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# Public Capital and Growth

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- Public capital = core public infrastructure assets.
- Public capital stock:

$$K(t+1) = (1 - \delta)K(t) + I(t)$$

- $\delta \in (0,1)$ : depreciation rate.

$$K(t+1) = (1 - \delta)K(t) + \alpha I(t)$$

- $\alpha \in (0,1)$ : efficiency/governance indicator.

# Africa's Infrastructure



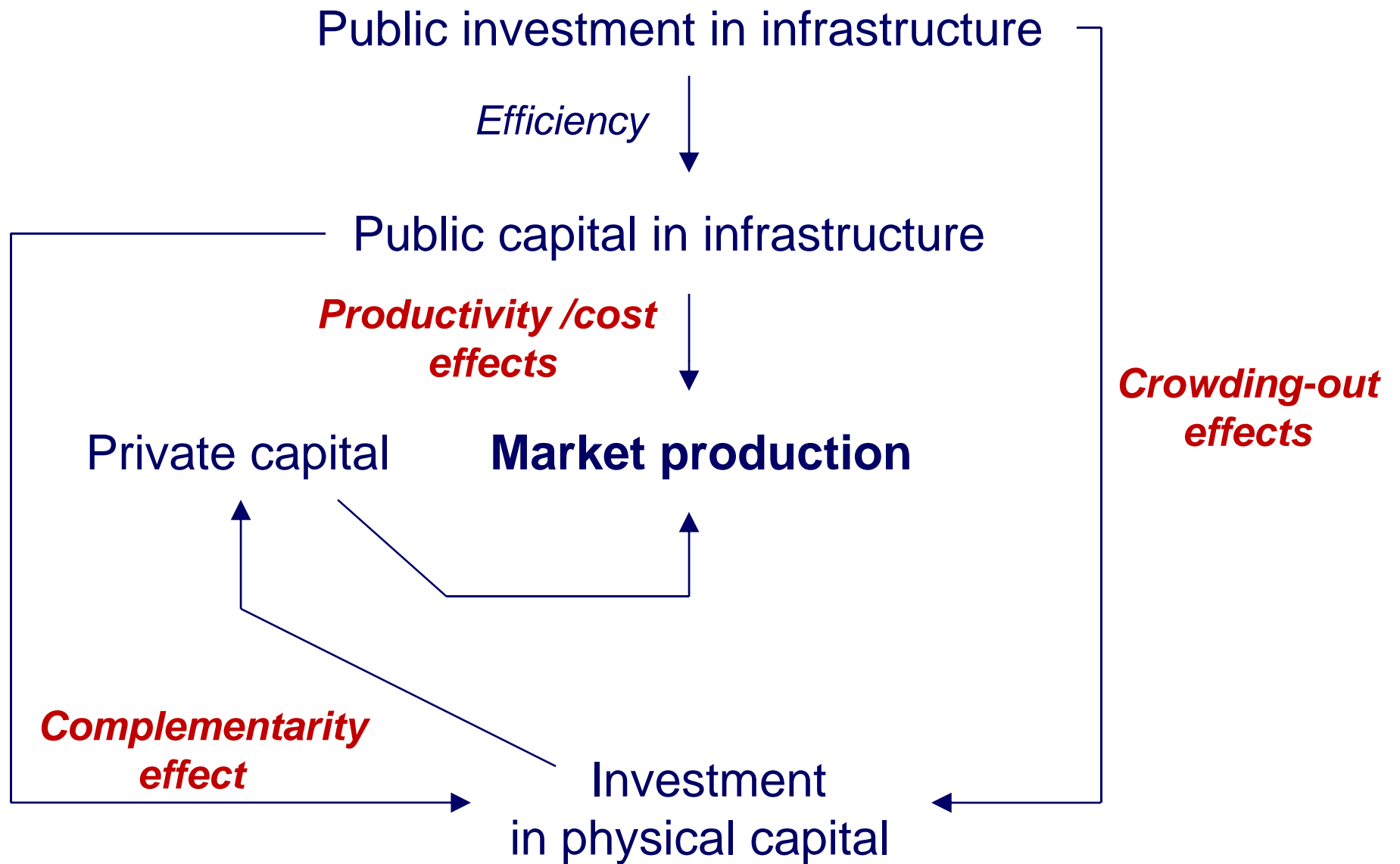
## A Time for Transformation

**Vivien Foster and Cecilia Briceño-Garmendia**

Editors

- What matters is the flow of services produced by the stock of public capital, not the flow of investment itself.
- Issue further discussed below.

