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Paul Collier

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Attracting international private finance for African infrastructure ☆

Paul Collier*

*Blavatnik School of Government, Oxford University, United Kingdom
Centre for the Study of African Economies, Oxford University, United Kingdom
International Growth Centre, United Kingdom*

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Abstract

Africa's trade is impeded by poor infrastructure. Inadequate transport infrastructure raises costs analogous to trade barriers, while inadequate power discourages investment. Yet Africa's infrastructure needs greatly exceed its capacity to finance them. There is therefore a need, and an opportunity, for substantial foreign private finance. However, to date, while private finance routinely finances infrastructure elsewhere in the world, in Africa it has been very limited. This article sets out the chain of impediments to scaling up private finance and suggests ways of addressing them. © 2014 Afreximbank. Production and hosting by Elsevier B.V. All rights reserved. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

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1. Introduction

International trade is highly dependent upon infrastructure. Without it, private initiatives are constrained by their inability to draw on essential contributions of transport, communications, energy, and water services. They are held back by the absence of the essential arteries through which the lifeblood of an economy flows to the veins of the private sector.

Africa needs far more infrastructure than its governments can afford to finance through tax or aid. Its infrastructure deficiency is a major impediment to the expansion of exports. Yet, while the region's infrastructure needs exceed its existing funding sources, the costs are trivial relative to the size of world capital markets. The inability of Africa to finance its infrastructure requirements is not therefore a capacity constraint. It is an institutional and organizational one. As such it is therefore soluble but it needs an imaginative approach which goes beyond what has been attempted to date.

This article sets out the basis of conceiving a different way of addressing Africa's infrastructure deficiency. It suggests that it can be tackled through a combination of public and private initiatives which address the public and private market failures which have existed to date. Only once it is recognized that both existing public and private sector arrangements are deficient will it be appreciated that each party should cease attributing blame to the other and instead recognize that it is in the interests of both of them to work together in innovative ways to combat the defects. If they do then the consequences for the region's development will be profound.

1.1. The actors to date

To date there have been four key players in the provision of infrastructure in Africa — governments, donors, private sector institutions in OECD countries, and China. African governments are very conscious that they need to attract private investment for infrastructure. There has been a gradual process of recognition that public monopolies have been dysfunctional, and the lobbies that benefit from them have increasingly been on the defensive. Usually, however, the desire for private financing has not advanced

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* Tel.: +44 1865614360; fax: +44 1865281447.

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much beyond long wish-lists of desired projects. African governments have little capacity to design and present projects in detail in a form that is financially attractive to investors. For example, at the investor conferences at which African governments commonly pitch projects, the political risk of hold-up once the investment has been made, which is probably the biggest single impediment to private finance, is seldom acknowledged let alone addressed.

Historically aid has been a major source of infrastructure financing. However, over the past 15 years donors have switched from infrastructure to social spending. The trend began during the Wolfensohn presidency of the World Bank and reflected two concerns. One was that the rise of private capital markets would rapidly make donor lending and grants for infrastructure irrelevant. The other was that OECD tax payers were often ambivalent about paying for modern infrastructure due to environmental and social concerns; something most evident in respect of dams. There was much stronger acceptance of expenditures that were directly child focused, such as health and education. In attempting to make infrastructure projects more acceptable to their critics, agencies then encumbered themselves with a demanding range of procedural checks which raised costs and slowed implementation. A significant exception to this trend has been the establishment of the Private Infrastructure Development Group (PIDG) by a consortium of donors led by DFID, which we will discuss later.

