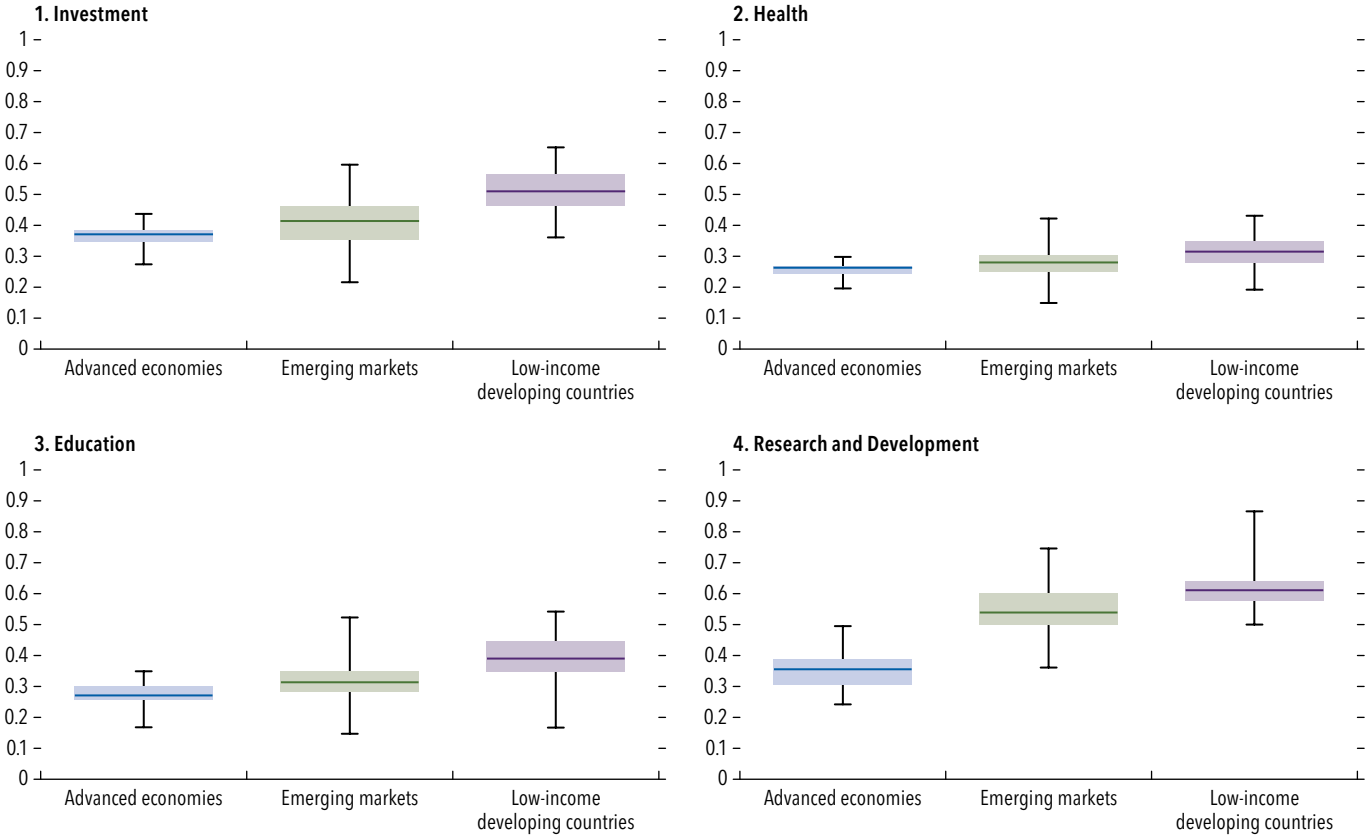
The inputs for spending in these areas are five-year averages. They are paired with outcome variables commonly used in the literature (Apeti, Bambe, and Lompo 2023; Herrera, Isaka, and Ouedraogo 2025). Public investment outcomes include both quantitative measures—such as transport and telecommunications infrastructure—and assessments from international surveys on infrastructure quality (see Online Annexes 1.1 and 1.2 for details). In the case of health spending, outcomes encompass life expectancy, numbers of hospital beds and doctors, and immunization rates, among other measures. Outcomes for education spending are measured using indicators such as enrollment and completion rates, average years of schooling, literacy rates, and pupil-to-teacher ratios. Outcomes for R&D spending include numbers of patent applications, publications in scientific journals, citations of publications, and researchers.

Measuring efficiency gaps across a large sample of countries presents challenges. First, the multifaceted nature of public services complicates the aggregation of outputs, necessitating multioutput approaches to accurately capture the full spectrum of government production. Second, inconsistencies in measuring public services across countries, such as reliable access to electricity, require the use of proxy variables. In addition, distinguishing between controllable

[4]This chapter extends the methodology of Piguillem and Riboni (2024), measuring spending rigidity using one-year autocorrelations over five-year rolling windows. Estimates range between 0 and 1, with higher values denoting greater rigidity. The resulting estimates are positively correlated with other rigidity measures used in the literature, including the share of items such as wages, pensions, and interest in total expenditure (Herrera and Olaberria 2020). The use of autocorrelations has the advantage of not requiring assumptions about which spending categories are the most rigid. Online Annex 1.3 describes the methodology and resulting data set.

[5]For details see Online Annex 1.2. The estimates address statistical noise using stochastic frontier analysis. Country fixed effects are used to account for structural differences between countries, such as a country's level of development or the extent of private spending. The analysis deals with model uncertainty through model-averaging techniques. It accommodates the multidimensionality of outcomes through the application of multioutput distance functions. Estimates are positively correlated with previous estimates in the literature.

Figure 1.2. Gaps in Efficiency of Public Spending by Country Group
(Scale, 0–1)



Source: IMF staff estimates.

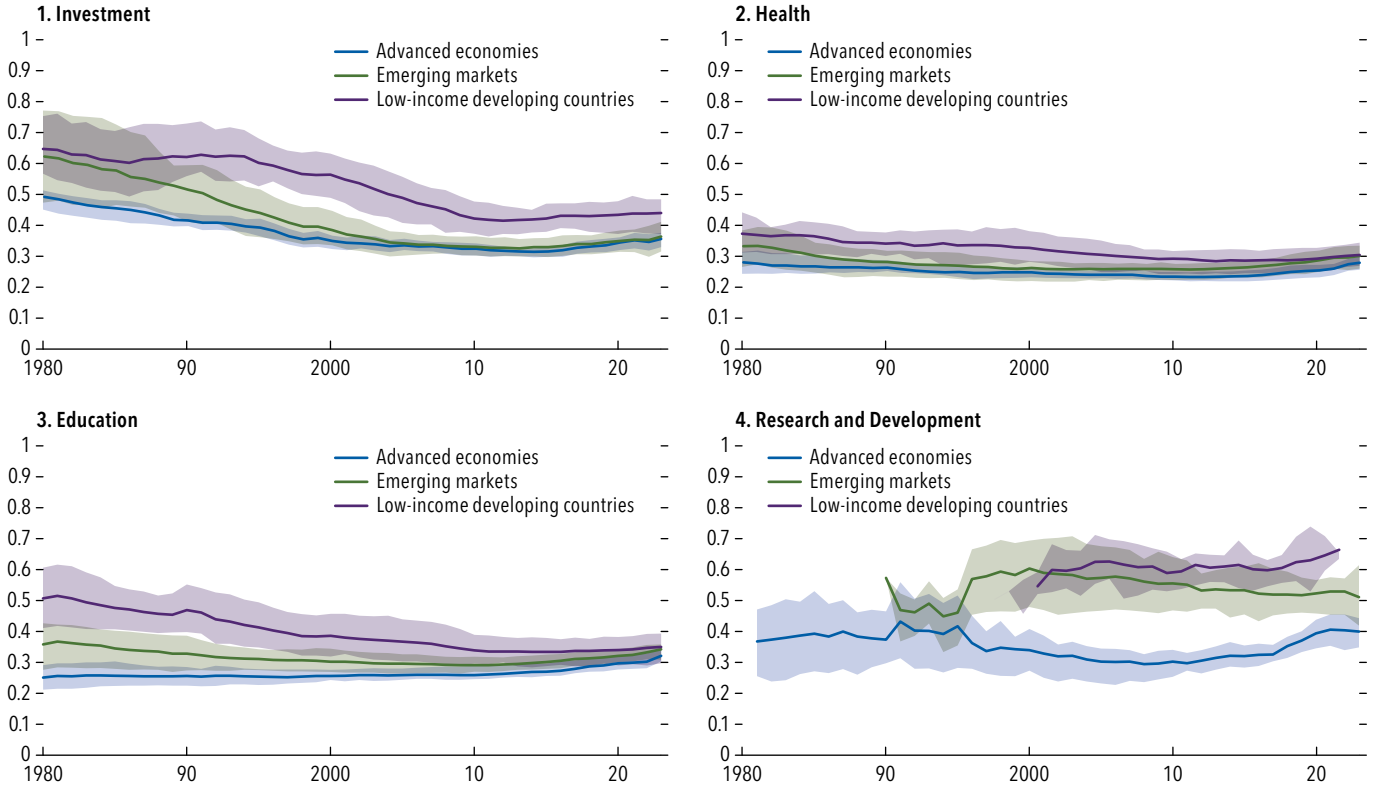
Note: The figure shows efficiency gaps, which are distances to the spending efficiency frontier. Efficiency gaps range from 0 (fully efficient) to 1 (fully inefficient). The frontier is estimated using stochastic frontier analysis, as described in the text and detailed in Online Annex 1.2. Boxes indicate regional medians and interquartile ranges (25th–75th percentiles) of the average efficiencies over time. Whiskers delineate the minimum and maximum values.

