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Growth and Distributive Impacts of Public Infrastructure Investments in the Philippines

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Structure – Content

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Introduction

Philippine Infrastructure and Poverty Trends

- Relatively low ranking in quality of infrastructure (WEF's GCR 2012-13)
  - 98th (out of 144) in quality of overall infrastructure
  - Ranked 87th in quality of roads, 94th in railroads, 98th in electricity supply, 112th in air transport, and 120th in port infrastructures.

- The projected infrastructure needs of the Philippines over the 2013-2020 period is US$110billion (2nd largest in ASEAN-4), of which 46% are in power, 24% in roads, and 23% in railroads (Goldman Sachs 2013).

- Philippine public infrastructure investment (% of GDP) stood at 2% in 2012, but the government plans to bring this up to 5% by 2016.

- Poverty incidence in the Philippines stood at 27.9% in 1H12, about the same compared with 1H09's 28.6% and 1H06's 28.8% (NSCB 2013).

Introduction

Government Policy on Infrastructure

- Infrastructure development program is aimed at contributing to inclusive growth and poverty reduction (Philippine Development Plan 2011-16)
- Increase tax revenues and more foreign/domestic borrowings for infrastructure spending.
- Public-private partnership (PPP) program to attract infrastructure investments.

Research Objectives

Objective No. 1:

- Utilize a combination of CGE and micro-simulation methodologies to trace and understand the channels via which public infrastructure investments filter through the Philippine economy.

Objective No. 2:

- Provide advice to policymakers on the potential immediate, short-run and long-run effects of increased public infrastructure expenditures when financed by either higher taxes or international borrowing.

Methodology and data

CGE Model

- Dynamic general equilibrium model (Dissou and Didic 2011)
- Small open economy with access to international capital markets.
- Public capital as input to the production function.
- 2 types of households and firms (constrained and non-constrained).
- Sectoral gross output is a CES aggregate of intermediate inputs and index of value added and public capital.
  - Index of intermediate input is a Leontief function of intermediate inputs.
  - Value added is a CES composite of labor and private capital.
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Methodology and data

CGE data

- Philippine SAM (Corong and Cororaton, 2009)
- Light manufacturing sector has highest value added, investment, exports and imports; other services has largest consumption.

Characteristics of Philippine economy (2000 SAM), % share

	Value added	Consumption	Investment	Government	Exports	Imports
Crops and livestock	4	3.5	4.5	0	1.2	1.9
Other agriculture	0	3.2	0.1	0	0.8	0
Food, beverage and tobacco processing	2	19.9	0.4	0	3.6	4.1
Mining	0.2	0.1	0	0	0.4	9
Paper and wood	1.7	0.7	0.3	0	2.1	1.8
Petrochemical	1.1	3.7	0.2	0	2.6	7.4
Textile s and garment s	1.1	3.2	0.2	0	9.5	5.2
Heavy manufacturing	1.4	0.1	0.6	0	2.7	4.7
Light manufacturing	85.3	3	48.6	0	59.5	47.9
Other manufacturing	3.2	1	2.7	0	3	2
Public services	0	0.1	0	100	0.1	0
Other services	0	61.6	42.4	0	14.6	16

Methodology and data

Microsimulation module

- Top-down CGE microsimulation module (Cockburn, Duclos, and Tiberti 2011)
- 2006 Philippine Family Income and Expenditure Survey (FIES) data.
- Logit model specifying the probability of being a non-constrained/constrained household.
- Foster-Greer-Thorbecke (FGT) poverty indices and Gini coefficient.

Policy Simulations

Scenario 1

- 25 percent increase in the public infrastructure expenditure-GDP ratio financed by international financing (concessional interest rate of 6%)

Scenario 2

- 25 percent increase in the public infrastructure expenditure-GDP ratio financed by production taxes.

Research results/key findings

Macro-economic results (% change from baseline)

- Real GDP falls in first year but grows in short- and long-run periods for both scenarios.
- Real exchange rate appreciation (stronger in scenario 1)
- Household consumption, private investment more positive in scenario 1.

