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Agriculture and Structural Transformation in Africa

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Abstract

Structural change during most of the first 5 decades of post-independence Africa has been productivity-reducing. It has been driven by negative diversification reflected in labor migrating from the underperforming, yet higher-productivity agricultural sector into an oversized, lower-productivity service sector. In the aftermath of the failure of the first generation of import-substituting, inward-oriented industrialization efforts of the 1960s, African governments had all but given up on the search for practical industrial policies. Meanwhile, agriculture continued to be confronted with significant policy and institutional challenges, moving from an environment marked with heavy direct and implicit taxation into an era of the controversial structural adjustment policies that significantly curtailed services support to the sector. The combined effect resulted in stagnation in the manufacturing sector and forced specialization in the primary sector. The latter continued to be dominated by a struggling agricultural sector, which could not create enough employment to absorb an increasing labor force from a rapidly growing population. In addition, people started to migrate from villages to rural towns and urban centers and in the process swelled up the ranks of the under-employed in a fast-growing informal sector.

The economic recovery of the last 15 years provides strong hope that African countries are starting to turn the page. The focus now should be on sustaining and accelerating the recovery process, enacting policies to raise productivity in the agricultural and service sectors, and revitalize the modern industrial sector. A good start is the continent-wide effort under the Comprehensive Africa Agriculture Development Programme (CAADP) to encourage evidence-based policy planning and implementation and to increase investment in agriculture. However, it needs to be complemented with innovative industrialization policies to develop comparative advantage in higher-valued manufacturing goods. Future development strategies should seek to raise productivity in the service sector, which now has a large and growing share of low-productivity labor. The objective of these strategies should be to modernize production processes and to promote innovation in the production of domestic and household goods ranging from metalwork to wood and leather processing to a host of handicraft products.

Agriculture and Structural Transformation in Africa

Introduction

This paper takes a comprehensive look at the process of structural transformation among African countries. It adds to the traditional focus on what happens or needs to happen within agriculture and includes several key issues that have been referred to marginally and not treated adequately in-depth. These additions include recent developments in the theory and measurement of economic diversification and related strategies for industrial development policies. The paper also expands the analysis to cover the theory of endogenous industrialization and its link to development of the non-agricultural segment of the rural economy, the role of agriculture, and the implication for the pace of productivity and income convergence across major economic sectors.

The role of globalization, emerging urban and regional economies, and the related development of agricultural value chains also bring an interesting new angle to the story and strategies in support of structural transformation. Finally, the trade-off faced by governments trying to meet both the short-term social need to mitigate some of the distributional impact of the transformation process and long-term need to invest in raising agricultural labor productivity under severe budgetary constraints, raises an interesting issue of public-investment optimization that needs to be part of the debate.

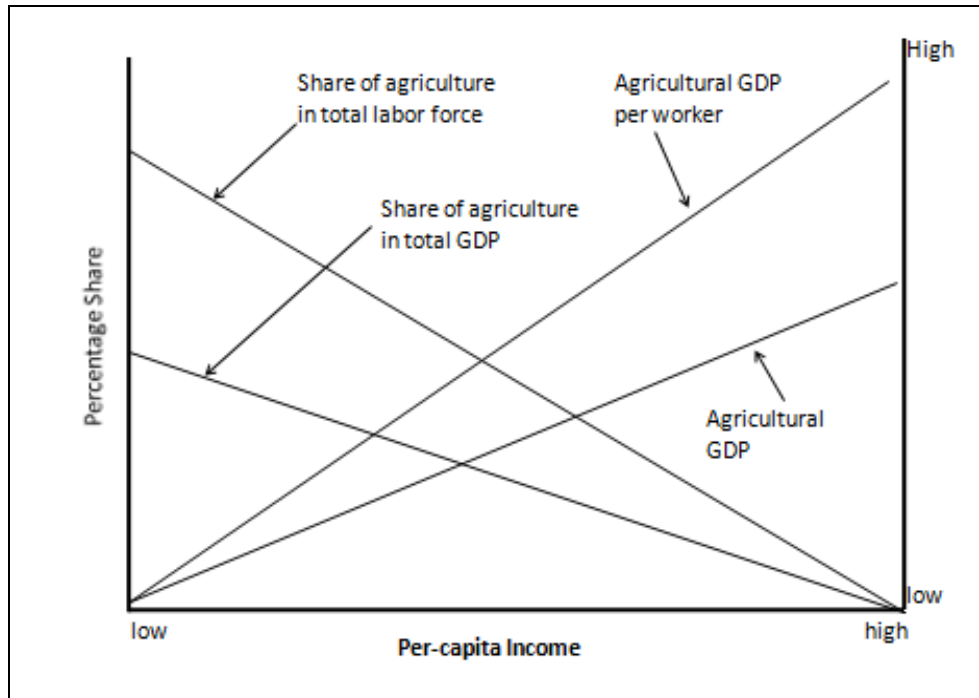
Agriculture and the growth process

Countries create wealth and become rich during the process of economic growth by producing more per unit of labor. They do this by producing more of the same good per unit of time and, more importantly, by producing a larger basket of higher valued goods. In the course of the process, the economy moves from a status where most economic activities are concentrated in agriculture and rural areas to a situation where industry and other urban based activities become dominant. The changes described above are summarized in Figure 1. Managing a successful economic transformation poses two key challenges: (i) to raise labor productivity sustainably in the agricultural sector and the rural economy, while (ii) diversifying into higher valued goods outside agriculture in emerging higher productivity, urban-based manufacturing and service sectors. The factors determining the success or failure of countries to transform successfully are linked to the adequacy of human and physical assets, institutional and technological resources, as well as policy and coordination capacities.

The role of agriculture in the transformation process is related to the changes reflected in Figure 1. As the economy grows, the levels of output and productivity per worker in the agricultural sector rise, while the sector's shares in total labor force and overall output decline gradually due to faster growth in the rest of the economy. The result is a rise in per capita income levels. Despite its relative decline, the agricultural sector plays a significant role in the economic transformation process, as summarized by Johnston and Mellor (1961). As per capita incomes and population grow, the expanding agricultural sector provides greater food supplies from domestic production or through imports paid for by foreign exchange earned from agricultural

exports. The increase in food supplies stabilizes prices and prevents real wages in the nascent industrial sector from rising too fast.

Figure 1: Agriculture in the economic transformation process



Source: Based on Timmer 2009.

During the first three decades following independence, the ratio of food import costs to agricultural export revenues of African countries was nearly identical to the ratio between food imports and total foreign exchange earnings, implying that resources to pay for the excess demand for food came almost entirely from the agricultural sector (Badiane 1991). Foreign exchange resources earned from agriculture help to meet the import cost of capital goods needed in other parts of the economy.

Agriculture plays another important role as the main source of fiscal revenue for financing road and power infrastructure, health, education, and other investments needed to stimulate growth in the rest of the economy. Finally, agriculture generates a large share of the income that fuels demand for goods produced in the emerging manufacturing sector. When agriculture grows and all the above linkages function properly, labor is released from the agricultural sector to meet demand for manpower in the expanding and higher productivity manufacturing sector. The migration of labor out of a growing agricultural sector also raises productivity in that sector. As a result, average productivity in the economy rises and so do per capita incomes.

Difficulties experienced by African economies following independence arise from the complexity of designing appropriate strategies to exploit these various contributions effectively. This outcome arises because the contributions are not straightforward and may conflict with one another, as well as with other goals outside agriculture. For instance, the need to raise foreign

exchange revenues may conflict with that of expanding domestic food supplies—both with the goal of generating sufficient fiscal revenues to finance capital goods. The latter may in turn conflict with the need to raise incentives and stimulate agricultural sector growth.

Another source of complexity in managing the contribution of agriculture to the growth process emanates sometimes from a misunderstanding of its role in that process. A historical review of the growth performance of the agricultural sector reveals that even if the most labor-intensive techniques are used, the achievable rate of agricultural growth is unlikely to be high enough to absorb the growing labor force (Mellor 1986). Analysis of industrialization by Syrquin (1989) in 100 countries has shown that the growth rate of value added and input use in agriculture is about 40 to 50 percent less than in manufacturing. While this finding underlines the fact that progressive industrialization is the engine for sustained long-term growth, development policy practitioners and analysts during the time of independence for African countries in the late 1950s and early 1960s failed to recognize the centrality of agriculture in stimulating growth in the industrial sector itself.

Johnston and Mellor (1961) define three phases, from early to late development stages, with distinct policy priorities in order to reconcile the above contradictions. In Phase 1, when the sector is dominated by subsistence agriculture, the focus should be on social innovation to remove institutional, social, and cultural constraints to improved farming practices. Programs dealing with land tenure, education, and related institutional infrastructure are required to align cultural and social practices with the need for future modernization of the sector. In Phase 2, emphasis is put on technological innovation and required systems for the provision of modern inputs and services to raise productivity and expand production based on labor-intensive, capital-saving technologies. Key elements of the technical innovation systems include research and development and related education systems to expand production possibilities, cost-competitive input procurement and distribution systems, output marketing systems, plus the required public investment in necessary infrastructure and institutions. In Phase 3, when the opportunity costs of most inputs, in particular labor, are high and rising, the focus should move to deeper penetration into mainstream financial services markets in order to meet the considerable resource needs of a transition to capital-intensive labor saving technologies.

Programs that are implemented in all three phases have to be cost effective and fiscally sustainable. Otherwise, they can become a burden on the rest of the economy and are bound to be abandoned. Sustainability is particularly problematic during the first two phases, when withdrawal of such programs can lead to a total collapse in the sector and loss of decades-worth of development. This outcome was typical in Africa in the years leading up to and through the period of structural adjustment programs of the 1980s and 1990s.

The pace and pattern of structural transformation in Africa

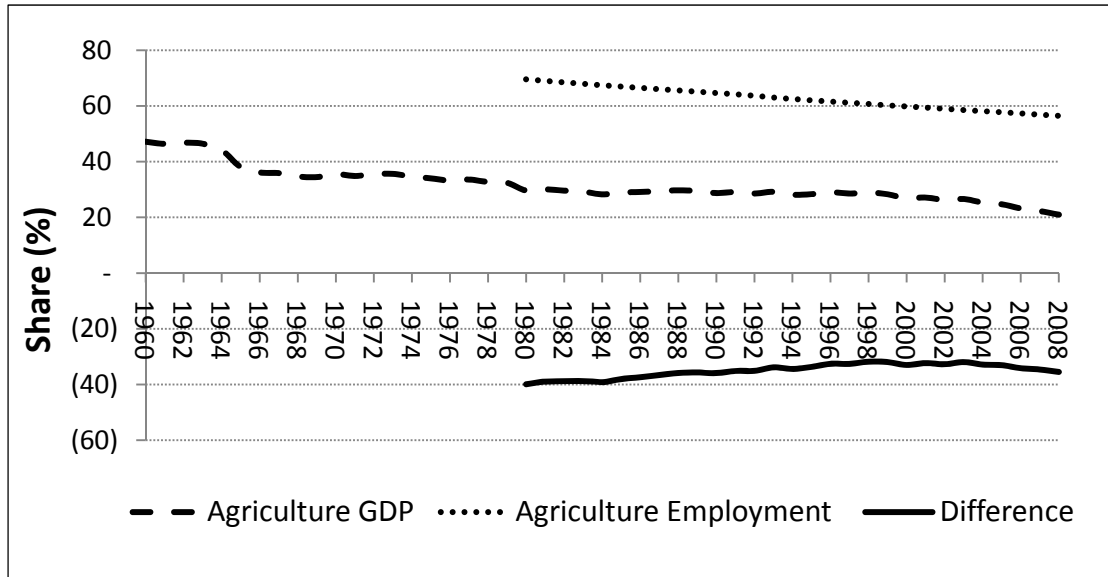
African countries have been undergoing a remarkable agricultural and economic recovery process since the mid 1990s. Average growth rates for the agricultural sector and the overall economy have been hovering around 5-6 percent. Even during the recent crises in global food and financial markets, African economies have managed to maintain positive growth rates while

economies in all other regions were contracting. More strikingly, the growth recovery has not only accelerated, it has also spread broadly across all major regions of the continent (Badiane 2008). The recent performance is taking place in the aftermath of low economic growth and stagnation during most of the preceding decades. Sustaining and accelerating the current growth recovery, therefore, requires a closer look at the process of economic transformation during the latter period and the factors underlying it, which is done in the subsequent sections.

Trends in sectoral productivity and employment

Analysis of structural transformation patterns among African countries starts with a review of the extent to which trends in output and employment shares of the agricultural sector are converging, as illustrated by the declining distance between the two lines in Figure 2. Given the scantiness of actual employment data and in particular for periods earlier than the 1980s, the analysis is based on agriculture's share of the economically active population (FAOSTAT 2011). The share of agricultural value added in total GDP is used as a proxy for agricultural GDP share. A look at trends in the shares of the agricultural sector in overall gross domestic product (GDP) and employment reveals the economic challenges faced by African countries. The flat slope of the bottom line in Figure 2, which plots the difference between the two shares, is reflective of the slow pace of structural change that has characterized African economies. Successful structural change would have gradually narrowed the difference between the agricultural shares of GDP and employment and thereby gradually raised incomes in the agricultural and rural sectors toward the level of incomes in urban and industrial sectors. This process of convergence takes a long time, as illustrated by Timmer (2009), but one should have expected at least a gradual decline in the gap and a steady upward slope of the bottom line over the 50-year period covered by the analysis. The same trends (lack of decline in the gap between shares) are observable among individual sub-regions, with the exception of North Africa, where convergence has increased steadily and to a lesser extent in Central Africa.

