

Economic development and inherited inequality: Kuznets meets the Great Gatsby?

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Development and inequality

- According to the Kuznets hypothesis, inequality first tends to increase and then decrease as a country develops.
- Kuznets (1955) considered the evolution of inequality in a country during the process of structural transformation, in which the population moved from a low productivity/low inequality 'sector' (agriculture) to a high productivity/high inequality 'sector' (industry).
- This inverted-U Kuznets curve as a stylized 'fact' has shaped the discourse on economic development and income inequality for decades
- An extensive literature exists, both empirical (in a cross section and time series contexts) and theoretical (pure economic and political mechanisms), which has also recognized the possibility of alternative development paths.

Development and inequality of opportunity

- Does a similar relationship hold between **development and inequality of opportunity**?
 - Inequality of opportunity (IOp) is the inequality associated with inherited individual circumstances such as gender, ethnicity, and family background
- If it does, why? **Which mechanisms?**
- The IOp-development relationship must be consistent with both
 - the association between income inequality and development (**Kuznets curve**)
 - the relationship between income and opportunity inequality (often referred to as the **Great Gatsby Curve**).
- A triangular relationship

Aims of the paper

1) To **investigate empirically the 'triangular' relationship** between development, income inequality, and inequality of opportunity.

- Problem of **data availability** for inequality of opportunity
 - Time series: a sufficiently long time span?
 - Cross section: comparability of country-specific estimates?
- We provide an empirical investigation in a cross sectional context, by exploiting the new **Global Estimates of Opportunity and Mobility (GEOM) database**.

2) To propose a simple **theoretical framework** that links the three concepts and describes a possible mechanism consistent with the evidence.

The theory of equal opportunities

Given a population, for each individual i

$$x_i = g(C_i, e_i)$$

- **Outcome x** (income, education): some “objective measure of individual advantage
- **Circumstances**: variables outside the individual responsibility
- **Effort**: ‘responsibility’ factors. $\frac{\partial g}{\partial e_i} \geq 0$
- Classifiability in **C** and **e**, not independence
- EOp: **Compensate** for the circumstances, **reward** the effort
- **Independent, plural** and sometimes **conflicting** principles

The theory of equal opportunities

The society can be represented by a $n \times m$ matrix, n types and m tranches.

Table 1

A tranche

	e_1	e_2	e_3	...	e_m
C_1	x_{11}	x_{12}	x_{13}	...	x_{1m}
C_2	x_{21}	x_{22}	x_{23}	...	x_{2m}
C_3	x_{31}	x_{32}	x_{33}	...	x_{3m}
...
C_n	x_{n1}	x_{n2}	x_{n3}	...	x_{nm}

A type

Ex-ante

“Equal opportunity sets”

$F(x|C_i)$ – a row -interpreted as the opportunity set for all individuals in type i

EOP if $F(x|C) = F(x) \Rightarrow$ Focus on inequality between types (rows)

Ex-post

“Equal outcome for equal effort”

EOP if $F(x|e)$ is egalitarian \Rightarrow Focus on inequality within tranches (columns)

Measuring inequality of opportunity

1. The actual distribution X is transformed into a counterfactual distribution \tilde{X} that reflects *only and fully* the unfair inequality in X . In the *ex ante* case, a parametric methodology:
 - Estimate by OLS $x_i = a + \beta_1 C_{1,i} + \beta_2 C_{2,i} + \dots + u_i$
 - Obtain the predicted values, hence the counterfactual distribution $\tilde{X} = \hat{X}$.
2. A measure of inequality $I(\cdot)$ is applied to \tilde{X} : Absolute IOp $I(\tilde{X})$ and Relative IOp $\frac{I(\tilde{X})}{I(X)}$
 - Model specification: normative vs data driven methods
 - Statistical issues of downward and upward biases due to unobs. Conc. and sample size
 - Arbitrariness vs political salience
 - Comparability (same model for all?)



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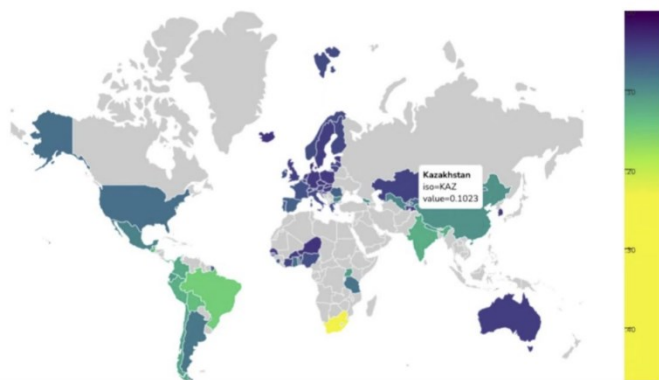
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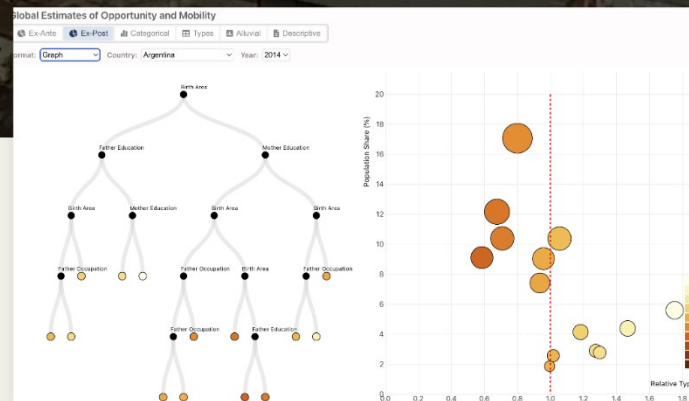
Global Estimates of Opportunity and Mobility

Data visualization tool to understand inequality of opportunities worldwide



World View

explore



Country Profile

explore

<https://geom.ecineq.org/>

GEOM is a data and research project led by the **London School of Economics** and the **University of Bari**, in partnership with other organizations around the world.

