LDCR 2014

Growth with Structural Transformation: A post-2015 development agenda

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Faculty of Economics and Business
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Structural change, narrowly defined here as the reallocation of labor across sectors, featured prominently in earlier analyses of economic growth (Kuznets, 1966; Chenery et al. 1986).

It is receiving renewed attention (Timmer and de Vries, 2009; IADB 2010; McMillan and Rodrik, 2011; De Vries et al. 2014).

LDCR 2014 first comprehensive study on structural change in LDCs
Data

The dynamics of structural change

...looking ahead
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>BWA</td>
<td>3.6</td>
<td>1.0</td>
<td>1.5</td>
<td>0.7</td>
<td>1.4</td>
<td>0.5</td>
<td>0.5</td>
<td>7.0</td>
<td>1.5</td>
</tr>
<tr>
<td>ETH</td>
<td>0.3</td>
<td>1.0</td>
<td>1.5</td>
<td>0.7</td>
<td>1.4</td>
<td>0.5</td>
<td>0.5</td>
<td>7.0</td>
<td>1.5</td>
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<tr>
<td>GHA</td>
<td>11.2</td>
<td>12.9</td>
<td>16.3</td>
<td>21.5</td>
<td>6.6</td>
<td>8.9</td>
<td>2.3</td>
<td>13.1</td>
<td>2.9</td>
</tr>
<tr>
<td>KEN</td>
<td>56%</td>
<td>9%</td>
<td>12%</td>
<td>16%</td>
<td>21%</td>
<td>6%</td>
<td>22%</td>
<td>53%</td>
<td>52%</td>
</tr>
</tbody>
</table>

Difference in coverage between two data sets: GGDC (which covers informal employment) and UNIDO (which is mostly formal, registered firms)
Groningen Growth and Development Centre

- Compiles comprehensive databases on indicators of growth and development and maintains them on a regular basis

- Amongst others:
  - Penn World Tables (since v. 8.0)
  - World Input-Output Database
  - GGDC 10 Sector Database
    - Africa Sector Database (funded by ESRC/DFID, spring 2012 – spring 2014)
Productivity trend in manufacturing
(USA is 100)
Productivity trend in market services (USA is 100)

<table>
<thead>
<tr>
<th>Employment shares</th>
<th>1960</th>
<th>1975</th>
<th>1990</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>72.9</td>
<td>66.4</td>
<td>62.1</td>
<td>50.8</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>4.7</td>
<td>7.8</td>
<td>8.8</td>
<td>7.5</td>
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<tr>
<td>Other industries</td>
<td>4.6</td>
<td>5.2</td>
<td>5.3</td>
<td>5.1</td>
</tr>
<tr>
<td>Market services</td>
<td>8.7</td>
<td>10.2</td>
<td>12.8</td>
<td>23.4</td>
</tr>
<tr>
<td>Non-market services</td>
<td>9.1</td>
<td>10.4</td>
<td>11.0</td>
<td>13.3</td>
</tr>
<tr>
<td>All sectors</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Notes: Figures are unweighted averages across eleven African countries.
• Shift-share decomposition method to measure the contribution to growth from the reallocation of workers across sectors

• Method decomposes the aggregate change in labor productivity into within and between effects

\[ \Delta P = \sum_{i \text{ within effects}} + \sum_{i \text{ between effects}} \]
Decomposition methods

1. McMillan and Rodrik (2011):
\[ \Delta P = \sum_i (P_i^T - P_i^0) S_i^0 + \sum_i (S_i^T - S_i^0) P_i^T \]

2. Opposite base and end years:
\[ \Delta P = \sum_i (P_i^T - P_i^0) S_i^T + \sum_i (S_i^T - S_i^0) P_i^0 \]

3. Period averages:
\[ \Delta P = \sum_i (P_i^T - P_i^0) \bar{S}_i + \sum_i (S_i^T - S_i^0) \bar{P}_i \]

4. If growth and levels are not correlated, a more appropriate decomposition is:
\[ \Delta P = \sum_i (P_i^T - P_i^0) S_i^0 + \sum_i (S_i^T - S_i^0) P_i^0 + \sum_i (P_i^T - P_i^0) \cdot (S_i^T - S_i^0) \]
Decomposition results, 1960-2010