The private sector in OECD countries has been disengaged from investing in African infrastructure projects, perceiving them as being a hassle to undertake, risky both financially and in respect of reputation, and individually too small to warrant the costs of developing the necessary skills to assess. This is despite global capital markets being in a phase of exceptional liquidity with the real interest rate on risk-free assets hovering around zero. Large sums were directed to emerging market economies, but little to Africa. In contrast to the zero real return on safe OECD assets, the return required for private investment in African infrastructure is very high. For example, InfraCoAfrica, a PIDG-funded company which initiates infrastructure projects, struggled to raise finance for a Ghanaian electricity project despite a projected yield on equity of 20%. Since Ghana is rated as one of the best-governed countries in Africa, this massive wedge between the risk-free rate of interest acceptable to financial markets, which is currently around zero, and the risk-corrected rate demanded for African infrastructure, suggests that managing risk is central to the provision of private finance. Nor is this Ghanaian project in any way exceptional. A World Bank analysis of the African electricity sector undertaken in 2011 found that despite several attempts, virtually no privately financed projects were actually operating.¹ Up to 2011, new spending on PPI in African power was averaging around \$0.5bn per year, against a target of \$40bn.

China has filled the resulting vacuum through a distinctive package in which infrastructure is financed and built in return for rights to resource extraction. This offers speed and a full range of

services in which the infrastructure is designed, built, financed and transferred. It also provides a commitment technology whereby an African government can lock into using natural asset depletion to accumulate infrastructure, thereby avoiding pressures to dissipate resource revenues in recurrent expenditure. However, the Chinese proposals are often difficult to evaluate. They are opaque and so are hard to price, and since China is a near monopolist in this type of package they are not subject to direct comparison. Further, Chinese projects are usually not well-integrated into larger development strategies. A radical approach would be for the bilateral OECD donors either to partner with Chinese approach, encouraging better integration into development planning, or to copy it, using aid to catalyze a consortium of private firms. Several OECD donors used to work in this way, and indeed China appears to have modelled its approach on aid it received from Japan in the 1950s. It would, however, require a cultural revolution in OECD aid agencies and is probably not feasible let alone desirable.

1.2. If private finance for African infrastructure is a good idea why hasn't it happened already?

Since private capital markets are designed to seek out attractive opportunities to finance investment, a reasonable question is why, if private capital should finance African infrastructure, has it not happened already? Economics is rightly wary of arguments that depend on sophisticated private financial actors making prolonged and systematic errors.

A compelling response would be if the overall social return on African infrastructure was inherently too low to warrant private investment.² In that case arguably investment in infrastructure should not occur. We say arguably because a shortfall of social returns below private required rates of return may also result from private costs of capital being greater than their social equivalents, *i.e.* the costs at which society as a whole, as against particular private sector investors, would be willing to invest.

For the reasons mentioned at the beginning, it is unlikely that the social returns to African infrastructure investment are low. It is difficult to envisage Africa becoming a developed region without substantially improved infrastructure. But it is quite likely that the valuation of benefits by private investors is substantially different for private investors from public institutions. There are two reasons for this. The first is the obvious point that there are significant externalities associated with the provision of infrastructure projects of which private investors can only capture a small component. One only has to think of the array of private sector enterprises which typically spring up around major transportation hubs to appreciate the difference between social and private rates of return.

Second, the risks and therefore costs of capital are fundamentally different between private and public sector providers. Referring back to the arteries analogy used earlier, one piece of infrastructure is inherently dependent on another — a bridge on a road and the road on the bridge. In addition the profitability of

¹ See Eberhard et al., (2011), and Eberhard et al., (2012).

² In some African countries this is likely to be the case. See Collier, (2013).

both the bridge and the road might be undermined by the building of new ones in a neighbouring location — the problem of the exposure of incumbents to the arrival of competing providers.

It is therefore almost inevitably the case that social returns on infrastructure exceed private returns and private costs of capital exceed social ones with the implication that the private sector fails to fund and initiate infrastructure projects which from a social perspective should be undertaken.

Related to this is the problem of standardization. The development of the mobile phone market in the US was held back relative to that elsewhere in the world for many years by a failure of providers to agree on common standards of inter-connection. The effect of this is again to make private returns on investment significantly below their social equivalents. Standardization is essential for reducing the information burden associated with the implementation of idiosyncratic infrastructure transactions. The scope for private actors to establish standardization is further limited by the fact that one or more African governments are necessarily parties to these transactions implying that only multinational public actors are likely to have the perceived legitimacy.