GEOM provides estimates of **inequality of opportunities**:

- for **72 countries**
- accounting for **67% of the world's population**
- drawn from **196 household surveys**
- in some cases over more than **40 years**

For each country we identify

- **the role** played by different **circumstances**
- the **groups** that have the most and the least access to opportunities

We are working on **intergenerational income mobility** estimates...

The trade off between coverage and comparability



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Inclusion criteria:

1

The availability of outcome and circumstance variables

Outcome: household equiv. dispos. income (expendit.), corrected for CPI, PPP, age

Circumstances: At least five of the following seven:

- Area of birth
- Gender
- Parental occupation (Father and Mother)
- Parental education (Father and Mother)
- Ethnicity, race, or religion of the parents

2

The sample size

A minimum of 1,200 observations with complete information

3

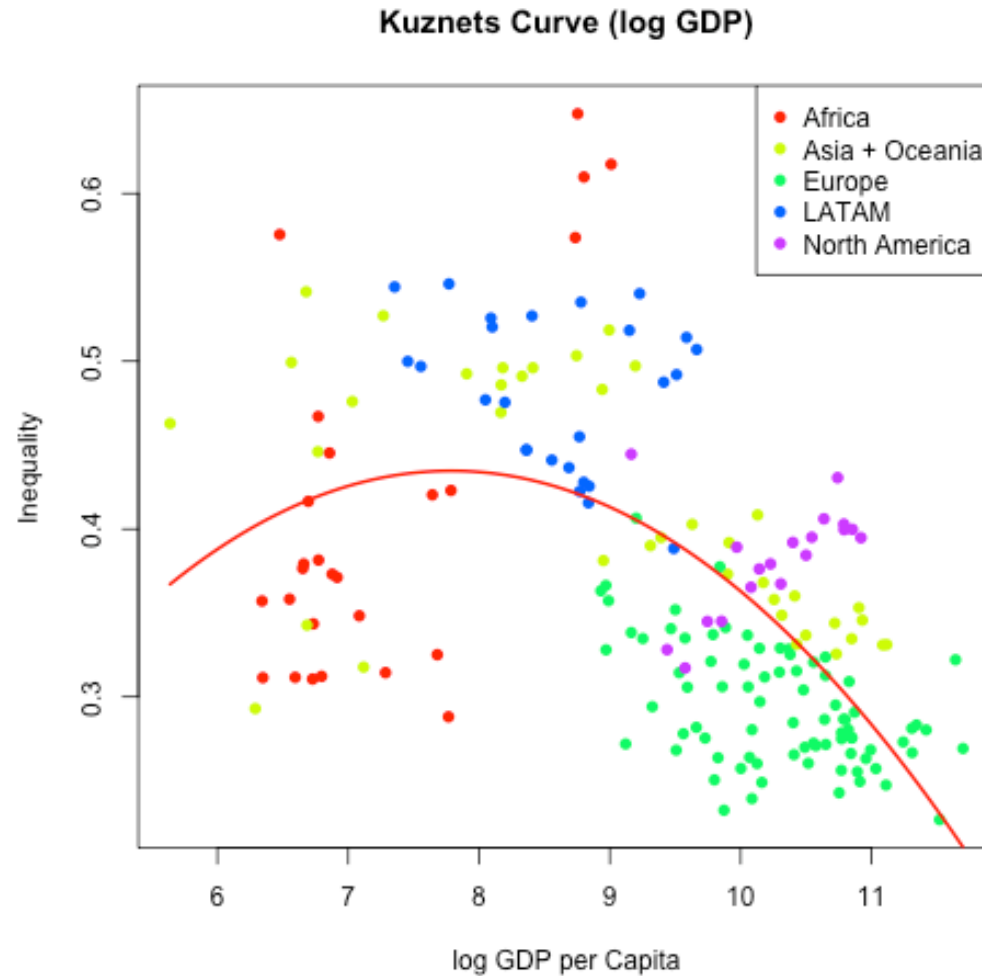
Methodology

- Both ex ante and ex post approaches
- Data driven (ML) methods for the model specification
- A set of inequality measures (Gini, MLD)

Data selection for this paper

- We select all country-year observations in the GEOM database (**pooled cross-section**)
- Development is measured by **log GDP per-capita** (IMF database)
 - Alternative: share of employed in agriculture (Timmer et al., 2015).
- Inequality index: **Gini coefficient**
- Inequality of Opportunity:
 - **Ex ante**
 - Both Relative and Absolute

