

Walking up the down escalator:

Public investment and fiscal stability

William Easterly, Timothy Irwin, and Luis Servén*

Abstract

Fiscal adjustment becomes like walking up the down escalator when growth-promoting spending is cut so much as to lower growth and thus the present value of future tax revenues to a degree that more than offsets the improvement in the cash deficit. Although short-term cash flows matter, a preponderant focus on them encourages governments to invest too little. Cash flow targets also encourage governments to shift investment spending off budget, by seeking private investment in public projects—irrespective of its real fiscal or economic benefits. To evade the action of cash flow targets, some have suggested excluding from their scope certain investments (such as those undertaken by public enterprises deemed commercial or financed by multilaterals). These stopgap remedies might sometimes help protect investment, but they do not provide a satisfactory solution to the underlying problem. Governments can more effectively reduce the biases created by the focus on short-term cash flows by developing indicators of the long-term fiscal effects of their decisions, including accounting and economic measures of net worth, and where appropriate including such measures in fiscal targets or even fiscal rules, replacing the exclusive focus on liquidity and debt.

JEL codes: O23, E62, H60, H54

World Bank Policy Research Working Paper 4158, March 2007

The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the view of the World Bank, its Executive Directors, or the countries they represent. Policy Research Working Papers are available online at <http://econ.worldbank.org>.

* This paper was originally prepared for the study on “Fiscal Space in Latin America” developed as part of the World Bank’s LAC Regional Studies Program. We are grateful to Penelope Brook, Antonio Estache, José Luis Irigoyen, Guillermo Perry, Sergio Rebelo, and Augusto de la Torre for helpful comments on previous versions.

Outline

Introduction	1
Shortcomings of the standard approach to fiscal discipline	6
Bias against public spending with future fiscal benefits	7
Defining a fiscal strategy	13
Is excluding certain public investments from fiscal targets a solution?	15
Private financing of public investment projects	15
Exception of specific public projects.....	17
Addressing the problem by shifting the focus of measures of fiscal performance	18
Modern accrual accounting	20
Long-term fiscal projections	21
Fiscal targets and fiscal rules	23
Improving investment decisions	25
Services provided free	26
Service provided for a fee.....	27
Competitive markets.....	29
Conclusions.....	30
References.....	32

Introduction

A popular phrase during macroeconomic stabilization in Latin America in the 1990s was “adjustment with growth.” Our focus here is on the surprising possibility that some types of fiscal austerity not only fail to bring growth, they may not even bring “adjustment” in the long run.

Consider the following anecdote from the World Bank’s own budgeting experience. In 1993, the World Bank Research Department unexpectedly produced a best-seller called *The East Asia Miracle*. The book was sold at a price that handsomely exceeded its production cost. However, the Research Department soon exhausted its administrative budget allocation for printing copies of the book. A request to get extra budgetary resources for printing more copies to meet the demand was denied by the World Bank’s centralized budget department on the grounds that the Research Department had already exceeded its printing budget, even though producing more copies of the book would have paid for itself!

This kind of unreason is not confined to the world of bureaucratic budgetary management, but extends also to fiscal policy practice. The primary concern of most fiscal programs is to ensure public sector solvency, commonly viewed as an essential ingredient of macroeconomic stability. Solvency is by definition an intertemporal concept, relating to the present value of revenues and expenditures, and encompassing both assets and liabilities. A cut in public investment that lowers growth will lower the present value of revenues; it is conceivable that the government’s intertemporal position worsens at the same time as the cash deficit improves. In practice, however, it is customary to assess the strength of public finances almost exclusively on the basis of the cash deficit (or “overall balance”), that is, the rate of acquisition of debt by the public sector.

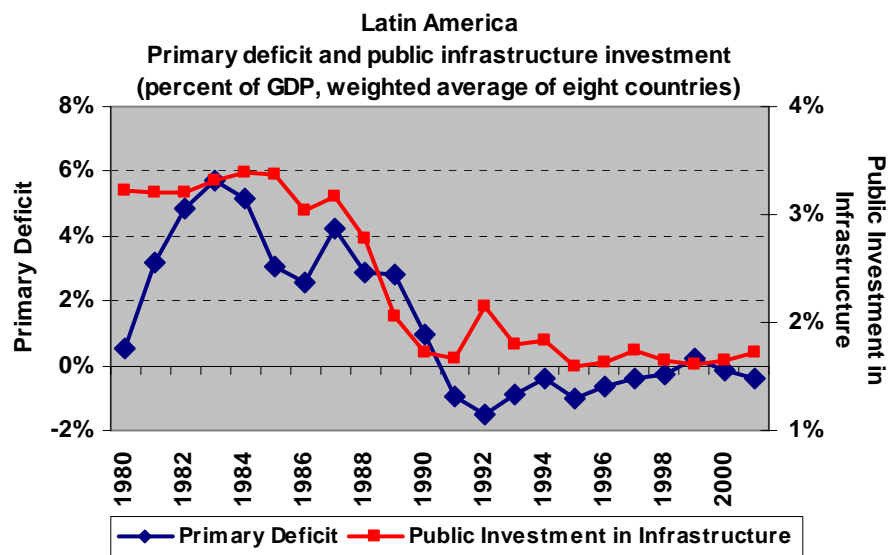
This practice relates to the rising concern across Latin America that the fall in public investment undergone by the region since the early 1990s may have been excessive (see Figures 1 and 2). To the extent that the response of private investment has been insufficient to offset the decline of public investment in key sectors, such as infrastructure, present levels of public investment are perceived

by many as too low to support long-term growth rates consistent with rapid poverty reduction.

The decline of public investment is the result of several factors. Chief among them was Latin America’s shift to a market-oriented development model after the debt crisis of the early 1980s, and the retrenchment of the public sector from direct involvement in the production of goods and services. The latter was driven mainly by the difficult financial situation of most Latin American governments, which forced a deep and protracted fiscal adjustment in many countries. The opening up of infrastructure industries to private sector participation was an important aspect of this process—although its timing and extent varied greatly across countries and infrastructure sectors.

Political economy makes adjustment difficult at the best of times. The recent backlash against free market reforms in Latin America, and the longstanding sensitivity to conditions perceived as imposed by outsiders, makes it more important than ever that adjustment programs be well conceived.

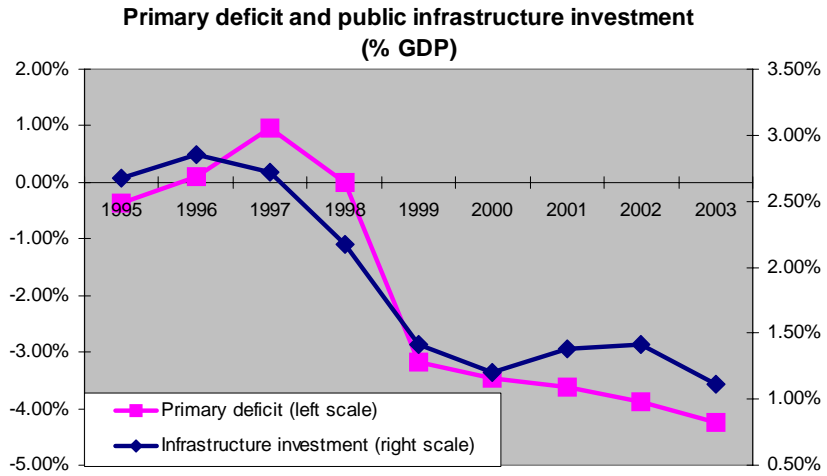
Figure 1



Source: Calderón and Servén (2004); and FITCH database.