While the public sector may have an advantage in the provision of certain infrastructure activities, its deficiencies and public sector failures have to be equally recognized. In particular, their scope to impose risks on other parties through their powers to confiscate, divert and expropriate anticipated returns are legendary. A key step in making African infrastructure eligible for OECD private finance is to de-risk it by restraining the ability of governments to engage in such activities. This requires the provision of commitment technologies which allow African governments to tie themselves to their masts of self-restraint. Without such commitment devices, promises of adequate returns to private sector investment are simply not credible. Those commitment devices will in general come from international public agencies rather than private sector bodies whose powers of enforcement over sovereign bodies are necessarily limited, but regulators in OECD countries might also play a role in this.

As significant as commitment technologies is the proper incorporation of infrastructure in public sector accounts. Deficits are augmented by expenditure but, in the absence of a full set of public sector balance sheets, the potential benefits of investments are not correspondingly recognized. They therefore lead to deteriorations in public sector accounts and worsening in the terms on which countries can raise finance externally. For spurious accounting reasons, countries are therefore discouraged from investing in infrastructure projects which augment their productive potential. It is a problem that afflicts developed as well as developing countries but it is particularly serious in the most financially dependent economies.

One should not presume that the public sector failures are restricted to host governments. Home country authorities are inevitably inclined to bind their private sector institutions excessively to their masts. While the benefits of infrastructure investments are enjoyed by host countries, the risks of widespread systemic failures are borne by home countries. As a consequence, OECD countries seek to protect their financial systems through regulation and in the

process fail to reflect adequately the costs that they thereby impose on host countries. The design of optimal regulation inevitably involves trade-offs between multiple competing objectives, most obviously between security and dynamism. In practice, these trade-offs are navigated through the arguments of competing lobbies of professionals within a country. However, where the benefits are extra-territorial the normal procedures do not yield optimal outcomes. At present an indirect consequence of OECD financial regulations is that pension funds cannot hold African infrastructure in their portfolios. Yet while Africa is disadvantaged by these regulations, there has been no lobbying channel for their reconsideration. In effect, there is a missing voice and OECD development agencies need to provide it.

While the presence of any one of these private or public failures might on its own be resolvable, the simultaneous presence of all them means that each party — private sector institution, host country, home country — perceive no way of solving them on their own. Some coordinated initiative is required to facilitate change and unblock the logjam.

An indication that such an initiative would be worth the effort is that since 2011 the situation has started to change: private finance for African infrastructure is no longer effectively stuck at zero. For example, in South Africa the REEP program for renewable energy has attracted committed financing of \$11bn while Nigeria and Kenya are on also track to attract significant private finance for power. IPPs have been finalized, or are coming to fruition, in 19 African countries. While this indicates private appetite for African projects, public agencies are also refocusing. For example, in 2013 sub-Saharan Africa was the main client for IFC infrastructure projects, accounting for 30% of the global total.

2. The problem

Once operating, infrastructure is not inherently a risky investment. In OECD countries investment in electricity generation and water provision is classified as being in the utilities sector. Despite the prospects of slow growth in the OECD, it is rated as a safe but boring asset for a pension fund. However, in the process of moving from developed to African economies, safe boring assets morph into high risk, high required rate of return, ventures. For example investment in electricity generation in Ghana, and *a fortiori* in most of the rest of Africa, is classified not as a utility but as a frontier market. Despite rapid growth of the economy, it is regarded as unsuited to pension funds. This reflects a series of differences between an electricity project in the OECD and in Africa.

The Ghanaian project promoted by InfraCoAfrica took eight years to prepare. That Ghana needed InfraCoAfrica is in itself a symptom of a lack of capacity within African governments, at both the civil service and political levels, to prepare projects at the design stage to a standard appropriate for financial assessment. Even with the InfraCoAfrica assistance the project took eight years to bring to market, which is an indication of the multiple political veto points that must be negotiated in order for a project to be authorized. The combination of political complexity and the lack of African public sector specialist teams able to prepare

projects mean that there is no pipeline of projects ready for funding.