# Conventional Channels

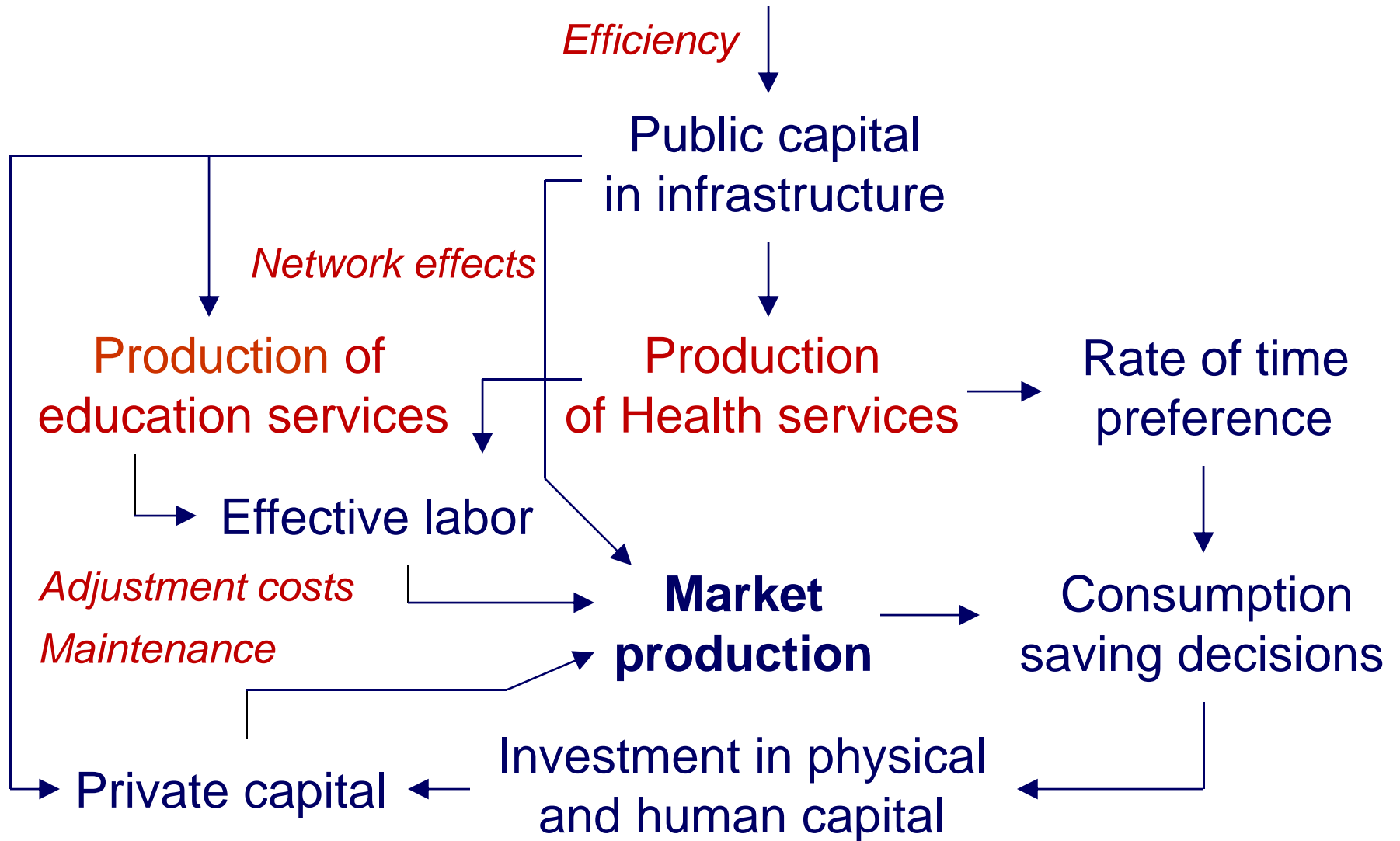


# New Channels

- No comprehensive, recent overview paper; theoretical contributions scatters in professional journals.
- All these channels were not “suddenly” discovered; for some of them, strong micro evidence has been available for quite some time.
- Rather, macroeconomists have only recently started to integrate them more systematically in their theoretical and applied models.



