

Discussion of “The Role of Energy Capital in
Accounting for Africa’s Recent Growth
Resurgence,” by S. Fried and D. Lagakos

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My discussion

- ▶ Revisit the paper and highlight key mechanisms at work
- ▶ Discussion - Data and model mechanisms
- ▶ further suggestions

Objectives and methods

- ▶ Objective: how much of the recent growth in Africa can be accounted for by observed increases in “energy capital.”
- ▶ Paper highlights important facts: impressive growth in electricity consumption per capita (twice as fast as that of GDP per capita).
- ▶ Since manufacturing growth tends to be related with electricity consumption, the channel is promising.
- ▶ Empirically there is a challenge - is higher consumption supply or demand driven? - to sort out this problem, the paper develops a closed-economy, dynamic general equilibrium model.
- ▶ Model is used to determine impact when the only change is higher energy capital.

Key elements of the model

- ▶ Elements of the model:
 - ▶ Energy is valued as a consumption good, and it is complementary (as an input) to capital-labor in producing non agricultural goods.
 - ▶ Energy is produced through a combination of grid energy (requires public “energy capital”) and off grid energy (private capital - generators, home based solar sources)
 - ▶ Energy - closed economy model - energy is produced and consumed domestically and its price is an equilibrium object.
 - ▶ Households - completely standard (with subsistence level requirements in agriculture), log preferences.

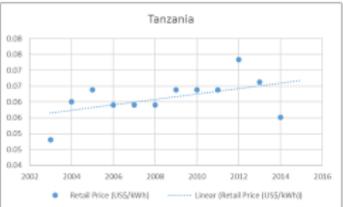
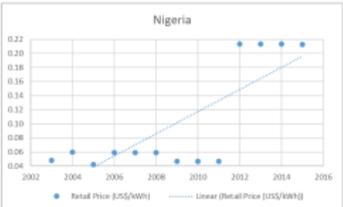
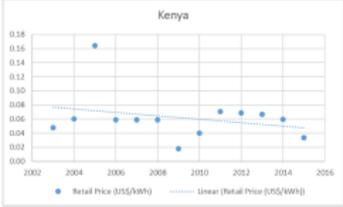
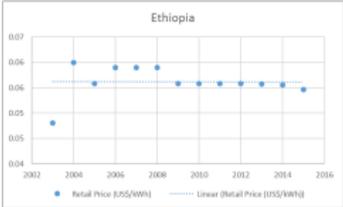
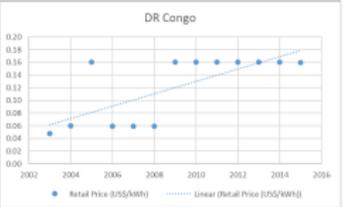
Transmission mechanism

- ▶ Key counterfactual experiment: increase public investment in energy capital.
- ▶ In the model this is equivalent to taking a lump sum tax on households and using it for infrastructure (can this be welfare improving?)
- ▶ Markets are competitive, hence, individuals or non energy producing firms will only change their demands when prices change or incomes change.
 - ▶ Increasing public investment in energy capital increases the supply, this pushes energy prices down, energy is complementary with other goods in production so the value of the marginal product of other productive inputs increases.
 - ▶ Energy capital is like infrastructure as it improves productivity of the sector; wages will go up.
- ▶ Mechanisms in the model are very transparent and economically intuitive.

The price mechanism

- ▶ Energy prices are heavily regulated in Africa.
- ▶ Further, the period of growth coincides with the boom in energy prices.
- ▶ How do prices look in the data?

Final user energy prices and consumption



The incomes mechanism

- ▶ Energy capital is like infrastructure
- ▶ Private firms have

$$\Pi_g = p_g A_g K_g^\phi N_g^{1-\phi} - w N_g$$

- ▶ What is ϕ
 - ▶ efficiency of infrastructure parameter - typically low values (maximum of 0.15 in aggregate)
 - ▶ capital share (position taken by this paper, value of 0.9)

Further suggestions

- ▶ There are good reasons to believe there is a link between energy availability and growth in Africa.
- ▶ Method of quantitative general equilibrium model seems the right approach, ingredients I would consider incorporating
 - ▶ The problem of availability may not manifest into a problem of (high) prices but a problem of randomness of availability.
 - ▶ Suppose firms can use two technologies, one that uses a generator (simple machines) vs one that uses a modern assembly plant (modern manufacturing) but requires constant energy flow, supply here could have the desired impact.
 - ▶ Even if price goes up (if the cost of production goes up, also suggested by the data) the availability of energy causes more efficient technologies to be used.

Further suggestions

- ▶ Currently the markets are competitive with no frictions; it is difficult to obtain welfare gains.
- ▶ Other international prices also moved (agricultural commodities), the interactions with energy availability may not be trivial.
- ▶ What about the bust?
- ▶ Reliable electricity may also be complementary to important infrastructure (making water available), which has been linked to economic activity (micro enterprise start ups , particularly for women) - Dinkelman (AER 2011)