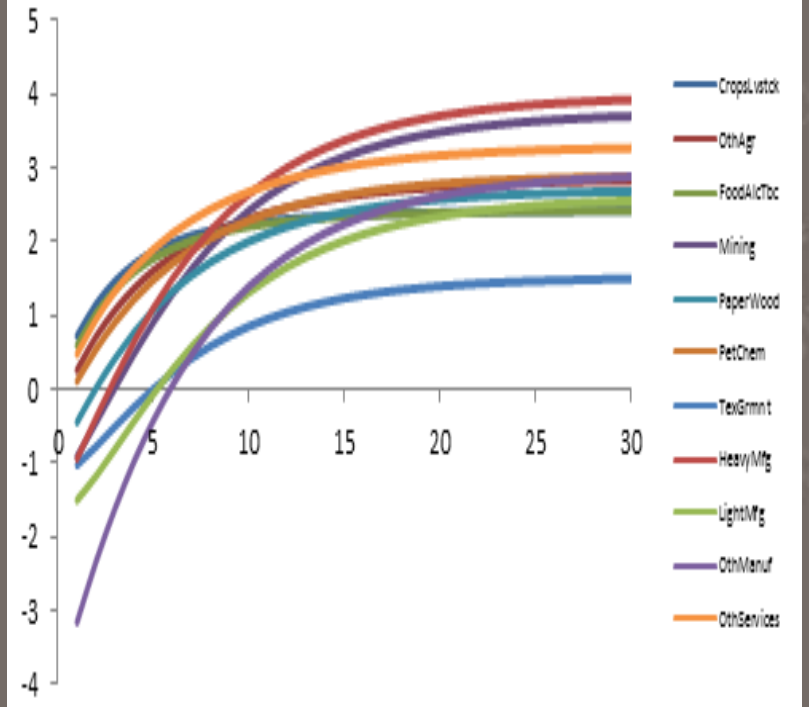
	International financing			Production tax financing		
	First	Short run	Long run	First	Short run	Long run
Real GDP	-0.1	1.5	2.9	-0.2	0.9	2.0
Wage rate	1.0	3.6	6.5	-1.0	1.5	4.1
Price of investment good	1.0	0.6	0.2	0.4	0.2	0.0
Total investment	6.4	7.7	8.2	5.2	6.6	7.1
Public investment	25.6	27.1	28.7	25.2	26.5	27.8
Private investment	0.8	2.0	2.3	-0.6	0.9	1.2
Constrained	1.4	1.7	1.9	-0.5	-0.2	0.1
Non-constrained	0.5	2.3	2.5	-0.6	1.5	1.8
Total household consumption	2.2	2.5	2.7	0.2	0.4	0.6
Constrained	2.4	2.3	2.0	-0.1	0.0	0.1
Non-constrained	1.9	2.7	3.3	0.6	0.8	1.1
Total exports	-2.8	-0.7	2.0	-1.2	1.0	3.5
Total imports	2.6	3.0	3.5	1.0	1.9	2.5
Real exchange rate*	-1.6	-0.9	-0.5	-0.6	-0.5	-0.4
Foreign saving	0.9	0.4	-0.3	0.8	0.4	-0.2
Total capital stock*	0.0	3.8	8.2	0.0	3.3	7.2
Public capital stock*	0.0	13.5	27.5	0.0	13.3	26.6
Private capital stock*	0.0	0.7	2.1	0.0	0.1	1.0
Constrained*	0.0	0.8	1.8	0.0	-0.2	0.1
Non-constrained*	0.0	0.7	2.3	0.0	0.3	1.6
Disposable income of constrained households	2.4	2.3	2.0	-0.1	0.0	0.1
Labour income	1.0	3.6	6.5	-1.0	1.5	4.1
Capital income	2.7	4.3	5.3	-0.1	2.0	3.5
Government revenue	8.4	9.6	10.9	6.9	8.3	9.6
Increase in production tax rate (%)	-	-	-	27.0	24.9	22.4
Additional international borrowing (% of GDP)	1.1	1.1	0.9	-	-	-