Inequality and development: the Kuznets Curve

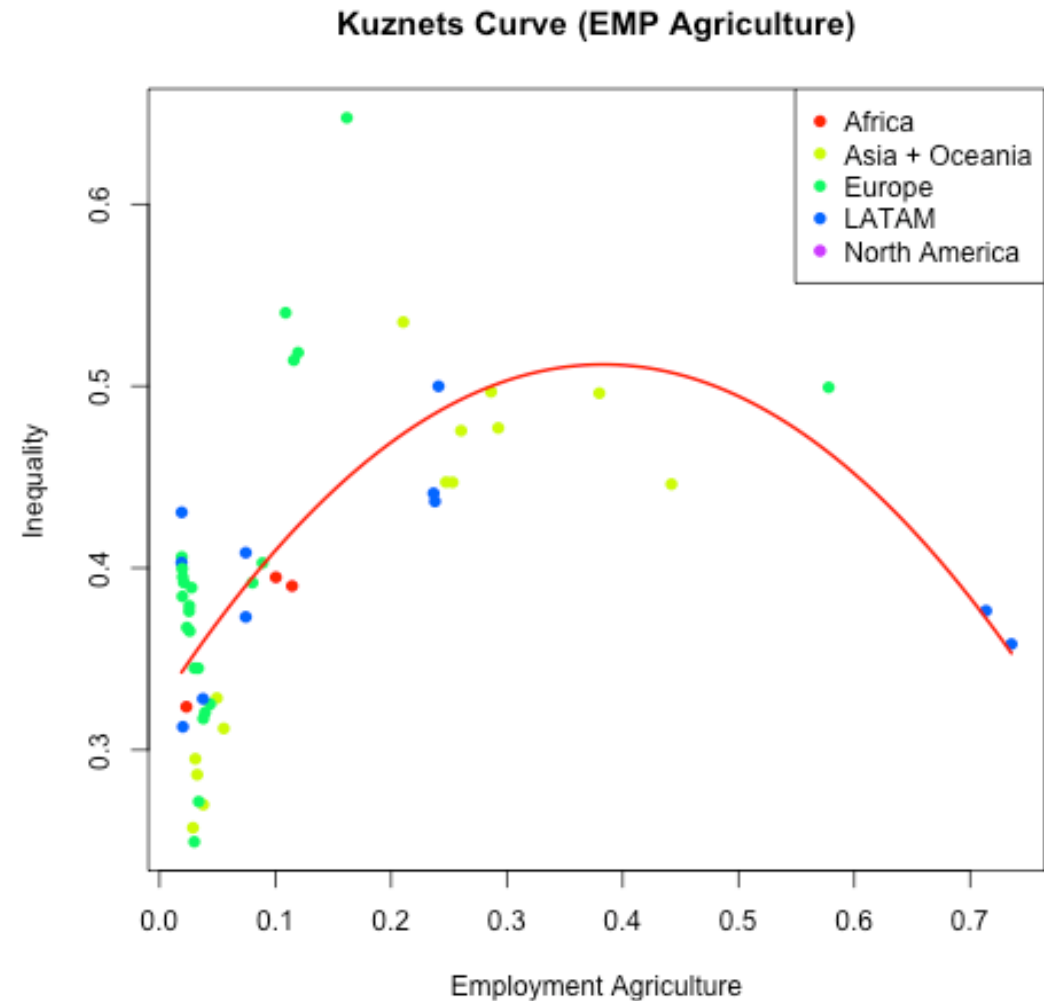


Source: GEOM and IMF data

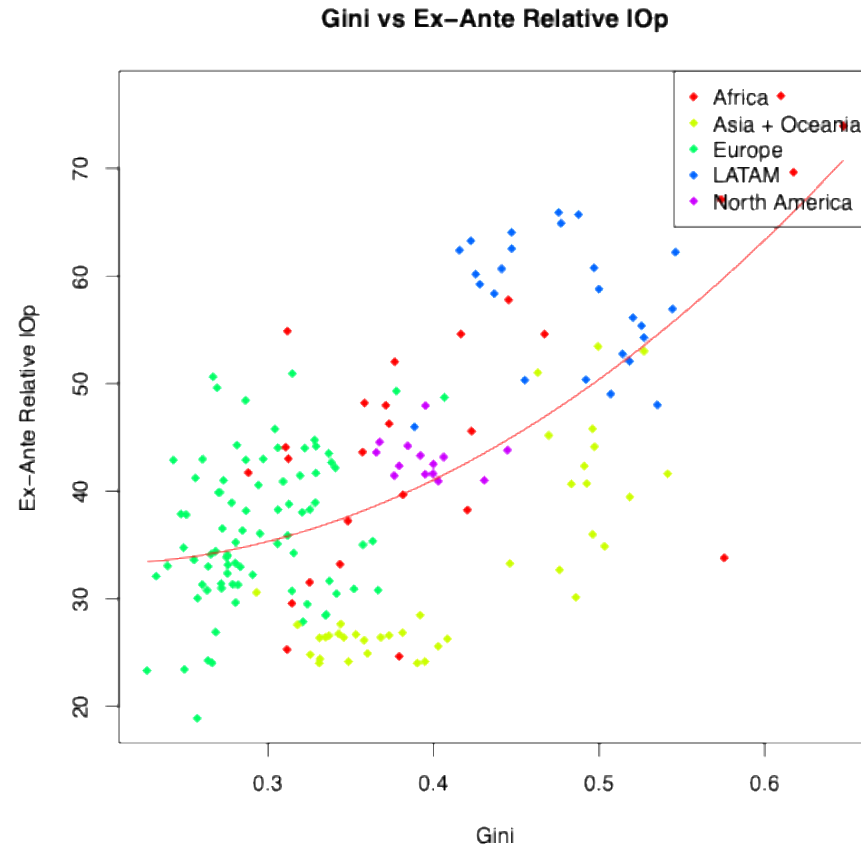
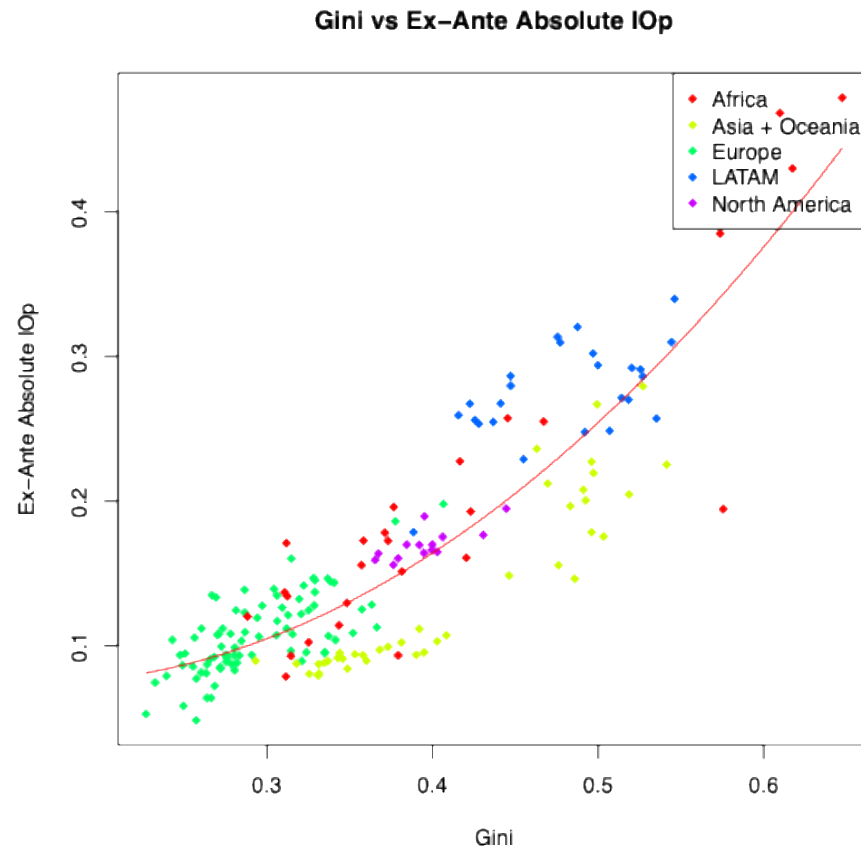
Inequality and development: a sectorial analysis

In the spirit of Kuznets, we can approximate the development by the share of population employed in the agricultural sector:

- Higher share \Rightarrow initial stages of development
- Lower share \Rightarrow people have moved to more productive sectors (secondary or tertiary): developed economies



Income and Opportunity Inequality: The Great Gatsby Curve

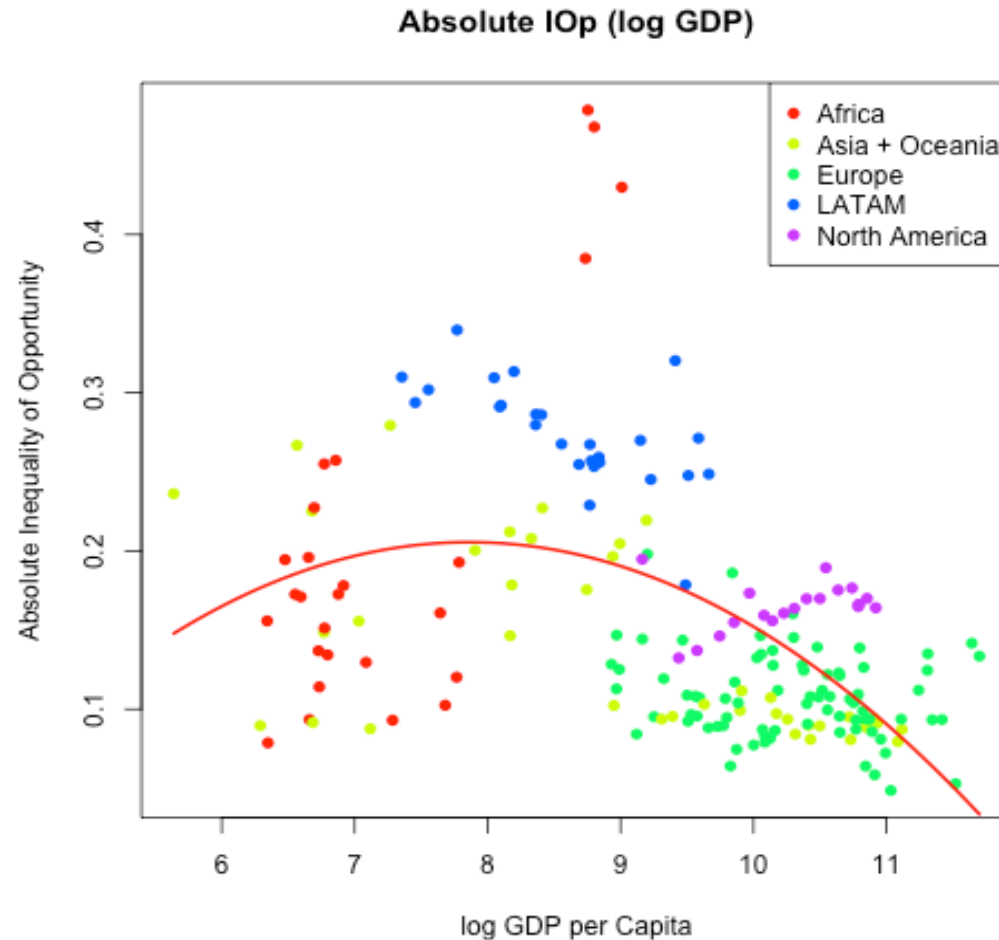


Source: Own elaboration on GEOM data

IOp and development: a mechanical relationship?