Figure 2: Changes in agricultural GDP and employment shares among African countries, 1960-2008

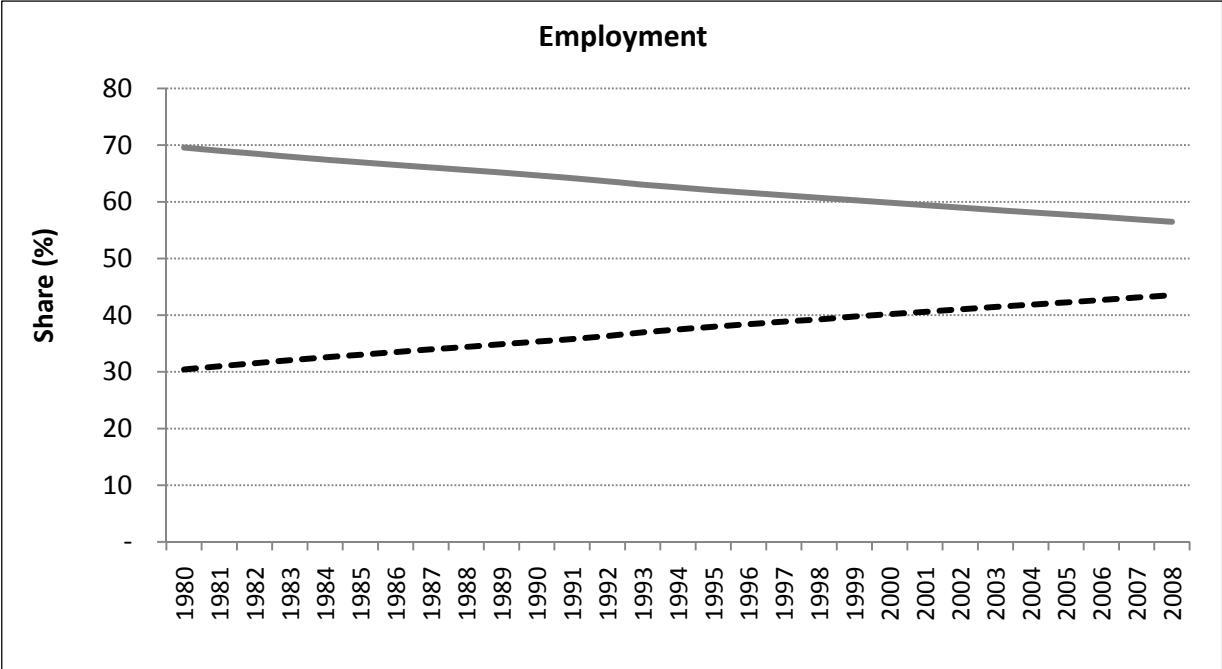


Source: Based on data from WDI 2009 and FAOSTAT 2011.

Of particular concern is the fact that the gap appears to have taken a reverse course and started to widen since the beginning of the new millennium. This indicates that the reforms of the 1980s and 1990s may have led to stronger growth in the manufacturing sector but without a commensurate increase in the demand for labor, as has been the case in post-reform Latin America (McMillan and Rodrik 2011). A closer examination of trends in labor productivity and employment share indicate that the problem may lie elsewhere. As shown in Figure 3, labor productivity in agriculture has stagnated despite a rapid decline in the employment share, which explains the rapid decline in the agricultural GDP share. In contrast, the non-agricultural sector displays falling trends in productivity combined with a rise in its employment share. Therefore, this combination shows that the pace of labor migration out of the stagnating agricultural and rural economy has exceeded the pace of growth in the non-agricultural sector. The problem is as much of non-growth in agriculture as it is of labor absorption outside agriculture. As will be shown later, the challenge in the non-agricultural sector comes from the oversized, low-productivity service sector that is absorbing most of the labor from agriculture.

Figure 3: Trends in labor productivity and employment shares among African countries, 1980-2008

— Agriculture - - Non-agriculture

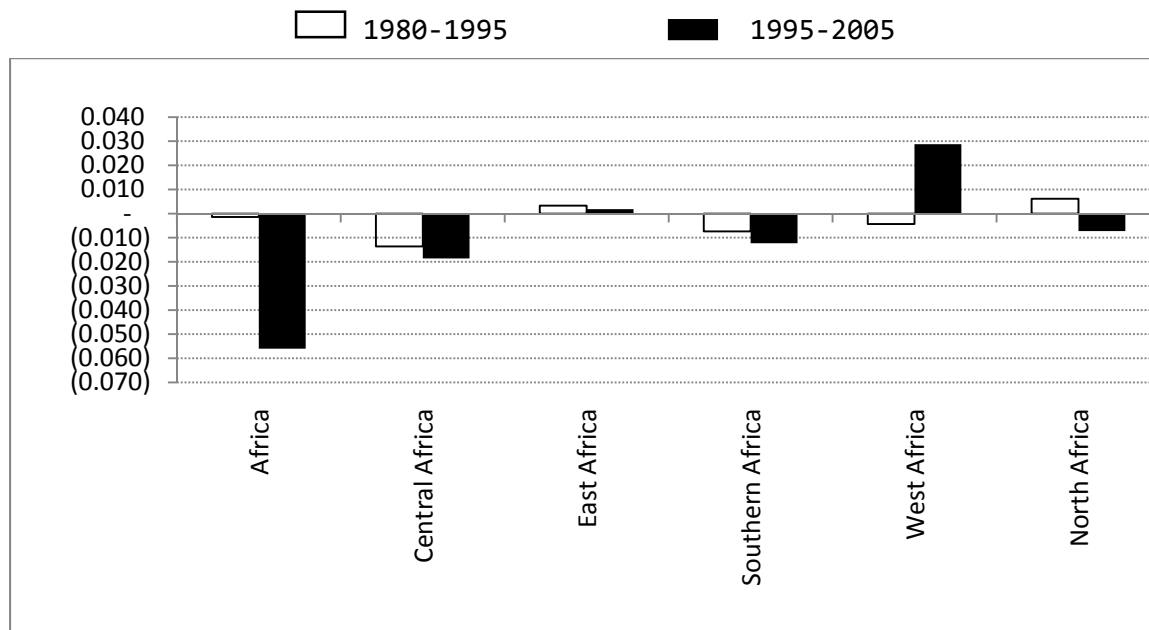


Source: Based on data from WDI 2009 and FAOSTAT 2011.

The contribution of structural change to productivity growth

The picture becomes much clearer with the decomposition of the contribution of individual sectors to growth and the role of structural change. The contribution of a given sector is calculated by multiplying its employment share at the beginning of the period ($\phi_{t_0}^{Sec}$) with the change in productivity for the sector at the end of the period (ΔP_{tn}^{Sec}). The residual of overall GDP growth that is not accounted for by the contribution of individual sectors corresponds to the contribution from structural change. The latter arises from the movement of labor between sectors and the differential changes in sectoral productivity. The results are presented in Figure 4 and in Figures a1 and a5 in the Annex. The non-agricultural sector is dominated by the low-productivity service sector, which accounts for more than 50 percent of African economies' GDP based on latest available statistics (WDI 2009). In reality, the service sector includes the largest segment of underemployed persons in the informal sector. A significant share of labor migrating from the agricultural sector lands in the informal segment of the non-agricultural sector. This segment tends to be less productive than agriculture, which can explain the rapidly falling trend in labor productivity in the non-agricultural sector depicted in Figure 3.

Figure 4: The contribution of structural change to productivity growth among African countries



Source: Based on data from WDI 2009 and FAOSTAT 2011.

The direction of movement of labor and changes in sectoral labor productivity determine the contribution of individual sectors to overall productivity growth. As shown in the numbers in Figures a1 and a2, the contribution of the non-agricultural sector has been overwhelmingly negative. In contrast, the contribution of the agricultural sector has been positive for Africa as a whole and for most major sub-regions. The onset of the growth recovery process in the mid 1990s indicates some improvement in both sectors' contribution to productivity growth. For the non-agricultural sector, the average contribution for Africa as a whole has turned positive. It remains negative only for North Africa and Central Africa, but at considerably reduced levels.

For agriculture, its average contribution has risen strongly but with marked difference across regions. In particular, the sector's contribution to growth has remained negative in West Africa.

The estimates of the contribution of structural change to overall growth are presented in Figure 4. In contrast to individual sector contributions, the contribution of structural change to growth is negative for Africa as a whole and in every single major region, with the exception of North Africa and Central Africa during the 1980s and early 1990s. The negative contribution is particularly significant during the post 1990s' recovery period. The big exception here is West Africa, which has shown a significant shift between the two periods. This result is in line with the observed trends in labor movement and productivity growth (Figure 3): the migration of labor from agriculture into the lower-productivity service sector. It appears from these results that the unabated pace of rural urban migration has adversely affected overall productivity growth among African countries. Figures a3 and a4 in the Annex present the results for individual countries. In each graph, countries are ranked from lowest to highest contribution of structural change to productivity growth. In all, 44 percent or 22 out of 50 countries show a negative contribution of structural change to productivity growth during the earlier period, compared to about 30 percent in the later period.

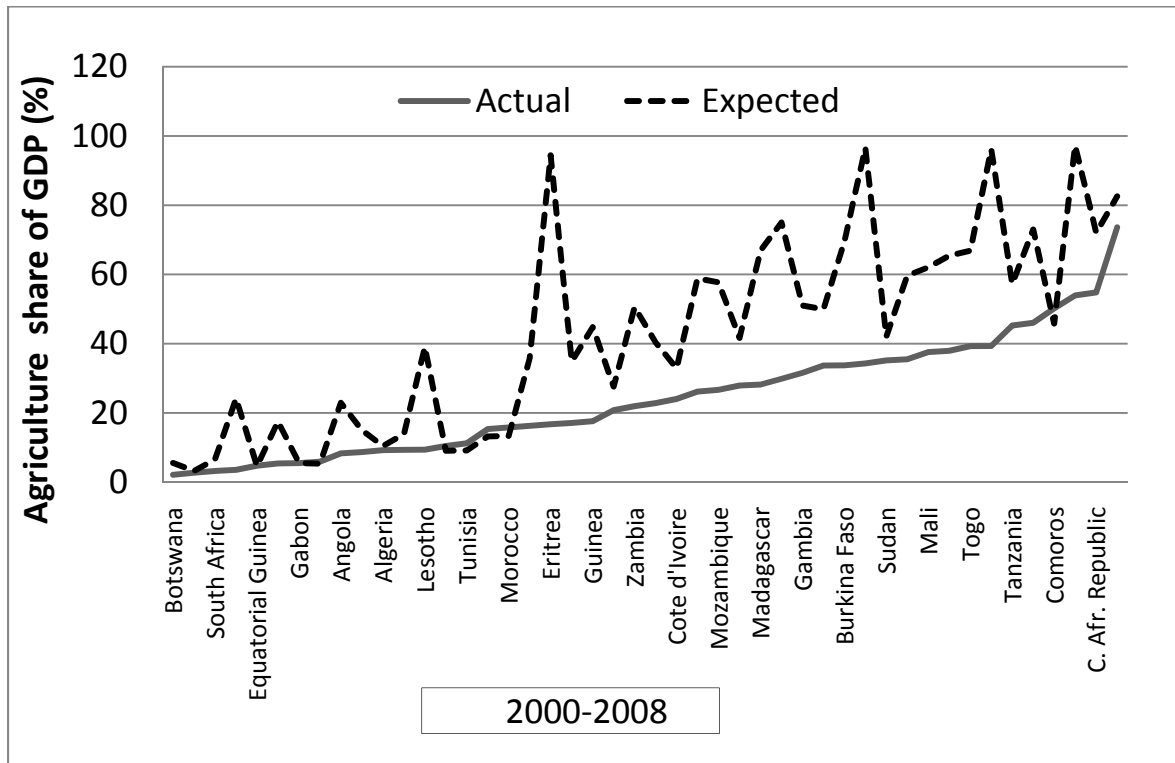
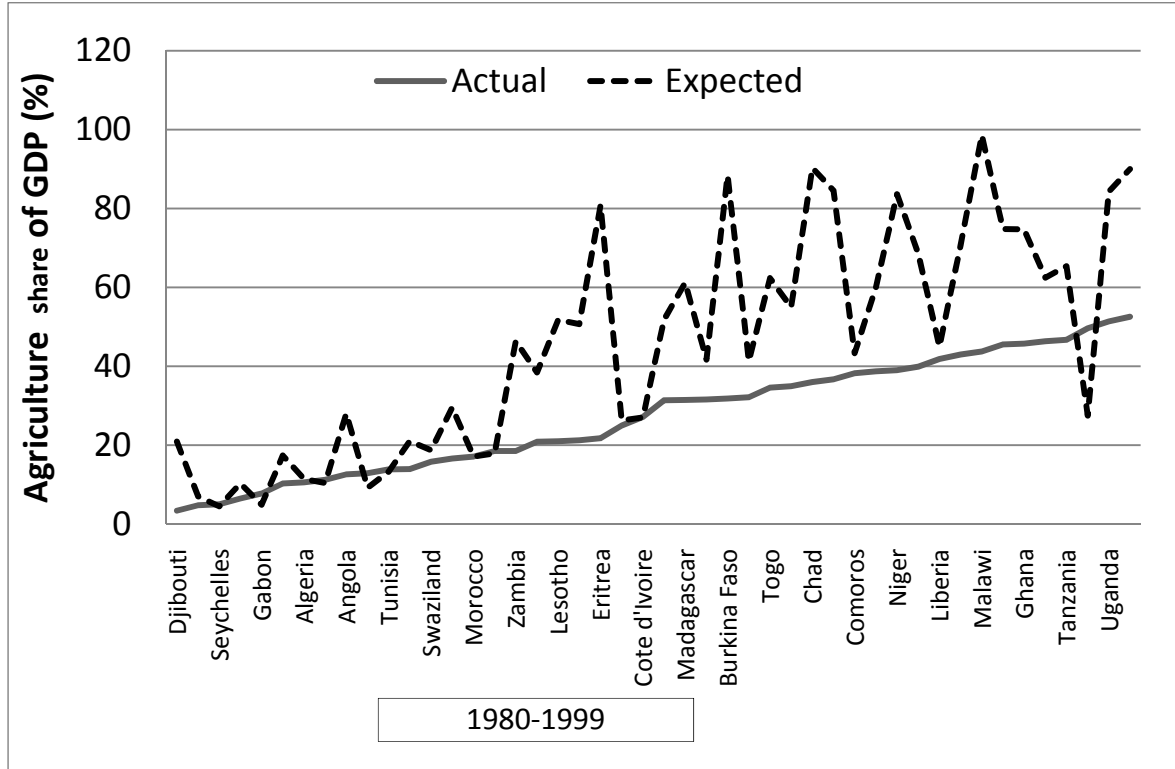
Sector imbalance, migration, and productivity-reducing structural change

