Education structures and industrial development:

Lessons for education policies in African countries

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Motivation

The recent growth, development and job creation debate:

- Limited understanding of the link between education and economic growth
  - empirically hard to prove, a «wrong» model

  (Pritchitt 1996, Commission Growth&Development 2008, Hanushek&Woessmann 2008)

- Improved understanding of the link between structural transformation and economic growth.
  - Patterns of productive transformation shape economic growth - diversification, sectoral change, sophistication (Imbs&Warzciak 2003, Klinger and Lederman 2004; Hausmann, Hwang & Rodrik 2007, McMillan and Rodrik 2011, Kucera & Roncolato 2012)
  - Manufacturing a leading sector of catch up growth in low and middle income countries (Pieper 2000, Ocampo et al. 2009, Harrison & Clare-Rodriguez 2009, Nübler 2013a)

- This research analyses the role of education in shaping patterns of industrial development.

A KNOWLEDGE-BASED FRAMEWORK

- **Industrial development patterns**
  - Described by two distinct dimensions
    - Importance of manufacturing sector in total economy
    - Level of sophistication and technologies within manufacturing sector
  - determines the nature of tasks, activities to be performed, and thereby the knowledge and skills profile of jobs in the manufacturing sector
- **Education structure**
  - is defined by six dimensions (educational categories)
    - No schooling, incomplete primary, complete primary, lower secondary, upper secondary, post-secondary
  - Determines the knowledge and skills profile of labour force
- **Relationship:** education structures and industrial development patterns:
  - Knowledge structure of labour force determines job profiles that may be developed.
  - Education structures therefore determine the **options** for industrial devel.
  - Other country-specific conditions (factor endowment structures, size of markets) determine whether options are translated into productive capacities.

Empirical Analysis

A cross-country study of 78 low and middle income countries from Africa, Asia, Latin America and Europe

Measurement

- **Industrial development level**

  Industrial and technological advancement index (ITA) developed by UNIDO. A composed index measuring two dimensions of industrial development:

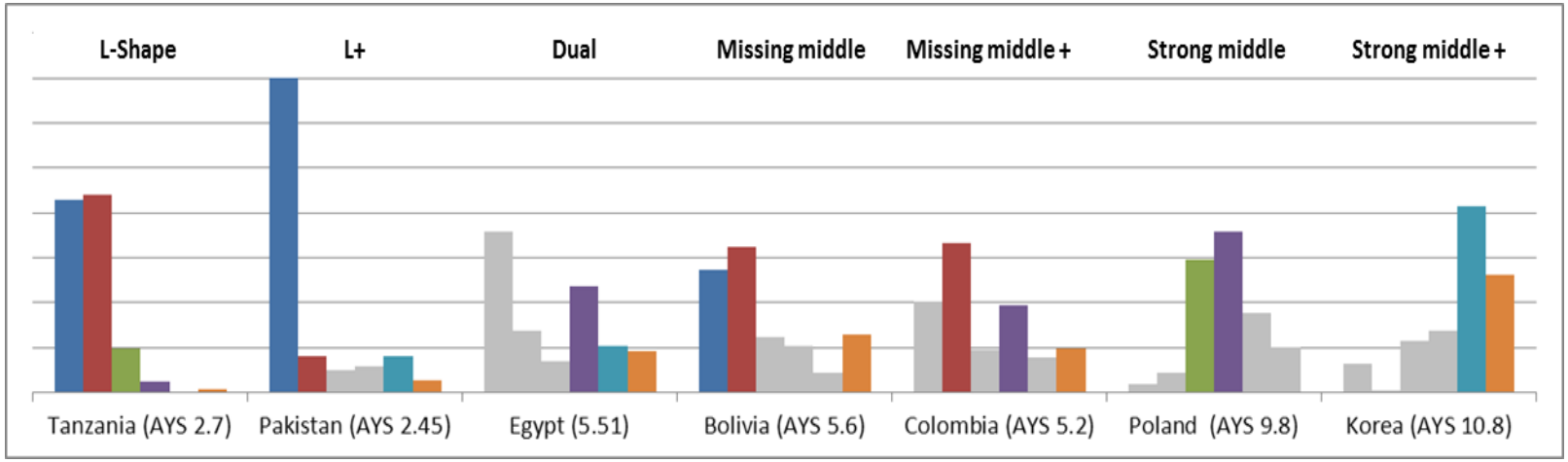
  - Industrial advance index (IAI): share of manufacturing in total production and exports
  - Technological advance index (TAI): share of medium and high technology products in manufacturing production and in export

