

Well Spent: How Strong Infrastructure Governance Can End Waste in Public Investment

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Public infrastructure is a key driver of inclusive economic growth and development and the reduction of inequalities. Roads, bridges, railways, airports, and electricity connect markets, facilitate production and trade, and create economic opportunities for work and education. Water and sanitation, schools and hospitals improve people's lives, skills, and health. Also, if done right, broad-based provision of public infrastructure can support income and gender equality; help address urgent health care needs (for example, during epidemics); reduce pollution; and build resilience against climate change and natural disasters.

Yet, creating quality—that is, infrastructure that is well-planned, well-implemented, resilient, and sustainable—has often been challenging. Almost all countries have infamous white elephants—major investment projects with negative social returns—that have never delivered on their initial promise. One does not have to search far to come across infrastructure projects that were poorly designed, had large costs overruns, experienced long delays in construction, and/or yielded poor social dividends. Examples of poor project appraisal, faulty project selection, rampant rent seeking and corruption, or lack of funding to complete ongoing projects abound and not only in low-capacity countries. And even perfectly good public infrastructures may deteriorate quickly when maintenance is inadequate, which often reflects a lack of funding or political attention.

Losses and waste in public investment are often systemic. On average, more than one-third of the resources spent on creating and maintaining public infrastructure are lost because of inefficiencies (IMF 2015; and Chapter 3 of this book). These inefficiencies are closely linked to poor *infrastructure governance*—defined as the institutions and frameworks for planning, allocating, and implementing infrastructure investment spending. Estimates suggest that, on average, better infrastructure governance could make up more than half of the observed efficiency losses (Chapter 3).

The need for stronger infrastructure governance for quality investment is widely recognized, and initiatives have been launched to provide guidance on

good practice. Yet, although much has been written on what constitutes good infrastructure governance or public investment management, most countries still lack the institutions needed to produce good infrastructure outcomes. Countries frequently stumble over key institutional issues. For example, they may struggle to select projects with the highest social and economic returns and finance projects in a fiscally sustainable way, given limited resources, or struggle to ensure that funding is available as needed throughout project implementation. Budgeting for operations and maintenance costs, ensuring that procurement is transparent and rigorous, or harnessing private sector skills, innovation, and funding without creating undue risks to public finances can also be challenging.

In the wake of *Great Lockdown* and the COVID-19 pandemic, more infrastructure investment and strong infrastructure governance are likely to become even more important (IMF 2020a, 2020b). First, with economic growth turning negative, public investment will have to be part of stimulating weak aggregate demand. For example, in the area of health, the pandemic has revealed a lack of preparedness of many health systems and an urgent need for upgrading health infrastructure that will have to be addressed. Second, countries will emerge from the pandemic with scarce fiscal space, elevated debt levels, large financing needs, and therefore a renewed need to make every dollar count, to ensure the efficiency of investment spending.

This book addresses how resources for public investment can be *spent well*. The overall message is simple: aspirations to end waste in public investment and create better quality infrastructure outcomes have to be met by specific actions on infrastructure governance to reap the full economic and social dividends from public investment.

QUALITY PUBLIC INFRASTRUCTURE: AN ASPIRATION FOR ALL COUNTRIES

Quality infrastructure plays a crucial role in fostering economic development:

- *Public investment improves delivery of public services and the quality of life of citizens.* Quality infrastructure affects our physical well being at the most basic level. An estimated 2.2 billion people worldwide do not have access to safe water. Their health and livelihoods are at risk from a variety of diseases and epidemics.¹ Research has found that interventions to improve water and sanitation infrastructure have been the most effective in reducing morbidity from these diseases (Freeman and others 2014; Wolf and others 2014; World Health Organization 2016).
- *Public investment connects citizens to economic opportunities by supporting private sector activities.* For example, quality transport infrastructure can

¹ For example, the World Health Organization (2016) estimates that environmental factors, including the availability of sanitary water sources, account for 57 percent of those affected by diarrheal diseases.

reduce travel times and transportation costs significantly (BenYishay and Tunstall 2011), and contribute, among others, to better access to jobs and the facilitation of trade.

