

Notes

Prelims

1. For politicians, a rent is an additional (formal or informal) benefit. This benefit can be a personal income, a contribution to the financing of its political party or added simply an opportunity to achieved political recognition associated with the way he or she interacts with the firms winning the contracts to deliver or maintain infrastructure.

1 Introduction

1. The book only marginally deals with the needs of the investors and producers. This does not mean that these needs are not important. It simply reflects the fact that there is a lot of new work currently being undertaken in the region on the drivers of investment climate but this work is only in its preliminary state and the direct linkages with poverty concerns are still very limited.
2. We leave out urban transport, irrigation, and dams, not because they are less important but simply because they require addressing much more specific issues than those we are trying to address here.
3. As pointed out by Brunel (2004), Africa's colonization dramatically modified the use of space in the region, shifting growth and urbanization from inland to the littoral. Most African capitals are ports built at the end of railways designed to carry flows of raw materials and people from the inland. She also points out that transport networks inherited from that growth was located perpendicularly to the seashores rather than a network designed to occupy space widely. This is one of the reasons why the economic capitals of Africa are often so peripheral and why increasingly political capitals have moved to more central locations.
4. There is no country in Africa who is not a member of at least one of the ten regional economic groupings!
5. The urban population now represents 40 percent of the total, versus 30 percent 25 years ago. This is more than 300 million people.

6. Sachs and his colleagues talk about average annual infrastructure expenditure needs equivalent to 13 percent of GDP, in their United Nations paper. See, Millennium Development Project (2005).
7. The heated debates of governments—and often the World Bank sector staff—with the International Monetary Fund (IMF) on road funds serve as a witness to the divergence of views on this topic. The debates are, however, on very solid concerns. According to Desmarchelier (2005), the ratio of actual to required maintenance in roads for a sample averaged 42.4 percent and varied from 0.28 percent in the Democratic Republic of Congo (in 2003) to 89.3 percent in Burkina Faso (in 2001). It was below 50 percent for 6 of the countries.
8. As Europe has been slower than many had hoped for to pull out of the Great Depression, emerging markets have been attracting a lot of interest. In particular, Africa's infrastructure is a recurring theme in investors' conference and in the financial media. The IMF and the African Development Bank (AfDB) are pushing for African infrastructure bonds and many key private players have been launching their own efforts, as discussed later.
9. The overview report (Foster and Briceno-Garmendia 2010) and many of the datasets and studies conducted in that context started to be released in 2010.
10. For a complete presentation of this new database, see African Development Bank (2013) and Africa Infrastructure Knowledge Program (2011).

2 Infrastructure, Growth, and Country Strategies

1. A PRSP is an official document issued by government in low-income countries to describe the macroeconomic, structural, and social policies and programs that a country will try to implement over a specific time span to promote growth and reduce poverty. It is prepared in consultation with key domestic and foreign actors. It includes an identification of the financing needs associated with the strategy and a discussion of the essential external financing sources, often at the project or program level. The International Monetary Fund (IMF) and the World Bank played an active role in helping countries prepare these PRSPs.
2. The reader is referred to a later section for a discussion of more robust econometric evidence on the relative importance of the various sectors, in particular Calderon and Servén (2008).
3. For almost 20 years now, there have been debates on the drivers of growth in Africa; see Ndulu and O'Connell (2005), Ndulu (2004), and a new wave of research anchored in debates on the quality of statistics that could lead us to over- or underestimated growth and improvements in consumption in Africa. These have involved, among others, Miguel (2009), Young (2012), Devarajan (2013), and Harttgen, Klasen, and Vollmer (2013), and

provide some additional insights on infrastructure but only marginal ones so we will not address them here. To our knowledge, the only papers covering infrastructure quantitatively are Easterly and Levine (1997), Esfahani and Ramírez (2003), Calderon and Serven (2004), and Estache, Speciale, and Veredas (2005), Calderon (2009), and Jerome (2011). Many other papers mention infrastructure as an important variable but don't model it. Occasional country-specific studies deal with it, see for instance, Fedderke and Bogetic (2009).

