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Economic Complexity and Employment Expansion in Africa

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Summary

The long-run growth and development literature has found that for a pattern of structural transformation and inclusive growth to assert itself in an economy, two key inter-linked ingredients are required. Firstly, the move from a low productivity agricultural sector to a high productivity, high growth and export-oriented agricultural sector; and secondly, the development of a dynamic manufacturing sector which is both employment- and export-intensive.

The economic imperative of structural change is also increasingly important within the context of Africa's expected future population growth. According to the UN World Population Division, Africa's share of the working age population is expected to increase from 13.69% in 2015 to 42.55% by 2100.

This policy brief provides a synthesis of four country case studies: Ghana, Kenya, Senegal and South Africa. By using a novel methodology through which we can examine structural change, we provide policy options which expand the economic opportunities of disenfranchised women and youth.

Introduction

Broadly speaking, there is limited evidence pointing to structural change in Ghana, Kenya, Senegal and South Africa over the past 25 years. There has been a shift from agricultural activity toward wholesale and retail trade activity, which is characterised by high levels of informal employment. There is evidence of a minor shift toward manufacturing in Senegal and Kenya, while economic activity has shifted away from manufacturing in South Africa and Ghana. Overall, manufacturing-led structural change has been insufficient to drive massive job growth in the four countries of interest.

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Ghana, Kenya, Senegal and South Africa in Context

Economic complexity refers to the amount of "productive knowledge" within a country. Productive knowledge can be thought of as the "technical know-how" required to produce a product. As productive knowledge is expensive to acquire and cannot be easily transferred to other countries, the higher the economic complexity (or productive knowledge) of a product, the harder it is for a country to obtain the capabilities required to produce that product.

To gain insight into the level of economic complexity within a country, it is necessary to perform a product space analysis. The product space shows all the products which a country is currently exporting, as well as those which it is not. Importantly, product space analysis is based on the notion that countries shift from products which they already export to products which require a similar amount of productive knowledge. In turn, the export of these new products could result in further diversification opportunities, providing a basis for the evolution of a country's productive structure. Crucially, the degree to which a country can diversify – and hence create more economically complex products – depends on its location within the product space. Countries which export products on the periphery of the product space have limited diversification opportunities compared to those countries which export products in the core of the product space. This is a result of the high degree of inter-connectedness of products in the core compared to those on the periphery.

Ghana, Senegal and Kenya's main exports are dominated by primary products, which are products located on the periphery, and which are characterised by low levels of product complexity. Ghana's primary exports are gold, petroleum and wood. Senegal's exports are dominated by refined petroleum, gold and fish. Kenya's exports are largely concentrated in agro-based commodities such as coffee, tea and cut flowers. For all three countries, their product structure constrains their ability to diversify into more complex products.

South Africa, the most complex of the four economies, has a number of more central and clustered products in its export basket. These include various types of machinery and equipment, automotives, processed agricultural products, and various chemical products. Nevertheless, the South African productive structure remains resource-based and peripheral. This has potentially resulted in South Africa being unable to undergo structural transformation, and as a result, hindered further occupation of the core of the product space.

The Identification of Frontier Products

We now turn to identifying country-specific frontier products that are: marginally more complex products than the current export basket, and easy to shift into – given a country's current capabilities. We identify such products because they are key to enabling a sustainable economic growth path.

Two possible avenues for Ghana to increase its complexity of exports lie in cement and corrugated paper. The capabilities involved in producing cement are related to products such as wheat flour, raw sugar, plastic lids and non-knit suits. Corrugated paper is connected to 23 other products and includes *inter alia* milk, cleaning products and hair products.

The opportunities for Senegal are similar to those of Ghana. Cement accounts for 7% of Senegal's exports, which is connected to 10 other products (e.g. soap and scrap copper). Soups and broths, which accounts for 3.1% of Senegal's exports, is connected to 17 other products which include baked goods, toilet paper and jams.

There are two products that Kenya exports which offer good diversification opportunities – other painted material and aqueous paints. The capabilities involved in exporting these products are similar to 15 and 30 other products, respectively, such as milk and cream, buttermilk and sausages.

Although South Africa remains heavily reliant on primary products (e.g. gold and platinum), it does export complex manufacturing products which are located in the automotive, machinery and equipment industries. These products present an opportunity for South Africa to diversify into proximate products such as motor vehicle parts, engine parts and lifting machinery. Furthermore, the existence of a chemical industry suggests that South Africa could shift into aldehydes, vinyl chloride polymers and refractory cements.

Constraints to Frontier Product Growth

We now discuss the constraints that prevent firms from making a marked shift toward the identified frontier products. In what follows, we begin by discussing constraints that were common across all four countries, and then move onto constraints that are country- and product-specific.