- *Public investment is a catalyst for inclusive economic growth and development.* Public investment can increase demand in the short term and productivity in the long term, sometimes even with limited increases in indebtedness, if spending is done efficiently (IMF 2014, 2015; Chapters 2 and 8 of this book).

Infrastructure spending needs are staggering almost everywhere. Low-income developing countries and many emerging market economies have looming infrastructure needs in most sectors. In September 2015, governments assembled at the United Nations agreed on a comprehensive development agenda with 17 Sustainable Development Goals (SDGs) that will require a large scale-up in infrastructure, particularly in water, sanitation and hygiene, energy, and transportation. The estimated total cumulative investment needs to meet the SDGs by 2030 are more than 36 percent of GDP in low-income developing countries and emerging markets (Chapter 4).

Many advanced economies have aging infrastructures and see urgent spending needs for their upkeep and modernization. For example, in the United States, the American Society of Civil Engineers (2017) estimates cumulative spending needs of more than \$10 trillion through 2040 to maintain, repair, or rebuild existing infrastructure. In Europe, in November 2014 the European Commission announced an Infrastructure Investment Plan to unlock more than €315 billion for investment spending. In the same year, the IMF (2014) called for an infrastructure spending push to help support both short-term demand shortfalls and longer-term development needs; the OECD (2019) did the same more recently.²

In addition, almost all countries face issues related to making their infrastructure more resilient to climate change. Specifically, damage to buildings, transport, energy, and water infrastructures caused by climate change is expected to run into billions (Chapter 15), with small states that are prone to natural disasters being particularly at risk (Chapter 9). In some countries, this is also compounded by daunting infrastructure challenges as a result of wars, prolonged civil strife, or major migration movements.

Meeting these spending needs will be challenging at best. In most countries, spending needs contrast sharply with the resources available to meet them in fiscally responsible and macroeconomically sustainable ways. What are the options?

- *Additional borrowing* is often hampered by already large debt stocks. At \$188 trillion—or about 226 percent of global GDP in 2018—global debt levels were at a record high even before the COVID-19 pandemic, with most countries having little room to increase borrowing without risking to put their public debt on an unsustainable path.³ Even with debt relief, global

² See <https://oecdectoscope.blog/2019/09/19/growth-is-taking-a-dangerous-downward-turn/>.

³ Global debt data are available from the IMF Global Debt Database: <https://www.imf.org/external/datamapper/datasets/GDD>.

debt levels are continuing to rise substantially in the wake of the global COVID-19 pandemic.

- *Revenue mobilization* is key to expanding the resource envelope and creating fiscal space but is unlikely to be sufficient in and by itself to generate the resources needed. The median low-income developing country raises about 15 percent of GDP in tax revenue. Gaspar and others (2019) estimate that many countries, including most low-income developing countries, could aspire to increase revenue ratios by about 5 percentage points by 2030. This would certainly help to provide some, albeit not all, of the infrastructure spending needed to achieve key development objectives, like the SDGs. But large and continuous increases in revenue require a strong and sustained government commitment that is sometimes not politically feasible.
- *Private sector participation* in building infrastructure and providing infrastructure services can be an important component of a government's infrastructure strategy but goes hand in hand with significantly increased fiscal risks. Public-private partnerships, for example, can harness private sector innovation and efficiency to improve infrastructure service provision while allowing governments to share project risks with a private partner. But they also usually result in additional debt—both firm and contingent—and are a major source of fiscal risk (see Chapter 11). Bova and others (2016) estimate that the fiscal cost of contingent liabilities in public private partnerships amounted to 1.2 percent of GDP on average for a sample of 80 advanced economies and emerging markets, with a maximum cost of 2 percent of GDP.

In sum, infrastructure needs far exceed the resources that countries can hope to raise in a fiscally responsible and macroeconomically sustainable way. Options for spending more—borrowing, revenue mobilization, and private sector participation—should be considered and assessed, including their fiscal costs and risks. But spending more will not be sufficient to meet the infrastructure needs: governments also need to spend better. Indeed, additional investment spending will only yield the expected results when spending is done efficiently, and quality infrastructure investment is a priority for all countries, particularly as economies emerge from the economic crisis brought about by the COVID-19 pandemic.