inefficiencies and external factors is critical, as outcomes may reflect random fluctuations or shocks rather than systematic inefficiencies. Finally, estimates of efficiency must account for cross-country differences, particularly regarding countries' stages of development. The estimates provided in this chapter attempt to account for these considerations (see Online Annex 1.2) and yield several insights.

The estimates reveal significant efficiency gaps between the spending efficiencies of a number of countries and those of the most efficient countries (Figure 1.2). Historically, the efficiency gap for public spending on investment has averaged about 38 percent in advanced economies, 42 percent in emerging markets, and 53 percent in low-income developing countries. More developed economies typically exhibit higher levels of efficiency, reflecting greater administrative capacity, more effective planning, and stronger institutions, as outlined later in the chapter. Conversely, gaps in the efficiency of public spending on health and education tend to be lower, as increased spending in more developed countries partly offsets their higher levels of achievement in such outcomes as life expectancy and school enrollment.

Efficiency gaps in health spending have averaged about 26 percent in advanced economies, 28 percent in emerging markets, and 32 percent in low-income developing countries, whereas gaps in education spending average about 27, 32, and 40 percent, respectively. Efficiency gaps are particularly pronounced in public spending on R&D, as a handful of countries dominate patent applications and scientific publications. These estimates confirm the finding from existing studies—particularly OECD (2017); Apeti,

Figure 1.3. Gaps in Efficiency of Public Spending over Time
(Scale, 0–1)



Source: IMF staff estimates.

Note: The figure shows efficiency gaps, which are distances to the spending efficiency frontier. Efficiency gaps range from 0 (fully efficient) to 1 (fully inefficient). The frontier is estimated using stochastic frontier analysis, as described in the text and detailed in Online Annex 1.2. Lines indicate unweighted group means. Shaded bands show interquartile ranges (25th–75th percentiles).

Bambe, and Lompo (2023); Garcia-Escribano, Juarros, and Mogues (2022); Kapsoli, Mogues, and Verdier (2023); Herrera, Isaka, and Ouedraogo (2025)—that inefficiencies in public spending are substantial.

The efficiency of spending varies widely across regions and countries. On average, *Europe* and the *Americas* have the lowest gaps in efficiency, compared with other regions (see Online Annex 1.2 for regional estimates). Small developed countries such as *Latvia* and *Slovenia* achieve solid outcomes in infrastructure, despite below-average levels of public investment. In contrast, many African countries—such as the *Central African Republic* and *South Sudan*—have unfavorable outcomes in infrastructure even after adjusting for their low levels of spending, resulting in large gaps in efficiency. These countries' inefficiencies are often linked to acute challenges related to conflict, capacity constraints, and weaknesses in governance.

Gaps in the efficiency of public spending have narrowed considerably over the past four decades (Figure 1.3), with countries such as *Bangladesh* and *Rwanda* having dramatically improved their efficiency in the past decade. Low-income developing countries have expanded access to basic infrastructure, and advanced economies have achieved wide mobile phone coverage without increasing public investment. Increases in life expectancy have been broad-based, and although education expenditures per person have increased globally, the increases have only been substantive in advanced economies. However, progress has stalled recently, especially in advanced economies, as health spending has increased. In recent years, gaps in the efficiency of pro-growth spending have averaged 31 percent in advanced economies, 34 percent in emerging markets, and 39 percent in low-income developing countries.

Determinants of Public Spending

Understanding the factors that influence the efficiency and allocation of public spending is essential to shape policies that strengthen economic growth. This section identifies those key factors by empirically analyzing a broad range of determinants, including cyclical variables (such as elections and crises), structural factors (such as demographics and political ideology), and policies and institutional variables (for example, spending rigidity and management of public investment). The analysis applies cross-country and panel regressions, complemented by Bayesian techniques, to pinpoint the most consistent determinants of spending efficiency and allocation.[6] The evidence suggests that although macroeconomic conditions and sociodemographic factors are the most robust determinants of spending efficiency and allocation, institutional quality, governance, and fiscal institutions also play an important role.

As noted, institutional quality and governance strongly influence spending efficiency. Evidence suggests that countries with stronger institutions, characterized by less corruption and a more robust rule of law, generally exhibit greater efficiency in public spending on investment, education, and R&D. This is likely a result of better planning and greater transparency and oversight (Figure 1.4, panel 1).[7] For example, increasing control of corruption by one standard deviation—which is equivalent to improving from 30 places below average in the cross-country ranking to 30 places above average—is associated with an improvement in the efficiency of public education spending of 3.5 percentage points, a gain comparable to that from closing the gap in spending efficiency between *Argentina* and *Colombia*. Fragility and conflict are associated with lower spending efficiency as a result of institutional weaknesses and damaged infrastructure (see Online Annex Figure 1.4.4).

Effective practices regarding the management of public investment, especially in the area of resource allocation, are also linked to greater efficiency (Figure 1.4, panel 2). For example, an increase in the effectiveness of resource allocation equivalent to that from a country at the 25th percentile of the distribution (for example, *Albania*) to a country at the 75th percentile of the distribution (for example, *Croatia*) is associated with an increase in the efficiency of public investment of about 3 percentage points. Common weaknesses in the management of public investment include those involving project appraisal and selection, adequacy of maintenance funding, and monitoring of public assets (Figure 1.4, panel 3).

Decentralization of spending is also associated with higher levels of efficiency, especially in spending on public education and R&D (see Online Annex Figure 1.4.5).[8] In countries with more decentralized expenditure, spending decisions may be more aligned with local preferences, and there may be more competition and experimentation with policies (Oates 1972; Fedelino and Ter-Minassian 2010; OECD and KIPF 2021).[9]

Finally, spending reviews can help governments increase efficiency in spending by identifying potential savings in programs and policies and improving their effectiveness. Evidence indicates that efficiency of public investment and education spending improves after spending reviews (Box 1.1). This suggests that such reviews can be a useful tool to identify staffing redundancies and address uncompetitive compensation in the public sector, while enhancing project execution.

