

Harnessing natural resource wealth for economic growth:

Tony Venables

Oxford Centre for the Analysis of Resource Rich Economies,
Department of Economics, Oxford

- Review of the facts
- Discussion of policy issues

Natural resources in Africa

	Resource revenue		Resource exports	
	% revenue	% GDP	% exports	% GDP
Algeria	70.5	26.3	97.6	36.8
Angola	79.8	33.4	91.8	68.0
Cameroon	27.7	4.8	44.7	8.3
Rep. Congo	69.6	22.2	88.3	68.7
Eq. Guinea	85.2	24.4	96.8	93.1
Gabon	60.1	19.2	81.7	47.5
Libya	72.5	36.1	97.0	36.6
Nigeria	78.9	32.3	97.2	46.2
Sudan	49.8	8.3	80.6	12.9
Botswana	62.5	20.6	79.5	32.2
Namibia	5.9	1.9	59.9	20.0
Sierra Leone	0.9	0.2	87.0	10.1
Zambia			60.5	16.6

- Oil, Sub-Saharan Africa; produce 6.5 mbpd, export 5mbpd @ \$30 barrel \approx \$50 billion pa \approx ODA to Africa
- Uneven across countries
- Prospecting and discoveries: New finds: Uganda, Ghana
Estimates of sub-soil wealth

Correlates of resource abundance

- Low savings and investment
 - National accounts measures
 - 'Real saving': Nigeria -30% GDP, Central Asia, 0%
- Low education (enrolment, years of schooling)
- High inequality
- High volatility of exports and income
- High incidence/ duration of civil conflict
- Resource booms are short-lived
 - Direct effect of price boom such as 2006-07:
 - Additional short run growth effect, raises GDP 2.5%
 - Additional long run (25 year) effect, reduces GDP 26%.
- Slow growth:
 - each 1% point increase in the share of natural resources in GDP reduces growth by 0.09% per annum.

Correlates of resource abundance

- **Effects are conditional:** Countries with 'good institutions' do not have the resource curse.
- Why is governance particularly important for resource rich economies?
 - Inherently through government:
 - Assigning mineral rights
 - Revenues
 - Timescales and time-consistency
- What aspects of 'good institutions'?
 - Checks and balances
- Natural resources undermine institutional quality
 - Corruption
 - Conflict; resources increase likelihood of civil war
 - Undermine accountability of the state
 - Enable bad policies to be maintained
 - Economic instability can undermine political stability
 - Effects are conditional.....if start with poor institutions....

Policy issues

What can be done to increase the chances of success?

- Necessary condition, a government committed to using resource wealth for the benefit of the citizens
 - Transparency: EITI
 - Codes of best practise – The Natural Resource Charter
- But lots of ways to get it wrong
 - Contracting with investors
 - Fiscal regimes
 - Consuming, saving, investing
 - Volatility
 - Absorption, adjustment and structural change

Policy issues: contracting with investors

How should exploration/ extraction rights be allocated to private investors?

- Prospecting – first come first served; Wild West & artisanal mining
 - Knowledge spillovers and gold rushes
 - Rent dissipation
 - Technical inefficiency
- Formal allocation procedure
 - Negotiation vs auctions
 - Context of imperfect and asymmetric information (geology and market).
 - Long term investments and time-consistency
- Auctions
 - Transparency
 - Competition is efficient in capturing surplus
- *but*
 - Multi-dimensional objectives – scoring auctions
 - Bundling lots
 - Attracting participation – prior geological survey information needed?
 - Negotiation vs auctions: Botswana

Policy issues: fiscal regime

How should the fiscal regime be designed?

- Principal-agent problem to design tax regime which:
 - Captures rent
 - Provides incentives for efficient extraction & future exploration
 - Shares risk
 - Delivers preferred time profile of revenue
 - Is 'sustainable' – avoid frequent renegotiation
 - Hold-up problem and expropriation risk.
- African experience:
 - Examples of good practise
 - Alternative models: tax-royalty; production sharing
 - High government 'take'.
 - Africa surely under-prospected; Hold-up & expropriation risk
 - Examples of contracts that have been negotiated poorly or under difficult circumstances
 - Zambian copper: 0.8% royalty, lower profit tax rate than rest of the economy, generous tax breaks.
 - Land deals for food/ bio-fuel?