A main factor behind the negative contribution of structural change to productivity growth among African countries has been the outmigration of labor from a stagnating agricultural sector into a burgeoning informal service sector that has much lower productivity levels. There are no specific productivity numbers for the latter sector but there is no doubt that the sector constitutes the bulk of the non-agricultural sector in all African countries. The productivity trends shown in Figure 3 are therefore reflective of developments in the informal service sector. The case being made here is that the productivity-reducing structural change is the result of labor being forced out of a *stunted* agricultural sector into an *oversized* service sector.

To buttress that argument, the expected shares of the two sectors based on the level of development of African countries are compared to the actual shares. For that purpose, the relationship between per capita income and relative sector size was estimated for both agriculture and services using a sample including 210 countries over a period going from 1960 to 2008.¹ Figures 5 and 6 show, respectively, the discrepancies between actual and expected sizes of the agricultural and services sector. The graphs rank countries in terms of actual size of the individual sectors. Invariably in all countries, the actual share of the agricultural sector in GDP is distinctly lower than the size that should have been expected based on the level of per capita incomes. Observed average shares are around 30 percent or nearly 20 percentage points below expected levels. The opposite is observed for the service sector in the majority of countries.

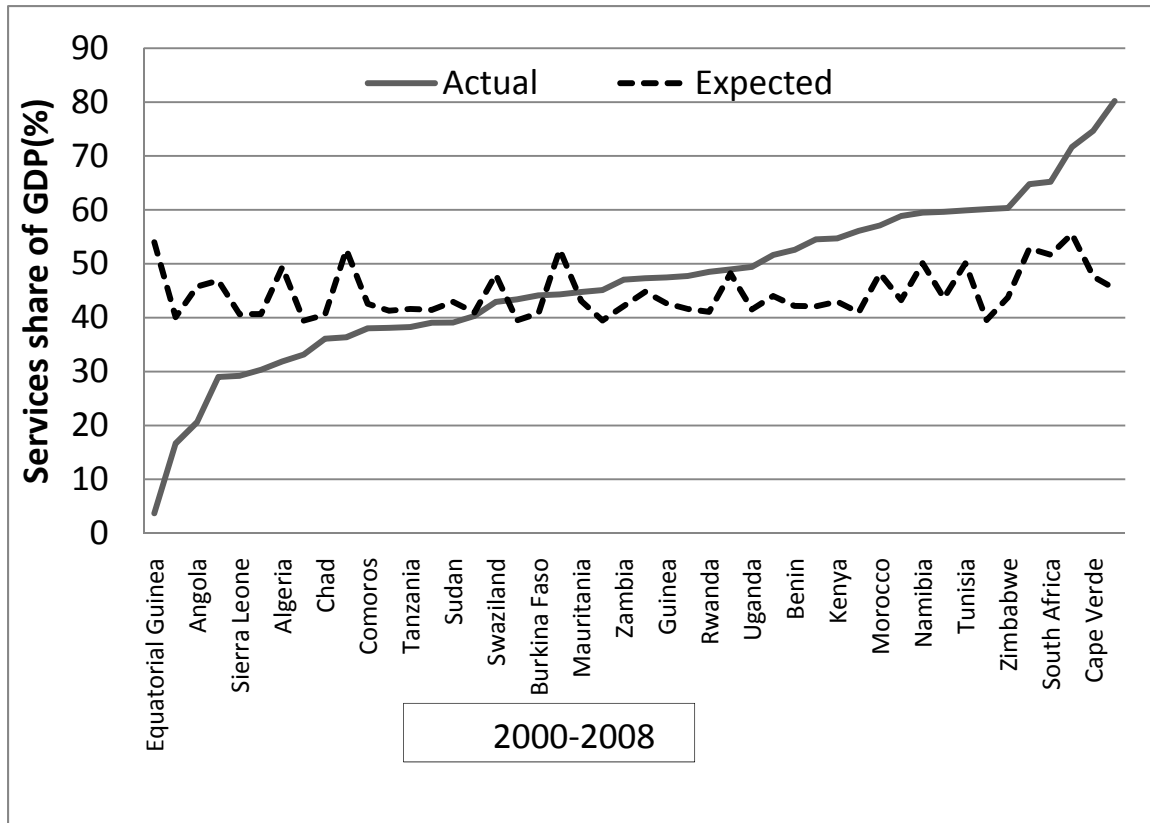
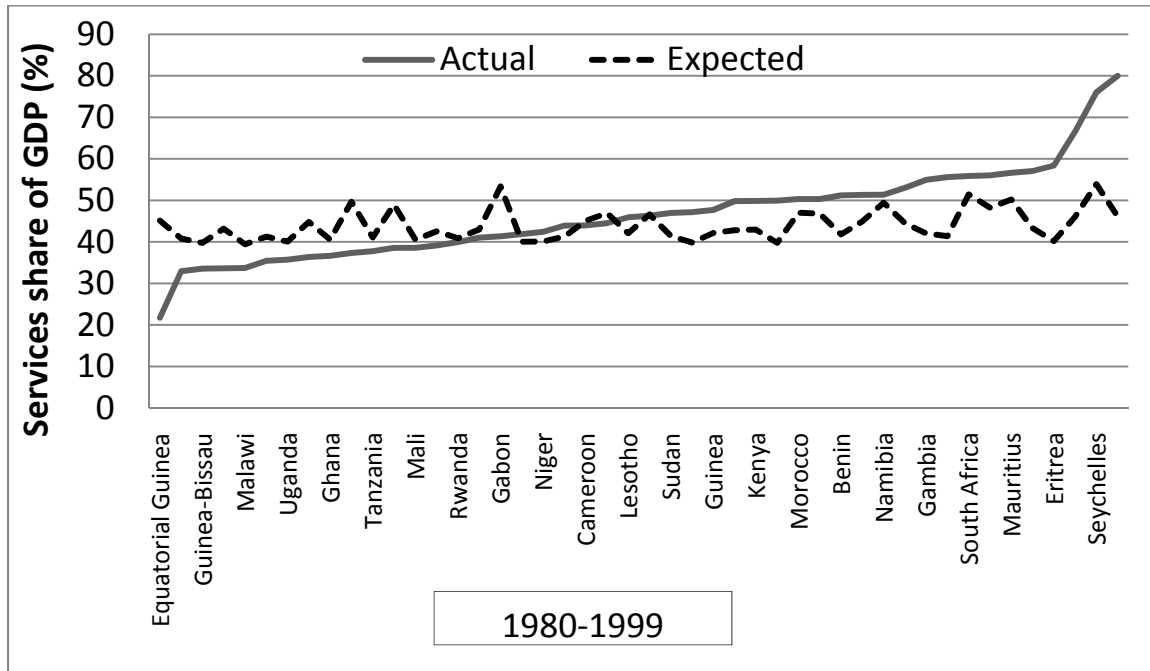
¹ The following random effects model was estimated: $y_{ist} = \alpha_i + x_{it}\beta + v_i + \varepsilon_{it}$, where y_{ist} is the log of sector s (agricultural, industry, and service) GDP share, x_{it} is the log of per capita GDP. $v_i + \varepsilon_{it}$ is the overall residual, where v_i is the country-specific effects and ε_{it} is the time-variant residual. The results are: $y_{ag} = 9.11 - 0.89x_{it}$; $R2 = 0.75$ and $y_{Ser} = 1.46 + 0.25x_{it}$; $R2 = 0.29$. All coefficients are significant at 1% level.

Figure 5: Actual vs. expected agricultural sector GDP shares among African countries



Source: Author's calculations.

Figure 6: Actual vs. expected services sector GDP shares among African countries

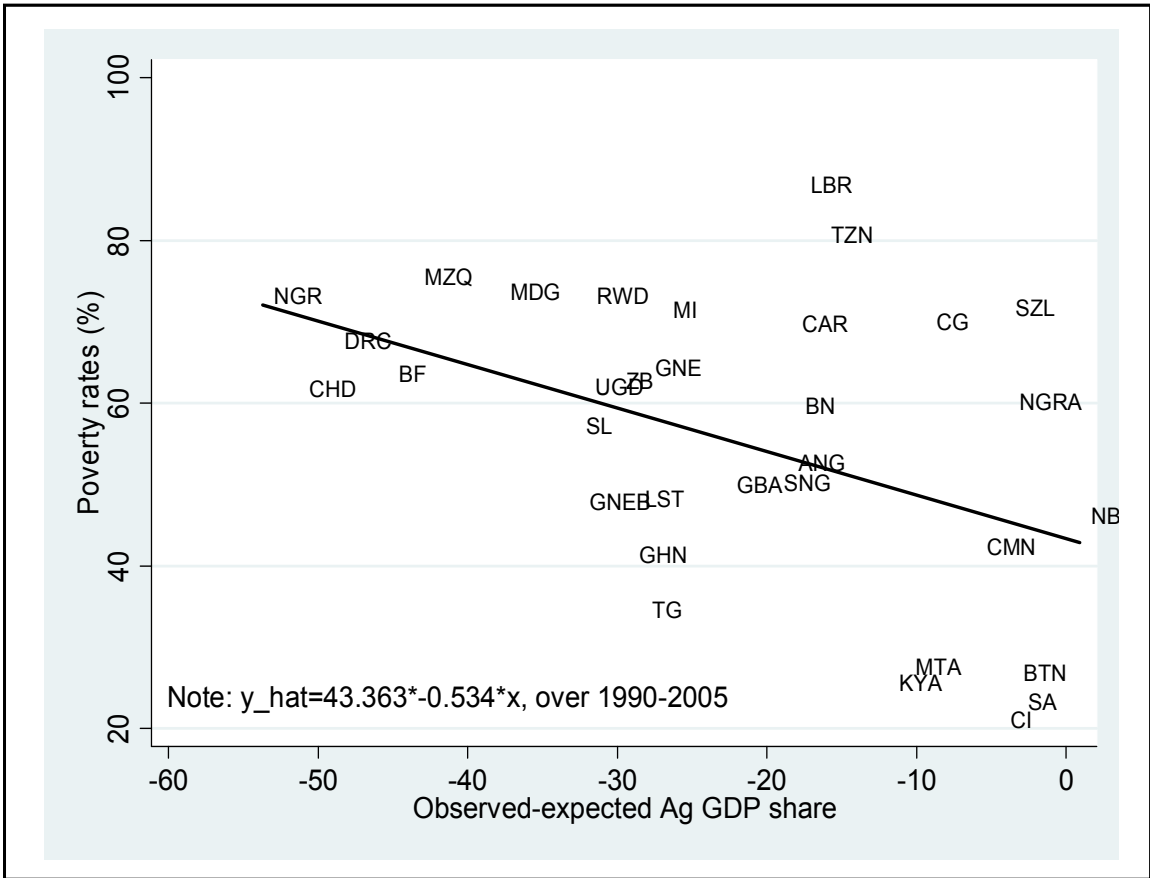


Source: Author's calculations.

