

Human capital, Inequality and Demographic transition in the Philippines

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Outline

- Why inequality?
- Data and Trends
- Extension to Lee and Mason (2009)
- Approximation
 - NTA
 - Panel VAR
- Summary and Future Directions



Why inequality?

- Basically impact on economy
 - Life expectancy
 - Economic growth
 - Health, e.g. AIDS
 - Others?
- For equity sake?

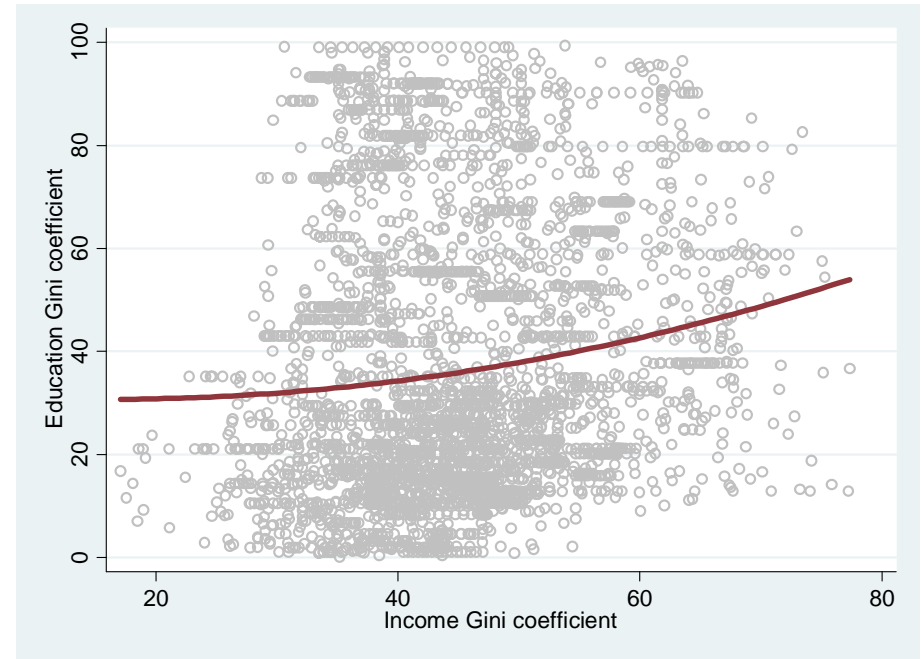


Data and Trends

- Availability of comparable country data
- Data sources
 - NTA country profiles
 - Barro and Lee (2010) education database
 - Solt (2008) SWIID v3

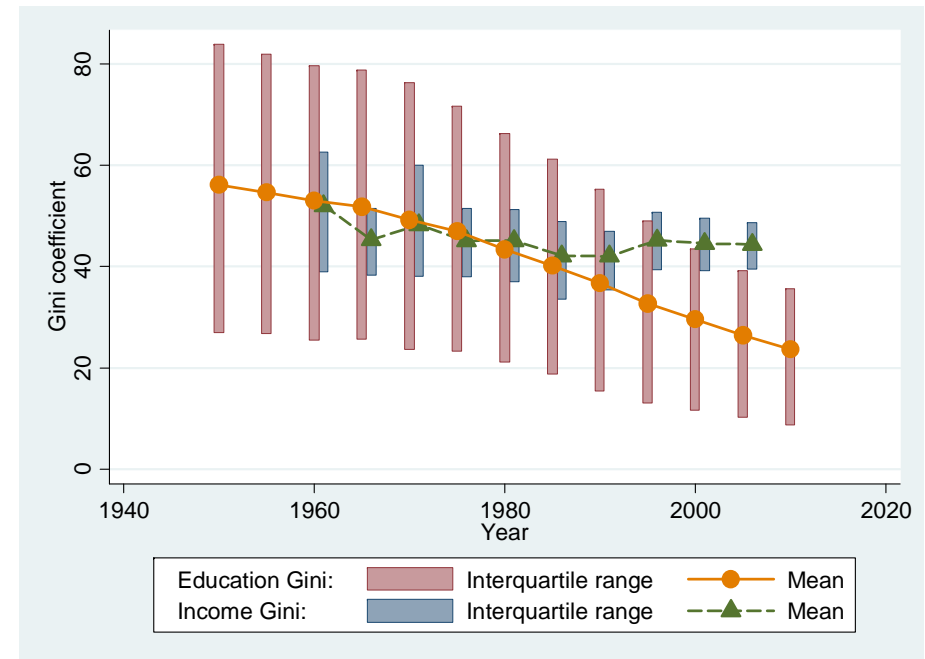
Data and Trends

- Y and HK (education) inequality have long run positive relationship (but not co-integrated)