FROM ASPIRATION TO ACTION: THE IMPORTANCE OF INFRASTRUCTURE GOVERNANCE

Weaknesses in infrastructure governance are critical factors behind inefficiencies and poor outcomes. Flyvbjerg (2009) attributed cost overruns and less-than-projected benefits mostly to deliberate optimism bias in project appraisal and planning. Rajaram and others (2014) pointed to a range of reasons for inefficient public investment, including weak interagency coordination processes, projects being driven by political considerations (which disrupts established processes and

diminishes the credibility of project appraisal), weak budget systems, challenges in procurement and project implementation, and corruption. IMF (2018) found weaknesses in infrastructure governance to be widespread across the public investment cycle but more prominent in the allocation and implementation stages of public investment, particularly during project appraisal and project selection.

Several chapters of this book describe big infrastructure projects that have gone terribly wrong for one reason or another, including corruption (Chapter 10), fiscal risks that materialize (Chapter 11), poor integration of planning and budgeting (Chapter 12), or insufficient project appraisal and selection (Chapter 13). Also, over the investment cycle, weaknesses in some areas (for example, project implementation) may easily offset strengths in other areas (such as project planning), reflecting that no “production process” is stronger than its weakest link (IMF 2015).

Poor or suboptimal infrastructure outcomes need not be a fact of life, however. Many examples exist where large and complex infrastructure projects have been delivered successfully, particularly in countries with strong frameworks for effective infrastructure governance in place. Chile provides an example of this. Its national investment system—*Sistema Nacional de Inversiones* (SNI)—covers all public bodies and provides a coherent framework for identifying, coordinating, evaluating, and implementing public investments. The system standardizes project presentation formats, establishes explicit application and evaluation processes, provides general and sector-specific methodological guidelines for project appraisal, and introduces a system of “checks and balances” by separating the institution that evaluates projects from the institutions promoting projects (Gómez-Lobo 2012). The Chilean infrastructure governance system has generated cost savings and helped sustain a pipeline of appraised and approved projects that fulfill technical criteria and are eligible for budget funding (World Bank 2006; IMF 2014). Korea and Norway are other examples of countries with strong frameworks for infrastructure governance.

How can countries build strong infrastructure governance? The international community has long emphasized and offered detailed guidance on good practices in infrastructure governance. Most recently, under Japan’s presidency in 2019, the Group of Twenty (G20) established a set of quality infrastructure investment (QII) principles (G20 2019), building upon earlier principles established by the Group of Seven (G7) under Japan’s presidency in 2016 (G7 2016) and endorsed by the G20 under China’s presidency in 2016. Similarly, in 2014, the World Bank set out “eight must-haves” for public investment management to provide guidance on good processes and procedures for managing the infrastructure project cycle (Rajaram and others 2014). The World Bank has used this framework to guide and support country reform efforts. The Organisation for Economic Co-operation and Development (OECD)’s 10-dimensional framework for “Getting Infrastructure Right” also provides guidance on infrastructure-budgeting principles and project management (OECD 2017). These various guidance frameworks first and foremost define aspirations; that is, they set out what countries seeking to produce quality infrastructure should aim for in their infrastructure governance institutions.

In 2015, the IMF launched its Public Investment Management Assessment (PIMA), explicitly designed to support, that is, help countries assess their infrastructure governance institutions in a comprehensive fashion and design a tailored and prioritized action plan (IMF 2015, 2018a). The PIMA provides a framework for assessing infrastructure governance across the full project cycle—the planning, allocation, and implementation stages of public investment—and allows for cross-country comparisons. The PIMA framework is consistent with the various existing guidance frameworks and expands on these by also focusing on the macro-fiscal and budgetary processes in which infrastructure projects are embedded. Using the PIMA framework and the lessons learned from dozens of country PIMAs carried out since 2015, this book seeks to help governments move from aspiration to action, exploring practical solutions to their specific challenges in improving infrastructure governance.

