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Infrastructure, economic growth and development

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Infrastructure, Economic Growth & Development

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Infrastructure is one of the most important asset classes in any economy.

**Defined**

Infrastructure (or social overhead capital) refers to the assets, networks and management that facilitates economic development, social & economic activity within an economy.

Infrastructure provides benefits to society and the economy.
Infrastructure delivers services …

**Social infrastructure:**
- Urban development
- Health services
- Education – primary, secondary and tertiary
- Public housing
- Justice – courts, corrective services, police stations
- Emergency services and IT
- Public buildings

**Economic infrastructure:**
- Ports, airports
- Roads
- Water resources
- Telecommunications
- Energy generation, transmission and distribution
- Communications
- Urban transport, railways.
The state plays a central role in the supply & distribution of infrastructure – in developed economies, over 73% of assets are state owned & operated *(Regan 2004).*

Delivery mechanisms:

- **Direct government participation** (eg. SEQIPP)
- **Statutory authorities**
- **Government business enterprises**
- **Outsourcing to private sector** (BOOTs, IMAs, PPPs and alliance contracting/management contracts).
Most infrastructure in developed and emerging economies is financed & managed by government business enterprises.

The issues:

• Enterprise performance (public choice theory)
• Community service obligations (CSOs)
• Asset allocation (policy based decision-making overrules economic fundamentals)
• Public failure (water, public transport)

Negative impact on microeconomic performance.
Constraints on future state funding:

1. Limited capacity for the state to use fiscal measures (public debt, increased taxes).
2. The deadweight effects of public fiscal stimulus
3. Microeconomic efficiency at the enterprise level
4. New approaches needed to service delivery (greater use of technology, innovation)
**PROCUREMENT IN THE BROADER NATIONAL ECONOMY**

Cyclical or macro-management decisions result in imbalance between demand & supply. Under-supply generates higher prices (+ inflation) & constrains economic activity & growth.

### SUPPLY

**Inputs:**
1. Capital (investment, NCS incl. av. age, capital productivity & deepening)
2. Labour (population growth, participation rate, education)
3. Infrastructure (productive capacity)
4. Technology (productivity gains, innovation, R&D, management efficiency)
5. Policy - fiscal & monetary (savings, domestic & foreign investment)
6. Land
7. Externalities eg. energy

### DEMAND

**Defined:** The total quantity of output that consumers, industry & government buy in a period (FCE or final consumption expenditure).

**Inputs:**
1. Consumption expenditure (household disposable income, consumer wealth)
2. Government outlays & capital expenditures
3. Net exports
4. Private domestic investment ...

What are the determinants of investment?
+ COC (monetary policy incl. interest rates & availability of money – credit or profits)
+ Expectations & confidence
+ Level of output.

**Final Consumption Expenditure (GDP)**
- Households: 63%
- Government: 22%
- Business: 15%

**Factors:**
- Capital Market: Equity, Debt
- Profits
- Taxation

**Long-run Movement Short-term Response**

**Strategic Infrastructure**
Infrastructure investment has a significant and causal relationship with a nation’s economic and social development.

Optimal investment in the Asia Pacific region means improved living standards and competitive advantage.

Significant differences in the social return from different industries …

Highest – telecommunications, transport
Long term – health and education.
Infrastructure plays a central role in economic and social development.

**Macroeconomy**
- Productive capacity, output & economic growth
- Technical progress
- Productivity growth
- International trade
- Direct foreign investment (DFI)

**Microeconomy**
- Private sector costs, returns
- Spatial development
- Regional development
- Private investment
- Employment & incomes
- Externalities
Direct & Indirect Impacts

1. Productive capacity (NIEIR 2002)
2. Output (Aschauer 1998; Canning 1989; Kamps 2004; Pereira & Roca-Segales 2001)
4. Transitional impacts - employment & incomes
5. Sustainable impacts - productivity, competitive advantage
7. Private sector industry performance, costs and returns (Berndt & Hansson 1992)
9. Regional economy spatial development (industrial agglomerations) (Dawkins 2003)