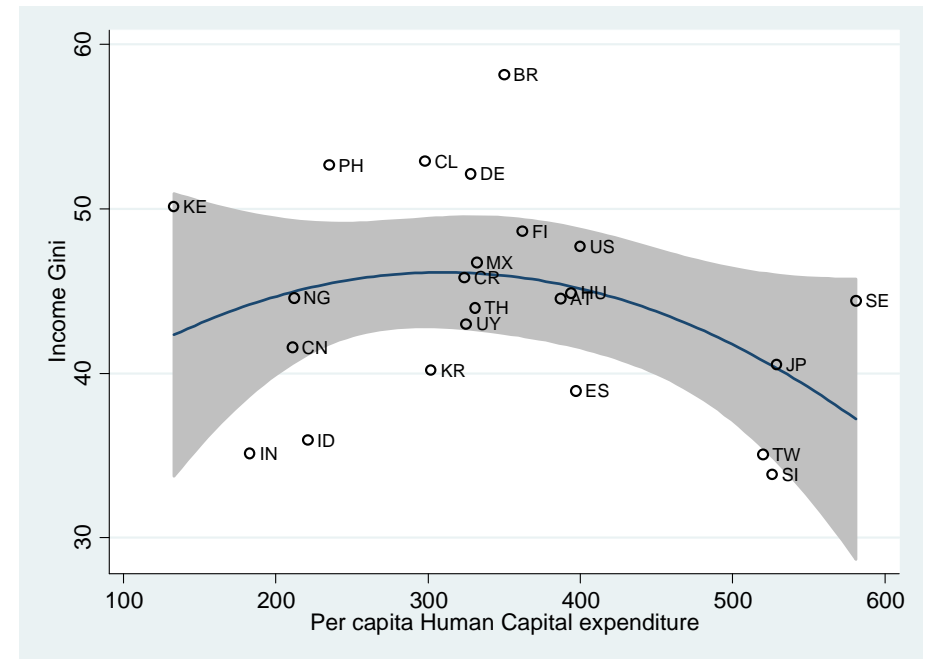
Data and Trends

- While HK inequality has been decreasing, Y inequality has stagnated
- Contracting dispersion in HK and Y inequality: real or data artifact?



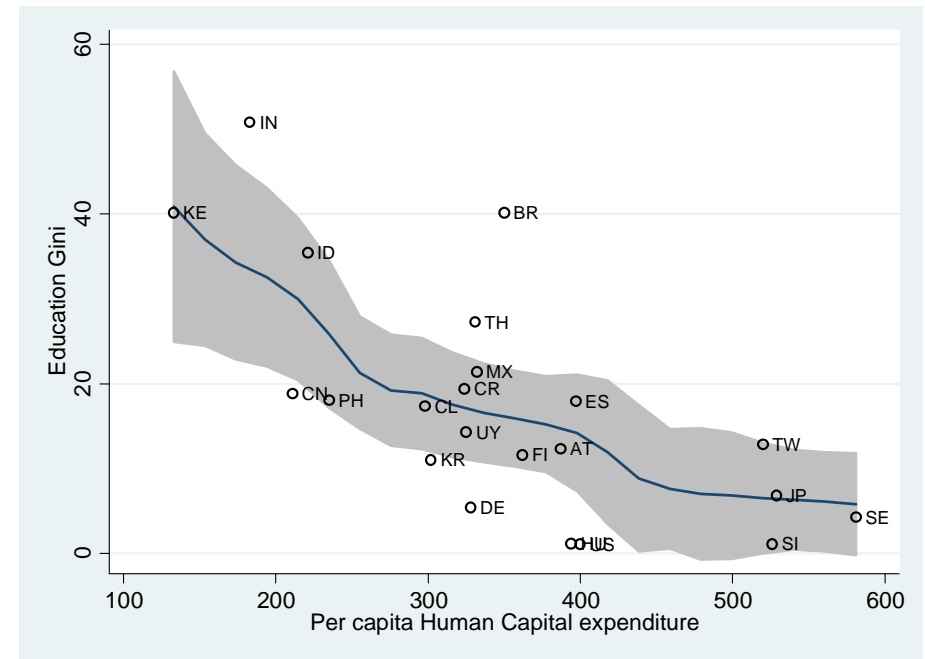
Data and Trends

- Y inequality and HK expenditure not straightforward – non-linear? Not enough sample?



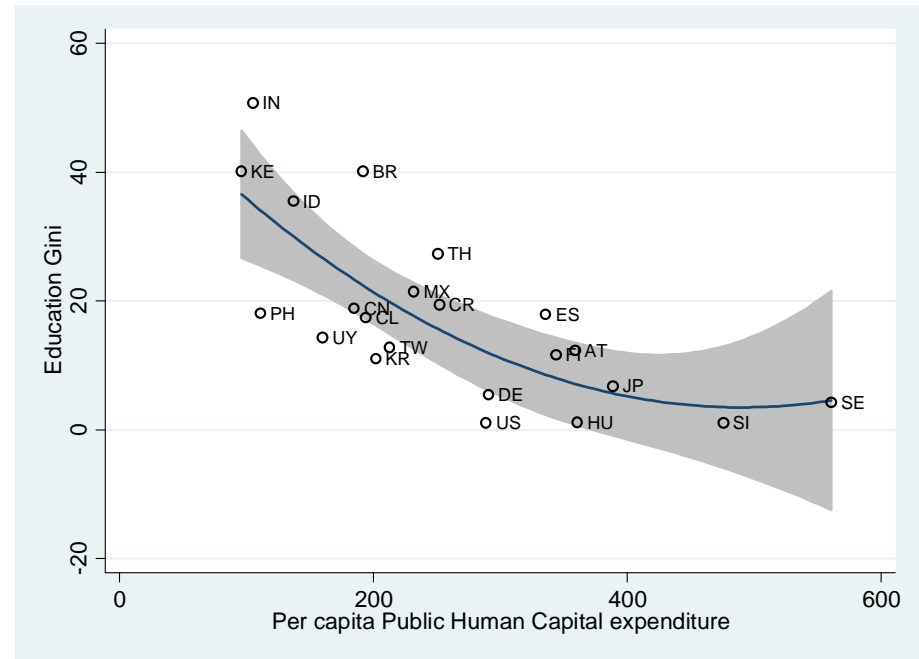
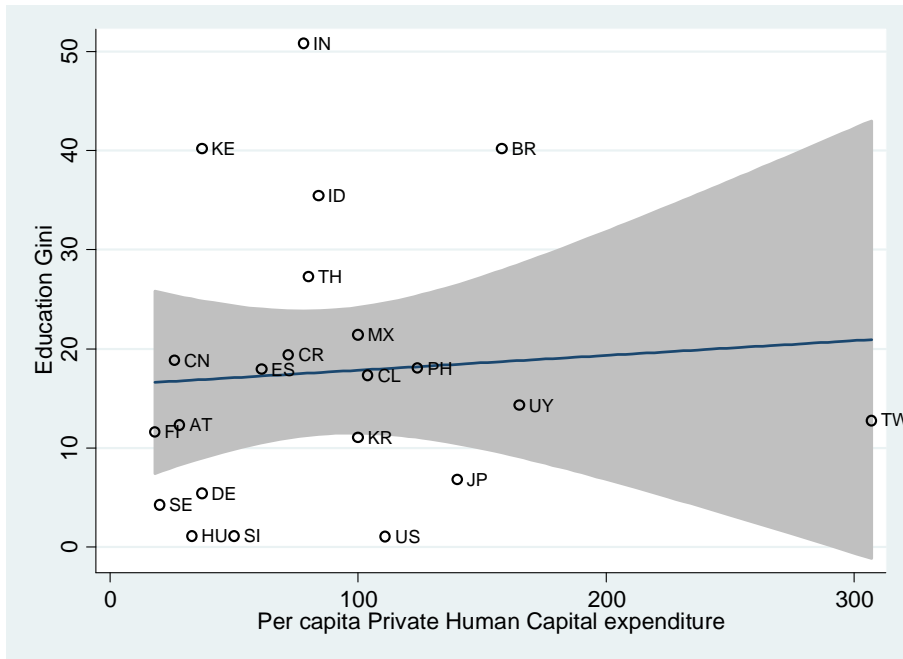
Data and Trends