4. Estache, Speciale, and Veredas (2005).
5. See Estache, Speciale, and Veredas (2005), who compare the relevance of infrastructure stocks in an augmented Solow model with and without human capital variables. There are also a few studies looking at the importance of being landlocked for a country. They are reviewed in Ndulu (2004).
6. See Ndulu (2004).
7. Estache, Speciale, and Veredas (2005).
8. Abdulai, Diao, and Johnson (2005).
9. See Stern and Holder (1999) and Ros (1999).
10. Wallsten (2001).
11. For more details, see Briceno, Estache, and Shafik (2004).
12. Because of the way they are computed, these rates of return are closer to financial rates of return and tend to underestimate the social rates of return. The underestimation is likely to be quite significant. For Uganda, for instance, Fan et al. (2004) estimate that the marginal returns to government intervention for feeder roads in rural areas is equivalent to a benefit-cost ratio of over seven.
13. These findings underscore the need to decarbonize the fuel mix for centralized power generation as it expands in Africa.
14. Leonard (2005) offers a useful survey of the literature on infrastructure and PRSPs; Ellis and Freeman (2004) illustrate some of the limitations of PRSPs including those for decisions regarding infrastructure in very specific contexts for four countries.
15. For detailed overviews, see Nankani and Allen (2004), Craig and Porter (2003), and Oxfam (2004), for instance.
16. In his review of infrastructure presence in PRSPs, Murooka (2004) provides detailed information on 17 SSA countries. Ghana, Mali, and Senegal stand out in the clear priority assignment to infrastructure.
17. See, for instance, UNDP, AfDB, and UNECA (2013).
18. Note that this correlation measure can reflect not only direct or indirect causation but also a simple statistical oddity. In this context, however, the correlation is taken to be an initial indication of a link between education and infrastructure that deserves better scrutiny.
19. See Ndulu (2004) for a survey.
20. Sachs and Warner (1997) were among the most vocal to argue the relevance of this variable initially. See Ndulu (2004) for a survey; one exception not

covered by Ndulu's survey is Naudé and Krugell (2003) who find no evidence for the role of geography once institutions are taken into account.

21. For details, see, <http://www.3ieimpact.org/evidence/impact-evaluations/>.

3 Infrastructure and the MDGs

1. See, <http://www.un.org/millenniumgoals/enviro.html>.
2. See, for example, Besley and Burgess (2003).
3. This derivation is possible because we rely on a semilog regression setting. In this setting, the impact of access to basic services will be proportional to the expected rent computed using all housing characteristics except the services.

4 Africa's Infrastructure Investment Needs

1. Foster and Briceno-Garmendia (2010).
2. This section is largely based on the background studies conducted for the AICD study. For details, please refer to Foster and Briceno-Garmendia (2010). It also relies on updated information from the PPI database of the World Bank on foreign private investment in infrastructure.
3. To be precise, the estimates based on a sample of 28 countries for which the required data on poverty is available suggests that a population-weighted average growth per capita needed to achieve the MDGs is 5.2 percent. More than half of the countries in the sample need per capita growth rates of over 6 percent.
4. The main investments include about 7,000 megawatts a year of new power generation capacity, 22,000 megawatts of cross-border transmission, an acceleration of the residential electrification rates, an expansion of the intraregional fiber-optic backbone network and of the continental submarine cable hoop, a major improvement and development of the road network and of interconnections within that network, a globalization of mobile systems, 100 percent public access to broadband, a doubling of irrigated areas, and the delivery of the commitments made to reach the W&S MDGs.
5. Note that this discussion ignores the restrictions associated with the limited absorptive capacity of many countries. This discussion has many dimensions and goes beyond what can be addressed in this book.
6. See, for instance, Schiere and Rugamba (2011) for a discussion of the potential role of China in infrastructure.
7. This information is not all that inconsistent with an estimate that would derive investment rates from a comparison of the changes in the value of infrastructure capital stocks assessed at constant price. From 1970 to mid-1980s, this exercise yields total expenditure levels of around 9 percent of GDP.
8. The section draws on some of the calculations prepared by Warlters (2005).

