The New AFRICA

Building an Infrastructure

Paul Collier

Key political decisions are needed to build critical rail networks for a continent well suited to them

THE coming decade could be Africa's opportunity for investment. Globally, there is a massive pool of investable private resources. Prospects in the advanced economies look bleak, and in the major emerging economies—the so-called BRICs: Brazil, Russia, India, and China—the future is looking more uncertain. Although Africa is not immune to global risks, its continued growth is likely to rest on the potential for further resource discoveries and for commercial cultivation of its vast, underused agricultural land.

New transportation infrastructure is vital to harness these two potential sources of growth. At the top of the list is the classic form of economic infrastructure: railways.

The continent is a huge landmass, well suited to railroads. Yet during the past half-century Africa's rail network, never very extensive, has shrunk. Even the United States, a huge landmass with relatively low population density, has one kilometer of track for every 43 square kilometers of land. By contrast, Nigeria, home to one-fifth of the population of sub-Saharan Africa and one of its most densely populated countries, has but one kilometer of rail for every 262 square kilometers. Nigeria is not atypical: by radically reducing transportation costs, railways could open up vast tracts of Africa to economic opportunities, especially in agriculture and mining, which many countries are relying on for future growth. The continent needs a decade of massive investment in rail networks.

Politics at play

Railways are hardly technologically challenging. They represent the oldest continuous industrial technology. Africa's lack of railways compared with other regions is primarily a consequence of politics. Although railways are technologically simple, they are politically complicated—for three fundamental reasons:

- *Railways are a primary example of a network industry.* The key feature of a network industry is that its operations are so interconnected that it is more efficient to run it as a single entity. This presents

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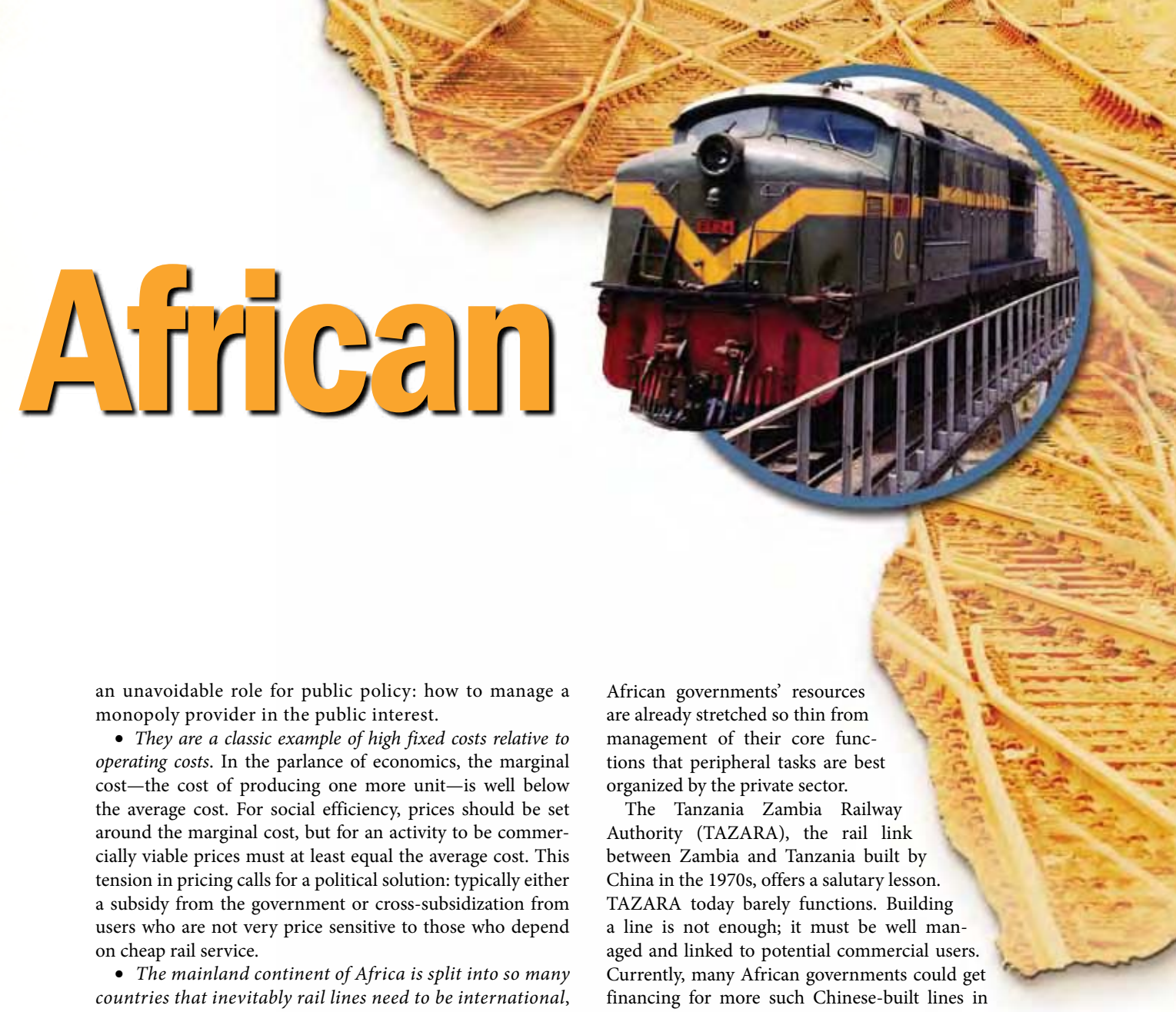

an unavoidable role for public policy: how to manage a monopoly provider in the public interest.