- \uparrow HK expenditure per capita related to \downarrow HK inequality
- Government plays an important role!



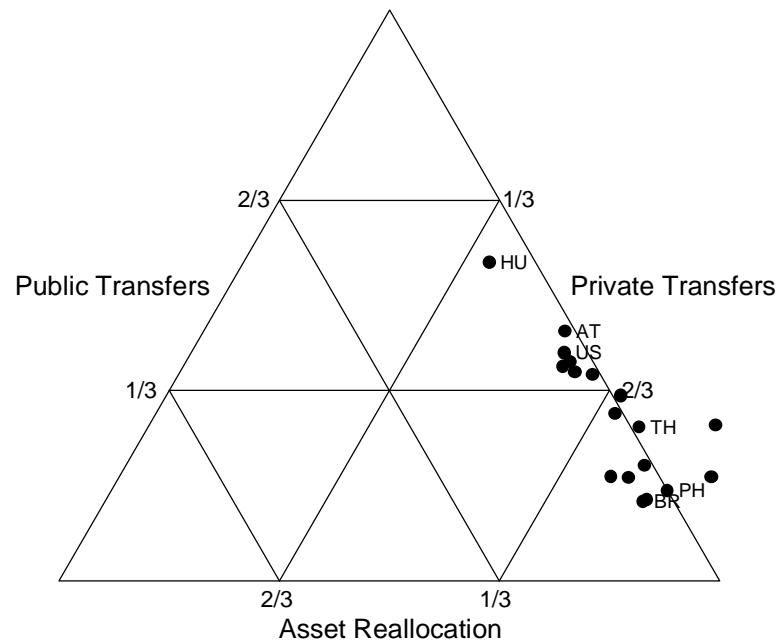
Data and Trends

- Government plays an important role!



