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Structural Transformation in Sub-Saharan Africa

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Economic development is typically accompanied by the movement of labor from agriculture to the non-agricultural sector, a pattern commonly referred to as structural transformation. This note aims to better understand the ongoing structural transformation in Sub-Saharan Africa. It finds that: (i) The structural transformation is occurring more slowly, and is much less variable across countries, than prevailing estimates suggest. (ii) There is a weak relationship between initial agricultural employment shares and the pace of transformation, suggesting little convergence across regions. (iii) Movement out of agricultural employment is clearly but only modestly correlated with poverty reduction.

Economic development is typically accompanied by large movements of labor out of agriculture into non-farm employment, a pattern commonly referred to as the structural transformation. Non-farm employment tends to be less risky, less prone to underemployment, and more productive than agricultural employment. Movement out of agriculture and into non-farm employment is often a sign of both economic development and welfare improvements. However, commonly used measures of structural transformation come from modeled estimates – not household survey data – and little is known about the accuracy of these estimates. Because of this, it is not entirely clear how much the current structural transformation is reducing poverty.

Table 1 compares modeled estimates from the International Labor Organization (ILO) with estimates computed from SSAPOV, a set of harmonized nationally representative household surveys from Sub-Saharan Africa (SSA). The ILO estimates mainly rely on GDP growth to project changes in sectoral employment patterns since the last survey. SSAPOV, in contrast, is based solely on surveys and is frequently updated, because it is the source of the Bank's official poverty estimates for SSA countries.

We compare ILO estimates in the change of agricultural employment with household-level survey

estimates from SSAPOV in the same years. We restrict attention to countries with greater than 15 million people, for which there are two separate SSAPOV surveys that ask about the sector of primary employment over the previous seven days, the same recall period on which the ILO estimates are based.

There is significant heterogeneity in the speed of the structural transformation across SSA countries. The variance in the ILO modeled estimates is particularly striking, ranging from an annual decrease of 4.4 percentage points of the share of agricultural employment in Burkina Faso to a 1.3 percentage point per year increase in Uganda. The range of SSAPOV estimates is considerably smaller, as the standard deviation for the ILO estimates is more than 40 percent smaller than that of the SSAPOV estimates

On average, the SSAPOV estimates are more than 0.5 percentage points per year smaller in magnitude than the ILO estimates, equivalent to a 60 percent decline in magnitude. (Table 1, bottom row) The SSAPOV estimates suggest that the structural transformation is proceeding much more slowly than the ILO estimates would suggest. The country-specific estimates differ greatly in some cases, as the discrepancy between the SSAPOV estimates and the ILO estimates exceeds one percentage point in eight countries. The direction of the travel by the SSAPOV

Table 1: A Snapshot of Structural Transformation in large SSA countries

country	year1	year2	Share of employment in agricultural sector from SSAPOV			ILO estimates of share of employment in agricultural sector		
			Year 1	Year 2	Annual reduction	Year 1	Year 2	Annual reduction
Angola	2008	2014	46.9%	45.2%	-0.3 p.p.	44.6%	49.4%	0.8 p.p.
Burkina Faso	2009	2014	85.1%	82.4%	-0.4 p.p.	52.2%	30.4%	-4.4 p.p.
Cameroon	2007	2014	64.0%	50.3%	-2.0 p.p.	59.8%	47.6%	-1.7 p.p.
Congo Dem. Rep.	2004	2012	73.4%	78.9%	0.7 p.p.	72.4%	70.7%	-0.2 p.p.
Ethiopia	2010	2015	72.6%	73.5%	0.2 p.p.	73.9%	68.9%	-1.0 p.p.
Ghana	2012	2016	49.0%	46.2%	-0.7 p.p.	46.8%	34.7%	-3.0 p.p.
Kenya	2005	2015	66.3%	52.3%	-1.4 p.p.	61.1%	58.3%	-0.3 p.p.
Liberia	2014	2016	20.4%	18.5%	-1.0 p.p.	45.7%	46.5%	0.4 p.p.
Madagascar	2005	2012	81.6%	81.4%	0.0 p.p.	82.0%	68.9%	-1.9 p.p.
Mozambique	2008	2014	83.3%	77.1%	-1.0 p.p.	77.8%	73.0%	-0.8 p.p.
Malawi	2010	2016	83.8%	81.3%	-0.4 p.p.	73.3%	72.2%	-0.2 p.p.
Nigeria	2010	2012	48.0%	48.8%	0.4 p.p.	40.8%	39.3%	-0.7 p.p.
Uganda	2012	2016	76.5%	79.9%	0.9 p.p.	66.1%	71.4%	1.3 p.p.
South Africa	2014	2016	4.7%	5.4%	0.3 p.p.	4.7%	5.6%	0.5 p.p.
Zambia	2010	2015	69.9%	61.0%	-1.8 p.p.	64.2%	54.7%	-1.9 p.p.
Average					-0.35 pp			-0.88 pp
Standard deviation					0.87 pp			1.51 pp