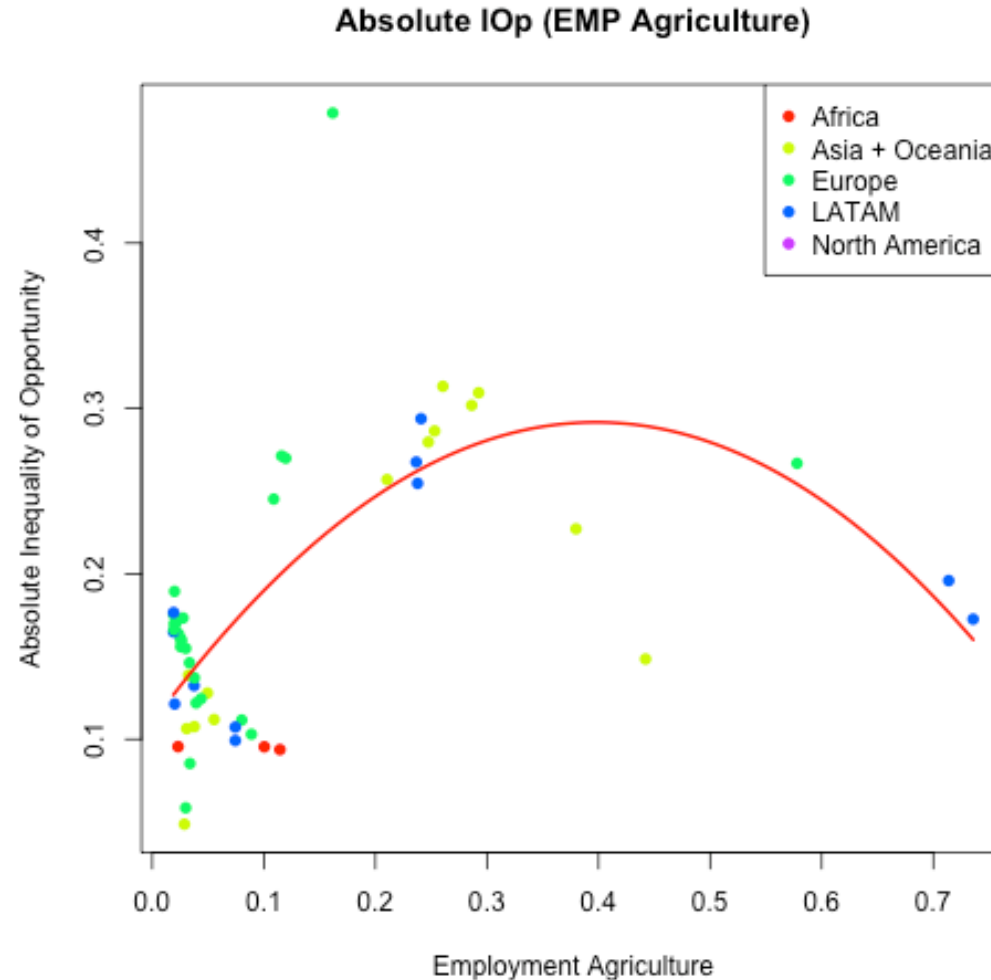
- If the Kuznets hypothesis holds and the relationship between relative IOp and income inequality were strictly positive, then for pure mechanical reasons the Opportunity Kuznets (with absolute Iop):
 - Should show an inverted-U shape
 - Should be steeper than the standard Kuznets curve