9. There are, of course, specific projects and specific activities for which the private sector will be an ideal partner, but this statement must also be weighed against the possibility that these private projects are associated with cream-skimming problems in which a profit center is amputated from a public sector business at a higher net fiscal cost. There is significant evidence of this in Latin America (see, e.g., Campos et al. 2003).
10. See Briceno, Estache, and Shafik (2004).
11. This is from the OECD database, which only provides data on commitments and moreover has some problems in the classification of infrastructure expenditures because donors do not classify strictly similarly. The “big picture” of what this data means for infrastructure is however fairly reliable.
12. Direct comparison between MCF and WACC rates of return is only possible if infrastructure projects yield no externalities, whereas in general we would expect the social benefit of infrastructure to exceed the private returns to the investor.
13. Although it did not occur in any of these seven countries, it could also occur that within a single country public financing is cheaper than private financing in some sectors but not in others. And if a different measure of the MCF were used (i.e., the MCF of a particular tax), different comparative results would result.
14. See, among others, Adelegan and Radzewicz-Bak (2009), Mbeng Mezui (2012), and Mu, Phelps, and Stotsky (2013) for discussions of the scope for capital market development in the region directly relevant to the scope for innovative financing options in infrastructure. See also Mben Mezui and Duru (2013) on additional options to finance infrastructure through the use of reserves.
15. For a very useful overview, see Bevan (2005).
16. Note in addition that the debate on grant versus loan financing of this scaling up effort is actually irrelevant to the assessment of the fiscal absorptive capacity since it turns out that conventional fiscal accounting generally does not distinguish between borrowing and external grant financing. This means that the bias against accessing grant finance further hurts infrastructure asset accumulation, growth, and long-term solvency.
17. Even after accounting for the common real exchange-rate appreciation that tends to be associated with export booms, the Dutch disease problem resulting from the distribution of gains from infrastructure investments between tradables and nontradables need not appear as indicated by Adam and Bevan (2004).

8 Are Quality and Production Costs a Problem?

1. See Flyvbjerg, Skamris Holm, and Buhl (2003).
2. A longer discussion of this issue is available in Estache, Foster, and Wodon (2002).

3. Although it could be argued that in developing countries, cost padding enables operators to collect a risk premium that needs to be paid to attract private capital, there is ample evidence in both developed and developing countries suggesting that there are governance issues associated with this practice. Poor transparency in costs not only leads to inequity and short-run inefficiency, but it also tends to reduce competition when it allows for opaque cross-subsidies or when unscheduled cost hikes appear shortly after contracts have been awarded, raising concerns that bids are strategic rather than revealers of fair commitments by bidders. Linking tariffs to the cost of capital revised recurrently in a transparent way tends to generate fairer and more efficient outcomes for all parties involved. But as in many matters relating to regulation, unwritten debates point to disagreements on the extent to which this conceptually more desirable approach can actually be implemented when institutions are weak.
4. One of the main purposes of tariff revisions in regulated industries is to ensure that these cost savings are eventually shared with the users in such a way that they do not simply become a pure monopoly profit for operators, while recognizing that the sharing mechanism must maintain some degree of incentives for the operator to continue searching for cost savings opportunities.
5. For more specific details, see African Development Bank (2013).
6. Additional information on the extent of misestimations and how these are related to procurement practices is discussed and documented in Estache and Iimi (2011).
7. For an introduction of the key concepts and their application to infrastructure see Coelli et al. (2003).
8. For more details, see Coelli et al. (2003)
9. This extrapolation from partial data on production and on inputs is a very far stretch conceptually since it uses information on efficiency levels in production to imply cost efficiency levels. It is only done to provide a very rough order of magnitude, not a precise measurement.

9 Markets, Institutions, and Reforms

1. There is quite a widespread interest in assessing reforms but most rely on country-specific case studies or on small samples of countries. See, for instance, Eberhard and colleagues (Eberhard and Tenenbaum 2005; Eberhard and Shkaratan 2012) and Gualberti et al. (2009) for electricity sector; Karekezi and MacKenzie (2002) and Perelman, Mbuvi, De Witte (2012) for water sector; and Trujillo, González, and Jiménez (2013) for ports subsector. See also Parker, Kirkpatrick, and Figueira-Theodorakopoulou (2008) for a survey.
2. Additional information on the changes in governance can be found in Banerjee and Morella (2011) for the water sector and Eberhard and Shkaratan (2012) for the energy sector.

3. This point is very well documented in Kariuki and Schwartz (2005)
4. These countries where DHSs were held are Benin, Burkina Faso, Cameroon, Cote d'Ivoire, Ghana, Madagascar, Malawi, Mali, Namibia, Niger, Nigeria, Rwanda, Senegal, Tanzania, Uganda, Zambia, and Zimbabwe.

11 Toward an African Infrastructure Strategy to Meet the Needs of the Poor

1. It can be argued that technological progress, notably in generation technology, has made it possible for small independent supply networks to achieve cost recovery. However, the issue of mismatched timing between initial capital expenses and insufficient demand development remains and implies that subsidies appear unavoidable, at least in the initial period where up-front investments are needed.
2. The concept of low-cost expansion of network can be easily challenged if it requires major works in dense peri-urban locations.
3. Fishbein (2001) gives a good sense of what and how local governments can take charge of their infrastructure needs in Africa.

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