Source: SSAPOV database, Sub-Saharan Africa Team for Statistical Development, World Bank, Washington DC and World Development Indicators (which reports ILO estimates).

and the ILO estimates differs for a number of countries, including Angola, Liberia, Congo, Ethiopia, and Nigeria.

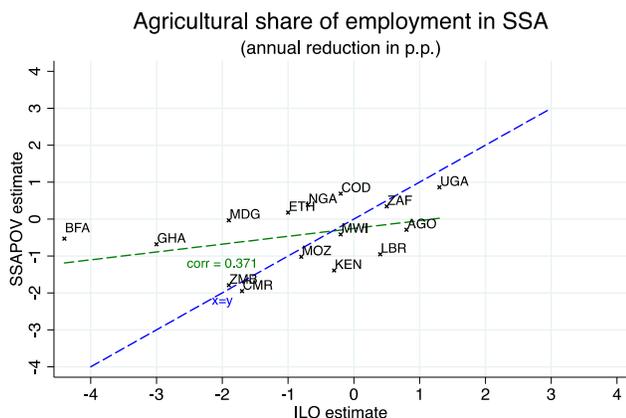
Figure 1 compares the ILO and SSAPOV estimates graphically. The blue line is the 45-degree line, representing perfect agreement between the SSAPOV and ILO estimates. Zambia, Cameroon, Mozambique, Malawi, South Africa, and Uganda are located relatively close to this line. However, the other countries lie quite far from it, especially Burkina Faso, Ghana, and Madagascar. The green line represents the actual correlation between the two estimators, which is $r=0.371$. Squaring the correlation implies that the ILO estimates explains just 14 percent of the variation in the SSAPOV estimates. This demonstrates the considerable difference between the ILO and SSAPOV estimates, and

reinforces the importance of distinguishing between modeled and actual estimates when examining changes in sectoral employment composition.

We next consider the extent to which rates of agricultural employment are converging across regions. One possibility is that urbanization is occurring in peri-urban areas with a medium level of initial agricultural employment, leading to increased polarization in agricultural employment between remote rural areas and growing cities. Figure 2 sheds light on the extent of convergence in agricultural employment shares across countries in SSA, by using the SSAPOV data to compare the speed of structural transformation with initial shares of agricultural employment. An important advantage of using the SSAPOV data is the ability to conduct sub-national analyses. Panel A presents a simple scatter plot and line of best fit – weighted by population – at the

country level, Panel B at the country-region level, and Panel C at the country-district level. These three figures show that the level of measurement matters. At the country level, the evidence suggests divergence, with more agricultural countries actually increasing their share of agricultural employment.

Figure 1: SSAPOV vs ILO Estimates



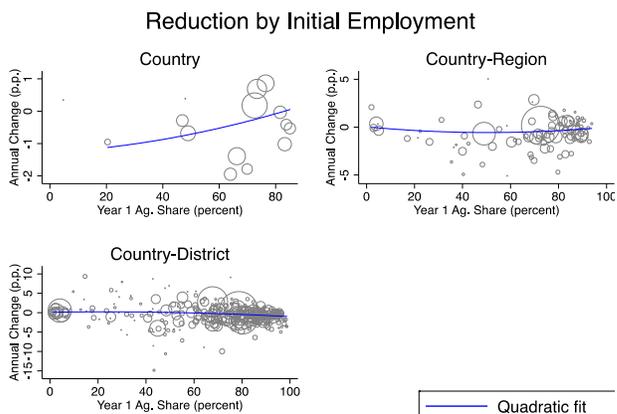
Source: SSAPOV database, Sub-Saharan Africa Team for Statistical Development, World Bank, Washington DC and International Labor Organization (ILO).

When examined across districts, however, this relationship greatly weakens and if anything, agricultural employment is converging. There is little evidence that districts with a medium amount of initial agricultural employment systematically saw greater reductions in agricultural employment. Furthermore, the overall linear point estimate is quite small, indicating that the rate of convergence is slow. In other words, there is at best weak evidence that agricultural employment rates are converging across districts in SSA at any level.