The composition of spending is also crucial for allocative efficiency, as reallocating spending toward pro-growth areas can yield significant benefits. Countries with stronger governance tend to allocate more funds to areas that enhance growth. In addition, lower levels of public debt are robustly associated with growth-enhancing spending allocations, likely because debt-servicing costs consume less of the spending envelope (see Online Annex Figure 1.4.6).

Finally, spending rigidity can hinder adjustments to spending. Countries with higher degrees of spending rigidity are less likely to undertake major reforms to expenditure (Figure 1.4, panel 4).[10] Improving

[6]Online Annex 1.4 presents analytical details and more extensive results.

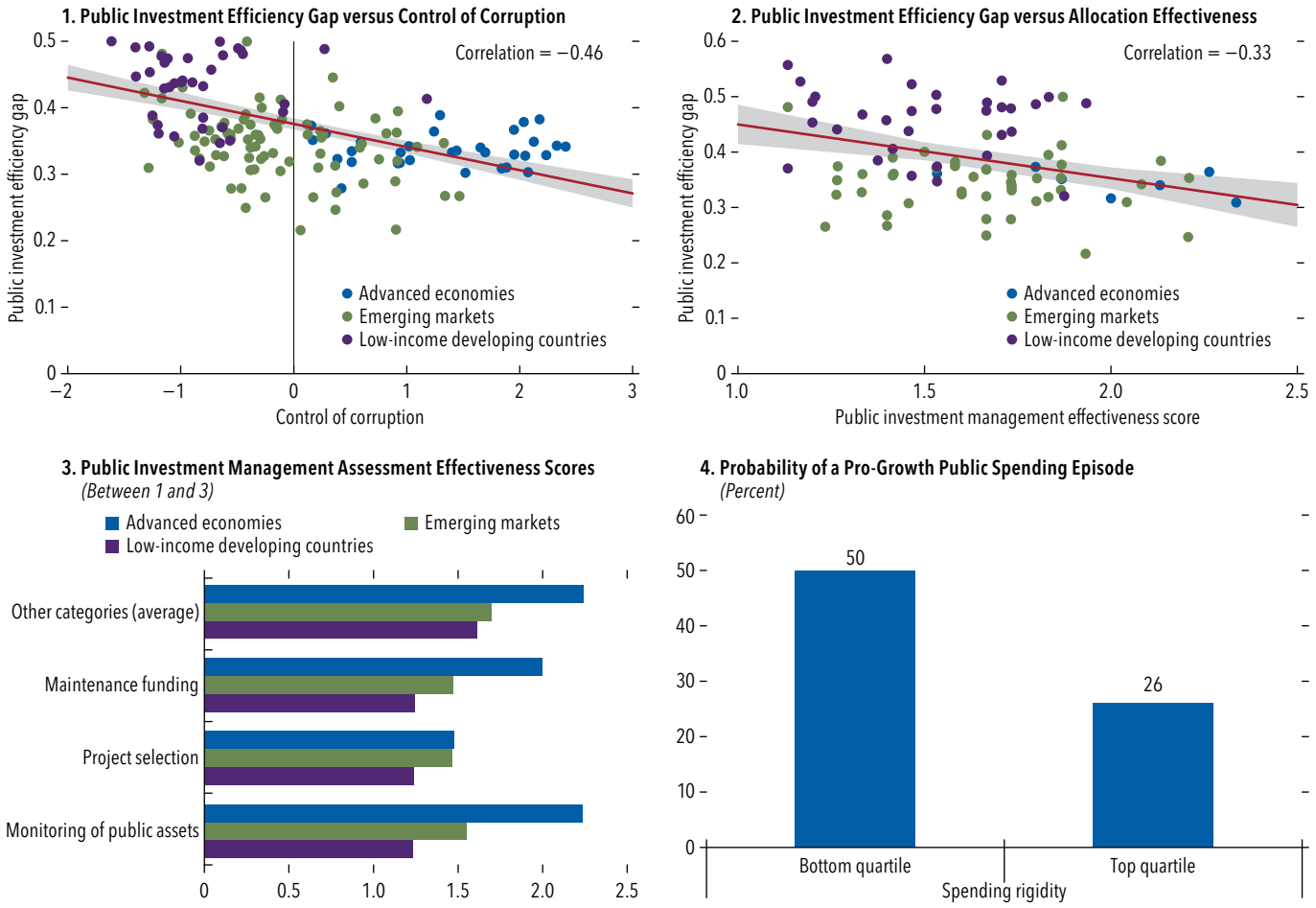
[7]As discussed in Online Annex 1.4, some of these empirical associations are not robust when controlling for the level of GDP per capita and/or country fixed effects. The full set of robustness checks is described in Online Annex 1.4.

[8]Decentralization of spending is measured as the ratio of spending by subnational governments to that by the general government.

[9]Decentralization can exacerbate deficit biases, especially without strong fiscal rules and oversight (Oates 2006; Nakatani 2025). In addition, several factors could influence the efficiency of local spending, including local capacities, coordination mechanisms, and governance quality.

[10]Major episodes of expenditure reform are defined in the subsection "Empirical Analysis of Spending Reforms."

Figure 1.4. Drivers of Public Spending Developments



Sources: IMF, Government Finance Statistics; IMF, Public Finances in Modern History database; IMF, World Economic Outlook database; World Bank, Worldwide Governance Indicators; and IMF staff estimates.

Note: Efficiency gaps are measured from 0 (most efficient) to 1 (least efficient). Control of corruption is a perception-based indicator, measured in standard deviations. In panels 2 and 3, Public Investment Management Assessment scores are measured on a scale of 1–3, with 3 being the highest and 1 the lowest. Allocation effectiveness evaluates the degree to which public investment allocation processes effectively operate. Panel 4 shows the share of countries that have experienced an episode of a major increase in public education spending as a share of total expenditure during 2000–22. Average rigidity in the bottom quartile is 0.18 and in the top quartile 0.38.

institutional factors, such as public investment management practices, for example, can help decrease spending rigidity (see Online Annex Figure 1.4.7).

Lessons from Country Reform Efforts

Case studies on the efficiency of public spending (*Bahrain*, *Croatia*, *Rwanda*, *Togo*, the *United Kingdom*), reallocation of public spending (*Brazil*, *Serbia*), and spending reviews (the *Slovak Republic*) provide granular insights into the design of expenditure reforms, supporting the chapter's empirical analyses. These case studies underscore the importance of synergies in commitment, institutions, and reform.

Public Spending Efficiency Reforms

The case study of *Togo* shows that enhancing institutions can help improve the efficiency of public spending (IMF 2020a, 2024d). Togo has implemented a comprehensive set of public investment management reforms since 2016. Early measures included clarifying institutional responsibilities, standardizing project appraisal methods, integrating investment planning into multiyear budgets, and improving monitoring and evaluation. A major milestone was the launch of the multiyear Public Investment Program (PIP) in 2018, fully integrated into the budget and supported by a framework requiring cost-benefit analyses for all projects. To improve project selection and

coordination, the government established an inter-ministerial investment committee and developed a public investment manual. Between 2020 and 2024, *Togo* transitioned to program-based budgeting to better link expenditures and development outcomes. The government also reformed public procurement practices and expanded the PIP to include investments from state-owned enterprises. Subsequently, the public investment efficiency gap declined by 5 percentage points between 2015 and 2023 (see Online Annex Figure 1.2.5). Despite the progress, however, challenges remain—particularly in the case of public-private partnerships and evaluation—and implementation of the reforms is still uneven.