Figure 2

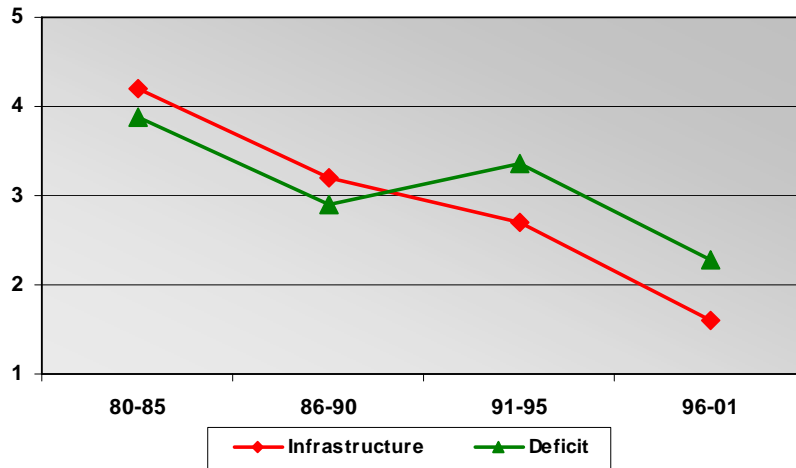
Brazil



Source: Afonso (2005)

Figure 3

Sub-Saharan Africa
Overall deficit and public infrastructure investment
(percent of GDP, average of 11 countries by period)



Source: Estache (2004)

The international evidence suggests that Latin America's experience is the rule rather than the exception. Indeed, the same phenomenon has been documented in a variety of countries by numerous observers, including the IMF.¹ By way of example, Figure 3 depicts the case of Sub-Saharan Africa. It suggests that much, or indeed most, of the decline in the overall fiscal deficit across the region since the mid 1980s was the result of declining public infrastructure expenditures.

The tendency towards compression of public investment at times of fiscal austerity underlies the fact that investment is the most volatile of all public spending items. In Latin America, it also reflects a tradition of expansion of current spending in good times, which becomes politically very hard to undo in bad times, thus leaving investment contraction as the chief adjustment device.

Of course, the declining trend in public investment would be of little consequence if it were a reflection of improved spending efficiency, or if it had been fully matched by increased investment by the private sector. In the case of infrastructure, this may have been the case in the telecommunications sector in most Latin American countries. But the evidence suggests that in most sectors in most countries private investment has not offset the public sector retrenchment.²

Declining investment is a cause for concern to the extent that it results in decreased accumulation of public capital, when public capital is productive. We are certainly aware that this is not always the case, and that many projects labeled as "public investment" can be wasteful "white elephants" that bring no future output benefits. It is extremely important that government officials face the incentives to invest in projects with high social returns, but there are many good political economy reasons why these incentives can be weak or absent.

The link between public investment spending and capital accumulation can be fragile if investment involves significant waste—e.g., when projects are poorly selected and public procurement is inefficient or beset by corruption.³ With weak

¹ See IMF (2003).

² See Calderón and Servén (2004) for an overview of developments concerning private and public participation in different Latin American countries and infrastructure sectors.

³ See Pritchett (2000).

governance, public investment may become a vehicle for dispensing political favors rather than acquiring productive assets.⁴ In the case of infrastructure in Latin America, the accumulation of physical assets appears to track infrastructure investment fairly closely in empirical country studies of Brazil (Ferreira 2005a), Colombia (Suescún 2005), and Costa Rica (Bolaños 2005), although the quality of the fit varies across sectors.

In turn, a majority of empirical studies concludes that public capital raises output and/or growth. The literature is far from unanimous, however, and its conclusions appear to depend on the approach followed.⁵ Studies using measures of physical infrastructure assets find significantly positive output contributions in the vast majority of instances, while those that measure public capital using cumulative investment flows tend to be less conclusive, likely for the reasons outlined in the preceding paragraph. In many cases, however, both approaches yield similar results; e.g., for Brazil, Ferreira and Araujo (2005) find significantly positive output effects using both financial and physical measures of public capital.

Moreover, even if wasteful public investment spending weakens the link between spending and outcomes, an across-the-board reduction in public investment will still result in cuts in productive infrastructure projects. Sacrificing such projects weakens the economy's growth potential, and the right response is instead to protect high-return projects from spending cuts.

To sum up, the international evidence raises the concern that fiscal discipline, as conventionally defined and enforced, excessively discourages public investment, in turn jeopardizing growth. In essence, fiscal discipline involves the application of rules targeting certain fiscal aggregates to keep them within limits prescribed by financial prudence. The question at issue is whether conventional rules and targets tend to bias fiscal discipline against public investment—or, more

⁴ Along these lines, Keefer and Knack (2006) show that, other things equal, across countries weaker governance is associated with higher public investment.

⁵ Easterly and Rebelo (1993) provide an early finding of a strong effect on growth of public spending on communications and transport. Romp and de Haan (2005) and Calderón and Servén (2007) survey the most recent empirical literature.

generally, against productive public expenditure. While this question is not new, it has been the subject of a renewed debate in recent years, which has featured proposals ranging from radical changes in fiscal rules—advocating current balance targets and net worth targets—to minor amendments to the status quo, that amount to making exceptions to otherwise unchanged rules.

This paper offers a selective overview of these issues, based on the recent experience of Latin America. It draws policy implications for the design and monitoring of fiscal targets consistent with both solvency and with the efficient utilization of fiscal resources. The rest of the paper is organized in five sections, as follows. The next section reviews the shortcomings of the current approach to fiscal discipline. The two following sections deal with two types of remedies – exceptions to existing fiscal targets, and introduction of new targets, respectively. We then turn to institutional choices to improve public investment decisions. The last section offers some concluding comments.

Shortcomings of the standard approach to fiscal discipline

Fiscal adjustment programs, and their monitoring, typically focus on the short-term time path of the government's overall balance, whose measurement usually is the center of attention of fiscal accounting. Short-term deficits and gross debt likewise are the key fiscal concern of official creditors, and form the basis of loan conditions in the fiscal and macroeconomic dimensions. They are also closely scrutinized by multilateral institutions, private creditors and investors, and economic analysts.

There are good reasons why these fiscal aggregates should be closely watched. The overall balance offers a fairly good approximation to the government's financing needs, which are a primary concern for the fiscal authorities as well as financial market participants—although the closely-related public sector borrowing requirement, which adds to the overall balance the public sector's net lending, provides an even better proxy of its financing gap. It can also give an indication of the public sector's contribution to overall aggregate demand and thus its stance from the viewpoint of short-term stabilization—although the primary deficit may be preferable for this purpose.

In contrast, the overall balance and gross debt are inadequate as solvency measures, because they do not take into account the assets and the future incomes that the government may acquire by incurring debt today. This, of course, is hardly surprising: liquidity and solvency are fundamentally different concepts, and different indicators are needed to gauge them—as is the case in corporate finance. Forcing the overall balance to proxy for all three concerns—public sector solvency, liquidity, and macroeconomic stance—is stretching things too far.

Bias against public spending with future fiscal benefits

Solvency assessments based on the overall balance and gross debt implicitly treat all public expenditures in the same way, since they all pose the same claim on today's fiscal resources. This blurs the distinction between public investment and public consumption and, more precisely, between expenditures that yield future fiscal benefits and those that do not—even though they may have radically different implications for tomorrow's public revenues, and therefore for solvency itself.

Such practice distorts the tradeoffs faced by fiscal policy, both across time as well as between different kinds of public expenditures. Across time, binding overall balance and debt targets today tend to encourage postponement of expenditures and advancement of tomorrow's revenues, even if their present value, which is the relevant concern for solvency, remains unchanged (or worsens as a consequence of delaying urgently needed expenditures, for example). Between expenditure types, liquidity targets pose a one-for-one tradeoff at the margin, regardless of the type of expenditures involved, while solvency targets do not. Faced with these tradeoffs, governments having to strengthen public finances frequently choose adjustment paths that, by altering the time profile and/or the composition of expenditures, attain the prescribed liquidity targets without any significant improvement in solvency. Adjustment is illusory.⁶

⁶ Easterly (1999) and Easterly and Servén (2003) offer a variety of examples of illusory fiscal adjustment.