IOP and development: the Kuznets opportunity curve



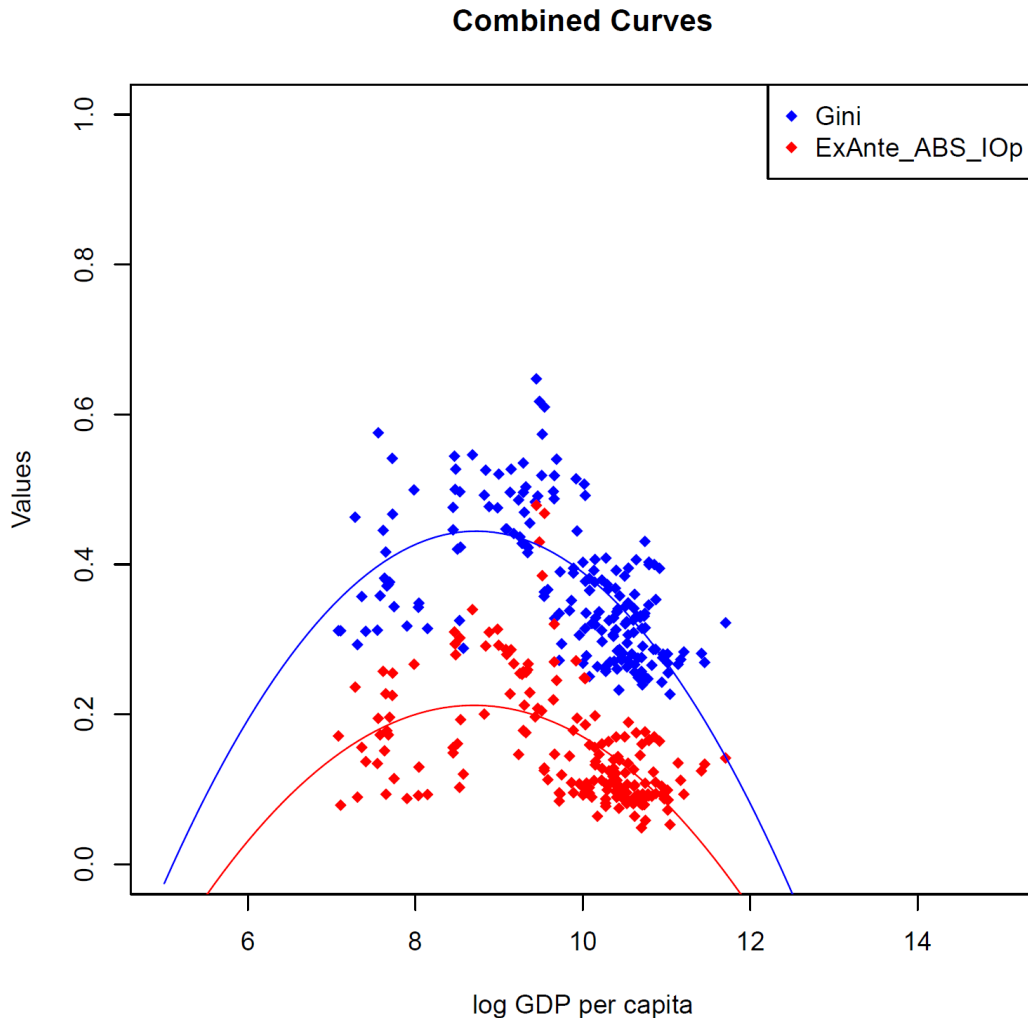
Source: Own elaboration on GEOM data

The Kuznets opportunity curve: a sectorial analysis



Source: Own elaboration on GEOM data

A comparison of income and opportunity Kuznets curves



Source: Own elaboration on GEOM data

$$Y = \beta_0 + \beta_1 \ln(GDP) + \beta_2 (\ln(GDP))^2 + \varepsilon$$

Variable	Inequality	IOp
Intercept	-2.123 ***	-1.666 ***
	(0.384)	(0.361)
GDP	0.591 ***	0.432 ***
	(0.083)	(0.078)
GDP^2	-0.034 ***	-0.025 ***
	(0.004)	(0.004)
R^2	0.401	0.299

Which mechanism?

- Development and technological progress improve living standards and generate new opportunities (income shocks).
- Crucial question: Is **development orthogonal to circumstances?**
- Two scenarios
 - 1) If income shocks are i. i. d. , then:
 - Assuming Kuznets inequality-curve holds
 - We have flat Kuznets opportunity curve
 - 2) Income shocks are circumstance-specific, then:
 - Assuming Kuznets inequality-curve holds
 - We have a inverted U-shape Kuznets opportunity curve
- **A model and a numerical simulation to show the two scenarios**

