

Fiscal Reform, Public Investment and Growth: distortionary taxation, recurrent costs, and incomplete appropriability

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Outline

- 1 Introduction: old problems and new sources of finance
- 2 Distortionary taxes, recurrent costs and appropriability
- 3 Model and application
- 4 Policy experiments
- 5 Conclusions and extensions

Infrastructure needs and sources of finance

- Estimates of infrastructure gaps
- Commission for Africa (2005) US\$40bn
- Africa Infrastructure Country Diagnostic (AICD) US\$93bn (of which up to US\$60bn 'rehabilitation')
- Expectations of blended financing (domestic, external concessional, external non-concessional)
- Enthusiasm from all quarters

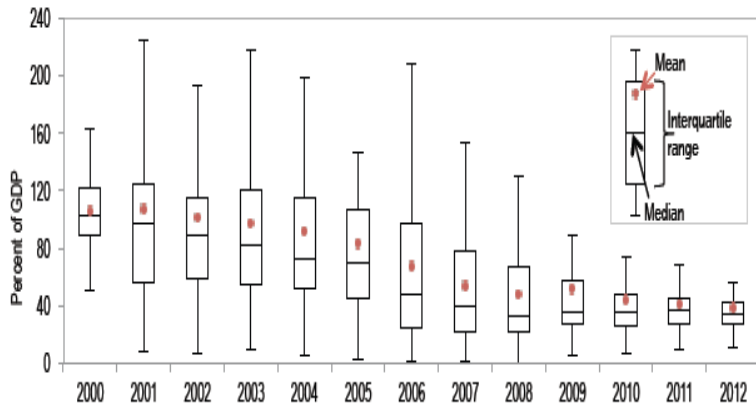
A substantial appetite for sovereign bond issues....

AFRICAN EUROBOND ISSUES						
Country	Issue	Tenor	Amount US\$ m	Yield at issue	Yield (Dec 2013)	Bid-to-cover ratio
Ghana	2007	10-yr	750	8.50%	6.2%	4
Gabon	2007	10-yr	1,000	8.30%	3.67%	-
Senegal	2009	5-yr	200	9.25%	rtd	-
Nigeria	2011	10-yr	500	7.0%	5.38%	2.2
Senegal	2011	10-yr	500	9.13%	6.79%	5
Namibia	2011	10-yr	500	5.75%	5.08%	5.5
Zambia	2012	10-yr	750	5.63%	7.32%	15
Rwanda	2013	10-yr	400	6.88%	7.48%	8
Nigeria	2013	10-yr	500	6.63%	5.95%	4.5
Nigeria	2013	5-yr	500	5.38%	4.50%	3.5
Ghana	2013	10-yr	1,000	7.88%	8.25%	2.5

...fuelled by strong growth and falling public sector debt...

Figure 2.1. Sub-Saharan Africa: Density of Public Sector Debt, 2000–12

(Percent of GDP)



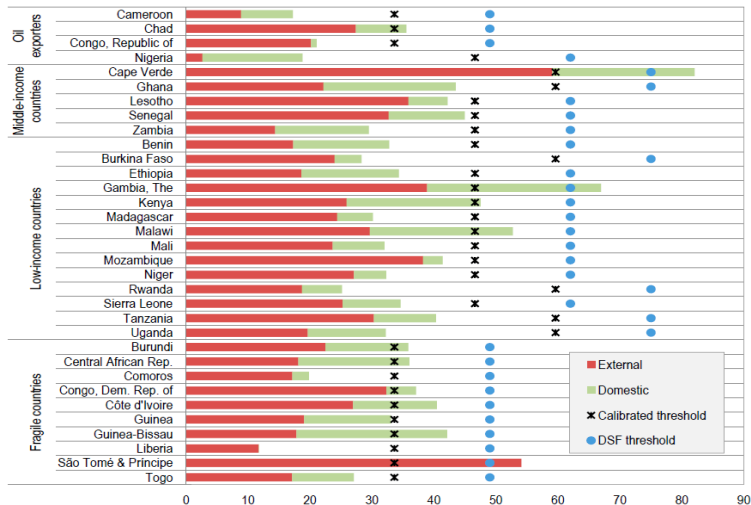
Sources: IMF, DSA database; and IMF staff calculations.

Note: For any given year, the "box and whiskers" plot (or boxplot) summarizes the distribution—during that year—of debt-to-GDP for 44 countries in sub-Saharan Africa (outliers not shown). Debt-to-GDP ratios pertain to public sector debt as defined in the IMF-World Bank Debt Sustainability Framework.