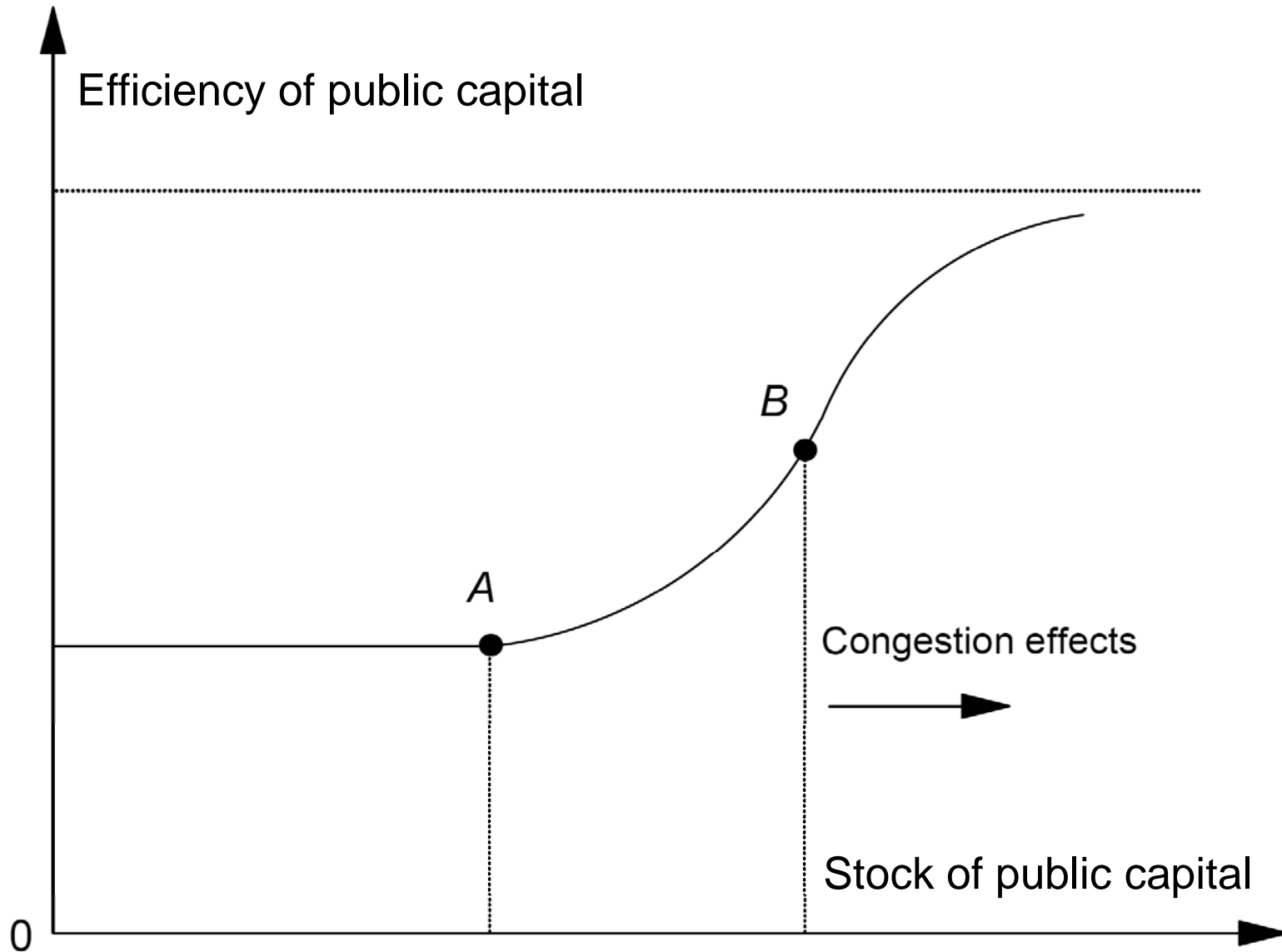
# Public investment in infrastructure



- Research on efficiency: role of political economy factors.
- Example of impact on adjustment costs: in response to permanent shocks (e.g., shocks to relative prices), easier for firms to reallocated resources across sectors.
- Example of impact on maintenance: poor roads make it more costly to operate trucks and increase maintenance