The technical aspects of project preparation can be undertaken by international consultancy companies, but they do not have the political authority needed to overcome the spoiling actions of veto players. The lack of a pipeline in turn means that it is not worthwhile for either private investors or African governments to finance specialist teams to undertake the design work necessary to raise funding for construction. The preparation stage is open-ended and may lead nowhere, as indicated by the failure of African electricity projects.

Further, as demonstrated by the Ghana case, once prepared there may then be no market for the project. African infrastructure projects are mostly small, specific and both costly to prepare and hard to value. This reduces the size of the market for the assets and makes them still harder to value. For example, the supporting legal documentation for the off-take agreement in a recent Kenyan electricity project was a thousand pages long resulting in prohibitive legal costs.

Even if problems at the design stage can be overcome then there is no certainty that the projects will get through the next stage of finding investors. Organizations with risk capital, such as investment banks, do not have the appetite for investments which are replete with unquantifiable and uncontrollable risks, and long gestation periods. They face the double jeopardy that if the project fails there will be no one to bail it out and if it succeeds it is an attractive deep pocket for cash strapped African governments. Risks of expropriation reduce high social returns infrastructure to uneconomic prospects and leave highly beneficial investments unfunded.

If the returns are inadequate for a private investor why should they be acceptable to a public agency? The most straightforward answer is that private and public valuations of risks and returns differ radically in low-income countries. Private investors have the option of transferring their capital elsewhere and will do so if they can thereby increase risk-adjusted returns. The public agency has an entirely different objective, namely to accelerate the development of the country. A project may be so risky as to be foolish for a private investor, yet reduce the risk of state failure and so be astute for a public agency.

Differences in valuation were the original rationale for public risk capital agencies, such as CDC and IFC. However, the activities of these agencies have seldom been integrated into any larger development strategies. Aid and public risk capital have been assigned by different and unconnected processes. The difference in valuation implies that it is possible that activities rejected by private financial actors might be sensible for public agencies, but that does not in itself guide us to where specific public interventions should occur. This is the question to which we now turn.

3. The solutions

3.1. Specialist teams

One reason why the Ghana electricity project took eight years is that African infrastructure projects are usually highly

political with multiple veto points. Catalyzing a project in such an environment requires a combination of specialist technical knowledge and high-calibre political entrepreneurship. While the technical knowledge is readily available on the consultancy market, the political entrepreneurship is rare. Conventional private venture capital is unlikely to have this combination of Africa-specific skills that can be redeployed between African projects and other activities, and so the set-up costs are high and the returns uncertain. Nor is it clear what the business model can be that would enable such a team to generate a return if its role is to catalyze the cooperation necessary for such a project but not itself to own equity in it.

PIDG has established a publicly funded enterprise that directly provides teams, but its staffing is essentially drawn from the infrastructure industry rather than from political entrepreneurs. It has yet to bring its projects to fruition. While the technical work involved in project preparation is highly appropriate for aid funding, the finance of political entrepreneurship is less evident. A new company, BlackIvy, which combines political and technical skills to catalyze large African infrastructure projects may be a pioneer of what is needed. Its business model envisages a combination of fees and a limited equity stake. It is too early to assess its performance. Since it is difficult for African governments to justify the decision to finance such entrepreneurial coordination, it may be that PIDG is better-suited to provide the finance for them rather than directly to try to provide the skills in-house. Donors are understandably wary of spending aid on fees and have surrounded decisions with procedures that sacrifice speed for defensibility but this sits uncomfortably with the opportunistic nature of entrepreneurial activity.