- **Educational attainment**
  - **Level**: Average years of schooling in labour force (AYS)
  - **Structure**: relative share of educational categories in labour force

A TYPOLOGY OF EDUCATIONAL ATTAINMENT STRUCTURES

Sorting educational categories

- **L-shape:** median on non-schoolers or (complete and incomplete) primary ; extremely low shares of lower, upper and post-secondary.
- **L+ :** like L-shape, but higher shares of upper and post-secondary .
- **Dual:** high non-schoolers, low primary (like L-shape), but higher shares of lower, upper and post-secondary when compared to the L-shape.
- **Missing middle :** polarized patterns; high non-schoolers and primary, very low upper secondary, post-secondary exceeding upper secondary.
- **Strong middle** : form of bell curve, with median on primary, lower or upper secondary.

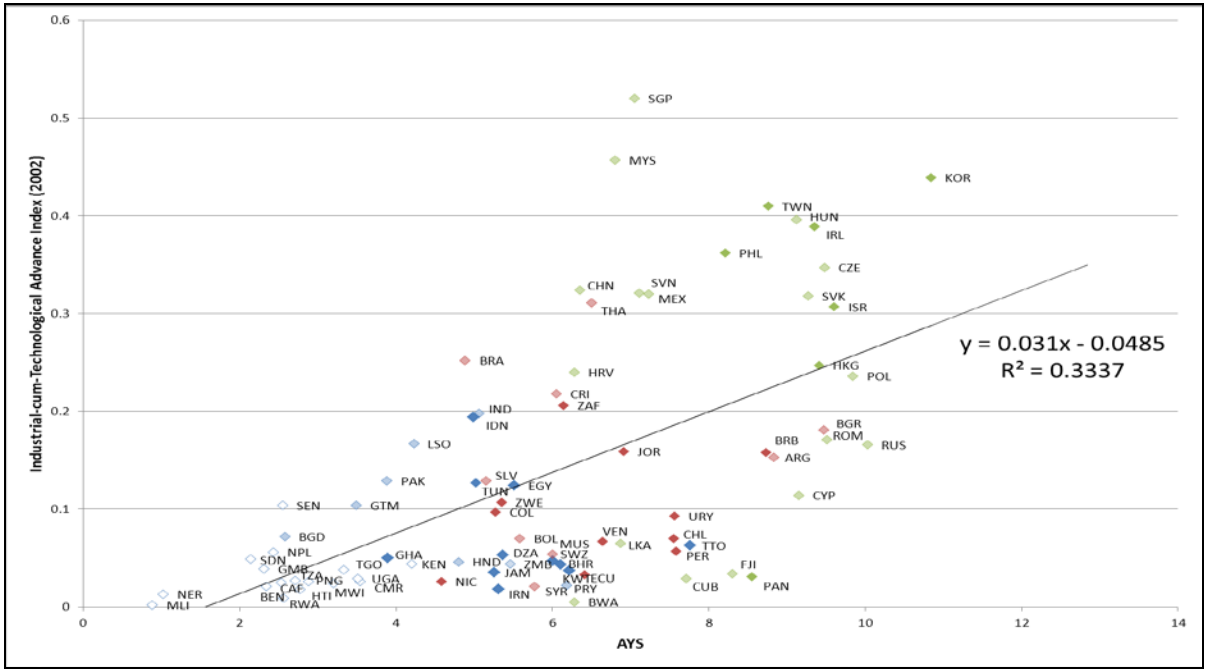


EMPIRICAL FINDINGS:
EDUCATION LEVELS AND INDUSTRIAL DEVELOPMENT

Limited power of educational attainment levels (AYS) to explain variation in industrial (manufacturing) development (ITA)