The extent of the sectoral imbalance can be seen by comparing sectoral shares among African countries to that of other developing regions. Figure a6 in the Annex shows that the average share of agriculture in GDP is significantly smaller among African countries compared to South Asian countries with similar levels of income. It is barely larger than the average share among countries in East Asia, the Middle East and North Africa, which have per capita incomes that are three times higher. The comparison also reveals a relatively oversized service sector. As can be seen from Figure a7 in the Annex, Africa has the highest average GDP share for services, only slightly lower than Latin America. Average per capita incomes among the latter countries are, however, nearly eight times higher than the African average.

Underperformance in the agricultural sector and the oversized service sector have delayed structural transformation in Africa; underperformance has also resulted in higher poverty levels observed among Africa countries. Figure 7 shows the relationship between poverty levels and the observed performance gap or the deviation between observed and expected agricultural GDP shares. The size of the deviation decreases away from the origin and along the x-axis. Countries with higher performance gaps also have higher poverty levels.

Figure 7: Agricultural sector underperformance and poverty levels



Source: Author’s calculations.

Trends in economic sophistication among African countries

An important part of structural change is that economies acquire greater capabilities as they mature to produce more sophisticated, higher valued goods. The basket of goods a country ends up producing competitively determines its level of economic performance and overall income level. Goods for which demand expands globally as incomes rise around the world can be exported in larger quantities and at high prices for a long time. Such goods are associated with higher levels of productivity and incomes. The more a country succeeds in producing such goods, the more wealth it will build, and the richer it gets over time. Using the expression by Hausmann et al. (2006), “countries become rich by producing rich-country goods”. In other words, “countries become what they produce”.

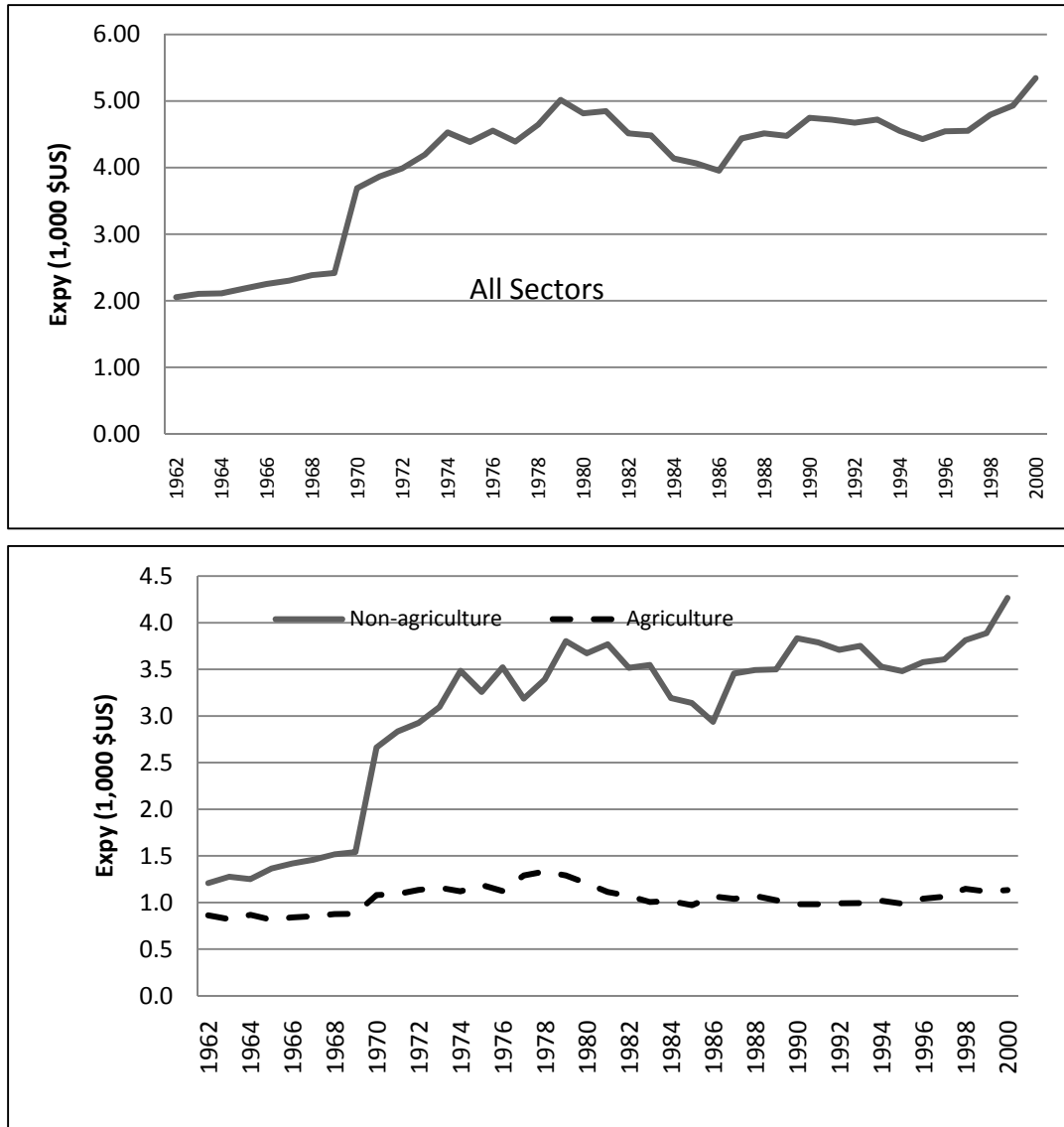
We use the methodology developed by Hausmann et al. (2006) to study the extent to which structural change among African countries is moving their economies on the path toward specialization in higher valued goods. They computed the level of income associated with specific products by taking the weighted average of per capita GDP of all countries exporting that good, using as weights the export shares of that product in an individual country’s exports. The product-specific income level is called PRODY. Hausmann et al. (2006) then calculated the productivity level of a given country as the weighted average of the value of PRODY for all the goods that are exported by that country, using as weights the shares of each good in the country’s export basket. The productivity level is called EXPY, and is reflective of a country’s success in competitively producing and specializing in high value goods. The higher the value, the more the country is exporting products that tend to be associated with more mature economies and higher per capita incomes. The lower the value, the more the country tends to export primary, unsophisticated goods that are associated with lower levels of development and per capita incomes.

EXPY estimates are used to measure the extent to which structural change in African countries has enabled them to develop revealed comparative advantage in sophisticated, higher value goods. Estimates for the agricultural and non-agricultural sectors as well as for the overall economy are presented in Figure 8. The top graph shows the evolution of the average value of EXPY for Africa for all products from 1962 to 2000. After a rapid increase in the 1960s that saw the value of EXPY double from US\$2,000 to US\$4,000, no further progress has been observed. The value of EXPY for the next 25 years has hovered between US\$4,000 and US\$5,000. In comparison, the estimation by Hausmann et al. (2006) of EXPY for 97 countries from 1962 to 2000 yields mean values above US\$10,000 (in 2000 US\$). Similar estimates by Hausmann and Bailey (2007) for a sample of nine emerging countries from 1975 to 2004 produce values that are well above US\$10,000 and as high as US\$16,000.

The bottom graph of Figure 8 shows the trends in EXPY for agriculture and non-agricultural sectors. Estimates for the former sector are virtually flat and have not exceeded the US\$1,000 mark over the entire nearly 50-year period. The estimates for the non-agricultural sector follow closely the average trends shown in the top graph, with a rapid increase in the 1960s followed by a fluctuation between US\$3,000 and US\$4,000. Although one would expect the industrial sector to dominate the product diversification process, it is striking that the agricultural sector has failed to make any positive contribution to economic sophistication since the 1960s. The estimates

bring out clearly the longstanding concern about continued specialization of African economies in agricultural raw materials. Even the upward shift in average EXPY estimates that is observed at the end of the period comes entirely from the non-agricultural sector.

Figure 8: Trends in economic diversification among African countries, 1962-2000



Source: Ulimwengu and Badibanga 2011.

The lack of progress toward product sophistication in the agricultural sector has real strategic implications. First, it is hard for the sector to raise labor productivity and incomes if it fails to achieve comparative advantage in higher valued products with greater income elasticity. Greater product sophistication would allow African countries not only to raise the overall and unit value of export to global markets, but it would allow them to capture a greater share of the fast growing demand for urban food in regional markets. The latter is projected to grow by an additional US\$100 billion by 2030 from just US\$50 billion in 2005 (NEPAD 2009). Greater

product sophistication and trade performance in the agricultural sector is also important for the broader growth process. The review of a large body of literature by Badiane (1991) indicates that an additional 1 percent increase in agricultural export earnings can raise the rate of growth in the industrial sector by 0.4 to 1.8 percent. Furthermore, estimates by Delgado et al. (1998) suggest that an additional revenue of US\$1.00 from sales of agricultural tradeables in local markets can generate an incremental income of between US\$1.30 and US\$3.30 in the broader rural economy.

The importance of product sophistication and trade performance for growth is also illustrated by estimates by Hausmann et al. (2006). They regressed GDP growth rates on country EXPY and an additional set of other variables including human and physical capital as well institutional quality. Their findings indicate that a 10 percent increase in EXPY raises the GDP growth rate by an average of 0.2 - 0.5 percent. They find the impact of EXPY on growth to be strongest among middle-income countries. Their analysis did not, however, yield significant relationships between EXPY and GDP growth rates among advanced countries or low-income countries. This finding may indicate that a minimum level of product sophistication has to be reached before the multiplier effects take hold.

The various multipliers presented above illustrate the cost to African countries in terms of lower growth, slow progress in structural change, and the failure to achieve greater product sophistication. Future growth strategies would have to focus on getting out of the low productivity trap in the agricultural sector and stimulating growth in the industrial sector and thereby accelerate the process of structural transformation. The following two sections discuss these strategic options.

Strategies to raise agricultural productivity and promote rural development

The preceding analysis indicates that structural transformation in Africa has not only been delayed, but that it has also been productivity-reducing in most instances. A particular problem has been the “stunting” or accelerated decline of the agricultural sector compared to the pace of overall economic growth. In terms of Figure 1, the slope of the line depicting the share of agricultural GDP has fallen faster than would have been justified by the process of economic growth. The flat trend in labor productivity shown in Figure 3 suggests that the share in agricultural employment has not declined fast enough. In Figure 1, this translates into a flatter slope of the line depicting the agricultural labor share. The combination of the two, that is the (temporary) shifting of the employment share line upward and that of the GDP line downward, means that the gap between the GDP and employment shares is larger than should have been expected at observed per capita income levels. The convergence process discussed in Timmer (2009) is being delayed further, with its implications on poverty levels and rural–urban inequalities.

It is easy to see now why revitalization of agriculture and increased productivity in that sector have to feature prominently in Africa’s future growth agenda. Fortunately, this viewpoint is also shared by African leaders, who in 2003 launched the Comprehensive Africa Agriculture Development Programme (CAADP)². CAADP is a continent-wide framework to facilitate faster

² The description of the CAADP process is based on Badiane et al 2011.

agricultural growth and progress toward poverty reduction and food and nutrition security in Africa. It seeks to promote policies and partnerships, raise investments in Africa's agricultural sector, and achieve better development outcomes. It is an unprecedented, comprehensive effort to rally governments and other stakeholders around a set of key values and principles, create partnership mechanisms at continental, regional, and country levels, promote evidence-based and outcome-driven policy design and implementation, and establish inclusive dialogue and review processes to raise the effectiveness of the development process among African countries.

CAADP has defined a limited set of clear continent-wide goals, including the attainment of a 6 percent annual agricultural growth rate at the country level. For that purpose, the allocation of at least 10 percent of national budgets to the sector is another CAADP target. In addition, CAADP contains the following key values and principles:

1. *Leadership and ownership* of all aspects of the agenda at all levels by African decision-makers and their constituencies. Unlike previous development efforts that were frequently externally-driven, CAADP is a fundamentally home-grown agenda. It has the advantage of facilitating broad-based acceptance and raising the likelihood of better alignment with local priorities and concerns.
2. *Inclusiveness* of all major stakeholder groups to facilitate participation in planning and implementation decision making. Albeit far from perfect, no other development effort on the continent has invested heavily in creating a wide understanding and support of its goals and action agenda.
3. *Partnership and mutual accountability* among African governments, their constituencies and development agencies. A number of dialogue and review platforms have been established at the country, regional, and continental levels to support this principle.
4. *Evidence- and outcome-based planning and implementation* to improve growth and poverty reduction outcomes of agricultural sector strategies. One of the main innovations of CAADP has been the use of locally based empirical economic analysis to support strategic decision-making, priority setting, and investment planning in the sector.³

From an operational point of view, this strategy was established on the basis of four pillars to guide investments by leading regional economic communities⁴ and their member states. The pillars deal with: (i) sustainable land and water management; (ii) agribusiness development and market access; (iii) hunger and social safety nets; and (iv) science and technology.

One of the many innovations of the CAADP process is its broad use of high quality, locally based analysis to guide and inform decision-making processes on planning and implementation, as well as review and dialogue by stakeholders around agricultural program priorities and

³ See the Regional Strategic Analysis and Knowledge Support Systems (www.resakss.org) that were established with three IT based platforms for West, East and Central, and Southern Africa.