...and a “generally favourable debt outlook for Africa”.

Figure 2.4. Sub-Saharan Africa: Public Sector Debt in 2012 and Sustainability Thresholds
(Percent of GDP)

PRGT-Eligible Countries



Three home truths about public investment and growth

- Recurrent costs are often larger than anticipated; O&M expenditures always vulnerable in tight fiscal conditions; but deficient O&M expenditures undermine the ex post return to public investment.
- Returns from public investment difficult to appropriate through user fees or levies (often for political economy rather than technical reasons)...
- ...which shifts the financing burden onto tax systems which still embody significant growth distortions.
- *These features ought to be embedded in DSA exercises. They're not: how important is their absence?*

Chronic neglect of recurrent costs

- Public investment imposes recurrent budgetary costs (in addition to the initial capital costs and/or the ongoing costs of debt servicing)
- Responsibility for capital and recurrent costs typically falls on different parts of government
- A nearly universal consequence has been inadequate O&M:
 - ▶ Reduction in the service flow
 - ▶ Avoidable acceleration in depreciation and expensive rehabilitation
- Some limited empirical work on what levels of recurrent cost are typical of different types of investment
 - ▶ can be approximated as proportional to capital cost ($r \times \text{capital cost}$)

...and they are big! (cents / \$ of public capital)

Fisheries	0.08
Agriculture	0.10
Rural development	0.08 - 0.43
Primary schools	0.06 - 0.70
Secondary schools	0.08 - 0.72
Rural health centres	0.27- 0.71
Urban health centres	0.17
District hospitals	0.11- 0.30
Buildings	0.01
Feeder roads	0.06 - 0.14
Paved roads	0.03 - 0.07

Heller (1991) *IMF Handbook of Public Expenditure*, 1991

- The 'O' component dominates O&M when public services are labour intensive ('MDG investments')
- Average Kg/Y range from 2 to 5 => scale back by this ratio to express as share of GDP.

...which is a problem if appropriability is limited

- Government either cannot, or chooses not, to levy user charges at a level that captures all of the investment's return
- Incomplete appropriability imposes substantial net budgetary costs, even if social rate of return is high
-a problem for the budget, and for growth and welfare.

Distortionary taxation and the marginal cost of funds

- Raising a dollar of government revenue imposes more than a dollar of cost of the private sector
- Recent estimates (Auriol and Warlters, 2012) for SSA LICs suggest typical values of 1.21 for the system as a whole
 - ▶ 1.11 for consumption taxes
 - ▶ 1.60 for factor taxes.
- Deadweight loss and MCF typically rises with the (square of the) tax rate
 - ▶ Standard argument for tax smoothing

A static illustration of the fiscal and welfare consequences of incomplete appropriability

- Benchmark If project is fully appropriable, should be undertaken provided benefit-cost ratio (BCR) is greater than one
 - ▶ where cost includes O&M, financing costs, and depreciation
- Now suppose government recovers only a fraction f of gross return
 - ▶ Remainder $(1 - f)$ accrues to private sector
 - ▶ Existing taxes recover τ of this but MCF is $1 + \theta$

Fiscal and welfare consequences (continued)

- Absent fresh taxes, government budget deteriorates unless

$$BCR \geq \frac{1}{[f + \tau(1 - f)]}$$

- If taxes can be raised, or expenditures reduced elsewhere, project yields social gain provided

$$BCR \geq \frac{(1 + \theta)}{(1 + f\theta)}$$

- Only if this is positive should project be undertaken, otherwise it inflicts a net burden on private sector.

Fiscal and welfare consequences (continued)

- When does a project induce a budget deficit and when is this still worthwhile?
 - ▶ Baseline tax ratio $\tau = 0.18$; and $MCF = 1.25$

Appropriability (f)	Minimum benefit-cost ratio:	
	to avoid deficit	for welfare increase
0.00	5.56	1.25
0.10	3.82	1.22
0.25	2.60	1.18
0.50	1.69	1.11
0.75	1.26	1.05
0.90	1.09	1.02

