STRUCTURAL TRANSFORMATION, OPENNESS, AND PRODUCTIVITY GROWTH IN SUB-SAHARAN AFRICA

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Overview of Structural Transformation and Growth

❖ Productivity growth and structural change are inextricably interconnected:

   ❖ Structural change induces allocative efficiency of resources across sectors, and thus, essential for productivity growth, job creation and sustainable economic growth.

   ❖ The *structural bonus and benefit hypothesis* – within-sector growth.

❖ Structural change could also be growth-reducing:

   ❖ *structural burden hypothesis/ cost disease* where labour could reallocate from high productive sectors to low productive sectors due to the increased cost of production in the high productive sectors.

Growth in sub-Saharan Africa (SSA)

❖ There have been recent success stories of growth in most countries in SSA.

❖ At the same time, there are debates that the recent growth rates appear devoid of structural change of the economies.

❖ The arguments are that the observed growth episodes are mainly from commodity booms and favourable external factors.

(see Diao & McMillan, 2016; McMillan, 2011; de Vries et al. 2015; Rodrik, 2016; Rodrik, Diao, & McMillan, 2017).

Key Research Questions

❖ Is growth in SSA engineered by structural transformation and/or openness? What is the evidence?

❖ Is there convergence in the productivity growth paths of the countries in SSA?

    ❖ Absolute or conditional convergence?

❖ Is there evidence of premature deindustrialization in SSA?

Brief Literature *(some notable quotes)*

❖ *SSA has grown rapidly over the last decade, but a curious feature of this growth was that it was accompanied by little structural change towards non-traditional tradables (such as manufactures).*

❖ *Now that China, the advanced economies, and most emerging markets are all slowing down, the question whether Africa's high growth can be sustained looms larger.*

❖ *Africa finds itself in an environment where it is facing much stronger head winds (effects of globalization)*

❖ *Premature deindustrialization- Developing countries are turning into service economies without having gone through a proper experience of industrialization.*

  (Rodrik D., 2016, p.2, Rodrik Dani 2016, P.1 & 15)

Brief Literature *(some notable quotes)*

❖ *The expansion of manufacturing activities during the early post-independence period led to a growth enhancing reallocation of resources in SSA.*

❖ *This process of structural change stalled in the mid-1970s and 80s.*

❖ *When growth rebounded in the 1990s, workers mainly relocated to market services industries.*

❖ *Market services activities had above-average productivity levels, but productivity growth was low and increasingly falling behind the world frontier.*

❖ *This pattern of static gains but dynamic losses of reallocation since 1990 is found for many African countries.*

   (Gaaitzen de Vries, Marcel Timmer and Klaas de vries, 2013, P.2)

Brief Literature *(some notable quotes)*

❖   *...since 1990 structural change has been growth reducing– with labour moving from low – to high- productivity sectors - in both Africa and Latin America, with the most striking changes taking place in Latin America.*

❖   *...things seem to be turning around in Africa: after 2000, structural change contributed positively to Africa's overall productivity growth.*

❖   *...globalization appears not to have fostered the desirable kind of structural change. Labour has moved in the wrong direction, from more productive to less productive activities, including, most notably, informality.* (Mcmillan, M., Rodrik, D., & Verduzco-Gallo I., 2014, p.1 & 12)

Dynamic Panel Model of Growth in SSA

❖   Consider the growth of labour productivity (PG_{it}) in country i at time t defined as;

❖ $PG_{it} = ln\left(\frac{P_{it}}{P_{it-1}}\right) = ln(P_{it}) - ln(P_{it-1})$ ❖   (1)

      ❖   Growth is measured over five-year period: 1991-1995, 1996-2000, 2001-2005, 2006-2010, and 2011-2015

❖   The dynamic relationship of productivity growth and structural change in the country can be expressed as:

❖ $PG_{it} = \beta_1(PG_{it-1}) + \beta_2 ln(P_{it-1}) + \beta_3 ln(S_{ijt)} + \beta_4 ln(K_{it}) + \eta_i + \xi_t + \mu_{it}$ (2)

      ❖ PG_{it} is the growth of aggregate labour productivity in country i at time t.

      ❖ P_{it-1} is the level of labour productivity at the start of the period.

      ❖ S_{ijt} is the share of labour in sector j of country i at time t;

      ❖ K_{it} is the total capital stock. η_i and ξ_t are country and period effects respectively

      ❖ μ_{it} is the error term.