⁴ The Economic Community of West African States (ECOWAS); the Common Market for Eastern and Southern Africa (COMESA); the Southern African Development Community (SADC); the Economic Community of Central African States (ECCAS); and the Union of Maghreb Arab (UMA).

outcomes. This approach is unprecedented in the majority of countries. An early impact of its adoption has been a much greater credibility of the agricultural agenda within national governments. This credibility has enabled ministries of agriculture to present higher quality strategy documents to their peers in government, articulate their agenda more transparently, and justify requests for increased funding by linking them to clear goals and outcomes. Together with efforts to promote inclusiveness, the transition to evidence-based planning has facilitated consensus among stakeholder groups and strengthened the position of the agricultural constituency in an unprecedented fashion.

The analysis which has been carried out as part of the CAADP agenda has systematically targeted a set of key strategic questions and examined alternative future growth and poverty reduction outcomes based on several possible policy scenarios. Routinely, the scenarios include at least: (i) continuation of pre-CAADP trends in agricultural sector performance; (ii) successful implementation of on-the-shelf pre-CAADP strategies, where they exist; (iii) realization of the CAADP growth target; and (iv) achievement of the millennium development goal (MDG) target of halving poverty by 2015. For the first two scenarios, the objective of the analysis is to project growth and poverty reduction outcomes by 2015. In the case of the third scenario, the objective is to simulate the expected rate of poverty decline, if the country under consideration manages to achieve the CAADP 6 percent agricultural sector growth target. The last scenario simulates the required agricultural sector growth rate to enable a country to achieve the MDG poverty target by 2015 or at a later date, depending on the extent to which the required rate of growth is judged to be realistic or not. The analysis also examines the potential sources of future growth and poverty reduction, not just at the level of agriculture versus non-agriculture, but also among various agricultural sub-sectors.

Other critical and innovative components of CAADP are: (i) the organization of a roundtable and signing of a country CAADP compact specifying policy and investment priorities and commitments guided by the analysis discussed above; (ii) the design of a comprehensive multi-annual agricultural sector investment plan by each country; (iii) the organization of a business meeting and an independent technical review to systematically evaluate the technical quality of country investment programs and to discuss funding and implementation modalities. The technical review includes evaluations of the extent to which CAADP values and principles, such as inclusive review, dialogue processes, and promotion of regional complementarities, are sufficiently embedded in country investment plans. The review also allows for an accounting of the extent to which best practices and success factors, identified in framework documents and related implementation guides that are prepared for each of the four pillars specified above, are incorporated into the plans. Moreover, it verifies whether the plans are consistent with long-term growth and poverty reduction goals that were agreed upon at the compact signing stage. Finally, the review allows stakeholders to evaluate whether proposed program interventions are adequately costed, logically constructed, and implementation ready.

While it is too early to say anything definitive about the impact of CAADP on the agricultural sector in Africa, there is no question that the implementation of CAADP is happening at a time when performance in the sector is strengthening (Badiane 2008). African economies have indeed been undergoing a remarkable economic and agricultural recovery over the last 10-15 years. Growth is accelerating and spreading to encompass an unprecedentedly large number of

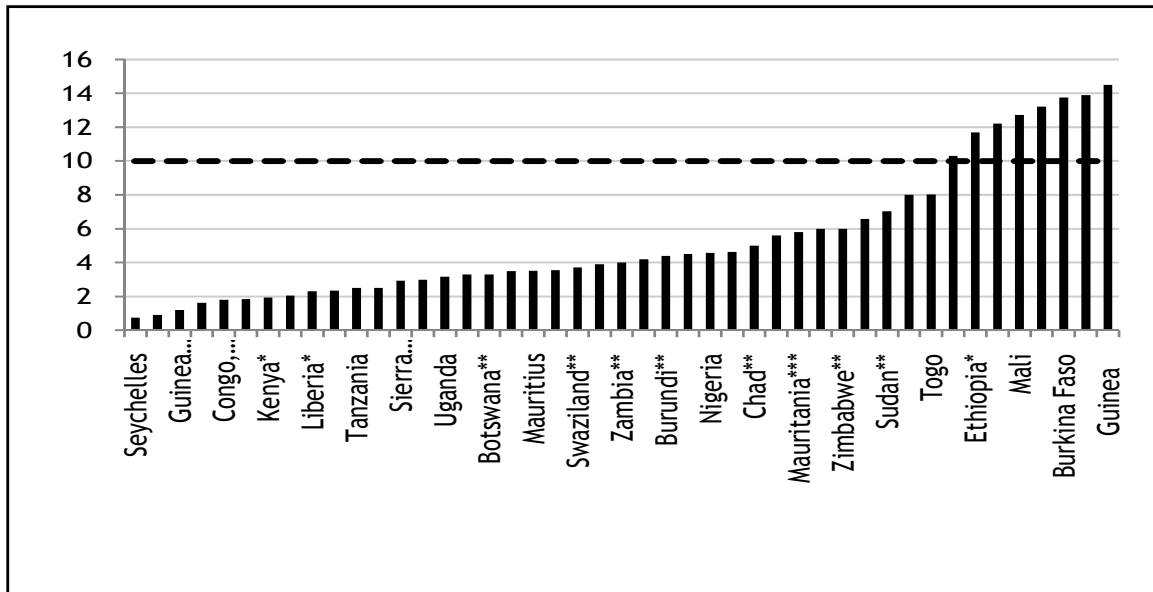
countries. Total agricultural factor productivity rose by about 50 percent during the same period, and per capita food production has improved to reverse the decline observed during most of the 1970s and 1980s (Nin-Pratt and Yu 2008). It is particularly worth noting that the recovery was robust enough to survive the 2008 crisis and in fact growth has rapidly returned to pre-crisis levels within a relatively short period of time.

The broad adoption and implementation of the CAADP agenda at this particular time in the history of Africa's agricultural sector development is of great significance. It offers the opportunity to sustain and deepen the recovery process. If, through CAADP, a large number of countries manage to maintain a 6 percent growth trajectory, living conditions on the continent would change dramatically within a generation. At the beginning of the last decade, only 5 countries exceeded the CAADP agricultural growth target of 6 percent. By the middle of the decade, the number had grown to 9. In 2009, the average agricultural growth rate for Africa as a whole as well as for two sub-regions (North and Southern Africa) exceeded the 6 percent target (ReSAKSS 2011). It is worth noting that this level of agricultural growth is similar to that witnessed by India during much of its Green Revolution.

Besides the improvement in planning and implementation of sector policies and strategies, sustaining the recovery process requires increased funding for the sector, a major CAADP goal. Conscious of the need to reverse trends in declining investment in the sector, African Heads of State at the 2003 launch of the CAADP agenda in Maputo, Mozambique committed to allocating at least 10 percent of government budgets to agriculture by 2008. As shown in Figures 9a, some progress toward that goal has been achieved but more needs to be done. Less than 10 countries have reached the 10 percent mark, while close to that number have budget shares exceeding 5 percent. Figure 9b offers a clearer picture of the changes that have taken place. Since the Maputo decision, the share of countries that have achieved the budget expenditure target has grown steadily. In contrast, the share of countries spending between 5 percent and 10 percent has declined, while the number of countries spending below 5 percent of their budget for agriculture has remained nearly unchanged. It appears from the trends depicted in Figure 9b that half of reporting countries have not yet responded to the call to raise agricultural funding. With the adoption of long-term investment plans in nearly 2 dozen countries in the last 2 years, it is to be expected that the number of countries moving toward the expenditure target will increase in the near future.

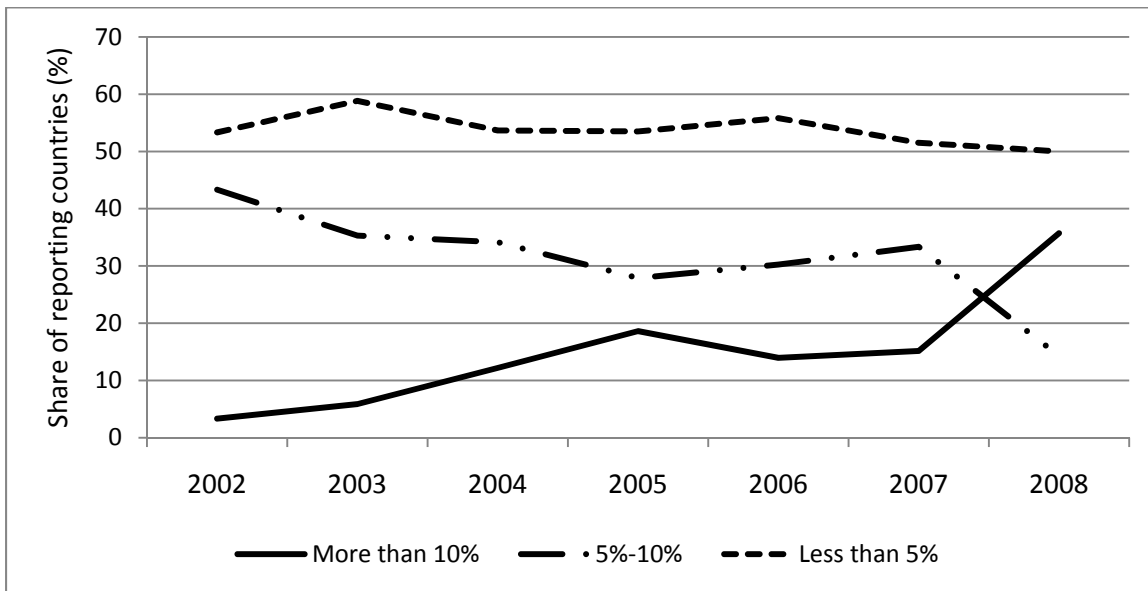
This expectation seems to be justified, based on the experience of Rwanda. Rwanda was the first to sign a CAADP compact in 2007 and complete an investment plan in 2009. According to data from the Ministry of Agriculture and Animal Resources, the country's agricultural budget has nearly doubled from 2007 to 2009, from RWF 18.00 billion to RWF 31.00 billion, and more than doubled again to exceed RWF 66.00 billion in 2011. Its agriculture budget share has also doubled since the signing of the compact from 3.5 percent in 2007 to 6.8 percent in 2011.

Figure 9a: Agricultural expenditure shares (latest in percent)



Source: ReSAKSS 2011.

Figure 9b: Changes in agricultural budget shares



Source: ReSAKSS 2011.

Successful implementation of CAADP can help African countries boost productivity in the agricultural sector and reverse the patterns of productivity-reducing structural change discussed above. However, this would require continued commitment to the agenda by African countries, leadership and ownership by African governments and stakeholders, and full alignment by the international development community. With the ongoing changes in global food markets and the

associated false sense of an African crisis that is being created, the biggest risk is that countries may be distracted from the strategic long-term focus of CAADP and instead be driven into a disruptive crisis management mode by an international community that is likely to turn to yet another event without hesitation. These potential diversions are of great concern, especially because the emerging long-term trends in global food markets should be seen as opportunities for African countries. This opportunity arises because the anticipated rise in food prices is taking place at a time of strong performance in Africa's agricultural sector, growing resource constraints, and declining productivity among emerging economies in Asia and elsewhere.

In spite of the considerable impact that CAADP could have on African economies, it is also clear that a strategy focused solely on transforming the agricultural sector would fall short of creating the type of structural change needed among African countries. Therefore, CAADP needs to be accompanied by equally focused strategies to raise productivity in the manufacturing and service sectors. The contours of such strategies are described in the following section.

Policies for successful economic transformation in Africa

Structural transformation is the movement of labor from less to more productive sectors, such that overall labor productivity rises even with constant sectoral productivity levels. The problem in developing countries, as has been shown here for African countries, arises when: (i) labor migration stalls because of slow growth in the rest of the economy and/or rapid population growth; and/or (ii) value added in low productivity sectors such as agriculture fails to rise fast enough to erase the intersectoral productivity gaps.

Countries with successful structural change have universally achieved two things: moving labor from lower to higher productivity sectors and raising output in lower productivity sectors. Progress has to be achieved in three key areas to lead to this outcome: labor movement, productivity growth, and trade competitiveness. The movement of labor between lower to higher productivity sectors raises average productivity and incomes in the economy, even without any changes in sector productivity levels. This effect is magnified when accompanied with concomitant sectoral productivity growth.