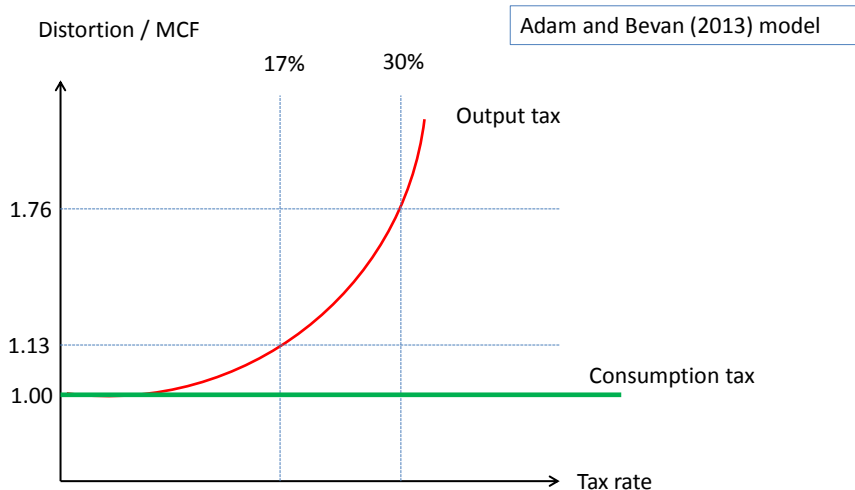
Embedding the calculation in a GE macro model

- Modification of 'new' IMF-standard model for debt sustainability analysis (Buffie et al, IMF WP 46/12)
- Standard two-sector real small open economy GE model
 - ▶ Traded and a non-traded goods
 - ▶ Optimizing (saving) household and rationed household
- Non-optimizing government
 - ▶ Public infrastructure a pure public good, but...
 - ▶ ...Inefficient public investment (a dollar of investment produces less than a dollar of public capital)
- Donor-determined supply of concessional finance may be blended with domestic and external non-concessional borrowing
 - ▶ Endogenous country risk premium

Recurrent costs and taxation

- Two tax instruments
 - ▶ Distortionary tax on output (as a 'metaphor' for real-world distortionary tax regimes).
 - ▶ Non-distortionary (across steady-states) uniform consumption tax
- Revenue-neutral calibration (17% of GDP output tax raises same revenue as a uniform tax of 20% on consumption)
- Introduce recurrent cost obligations on government
 - ▶ r -coefficient = 0.05 (low end of Heller's estimates) spread equally between Operations and Maintenance
 - ▶ Government may seek to 'economize' on either or both
- Partial cost-recovery on recurrent O&M costs as well as depreciation and debt service

The model-based MCF schedule



Model calibration and experiments

- Core experiments: 50% sustained increase in public investment (from 6% to 9% of GDP)
 - ▶ Subject to inefficiency in capital formation and possible inefficiency in O&M
- Fiscal reform experiments:
 - ▶ Improved efficiency of O&M
 - ▶ Tax reform: 'revenue neutral' replacement of output tax with consumption tax

Distortionary Taxation and Deficient O&M

Table 1: *Initial Conditions (for common L and technology)*

Tax regime	Consumption		Output	
Maintenance efficiency	1.0	0.8	1.0	0.8
Operations efficiency	1.0	0.8	1.0	0.8
GDP	100	82.9	80.9	67.0
Capital in T-sector	100	80.8	63.8	51.5
Capital in NT-sector	100	82.5	66.1	54.4
Product real wage	1.0	0.83	0.67	0.55
O&M costs (% GDP)	2.8%	1.9%	2.9%	2.0%

Comparative effects of tax-financed public investment

Table 2: Tax-Financed Public Investment

	<i>Consumption Tax</i>		<i>Output Tax</i>	
Initial tax rate	20%		17%	
Maintenance efficiency	1.0	0.8	1.0	0.8
Operations efficiency	1.0	0.8	1.0	0.8
GDP growth [%]	14.6	14.6	12.5	13.0
Crowding-in [1= prop]	1.8	2.5	1.0	1.5
Consumption growth [%]	10.3	10.7	8.5	9.3
Real wage growth[%]	15.0	14.5	10.4	10.9
Real Exchange Rate[%]	-2.2	-2.3	-1.6	-1.9
O&M growth[%age points]	0.82	0.57	0.93	0.63
Final cons. tax rate	23.1	22.6	-	-
Final output tax rate	-	-	19.0	18.6

Public investment with deficient O&M

Table 3 *Public Investment with deficient O&M*

Public investment increases by 3% initial GDP.	T2(4)			
Final average expenditure efficiency $M(\gamma_m)$	0.8	0.8	0.67	0.67
Final average expenditure efficiency $O(\gamma_p)$	0.8	0.67	0.8	0.67
Final output tax rate (initial = 17%)	18.6	19.89	18.80	20.09
Final O&M cost (% GDP, initial = 2.01%)	2.64	2.62	2.30	2.26
Increase in effective public capital (%) [1]	50.0	25.0	37.8	14.8
Product wage growth (%)	10.9	1.8	7.3	-1.2
Crowding In	1.50	0.38	1.34	-0.89
Real GDP [1]	12.96	5.03	9.60	1.88
Real consumption [1]	9.24	1.18	6.21	-1.64
Final social return to public investment (14.7%)	9.13	7.98	9.61	8.38