- *They are a classic example of high fixed costs relative to operating costs*. In the parlance of economics, the marginal cost—the cost of producing one more unit—is well below the average cost. For social efficiency, prices should be set around the marginal cost, but for an activity to be commercially viable prices must at least equal the average cost. This tension in pricing calls for a political solution: typically either a subsidy from the government or cross-subsidization from users who are not very price sensitive to those who depend on cheap rail service.
- *The mainland continent of Africa is split into so many countries that inevitably rail lines need to be international*, especially because many of the countries that would benefit most are landlocked. Yet a transnational network investment is potentially at risk from each national polity. Indeed, each time rolling stock crosses borders a valuable asset moves into a new jurisdiction.

Because African governments have yet to tackle these three political challenges, the African rail network remains inadequate.

Organizing a network industry

Railways are not the only network industry. Telephone service and electricity are other important examples. In Africa phone networks are usually provided by the private sector but subject to regulation; electricity is usually in the public sector and run as a public monopoly. A rail network could be run under either of these models. However, in Africa public ownership and management of the rail network is unlikely to be the best approach. Governments have so many other pressing needs that they cannot afford to finance the huge cost of a rail network—new or rehabilitated. Furthermore, African governments' resources are already stretched so thin from management of their core functions that peripheral tasks are best organized by the private sector.

The Tanzania Zambia Railway Authority (TAZARA), the rail link between Zambia and Tanzania built by China in the 1970s, offers a salutary lesson. TAZARA today barely functions. Building a line is not enough; it must be well managed and linked to potential commercial users. Currently, many African governments could get financing for more such Chinese-built lines in exchange for mineral concessions, but granting mineral concessions means mortgaging Africa's limited wealth and should not be done lightly.

Africa's particular needs suggest that a rail network should be a regulated private monopoly, with both financing and managerial expertise from a private company. But regulation poses difficulties that may be insuperable. It is not possible to anticipate all eventualities: presenting a public rail regulator with a set of agreed rules to be implemented is not enough. To cope with unforeseen circumstances, the regulator must have some discretionary room. But in African governance environments such discretion would likely kill private investment. With the region's reputation for corruption, even an honest regulator's decisions would be subject to allegations and expectations of bribery. Once a regulator is given the power to set prices that could bankrupt either the railway company or its customers, neither group would be willing to risk investment.

Fortunately, there is a viable alternative to a domestic regulator with discretionary power—namely, an international dispute settlement board whose members are approved by govern-

ments, investors, and customers. This is a standard means of international contract enforcement, and indeed one commonly used both by foreign investors in China and by Chinese investors in Africa. The record of these boards is good. Despite frequent findings against governments, there is a high rate of compliance with decisions. Before investment, a government, an international rail investor, and commercial rail users can negotiate a mutually satisfactory agreement and lock it in by including a contract clause that refers disputes to such a procedure.

TAZARA train leaving Dar es Salaam, Tanzania.

Differential pricing

As noted above, because the fixed costs of rail investment are so large, marginal costs are substantially below average. This would generally argue for public ownership, with government using tax revenues to subsidize the fixed costs of the network to keep the price to users around the marginal cost. The importance of such low pricing is not just hypothetical. Although rail networks can open up huge tracts of little-used land to commercially viable agriculture, the amount of usable land is likely to be highly sensitive to transportation costs.

While marginal cost pricing would be very helpful for opening up African agriculture, African governments are in no position to finance such a subsidy. Indeed, even if a government were to provide a subsidy, it might actually deter investors because of the government's limited long-term credibility. Neither potential rail operators nor potential commercial farms would trust a government commitment to a long-term subsidy.

As with regulation, there are feasible alternatives: *price discrimination among users* is one. Price-sensitive users can pay only marginal costs, if higher-profit industries less sensitive to transportation costs pay more. In Africa, rail networks have two principal potential users, mining and commercial agriculture.

Many natural resource discoveries will be far from coasts and will require lengthy rail links to move ore to ports. Without these rail links vast tracts of underused land would have no commercial value. The core economic challenge is to organize the rail network in a way that meets the needs both of the extraction industries and of agriculture.

Mining operations require railways and ports. Were there no agricultural users, the mining companies themselves could finance the rail network from some of the high profits generated by extraction. As long as these rail links serve agriculture and resource-extraction users, agriculture need pay only the marginal cost of operation. In effect, the differential profitability of mines and agriculture creates the potential for price discrimination between them.