In the *United Kingdom*, increased mobilization of private funding for infrastructure investment accompanied better practices in public financial management (IMF 2022a, 2022b). Strengthened oversight by the country's Infrastructure and Projects Authority (established in 2016), along with improved strategic planning through the treasury, has resulted in more effective selection of projects, better control of costs, and closer alignment of spending with national priorities. The newly established National Wealth Fund—the successor to the UK Infrastructure Bank established in 2021—has played a key role in catalyzing private investment and supporting projects that exhibit additionality. Following a Public Investment Management Assessment (PIMA) in 2022, the *United Kingdom* further strengthened its framework for public investment management. The PIMA highlighted the country's strong institutional foundation and effectiveness across the three phases of the investment cycle (planning, allocation, implementation), supporting efficient investment by the central government.

Rwanda's experience offers valuable insights into enhancing the efficiency of public spending on education through improved access to schools and digitalization (UNESCO 2015). *Rwanda* implemented three major reforms: the Nine Year Basic Education in 2006, One Laptop per Child Programme in 2008, and Twelve Year Basic Education in 2012. These reforms aimed to boost both enrollment and learning outcomes. They led to near-universal enrollment in primary education. They also generated a significant rise in enrollment at the lower- and upper-secondary levels, particularly among rural and disadvantaged children. The One Laptop per Child Programme distributed more than 200,000 laptops to primary students to increase digital access, although challenges in teacher training and curriculum alignment limited its impact. Overall, these reforms were followed by an 8 percentage point increase in the efficiency of *Rwanda*'s public spending on education between 2007 and 2011 and by 3 percentage points between 2013 and 2016 (see Online Annex Figure 1.2.5, panel 2).

Bahrain's education spending reforms since the mid-1970s have focused on enhancing access to schools and improving teacher education (UNESCO 1982; Shirawi 1987; Mathai and others 2020). During the 1980s and 1990s, the country experienced a rapid rise in efficiency, with the public education spending efficiency gap decreasing by 12 percentage points between 1980 and 2000 (Online Annex Figure 1.2.5, panel 3). Net primary and secondary enrollment rates are exceptionally high in *Bahrain*, and the literacy rate jumped from 86 percent in 1980 to 100 percent in 2018, well above average levels in the *Middle East*, *North Africa*, *Afghanistan*, and *Pakistan* region (Mathai and others 2020).

The case of *Croatia* highlights how reforms to health care can increase the efficiency of public spending over a relatively short period of time (EC 2019). The reforms, implemented between 2008 and 2011, involved a number of actions, including increases in copayments and measures to resolve accumulated arrears. Other important aspects included changes in the mechanisms to pay for primary and hospital care, reforms to pricing and reimbursement for pharmaceuticals, and changes to the way health care is provided (for example, emergency care). Following the reforms, the efficiency of *Croatia*'s public spending on health increased by 1.5 percentage points.

Reforms That Reallocate Public Spending

In *Serbia*, public investment management reforms were crucial given the increase in public investment in a short timeframe—from about 12 percent of total expenditure in 2019 to 19 percent in 2024 (IMF 2024a) (see Online Annex Figure 1.1.4). In 2019, the country launched the five-year *Serbia* 2025 program, which includes various projects focused on road and railway infrastructure, improvements in the health sector, and enhancements to sewage and waste treatment. With support from an IMF Policy

Coordination Instrument and technical assistance from the European Union and World Bank, *Serbia* also implemented fundamental reforms to the management of public finances. Notably, it introduced a Public Investment Management Information System in 2023 to improve project coordination and oversight.

The case of *Brazil* offers valuable lessons on how to integrate social protection with education policies to promote both equity and learning outcomes.[11] The Bolsa Família conditional cash transfer program, implemented in 2003, requires families to ensure that their children attend school and get health checkups in order to receive financial support. This policy significantly increased school attendance among children of low-income groups, helping to reduce dropout rates and enhance equity. In parallel, the rise in school enrollment generated a sharp increase in demand for qualified teachers. Public education spending increased by about 3 percentage points of total expenditure between 2002 and 2008 (see Online Annex Figure 1.1.4).

Spending Reviews

The case of the *Slovak Republic* demonstrates how spending reviews can yield significant fiscal savings (Ministry of Finance of the Slovak Republic 2020; OECD 2024; IMF 2025a). The country launched the Spending Review Project in 2016 and has since conducted 19 spending reviews. These reviews have covered almost two-thirds of total public spending, identifying potential savings of 7 percent of total expenditure. A review of the country's spending in 2020 proposed key measures to contain the country's public wage bill, including reducing employment in the general government, optimizing staffing in state-owned enterprises, and streamlining the number of nonteaching staff at tertiary education institutions. A key takeaway is that spending reviews can help identify areas for saving, especially when aligned with the timing and scope of annual budget cycles and medium-term expenditure frameworks.

[11] *Brazil* launched the Bolsa Escola program in 2001. The subsequent program, Bolsa Família, unified and expanded previous initiatives. See Bruns, Evans, and Luque (2012) and Brollo, Kaufmann, and La Ferrera (2020) for more information.

Output Dividends from Expenditure Reforms

This section provides evidence of the potential economic gains associated with improving the composition of public spending and closing efficiency gaps. It begins by discussing the channels through which spending on specific categories can contribute to growth and the complementarity of such spending reallocations with spending efficiency. It then presents evidence from empirical and model-based analyses on the potential dividends to output from increasing spending allocations and closing efficiency gaps.

A Primer on Public Spending and Economic Growth

Public spending drives economic growth through several key channels. First, it enhances production factors by increasing physical capital (for example, infrastructure) and human capital (through education and health). For its part, public sector research—both basic and applied—adds to the knowledge base that firms leverage to boost productivity (Morales 2004). Second, governments can use public spending to create incentives for firms to invest, hire, and innovate, thereby expanding the productive capacity of the country's economy (Bovenberg and Jacobs 2005; Petrucci and Phelps 2005; April 2024 *Fiscal Monitor*, Chapter 2). Instruments such as subsidies, cofinancing, guarantees, and tax expenditures stimulate investment in training and R&D, and public procurement fosters the development of new products, as seen in the case of green hydrogen in *Germany*. Public investment can also generate positive externalities, where the social return to a project exceeds its private returns. Finally, public spending can reallocate resources across firms to better align those resources with firms' productivities, using targeted subsidies or procurement rules to address market distortions such as a lack of access to credit for certain firms (Baquie and others 2025). Public sector facilities for transfer of technology, such as the US Small Business Innovation Research Program, can enable the adoption of new technologies and promote technology diffusion throughout an economy.

In practice, the effectiveness of public spending in boosting economic growth hinges on its efficiency (Dabla-Norris and others 2012; Abiad, Furceri, and

Topalova 2016). Higher levels of efficiency in public investment translate into greater contributions to physical and human capital, enhancing productive capacity. Similarly, more efficient public spending on R&D generates more scientific knowledge, providing firms with innovative ideas for new products. Thus, spending efficiency amplifies the growth dividend of public expenditure.

Empirical Analysis of Spending Reforms

To assess the gains in economic output from improving spending composition and closing efficiency gaps, this chapter compares pro-growth reforms of spending in contexts of varying levels of efficiency. The analysis unfolds in three steps. First, it identifies historical episodes of major reforms involving reallocation of spending. Second, it traces the economic effects of these episodes at the aggregate and firm levels (Box 1.2) using a variety of empirical approaches.[12] Third, it compares the effects of these episodes in countries with high versus low levels of efficiency in spending.

Episodes of Spending Reform

Reform episodes are defined by substantial increases in spending on each of the four categories of pro-growth spending—public investment, health, education, and R&D—within a fixed spending envelope.[13] The analysis identifies about 700 episodes across 155 countries. On average, public investment increases by about 4 percentage points of total expenditure during these episodes, health spending increases by 0.8 percentage point, and education spending increases by 1.6 percentage points. R&D spending shows a small increase of just 0.1 percentage point during those episodes, reflecting the limited allocations to spending in this category (Figure 1.1, panel 3).[14] Major reallocations toward public investment and health tend to be funded by cuts to spending on social protection and general public services, including administration, lawmaking, and debt servicing.