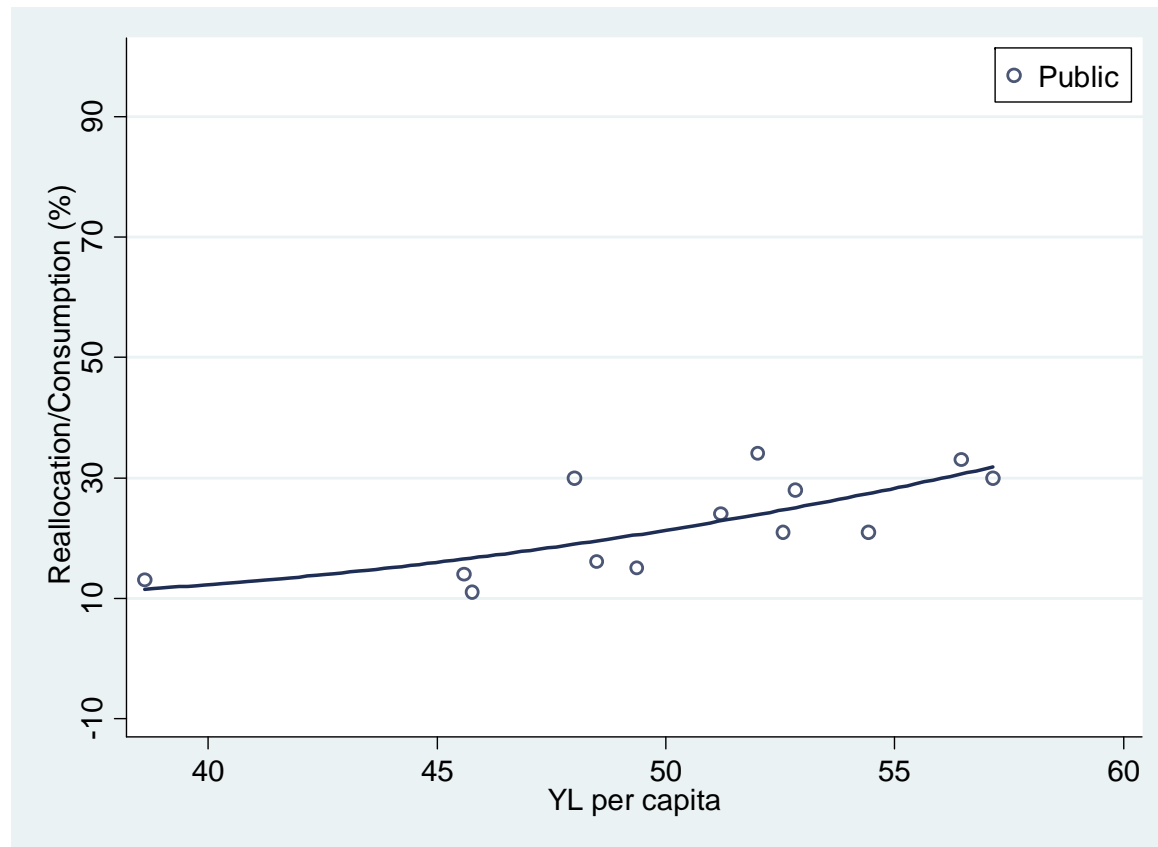
Data and Trends

- Governments play an important role! (2)
- ↑ Y countries with ↑ %TG to children



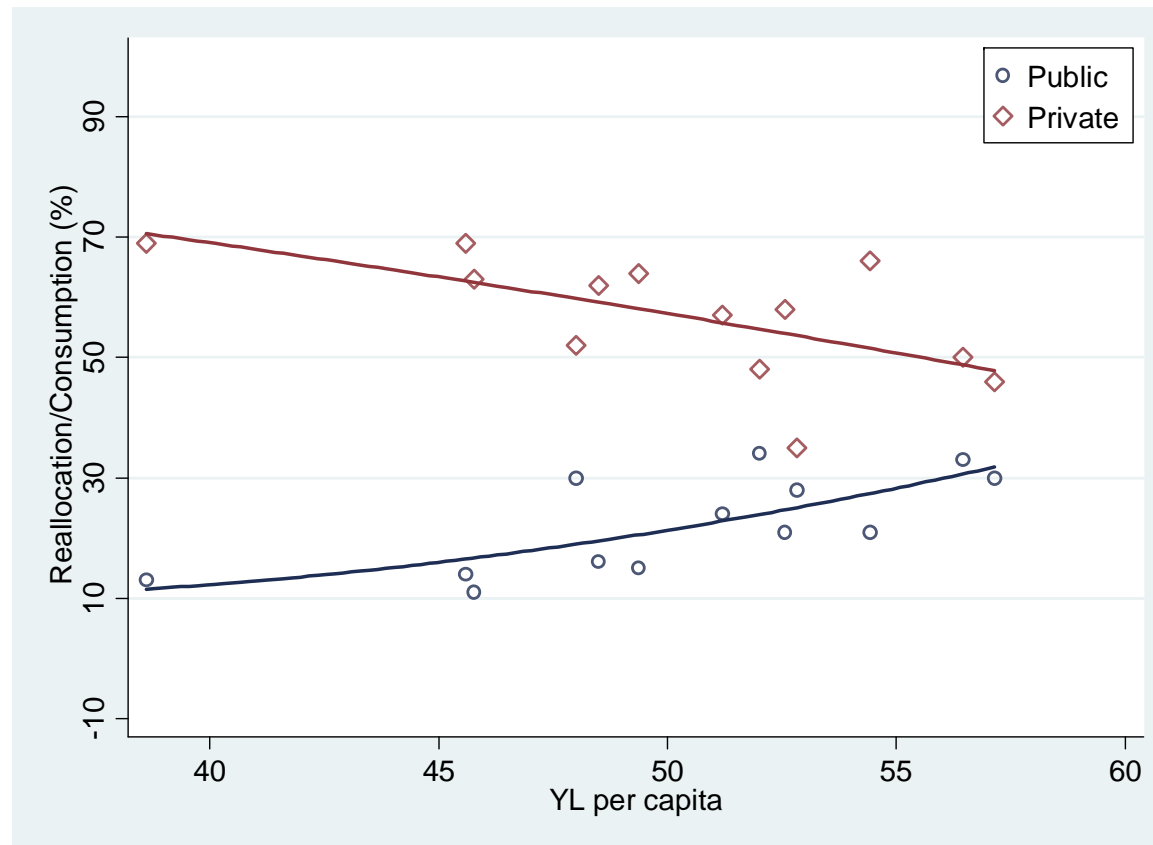
Data and Trends

- Per capita TG^C increases with YL



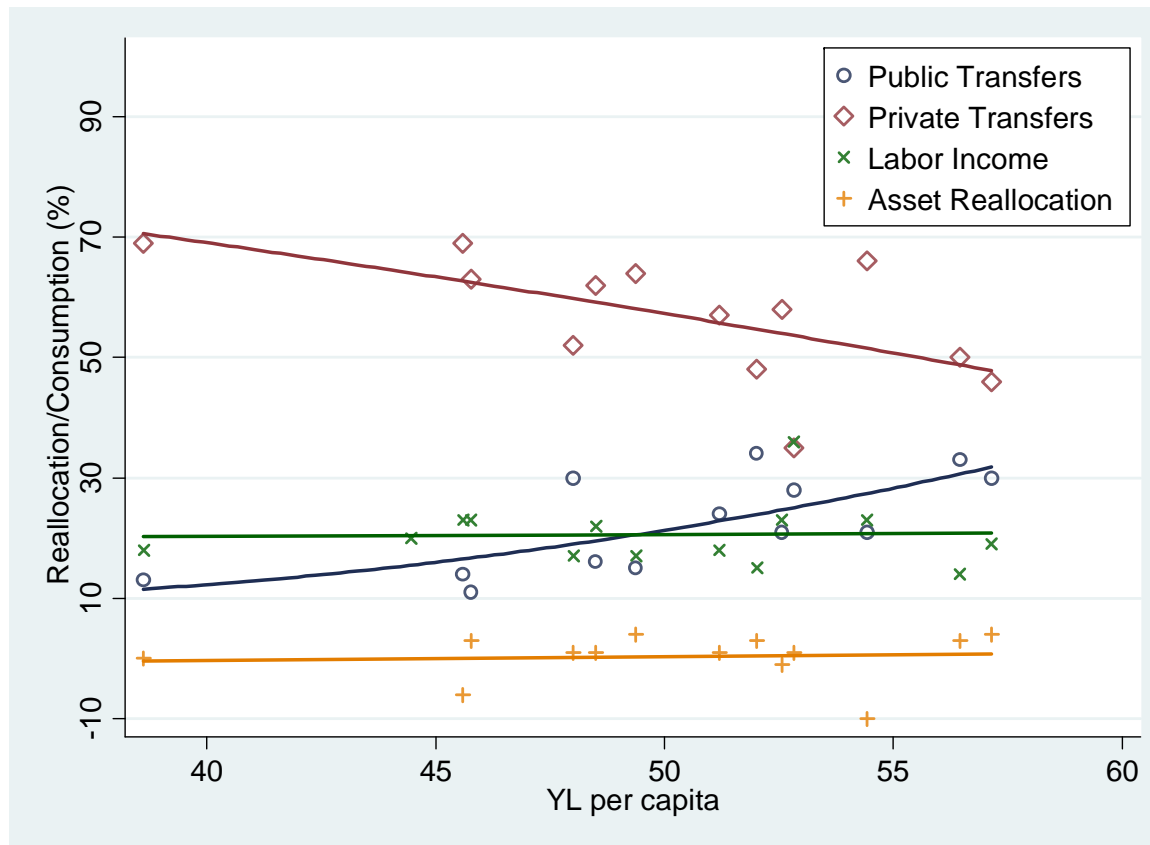
Data and Trends

- While per capita TF^C decreases with YL



Data and Trends

- AR^C and YL^C per capita are constant shares of Consumption in YL

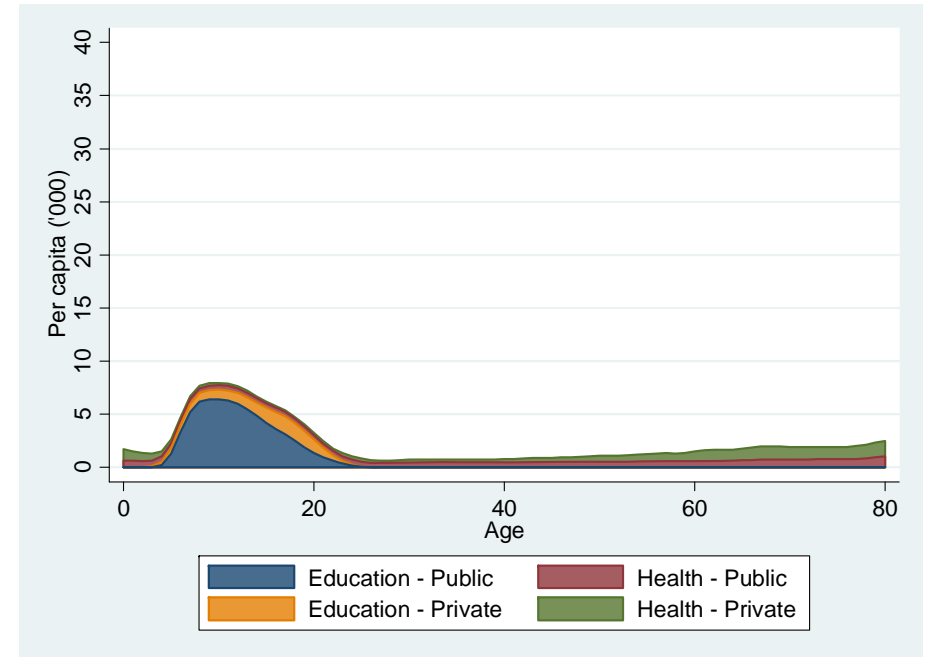


Data and Trends