Thus, other things equal, governments facing binding liquidity targets today may devote too few resources to expenditures that yield returns tomorrow. This effect of liquidity targets on public spending composition is *additional* to the biases introduced by other political economy factors. In many cases—e.g., governments’ short time horizons and political clientelism—these factors tend to distort spending choices in a similar manner—i.e., discouraging public expenditures whose benefits accrue in the future, in favor of those with immediate fiscal or political payoff. Far from correcting these distortions, the conventional approach to fiscal discipline arguably magnifies them.⁷

To the extent that fiscal adjustment disproportionately cuts public spending that enhances growth, it may lead to a vicious circle in which low growth generates unsustainable debt dynamics, which force fiscal adjustment implemented through investment cuts, which lowers growth further, and prompts additional fiscal retrenchment and investment cuts. In other words, if debt stabilization is pursued primarily by cutting productive spending, the result can instead be destabilization. The reason, of course, is the narrow focus on debt, rather than public sector net worth, as the ultimate measure of fiscal stance.

These issues concern all kinds of public expenditure having future fiscal benefits. Public investment is the leading example, to the extent that public capital yields financial returns that the government can capture. This is likely to be the case with many, although not all, infrastructure projects. Conceptually, we can categorize infrastructure investments in three groups:

- Investment generating direct financial returns through user fees: utilities provide the clearest example, but many transport projects also yield direct revenues (e.g., ports, airports, railways, tolled roads).

⁷ We should note that some political economy forces might operate in the opposite direction, however, encouraging too much public investment. For example, politicians might show a preference for investments expenditure because it allows bigger bribes and ribbon-cutting photo opportunities (e.g., Keefer and Knack 2006). Likewise, international donors often embed their aid in concessional loans for investment projects.

- Investment not generating user fees, but increasing growth and future tax collection: some infrastructure projects, including most roads, generate no user fees; but to the extent that they contribute to the expansion of future tax bases, they still yield indirectly a financial return to the government.
- Investment generating no future fiscal benefits: the last category consists of projects that yield no financial return, regardless of whether their social return is positive (e.g., environmental projects) or not (as in the case of purely wasteful investments).⁸

The first two types of projects may “pay for themselves” —i.e., generate a stream of financial returns whose present value exceeds the cost of the projects. On solvency grounds, deficit financing of those projects—termed “self-liquidating”—⁹ would then be justified in principle, because they increase government net worth, even if they raise public debt in the short run. But in practice, this requires that the government be able to capture the returns—i.e., for the first type of projects, that user fees be sufficient to cover project costs; for the second type of projects, that taxes be high enough to translate the additional growth into a sufficient amount of additional revenues.¹⁰

The latter requirement means that under plausible circumstances, and absent user fees, many growth-enhancing projects may fail to generate sufficient tax revenues to cover their cost. To put it differently, given the low (marginal) tax collection rates of many developing countries, growth impacts have to be quite considerable to yield the required tax revenue increases. For example, with a tax rate of .2, the output contribution would have to be five times as high as the project’s user cost for the government to break even. In other words, if the user cost is around 10 percent (say a 5 percent real interest rate and a 5 percent rate of

⁸ Arguably, for this last category the problem is one of mislabeling, since spending without future returns perhaps should not be called investment.

⁹ Mintz and Smart (2006).

¹⁰ Across Latin America, cost-recovery has largely been achieved in telecommunications, but not in water and power—although in these sectors it is already the highest among all developing regions. See World Bank (2005).

depreciation), then the project's marginal productivity must be at least 50 percent for the given tax rate to yield enough revenues.¹¹

Such high productivity is more likely to arise in situations in which the initial endowment of public capital is low (relative to that of other productive assets)—specifically, when public capital services are substantially under-provided, so that the marginal product of capital exceeds its user cost by a wide margin. Empirically, the international evidence is consistent with the view that the marginal productivity of infrastructure capital is higher in developing countries, especially poorer ones, than in industrial countries.¹²

Even if public sector projects fall in the intermediate area of having high returns for the economy as a whole, but insufficient returns for public finances to improve public sector solvency, it may still be sub-optimal to cut such projects during fiscal austerity. Ideally, one would devise a marginal revenue collection scheme that allowed the public sector to capture the returns, and hence eliminate the wedge between economy-wide returns and public sector returns. After all, the business of the public sector is precisely to provide public goods that yield a high return for the economy as a whole.

In addition, public investment projects are more likely to exhibit higher marginal productivity *ex-post* if the government's *ex-ante* project evaluation capabilities are sufficiently strong, resulting in the selection of high-return projects and the rejection of low-return ones. This, however, is far from assured in practice. In Latin America, for example, Chile features thorough project evaluation procedures (Fontaine 1997), but it represents the exception rather than the rule. In contrast, Costa Rica lacks both *ex-ante* and *ex-post* formal evaluation procedures (Bolaños 2005).

Hence, the extent to which public investment pays for itself through increased tax collection depends not only on the kinds of investment projects under consideration, but also on country-specific public capital endowments and institutional factors.

¹¹ See Servén (2006) for the analytics underlying this and other similar calculations.

¹² See Calderón and Servén (2007).

The limited evidence available reflects this heterogeneity. In rich countries, empirical results are inconclusive regarding whether public investment may be self-financing through its growth and tax-collection effects.¹³ This is unsurprising given the fact that these countries are characterized by relatively abundant public capital endowments, which other things equal results in a low marginal productivity. In contrast, Ferreira and Araujo (2005) find that public infrastructure investment may be self-financing in Brazil, although it takes ten years or more for the government to collect sufficient tax revenues to recoup the investment cost.¹⁴ Another way to address the same issue is to examine to what extent public investment cuts enhance solvency. Evidence from selected Latin American countries suggests that the growth cost of public investment cuts, and the ensuing slump in future tax collection, greatly weakened the intended solvency-enhancing effects of the capital expenditure cuts of the last decade.¹⁵

What should matter for these assessments of the solvency impact of public investment is the *marginal* cost of capital, rather than its prevailing (average) value.¹⁶ They differ to the extent that lenders impose a credit-risk premium on borrowers, resulting in an upward-sloping credit supply. Increased borrowing to finance additional public capital is then incurred at higher interest rates, and this lowers the present value of the future tax collection increases.¹⁷ The risk premium may itself reflect the uncertainty about what the ex-post return to public

¹³ Perotti (2005) offers an empirical assessment of this issue in five OECD countries, based on a vector autoregression approach. His results suggest that in Canada and the U.K. the extra public capital has a negative growth contribution. In turn, in Australia and the U.S. the effect on growth and tax collection finances only 20-30 percent of the investment cost. Only in Germany does it finance over 100 percent.

¹⁴ Ferreira and Araujo (2005) use a vector error-correction model rather than a VAR, but their approach is otherwise very similar to Perotti's.

¹⁵ Calderón and Servén (2003). See also Buitert (1990) for a general equilibrium model in which fiscal austerity in the form of public investment cuts is self-defeating.

¹⁶ Related to this, one should note that all these empirical experiments implicitly assume that the asset composition of the marginal investment is the same as that of the existing public capital stock.

¹⁷ Along these lines, Ferreira and Araujo (2005) show that allowing for a substantial risk premium significantly reduces, and even reverses, the positive net worth effect of a deficit-financed infrastructure investment expansion in Brazil

investment will be. Even if a project appears to have high returns ex-ante, there is less than perfect certainty about the many variables that determine such returns. The consequence is that some investment projects may be deemed to enhance solvency when their future returns are discounted at the prevailing interest rate, but fail to do so when the endogenous adjustment of interest rates is taken into consideration.

In practice, it is difficult to identify with much accuracy the slope of the lending supply schedule. Furthermore, the schedule may be subject to erratic shifts reflecting lenders' changing expectations. The practical implication from all this is that assessments of the net worth effect of public investment projects should err on the side of caution, particularly when the government's initial indebtedness is high, since in such case even small changes in interest rates might have very large adverse effects on public finances.