Policy issues: consuming, saving, investing

How should resource revenues be used?

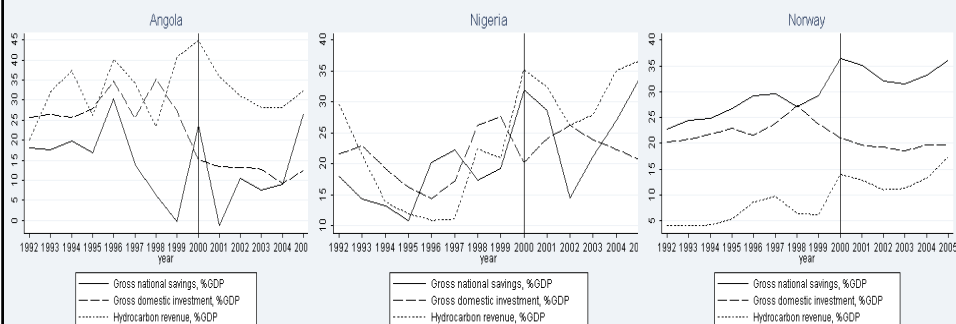
- Consumption/ Domestic investment/ Foreign asset accumulation (SWF)

Given that,

- Revenue is:
 - Temporary
 - Foreign exchange
 - Public funds
 - Volatile
- Country is:
 - Capital scarce
 - Weak government capacity and institutions

Policy issues: consuming, saving, investing

Historical record



- Comparing oil booms (IMF):
 - 1974-81: $\Delta \text{expend} / \Delta \text{revenue} = 0.93$
 - 2000-05: $\Delta \text{expend} / \Delta \text{revenue} = 0.55$
- Most developing countries need to save more – but can save too much.
- Eg; 'Bird in hand' (Norwegian?) model; only consume the interest on a sovereign wealth fund

Policy issues: consuming, saving, investing

Issues:

- Inter-generational distribution of benefit?
 - Rights based – custodianship
 - Utilitarian – spread through time with bias towards poor
- What assets?
 - Domestic/ Foreign
 - Public/ private
- What spending channels?
 - Public expenditure
 - Government lending/ debt reduction
 - Transfer to private sector: tax cuts/ citizen dividends

Policy issues: consuming, saving, investing

Two-period model:

$$c_2 = Y(\bar{K} + k, \bar{G} + g) + N_2 + r_W [y_1 - c_1 - k - (g - N_1)(1 + \lambda)]$$

- K, G capital, infrastructure stocks (complementary)
- First period non-resource income $y_1 = Y(\bar{K}, \bar{G})$
- k, g , investments.
- N_1, N_2 , resource revenue each period
- λ shadow premium on public funds
- $r_W = 1 +$ rate of return on foreign assets
- r_K, r_G endogenous

Social planner, max wrt k, g, c_1, c_2

$$W = u(c_1) + Eu(c_2) / \rho$$

Policy issues: consuming, saving, investing

First order conditions wrt c_1, k, g :

$$u'(c_1) = (r_W / \rho)Eu'(c_2) \quad r_K = r_W \quad r_G = (1 + \lambda)r_W$$

Concentrate on growing consumption case; if $r_W > \rho$, then $c_2 > c_1$.

I: The developed economy: permanent income hypothesis.

- Resource revenue is simply a shift in the budget constraint, present value $N_1 + N_2 / r_W$
- No change in $\lambda, r_W \rightarrow$ no change in k, g .
- c_1, c_2 increase together.
- Accumulation of foreign assets (SWF) if $N_1 \gg N_2$
- Prudence ($u''' > 0$) \rightarrow increase saving in response to N_2 uncertainty