No correlation for country group ITA< 0.1 (horizontal) and for AYS>9 (vertical)

Figure 1: Education levels and industrial development levels

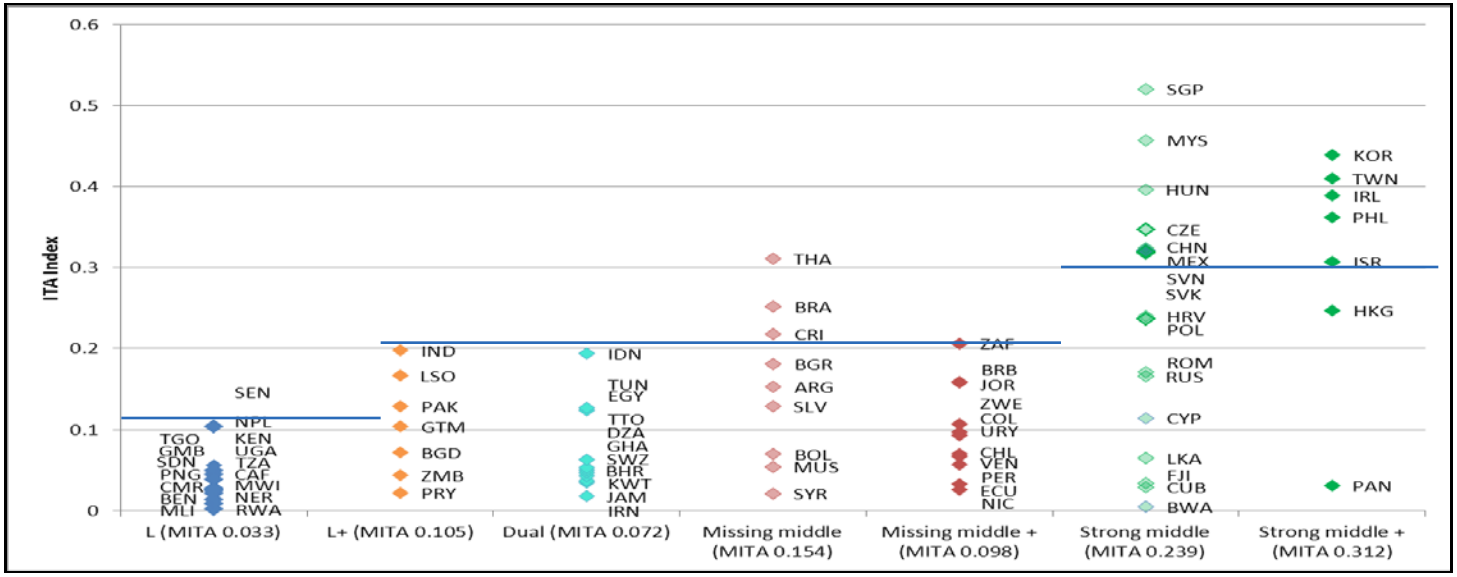


Source: Author's elaboration based on Barro & Lee, 2000; UNIDO, 2005

Empirical findings: Education structures determine <u>options</u> for reaching high **<u>levels</u>** of industrial development (ITA)

- L: ITA<0.1,
- L+ and dual: ITA < 0.2
- Missing middle: 4 good performers with ITA between 0.2 and 0.3
- Strong middle: Half of countries are high performers with ITA>0.3