Research results/key findings

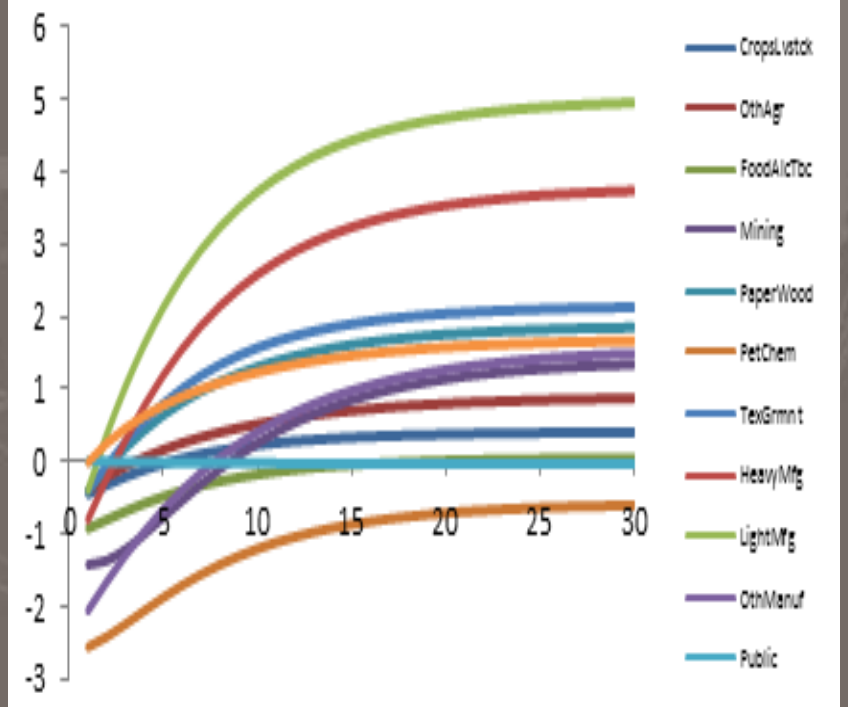
Sectoral effects

- First year: Sectoral output growth mixed for both scenarios, but negative for most sectors under scenario 2.
- Short- and long-run: Sectoral output growth stronger under scenario 1.

Effects on Sectoral Output Under Scenario 1 (International Financing)



Effects on Sectoral Output Under Scenario 2 (Production Tax Financing)