costs for private sector; may “crowd out” private investment.

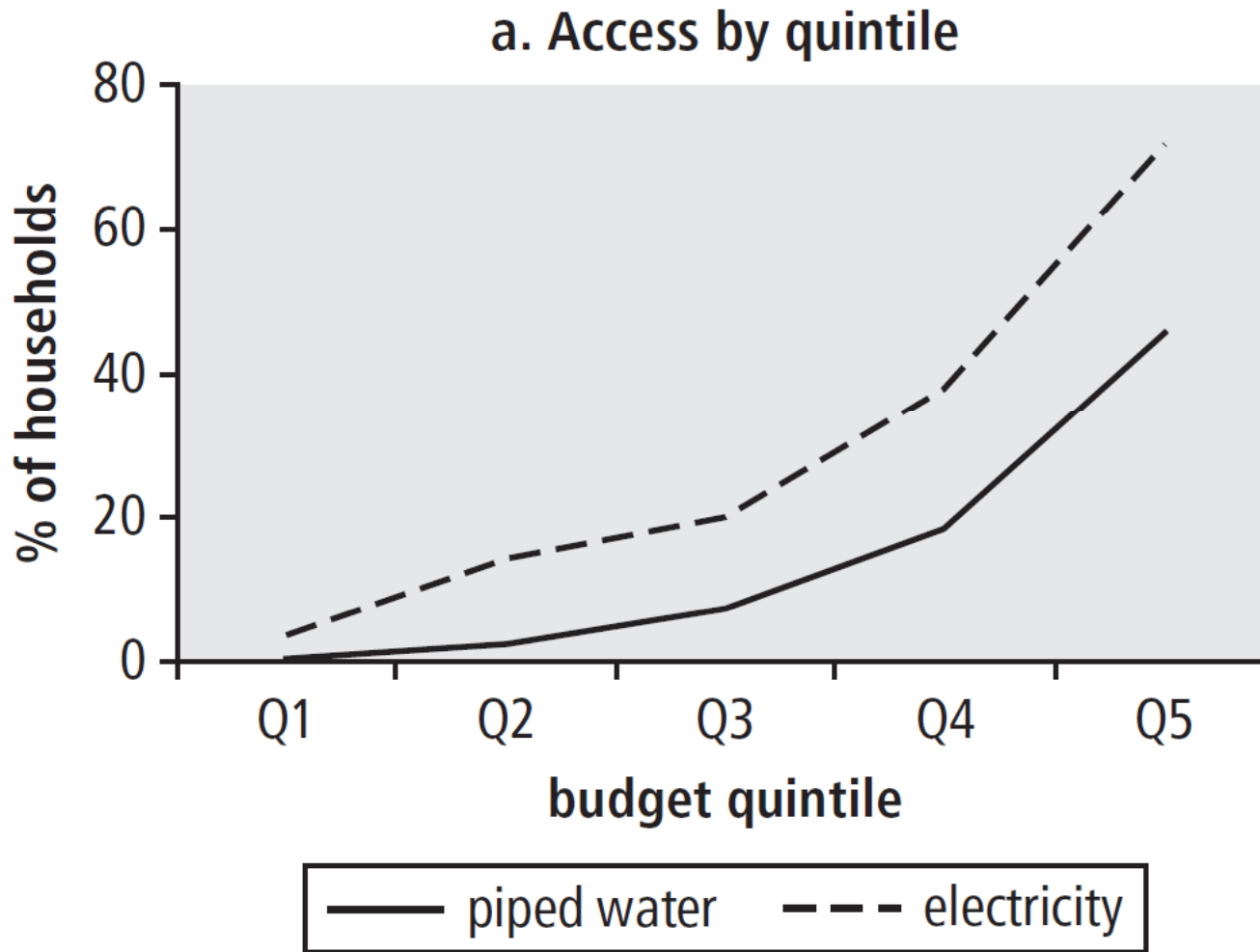
- Examples of impact on education and health:
- 1. Water and sanitation—increase in enrolment rates (especially for girls, rural areas).
- 2. Electricity—allows hospitals and schools to function properly.
- 3. Roads—easier for patients/students, and teachers/medical workers to get to school/medical facilities.