OVERVIEW OF THE BOOK

The book is divided into three parts. Part I, *Infrastructure, Growth, and Development* (Chapters 2–5), discusses why countries should aspire to invest in public infrastructure, and why it matters to do so in an efficient way. It demonstrates that public investment fosters economic growth and helps countries meet the SDGs when infrastructure governance is strong. It concludes with a presentation of the PIMA framework and lessons learned from PIMAs that have been carried out so far. Part II, *Fiscal Policy for Quality Public Investment* (Chapters 6–9), explores how fiscal policy can help promote, enable, and protect public investment spending. It considers the impact of public investment during periods of expenditure consolidation, examines the effect of fiscal rules, and presents a case study of infrastructure financing in Asia. This part also examines resilience issues in states vulnerable to natural disasters. Part III, *Building Strong Public Investment Institutions* (Chapters 10–15), turns to the foundation of strong infrastructure by establishing good and innovative practices in key areas of infrastructure governance. This part covers critical issues, such as controlling corruption, managing fiscal risks, integrating planning and budgeting, and identifying best practices in project appraisal and selection. It also covers emerging areas in infrastructure governance, such as maintaining and managing public infrastructure assets and building resilience against climate change.

Infrastructure, Growth, and Development

In Chapter 2, Hiroaki Miyamoto, Anja Baum, Nikolay Gueorguiev, Jiro Honda, and Sébastien Walker analyze the macroeconomic impact of public investment. Public investment spending has declined globally in recent years, but this common trend hides large differences in stocks and quality of physical infrastructure assets across countries. The large differences point to the importance of raising the efficiency and productivity of public investment, particularly for countries with insufficient and poor-quality infrastructure assets. The authors suggest that, with more

efficient and productive public investment, countries can achieve higher growth, while increasing the level and quality of their infrastructure. In particular, the authors explore how the strength of a country's infrastructure governance system plays a critical role in determining the macroeconomic effects of public investment on economic activity. They find that countries with better governance systems enjoy more positive output effects and fiscal outcomes from public investment, and the effects disappear in countries with weaker governance. They also conclude that the planning and implementation stages of public investment management are particularly important for enhancing the growth impact of public investment.

Infrastructure governance is intrinsically linked to the efficiency of public investment; that is, the ability to improve the volume and quality of infrastructure assets for a given amount of spending. In Chapter 3, Anja Baum, Tewodaj Mogues, and Geneviève Verdier compare the value of public capital and the resulting outcomes in terms of infrastructure volume and quality across countries and provide a measure of the efficiency of public investment spending for more than 160 countries. They find a large median efficiency gap, in which the latter is defined as the percentage difference in infrastructure access and quality for a given level of spending between the median country and the best performers. Over one-third of resources are lost in the public investment process, according to the authors. Improvements in infrastructure governance are crucial in closing this gap. The authors find a robust and significantly positive relationship between efficiency and the strength of a country's infrastructure governance, as measured by the PIMA. Strengthening institutions that manage public investment can therefore play a key role in increasing efficiency: on average, countries could close more than half the efficiency gap if they adopted infrastructure governance and public investment management practices of the best performers.

Increasing efficiency will be critical as countries tackle the 2030 SDG agenda and related ambitious targets for infrastructure. In Chapter 4, Yuan Xiao, Devin D'Angelo, and Nghiã-Piotr Trọng Lê develop methodologies to estimate the investment spending needed to reach the SDGs related to infrastructure in roads and electricity, and in water and sanitation. They find that spending needs are substantial: total cumulative investment needs until 2030 in these three sectors average about 36 percentage points of GDP in emerging markets and low-income developing countries. Estimated investment needs vary significantly across countries depending on their income level but a significant scaling up of public investment spending is required in many countries. For example, until 2030, low-income developing countries would face an annual investment need of about 10 percentage points of GDP, more than two times the current median capital spending of 4.6 percent of GDP. Governments will need to explore policy options for financing the increased spending. Efforts to improve public investment efficiency could affect the size of these spending needs. For example, the authors estimate that improvements in efficiency could reduce annual spending needs by over 1 percentage point of GDP for low-income developing countries. Hence, in addition to exploring financing options, improving public investment efficiency will be crucial to reach the infrastructure-related SDGs.