- The Philippines is an interesting case
 - Over-all, PH follows the global story
 - Disaggregation tells a more nuanced picture!
- By construction, ordering in YL per capita
 - $YL(\text{Tercile } 2) = \sim 3 * YL(\text{Tercile } 1)$
 - $YL(\text{Tercile } 3) = \sim 7 * YL(\text{Tercile } 1)$

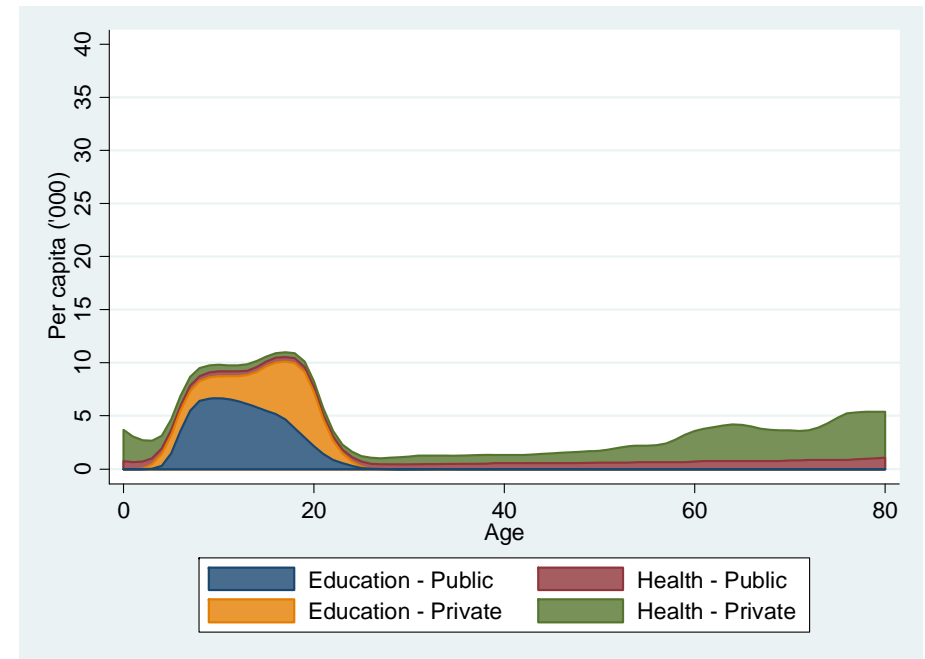
Data and Trends

- Tercile 1 relies heavily on government transfers to finance HK spending
- TG per capita concentrated on primary education; Low survival rate