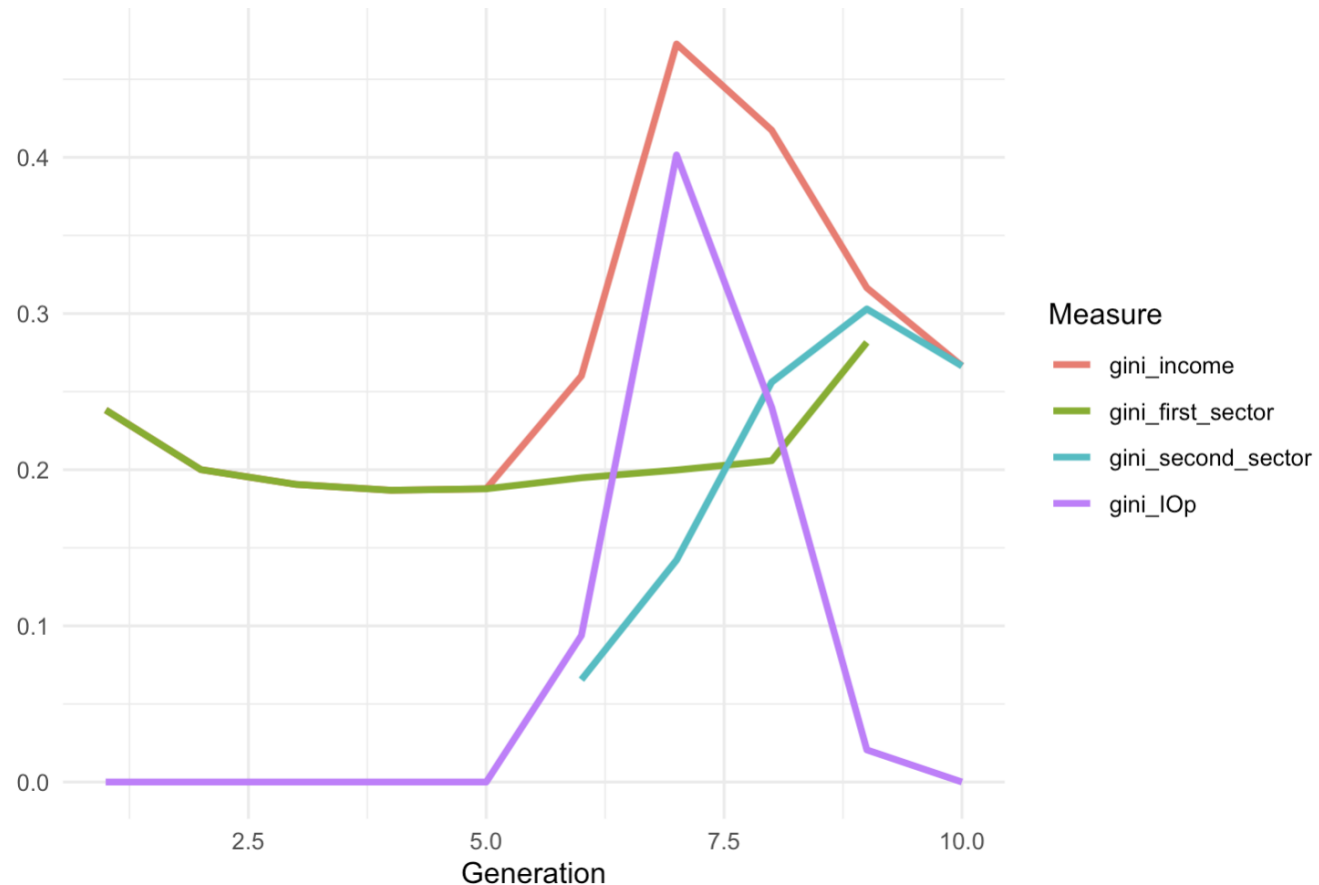
A simple model in the spirit of Kuznets

- T consecutive generations of n agents
- Full information
- Two sectors
- Each agent lives for three periods
- **Period 1** – Receives bequest w_t from the parents and «chooses» between two production sectors:
 - Sector 1: $y_t = y_0(w_t, e_t) = f_0(w_t) + g_0(e_t)$
 - Sector 2: $y_t = y_\phi(w_t, e_t, \phi_t) = f_\phi(w_t) + g_\phi(e_t) - \phi_t$
 - Separability in circumstances (w_t) and effort (e_t)
 - ϕ_t : entry barrier
 - $f', g' > 0$; $f'', g'' < 0$
 - $y_0(w_t, e_t) < y_\phi(w_t, e_t, \phi_t)$ for all (w_t, e_t, ϕ_t)
- **Agents cannot borrow.** Wealth can only be invested in production. Therefore, an agent is employed in Sector 2 if $w_t \geq \phi_t$, and in Sector 1 otherwise. A pure effect of circumstances.

A simple model (ctd)

- **Period 2** – Exerts **effort** $e_t \in [e_{min}, e_{max}]$
- Effort depends on preferences, orthogonal to wealth. We do not model this choice but assume there is a distribution of effort.
- **Period 3** – Realizes y_t and chooses between consumption and bequest according to $U(c, b) = c^\alpha b^{1-\alpha}$
- **Development decreases entry barriers:** $\phi_t \geq \phi_{t+1} \geq 0$
- **Dynamics.** Development pushes agents out of Sector 1, into Sector 2 with higher average income and higher inequality.
- **Income inequality** at time t is measured as the Gini coefficient of the incomes of the n agents in the population
- **Inequality of Opportunity** in this model is the **inequality between sectors**.
 - Other definitions are possible.

Dynamics: a simulation



We simulate the model for a population of $n = 1000$ agents and $T = 10$ generations.

Assume:

- initial distribution of wealth: $w_0 \sim Unif(0, 1.5)$
- $\varphi_0 = 2$ and $\varphi_{t+1} = \varphi_t + 1$
- $e_{\min} = 0$, $e_{\max} = 1$
- $g_0(x) = x$, $g_\phi(x) = Lx$, $L = 2$
- $f_0(x) = x$, $f_\phi(x) = Kx + \varphi_0$, $K = 3$
- $\alpha = 0.5$

- Until the 5th generation no agent can access Sector 2 (development too low): IOp = 0
- No entry barrier in generation 10 \Rightarrow everyone is employed in Sector 2 \Rightarrow IOp = 0
- The new steady state is more unequal.

Alternative scenarios

- If entry in the new sectors depends only on effort => No inequality of opportunity
- If, for instance, assume the existence of a credit market to pay ϕ_t :
Intermediate solutions