Methodology

❖ Equation 2 is augmented with the key measures of openness variables to capture the effects of economic openness on aggregate productivity growth;

❖ $PG_{it} = \beta_1(PG_{it-1}) + \beta_2 ln(P_{it-1}) + \beta_3 \ln(S_{ijt}) + \beta_4 \ln(K_{it}) +$

$$\beta_5(FDI_{it}) + \beta_6(TOP_{it}) + \beta_7(CAO_{it}) + \eta_i + \xi_t + \nu_{it} \qquad (3)$$

  ❖ TOP_{it} is trade openness measured as the ratio of total export and imports to total GDP.

  ❖ FDI is the net inflows of foreign direct investment.

  ❖ CAO is the indices of capital account openness.

  ❖ ν_{it} is the error term.

Estimation

❖ The equations are estimated with the quasi maximum likelihood (QML) approach which has some superior features for estimating dynamic panels:

  ❖ It relaxes the normality assumptions to deal with possible non-normality but the efficiency of the estimates are not affected.

  ❖ The QML estimators are robust to initial conditions and time series heteroscedasticity and can therefore deal with convergence problems.

  ❖ The QML is asymptotically normal when the log-likelihood for dynamic panels is misspecified, and could produce better finite-sample performance compared to the difference and system GMM estimators.
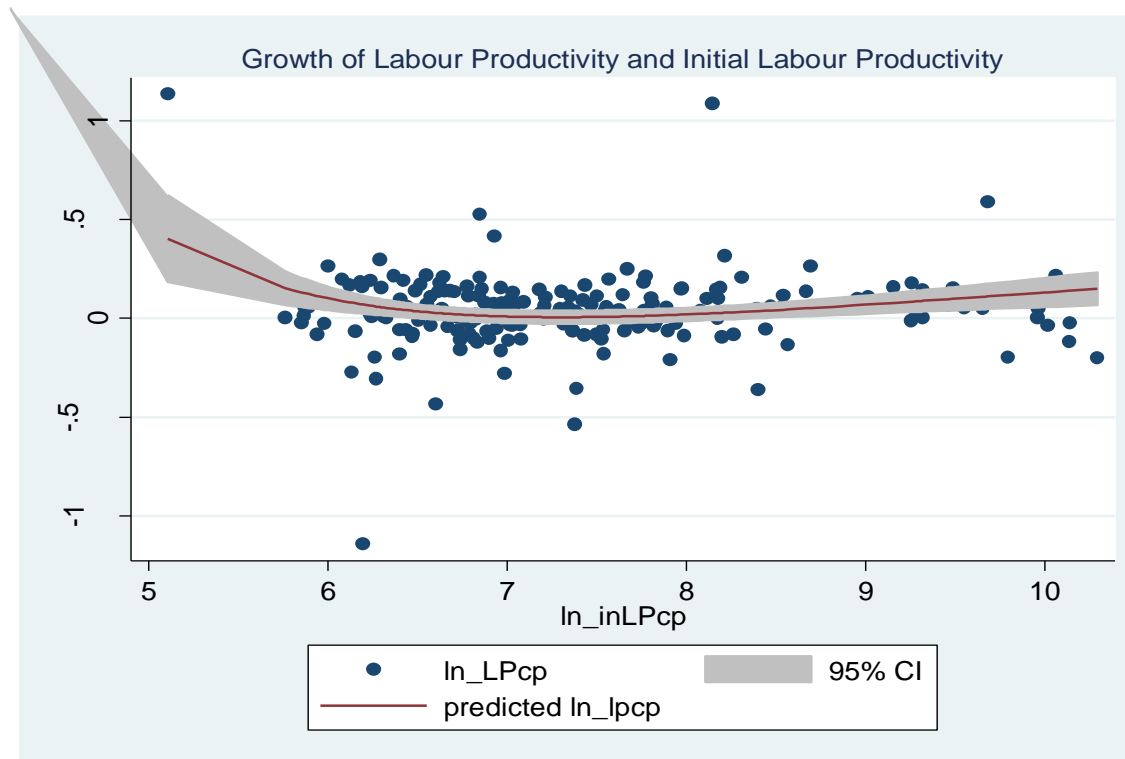
Data

❖ Aggregate labour productivity is the total value of output per worker in the economy, and thus captures the contributions of each worker to the growth of output and the overall economy at large. It is measured at constant 2005 USD prices.

❖ Sectoral labour shares are measured as the percentage of the aggregate labour employed in the sector.

❖ The data for GDP, export and imports are all measured at constant 2010 USD prices.

❖ The data for the capital stock is based on the work of Gupta et al. (2014). It is measured in billions of constant 2011 international dollars. The total economy's capital stock is calculated as the summation of private capital stock, public capital stock and public-private capital stock.

❖ Net inflow of FDI is measured as the total net inflow of FDI as a percentage of GDP.

