In search of a Strategy for Making Growth More Pro-Poor in the Philippines

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2 underlying questions:

- The Philippine Contexts (motivations)
  - Revisiting the ‘role of agriculture’ in rural poverty reduction → To what extent does agricultural growth (still) hold the key to rural poverty reduction?; how should agricultural investment be targeted?
  - Slow pace in poverty reduction in the Philippines → How can (non-agricultural) growth be made more ‘pro-poor’?: setting priority for policy interventions

The Philippine context 1: revisiting the old question—does agricultural growth (still) hold the key to rural poverty reduction?

- Emerging empirical evidence: micro-level studies in rice growing villages in Luzon and Panay

  [Hayami & Kikuchi 2000; Estudillo,Sawada& Otsuka, 2006; Fuwa 2007, etc.]

  - Non-agricultural growth as the main driver of poverty reduction after the 1980s-90s
  - relative increase in returns to education, vis-à-vis returns to land
  - Main sources of "non-ag" growth differ across sample villages: export-led (light) manufacturing (Laguna), local non-farm enterprises (N. Ecija, Iloilo), international labor migration (Iloilo, Pangasinan), mostly public sector jobs only (Bukidnon), etc.
  - Green Revolution in the 1970s → investment in education → non-agricultural economic opportunities

→ A major limitation in the existing literature: very limited geographical coverage (rice-growing; Luzon & Panay): how general(izable) are those findings?

The Philippine context 2: slow pace in poverty reduction

- Poor performances in poverty reduction in the Philippines, esp. slow response of poverty to economic growth

  Comparing 'growth elasticity of poverty reduction'

  (= change in poverty incidence in response to 1% increase in mean income)

Philippines	:	1.4 ~ 1.6
Developing countries (cross-country)	:	2.5
Thailand	:	3.5
Indonesia	:	3.0
China	:	2.9

→ How can we change this?

Empirical Results 1: To what extent has non-agricultural sector growth replaced agricultural growth as the main driver of rural poverty reduction? : descriptive approach —provincial panel,1991-2006

- The data
  - Household survey data: Family Income and Expenditure Survey (by National Statistical Office)---nationally representative sample survey of household consumption and income;
  - Every 3 years (cross-section); 1991, 1994, 1997, 2000, 2003, 2006.
  - Constructing provincial panel data: household level data (e.g., percapita consumption expenditures, hh. income by source, etc.) are aggregated into provincial averages, in order to form provincial-level panel data (unit of obs. = 73 provinces (Metro Manila excluded))
- During 1991-2006, in a majority of provinces, poverty ratio fell, and the growth rates in non-ag. income was higher than ag. income growth

(# of provinces)	Δag income> Δ non-ag income 1991-2006	Δag income< Δ non-ag income 1991-2006
Poverty reduction	4*	58
Poverty increase	3	8

* Cagayan, Eastern Samar, Ifugao, Marinduque

→ Suggests that non-ag. income growth has become the main engine for poverty reduction for the majority of provinces during the past two decades.

Empirical Results 2: To what extent has non-agricultural sector growth replaced agricultural growth as the main driver of rural poverty reduction?: estimating sectoral growth elasticity of poverty reduction

- Estimating sectoral "growth elasticity of rural poverty reduction" (Ravallion & Datt, WBER,1996; Demery & Christiaensen 2007) → *Is agricultural growth more(or less) 'pro-poor' than non-ag. income growth?*
  - $\Delta \ln P_{it} = \alpha + \beta_{ag} \Delta \ln Y_{ag,it} + \beta_{non\text{-}ag} \Delta \ln Y_{non\text{-}ag,it} + \Sigma D_t + \eta_i + \varepsilon_{it}$

    $P_{i(t)}$: poverty ratio in province i (, year t)

    $Y_{ag,i(t)}$: provincial average income from agriculture in province i,(, year t)

    $Y_{non\text{-}ag,i(t)}$: provincial average income from non-agricultural sources,(, year t)

    D_t: year dummy ; η_i : province fixed effects; ε_{it} : random error term
  - 3 year panel analysis (1991-2006) with province-level fixed-effects:
- *Estimation results*

  agricultural growth elasticity (β_{ag}) = -0.259

  non-agricultural growth elasticity ($\beta_{non\text{-}ag}$) = -0.589 (*H_0: $\beta_{ag} = \beta_{non\text{-}ag}$ rejected at 0%)*

→ *1% increase(growth) in non-agricultural income reduces poverty incidence twice as much, on average, as does 1% increase(growth) in agricultural income.*

Empirical Results 3: What are the determinants of 'growth elasticity' with respect to agricultural growth and non-agricultural growth? 1:

- Exploring potential determinants of sectoral "growth elasticity of rural poverty reduction" (Ravallion & Datt, JDE, 2002) → *How can growth be made more 'pro-poor'?*
  - $\Delta \ln P_{it} = \alpha + \beta_{ag} \Delta \ln Y_{ag,it} + \beta_{non\text{-}ag} \Delta \ln Y_{non\text{-}ag,it} + \sum \gamma_{1k} \Delta \ln Y_{ag,it} * X_{ki} + \sum \gamma_{2k} \Delta \ln Y_{non\text{-}ag,it} * X_{ki} + \sum D_t + \eta_i + \varepsilon_{it}$
  - X_{ki}: potential determinants of sectoral growth elasticity = initial conditions (as of 1991)
    - *Human capital:* years of schooling of the household head; malnutrition rate; child mortality rate; proportion of overseas migrant workers
    - *Comparative advantage in agriculture (*proportion of not-hilly land areas)
    - *Income inequality* (gini coefficient)
    - *Infrastructure development:* road density; proportion of irrigated farm areas; proportion of households with electricity; household water access
    - *Political characteristics:* political dynasty; number of MILF militants in the province in 1997.

Empirical Results 4: What are the determinants of 'growth elasticity' with respect to agricultural growth and non-agricultural growth?: 2 — provincial-level fixed-effects regression

Right hand side variable:	Estimated coefficient (standard error)
Time varying variables	
Ln(non-agricultural Income percapita)	-1.6699*** (0.3575)
Ln(agricultural income per hectare)	-0.2300*** (0.0830)
Time trend (year)	-0.0098*** (0.0033)
Ln(non-ag. income) interacted with initial conditions as of 1991	
Ln(non-ag. income)*Overseas labor migrants	-0.5005*** (0.1158)
Ln(non-ag. income)* Malnutrition	6.3087*** (2.1221)
Ln(non-ag. income)* Road density	-0.3720*** (0.1336)
Ln(non-ag. income)*Income inequality	1.8773** (0.8458)
Ln(ag. income) interacted with initial conditions as of 1991	
Ln(Ag income)* irrigation potential	-0.6744** (0.3121)
_constant	27.7450*** (6.3237)
Number of obs.	402
R-squared	0.5503
F-test (all coefficients zero)	39.1161

* significant at 10%; ** significant at 5%; ***: significant at 1% or less

Empirical Results 5: What are the determinants of 'growth elasticity' with respect to agricultural growth and non-agricultural growth?: 3

- *(Robustly) significant determinants of sectoral growth elasticities:*
  - *Agricultural growth elasticity is larger when:*
    - *Higher 'irrigation potential' (having comparative advantage in agricultural production)*
  - *Non-agricultural growth elasticity is larger when:*
    - *Better human capital in terms of lower malnutrition rate*
    - *Better infrastructure in terms of higher road density—consistent with a key theoretical insight: relative impacts of ag. vs. non-ag growth on poverty depends on the openness of the economy (better road infrastructure → makes the economy more like an 'open economy': thus, a larger impact of non-ag. growth on poverty)*
    - *More overseas labor migration (← income from overseas work often invested in education and small-scale nonfarm businesses)*
    - *Lower initial income inequality (lower initial inequality appears to make subsequent growth not only faster but also more pro-poor)*

Summary

- In the past two decades, non-agricultural sector growth has increasingly become the main driver of rural poverty reduction in the majority of provinces in the Philippines
- However, agricultural development may still have important roles to play in the areas where:
  - agricultural income shares are higher
  - Land topography suggests comparative advantage in agricultural production (highly 'irrigable')
  - Road infrastructure is underdeveloped (i.e., relatively more isolated areas)
- Now that rural non-farm sector has become the main driver of poverty reduction in the majority of provinces, what policy interventions should command high priority in making nonfarm growth more 'pro-poor'?
  - Invest in reducing child malnutrition
  - Invest in road infrastructure
  - Invest in reducing income inequality (e.g., better implementation of land reform could not only improve agricultural income distribution, but also make nonfarm growth more pro-poor)
  - Overseas labor migration should not be discouraged

Thank You!

Empirical Results 6: Where should agricultural investments be targeted? (1): a typology of Philippine provinces by irrigation potential and urbanization (1)

		Level of commercialization (Urbanization)		
		Low (highly rural)	**Mid (Peri-urban)**	**High (urban)**
Geo-physical endowments (Irrigation potential)	**Low**	Abra, Antique, Catanduanes, Ifugao, Kalinga Apayao, Mt.Province, Nueva Vizcaya, Quirino, Romblon, Southern Leyte	Aurora, Bananes, Mindoro Occidental	Benguet
	Mid	Agusan del sur, Aklan, Albay, Bohol, Cagayan, Davao del sur, Ilocos Norte, Ilocos Sur, Isabela, La Union, Lanao del Norte, Marinduque, Mindoro Oriental, Misamis Occ., Negros oriental, Northern Samar, Samar (western), Siquijor, Sorsogon, Sultan Kudarat, Zamboanga del norte	Bukidnon, Camiguin, Capiz, Davao, Davao Oriental, Eastern Samar, Iloilo, Lanao del Sur, Leyte, Negros Occidental, Palawan, Quezon, South Cotabato, Surigao del Norte, Zambales, Zamboanga del sur	Cebu, Misamis Oriental, Rizal
	High	Camarines Norte, Cotabato, Masbate, Nueva Ecija, Sulu, Tarlac, Tawi-Tawi	Agusan del Norte, Basilan, Batangas, Camarines Sur, Maguindanao, Pangasinan	Bataan, Bulacan, Cavite, Laguna, Pampanga