# Stylized View of Network Effects



- Impact on **innovation** (ability to innovate and diffusion of innovations); evidence: important role of telecommunications.
- Impact on **income distribution**. Improved access to infrastructure may reduce inequality.
- Possible reason: improved access benefits the poor more than proportionally; if inequality is bad for growth (e.g., due to credit market imperfections), then indirect effect on growth.
- However, more research is needed.

# Africa: Access to Piped Water and Electricity



Note: Q1 = first (or poorest) budget quintile; Q2 = second budget quintile; Q3 = third (or middle) budget quintile; Q4 = fourth budget quintile; Q5 = top (or richest) budget quintile.

- Causality can go both ways.
- Example: access to piped water and electricity in Africa; richer households have higher access rates.
- 1. Households with access to clean water are in better health and more productive; this implies higher income.
- 2. higher-income Households live in urban areas, where connectivity is easier (higher pop. density) and/or have greater ability to “force” governments to spend on these services.

- Impact on **gender equality**.



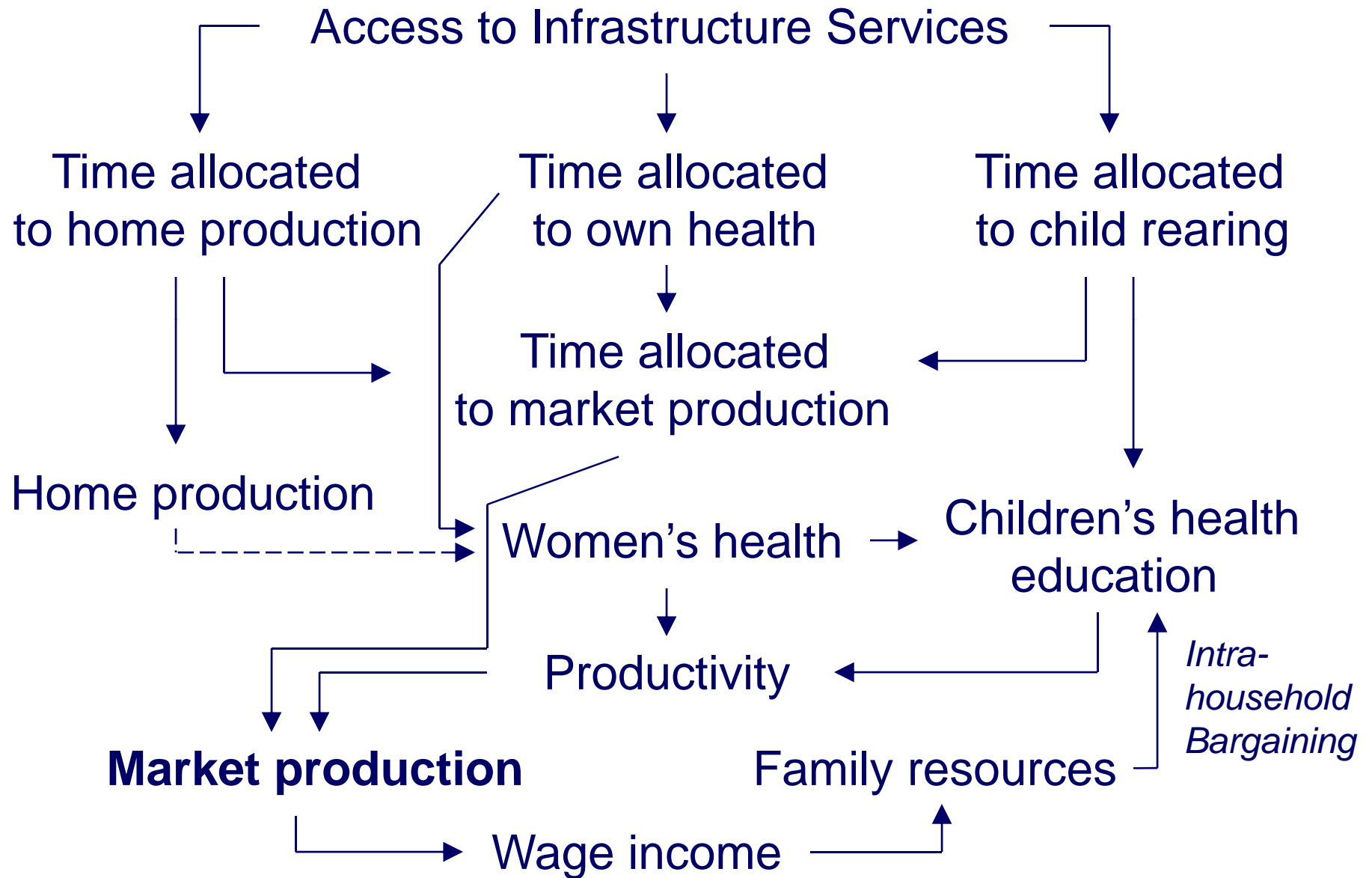
Table 3.7. Time Spent on Fetching Water and Collecting Firewood by Women and Men (In hours and minutes)