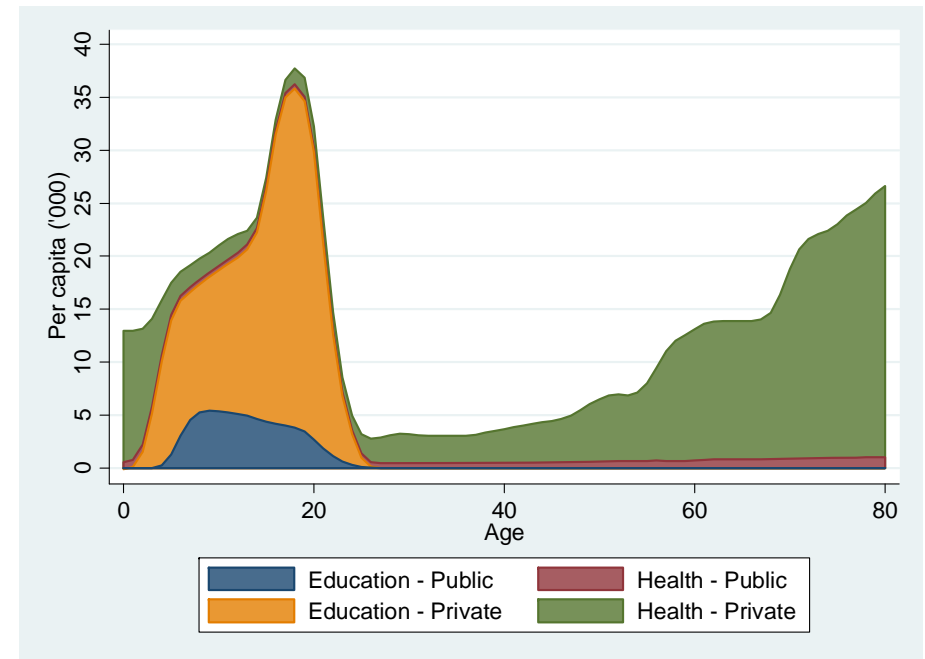
Data and Trends

- Tercile 2 with substantial transfers from government; extends to tertiary education
- OOP per capita expenditure, i.e. CF, higher in tertiary education years



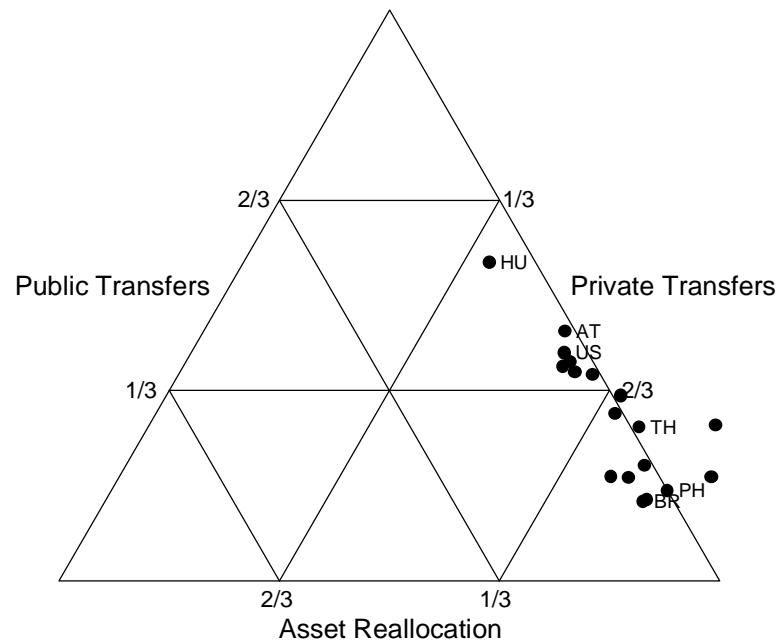
Data and Trends

- Tercile 3 TG extends to tertiary education years
- But OOP expenditure a more important source of financing
- Is PHL public HK expenditure progressive?



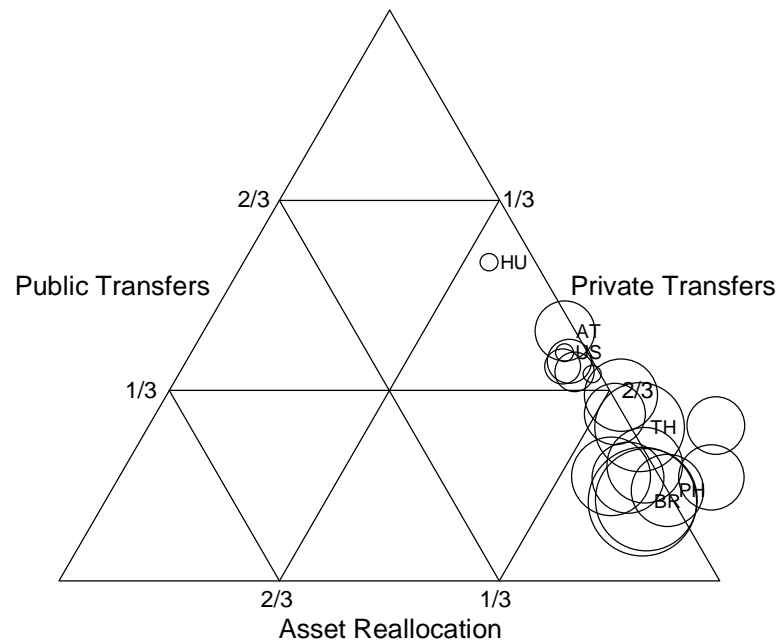
Data and Trends

- Governments play an important role! (2)
- ↑ Y countries with ↑ %TG to children



Data and Trends

- Governments play an important role! (3)
- \uparrow Y countries with \downarrow HK inequality





Data and Trends

- Given existing inequalities in YL and HK, concern effect on economy
 - Does YL and HK inequality feed on each other?
 - Spiraling inequality?

Extension to Lee and Mason (2009)

- Lee, R. and A. Mason (2009). Fertility, Human Capital, and Economic Growth over the Demographic Transition. *European Journal of Population*.