3.2. Standardization

Idiosyncrasy is often a killer for markets because it inflates the information cost of transactions. Private finance is beginning to commit more resources to building a knowledge base on Africa, but this usually remains rudimentary in comparison with expertise on other regions. To accelerate the process whereby private finance becomes comfortable with African investments the information costs must be lowered. There are three solutions to idiosyncrasy: standardization, insurance and bundling. By means of standardization the information costs can be reduced twice over. Most obviously, purchasers need a single effort to understand a whole class of projects and so the cost can be spread over the class rather than be individual to each project. More subtly, in designing a standard it is worth investing in the costs of achieving simplicity. Although *ex post*, simplicity by definition requires little effort, *ex ante* it may appear difficult, as acknowledged in the famous letter which ended ‘I apologize that this letter is so long; I did not have the time to write a short one’. Radical simplicity is attainable: for example, in contrast to that 1000 page Kenyan agreement, an Indian off-take agreement for electricity was only around 20 pages long.

Markets are bad at self-generating standardization. Even simple standards such as weights and measures have invariably been supplied by governments as public goods. That a standard contract which would be suitable for many low-income countries

has not yet been provided reflects the deficit in international economic governance: no authority has yet been able to play the coordinating role. Partnerships UK attempted this role in Africa and had a memorandum of understanding with IFC, but the attempt to bring a British template to Africa failed, in part because there were too few potential projects for standardization to be meaningful. However, now that there is a surge of interest in projects, there may be a genuine opportunity.

Together the provision of specialist teams and standardization address the supply of projects to a pipeline. They do not, however, address the risk of the project. To make the risk acceptable, it can be insured, repackaged and lowered.

3.3. Insurance

MIGA, the World Bank's insurance arm, is small, and until very recently largely avoided Africa. As with IFC, it has not been strategically integrated into World Bank operations. Typically, if MIGA is willing to insure a particular African infrastructure project, it will charge around 1% per year to cover a range of political risks. MIGA's operations in Africa need to be scaled up and for this it needs more public capital. Further, if the infrastructure project is strategic, covering the cost of the insurance premium should be regarded as a legitimate use of IDA: currently there is no mechanism for a country's IDA allocation to be used in this way.

Political risk insurance is not the only need. Revenue streams from projects are in local currency, whereas investors function in foreign currency. Hence, there is a need for currency hedges. Often African financial markets lack the efficiency and depth to provide currency hedges beyond the short term at reasonable rates. PIDG has recognized this need by establishing a company to provide currency hedges for infrastructure, GuarantCo Ltd Infrastructure.

3.4. Bundling

To the extent that risks cannot be further insured, they can be re-bundled so that investors with a low risk threshold are able to accept the low-risk component on a project without having to take on risks which are unacceptable. Over the lifetime of a project, from design through construction to operation, the risks change considerably. Once the project is operating it becomes a utility with relatively low and clear risks, whereas up to that point it faces substantial uncertainties. This suggests that if pension fund money is to be attracted into African infrastructure it would be appropriate to split the project up into two or three stages. The catalytic design stage might be funded by either public capital or private venture capital. The project construction phase, during which large irreversible investment is committed, is likely to require a combination of equity and bond finance. It may be particularly suited to public agencies. The project operation phase, which may last for decades, is lower risk, and should in principle be appropriate for OECD pension funds.

Having un-bundled individual infrastructure projects according to their phasing, a further step in de-risking would be to re-bundle them into a fund which would hold them together with other infrastructure projects from emerging market and OECD

contexts. This would both diversify individual country risk and dilute the high-risk projects. Such a bundling approach has already been demonstrated to work by the Bank for International Settlements in respect of East Asian sovereign debt. Following the East Asian Crisis, the sovereign bonds of Indonesia and the Philippines were rated at sub-investment grade, but, by placing them within a sovereign bond fund which predominantly held bonds from countries which were investment grade, the fund received an investment grade and thereby channelled money into sub-investment grade assets.

A good way of getting such a fund started would be for the public agencies that already provide risk capital for infrastructure, such as IFC, FMO and CDC, to divest themselves of their existing portfolio of completed, operational infrastructure projects. Not only would this enable a fund to hold a range of projects from the start, but it would inject liquidity into the agencies needed for the role in which they are irreplaceable, of funding the construction phase.