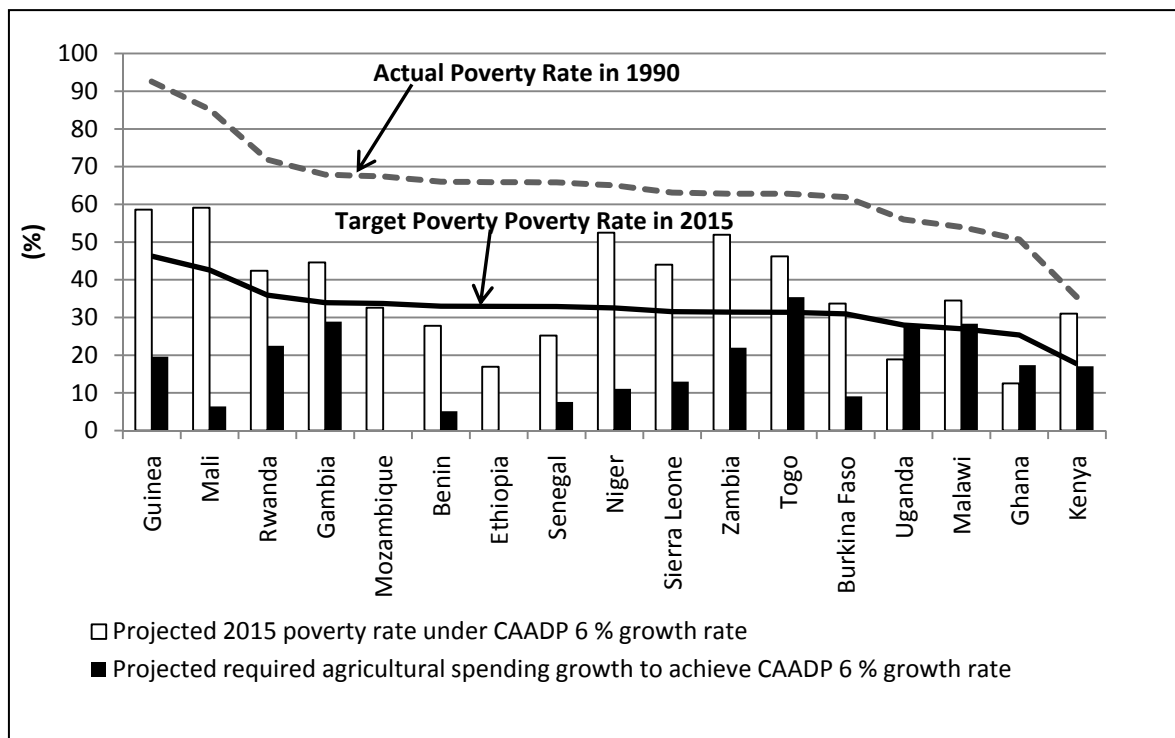
A new approach to rural development in future structural transformation policies in Africa

The basic growth and development challenge is how to employ a growing number of people in an increasing number of rapidly expanding, high productivity sectors in order to reach a point where productivity and incomes converge across sectors. As shown by Timmer (2009), the convergence process has taken more time over the last 50 years. This duration in turn raises the burden on agriculture to provide a larger share of incomes for a longer period of time. The problem has been made more complicated for African countries due to underperformance in agriculture. Agricultural underperformance has primarily pushed labor into the service sector at a pace that has been considerably faster than output growth in the latter sector. Improving policies and raising investment to boost performance in agriculture, as being attempted under CAADP, has to be, therefore, a central element of structural transformation strategies. Accelerated agricultural growth is the most effective tool to generate the largest impact in terms of poverty

reduction in the short run. Rural growth also raises productivity in the rural areas and slows the pace of outmigration into the service sector.

The decade-long stagnation has created conditions that have made the effective pursuit of productivity enhancing strategies a more challenging undertaking. The extent of the challenges is illustrated in Figure 10. The top line in the graph indicates the level of poverty measured by the share of people living on one dollar per day for selected African countries. The bottom line denotes poverty levels in 2015, assuming the countries achieve the MDG target of cutting poverty by 50 percent. The clear bars represent the projected level of poverty, if the countries were to achieve the CAADP annual agricultural growth target of 6 percent.⁵ It appears that realizing that rate of growth would indeed allow many countries to achieve the MDG poverty target. But it would not be enough for several other countries. Yet, as shown by the shaded bars, nearly all of the countries would have to sustain double-digit rates of growth in agricultural public expenditures over many years to realize these outcomes. Such a rapid increase in public expenditures would be extremely hard if not impossible to sustain for the large majority of African countries. It constitutes the first challenge to boosting agricultural growth in pursuit of accelerated structural change and poverty reduction.

Figure 10: Projected agricultural output and expenditure growth rates and poverty levels by 2015, selected countries



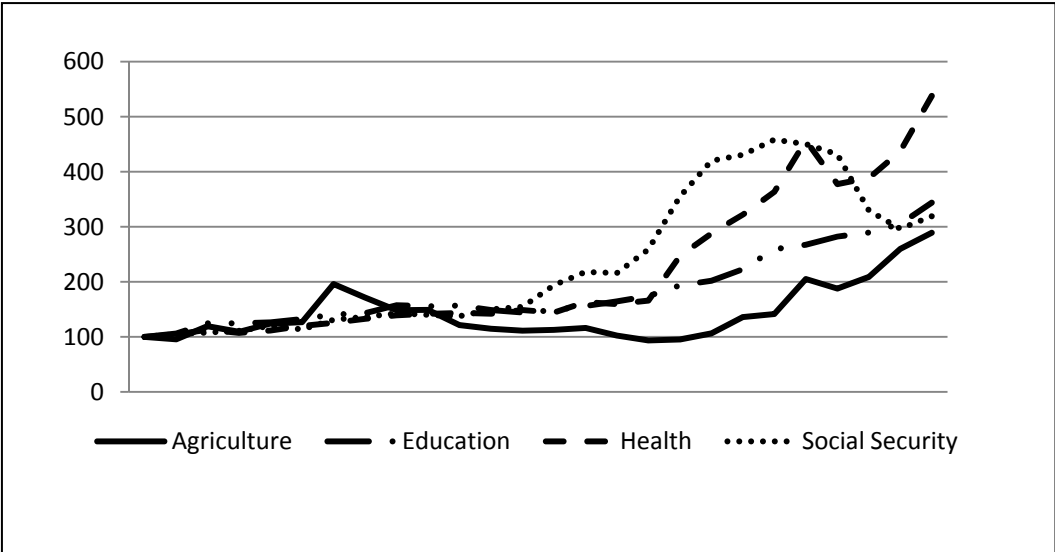
Source: Badiane and Ulimwengu 2009.

⁵ Different poverty base years are used for the different countries.

The second challenge is reflected in the position of the 2015 target poverty line. The line indicates that average poverty levels among African countries would still lie around 30 percent, even after they have met the MDG poverty target. The anticipated high level of poverty will continue to put considerable pressure on African governments. They will have to deal with the symptoms of large-scale poverty and thus be forced to spend increasing amounts of money to address the social needs of the poor and vulnerable. Going forward, the biggest question facing African governments seeking to build on the ongoing recovery process is how to raise productivity enhancing investments while meeting the expenditure requirements of addressing social needs of the stubbornly large segment of the poor and vulnerable. This dilemma is a huge challenge, given limited fiscal resources and tight budget constraints under which most of these governments operate.

Figure 11 shows trends in social service expenditures compared to those in agriculture. There is no room in country budgets to sustain this rise in social expenditures and achieve a double-digit growth in agricultural expenditures. What is required is for African governments to take another look at social service provisions. The conventional approach is to look at social services from an entitlement point of view, with a primary objective of meeting people’s welfare needs. Part of that convention is to treat social services as homogeneous and to think about the impact on growth only as a function of the level of spending and efficiency of delivery. This is the wrong approach in African countries characterized by large-scale poverty that is rooted in low productivity in the main productive sector. What is required instead is a set of social policies designed to maximize their impact on labor productivity among the poor and vulnerable.

Figure 11: Trends in social services and agriculture expenditures among Africa countries, 1980=100



Source: Badiane and Ulimwengu 2009.

Social policy thus becomes an optimization problem, and the composition of services provided becomes more important than their level. The reason is that (i) social services are composite bundles of a variety of subservices, and (ii) the composition of these services, which affect labor productivity differently, is not growth-neutral. In other words, health, education, and social protection services consist of various types of sub-services with different impacts on long-term productivity. Consider a government spending an x amount of money every year in the health sector, with the objective of improving average access to services across the country over a ten-year period. The same country could target a specific share of the same budget to control the seasonal diseases that curtail a significant share of the rural population during peak labor seasons. The same health budget would have a larger impact on agricultural productivity and rural growth in the latter case. The same reasoning can be applied to policies geared towards education for all compared to alternative policies that include a strong focus on vocational training to meet the growing skill needs among smallholders and other segments of the agricultural value chain.

There has not yet been a lot of research on the study of social services provision from an optimization point of view. But the existing literature indicates that there is scope to optimize the mix of social services to raise their impact on labor productivity. Estimates by Badiane and Ulimwengu (2009), using data from Uganda for health and Vietnam for education, show that an increase in expenditures to control malaria had an impact on efficiency that is twice as high as a similar increase in overall health services expenditures. In the case of education, an increase in expenditures on vocational training had significant efficiency and poverty effects, whereas none could be detected from expenditure increases on primary and secondary education.

In sum, what is being advocated here is an approach to social services that is similar to what has been done for infrastructure. When considering the impact of infrastructure on growth, it is an established convention to treat the various types of infrastructure — highways, feeder roads, tracks and trails, etc — distinctly as well as to consider the implication of their complementarities and geographic location. In other words, resource-constrained African countries have to search for practical strategies to create synergies between social services provision and productivity-enhancing investments so as to maximize the long-term poverty and growth outcomes of public expenditures in rural areas.

From an institutional point of view, the search for synergies would make it possible for governments to approach budget allocations between sectors from a win-win rather than a win-lose standpoint. This approach would increase cooperation between agriculture and social services ministries, reduce the tension around budget negotiations, raise the efficiency of public expenditures in the agricultural and rural sector, improve the effectiveness of the delivery of public goods and services in rural areas, and achieve better growth and poverty reduction outcomes. For instance, the ministry of agriculture would no longer consider budgetary resources going to social ministries as lost to agriculture. In turn, the latter would be more conscientious about the specific contribution of their programs to agriculture beyond the broader social targets in rural areas.

A new approach to industrialization and future structural transformation policies in Africa⁶

As summarized by Chenery (1960), the process of structural transformation is one through which the non-agricultural segment of the national economy undergoes a series of changes including: (i) a rise in the absolute and relative sizes of overall economic output coming from the manufacturing sector; (ii) a change in the number and nature of goods produced in the industrial sector; (iii) a change in the techniques used to combine labor, capital, and technology, as well as the level of costs related thereto, to produce the various goods in industry; and (iv) a change in the sources supplying the economy with existing and new products. The transformational challenges faced by industrial enterprises in this process are: (i) how to leverage existing assets into new and/or related businesses; and (ii) how to learn, and how to combine and recombine assets to establish new businesses and address new markets (Teece 2000).

More specifically, industrialization happens through the production of new, more sophisticated, higher valued goods. Hausmann et al. (2007) have developed a hierarchy of goods, identifying products that are associated with faster growth. Their work also shows that African economies tend to be located at the periphery of the product space with a concentration on low productivity goods. African countries therefore need an industrial strategy-renewal, along the lines of CAADP, with the goal of developing comparative advantage in, as well as a critical mass of, higher productivity goods. Hausman and Klinger (2006) and Hidalgo (2009) provide estimates of the distance countries have to travel in order to develop competitive advantage in higher value products on their way to economic diversification. The map of such distances can serve as a guide to designing future industrialization strategies to promote structural transformation.

Externalities that are linked to efforts by entrepreneurs to produce a new good for the first time constitute a major determinant of the capacity of economies to diversify into higher productivity goods. Economies diversify into such products because entrepreneurs successfully engage in what Hausmann et al. (2007) and Rodrik (2004) call a self-discovery process of finding out which goods can be produced profitably. They must try out a combination of new technologies and firm-level processes to discover the cost of producing these goods. The goal of industrialization policies should be to raise the number of entrepreneurs that can engage in the cost discovery process by addressing the above externalities. They include primarily information externalities and coordination externalities that can be significant deterrents to entrepreneurship growth among developing countries.

Information externalities arise because individual entrepreneurs have to bear the risk, uncertainty, and cost associated with discovering what products the economy is good at producing. When successful, they cannot capture the full benefit of their discovery as others are free to pick up production of the same good. Coordination externalities arise when the market fails to align investment and production decisions of individual entrepreneurs. This outcome could result because complementary services and inputs that are required for a profitable investment are too high for the individual entrepreneur to bear or are non-tradable. Both types of

⁶ Policies related to infrastructure development, in particular power, water, road, information and communications technologies, as well as to macroeconomic policies are treated extensively in the development literature and are not covered here. The World Bank has a new and comprehensive report on African infrastructure (World Bank 2009).

externalities reduce returns to investments by private entrepreneurs and slow the pace of growth in the industrial sector.

The new generation of industrialization strategies will have to address the above externalities effectively through technology, infrastructure, and macroeconomic policies. Rodrik (2004) defines a set of principles and key elements to guide industrialization strategies in developing countries. The strategy elements include:

1. Subsidizing self-discovery cost to raise private returns to the level of social returns through, for instance, financing of feasibility studies, technology trials, and market intelligence;
2. Facilitating access to long term, higher risk finance through development banks, venture funds, and long-term commercial loan guarantees; and,
3. Promoting public research, development, and vocational training.

The principles of industrialization policies call for: (i) focus on the reduction of discovery cost related to new technologies, processes, and products and not on individual sectors; (ii) targeting of activities with spillover and demonstration effects; and (iii) defining an exit strategy through clear benchmarking to define when an intervention is successful or has failed. Effective design and implementation of these policies would also require transparent public-private coordination mechanisms to avoid the myriads of risks associated with public intervention and reduce moral hazard. The review, dialogue, and coordination mechanisms under CAADP offer a good example to follow.