<table>
<thead>
<tr>
<th>Decomposition equation used:</th>
<th>Labour productivity growth</th>
<th>Component due to:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Within</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Between Static</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dynamic</td>
</tr>
<tr>
<td>(1)</td>
<td>1.4</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.6</td>
</tr>
<tr>
<td>(2)</td>
<td>1.4</td>
<td>-0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td>(3)</td>
<td>1.4</td>
<td>0.3</td>
</tr>
<tr>
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<td></td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.8</td>
</tr>
</tbody>
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Notes: Figures are unweighted averages across eleven African countries. Numbers may not sum due to rounding.
Decomposition results by period

Sub-Saharan Africa

1990-2010
- Between - static: 1.8%
- Between - dynamic: -0.1%
- Within: 2.9%

1975-1990
- Between - static: -2.0%
- Between - dynamic: 0.0%
- Within: 2.0%

1960-1975
- Between - static: 2.0%
- Between - dynamic: 0.0%
- Within: 4.0%

average annual labour productivity growth
Decomposition results by period

Asia

1960-1975
1975-1990
1990-2010

average annual labour productivity growth

-2.0%  0.0%  2.0%  4.0%  6.0%

Within
Between - static
Between - dynamic

4.4%  3.3%  3.1%
Decomposition results by period

Latin America

1990-2010

0.9%

-4.0% -2.0% 0.0% 2.0% 4.0%

average annual labour productivity growth

1975-1990

-0.9%

1960-1975

2.4%

Within
Between - static
Between - dynamic
What has been the role of sectors in explaining these aggregate patterns?

> Requires adjusting the decomposition method

> In current decomposition methods, all expanding sectors contribute positively to changes in aggregate productivity even when they have below-average productivity levels or growth rates.
The decomposition in equation (4) is modified as follows

\[ \Delta P = \sum_i^I (P_i^T - P_i^0) S_i^0 + \sum_j^J (S_j^T - S_j^0) (P_j^0 - P_j^{0*}) + \sum_j^J \left( (P_j^T - P_j^0) - (P_j^{T*} - P_j^{0*}) \right) (S_j^T - S_j^0) \]

where J is the set of expanding sectors, and K is the set of shrinking sectors, and average labour productivity of shrinking sectors at time T and 0 is given by

\[ P_j^{0*} = \frac{\sum_k^K (S_k^T - S_k^0) P_k^0}{\sum_k^K (S_k^T - S_k^0)} \]

\[ P_j^{T*} = \frac{\sum_k^K (S_k^T - S_k^0) P_k^T}{\sum_k^K (S_k^T - S_k^0)} \]
### Decomposition results, 1990-2010

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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Within</td>
<td>Static</td>
</tr>
<tr>
<td>Agriculture</td>
<td>0.7%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>0.2%</td>
<td>0.1%</td>
<td>-0.1%</td>
</tr>
<tr>
<td>Other industries</td>
<td>0.6%</td>
<td>0.5%</td>
<td>-0.4%</td>
</tr>
<tr>
<td>Market services</td>
<td>0.1%</td>
<td>1.1%</td>
<td>-1.1%</td>
</tr>
<tr>
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<td>0.2%</td>
<td>0.1%</td>
<td>-0.2%</td>
</tr>
<tr>
<td>All sectors</td>
<td>1.9%</td>
<td>1.8%</td>
<td>1.8%</td>
</tr>
</tbody>
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Looking ahead

DEMAND
- changes in *demand patterns* due to different income elasticity of demand for agricultural products (low), manufactured goods (median), services (high) => ‘Engel’s Law’
- changes in *composition of trade*

SUPPLY
- changes in *composition of production factors* (land, mineral resources, labor, physical capital)

POLICIES
- LDCR 2014: resource mobilization, industry and sector policies, macroeconomic policies

... No single development path
Thank you for your attention

Dr. Gaaitzen de Vries

www.ggdc.net
www.wiod.org