Economic Impact of Reform Episodes

To assess the economic impacts of reforms involving spending reallocation, the analysis is conducted at the aggregate and firm levels. Empirical evidence suggests that substantial increases in public investment within a fixed expenditure envelope are associated with statistically significant and economically large short- and long-term output effects. A major episode—such as that observed in *Korea* in 1975—is followed by an increase in output of about 4 percent 10 years later (Figure 1.5, panel 1).[15] The effect stems from a rise in the economy's productive capacity, as the private sector boosts investment and accumulates more capital (Figure 1.5, panel 5).

Firm-level evidence corroborates the effect of public investment on productivity and investment by the private sector. An average 12 percent increase in firms' total factor productivity over five years accompanies episodes of greater allocations to public investment (Box 1.2). The productivity gains are broad based and not merely a result of resource reallocation from less productive firms to more productive ones. The gains are greater among firms in sectors that are less exposed to international trade, because domestic suppliers absorb a larger share of the aggregate effects on demand in these industries. Gains are also larger for firms that have greater flexibility to scale up production and effectively respond to increased aggregate demand.

The analysis also sheds light on the time horizon over which growth dividends materialize. In the first five years following a reform, public investment boosts

[12]The estimates are based on local projection techniques detailed in Online Annex 1.5. The baseline specifications control for past economic growth, forecasted economic growth, structural reforms, and country and time fixed effects. The results regarding the effects of spending reform episodes are also robust to controlling for crises and weighting episodes by their likelihood of occurrence, known as augmented inverse probability weighting. Sector-level, difference-in-differences, and synthetic control analyses further address endogeneity by controlling for countrywide economic conditions.

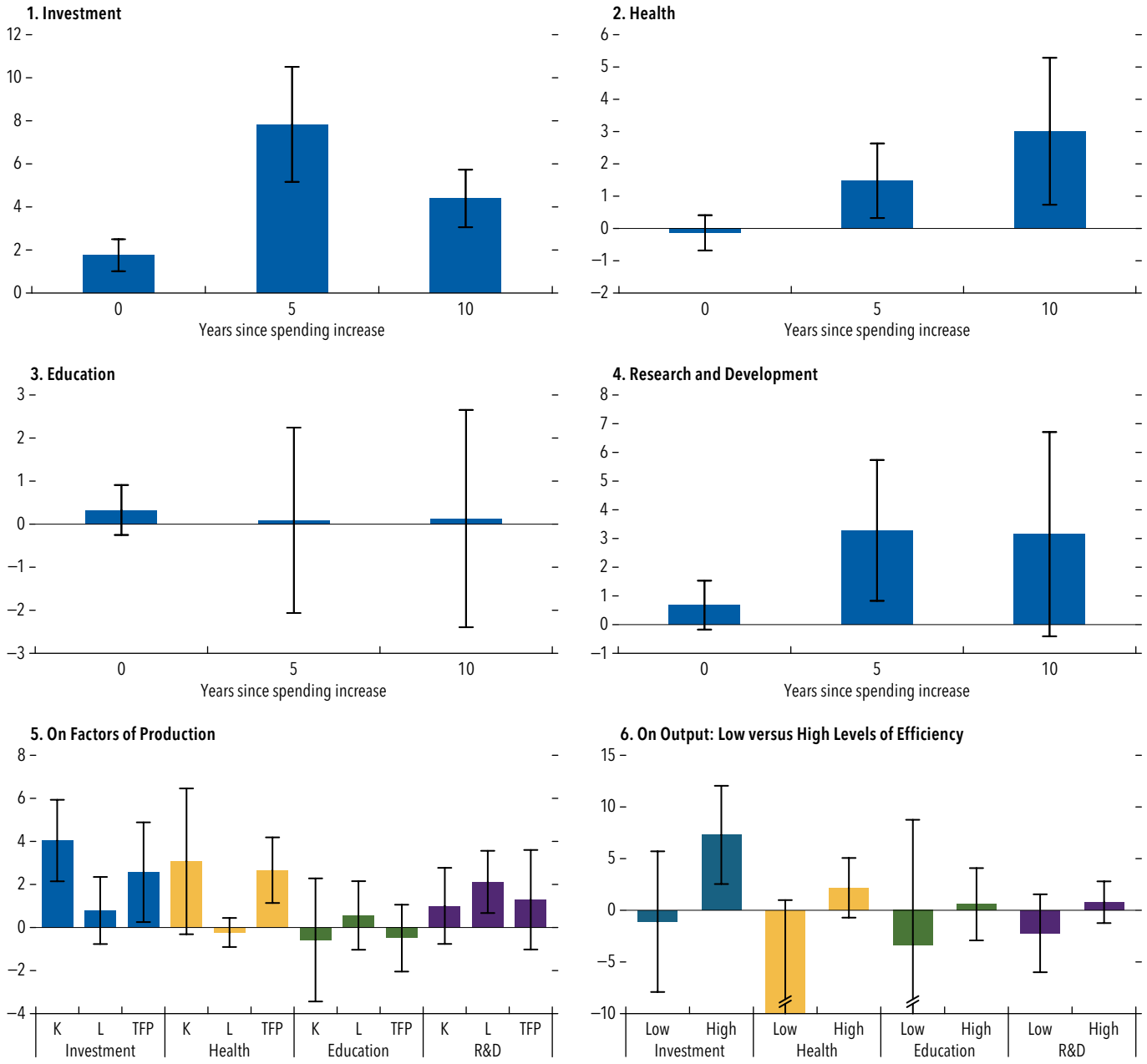
[13]An episode is defined as any four-year period during which spending in a particular category increases in at least three of the years, with the increase in at least one of the years being 1.5 standard deviations or greater. This definition ensures that episodes are substantive within each country's unique context and general enough to accommodate one year of slippage during a reform episode. Episodes can last longer than four years, if the spending share continues to increase. Online Annex 1.5 explains the methodology and characteristics of episodes.

[14]The results are also robust to alternative definitions of reform episodes. A possible concern regarding the analysis is whether the episodes can really be interpreted as holding total spending constant, given that changes in spending composition could be correlated with changing deficits. To address this concern, Online Annex 1.5 shows that results are robust to controlling for total spending.

[15]The growth impacts are net of any opportunity cost from reductions in other spending.

Figure 1.5. Impact of Pro-Growth Spending

(Percent)



Source: IMF staff estimates.

Note: Panels 1–4 show the percent change in output in response to episodes of major increases in public spending in the respective areas, as explained in the text. Panel 5 shows the percent change in the capital stock (K), employed persons (L), and total factor productivity (TFP) over the 10 years following these spending episodes. Panel 6 compares the response after 10 years in countries with high (75 percent) and low (25 percent) efficiency of spending in each spending category. Estimates use local projections and control for potential confounding factors, as described in Online Annex 1.5. The error bars show 90 percent confidence intervals. Jagged whisker ends indicate that the bounds exceed the axis range. R&D = research and development.

output on account of demand effects.[16] The output gains from episodes of reallocation of spending to R&D, such as that in *Singapore* in 2004, also average about 3 percent after just five years. Output gains from reallocating spending to R&D persist over the subsequent 10 years as an economy's technological frontier expands (Figure 1.5, panels 4 and 5).

Similarly, increased health spending is followed by increases in output of about 3 percent over 10 years, primarily driven by higher productivity from a healthier workforce (Figure 1.5, panels 2 and 5). In contrast, output does not respond to increased public spending on education even after 10 years (Figure 1.5, panel 3), as the benefits of investing in the education of young people materialize only once they enter the labor force (see section "Long-Term Impacts: Evidence from a Theoretical Model"). However, reallocating public spending toward investment and education is associated with reduced income inequality, suggesting that such reallocations are compatible with equity considerations (see Online Annex 1.5).