The ultimate objective of industrialization policies is to expand the stock of technology capabilities and their application to create new, higher valued goods. Technological capabilities, as defined by Lall (2000), are “the complex of skills, experience, and efforts that allow a country's enterprises to efficiently buy, use, adapt, improve, and create technologies”. A complicating factor is that technology learning and innovation tend to be path dependent and cumulative, thereby creating a pattern of specialization and comparative advantage from which is hard to escape. Learning tends to be local: firm level learning takes place in connection with existing processes, products, and transactions (Teece, 2000).⁷ Therefore, innovation and movement to new, higher value products requires learning outside firms' existing processes, products, and transactions. The longer the distance to be traveled in the “product space” towards these new products, the more formidable the transformational challenges and the higher the related risks and costs tend to be; thus, the stronger the rationale for public action. In other words, moving to new, higher valued goods requires the introduction of different technologies and processes involving costs, risks, and uncertainties. The role of public action would be to lower the cost of discovering and implementing profitable technologies.

Public action in support of industrial growth has been a central element of economic development strategies in emerging Asian economies. In a slight deviation to one of the principles of industrial policies suggested by Rodrik, emerging Asian countries have, universally, specified strategic sectors as the focus of their industrialization policies (Dodgson 2000). In the example of the electronic industry, Mathews (1996) finds that "in all countries, governments

⁷ See also Stiglitz (1987) on localized learning and implications for technology adoption and innovation.

have played a key role in shaping the industry's development, laying down conditions within which companies would operate, and reducing and spreading the risk for investments in advanced technological activities."

The development of agribusiness value chains and the modernization of the service sector in future structural transformation policies

The patterns of structural transformation marked by an oversized, low productivity service sector and underperforming agricultural sector implies that African countries need a labor productivity raising strategy for the service sector; this strategy needs to go alongside smallholder-friendly agribusiness development. Industrialization strategies must therefore target, in the short and medium run, entrepreneurship growth in the informal service sector and the traditional agricultural sector. Technology and innovation policies should seek to enhance technical capabilities and entrepreneurship in both agribusiness and informal sector industries. The current growth recovery is producing a rapidly growing middle class, and a sustained demand for processed urban food, housing, and related household equipment. The example of palm oil and rubber in Malaysia and cassava in Thailand demonstrate amply the significant potential for innovation and entrepreneurial growth in the agribusiness sector. Success stories can also be found among African countries, in particular in the processing of local food staples such as cassava in Nigeria and millet in Senegal. The scope for enterprise growth and innovation in the staples sector should be significant in Sub-Saharan Africa, judging from the projected rise in urban demand for local food to \$150 billion by 2030. The same projections indicate potential income gains of \$30 billion for local smallholders, should African countries succeed in positioning domestic sectors competitively in these markets (NEPAD 2009).

Technology and innovation policies also need to address the needs of the farming segment of the agribusiness value chain. African countries will in particular need to start investing heavily in the training, research laboratories, and other infrastructure required to develop biotechnological capabilities in order to compete in domestic and global agricultural markets. The current debate on genetically modified organisms is particularly unhelpful and distractive in this respect. The real strategic issue facing African countries should not be whether or not to allow or ban genetically modified organisms (GMO) based food. The real issue is whether or not African societies have enough capabilities in the broader field of biotechnology to catch up with the rapid developments around the world. They will otherwise be wiped out of the future global food systems. The case of the cotton sector is a very good example. Just a few years ago, West African producers had strong quality and cost advantages that allowed them to compete successfully in global markets. Their position is now being seriously threatened by the embracing of biotechnology cotton in major competing countries.

The strategy should also put emphasis on enterprise creation and growth in the service sector, which in national statistics includes the large informal sector dominated by handicrafts, metalwork, woodwork, furniture, garments, and leather products. It is unlikely that agriculture alone can generate the rate of employment growth needed to erase the backlog of unemployment and underemployment let alone absorb future growth in the labor force. The formal industrial sector is still small and would take a long time to make a major impact on the broader labor market. The service sector has become a major reservoir of low productivity labor due to the

pattern of structural change discussed earlier. Growth in that sector would therefore play an important role in employment creation and productivity growth among African countries.

In their studies of endogenous industrialization, Sonobe and Otsuka (2006; 2011) identify key sources of market failures that hamper modernization and growth in the informal sector. They include transaction costs related to information asymmetry and contract enforcement, innovative knowledge spillovers, and insufficient managerial capital. They propose the cluster based approach that has played a key role among Asian countries as a possible option for Africa. Required organizational competencies and other productive capabilities among enterprises in the informal sector are often tacit and not codified. Replication and imitation are therefore limited unless facilitated through clustering, which allows skill transfer through movement of labor. They see in cluster based industrialization (CBI) advantages related to technology spillover, in addition to information spillover.

CBI seems to be the best approach to facilitate migration of informal enterprises in the service sector into the more productive, formal segment of the economy. CBI could also serve as a strategy to develop industrial activities in rural towns. In their recent comparative study of clusters between Asian and African countries, including Kenya and Ethiopia, Sonobe and Otsuka (2011) found that clusters in the latter countries tended to suffer from declining profitability as they expand through new entrants. The reason is that lack of continued innovation and the emergence of larger enterprises mean that the number of enterprises keeps growing and profitability keeps falling. Growth within the cluster eventually ceases. The leather industry in Ethiopia was the only exception. Given the lack of effective industrialization strategies, CBI or otherwise, it should not be a surprise that the authors did not encounter successful clusters. The lessons from Asia do point to some potential for CBI to work in Africa's informal sector.

The double challenge of addressing productivity both in the informal and agricultural sector in Africa requires CBI strategies to also include the agribusiness sector. CBI in agribusiness would focus on areas and sectors with confirmed high productivity and technology spillover potential, such as peri-urban processing industries, river basin areas, and other high agro-climatic potential areas, as well as regional transport corridors. CBI activities would target industry-centered technology research, quality management infrastructure, regulatory services, trading infrastructure, smallholder integration, and vocational training. In particular, CBI would promote agribusiness value chain development through the development of a variety of activities--adapted packaging and processing technology, quality management services, institutional design of procurement and distribution networks, production technology and practices, and financial intermediation services.

Conclusions

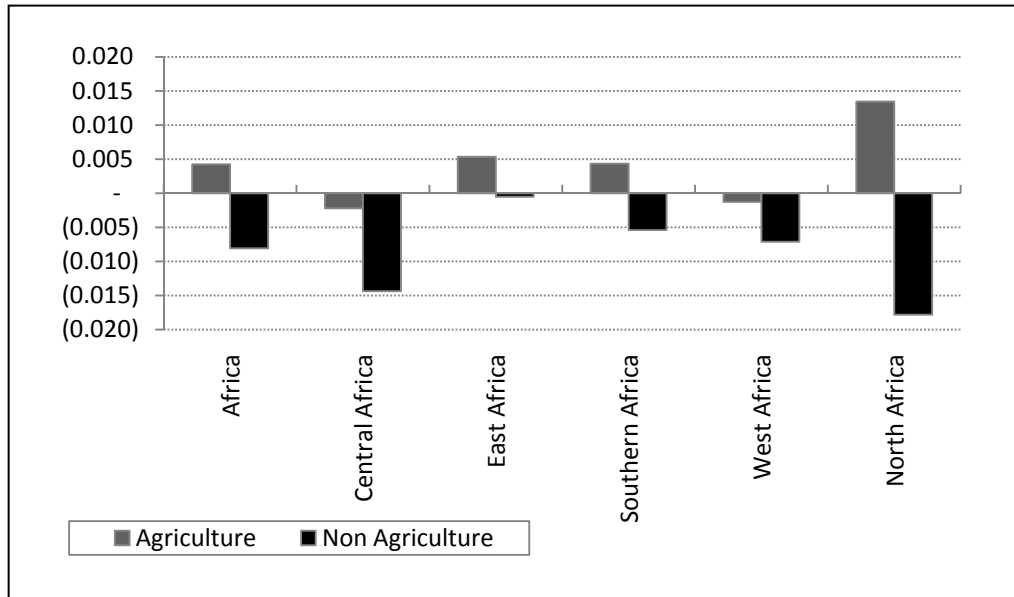
Following decades of stagnation and even decline, African economies are growing again. Growth has been strong, broadly based, and sustained over more than a decade. Underneath the recovery are troubling trends that will need to be addressed effectively. The pace and pattern of economic transformation over the preceding decades suggest that structural change has been historically productivity-reducing. The reason has been the movement of labor out of an

underperforming agricultural sector to an oversized, low-productivity service sector. The problem was made worse by the lack of effective industrialization strategies that prevented African economies from diversifying into higher productivity goods.

Sustaining and building on the current recovery process to raise incomes and reduce poverty among African countries would require innovative strategies to revitalize agricultural growth. Such strategies would have to consolidate the progress under CAADP. They would include a new approach to rural development with greater synergies between social service provision and productivity enhancing investments in order to maximize the impact of public expenditures on labor productivity in rural areas. A new approach to industrialization policies is also needed to promote transition of African economies to higher valued products. In addition to conventional priority areas such as improved macroeconomic policies and infrastructure investment, there is a need for technology and innovation policies to support enterprise growth not just in the formal industrial sector, but also the informal sector.

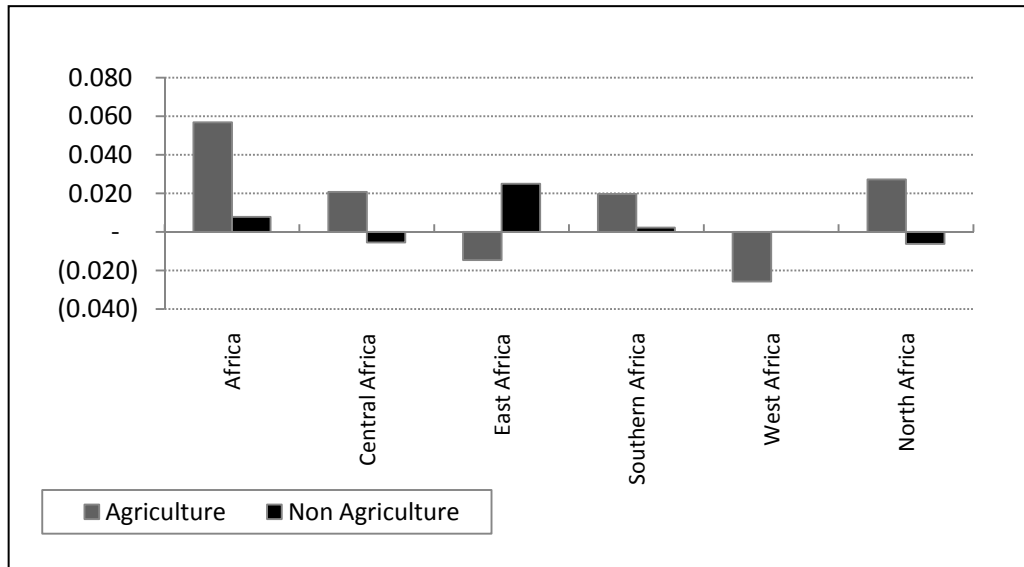
Annex

Figure a1. Agriculture and non agriculture productivity contribution, 1980-1995



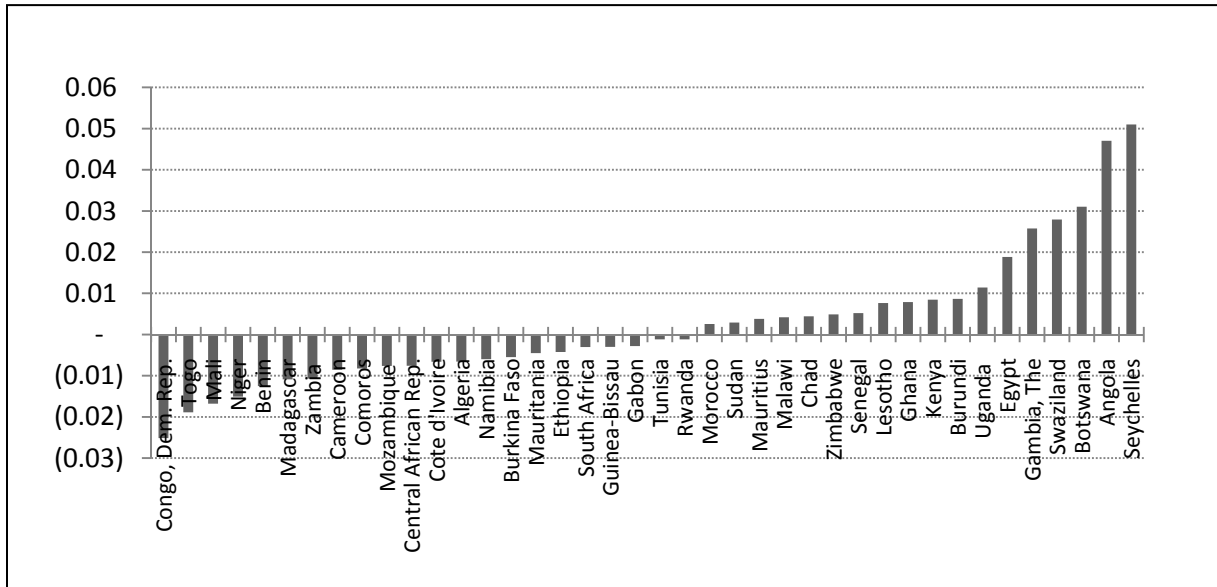
Source: WDI 2009 and FAOSTAT 2011.