Extension to Lee and Mason (2009)

- OLG model
 - Population: $N_{it} = N_{it}^0 + N_{it}^1$
 - Adults: N_{it}^1
 - Children: $N_{it}^0 = F_{it} * N_{it}^1$
 - For simplicity, no retirees
- Adults earn wages (W_{it}) and consumes (C_{it});
Transfers to Children for HK_{it}
- Focus on W_{it} and HK_{it}

Extension to Lee and Mason (2009)

- Human capital expenditure
 - HK_{it} a constant share of W_{it-t}
 - $HK_{it} = h(F_{it-1}, W_{it-1}) = (\alpha F_{t-1}^\beta) * W_{it-1}$
 - $\beta < 0$; $0 < \alpha F_{it-1}^\beta < 1$
- Wage rate
 - W_{it} a function of HK_{it}
 - $W_{it} = g(H_{it}) = \theta H_{it}^\gamma = \theta ((\alpha F_{t-1}^\beta) * W_{it-1})^\gamma$
 - $0 < \gamma < 1$

Extension to Lee and Mason (2009)

- Human Capital

$$V(\ln(H_{it})) = \beta^2 V(\ln(F_{it-1})) + V(\ln(W_{it-1})) + 2\beta \text{Cov}(F_{it-1}, W_{it-1})$$

- Wage

$$V(\ln(W_{it})) = \gamma^2 V(\ln(H_{it}))$$

Extension to Lee and Mason (2009)

- If $V(\ln(F_{it}))$ does not increase in time
 - $V(\ln(W_{it})) < V(\ln(W_{it-1}))$ because $\gamma^2 < 0$
 - $V(\ln(H_{it})) < V(\ln(H_{it-1}))$

Approximation

- Gini coefficient as measure of dispersion
- Simulation
 - Based on NTA data
 - Panel VAR using Barro and Lee (2010) education, and Solts (2008) income inequality data



Approximation

- NTA-based simulation
 - Lee and Mason (2009) parameters
 - Three representative HH from 2007PHL NTA sub-aggregate estimates
 - Not causal! One of possible realizations

Approximation

- NTA-based simulation: Scenarios

Scenario 1 Constant F_{it}

Scenario 2 Constant F_{it} in $i = 1, 2, 3$

Scenario 3 Increasing F_{1t} in 2 periods; decrease after
Slow decrease in F_{2t}
Constant F_{3t}

Scenario 4 Scenario 3; constant W_{i0}

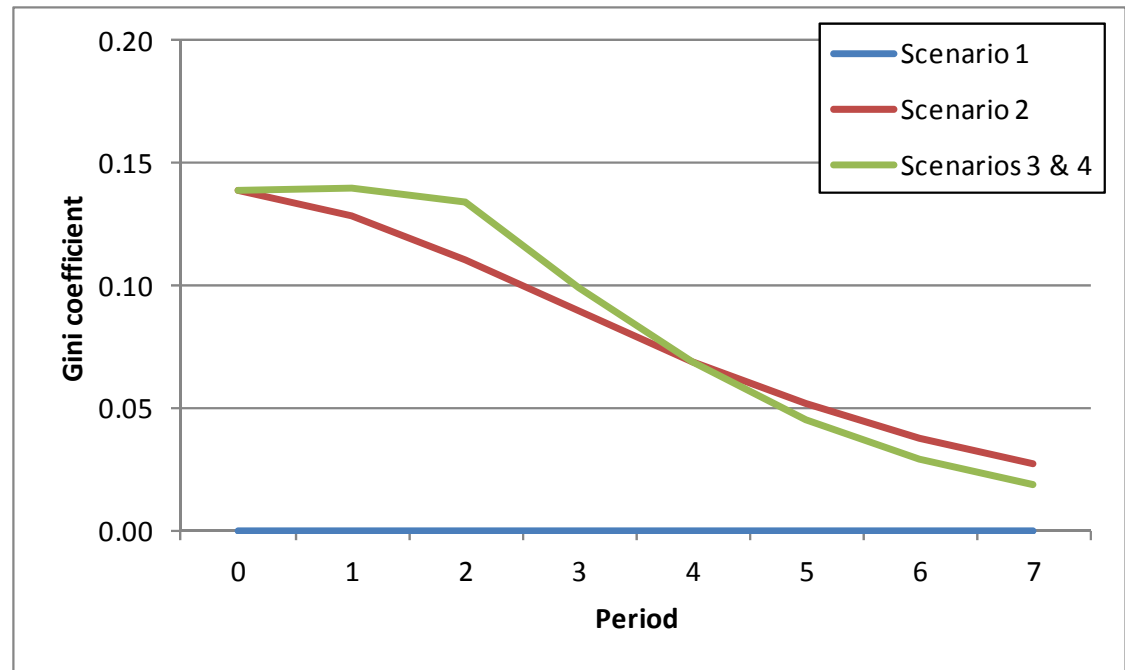
Approximation

- NTA-based simulation: Parameters

Parameter	Estimate	Source
β	-1.2	Lee and Mason (2009)
γ	0.3	Mankiw, et. al. (1992) in Lee and Mason (2009)
α, θ	1.0	Arbitrary; Will cancel in calculation
F_{10}	1.8	2007APIS
F_{20}	1.3	2007APIS
F_{30}	0.9	2007APIS
W_{10}	1.0	2007PH NTA estimate
W_{20}	2.6	2007PH NTA estimate
W_{30}	6.9	2007PH NTA estimate