Empirical Results 7: Where should agricultural investments be targeted? (2): a typology of Philippine provinces by irrigation potential and urbanization (2)

		Level of commercialization (Urbanization)		
		Low (highly rural)	**Mid (Peri-urban)**	**High (urban)**
Geo-physical endowments (Irrigation potential)	**Low**	# of provinces: 11 Poverty incidence: 23.5% Share to total poverty: 3.6% **Ag income share: 21%**	# of provinces: 3 Poverty incidence: 18.5% Share to total poverty: 0.6% **Ag income share: 18%**	# of provinces: 1 Poverty incidence: 11.5% Share to total poverty: 0.4% **Ag income share: 8%**
	Mid	# of provinces: 25 Poverty incidence: 32.4% Share to total poverty: 28.3% **Ag income share: 19%**	# of provinces: 17 Poverty incidence: 25.2% Share to total poverty: 28.7% **Ag income share: 20%**	# of provinces: 3 Poverty incidence: 22.9% Share to total poverty: 8.3% **Ag income share: 5%**
	High	# of provinces: 8 Poverty incidence: 41.0% Share to total poverty: 16.3% **Ag income share: 29%**	# of provinces: 6 Poverty incidence: 24.6% Share to total poverty: 10.6% **Ag income share: 20%**	# of provinces: 5 Poverty incidence: 6.6% Share to total poverty: 3.2% **Ag income share: 5%**

Empirical Results 8: Where should agricultural investments be targeted? (3): agricultural vs. non-ag. elasticity, 1988 and 2000s

(non)Agricultural Elasticity = $\pi_{(non)ag}$*(non)ag. income share*

Based on sectoral income shares in 2000s

π_{ag} = -1.109
$\pi_{non\text{-}ag}$= -0.768

2000-06		Level of commercialization (Urbanization)		
		Low (highly rural)	Mid (Peri-urban)	High (urban)
Geo-physical endowments (Irrigation potential)	Low	Ag. elasticity: -0.23 non-ag. elasticity: -0.61 Non-Ag/Ag: 2.61	Ag. elasticity: -0.20 non-ag. elasticity: -0.63 Non-Ag/Ag: 3.15	Ag. elasticity: -0.09 non-ag. elasticity: -0.71 Non-Ag/Ag: 7.96
	Mid	Ag. elasticity: -0.21 non-ag. elasticity: -0.62 non-Ag/Ag: 2.95	Ag. elasticity: -0.22 non-ag. elasticity: -0.61 Non-Ag/Ag: 2.77	Ag. elasticity: -0.06 non-ag. elasticity: -0.73 Non-Ag/Ag: 13.16
	High	Ag. elasticity: -0.32 non-ag. elasticity: -0.55 Non-Ag/Ag: 1.70	Ag. elasticity: -0.22 non-ag. elasticity: -0.61 Non-Ag/Ag: 2.77	Ag. elasticity: -0.06 non-ag. elasticity: -0.73 Non-Ag/Ag: 13.16

Based on sectoral income shares in 1988

π_{ag} = -1.109
$\pi_{non\text{-}ag}$= -0.768

1988		Level of commercialization (Urbanization)		
		Low (highly rural)	Mid (Peri-urban)	High (urban)
Geo-physical endowments (Irrigation potential)	Low	Ag. elasticity: -0.55 non-ag. elasticity: -0.38 Non-Ag/Ag: 0.69	Ag. elasticity: -0.55 non-ag. elasticity: -0.38 Non-Ag/Ag: 0.69	Ag. elasticity: -0.23 non-ag. elasticity: -0.61 Non-Ag/Ag: 2.61
	Mid	Ag. elasticity: -0.47 non-ag. elasticity: -0.45 non-Ag/Ag: 0.96	Ag. elasticity: -0.50 non-ag. elasticity: -0.42 Non-Ag/Ag: 0.85	Ag. elasticity: -0.35 non-ag. elasticity: -0.52 Non-Ag/Ag: 1.47
	High	Ag. elasticity: -0.57 non-ag. elasticity: -0.38 Non-Ag/Ag: 0.67	Ag. elasticity: -0.52 non-ag. elasticity: -0.41 Non-Ag/Ag: 0.78	Ag. elasticity: -0.23 non-ag. elasticity: -0.61 Non-Ag/Ag: 2.61

** Ag. income shares used here are likely lower bounds*