Research results/key findings

Poverty and inequality effects

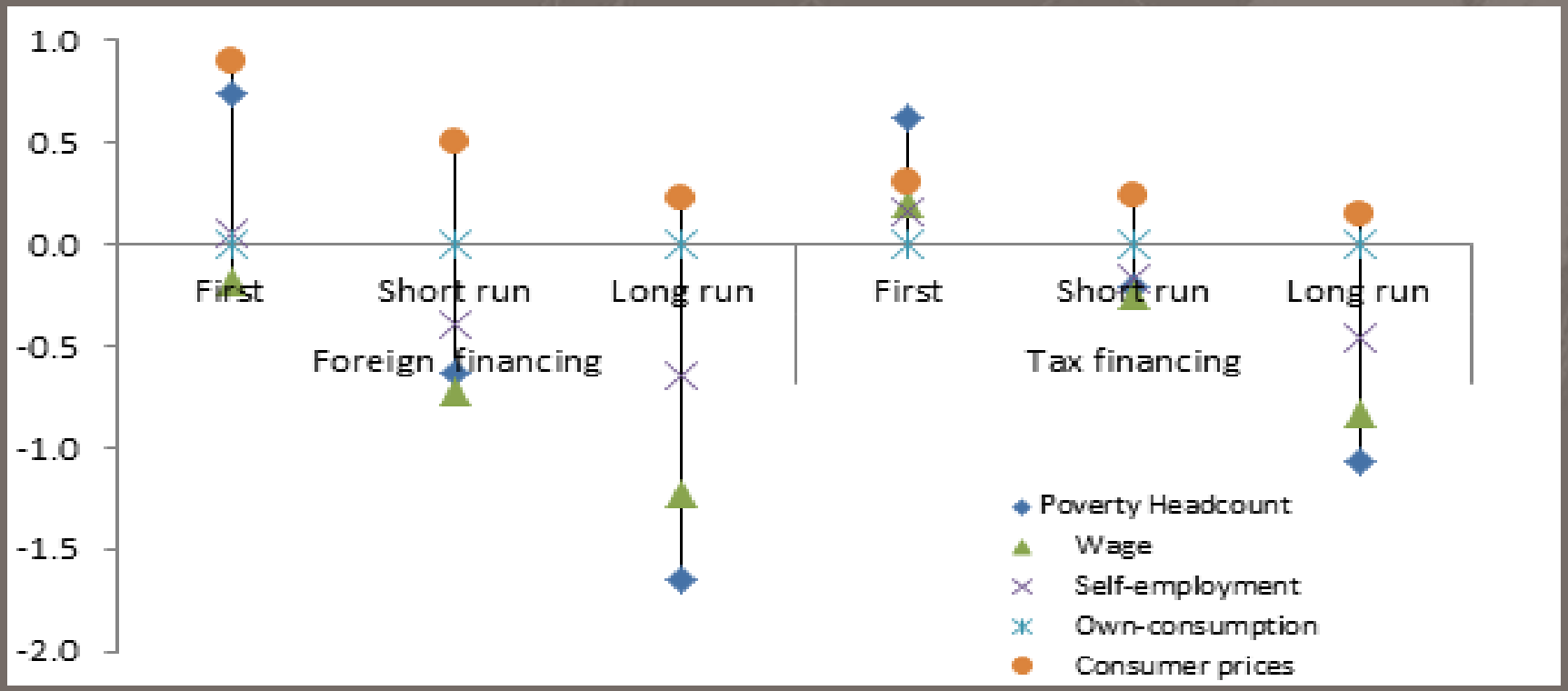
- Poverty and inequality rises in the first year but falls in the short-run and long-run.

	International financing			Tax financing		
	First period	Short run	Long run	First period	Short run	Long run
Poverty headcount						
Base (national)			29.0			
Simulation	0.74*	-0.63*	-1.64*	0.62*	-0.21*	-1.07*
Components of changes in poverty headcount**						
Growth	0.65	-0.63	-1.73	0.63	-0.24	-1.08
Redistribution	0.09	0.00	0.08	-0.01	0.03	0.02
Change (in % points) in poverty headcount due to change in:						
Wage	-0.18	-0.72	-1.22	0.20	-0.25	-0.83
Self-employment	0.05	-0.39	-0.64	0.16	-0.17	-0.46
Own-consumption	0.00	0.00	0.00	0.00	0.00	0.00
Consumer prices	0.90	0.50	0.23	0.30	0.24	0.14
Poverty headcount (by location)						
Urban	0.38	-0.61	-1.43	0.36	-0.23	-0.95
Rural	1.09	-0.65	-1.86	0.87	-0.20	-1.17
Poverty headcount (by household type)						
Constrained	0.77	-0.55	-1.42	0.55	-0.24	-0.83
Non-constrained	0.73	-0.64	-1.68	0.63	-0.21	-1.10
Gini coefficient						
Base (national)				0.42		
Simulation (change in % points)	0.036	-0.013	-0.004	0.016	-0.003	-0.006

Research results/key findings

Contribution to changes in poverty headcount (percentage points from baseline)

- Increase in consumer prices outweigh contributions from other factors in first year.
- Short- and long-run periods highlight positive supply-side effects, higher factor returns, of increased public infrastructure investment:



Conclusion and policy recommendation

- Higher public infrastructure investment brings about positive real GDP effects and reduces poverty and inequality in the short- and long-run periods.
- These effects on GDP growth, poverty and inequality are greater under the international financing scenario.
- Financing schemes that aim to augment public spending on infrastructure are needed in the Philippines. International borrowing at concessional rates as well as PPPs are some examples.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