Note: [1] Percentage change between steady states

Fiscal reforms

TABLE 4: *Fiscal reforms(no public investment)*

	Baseline		Reforms	
	Table 2(4)	O&M	Tax	Tax+O&M
Final maintenance efficiency	0.8	1.0	0.8	1.0
Final operations efficiency	0.8	1.0	0.8	1.0
Real GDP growth[1]	13.0	14.6	29.2	46.1
Real consumption[1]	9.3	14.4	23.9	40.1
Investment crowding-in	1.5	2.6	-	17.2
Real exchange rate	-1.9	-2.8	-10.3	-12.3
Effective public capital[1]	50.0	44.2	0.00	44.2
Final product wage	0.61	0.65	1.0	1.15
Final O&M cost (% GDP)	2.6	2.5	1.5	1.9
Final output tax rate (%)	18.6	15.5	-	-
Final consumption tax rate (%)		-	16.5	14.2

Note: [1] Percentage change between steady states.

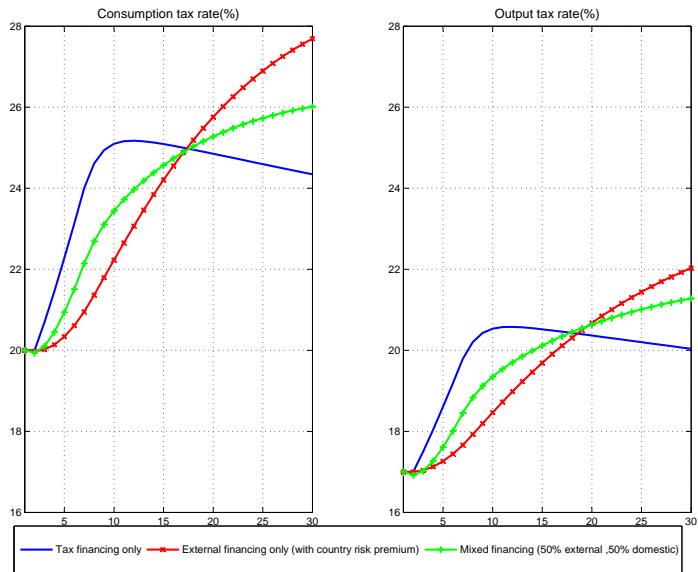
Conclusions and extensions

- We explore the impact on 'new' IMF DSF analysis of two staples of public finance theory
 - ▶ Taxation inflicts deadweight losses
 - ▶ Public investment entails ongoing budgetary costs of O&M
- Implications are material and point to important areas for reform
 - ▶ Without robust public expenditure institutions, public investment surges may be very expensive and potentially immiserising
 - ▶ Returns to reform of budgetary institutions potentially high
 - ▶ Tax reform may be as valuable as renewed public investment
 - ▶
- To take this further requires *much better* information on scale of r-coefficients and the costs of deficient O&M expenditures

Some basic extensions

- Non-concessional debt financing (domestic and external)
 - ▶ Explore alternative financing packages
- Debt financing raises steady state tax rates but finances 'tax smoothing' profile

Public debt and tax-smoothing



Tax ceilings and public investment

- There may exist 'hard' constraints to tax adjustment, either administrative and political, that render otherwise feasible public investment strategies infeasible
- We explore how lack of fiscal flexibility interacts with alternative debt financing
- Blending concessional financing may help to navigate fiscal inflexibility.

Tax ceilings and public investment

TABLE 6: Feasible public investment with tax ceiling.

Baseline settings as Table 1, columns (4) and (8); public investment increased by 3% of GDP

Domestic interest rate 10%; external interest rate $6\% + \theta(dc/y)$

	Consumption Tax			Output Tax		
Domestic debt (share of investment surge)	0%	0%	50%	0%	0%	50%
Non-concessional debt (share of investment surge)	0%	100%	50%	0%	100%	50%
Tax ceiling	24.0%	24.0%	24.0%	20.4%	20.4%	20.4%
Maximum unconstrained consumption tax rate	25.5%	28.6%	26.1%			
Maximum unconstrained output tax rate				20.8%	24.1%	22.2%
Financeable share of investment (no cost recovery)	81%	53%	47%	98%	60%	45%
Financeable share (50% cost recovery on O&M)	87%	57%	54%	109%	66%	56%