Mining companies, eager to open up resource-laden lands, have offered to set up such railways, even though these companies are not likely to welcome or desire multifunctional use of the rail network. Mines are accustomed to dedicated services. With the price for agricultural users set close to the marginal cost, the hassle for the mining company of serving other users would far outweigh the benefit from the revenue. For governments, however, a multiuser rail network is very desirable. Especially in light of the uprisings in north Africa, the imperative across the continent is to generate jobs.

Modern mining, which is becoming increasingly capital intensive, generates few jobs and is often damaging to the environment. As a result, the local population may see few direct benefits from mining operations alone. But commercial agriculture can generate both mass wage employment and opportunities for small farmers—a large constituency that will benefit from a rail network made viable by resource extraction.

Who will run the railway?

Such a multiuser rail infrastructure, while attractive, is organizationally demanding. Who will run it? As noted above, *it would be beyond the core competence and natural interest of a mining company to run a railway that prices its service for farms at their marginal cost*. As a result, even if a mining company were to provide such rail service, farms would likely mistrust it because of its peripheral nature for the mining company. Further, resource endowments are unlikely to be discovered all at once. A single rail company would, in effect, have acquired the exclusive right to any undiscovered minerals. Other resource-extraction companies would not be likely to explore if they had to depend on the single rail company to ship their ore. In that situation, the government would have radically less future bargaining power over mining concessions.

Yet, as already discussed, government control is probably not a good solution either. *A third-party commercial operator with core competence in infrastructure but without mining interests appears to be the most credible option*. All rail contracts would include an agreement with the government and commercial users—enforced by reference to a dispute settlement board—that builds in price discrimination. The

agreement would ensure that the difference between average and marginal costs is covered by the high profits of natural resource extraction, with agriculture charged only the marginal cost.

Such contracts could provide the underlying security needed for a rail company to raise sufficient money to build a rail network, ensuring recovery of the initial investment from income generated by resource companies. Conversely, it would reassure resource-extraction companies of consistent railway service free from political motivation, and commercial farms would be assured low-cost transportation to market.

An international rail line

In many cases the track of African railways must cross national borders. For example, South Sudan, Uganda, Rwanda, Burundi, Zambia, Malawi, and the eastern Democratic Republic of the Congo all need rail links to the coast of east Africa—through Kenya, Tanzania, and Mozambique. Similarly, the most efficient route to the coast from eastern Guinea, which has many valuable minerals, is through Liberia. Yet for the past half-century the governments of these countries have not sustained the necessary political cooperation to make such transnational lines work.

If a rail line is transnational, pricing issues become more complex. For example, *the natural resource may be in one country (at the rail head), while most of the agricultural land to be opened up may be in another country*. Moreover, because much of the output—ore or agricultural—is for export, the monopoly position of the port gives the government of the coastal country the ability to negate a pricing agreement confined to rail charges by inflating port charges. Another complication occurs because the rolling stock keeps crossing borders. *Unless there is a coordinated approach to legal recourse, the engines and cars cannot be used as collateral for loans,* which will make the financing cost unnecessarily high. Finally, *because the goods transported by the railway cross borders, they are vulnerable to delays because of slow or predatory customs procedures*. Hence governments must make credible commitments to maintaining the free flow of goods in transit.

For a transnational rail line to be commercially viable, the risks for investors and customers must be addressed at the start of negotiations. In effect, the governments involved must agree in advance to a limited but clearly specified degree of pooled sovereignty. An intergovernmental rail authority must be established that has sufficient power to negotiate credibly with a rail company and its commercial users. Clearly, the decision to set up such authorities is beyond the realm of ministers of transportation and rests with presidents and parliaments.

The way forward

After half a century of neglect, it is tempting to resolve the need for rail investment by succumbing to the offers of mining companies. While that would undoubtedly get railways built, it would come with two hidden costs. Once a particular mining company owns a rail network, other mining companies will be reluctant to depend on it, which would give the network builder enormous bargaining power with respect to future resource discoveries. Governments tend to look at the short term, but mining companies have learned to consider the long term. Further, mining companies have little interest in multiuser railways. They are liable to regard low-value agricultural users as a nuisance. In contrast, governments have an overwhelming interest in ensuring that rail networks serve many users. During negotiations, mining companies will doubtless tout their willingness to provide comprehensive rail service to all, but afterward governments may be in a bind if a mining company finds so-called facts on the ground that it says prevent construction of a multifunctional railroad.

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In the scramble to negotiate mining deals, African governments risk missing a historic opportunity to transform the transportation arteries of the continent. The past impasse over rail provision did not stem from a lack of financing, but from inadequate political design. Because railways are network industries, they cannot be kept in check by competition nor—because of deficiencies in African governance—by regulation. The solution is to write contracts subject to dispute settlement boards. Because railways have high fixed costs, social efficiency will require subsidies for price-sensitive users. Subsidies cannot come from cash-strapped governments, but can be achieved through price discrimination. In Africa, rail arteries must be transnational, which can lead to intercountry disputes and holdups that would deter private investment. Yet these risks can be addressed by subregional rail authorities with decision-making power.

Africa's current generation of political leaders has the opportunity to open the physical geography of the region. The decisions they must make are complicated, and much is at stake for the economic well-being of the continent. But forewarned is forearmed. ■

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