Public infrastructure investment is the expenditure item that has attracted most attention in the ongoing debate about the design of fiscal policy. But the link between spending composition and solvency arises in a broader context. On the one hand, not all public investment projects yield future income to the government, as already noted; on the other, some current expenditures do yield future fiscal returns. Infrastructure operations and maintenance (O&M) expenditure is a case in point. O&M determines the useful life of capital, and hence has a "capital-creating" effect similar to that of investment. If public capital yields financial returns to the government, so does O&M.¹⁸ In fact, the marginal return on the latter may well exceed that of new capital when the assets are not being properly maintained. The same applies to the respective welfare impacts of O&M and investment spending.¹⁹

Similar arguments are often made for health or education expenditures that help build up human capital, and thus should raise future output and tax collection. For example, Filmer and Pritchett (1999) find extremely high returns to such

¹⁸ This is a reminder of the general fact that the fiscal effects of expenditure depend not only on future revenues but also future costs (e.g., the purchase of new assets) that may be avoided by current expenditure.

¹⁹ See Kalaitzidakis and Kalyvitis (2004) and Rioja (2003a,b).

education inputs as textbooks, chalkboards, and paper and pencil. However, one key difference vis-à-vis the case of physical investment is that the latter builds assets through capital expenditures (i.e., typically frontloaded), while health and education services (as well as O&M activities) involve mostly recurrent expenditures. In both cases the expected returns should be taken into account when choosing the optimal levels of expenditure, but arguments for deficit finance are more persuasive in the case of capital expenditures than in that of recurrent expenditures (Mintz and Smart 2006).

Defining a fiscal strategy

The preceding discussion does *not* imply that a public investment expansion is necessarily the right prescription for all, or even for most, Latin American countries at this time. Nor is there any implication that, as a rule, public investment increases should be financed via debt, or in any other particular way. Instead, the appropriate fiscal strategy should be expected to vary across countries, depending on the volume of their revenues, the level and composition of their expenditures, their level of indebtedness, their endowments of public capital, their fiscal institutions, and a variety of other country-specific factors.

To recapitulate, the decision to invest should be guided by the return and the cost of investment. The return is primarily determined by the marginal productivity of public capital, itself dependent on the government's ability to select good projects and the (relative) scarcity of services rendered by public capital—e.g., the availability of infrastructure services. However, high returns do not suffice: equally important is the government's ability to capture them, and that is given by the extent of cost recovery in public services as well as its tax collection capacity.

The financial return on public capital needs to be compared with its user cost, which reflects a variety of ingredients—the efficiency of public procurement (e.g., corruption), the cost of maintaining and operating the public capital stock, and the marginal cost of borrowing. The latter in turn is likely to reflect the government's perceived repayment capacity. Both return and cost calculations should embody risk adjustments to take account of uncertainty. If the return on public capital exceeds the user cost, with both expressed in risk-adjusted terms,

debt-finance of public investment would be justified. In the opposite case, any additional investment has to be financed, at least in part, by either raising taxes or reducing other expenditures.

These considerations may sound abstract but they can be readily related to each country's initial fiscal situation. For example, deficit-finance of additional investment may be the right strategy to follow when starting from a strong fiscal position with low debt (and hence low marginal borrowing costs). If instead the initial fiscal situation is weak—i.e., initial indebtedness is high, and so is the risk-adjusted marginal cost of borrowing—any additional investments, if justified by their returns, should be financed through either increased taxation or reduced current expenditure. If, furthermore, taxes are already at high levels—so that the marginal excess burden of taxation is already high—then the only reasonable strategy left is that of cutting current expenditures to allow for larger investment while leaving total spending unchanged.

One way to assess the interplay of all these ingredients in practice and evaluate alternative fiscal strategies is through formal macroeconomic simulation models that offer a synthetic representation of the inter- and intra-temporal tradeoffs faced by policy makers when choosing the level and composition of public expenditure. In this vein, Ferreira and Nascimento (2005) examine fiscal policy choices in Brazil simulating a macroeconomic model of intertemporally-optimizing consumers and investors. Their findings suggest that reversing the public investment decline of the last decade can yield significant welfare gains, especially when the reversal is financed through an offsetting cut in public consumption – which rose sharply over the same period.

This serves to highlight two practical lessons. The first one is that appropriate spending composition has to be an essential part of fiscal adjustment and consolidation strategies, since it affects growth outcomes. In other words, spending targets and growth forecasts cannot be set without regard to the composition of expenditure—in contrast to current practice.

The second lesson is a logical consequence of the first, namely that governments need to have the flexibility to redeploy their expenditures. This, however, is far from being the case at present in most Latin American countries, because

comprehensive entitlements and expenditure earmarking imply that discretionary expenditures often account for a very small fraction of the total—e.g., below 10 percent in Brazil, Colombia, and Peru. This suggests the urgent need for reform in this area.

Is excluding certain public investments from fiscal targets a solution?

Broadly speaking, there are two possible ways to address the bias against productive public spending implicit in existing fiscal targets and rules. One is to retain them, but exempt from their action certain public investments deemed more likely to be solvency-enhancing. The other is to adopt new fiscal performance indicators, fiscal targets, and fiscal rules. This section reviews the former alternative; the next section discusses the latter.

Governments that cannot change the fiscal targets they are subject to can instead seek to invest through entities that are excluded from the targets. This includes “off-balance-sheet” public entities as well as private entities supported by guarantees or long-term purchase contracts. These devices could allow productive public spending to go ahead when it otherwise couldn’t.

Private financing of public investment projects

One way to place investment projects beyond the reach of short-term deficit and gross debt targets is by having private firms finance the investments. Many Latin American governments have privatized their telecommunications industries and parts of their power and water industries. In sectors such as roads, private firms are often engaged in some form of private-public partnership in which the government retains an important financial role. Chile and Colombia, for example, have had roads privately financed under arrangements in which the government provides minimum-revenue or foreign-exchange guarantees. Some Latin American countries such as Chile have begun to use a different form of public-private partnership, in which a private firm finances an asset (such as a school, hospital, or prison) but the government is the sole purchaser of the

service provided by the firm and signs a long-term contract to pay for the service.

These arrangements offer room for improving the returns to public investment and thus enhancing government solvency. In many cases, however, concern about the efficiency of public investments has played a minor role, and the resort to private financing has been primarily guided by the desire to evade the pressure of liquidity targets on public investment. This poses the danger that projects conceived with such purpose may not be well-designed from the point of view of efficiency or solvency. More generally, there is no good argument for private sector involvement unless private firms are productively more efficient than the public sector.²⁰

The fiscal dangers are particularly apparent in privately financed projects that benefit from long-term “take-or-pay” purchase contracts with the government, whose main effect is to replace one type of government obligation (explicit debt) with another (commitments that are typically off-balance sheet), without any significant change in the magnitude of the government’s total obligations.

Fiscal dangers also arise when the government provides guarantees to private investors—e.g., guarantees of the private firm’s debt or revenue—that leave the public sector bearing much of the investment risk.²¹ Even when such guarantees are not formally offered *ex-ante*, they may be provided *ex-post* through renegotiation of concession agreements, which has been frequent in Latin America.²²

On the whole, private financing has not come to play the dominant role in the provision of infrastructure services in Latin America and elsewhere that many observers expected. It may sometimes improve efficiency, and it may sometimes allow governments to sidestep the problems created by traditional fiscal targets,

²⁰ Engel, Fischer, and Galetovic (2005).

²¹ Irwin et al (1997). For example, the bailout of the failed Mexican toll road program in 1997 cost between 1 and 1.7 percent of GDP (World Bank 2005).

²² Guasch (2004).

but in sectors such as roads and water it plays a very small role in total investment—something unlikely to change in the near term.