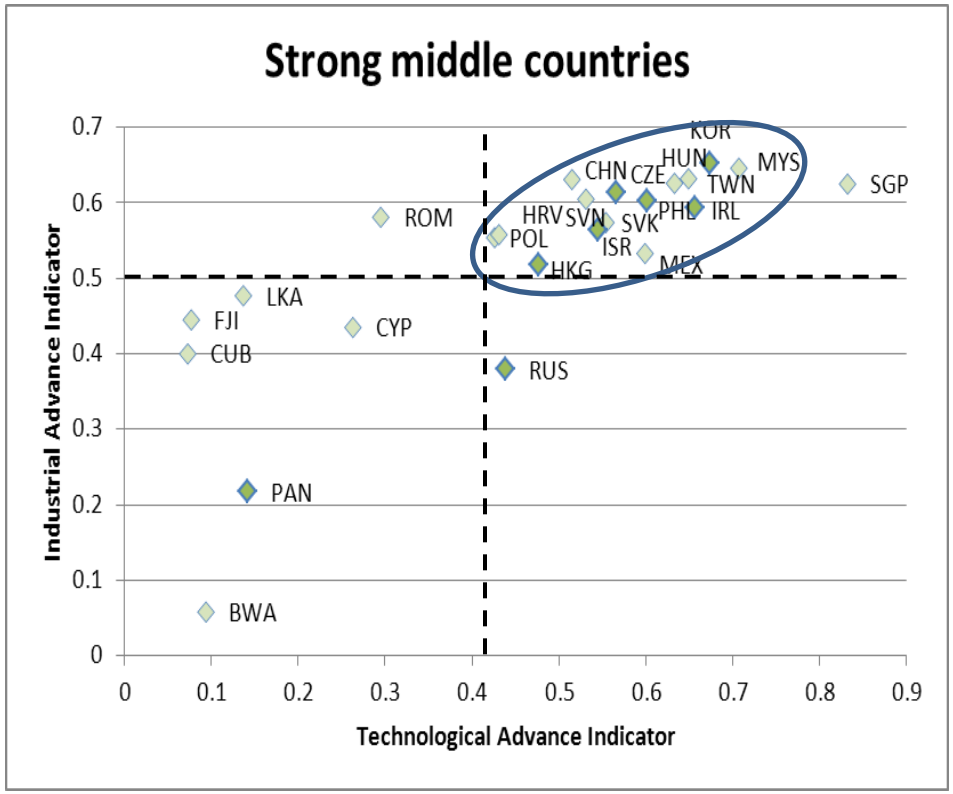
Figure 1: Educational attainment structures and levels of industrial development (ITA)

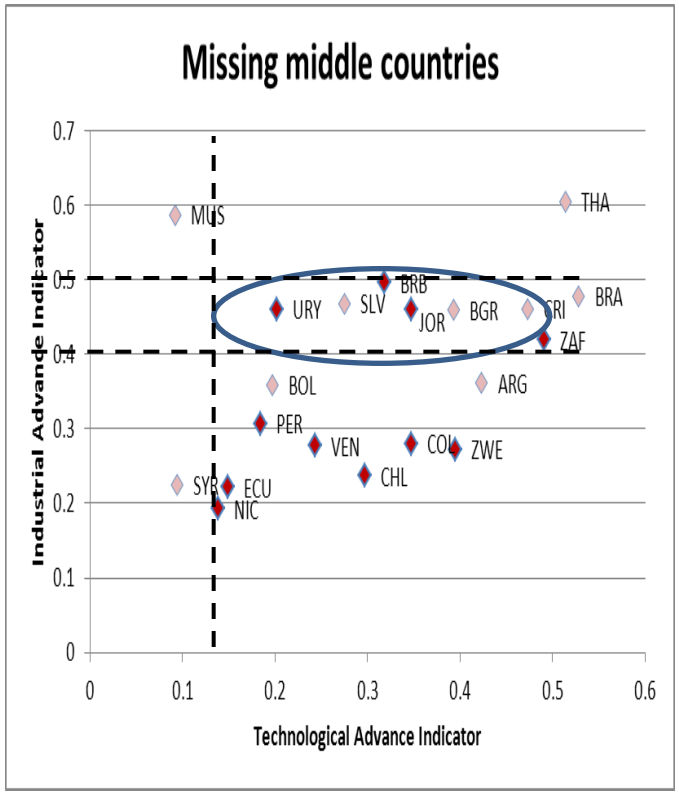


Source: Author's elaboration based on Barro & Lee, 2000 and UNIDO, 2005

Empirical findings:
.... by creating options for shaping Distinct **patterns** of industrial development

Strong middle: options to achieve both high IAI and TAI (high share of secondary allows industrial widening and deepening)
Missing middle: options to increase only TAI at given IAI level (high share of post- secondary allows technological upgrading.)