		Benin (1998)			South Africa (2000)			Madagascar (2001)		
				Women/ Men			Women/ Men			Women/ Men
		Women	Men	Men	Women	Men	Men	Women	Men	Men
Fetching water	Urban	16	6	267%				16	10	160%
	Rural	1h 2	16	388%				32	8	400%
	Urban and rural	45	12	375%	8	3	267%	27	9	300%
Collecting firewood	Urban	3	1	300%				3	6	50%
	Rural	23	5	460%				8	27	30%
	Urban and rural	16	4	400%	6	3	200%	7	13	54%

Source: Blackden and Wodon (2006).

Note: time in minutes.

# Gender Dimension of Infrastructure



# Policy Implications

- 1. Investment spending is a **poor proxy** for the accumulation of public productive assets.
- Possible to have at the same time negative impact of the flow (crowding-out effect), and positive impact of the stock, on growth...
- ...important for assessing the fiscal stance (size of deficits/debt sustainability).
- 2. Accounting for **quality** of stocks and **congestion effects** is also important.

- Moreover, inverse correlation between quality of infrastructure and level of corruption.
- Scaling-up of public investment must be accompanied by improvements in selection, implementation, and monitoring of investment projects.
- Need to go beyond discussions of spending levels and address issues of the broad **institutional framework** underpinning provision of investment.

- **3.** Beyond productivity/cost effects: critical to capture externalities associated with public capital.
- Investing in infrastructure is as much about promoting markets as it is about achieving health/education targets and empowering women.
- Implication for public expenditure allocation; best way to improve education/health outcomes could be to spend more on infrastructure.
- Implication for the selection of infrastructure projects; in addition to IRRs, account for benefits in terms of health/education.

- Impact of infrastructure on growth: underestimated by single-equation, cross-country regressions.
- 4. Account for **network/threshold** effects in elaborating investment programs.
- 5. For LICs, issue is not only the **level** of aid/foreign financing to support infrastructure investment, but also its **volatility**.
- With “time to build”: if aid/foreign financing is too volatile, it may hurt more than it helps.

- 6. Account for both “old” and “new” channels in macro analysis and macro models.
- Accounting for supply-side effects: crucial to understand that the **Dutch disease does not have to be a terminal illness.**
- Essential to study debt sustainability issues, fiscal rules, in a medium-term context...
- ...and to calculate aid requirements/external borrowing needs.



# Public Investment, Macro Model, and External Funding