Exception of specific public projects

Another option is to exclude from fiscal targets certain investments undertaken by the public sector. A recent proposal would exclude projects financed by multilateral institutions, on the grounds that such projects are more likely than others to be carefully screened and designed. However, this idea has not garnered much support, among other reasons because the fungibility of money means that the marginal financing from multilateral institutions would not necessarily support the intended projects. Furthermore, total multilateral flows to Latin America are at present quite small (less than 1 percent of GDP), so they are unlikely to make a big difference.

A second proposal, developed and refined by the IMF (2004b), is to exclude from fiscal targets investments made by public enterprises deemed to be commercially run.²³ In principle, the proposal is potentially important for Latin American countries, since public enterprises are typically included in the public sector aggregates monitored under fiscal programs. In most other industrial and developing regions, this is not the case.

In practice, this approach poses several problems. First, appropriate criteria to identify commercially-oriented public enterprises are difficult to establish. Second, enterprises that meet likely criteria are the exception rather than the rule in Latin America,²⁴ and this naturally detracts from the practical relevance of this approach for public investment.

Another difficulty is that excluding commercially-run public enterprises from targets may further restrict investment elsewhere in the public sector if those

²³ In fact, this proposal is not new: back in 2002, the IMF had already agreed to exclude the investments of Brazil's public oil company PETROBRAS from the country's fiscal performance targets. However, the authorities apparently never took advantage of the agreement, see Afonso (2005). This exceptional treatment was predicated on the basis of the company's profitability, its corporate governance, and the fact that some of its shares were publicly traded.

²⁴ In fact, very few were found by the recent pilot country studies summarized in IMF (2005)

enterprises make a positive net contribution to the aggregate budget surplus (or if they hold net financial assets that reduce overall public debt). Exclusion of those enterprises would then make fiscal targets more stringent, rather than less, for productive public expenditure. One way around this difficulty is to exclude the investments, but not the saving, of these firms, from fiscal targets. This, however, represents added complexity that further detracts from the transparency of the approach. Another would be to relax the targets by the net saving of the excluded public enterprises.

However, the fundamental problem with this proposal is that investments by enterprises that are not commercially-run may still have offsetting fiscal and economic benefits—as is the case of many investments in roads, for example. In other words, the investments of commercially-run public enterprises may not be the ones with highest priority from society’s perspective. Thus, removing restrictions on investment by the latter while leaving the former restricted may help, but it may also lead to an overall public investment program far removed from the socially desirable one. For example, it is unlikely that Brazil’s infrastructure needs will be significantly alleviated by allowing more investment by PETROBRAS. Indeed, this is a general difficulty with any proposals based on the special treatment of specific investments.

Addressing the problem by shifting the focus of measures of fiscal performance

The limitations of these “selective” approaches that exempt certain investments suggest that it is important to consider more-fundamental changes. The first step is for governments to develop indicators of net worth to supplement traditional fiscal indicators. Later, they may wish to develop new fiscal targets or fiscal rules that make use of the indicators. None of this implies, of course, that governments should ignore short-term cash deficits or debt. Monitoring short-term cash flows is crucial for assessing liquidity, and monitoring debt is crucial for assessing vulnerability to shocks.

Estimating net worth, or the difference between the value of assets and value of liabilities, requires peering into the future. The value of an asset is the present

value of the revenues it will generate, and such revenues are usually uncertain. Likewise, the value of a liability is the present value of the payments it will cause the government to make, and such payments are often uncertain. Thus indicators of net worth are inherently approximate.

This creates two challenges. First, can the indicators incorporate the effects of uncertainty on values? Ideally, the valuation of assets and liabilities would adjust for risk, so that an asset that generated particularly uncertain revenues would have a lower measured value than an otherwise identical but less risky asset. Ideally, too, analysts would have not just a point estimate of the government's net worth but a probability distribution.

Second, can the indicators of net worth be protected from the effects of self-serving forecast bias? Governments wanting to beautify their reported fiscal position can take advantage of uncertainty to overestimate future revenues and underestimate future costs. Governments wanting to protect some category of public spending on political grounds can invent some "asset value" for that category, even if the spending is actually wasteful. If an indicator of net worth is too vulnerable to such manipulation it has too little credibility to be useful.

All things considered, the ideal set of fiscal indicators would

- Reveal short-term cash flows to indicate the government's liquidity (and the extent of any fiscal stimulus)
- Measure net worth to indicate the government's solvency
- Incorporate uncertainty in measures of net worth and other variables
- Limit self-serving forecasts and asset value manipulation.

We consider below how well these criteria are satisfied by two ways of generating indicators of net worth: modern accrual accounting and long-term fiscal projections.

Modern accrual accounting

Like traditional cash accounts, modern accrual accounts include information on short-term cash flows. Unlike them, accrual accounts also include a balance sheet showing assets and liabilities. As a result, accrual accounts generate a measure of net worth. They also include a measure of the surplus or deficit that isn't based on current cash flows. That measure includes revenues that have been earned but are not yet collected and bills that are payable but not yet paid. Crucially, investment itself is not counted as an expense in the period of investment; only the depreciation of the investment is. The difference between accrual revenues and accrual expenses gives an "income-statement surplus" that is roughly equal to the increase in the government's net worth.

Accrual accounting standards for financial reporting are designed to limit bias. Most obviously, financial reports, whether they are based on cash or accrual accounting, must be audited by an independent auditor. In addition, accrual accounting standards tackle bias by preferring measures that are objectively verifiable even at the cost of some relevance. For example, some standards require an asset to be valued by recording its acquisition cost and then depreciating the cost according to a simple formula. The result can only approximate the asset's real value, but the measure is less vulnerable to bias than alternative measures. When standards require the reporting of market value, they sometimes require the valuation to be done by an independent expert (separate from the auditor). Accounting scandals show that such devices can fail, but they are surely better than nothing. And, while the risk of misleading accrual accounting information is real, it doesn't provide a strong argument against adoption since cash-based reporting is at least as vulnerable to manipulation—for example by deferring payments to the first day of the next year or promising higher pensions instead of increasing wages now.

Reporting according to modern accrual accounting standards is more arduous than reporting according to cash standards, and it can take years for a government to move from cash to accrual accounting. Yet several governments have made the transition, including those of Australia, Britain, Canada, New Zealand, and the United States. They now report according to accounting standards similar to those applying to private firms in their countries. Many

other governments are planning to adopt accrual accounting. In Latin America, Chile has said that it will report government financial statistics to the IMF by 2007 and El Salvador already reports partial accrual information to the IMF.²⁵ (Such statistical reporting differs from financial reporting in that it need not be audited.)

Overall, accrual accounting generates valuable information missed by traditional cash accounting. Yet it isn't sufficient for the assessment of net worth. For one thing, accounting values can diverge too much from true values. After many years of inflation, the depreciated acquisition cost of an asset may greatly underestimate the present value of the cash flows it will generate. In addition, accounting values of assets that generate user fees and higher tax payments at best capture only the value of the user fees, since the present value of future tax revenues does not count as an asset from the conventional accounting perspective. On the other hand, durables are generally treated as assets and valued at their depreciated acquisition or replacement cost even if they generate no future cash flows from either user fees or taxes. Expenditure on a bridge to nowhere can create an accounting asset even if it generates no tolls and does nothing to increase economic output.

Long-term fiscal projections

Long-term fiscal projections can help where accrual accounting fails. Such projections, prepared in various ways by countries such as Australia, Britain, New Zealand, and the United States, can in principle include estimates of the government's operating and investing cash flows over the next 50 or 75 years, which can then be discounted back to the present to arrive at an estimate of the government's net worth. Crucially, all expected cash flows under current policies can be projected, including items such as taxes and welfare expenditure.

The projections can include public investment, expenditure on operations and maintenance, and payments made to privately financed firms in public-private partnerships. Revenues from any user fees can be included. And, if evidence

²⁵ Government of Chile (2003), IMF (2004a).

suggests that some investments increase tax revenue by generating more taxable economic activity, so too can this extra revenue.