Summary

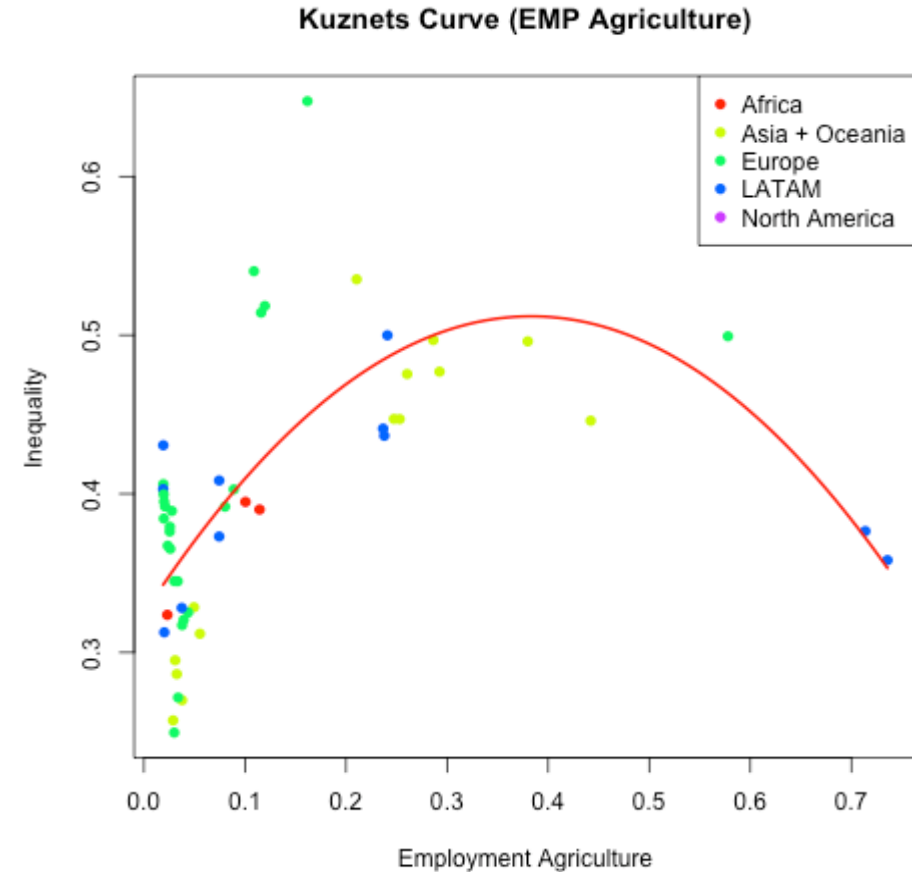
- By exploiting the new Global Estimates of Opportunity and Mobility (GEOM) database we have analyzed, in a cross sectional context, the following relationships:
 - Inequality and development (Kuznets curve)
 - Inequality and inequality of opportunity (Gatsby curve)
 - Inequality of opportunity and development (Opportunity Kuznets curve)
- Inequality of opportunity **first tends to increase and then decrease as a country develops**
- We have proposed a simple model describing a possible mechanism consistent with the evidence.

Thank you for the attention.

- Additional material

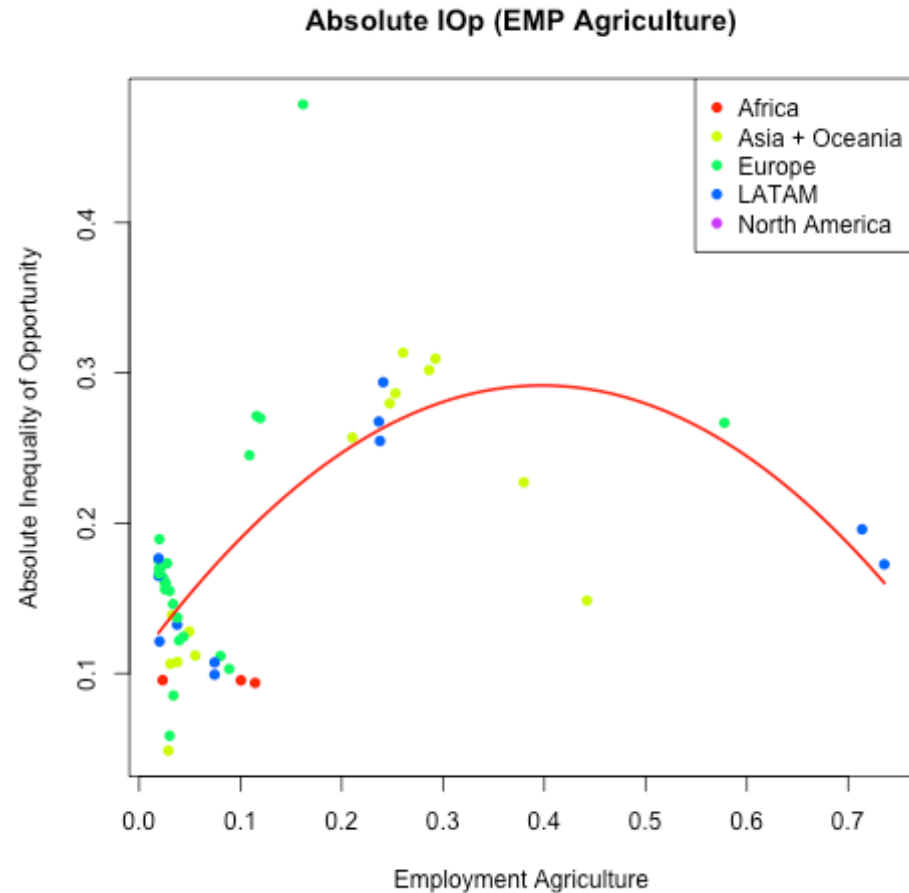
A sectoral analysis: inequality and development

- we can approximate development via the share of the population employed in the agricultural sector. Indeed, when this share is particularly high, then we are in the presence of an economy at the initial stages of development, as described in our model. Conversely, when this share is particularly low, then most of the population has moved toward the more productive technology, which is likely be represented by the secondary and, in particular, tertiary sectors



A sectoral analysis: IOP and development

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ExAnte_REL_IOp vs log GDP per capita