Part I ends with a presentation of the PIMA framework in Chapter 5, where Taz Chaponda, Chishiro Matsumoto, and Lewis Kabayiza Murara examine the importance of strong infrastructure governance for quality infrastructure investment. They discuss lessons learned from the over 50 PIMAs carried out between 2015 and mid-2019. The chapter shows that all countries, but most notably emerging markets and low-income developing countries, have significant room to improve their infrastructure governance to increase effectiveness in public investment. It argues that large gains can be made by enhancing reforms of the institutions with roles specific to public investment, particularly at the allocation and implementation stages. Whereas countries tend to score better on more general public financial management institutions, such as budget comprehensiveness and availability of funding, they fall short on project appraisal and project selection (early in the public investment cycle), and on monitoring and accounting for assets (later in the cycle). Moreover, infrastructure governance institutions tend to look better on paper than in practice, where gaps in what they can achieve become particularly evident at the implementation stage. This points to the critical importance of having institutions (for example, project selection processes) that are both well designed and function well in practice.

Fiscal Policy for Quality Infrastructure Investment

There is evidence that public investment spending is often cut during episodes of fiscal consolidation, notwithstanding the long and lasting growth benefits attributed to public investment (Chapter 2). In Chapter 6, Tannous Kass-Hanna, Kangni Kpodar, and Dawit Tessema investigate the growth dividends of shifting the composition of government spending toward more public investment during periods of consolidation. The findings suggest that protecting investment spending during fiscal consolidation, although contractionary in the short term, boosts medium- to long-term growth, and so leads to a more sustained reduction in budget deficits. This result, which also holds during good times, underscores the importance of public investment for growth, particularly in countries where initial public investment spending in total government expenditure is low.

In Chapter 7, Olivier Basdevant, Taz Chaponda, Fabien Gouguet, Jiro Honda, and Saji Thomas explore the potential impact of fiscal rules—permanent numerical constraints on fiscal aggregates—on public investment. While fiscal rules may disproportionately affect public investment relative to current spending during fiscal adjustment, the chapter finds that countries with high efficiency in public investment are better at protecting public investment from spending cuts. Therefore, strengthening infrastructure governance can help countries reconcile the fiscal sustainability concerns reflected in their general fiscal rules with the protection of public investment. The chapter also argues that numerical rules can be designed to help countries avoid making undesirable cuts in public investment, especially when the rules are supported by sound public financial management practices, including adequate procedural rules.

Ha Vu, Olivier Bizimana, and Masahiro Nozaki examine public investment needs in emerging and developing Asia in Chapter 8. They assess the need to scale up infrastructure investment in the region and how to deliver it. They first emphasize why emerging and developing Asia would need more and better investment spending to improve infrastructure outcomes and reach the SDGs. They find that financing additional infrastructure spending with higher indirect taxes would be desirable in the long term, particularly in view of the growth-debt trade-off. They also suggest that public investment efficiency in the region needs to be improved to obtain more and better-quality infrastructure for every unit of money spent on infrastructure investment. Countries in emerging and developing Asia should focus reform efforts on their weakest and most critical practices of public investment management, the authors conclude.

Frequencies and levels of damage from natural disasters are expected to rise with climate change, leaving many countries, especially small states, highly vulnerable. Natural disasters destroy lives and livelihoods and also have significant adverse macroeconomic impacts in terms of lower growth and higher debt. They are associated with large recovery costs as significant amounts of public and private infrastructures have to be rebuilt after a disaster. In Chapter 9, Wei Guo and Saad Quayyum explore whether a significant amount of the damages and associated output losses could be avoided by investing in resilient infrastructure. They find that policymakers can save in net present value terms by investing in resilience and avoiding large rebuilding costs. By changing the pattern of support toward building the resilience for infrastructure to withstand damage, countries that are vulnerable to natural disasters can improve investment outcomes, with lower outlays on recovery efforts in the long term. The findings underscore the importance of mobilizing more resources toward building resilience. Given limited fiscal space, not only will countries need to mobilize domestic revenue and prioritize spending but also to spend better and increase the efficiency of capital spending. The international community can play an important supportive role.

Building Strong Public Investment Institutions

Public investment is particularly vulnerable to corrupt behavior, which may take many forms, including small bribes, kickbacks, collusion, embezzlement, influence peddling, or unlawful beneficial ownership. Sailendra Pattanayak and Concha Verdugo-Yepes demonstrate in Chapter 10 that corruption can occur at any phase of the investment cycle, inflicting different economic costs and requiring different mitigation strategies. They propose a strategy for effectively mitigating corruption risks along the infrastructure cycle that includes a proactive approach to corruption risk management; clear delineation of decision-making authority without conflict of interest; transparent frameworks and criteria for taking infrastructure decisions; effective arrangements to enforce accountability for the decisions taken; a framework for transparent disclosure of relevant information at all key stages; and promotion of integrity in the transactions of private firms/actors

involved in public infrastructure. The chapter also identifies specific indicators and “red flags” to improve the detection and sanctioning of corrupt acts, and to alert policymakers and citizens to potential corruption risks.