Long-term fiscal projections can be designed to take account of the uncertainty of future cash flows. On the one hand, future revenues and expenditure can be adjusted for risk: risky tax revenues, for example, can be discounted at a higher rate than more predictable pensions. On the other hand, the projections can show how net worth changes with critical assumptions about life expectancies, health-care costs, and output. If output were modeled as a function of the stock of public capital, the projections could show how sensitive the government's net worth is to this assumption. Risk could also be acknowledged by allowing some of the underlying variables to have both a trend rate of change and a random element. Output, for example, might have a trend rate of growth, but be subject to random shocks.

In principle, long-term projections can be designed to provide all the information necessary for fiscal analysis. The first few years provide information on short-term liquidity, and the net present value of the entire series of cash flows provides another measure of net worth. And, as just discussed, they can incorporate uncertainty. Their biggest disadvantage is a corollary of their usefulness: generating the relevant information requires estimates subject to enormous uncertainty: What will life expectancy be in, say, 30 years? What will the rate of growth of GDP be then? How will it be affected, if at all, by public investment? The large extent of reasonable disagreement about such estimates implies a large range of reasonable estimates of the government's net worth. This makes room for self-serving projections.

Though uncertainty in the estimates is unavoidable, a government can take steps to make its projections more credible. It can make its projection model publicly available (e.g., in a spreadsheet on the Internet), allowing others to see how the results are generated. For critical parameters or key variables, it can use the estimates of a panel of independent experts, as Chile does in estimating its structural surplus. It can prepare and publish standards that it will follow in making the projections. And it can legislate that an independent auditor must opine on whether the projections follow those standards and reflect the stated

assumptions. International organizations and financial institutions could help develop the standards and expertise necessary for some of these steps.

Table 1 summarizes how well the fiscal indicators generated by cash accounting, accrual accounting, and long-term projections satisfy the four criteria set out earlier. Cash accounting offers the necessary information on liquidity and, because of its short-term focus, limits opportunities for some sorts of bias, but it provides no information on the crucial issue of government net worth. Accrual accounting fills this gap using methods designed to limit bias, but partly because of the concern to limit bias provides no information on crucial elements such as future tax revenues. It also fails to distinguish between cash-generating and other assets. Long-term projections can overcome these problems, but at the cost of requiring more estimates, creating more leeway for bias. Given the advantages and disadvantages of each approach, the best strategy would seem to be for governments to develop both accrual accounting and long-term projections, while continuing to monitor short-term cash flows.

Table 1 Benefits and drawbacks of three sources of fiscal indicators

	Cash accounting	Modern accrual accounting	Long-term projections
Provides information on short-term cash flows	Yes	Yes	Yes
Provides information on net worth, given current policies	No	Partially	Yes
Incorporates uncertainty	Avoids the issue	Partially	Yes
Limits self-serving forecast bias	Yes	Yes	Not easily

Fiscal targets and fiscal rules

Indicators of net worth and changes therein can also form the basis for new fiscal targets and rules that promote solvency without sacrificing public investment. One of the various alternatives that have been proposed is the so-called golden rule, according to which governments can borrow only to invest—that is, if and

only if the borrowing is used to create assets. The British government has adopted a version of the golden rule: it has said that “over the economic cycle” it will borrow only to invest and only so long as public-sector net debt remains below 40 percent of GDP.²⁶

Accrual accounting suits the golden rule, since another way of stating the rule is to say that governments must not run an income-statement deficit (roughly, must not reduce their net worth). Because the income-statement surplus excludes expenditure on investment, the golden rule encourages investment. Because the income-statement surplus includes depreciation, however, adopting the golden rule is not the same as simply exempting investment from the fiscal targets—it amounts to exempting *net* investment from them. Observance of the golden rule over a long period of time would eventually result in a public debt stock no larger than the public capital stock, so that to a first approximation the outstanding debt would be fully backed by public assets.

However, the limitations of typical accounting mean that the golden rule doesn’t ensure solvency, or even expected solvency. The reason is that the assets may not yield an expected return high enough to cover the interest on the debt that financed their acquisition. Furthermore, by treating differently current and capital spending, the golden rule offers an incentive for opportunistic misclassification of the expenditures.

An alternative that, in principle, avoids these problems is the permanent-balance rule. Roughly stated, it requires governments to set the tax rate at a constant fraction of output that over the long run pays for the government’s present and future expenditure.²⁷ Named by analogy with Milton Friedman’s permanent-income hypothesis, the rule allows governments to borrow when revenue is temporarily low or when present investment opportunities are greater than future investment opportunities. Long-term fiscal projections suit the permanent-balance rule, since such projections are required to determine the required minimum tax rate. Implementing the permanent-balance rule successfully would

²⁶ H.M. Treasury (2004, page 4).

²⁷ Buitert and Graafe (2004).

thus require addressing the problems discussed above about the reliability of long-term fiscal projections, which is no easy matter.

A compromise solution that may avoid the problems with both the golden rule and the permanent-balance rule is the modified golden rule recently proposed by Mintz and Smart (2006).²⁸ They suggest that governments should be able to borrow to invest in self-liquidating assets like power plants that generate future revenues for the government, but not to invest in assets that generate no revenues, such as typical public schools. Further, government borrowing would be limited to some fraction of the value of the revenue-generating assets, just as firms do not finance all their assets with debt. These features would result in a rule more conducive to solvency than the golden rule, without relying as much on potentially unreliable long-term forecasts as does the permanent balance rule.

Improving investment decisions

Encouraging public investment raises the risk of wasteful investments.²⁹ Roads may be built to nowhere, and useful roads not maintained. Power plants may lie idle after being built too far ahead of demand. Water-supply networks may be fully used, but still burden the budget, because the tariff increases on which their financial viability was predicated weren't allowed. Some investments may be well motivated but poorly informed; others may be motivated by bribes, patronage, or photo opportunities.

Improvements in the measurement of fiscal performance can reduce these risks by accelerating fiscal recognition of the consequences of bad decisions. Modern accrual accounting standards sometimes require assets to be written down in value if they generate little income, increasing the income-statement deficit and possibly embarrassing the government. Good long-term projections would rely on unbiased estimates of the fiscal effect of investment, not the hopeful estimates of project promoters, or the misclassification of political patronage as "investment".

²⁸ Mintz and Smart (2006).

²⁹ See Pritchett (2000) and Tanzi and Davoodi (1998).

Yet it would be unwise to rely on fiscal indicators to improve investments, since many other things also affect the quality of investment decisions. For example, which officials or ministers decide whether to invest and what criteria must they follow? Improvements in investment decisions can be sought in changes in the rules that determine the answers to these questions. Here we can do no more than survey some of the options.

Services provided free

It is useful to distinguish public services that are provided free of charge from those that are sold. When services are provided free, investment decisions must be made on noncommercial grounds, usually by officials or politicians. The advantage of such administrative decision-making is that all costs and benefits can be considered, not just those that are commercial. The disadvantage is the difficulty of measuring economic costs and benefits and the consequent difficulty of holding the officials or politicians accountable for their choices. In practice, they may therefore invest on grounds unrelated to economic benefits. They may favor politically important regions or just seek to enrich themselves. Cost-benefit analysis may have little influence.³⁰ The evidence discussed earlier suggests that public investment is often valuable despite these problems, but if the bias against public investment is removed, the risks become greater.

What can be done to improve the quality of the investment choices? With much work already available on the technical aspects of cost-benefit analysis, the problem now may be to increase the influence of cost-benefit analysis. Several options can be considered:

- Requiring that cost-benefit analysis be undertaken and made public
- Requiring the disclosure and justification of investments undertaken despite negative cost-benefit analyses

³⁰ Fontaine (2004) describes problems with attempts to bring Chile's favorable experience with cost-benefit analysis to other Latin American countries.