Standardization, insurance and bundling are traditional forms in which risks are spread and offset in financial markets. In the case of African infrastructure, countries can in addition play an important role themselves in reducing risks.

3.5. Commitment technologies

The riskiness of African infrastructure projects is predominantly political. This is especially the case now that the conventional commercial risks have been reduced by rapid economic growth. The political risks are seen as substantial because governments have exceptionally strong opportunities for hold-up. By its nature infrastructure is irreversible and single function. Its construction is often intrusive on the local environment and so provokes opposition. The services are often provided through a network, so that there are inherent issues of monopoly, network access, and hence regulation. If these discretionary regulatory powers are assigned domestically in a corrupt environment, there is a reasonable presumption of corruption. The services that infrastructure provides are often politically sensitive because citizens perceive the government as having some obligation for them. Further, the government will sometimes be a customer for these services.

Infrastructure is long-lasting and so the horizon for government interference extends far into the future. Since not all issues can be fully anticipated in sufficient detail, contracts will inherently be incomplete and so subject to subsequent negotiation. The risks of infrastructure can be compared and contrasted with those of investing in mining. Like infrastructure, a mine is disruptive to the local environment and so provokes opposition, and it is long-lasting, irreversible and single-function. However, the output of the mine is sold neither to government, nor to the population, and so the scope for hold-up is considerably reduced. In the past decade, in contrast to infrastructure, African mining has been able to attract considerable private finance. Infrastructure for mining has proved more problematic, as implied by the above comparison.³

³ An important issue that we do not consider here is the opportunity to make mine-related infrastructure multi-user and multi-function (see Collier, 2011).

Faced with these exceptional political risks, one approach is to reduce them through commitment technologies. Some commitment technologies do not need public intervention. Dispute Resolution Boards are purely private processes that can be agreed between African governments and the private contractor. However, African governments are often wary of this loss of sovereignty. A more widely accepted form of commitment technology is implicit in the political risk insurance provided by the World Bank and the US Government: MIGA and OPIC. Each agency is able to offer political risk insurance cheaply because, through the implied power of the World Bank and the US Government respectively, they are able to recover from governments most of what they have to pay out to insured investors. In effect, by permitting investors to insure with MIGA and OPIC, governments are subjecting themselves to a publicly provided commitment technology in which the implicit threat of deteriorating relations provides credibility.

There may be potential for other implicit publicly-provided commitment technologies. For example, a standardization package such as one the African Development Bank might promote could include a guideline timetable for setting deadlines. Deadlines, if credible, are useful devices for coordinating action, and a neutrally provided standard timetable might make it easier both to get agreement on them and to enforce them.

3.6. Utility operators

Whether the operation phase of a project is low risk depends primarily upon whether it is well-run. This requires a reputable specialist private operator. In the OECD there are now major companies dedicated to running infrastructure — power companies, rail companies, port companies, airport companies *etc.* To date, these companies have seldom ventured into Africa but it is a potential market for expansion of their business. To an extent, their reluctance may reflect their OECD-focused corporate cultures: the OECD infrastructure companies grew out of domestic privatisations. Even in respect of telecoms they were late into the African market: Mo Ibrahim only founded Celtel, his spectacularly successful African company, after failing to persuade established OECD companies to enter the African market. Despite not being African, OECD infrastructure companies offer several advantages for African governments. They have built the specialist teams and organizational structures needed for good performance, and having established reputations, they have a stronger incentive to perform.

Potentially, OECD infrastructure companies could not only operate African infrastructure but finance it on their core balance sheets, subsuming it into their other projects just as an international oil company treats its African projects as financially integral rather than being run a separately financed subsidiary. However, because of the high fixed costs of entry, companies may be unable to diversify uncorrelated political risks across countries leaving them exposed to the idiosyncratic conduct of particular governments. For such diversification the project-specific risks need to be re-bundled as discussed above thereby allowing OECD infrastructure companies which do not wish to

retain African projects in their core portfolios to sell them on to infrastructure funds while retaining management contracts.