Policy issues; consuming, saving, investing

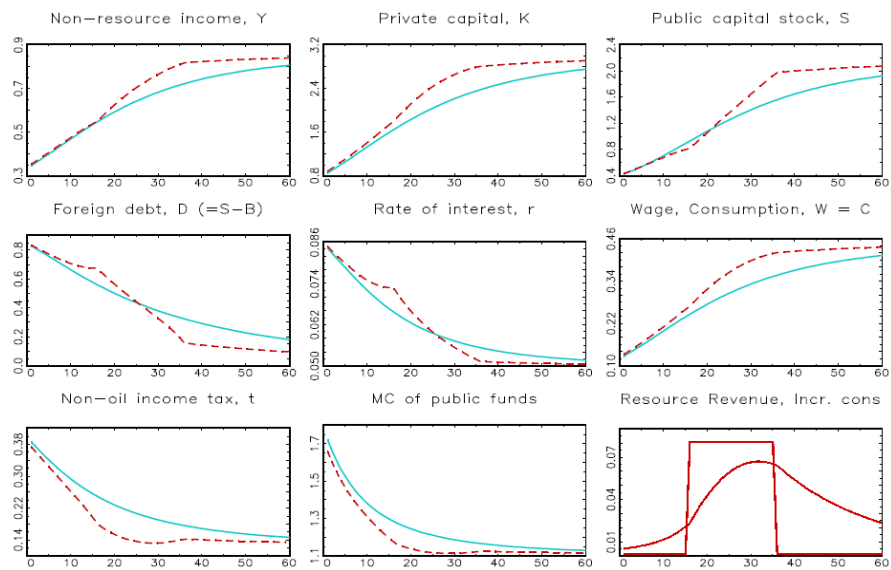
$$u'(c_1) = (r_W / \rho) E u'(c_2) \quad r_K = r_W \quad r_G = (1 + \lambda) r_W$$

II: The developing economy: accelerating growth

- Resource revenue $\rightarrow r_W$ high and falls
 - Direct effect
 - Foreign debt reduction
- Resource revenue $\rightarrow \lambda$ high and falls
 - Finance g without distortionary taxation.
- Increase g (λ and r_W)
- Increase k (direct and complementarity)
- Consumption profile becomes flatter (r_W/ρ falls)
- Compared to PIH:
 - Less saving (c_1 increase relatively more)
 - Saving goes to domestic investment rather than SWF

Use revenue to bring forwards development path rather than increase consumption in the far distant future.

Continuous time variant: using revenue to bring forwards development



Policy issues; consuming, saving, investing:

III: The Ricardian economy: booming consumption

- **2nd stage;** private sector, discount rate $\delta \geq \rho$

Transfers t_1, t_2

Access to international capital markets

Max V wrt c_1, c_2, k :

$$V = u(c_1) + Eu(Y(\bar{K} + k, \bar{G} + g) + t_2 + r_w[y_1 - c_1 - k + t_1]) / \delta$$

$$u'(c_1) = (r_w / \delta) Eu'(c_2) \quad r_K = r_w$$

- **1st stage;** government

Max W wrt t_1, t_2, g : subject to budget and 2nd stage:

$$t_2 = N_2 + r_w[(N_1 - g)(1 + \lambda) - t_1]$$

$$W = u(c_1) + Eu(Y(\bar{K} + k, \bar{G} + g) + N_2 + r_w[y_1 - c_1 - k + (N_1 - g)(1 + \lambda)]) / \rho$$

- t_1, t_2 disappear -- Ricardian consumers
- Change in g has no effect on c_1, c_2 .
- Change in g can change k , but effect is of no value so $r_G = (1 + \lambda)r_w$

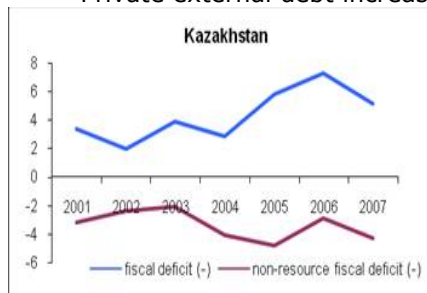
Consuming, saving, investing: Ricardian consumers

III: The Ricardian economy: (continued)

- Fall in $r_w \rightarrow$ private sector surge of investment and (especially, if $\delta \geq \rho$) consumption.
- Government prudence is irrelevant: eg, low t_1 , high t_2 foreseen by private sector.