- Setting standards for cost-benefit analysis that make the analysis relatively easy to undertake and understand, even at the cost of some inaccuracy
- Having cost-benefit analysis performed by independent evaluators without a political stake in the outcome of the analysis.
- Linking the analysis to fiscal planning, so that it feeds into long-term fiscal projections and fiscal targets influence the investment criterion

Service provided for a fee

Administrative decision-making remains possible when services are sold for a fee. But when fees can be charged the weak accountability associated with administrative decision-making has led many governments, in Latin America as elsewhere, to prefer commercial decision-making subject to firm-specific regulation of prices.

Commercial decisions don't take account of noncommercial costs and benefits. Commercial water and sanitation firms, for example, may ignore the spillover benefits of investments in wastewater treatment. But if the difference between economic and financial costs and benefits is small, or if the government can use taxes, subsidies, or regulation to close the gap, the disadvantage of commercial decision-making may be outweighed by the fact that commercial performance is more easily measured than economic performance and decision-makers are therefore more easily held accountable. Stronger accountability for something not too far off the right result may be better than weaker accountability for precisely the right result.

In some countries, the commercialization of publicly owned providers appears to have improved services and reduced fiscal costs. Yet governments have struggled to create truly commercial decision-making under public ownership. Even when they have ostensibly given a public enterprise a commercial goal, they haven't been able to refrain from directing it to pursue other goals. For similar reasons, they have often prevented public enterprises from charging cost-covering prices.

Combined with the fiscal constraints, these problems have encouraged many governments to privatize public enterprises. Although the privatization of public enterprises operating in competitive markets appears to have improved efficiency and many other outcomes of interest,³¹ it is less clear whether the privatization of regulated monopolies has worked. Studies of public and private water and power monopolies in the United States, for example, have found that private firms are no more efficient.³² On the other hand, studies of privatization in developing countries have often found that privatization was associated with lower costs and higher investment.³³ Knowing what would have happened in the absence of privatization is difficult, however. Moreover, even when privatization seems to have been helpful, it has often been unpopular—in Latin America perhaps more than anywhere else.³⁴

It seems likely that government will continue to experiment with both privatization and commercialization of public enterprises. Options for improving the success of privatization include the following:³⁵

- Improving governments' capacity to write concession contracts, regulate the firms, and avoid opportunistic renegotiation
- Better protecting firms from the risks of losing money not because of poor performance or bad luck, but because of unexpected, adverse government decisions
- Making greater use of subsidies when cost-covering prices are undesirable or infeasible.

Options for improving the success of the commercialization of public enterprises include the following:

- Legislating that the public enterprise's goal is to be profitable

³¹ Megginson and Netter (2001) survey this evidence.

³² See Kwoka (1996).

³³ Harris (2003) reviews some of this evidence.

³⁴ McKenzie and Mookherjee (2003).

³⁵ See, for example, Brook and Smith (2001), Guasch (2004), World Bank (2004, chapter 6),

- Subjecting the enterprise to private-sector company law, when such law requires an arms'-length relationship between owners and managers
- Requiring the enterprise to prepare audited financial reports according to local generally accepted accounting principles or International Financial Reporting Standards
- Requiring the enterprises to borrow without the benefit of a government guarantee
- Appointing to the board of directors business people rather than government officials
- Making greater use of transparent subsidies to pursue nonfinancial goals.

If such measures seem undesirable, it may mean that regulated commercial decision-making should be abandoned in favor of administrative decision-making. Another option is to try to avoid the problems that afflict regulated monopoly, public or private, by creating competition.

Competitive markets

The biggest improvements in the provision of public services have occurred when new policies and new technology have created competition where before there was none. The most notable example is in telecommunications, where new technology including mobile telephony and the removal of statutory monopolies have greatly expanded competition. The changes have usually been accompanied by privatization and a reduced reliance on industry-specific price controls. Many studies have found that the policy changes have improved performance, sometimes because of liberalization, sometimes because of

privatization.³⁶ Some have found improvements because investment constraints were loosened when ownership became private.³⁷

The success of telecommunications reforms has encouraged governments to seek opportunities to create competition in other industries where monopoly has been the norm. Many governments have done so in the energy sector by breaking up formerly monopolistic suppliers of power and natural gas. Competition has proved harder to create in these industries, however, and some reforms, notably in California, have been associated with spectacular problems.

Conclusions

In Latin America and elsewhere, governments have cut back on public investment as they have brought their budgets closer to balance. While budget cuts were probably necessary, the cuts in public investment may have been counterproductive, since much theory and evidence suggests that public investment has the potential to increase future output.

In the worst case, investment cuts trigger a vicious circle, in which the subsequent deterioration of future revenue forces further investment cuts, leading to yet further deterioration, further investment cuts, and so on ad infinitum. What is supposed to be fiscal adjustment in this case actually has the same consequences as fiscal profligacy. Cutting investment to promote solvency becomes the fiscal equivalent of walking up the down escalator – you step up only to end up lower than where you started.

The cuts in public investment should have come as no surprise when most countries measure their fiscal position not in terms of net worth but in terms of short-term cash flows and gross debt, and cutting investment can reduce debt and short-term cash flows, even as it reduces net worth.

³⁶ See Bortolotti and others (2002), Boylaud and Nicoletti (2001), Fink, Mattoo, and Rathindran (2002), Galal and others (1994), Li and Xu (2004), Ramamurti (1996), Ros (1999), Wallsten (2001 and 2003), and Winston (1993).

³⁷ Galal and others (1994).

The decline in public investment suggests the need for a rethinking of fiscal strategies. In some cases, it may be best to increase public investment and accept a higher short-term cash deficit in exchange for higher tax and user-fee revenues later. Yet this strategy is unlikely to be right for all countries. Those with good infrastructure and bad fiscal positions may indeed do well to cut back on public investment. Others with high taxes and debt, with Brazil perhaps as a leading example, may do best to increase public investment but finance it by cutting current expenditure. Still others, with high debt and little room for cuts in current expenditure may have no choice but to raise taxes or forgo improvements in their infrastructure. Each case must be analyzed on its merits and—given the tendency to be optimistic in forecasting growth and the performance of investments—with a degree of skepticism.

All governments, however, are likely to benefit from better fiscal information. The idea is not to abandon measures of debt and short-term cash flows, which are clearly important, but rather to supplement them with measures of assets—yielding a measure of net worth and its change over time. What is needed is information that allows governments to tell quickly when improvements in short-term cash flows are coming at the expense of declining net worth. Two means of generating such information are constructing long-term projections of fiscal cash flows, and adopting modern accrual accounting.

Better fiscal information is helpful irrespective of whether the government follows quantitative fiscal rules or targets. But the question also arises whether governments should set themselves fiscal rules or targets incorporating measures of investment or net worth. Because debt and short-term cash flows matter, rules or targets based exclusively on net worth may not be helpful. But combining net worth with conventional fiscal measures may have merit. Britain offers one example—adopting a version of the golden rule combined with a debt target. An even better option might be a modified golden rule—allowing borrowing to finance a portion of the cost of cash-generating assets, but also requiring some proportion to be financed by current taxes. There is no obvious “best” solution but, whatever the specific solution chosen, it is clearly time to change the exclusive focus on public sector liabilities, and bring public sector assets into the fiscal picture.