3.7. Financial regulation

The next hurdle facing the private financing of African infrastructure is the behaviour of pension funds. Currently, OECD pension funds are required by law to hold assets of at least A– quality. African infrastructure projects are far below this threshold and there is no realistic prospect of getting them to A–. The move to risk-weighting of capital ratios further disadvantages those assets perceived as high-risk. This is why diluting the risk of African infrastructure projects through bundling them in with lower risk projects might be particularly useful.

One possible deficiency in financial regulation is that pension funds tend to equate safety with liquidity. Since pension funds have well-defined future obligations, the comprehensive liquidity of assets should be irrelevant to their concerns. Pension funds are currently facing a crisis not because their assets have become illiquid, but because the yield on them has substantially declined. By sacrificing some liquidity for higher yield, pension funds could reduce the risk that they will be unable to meet their liabilities. Hence, regulations which equate safety with liquidity might not only be damaging for Africa but also counterproductive for their core objective.

A further possible deficiency is a consequence of the fact that financial regulations give legal force to the assessments of commercial risk-rating agencies which are not publicly accountable. A rule adopted by the rating agencies, which is of considerable importance for African infrastructure, is that an African project cannot be rated more highly than the sovereign debt of the country. The rating agencies do not adopt such a rule for OECD countries: there, projects can be rated more highly than national debt (Greece is a case in point where Goldman Sachs famously encouraged the government to raise funds by securitizing infrastructure projects). The rationale for applying this rule to Africa but not to the OECD appears questionable. For example, during the past decade when the government of Cote d'Ivoire suspended its debt service, projects maintained payments to bondholders. More generally, the structure of risks differs between sovereign debt and infrastructure. With sovereign debt the collateral is the revenue stream from the tax base, but this is subject to possible pre-emption by public spending. With an infrastructure project, the revenue stream is project-specific, but this cannot be pre-empted by other claims. A more limited revenue stream is compensated by stronger rights.

The rating ceiling is important because there is a lot of inertia in bond ratings. Lacking a track record of public debt service, even though African governments are currently able to borrow cheaply on sovereign debt markets, their new bonds are not highly-rated by the agencies. Nor, given their record, can the rating agencies make strong claims for specialist knowledge. It is questionable whether OECD financial regulators are even aware that they are giving legal force to this questionable ceiling, yet it closes off the chance of creating ring-fenced collateral that can leapfrog the slow process of sovereign bond re-rating.

3.8. Utility regulation

Governments are not the only agents that impose risks on investors in infrastructure projects. Since infrastructure has features of local if not national monopolies associated with it, it is in general subject to regulation which determines the charges that can be levied on customers and the requirements on operators to maintain and enhance the fabric of the infrastructure over its life. Regulation sets obligations on utilities to supply disadvantaged customers and those living in remote rural areas, and requires environmental and quality of service standards to be satisfied. In the absence of such regulation, utility companies might be able to impose excessive and unfair charges, cherry pick their most profitable customers, and degrade both the infrastructure and the environment.

Regulation is therefore essential for infrastructure provision to be politically acceptable but, in so doing, it shifts the burden of risks onto the utility companies by making them potentially exposed to regulatory interventions that extinguish their ability to recover the costs of their investments. Regulation therefore has to play an astute role in avoiding exploitation of vulnerable customers, communities or investors. It is a function which requires a considerable degree of expertise and experience and it has taken regulatory organizations many years to acquire this knowledge in OECD economies. The absence of the necessary skills could potentially undermine the emergence of infrastructure investment and utility company operations in Africa.

One approach that can be taken to address this is to draw on the knowledge and experience that regulators in OECD have acquired by encouraging them to advise on, oversee or actually undertake the regulation of infrastructure projects in Africa. This would provide precisely the type of independent and informed oversight of infrastructure activities associated with the commitment technologies described above. The ability to export their expertise might be attractive to OECD regulators seeking to benefit from the expertise that they have acquired domestically.