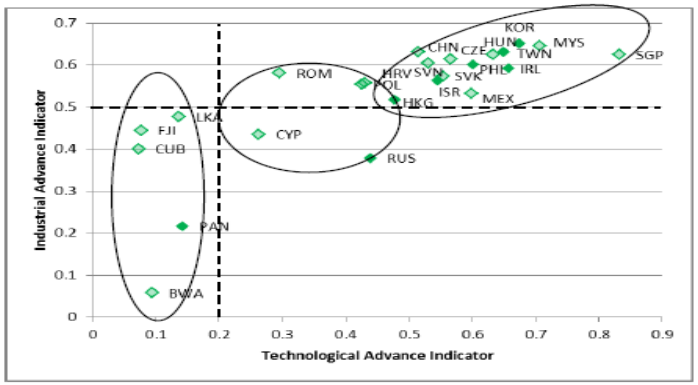




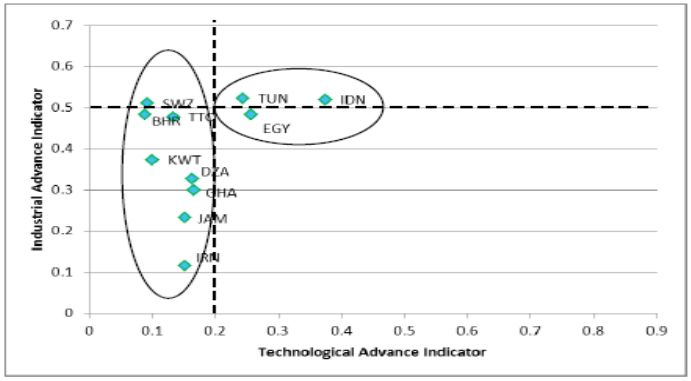
Empirical findings: L+ (low secondary) and dual (high secondary)

High shares of low educated affect speed of industrial development, but not structures

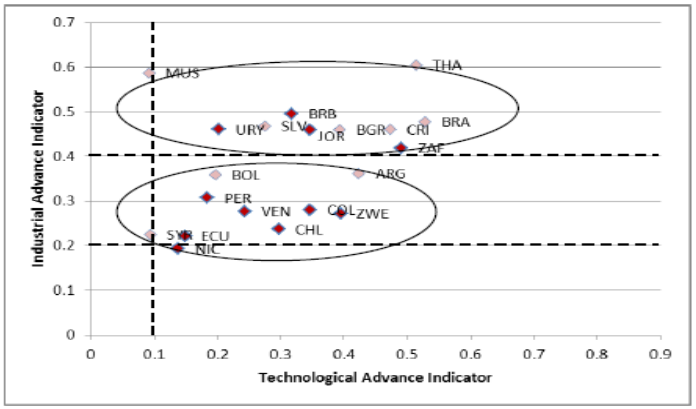
I: Strong middle (SM, SM+)



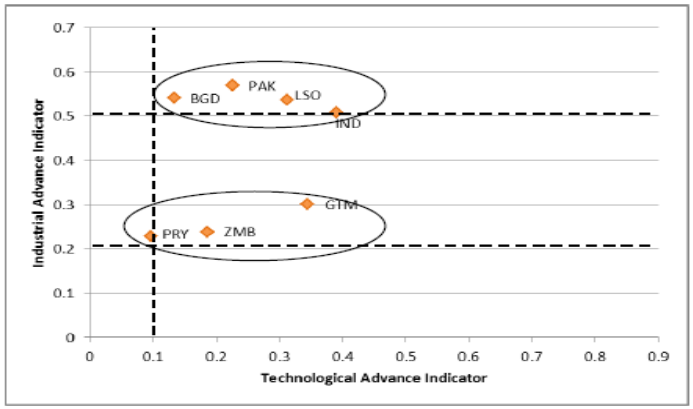
II: Dual



III: Missing middle (MM, MM+)