SOURCE Regan 2004; 2007
**INFRASTRUCTURE INVESTMENT**

**Contribution to Growth**

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<td>Fiji</td>
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**SOURCE EBRD 2006, WDF 2007, Regan 2008**
1. Diminishing returns (Barro & Sala-i-Martin 2001)
2. Optimality (Gramlich 1994)
3. Role of intermediate variables (Graham 2005)
5. Efficiency in use (Hulten 1996)
6. Two-way causation (Looney 1998)
7. State investment imposes deadweight costs (Morrison & Schwartz 1996)
8. Different regional effects (Pereira et al 2006)
9. Transitional v. long-term benefits (Shioji 2001)

SOURCE Regan 2004; 2007
The relationship between infrastructure and economic development is difficult to measure:

1. Multi-national studies inconclusive (GPI)
2. Evidence of 2 way causation
3. Around 50% of new investment accounted for by depreciation & capital wasting.
4. Quality of delivery & management
5. Identifying optimal investment levels (Regan 2004)
6. The impacts are direct and indirect …
The role of intermediate variables..

Investment → Capital Deepening → Productivity → Economic Growth

Source: Erenburg 1993, 1994
CAPITAL DEEPENING AND PRODUCTIVITY
Australia, 1989-2002

SOURCE ABS 1350.0 Table 1.6 Feb 2003
Social return from infrastructure investment in emerging economies:

1. Short-term stimulus provides employment, incomes & skills transfer *(McCann 2001)*
2. Long-term multipliers *(Farrell 2006)*
3. Long term externalities (sustainable employment, technology transfer, vocational training and skilled employment) *(Armstrong & Taylor 2000)*
4. Poverty alleviation *(Grabowski et al 2007)*
5. Improved amenity, quality of life and standard of living *(SEQIPP Study 2007)*
What is an optimal level of investment?

- Australia 7% GDP (SEQAPP 12% short-term)
- Caribbean 12% GDP
- SADC (African) countries 14% GDP
- European Commission (western) 6-7% GDP and 10-11% GDP (Eastern).

* assumes current GDP and population sizes (EC 2007; EBRD 2007; Manninen 2008).
GROSS FIXED CAPITAL FORMATION
Australia

GDP %


Public GFCF  Private GFCF  Total GFCF  Av. Age (Years)
Emerging economies

1. Low historical investment in GDP and per capita terms
2. Level of development of the finance sector, fiscal policy, credit rating & DFI
3. Initial returns from investment are greater moving towards a long-term steady state rate of growth
4. The opportunity to benefit from new and emerging technologies – energy, water management, telecoms.
Developed economies

1. Declining investment (GDP and per capita)
2. Diminishing returns
3. Convergence via international capital mobility and trade
4. Ageing infrastructure
5. Increased levels of unbundling and privatisation
6. High levels of depreciation
7. The challenge of climate change.
Infrastructure investment in the Pacific:

1. Trade facilitation

2. Planning for essential infrastructures that develop major industries:
   - **Tourism** (airports, ports)
   - **Manufacturing** (reliable energy, roads & telecommunications)
   - **Foreign investment** (legal & financial institutions, foreign currency).
INFRASTRUATURE INVESTMENT, CAPITAL STOCKS,
CORPORATE PROFITS & INCOMES, Australia, 1989-2002

SOURCE ABS 1350.0 Table 1.6 2003 (Feb.)
NEO-CLASSICAL (EXOGENOUS) GROWTH THEORY
(Recent development: Solow 1956, Swan 1956, Meade 1961)

- An economy will move toward a steady state (conditional convergence)
- In this state, growth depends only on the rate of technical progress (an element outside the model)
- Policy measures (tax cuts, public spending) have little (if any) effect.

The Solow model shows how savings (or investment), population growth and technological progress affect output & growth over time (Mankiw 2005, Macroeconomics, 5th. edn., Worth Publishing).

ENDOGENOUS (LONG-RUN) GROWTH THEORY

- Helps to explain the rate of technical progress using investment & R&D
- The production of new technologies (R&D, public & private research spending, preferences)
- Population growth (fertility rate), human capital (labour force health, education & literacy) are key factors
- Policy measures are effective – increased public expenditures on infrastructure, systematic research etc.
- New growth spillovers/externalities.

Issues
- Willingness to save (invest) in R&D
- Rate of growth depends on various characteristics of preferences & technology including the level of production, cost of R&D and scale of the economy. (Barrow & Sala-i-Martin 2001).

INTERNATIONAL
Purchasing power parity (PPP)

MEASUREMENT
Comparison of GDP per capita