Kazakhstan: 2004-08:

- Govt saved 2/3rd oil revenue;
- SWF + reserves increased by \$50bn
- Private external debt increased by \$30bn



Consuming, saving, investing: private sector response

IV: The economy with capital controls: raising investment

- 2nd stage; private sector, discount rate $\delta \geq \rho$, transfers t_1, t_2
Domestic investment but no access to international capital markets

Max V wrt c_1, c_2, k :

$$V = u(c_1) + Eu(Y(\bar{K} + \{y_1 - c_1 + t_1\}, \bar{G} + g) + t_2) / \delta$$

$$u'(c_1) = (r_K / \delta) Eu'(c_2)$$

- 1st stage; government

Max W wrt t_1, t_2, g : subject to budget and 2nd stage

$$W = u(c_1) + Eu(Y(\bar{K} + \{y_1 - c_1 + t_1\}, \bar{G} + g) + N_2 + r_W [(N_1 - g)(1 + \lambda) - t_1]) / \rho$$

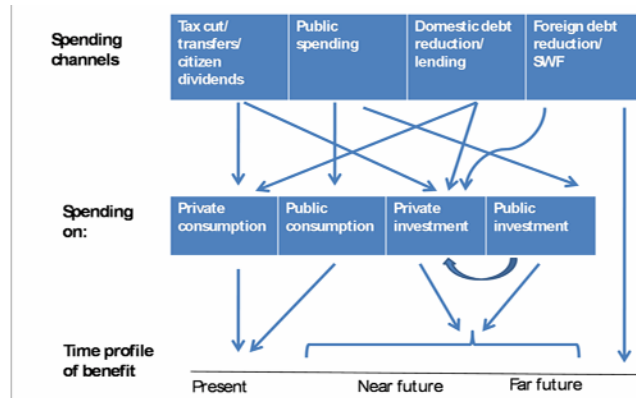
$$[r_G - (1 + \lambda)r_W] u'(c_2) / \rho + [u'(c_1) - (r_W / \rho) Eu'(c_2)] dc_1 / dg = 0$$

Incentive to increase g & reduce t_1 to reduce current consumption

$$[r_K - r_W] u'(c_2) / \rho + [u'(c_1) - (r_W / \rho) Eu'(c_2)] dc_1 / dt_1 = 0$$

Consuming, saving, investing: conclusions

- For capital scarce developing economy priority is to raise growth by *domestic* investment
- Role of infrastructure investment to increase private investment
- Requires public expenditure systems: honest & efficient
- Need to understand private sector response to various spending channels.



Policy issues: volatility

How to handle extreme volatility?

- Evidence that volatility a key factor in resource curse.
- Hard to reverse spending commitments that become unaffordable
- Role for stabilization fund to:
 - a) Self-insure against periods of low price/ revenue
 - b) 'Park' funds abroad when absorptive capacity is limited

Oil funds in practise: -- two objectives:

- Stabilization fund / savings ('future generations') fund:
- Need to keep clear separate objectives & importance
- 2005: 21 out 31 oil producers have funds (IMF);
 - 10 focus on stabilisation, 8 stabilisation and saving.
 - Stabilisation funds typically price or revenue contingent
 - Eg Trinidad and Tobago: 60% of 'excess revenue' (based on deviation of price from long moving average) placed in fund.

Policy issues: volatility

Design criteria: how big should a stabilization fund be?

- Is it possible to insure/ hedge?
 - Mexico – incomplete and expensive.
- Cost of volatility to the domestic economy?
 - Consumption, investment
- Opportunities for borrowing in downturn?
 - High cost, possibly closed off. Shocks facilities.
- Stochastic process governing resource
 - Random walk; Flat and spikes
- Political risk – fund is lootable.

Absorption, adjustment and structural change

How to manage the impact on other sectors?

- Do resource revenues crowd out other activity?
Eg, Increased spending on non-tradables may bid up prices & crowd out production of tradables (Dutch disease)
- Not inevitable: need to understand supply response:
 - Unemployed resources: $\Delta Y = R / (\text{marginal propensity to import})$ (crowd-in production via Keynesian multiplier)
 - More generally – slope of supply curves.
- Short-run: 'absorptive capacity'
 - Eg construction boom → higher P not Q.
 - Response: openness; 'investing in investment'
- Long-run: Dutch disease
 - Heterogeneous country experience: Malaysia vs Nigeria
 - Use revenues to raise productivity, make complementary investments.

Conclusions

- Opportunity that must not be wasted again
- Complex economic and political economy issues
 - African governance much improved
- Guiding principles
 - Transparency
 - Competition
 - High savings – but for domestic investment
 - Promote flexible domestic supply response