A final set of results explores an important dimension of structural transformation: poverty reduction. Because the SSAPOV data comprise a multitude of different indicators, they are well suited to analyzing how changes in agricultural employment correlate with other household outcomes, like poverty. Figure 3 presents scatter plots and lines of best fit for the relationship between the speed of structural transformation and the speed of poverty reduction, again at three separate levels of aggregation. In all three cases, reductions in agricultural employment are associated with reductions in poverty.

Given the importance of this result, Table 2 presents results from a set of related regressions. Columns one and two present results at the country level, columns three through five at the country-region level, and columns six through eight at the country-district level. Given that the sample contains only 11 countries with both requisite employment and poverty data, there is insufficient data to draw a meaningful conclusion at the country level, whether the estimates are unweighted or weighted by country population (column two).

Figure 2: Pace of Reduction by Initial Employment



Note: Bubble sizes correspond to relative population.
Source: SSAPOV database, Sub-Saharan Africa Team for Statistical Development, World Bank, Washington DC and International Labor Organization (ILO).

Columns three through five disaggregate the data to the region level, while columns six through eight disaggregate the data to the district level. Our preferred specifications are columns five and eight, which isolate within-country variation in both variables. The coefficients are relatively similar in both columns. The coefficient in column eight is statistically significant but only moderately large.

Within countries, a decrease in primary agricultural employment of a percentage point in a district is associated with a decrease in the poverty rate of approximately 0.24 percentage points. Reducing agricultural employment can contribute to poverty reduction, but the quality of non-agricultural employment matters, and increasing workers' productivity on and off the farm remains essential.

Table 2: Annual Change in Ag. Share and Poverty Rate

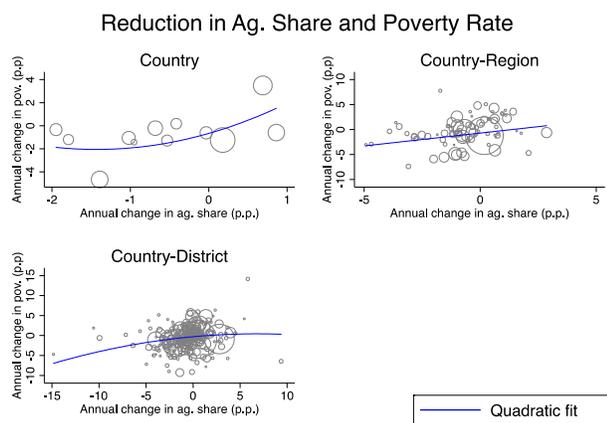
DV: Change in poverty rate (annual change)	(1) Country	(2) Country	(3) Region	(4) Region	(5) Region	(6) District	(7) District	(8) District
Annual change in ag. share	1.000* (0.545)	1.317 (0.856)	0.552* (0.291)	0.515 (0.430)	0.285 (0.311)	0.258** (0.117)	0.235 (0.131)	0.210** (0.069)
Weighted by population?	No	Yes	No	Yes	Yes	No	Yes	Yes
Country FE	No	No	No	No	Yes	No	No	Yes
Observations	11	11	80	80	80	230	230	230

Note: Standard errors are in parentheses and are clustered at the country level (columns three through eight). Columns one and two are at the country level. Columns three through five are at the country-region level. Columns six through eight are at the country-district level.

Source: SSAPOV database, Sub-Saharan Africa Team for Statistical Development, World Bank, Washington DC.

* p<0.1 ** p<0.05 *** p<0.01

Figure 3: Changes in Ag. Share vs. Poverty Rate



Note: Bubble sizes correspond to relative population.
Source: SSAPOV database, Sub-Saharan Africa Team for Statistical Development, World Bank, Washington DC.

typically used. There is at best a weak relationship that reduction in agricultural employment is occurring in both urban and rural districts. Finally, the association between movement out of agriculture and poverty reduction is robust but only moderately strong. The evidence presented here is descriptive rather than causal, since choice of sector is itself a decision taken by workers. Future work can utilize these data to better understand which workers choose to work in agriculture and why. Additional analysis can examine how the quality of structural transformation varies across countries, by looking at how growth in different types of non-agricultural employment relates to poverty reduction.

To recap, this note aims to better understand the extent of structural transformation in Sub-Saharan Africa and its role in poverty reduction. The SSAPOV database is well-suited to this task, as it includes survey-based measures of both agricultural employment and poverty. The results show that the structural transformation is proceeding more slowly on average, and is far less variable, than would be inferred from the ILO modeled estimates that are between the initial level of agricultural employment and the pace of change across districts, suggesting

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