Some Descriptive patterns

❖ Figure 1 plots the growth of labour productivity for the five-year period interval on the vertical axis, against the initial labour productivity levels at the start of the five-year period interval on the horizontal axis for the SSA countries for the period 1991-2015.

Figure 1: Growth of Labour Productivity and Initial levels of Labour Productivity in SSA, 1991-2015

Source of Data: ILO Labour Statistics Database.

❖ the data does not appear to support the absolute convergence hypothesis

❖ very low dispersions in the relationships of the growth of labour productivity and initial levels of labour productivity of the periods

❖ countries may not necessarily be structurally similar and could therefore have different steady state positions.

❖ there may be *conditional* rather than *absolute* growth convergence.

Some Descriptive patterns

❖ Table 1 presents summary statistics of the key variables of the study.

Figure 1: Growth of Labour Productivity and Initial levels of Labour Productivity in SSA, 1991-2015

Periods	Number of Observations	Labour Productivity		Capital stock		Shares of labour in Agriculture		Shares of labour in Industry		Shares of labour in Services	
		Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard Deviation	Mean	Standard Deviation
1991-1995	205	3035.87	4716.35	72.25	166.52	62.07	18.72	10.15	7.44	27.79	12.45
1996-2000	205	3235.13	4918.22	75.29	167.96	61.19	19.06	9.64	6.94	29.16	13.36
2001-2005	205	3724.50	5704.31	79.47	169.96	59.73	19.99	9.55	6.81	30.72	14.42
2006-2010	205	4220.85	6495.35	94.19	199.26	57.91	20.47	9.52	6.36	32.56	15.30
2011-2015	205	4580.51	6870.21	122.55	247.80	56.65	20.42	9.53	5.91	33.82	15.79

Results of Dynamic Panel Regressions

Table 2:Labour Productivity Growth, Structural Transformation and Economic Openness in Africa, 1991-2015

	(1) Growth of labour productivity	(1) Growth of labour productivity	(1) Growth of labour productivity	(1) Growth of labour productivity	(1) Growth of labour productivity
Lagged growth of labour productivity	0.041 (0.199)	0.110 (0.225)	0.107 (0.214)	0.113 (0.194)	0.151 (0.200)
Log of initial level of labour productivity	-0.625*** (0.044)	-0.731*** (0.088)	-0.731*** (0.083)	-0.735*** (0.084)	-0.763*** (0.079)
Log of share of total employment in agriculture	0.055 (0.063)	0.032 (0.061)	0.025 (0.061)	3.88e-04 (0.059)	-0.004 (0.062)
Log of share of total employment in industry	0.176*** (0.051)	0.180*** (0.060)	0.173*** (0.057)	0.150*** (0.059)	0.137*** (0.063)
Log of share of total employment in services	0.505*** (0.162)	0.496*** (0.203)	0.506*** (0.205)	0.510*** (0.233)	0.545*** (0.248)
Log of total capital Stock		0.104** (0.056)	0.108*** (0.052)	0.157*** (0.060)	0.188*** (0.066)
Trade openness			2.69e-04 (9.64-04)	2.00e-04 (0.001)	1.38e-04 (0.001)
Net inflows of FDI				0.003 (0.002)	0.003** (0.002)
Capital account openness					-0.031 (0.130)
No. of Observations	164	164	164	164	164

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Results

❖ structural change, particularly in industry and services has positive effects on the growth labour productivity in SSA

❖ openness appears to have weak influence on the growth of labour productivity in SAA

❖ There is evidence of conditional convergence of the growth of labour productivity across the countries.

  ❖ the results predict higher growth for countries with initial low labour productivities.

Results

❖ The statistically insignificant coefficients of the shares of labour in agriculture suggests three possible scenarios about structural change in the sector in SSA.

1. Averagely the decline in the labour shares in agriculture has not been that significant to raise sectoral productivity levels and contribute significantly to aggregate labour productivity growth.

2. The decline of valued added in the agriculture has been very high compare to the decline of labour shares

3. Low productivity in the agriculture sector could continue to keep the cost of production high.

   ❖ It will be difficult to raise productivity levels when the unit costs of capital and labour are high.

Conclusions

❖ labour productivity growth needs to increase beyond the current levels.

❖ agriculture productivity levels needs to be increased by adopting efficient production technologies and intra-sector transformation.

❖ Continuous capital investment to increase sectoral capital deepening (not just aggregate capital accumulation) is very essential to raise productivity levels

❖ Employment in services will be limited if other sectors remain stagnant because growth in service alone will not be enough to raise aggregate demand.

❖ The traditional trade compositions may need to be substantially transformed in most of the countries in SSA to achieve significance contributions of trade to productivity growth.

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