Public infrastructure projects are typically large and complex, with long planning, implementation, and operational periods, and therefore inherently exposed to uncertainties and risks. Yet, uncertainties and risks receive moderate attention during major investment decisions. Rui Monteiro, Isabel Rial, and Eivind Tandberg demonstrate in Chapter 11 that better risk-management practices can improve outcomes in public infrastructure projects. They review the main sources of risks affecting public infrastructure projects over their entire life cycle and find that a large source of fiscal risk lies in decisions or actions taken by the government, such as inadequate project design, costing techniques, and risk-sharing arrangements. The authors also discuss good practices for assessing, quantifying, and managing risks. They find that all countries have room for strengthening their infrastructure governance frameworks by gradually incorporating a risk-management function.

In Chapter 12, Richard Allen, Mary Betley, Carolina Renteria, and Ashni Singh explore the key role of efficient and well-integrated planning and budgeting functions for building quality infrastructure. The chapter analyzes the evolution and integration of these two key functions of government, considers possible mechanisms to better integrate them, and discusses how they should be organized. The chapter argues that most countries, both advanced and developing, are still struggling to find efficient mechanisms to link their medium- and long-term infrastructure plans within a sustainable fiscal framework. Moreover, establishing planning and budgeting functions that are efficient and effective is much more important than the organizational form of these functions, for which solutions are country dependent. Finally, centralized agencies play a useful role in the strategic planning of infrastructure and mitigating the influence of political factors and the electoral cycle on infrastructure investment.

In Chapter 13, Robert Taliencio and Eduardo Andrés Estrada discuss the key roles that project appraisal and project selection play within the planning and allocation stages of public investment and explore good practice in institutional design of these functions. The authors find that a clear, well-supported appraisal methodology and published project selection criteria, with well-defined processes for project selection, are critical for good infrastructure governance. Undue political influence is an issue in many countries and should be mitigated through rigorous analysis, central ministry scrutiny using clear and transparent procedures, and an independent review of projects before their inclusion in the budget. In low-capacity countries, outsourcing of project appraisal could be considered but should be balanced with the need for in-house capacity building and the development of practical know-how.

Achieving better infrastructure outcomes requires countries to both maintain their assets and manage their overall asset portfolio. Andrew Blazey, Fabien Gonguet, and Philip Stokoe address the little-researched topic of maintaining and managing infrastructure assets in Chapter 14. Based on country examples and empirical evidence, they find that benefits are associated with maintaining and

renovating assets, including longer asset life spans, reduced fiscal costs in the medium and long terms, and economic and social benefits for users. The authors also explore a variety of tested mechanisms that can properly provide resources for the maintenance of infrastructure assets. The success of these mechanisms relies on the ability of governments to assess the maintenance needs of an asset from the very beginning, to review its performance regularly, and to adjust actual maintenance spending on a timely basis.

The final chapter of the book goes back to the growing economic and fiscal liabilities that result from the frequency and severity of climate-related extreme weather events. In Chapter 15, Tuan Minh Le, Wei-Jen Leow, and Fabian Seiderer propose an approach that governments could use to adapt their infrastructure governance frameworks to strengthen climate resilience in major stages of public investment management, such as project planning, design, appraisal, selection, and financing. On that basis, they propose that the PIMA framework can be adapted to tackle some relevant climate-change issues. They highlight three key points: first, to avoid overwhelming already-stretched public investment institutions, a focused approach is recommended to assessing and mitigating the most severe climate risks and impacts on major investments; second, upgrading a national public investment system to factor in and mitigate growing climate risks requires a sequenced but holistic approach that includes regulatory, institutional, and operational reforms and provides adequate capacity building; and third, greater institutional cooperation is one of the major preconditions for a functional climate-sensitive public investment management framework.

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