References

- Afonso, J. (2005): "Fiscal space and public sector investment in infrastructure", IPEA Texto para Discussao 1141.
- Bolaños, R. (2005): "Public investment, fiscal adjustment and fiscal rules in Costa Rica", unpublished manuscript.
- Bortolotti, Bernardo, Juliet D'Souza, William L. Megginson, and Marcella Fantini. 2002. "Privatization and the Sources of Performance Improvement in the Global Telecommunications Industry." *Telecommunications Policy* 26(5-6):243–68
- Boylaoud, Olivier, and Giuseppe Nicoletti. 2001. "Regulation, Market Structure, and Performance in Telecommunications." *OECD Economic Studies* 32:99–142.
- Buiter, W. (1990): *Principles of Budgetary and Financial Policy*. MIT Press.
- Buiter, W., and C. Grafe (2004): "Patching up the Pact: Suggestions for Enhancing Fiscal Sustainability and Macroeconomic Stability in an Enlarged European Union," *The Economics of Transition* 12 (1), pp. 67-102.
- Calderón, C., and L. Servén (2004): "Trends in Infrastructure in Latin America," World Bank Policy Research Working Paper 3400.
- Calderón, C., and L. Servén (2007): "Is infrastructure capital productive?", unpublished manuscript.
- Easterly, W. and S. Rebelo (1993), "Fiscal Policy and Economic Growth: an Empirical Investigation," *Journal of Monetary Economics*, Vol. 32, 417-458.
- Easterly, W. (1999): "When is Fiscal Adjustment an Illusion?" *Economic Policy* 28, pp. 57–86.
- Easterly, W., and L. Servén (2003): *The Limits of Stabilization: Infrastructure, Public Deficits and Growth in Latin America*. Stanford University Press.

- Engel, E., R. Fischer and A. Galetovic (2005): "The basic public finance of public-private partnerships: the case of toll roads". Unpublished manuscript.
- Estache, A. (2004): "What do we know about Sub-Saharan Africa's infrastructure and the impact of its 1990s reforms?", unpublished manuscript.
- Ferreira, P., and C. Araujo (2005), "On the Economic and Fiscal Effects of Infrastructure Investment in Brazil", Fundação Getulio Vargas Ensaio Econômico #613.
- Ferreira, P., and L. Nascimento (2005), "Welfare and Growth Effects of Alternative Fiscal Rules for Infrastructure Investment in Brazil", Fundação Getulio Vargas Ensaio Econômico #604.
- Fink, Carsten, Aaditya Mattoo, and Randeep Rathindran. 2002. "Liberalizing Basic Telecommunications: The Asian Experience." HWWA Discussion Paper 163. HWWA-Institut für Wirtschaftsforschung-Hamburg.
- Fontaine, E. (1997): "Project evaluation training and public investment in Chile", *American Economic Review* 87, 63-67.
- Fontaine, E. (2004). "Project evaluation and the national system of public investment in Chile", unpublished manuscript.
- Galal, Ahmed, Leroy Jones, Pankaj Tandon, and Ingo Vogelsang. 1994. *Welfare Consequences of Selling Public Enterprises: An Empirical Analysis*. New York: Oxford University Press for the World Bank.
- Government of Chile (2003): "Report on public finances: Government budget bill for 2004". Presented by Mario Marcel Cullel, Budget Director, to the Special Joint Committee on the Budget of the National Congress. October.
- Guasch, J. Luis (2004): "Granting and renegotiating infrastructure concessions: Doing it right". World Bank Institute Development Studies. World Bank.
- Harris, Clive (2003): "Private participation in infrastructure in developing countries: Trends, impacts, and policy lessons." World Bank Working Paper No. 5.

- H.M. Treasury (2004): "Long-term public finance report: An analysis of fiscal sustainability". December.
- IMF (2003): Fiscal adjustment in IMF-supported programs.
- IMF (2004a): *Government finance statistics yearbook, 2004*. Washington, DC: IMF.
- IMF (2004b): Public investment and fiscal policy.
- IMF (2005): Public investment and fiscal policy—Lessons from the pilot country studies.
- Irwin, T. (2005): "Accrual accounting, long-term fiscal projections, and public investment in infrastructure", unpublished manuscript.
- Irwin, T., M. Klein, G. Perry, and M. Thobani (1997): *Dealing with Public Risk in Private Infrastructure*. Washington, DC: World Bank.
- Kalaitzidakis, P. and S. Kalyvitis (2004): "On the macroeconomic implications of maintenance in public capital", *Journal of Public Economics* 88, 695-712.
- Kikeri, Sunita, John Nellis, and Mary Shirley (1992): *Privatization: The lessons of experience*. Washington, DC: World Bank.
- Keefer, Philip, and Steven Knack (2006): "Boondoggles, rent-seeking and political checks and balances: Public investment under unaccountable governments", *Review of Economics and Statistics* (forthcoming).
- Kwoka, John E (1996): *Power structure: Ownership, integration, and competition in the US electricity industry*. Springer.
- Li, Wei, and Lixin Colin Xu (2004). The impact of privatization and competition in the telecommunications sector around the world. *Journal of Law and Economics*. Volume 47. Number 2.
- McKenzie, David, and Dilip Mookherjee (2003): The distributive impact of privatization in Latin America: Evidence from four countries. Unpublished manuscript.

- Meggison, William L., and Jeffrey M. Netter (2001): From state to market: A survey of empirical studies of privatization. *Journal of Economic Literature*. Volume 34. June. Pages 321–389.
- Mintz, J. and M. Smart (2006): "Incentives for public investment under fiscal rules", World Bank Policy Research Working Paper 3860.
- Newbery, David, and Michael Pollitt. 1997. "The Restructuring and Privatization of Britain's Central Electricity Generating Board (CEGB)-Was it Worth it?" *Journal of Industrial Economics* 45(3):269–303.
- Perotti, R. (2005): "Public investment: another (different) look", IGIER Working Paper 277.
- Pritchett, L. (2000): "The Tyranny of Concepts: CUDIE (Cumulated, Depreciated, Investment Effort) Is Not Capital," *Journal of Economic Growth* 5 (4), pp. 361-384.
- Ramamurti, Ravi. 1996. "The New Frontier of Privatization." In Ravi Ramamurti, eds., *Privatizing Monopolies: Lessons from the Telecommunications and Transport Sectors in Latin America*. Baltimore, M.D.: Johns Hopkins University Press.
- Rioja, F. (2003a): "The penalties of inefficient infrastructure", *Review of Development Economics* 7, 127-137.
- Rioja, F. (2003b): "Filling potholes: macroeconomic effects of maintenance versus new investments in public infrastructure", *Journal of Public Economics* 87, 2281-2304.
- Romp, W. and J. de Haan (2005): "Public capital and economic growth: a critical survey", unpublished manuscript.
- Ros, Agustin J. 1999. "Does Ownership or Competition Matter? The Effects of Telecommunications Reform on Network Expansion and Efficiency." *Journal of Regulatory Economics* 15(1):65–92.
- Servén, L (2006): "Fiscal discipline, public investment and growth", unpublished manuscript.

- Steiner, Faye (2001). "Regulation, industry structure, and performance in the electricity supply industry". OECD Economic Studies Number 32.
- Suescún, R. (2005): "Fiscal space for investment in infrastructure in Colombia", World Bank Policy Research Working Paper # 3629.
- Wallsten, Scott. 2001. "An Econometric Analysis of Telecom Competition, Privatization, and Regulation in Africa and Latin America." *Journal of Industrial Economics* 49(1):1–19.
- Wallsten, Scott 2003. "Privatizing Monopolies in Developing Countries: The Real Effects of Exclusivity Periods." AEI-Brookings Joint Center for Regulatory Studies 03-17. Washington, D.C.
- Winston, Clifford. 1993. "Economic Deregulation: Days of Reckoning for Microeconomists." *Journal of Economic Literature* 31(3):1263–89.
- World Bank (1995): *Bureaucrats in business: The economics and politics of government ownership*. Washington, DC: World Bank.
- World Bank (2004): *World Development Report 2005: A better investment climate for everyone*. Washington, DC: World Bank.
- World Bank (2005): *Infrastructure in Latin America: recent developments and key challenges*. Washington, DC: World Bank
- Zhang, Yin-Fang, David Parker, and Colin Kirkpatrick. 2002. "Electricity Sector Reform in Developing Countries: An Econometric Assessment of the Effects of Privatization, Competition, and Regulation." University of Manchester, Centre on Regulation and Competition, Institute for Development Policy and Management Working Paper 13. Manchester.