Efficiency Gaps and Reform Episodes

Spending efficiency not only amplifies output gains but also plays a decisive role in determining whether such gains materialize in the first place. In the 10 years following reallocations of spending toward public investment, output increases by about 8 percent in countries with relatively efficient public investment (efficiency of 75 percent), although output responds minimally in countries with low investment efficiency (25 percent) (Figure 1.5, panel 6). These findings suggest that a 10 percentage point improvement in the efficiency of a country's public investment—comparable to that country moving from the efficiency level of *Guyana* to that of *France*—can boost the output impact of reallocation toward public investment by 1.4 percentage points over a decade. Similar results are observed for reallocations toward R&D spending. In countries with large and inefficient health spending, cutting other productive expenditures to increase health spending can lead to increased waste.

[16]These effects imply cumulative multipliers of long-term output of about 0.5 for investment and 1.8 for health spending. These multipliers are consistent with other estimates reported in the literature (see Gechert and Rannenberg 2018 and Konstantinou, Partheniou, and Tagkalakis 2024 and the literature cited therein).

Long-Term Impact: Evidence from a Theoretical Model

To analyze the long-term impact of closing efficiency gaps and reallocating public spending, this subsection employs two versions of a dynamic general equilibrium model of endogenous growth: one calibrated for a typical advanced economy and the other for a typical emerging market and developing economy. The model also explores which complementary policies can enhance the long-term effects on output.[17]

Simulations indicate that reallocating 1 percent of GDP from government consumption (for example, administrative overhead) to public investment in human capital (for example, updating national curriculums and equipping schools) can increase output by 3 percent in advanced economies and 6 percent in emerging market and developing economies over approximately 25 years (Figure 1.6, panels 1 and 2). The larger gains for emerging market and developing economies are a result of lower initial levels of human capital in those economies, which implies a higher marginal return on investment. Similar reallocations to infrastructure investment could lift output by 1½ percent in advanced economies and 3½ percent in emerging market and developing economies over the long term, as increased public physical capital raises the marginal return to private capital and encourages private sector investment.[18,19]

In advanced economies, reallocating public spending toward R&D by 1 percent of GDP could boost output by 3 percent over the long term (Figure 1.6, panel 1). In general, simulations show that reallocations toward R&D or public investment generate higher levels of

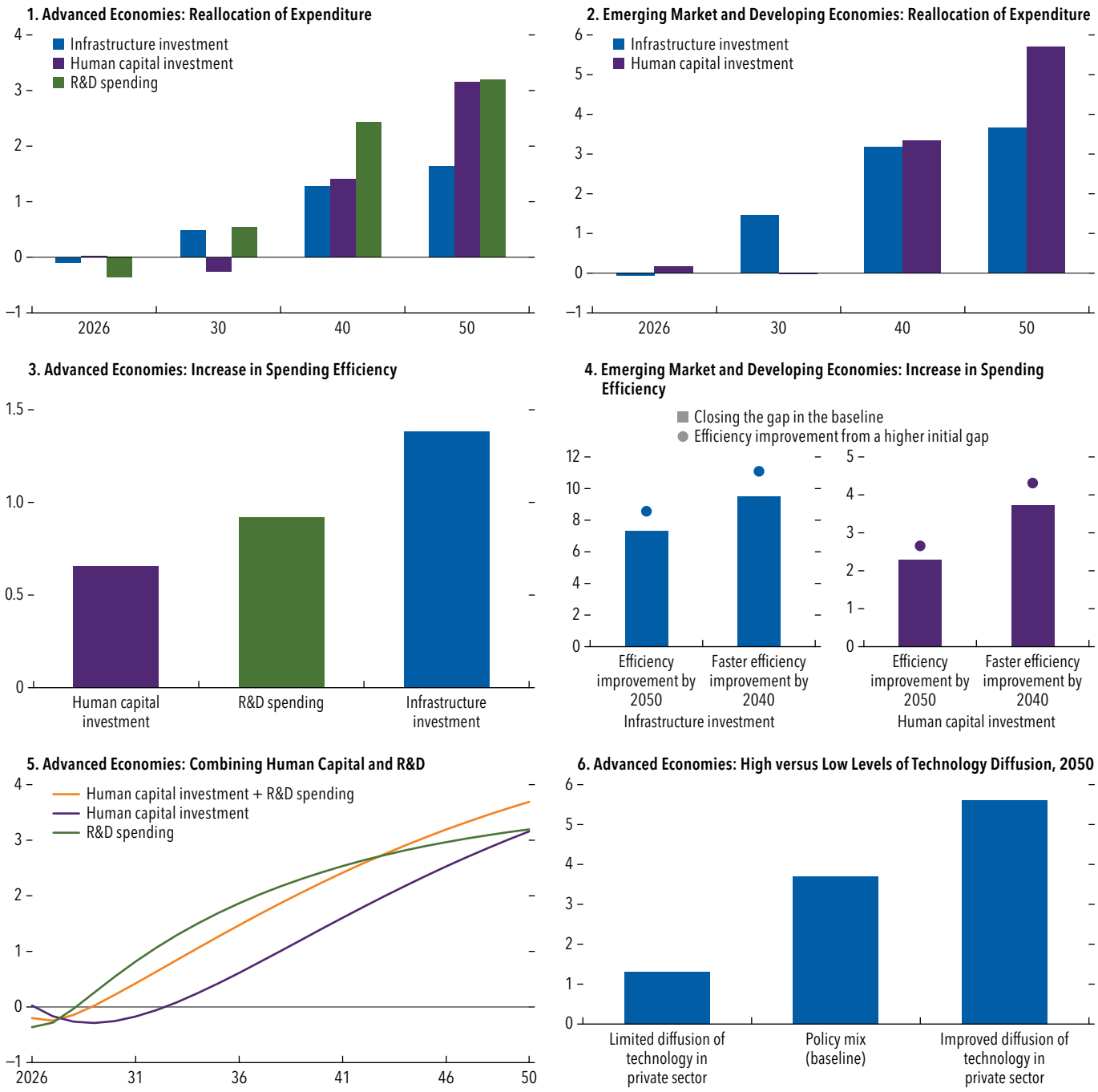
[17]The model has three key features. First, public infrastructure enters the production function alongside private capital and labor. Second, people in the model can choose to forgo labor income to invest in their educations. Public investment in human capital makes time spent in education more productive, accelerating the accumulation of private human capital. More public spending on education today builds a stronger labor force over time. Third, public spending on R&D fuels the stock of innovations that are available to firms to adopt. Innovation diffusion is gradual: Firms invest in technology adoption, which takes time. The model accounts for inefficiencies in public spending, indicating that not all public expenditures translate directly into productive capital. The model includes inefficiencies in public investment in infrastructure, public investment in human capital, and public spending on R&D. Online Annex 1.6 provides details.

[18]The theoretical model implies multipliers similar to those in the empirical analysis.

[19]Public infrastructure investment excludes public education and health investment, such as building schools and hospitals, which are included in human capital investment (see Online Annex 1.6).

Figure 1.6. Long-Term Gains in Output

(Percent deviation from steady state)



Source: IMF staff estimates.

Note: Panels 1 and 2 depict output responses to a permanent increase, in the expenditure categories listed in the legends, of 1 percent of GDP in 2025, funded by a cut in public consumption. Panel 3 shows additional gains in output by 2050 when gaps in spending efficiency are gradually closed by then. Panel 4 illustrates additional gains in output from gradually closing gaps in spending efficiency, by 2040 and 2050, as indicated on the horizontal axis, and from different initial efficiency levels, as described in the legend. Panel 5 shows output gains from increasing public investment in human capital, public spending on research and development (R&D), and a 50/50 mix of both, financed by cutting public consumption. Panel 6 depicts output gains from the 50/50 mix in panel 5 for different levels of diffusion of technology.

output even within five years, whereas the output gains from reallocating spending toward public investment in human capital emerge only after about 15 years.