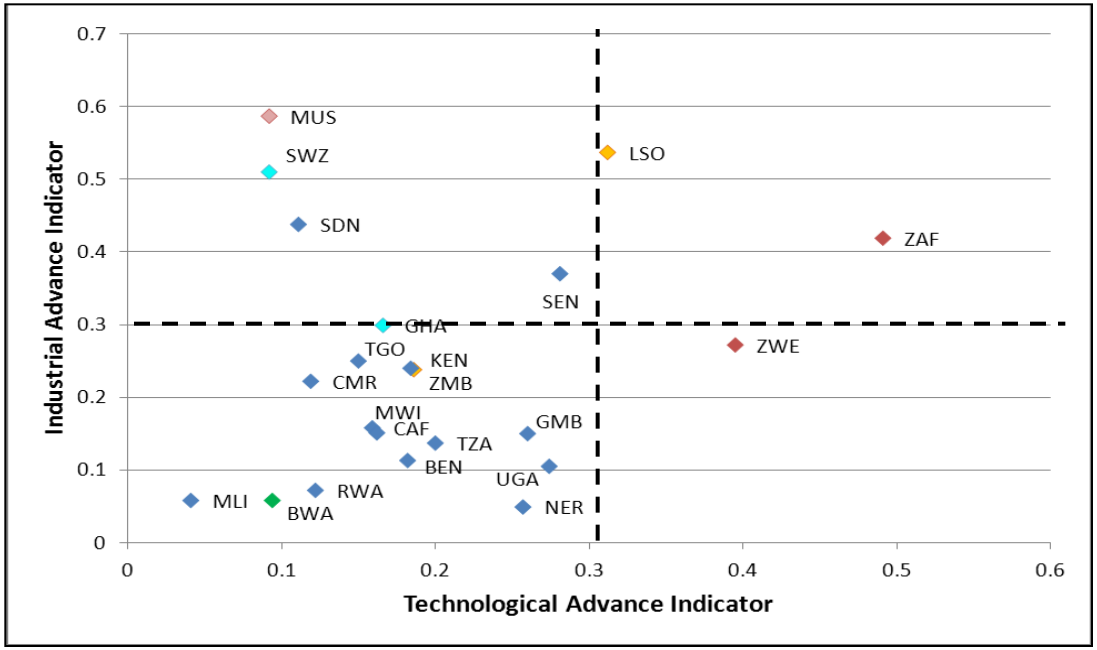


IV: L+



Sub-Saharan Africa: the L-shape

- Most SSA countries show L-Shape - Low levels of education, low diversity and low complexity of formal knowledge in labour force
- Lowest levels of industrial development (ITA)
- Due to low manufacturing base (IAI), low technological levels (TAI) or low levels in both dimensions
- Only few SSA countries with different education structures – show higher levels of industrial development



Policy Implications for Africa

- Recognize the role of education structures in defining options for industrial development (social capabilities)
- Formulate education policies that transform L-shape education structure towards a strong middle structure.
- Accelerate process of transforming educational structures to speed up dynamics of productive transformation.
- Align education policies with industrial policies to translate options into productive capacities and creation of productive jobs (industrial development vision)
- Integrate a training strategy to ensure that workers acquire the industry, technology and job-specific skills and competences required for efficient performance (human capital perspective).

Thank you for your attention

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Educational attainment structures and education levels

- Different education structures are related to different levels of education (AYS)
- Mean Average Years of Schooling (MAYS) is
  - Low for L, L+ and Dual structures
  - Medium for MM and MM+ structures
  - High for SM and SM+ structures
- This relationship obscures the importance of educational structures in addition to levels