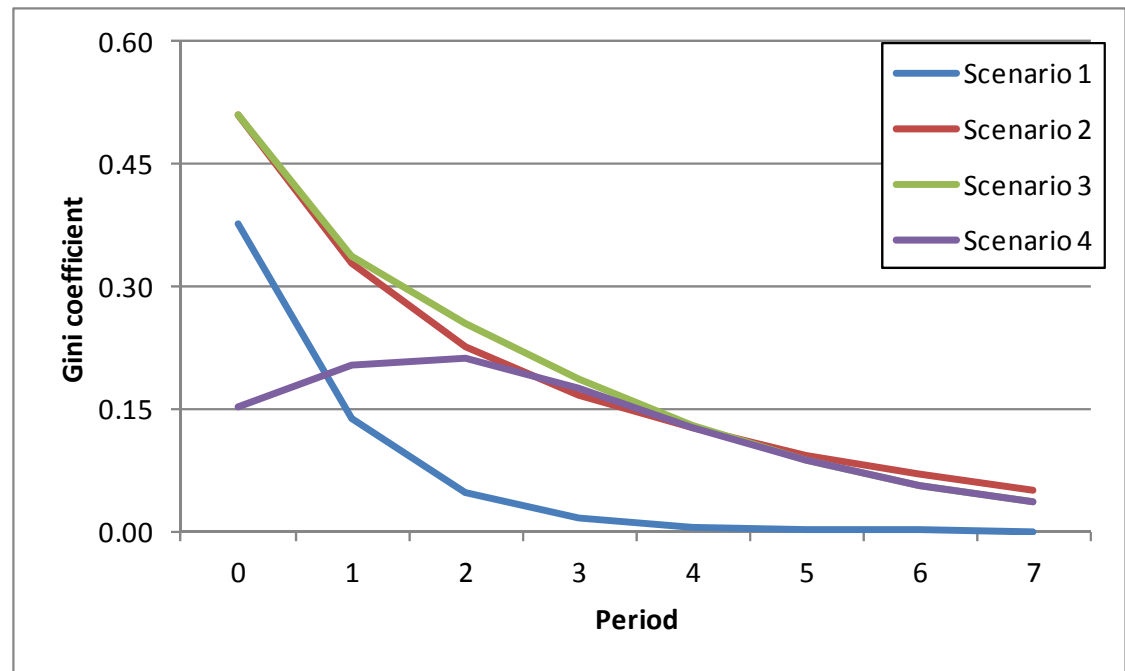
Approximation

- F_{it} inequality resulting from assumed F_{it} distribution



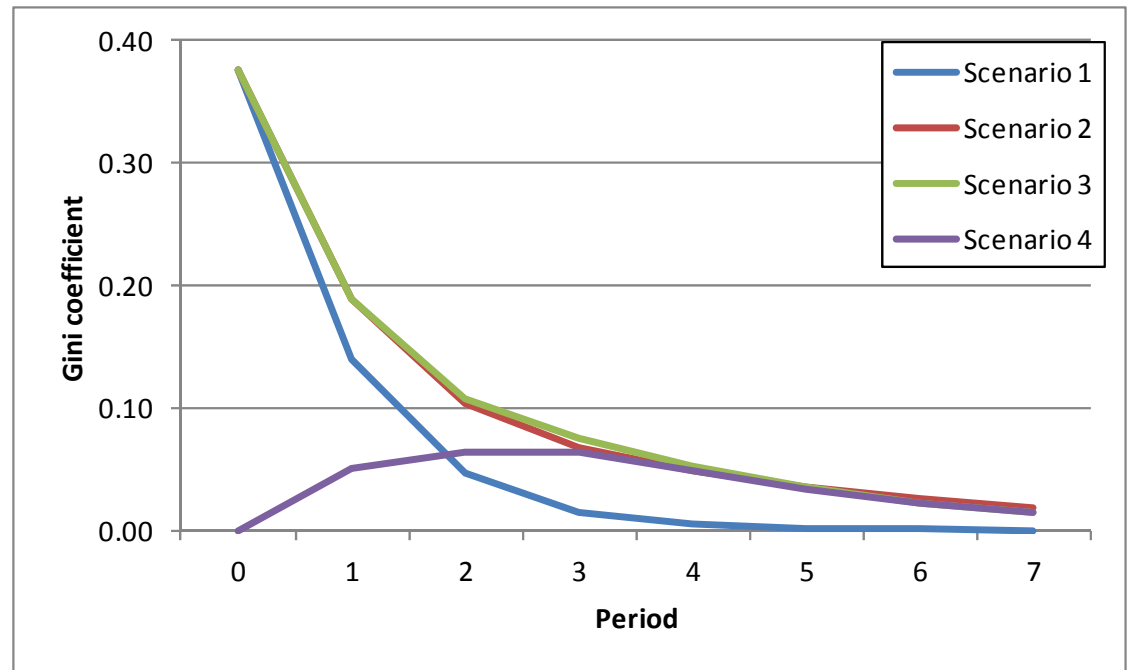
Approximation

- HK inequality:
Variations in F_{it} is important!



Approximation

- W inequality: generally same observation as HK inequality, but lower magnitude



Approximation

- NTA-based estimation: Summary
 - Variation in F_{it} contributes to HK and W inequality
 - \downarrow Gini(F_{it}) is related to decrease in inequality regardless of initial income distribution

Approximation

- Panel VAR approximation
 - HK and W endogenous in NTA-based simulation
 - Need to separate effect of shock on either HK or W inequality: Which is driving what?
 - Panel VAR model of education and income inequality using unbalanced panel of 119 countries covering 1950-2005
 - Variation in F_{it} not included in model: Is there data anywhere?

Approximation

- Panel VAR: Orthogonalized IRF



Approximation

- Panel VAR: Summary
 - (+) Impact of exogenous shock on HK (Y) inequality to HK (Y) inequality
 - Impact of shock on $G(HK)$ to $G(HK)$ persistent!
 - (+) Impact of exogenous shock on HK (Y) inequality on Y (HK) inequality: small but persistent

Summary

- Variation in F and initial HK and Y conditions contribute to future variations
 - Lowering F variation lowers HK and Y inequality
 - Effect of shock on HK inequality is persistent
- Government plays an important role in managing human capital inequality, and income inequality (?)



Future directions

- Add new NTA estimates whenever available
- Look for fertility variation proxy



(Thank you very much!)

For comments and suggestions:

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