The simulations further confirm that enhancing spending efficiency increases the impact of growth-supporting reallocations of spending (Figure 1.6, panels 3 and 4). Fully closing gaps in spending efficiency can increase the output impact by an additional 1½ percent in advanced economies and 2½ to 7½ percent in emerging market and developing economies, as more public spending translates into productive forms of capital and scientific knowledge. For emerging market and developing economies, the simulations show that closing efficiency gaps over 15 rather than 25 years can boost output gains by up to 2 percent (Figure 1.6, panel 4). The sooner spending efficiency is increased, the more effectively public investment in human capital can enhance skill acquisition. Economies with the lowest levels of spending efficiency stand to gain the most from reforms to spending efficiency: For example, in emerging market and developing economies, reducing the gap in the efficiency of public investment in human capital from 40 percent to 10 percent can increase output by 2.7 percent in the long term, compared with a 2.3 percent increase from reducing the gap from 30 percent to zero (Figure 1.6, panel 4).

Complementary policies play a crucial role in enhancing output gains. Advanced economies can achieve greater benefits by reallocating spending toward a combination of both R&D and education, rather than focusing exclusively on one area (Figure 1.6, panel 5). Investing in scientific research without having skilled workers to implement new ideas represents a missed opportunity, just as does investing in education without fostering innovation. Furthermore, advanced economies could support reforms to R&D spending with measures to enhance the diffusion of new technologies within the private sector (April 2024 *Fiscal Monitor*, Chapter 2) (Figure 1.6, panel 6).[20] These measures can include creating public agencies to facilitate technology transfer. An example is *Singapore*'s Agency for Science, Technology, and Research, which establishes industry-university technology hubs in science and engineering, coordinates research activities between public and private sectors, and manages the commercialization of the resulting intellectual property.

For emerging market and developing economies, a combination of investment in human capital and infrastructure can offer a more balanced outcome by capitalizing on the short-term gains to output from infrastructure investment and longer-term gains from investment in human capital (Online Annex Figure 1.6.1).

Policies for Efficient, Pro-Growth Public Spending

In the current environment of elevated public debt and subdued economic growth, governments face difficult tradeoffs. To navigate this landscape, they must deliver greater value for public money and reallocate spending toward areas that support long-term growth. Evidence presented in this chapter highlights the substantial scope for expenditure reforms and the significant potential payoffs. These reforms not only improve living standards but also help stabilize public debt relative to income, enabling fiscal consolidation to proceed more gradually.

Governments often respond to fiscal crises with blanket spending cuts. However, international experience shows that such measures can disrupt essential services and undermine efficiency. Uniform reductions fail to distinguish between high- and low-quality spending programs, risking damage to effective initiatives and jeopardizing long-term growth by curtailing investments in infrastructure and research. A more strategic approach—targeting inefficiencies and reallocating resources—is preferable wherever circumstances permit.

To increase spending efficiency and create room for high-priority investments, policymakers should employ a range of strategies, appropriately adapted to country-specific contexts.

Strengthen Institutions and Processes

Institutional reforms are foundational to spending efficiency. Combating corruption through robust mechanisms and effective anticorruption agencies reduces waste. Transparency and accountability—through budget publication, contract disclosure,

[20]Similar complementarities exist in the case of defense spending. For instance, a higher share of spending devoted to R&D and infrastructure investment could generate more positive GDP effects in the longer term, with positive international spillovers (Antolin-Diaz and Surico 2025; Moretti, Steinwender, and Van Reenen 2025).

and independent audits—are essential for ensuring that public funds are used effectively. Many countries, particularly low-income countries in *sub-Saharan Africa* and the *Middle East and North Africa* region, have significant scope to improve in these areas.

Public procurement, which accounts for about 15 percent of GDP in member countries of the Organisation for Economic Co-operation and Development, must be competitive, transparent, and aligned with budget priorities. Procurement can be an area of significant inefficiency: for example, in the average *Latin American* country, waste is estimated at about 16.7 percent of procurement costs, or 1.4 percent of GDP (Izquierdo, Pessino, and Vuletin 2018). Emphasizing value for money through life cycle costing and risk management ensures that spending achieves its intended outcomes (IMF 2018). Budgetary frameworks must also be improved. Fiscal rules—whether direct limits on expenditure or indirect measures such as deficit and debt ceilings—must be credible and subject to independent oversight (Acalin and others 2025). Extending planning horizons through multiyear budgeting helps align strategic goals with annual allocations and reduces budget fragmentation. Medium-term frameworks should incorporate tax expenditures and monitor extrabudgetary funds and contingent liabilities.

Improving systems for managing public investment is essential to maximize efficiency. Countries should upgrade processes for appraising the economic and social benefits of projects and selecting the ones with the greatest impact, employing clear methodologies and well-defined criteria for project selection (October 2020 *Fiscal Monitor*, Chapter 2). Independent reviews of projects can help mitigate political influence. Including maintenance funding in project budgets and establishing responsibilities for regular reviews of funding and maintenance are also important, especially in low-income developing countries.

Spending reviews are a powerful tool for optimizing the use of public resources. When well-designed and integrated into budgetary processes, they can help identify savings and improve program effectiveness. Even countries with low capacity can benefit from incorporating elements such as benchmarking or performance indicators for major spending areas. Reviews should be embedded early in the budget cycle to inform strategic planning and expenditure ceilings.

Create Fiscal Room

Spending on pensions, education and health care, and wage bills tends to be persistent. Linking retirement ages to life expectancy can curb spending rigidity and improve pension sustainability, especially in advanced economies. Gradual reforms, timed during periods of economic growth and paired with redistribution policies, can ease resistance from vested interests (April 2025 *Fiscal Monitor*, Chapter 2). Aligning public sector wages with private sector benchmarks and implementing merit-based hiring and promotion are key to managing wage bills (IMF 2016). In low-income developing countries, linking payrolls and personnel databases and auditing wage bills can eliminate ghost workers. This can free up resources to attract higher-skilled teachers, which would otherwise increase public spending on wages (IMF 2025b). In advanced economies, prioritizing prevention of chronic diseases—such as cardiovascular disease, cancer, and diabetes—can reduce health costs and extend working lives (IMF 2023).

Reforming tax expenditures and transfers can create fiscal room while improving equity. Blanket tax expenditures, such as exemptions from value-added taxes on food, medicines, and rent, are inefficient because they primarily benefit higher-income households (Abdel-Kader and de Mooij 2020). Better targeting of social assistance programs—using data for means testing and redesigning benefits—can also improve efficiency (IMF 2024b). Low-income developing countries can refine eligibility criteria for social assistance programs and consolidate fragmented programs (IMF 2024c). Oil exporters and *sub-Saharan African* countries should replace fuel subsidies with targeted support for vulnerable groups.

Defense spending is rising in many countries, adding pressures to already constrained budgets. The economic effects of defense outlays depend on the mix of equipment, R&D, personnel, and operations. Evidence suggests that the strong output impacts of public investment and R&D also apply to these components of defense spending (Antolin-Diaz and Surico 2025; Moretti, Steinwender, and Van Reenen 2025). Any permanent increase in fiscal outlays for defense should be accompanied by strengthened procurement systems (the *European Union*), improved multiyear fiscal planning, and credible financing strategies.

Improve Service Delivery

Digital tools can streamline public finance operations and improve service delivery (Amaglobeli and others 2023). Electronic payment for salaries and social assistance reduces cash management costs. Digital processes for procurement generate data that can be used to reduce audit costs and flag irregular payments. Less-developed countries can improve access to health care and education by leveraging information technology tools.