3.9. Interdependence of activities

The analogy with the arteries of the body at the start of the article suggests that infrastructure projects are rarely standalone activities. They interact with each other and with other parts of the economy in a network form. While conceptualizing infrastructure projects at the design stage involves establishing a case for them in their own right, they have to be considered in the context of broader local, national and social objectives. They should therefore be conceived of in their entirety as part of broader development strategies that promote private sector investments as well as social objectives.

Achievement of this requires proper evaluation and accounting for the benefits as well as the costs of infrastructure. Public accounts rarely show balance sheets that incorporate infrastructure assets as well as liabilities. Instead, these exercises are performed as separate cost benefit analyses that are not reflected in national accounts. The design and planning of infrastructure should be undertaken in the round with proper valuations

attributed to assets as well as liabilities that in turn flow through countries' national accounts.

The expertise to do this exists at the level of national and international bodies most notably the OECD and the World Bank. These organizations should be focusing their attention not on the funding of individual infrastructure projects but on assisting countries with developing the tools to provide accurate evaluations of the effects of infrastructure on national welfare. Included in this should not just be the financial benefits and costs but also the consequences of infrastructure development for environmental, human, natural and social capital.

3.10. Interdependence of solutions

The above has set out a long chain of deficiencies which between them account for why African infrastructure projects with high potential returns cannot attract private finance. Were there only one of these deficiencies there would be a strong market incentive to provide it since in matching finance in search of yield with high-yield assets in search of finance, big profits could be made. The over-arching problem is that there are multiple critical deficiencies which would need to be supplied by distinct classes of actor. When there is interdependence between multiple missing classes of actor, private markets do not transmit signals to respond to needs.

Without the chain of activities necessary for a pipeline of projects, there is no incentive to fix the impediments required to sell completed projects to pension funds. Restating this in reverse, the only actors with an incentive to recognize and respond to this strategic interdependence are the development agencies.

4. Conclusion

The expansion of African exports will need radical improvements in the region's infrastructure. The scale of finance required implies that international private capital will need to be attracted into the sector. Public agencies such as IFC, MIGA and PIDG already deploy public money to encourage private investment. However, unless agencies use their role strategically, they merely out-compete private agencies in transactions that would have been done anyway. This is indeed the standard private sector critique of their current behaviour. To the extent that they are staffed largely with expertise drawn from the private sector with which they compete, this outcome is all too likely.

This article has suggested a range of strategic uses of public money. To generate a pipeline of bankable projects there is a need for catalytic finance for specialist teams equipped not just with technicians but with political entrepreneurs who can overcome veto players. A further range of public interventions can help to de-risk projects: standardization, subsidized risk insurance, re-bundling, commitment devices and appropriate accounting. Financial regulation needs to be revised to remove rules which prevent pension funds from holding African infrastructure without making them safer and utility regulation could be imported from overseas to provide the form of regulatory certainty required

to promote private sector investment and protect both customers and communities. Once these obstacles are overcome by public action, the one remaining missing piece — OECD utility operators — will be resolved without further public action as a result of the changed commercial incentives.

Several donors now recognize the case for using public funds to catalyze private finance for African infrastructure. DFID promoted a multi-donor fund, PIDG, of which it remains by far the largest funder. It also recently reformed CDC, giving it a more development-focused purpose. During 2013 there have been several further initiatives. The African Development Bank announced its intention to launch an Africa50 Fund to raise private finance for infrastructure. The US Government launched a PowerAfrica initiative. The World Bank has recently quadrupled its MIGA portfolio in Africa, and announced that it will make IFC more strategic, for the first time creating an economic advisory board. The BRICS announced a plan to establish a development bank for infrastructure. The G8 communique

included a specific commitment to the objective with delivery in 2015; the G20 has a corresponding objective.

However, while these initiatives are encouraging, there is a danger that the public agencies will respond with a plethora of small, uncoordinated and incomplete initiatives. The challenge is for an organizational design that can rapidly scale up to match Africa's infrastructure needs.

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