General Constraints

One of the common identified constraints was a lack of state capacity, particularly in relation to product certification and standards. For products to be exported to other countries, especially those in the developed world, product quality and safety must be guaranteed through certification. This product certification is performed by state agencies. However, when such agencies lack regulatory capacity, products do not get certified and as result, cannot be exported – inhibiting the growth of firms

Another constraint common across all four case study countries was the high cost of doing business. In the 2018 World Bank Doing Business Survey (which surveyed 190 countries) Kenya was ranked as 80th, South Africa 82nd, Ghana 120th, and Senegal 140th. One of the factors in the report relates to electricity, a major input cost for any firm. Not only is the high-cost of the electricity supply a concern, but so is the stability of power supply. With an inadequate electricity supply, firms must invest in expensive diesel-operated generators in order to function.

A further constraint to doing business in these African countries relates to high transport costs. In order to trade, firms utilise port services. Yet ports in the region, and indeed for all four countries of interest, are widely regarded as inefficient and costly. Further costs to trade include onerous customs procedures, regulatory environments, poor services infrastructure, and high insurance costs.

A final constraint shared by all the countries relates to the supply of skilled labour. In order to build a strong manufacturing sector and diversify into more complex products, a country requires a skilled labour force. Many African countries boast an abundance of natural resources, but without a strong skills base, the scope for adding value through manufacturing and processing of these resources is heavily diminished. The lack of skilled workers is further compounded by the fact that educational standards in Africa are low, with African students consistently ranking at the bottom of international standardised tests.

Country and Product Specific Constraints

In Ghana, the cosmetics industry is constrained by a number of non-trade barriers and logistical costs associated with trade that prohibit further growth. In the case of medicaments, a lack of strict regulation restricts market access to foreign markets. In the food and beverages sector, the big constraint was land: it is hard to acquire ownership of land and thus it cannot be used as collateral to obtain finance.

In Kenya, the dairy sector is constrained by the high cost of setting up milk bulking and cooling centres, while textiles is greatly affected by competition from second-hand clothing, which is cheaper. The wood industry

is hampered by the requirement of an import license, which makes importing raw materials for furniture more costly.

In Senegal, artisanal fishers have to go through a laborious process to access credit, as there is a lack of social capital. The peanut industry is affected by aflatoxin contamination, which adversely affects market access. Similarly, in horticulture, uncontrolled use of pesticides hinders access market access, particularly to those in the EU, which have strict regulation regarding the use of pesticides.

In the agro-processing industry in South Africa, a lack of compliance with international bio-security measures hinders market access. For motor vehicle parts, the growth of the industry is constrained by the lack of integration into the global value chains, while for machinery, differential energy pricing for downstream industries creates high input costs, inhibiting growth.

The table below summarises the product-specific constraints by country, as well as the general constraints discussed earlier:

Country	Products	Product-Specific Constraint	General Constraints
Ghana	Cosmetics	High trade costs reduce scalability	Lack of state capacity in relation to product certification and standards. High cost of doing business High transport costs Lack of skilled labour in manufacturing industries
	Medicaments	Low product quality restricts market access	
	Food & Beverages	Lack of land as collateral	
Kenya	Dairy	Lack of Storage Infrastructure	
	Textiles	Competition from cheap second-hand clothing	
	Wood	Limited Import Licenses	
Senegal	Fish	Non-functioning credit market	
	Groundnuts	Aflotoxin contamination hinders market access	
	Horticulture	Uncontrolled pesticide use limits market access	
South Africa	Agro-processing	Sanitary and phytosanitary constrains market access	
	Motor Vehicle parts	Limited access to global value chains	
	Machinery	Differential energy pricing constrains downstream industries	

Conclusion

In order to realise a demographic dividend, African countries need to industrialise and undergo structural transformation. Arguably, this process is akin to building economic complexity, which ultimately leads to higher levels of economic development. The process of structural transformation is path dependent, meaning that countries must build from their existing productive structures. As is evident from this research project, the productive structures of all four countries studied are resource-based and peripheral. A key implication is that the capabilities and productive knowledge embodied in these productive structures are distant from those needed to produce more complex manufactured products. As such, structural transformation, and particularly change that targets industrialisation, is a key challenge for African countries.

The four country case studies show that issues such as state regulatory capacity, high costs of doing business, high transport costs and the limited supply of skilled labour, all serve to constrain firms from pursuing these avenues of diversification. In addition there are very country-specific constraints that inhibit the process of building economic complexity.

Overcoming these general and country specific constraints remains vital as a lever for generating employment opportunities for the growing labour forces which characterise the economies of these countries. If increasingly complex products are produced using increasingly capital-intensive means, for a given level of complexity this becomes heterogenous across products. Ultimately, the production of an increasing diversity of complex products is likely to yield aggregate employment gains.

As such, African policy makers seeking to advance both structural transformation and employment growth at the country level, need to address the constraints preventing firms from diversifying toward increasingly complex products.

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