Private sector involvement can potentially enhance spending efficiency and create budgetary space. Outsourcing noncore functions, such as transport, mail, cleaning, and maintenance, can lead to significant savings when offered by the private sector at a lower cost (April 2014 *Fiscal Monitor*, Chapter 2). Collaborating with the private sector on investment projects can leverage private sector expertise and catalyze private financing, although careful management of associated fiscal risks is essential (Fouad and others 2021).

Box 1.1. Spending Reviews: Impact and Best Practices

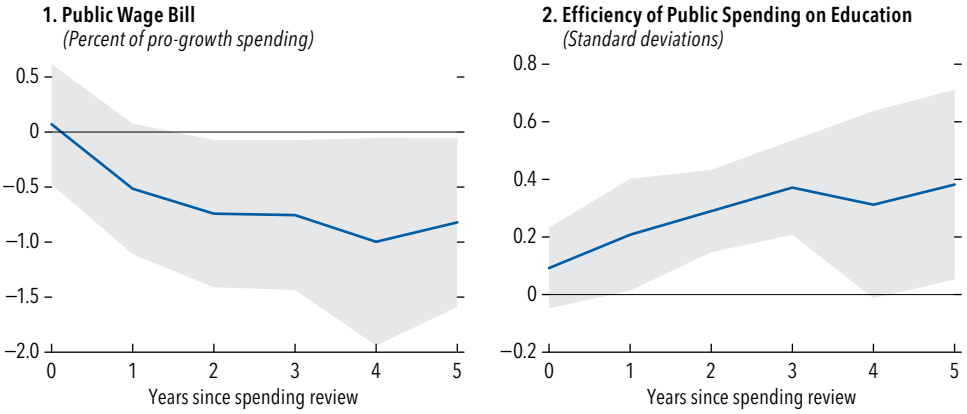
Spending reviews are designed to help governments manage overall expenditure, identify savings or reallocation measures, and enhance the effectiveness of programs and policies. Their frequency, scope, ownership, and mandate can vary significantly among countries. Some countries conduct regular, institutionalized reviews, whereas others perform them periodically and not on any set schedule. Reviews may assess overall expenditure or focus narrowly on specific programs. How the findings are integrated into budget cycles or medium-term frameworks also influences their effectiveness.

Empirical evidence based on 222 spending reviews in 39 member countries of the Organisation for Economic Co-operation and Development between 1999 and 2022 indicates that these reviews often result in reductions in public wage bills. Governments achieve these reductions by identifying staffing redundancies in public entities, rationalizing compensation practices for government workers, and streamlining the public sector. Public wage bills decrease not only in relation to total spending, but also in relation to growth-enhancing spending (Figure 1.1.1, panel 1). Furthermore, the efficiency of public spending typically increases following spending reviews (Figure 1.1.1, panel 2).

Country experiences (Doherty and Sayegh 2022; Tryggvadottir 2022) highlight three best practices to maximize the benefits of spending reviews:

- *Well-designed objectives with concrete savings goals.* Clear objectives, such as controlling expenditures, prioritizing programs, and enhancing efficiency, help align efforts with fiscal priorities.
- *Political commitment and robust arrangements regarding governance.* Finance ministries should take the lead, supported by line ministries and experts. Effective reviews require oversight, diverse expertise, and ministerial decision making to turn recommendations into actionable measures.
- *Timely reviews to inform annual and medium-term targets.* Integrating spending reviews into budget processes makes it possible for recommendations from the reviews to be aligned with processes related to fiscal management and appropriation. During the early phase of budget preparation, reviews can identify low-priority programs and suggest reallocations for the budget. In the budget formulation phase, reviews can shape expenditure ceilings and guide allocations. Throughout the approval and execution phases, reviews facilitate performance-informed decisions and establish benchmarks.

Figure 1.1.1. Impact of Spending Reviews on Public Wages and Efficiency



Sources: IMF, Government Compensation and Employment Dataset; Organisation for Economic Co-operation and Development budgeting databases; and IMF staff calculations.

Note: The figure shows responses to spending reviews based on an event study regression analysis.

Box 1.2. Public Investment and Firm Productivity

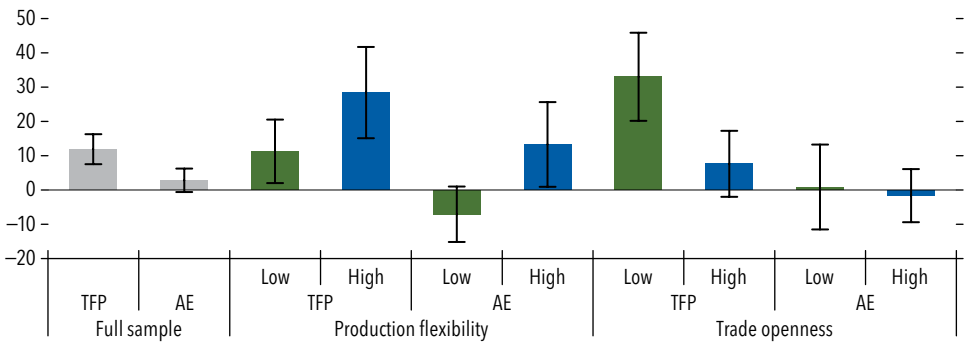
This box examines the impact of public investment on firm productivity—a relationship that is complex and multifaceted. On the one hand, public capital can alleviate constraints that capital and labor market rigidities impose on productivity growth (Chatterjee, Lebesmuehlbacher, and Narayanan 2021) and address the under-provision of public goods such as infrastructure that the private market does not have an incentive to supply (Ramey 2020). On the other hand, public investment may be misallocated or crowd out private investment (Boehm 2020), potentially undermining overall productivity.

Empirical analysis of firm-level data from 40 advanced and emerging market economies between 2000 and 2022 reveals that public investment can boost firm productivity without compromising allocative efficiency within sectors.[1] Following a substantial reallocation of government spending toward public investment, average sector-level total factor productivity (TFP) increases by 12 percent over five years (the main text describes these reallocation episodes). Although allocative efficiency declines slightly in the short term, this effect reverses in the medium term (Figure 1.2.1).

Sectoral factors mediate these effects, however. Sectors with high elasticity of substitution between labor and capital inputs experience more substantial medium-term gains in TFP and positive effects on allocative efficiency. This flexibility allows the private sector to better capitalize on increases in aggregate demand. Sectors that are less exposed to international trade also show more pronounced increases in TFP, in line with literature that shows significant home bias in public procurement contracts (Trionfetti 2000; Herz and Varela-Irima 2020) and finds that small- and medium-sized enterprises experience larger gains from government purchases (Ferraz, Finan, and Szerman 2015).

[1]Allocative efficiency is defined as in Hsieh and Klenow (2009), capturing the extent of misallocation of resources among firms due to distortions in capital, labor, and output markets, relative to the ideal allocation that maximizes aggregate total factor productivity.

Figure 1.2.1. Impacts of Reallocation toward Public Investment
(Percent)



Sources: Baquie and others 2025; Ciminelli, Duval, and Furceri 2018; IMF, April 2024 *World Economic Outlook*, Chapter 3; Moody's, Orbis; Organisation for Economic Co-operation and Development, Activity of Multinational Enterprises Database; and IMF staff estimates.

Note: Bars represent point estimates for cumulative changes in the logarithm of average sector-level total factor productivity (TFP) and within-sector allocative efficiency (AE) over five years after the start of the public investment episode (see Online Annex 1.5). Whiskers represent 90 percent confidence intervals. Production flexibility denotes the elasticity of substitution between labor and capital. "Low" denotes sectors at the 25th percentile or below for elasticity of substitution or trade openness, and "High" indicates sectors at the 75th percentile or above. Allocative efficiency is estimated as in Hsieh and Klenow (2009).

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