Figure a2. Agriculture and non agriculture productivity contribution, 1995-2005



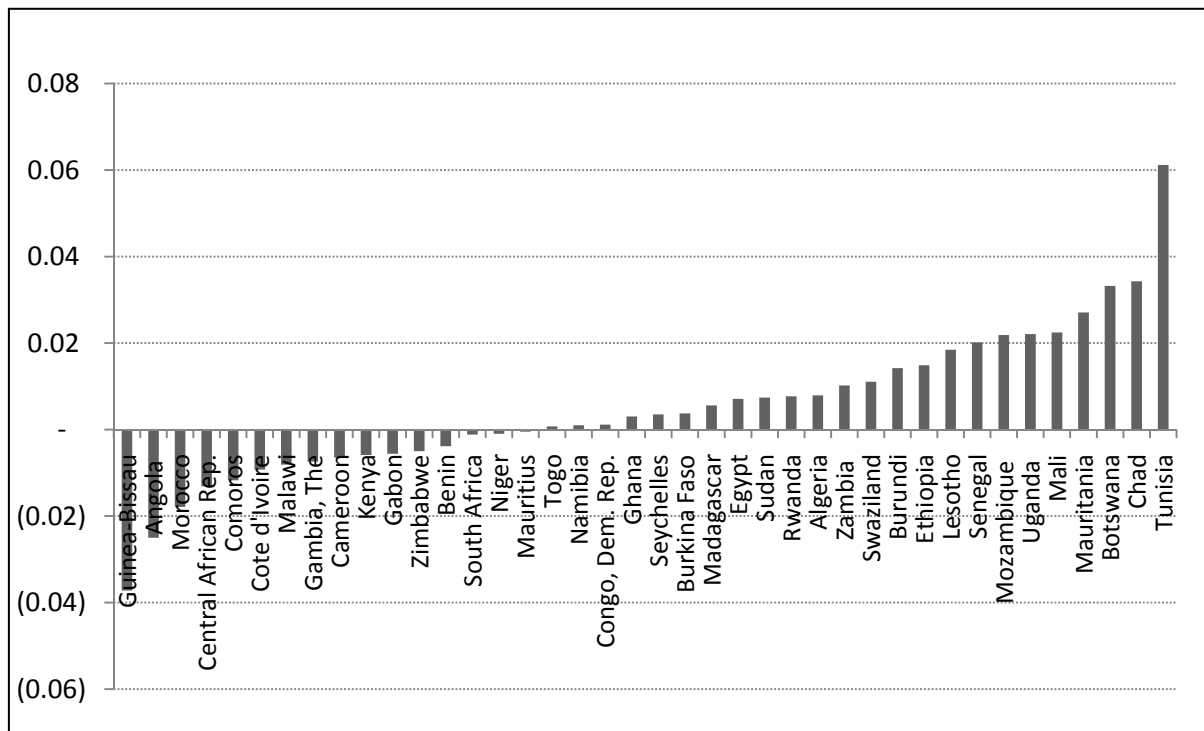
Source: WDI 2009 and FAOSTAT 2011.

Figure a3. Structural change contribution, 1980-1995



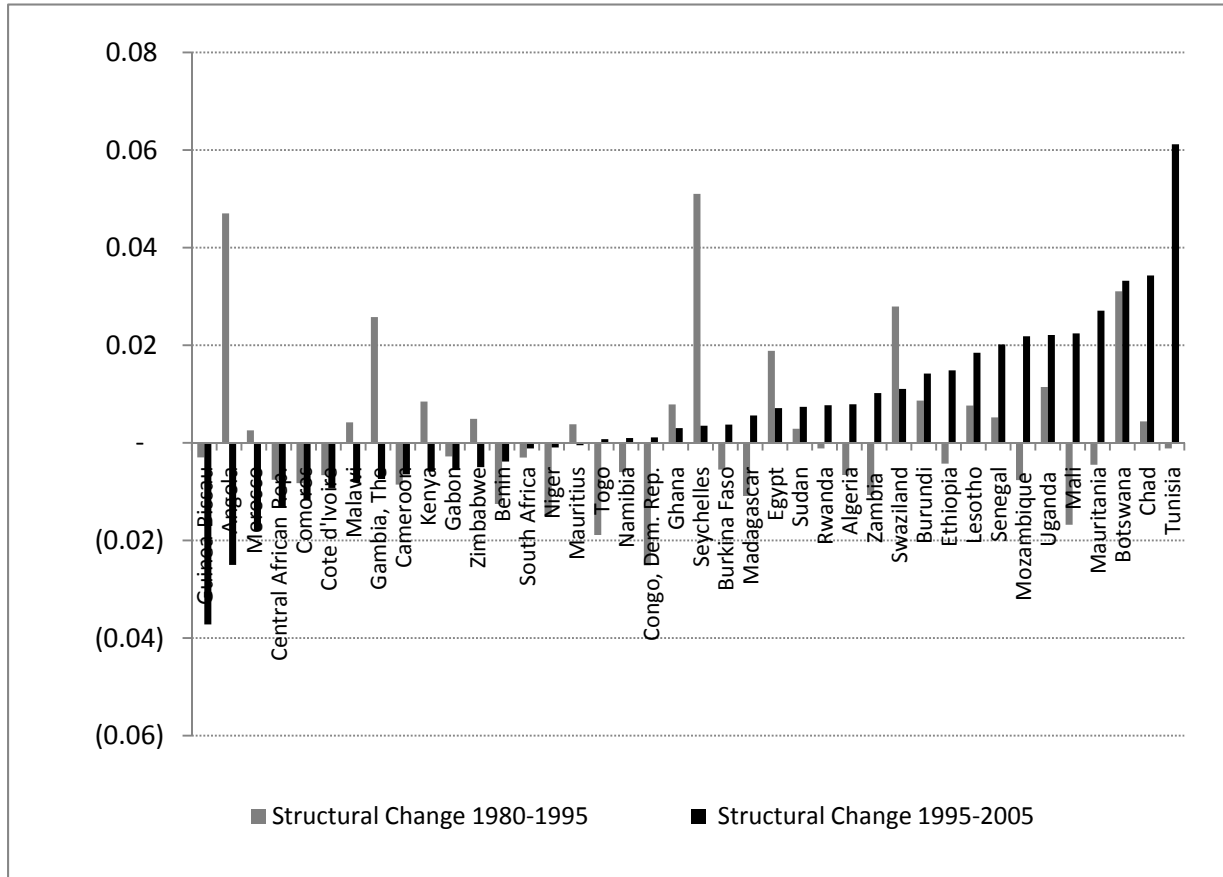
Source: WDI 2009 and FAOSTAT 2011.

Figure a4. Structural change contribution, 1995-2000



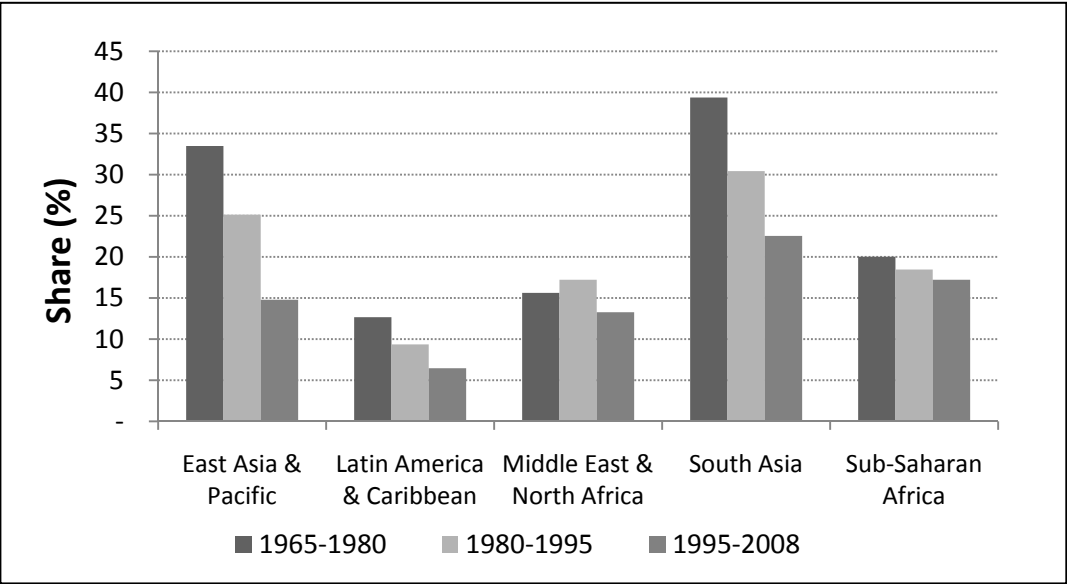
Source: WDI 2009 and FAOSTAT 2011.

Figure a5. Structural change contribution



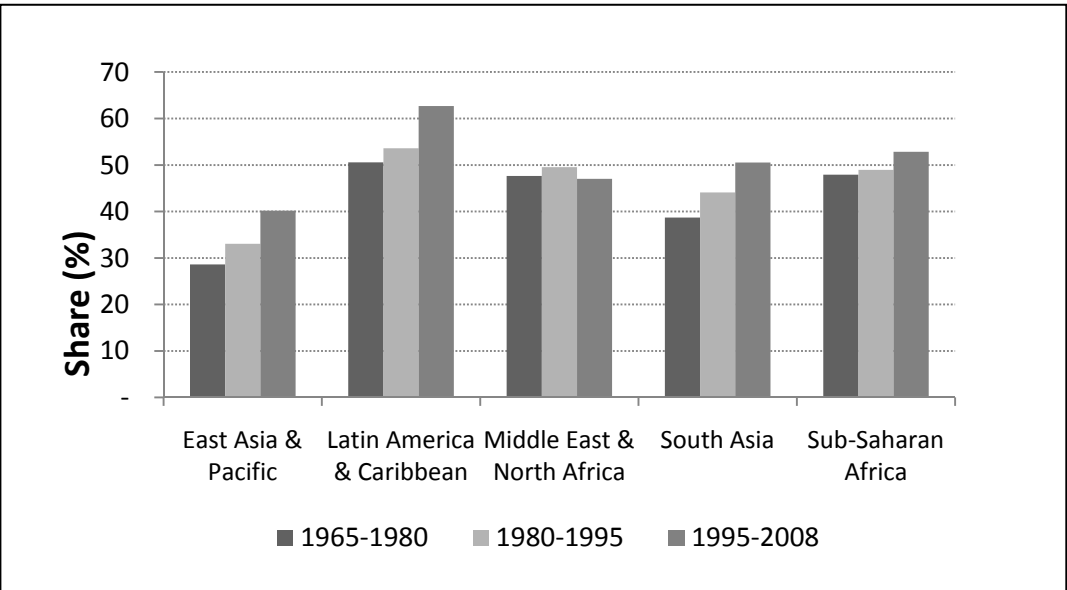
Source: WDI 2009 and FAOSTAT 2011.

Figure a6. Average share of agriculture in GDP



Source: WDI 2009.

Figure a7. Average share of services in GDP



Source: WDI 2009.

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Core literature on agriculture and structural change in Africa

Johnston B. F. and J. W. Mellor. 1961. The role of agriculture in economic development. *The American Economic Review* 51(4): 566-593.

Johnston and Mellor provide a systematic description of the many contributions of agriculture to overall economic growth, ranging from provision of increased food supply and foreign exchange to the generation of (i) fiscal resources to invest in the rest of economy and (ii) personal incomes to buy goods produced by the manufacturing sector. This is followed by a detailed analysis of the complexity of designing appropriate strategies to effectively exploit these various contributions, which arise from the fact that the contributions are not straightforward and may conflict with one another and with other goals outside agriculture. The authors define 3 phases with distinct policy priorities in order to reconcile these contradictions. Phase 1 focuses on social innovation to remove the institutional, social, and cultural constraints to improved farming practices. Phase 2 is on technological innovation through the development of systems for the provision of modern inputs and services to raise productivity and expand production based on labor-intensive and capital-saving technologies. Phase 3 focuses on emphasizing the penetration of mainstream financial services markets and the development of capital-intensive labor saving technologies in the late stages of development.

Timmer, Peter. 2009. *A world without agriculture: the structural transformation process in historical perspective*. Washington DC: The American Enterprise Institute Press.

Also in **Timmer, Peter and S. Akkus. 2008. The structural transformation as pathway from poverty: Analytics, empirics, and politics. Center for Growth and Development. Working Paper No. 150.**

Timmer describes the structural transformation pathway that is illustrated by falling shares of agriculture in output and employment, rising shares of industry and services, the migration of rural workers to urban centers, and a stabilization of population growth. He emphasizes the productivity gap and income convergence gap in the course of the transformation process. The gaps arise because at the early stages of growth acceleration, the share of agriculture in gross domestic product (GDP) falls faster than its labor share, thus leading to falling agricultural productivity and incomes compared to other sectors. At some point, as overall incomes grow, a reversal takes place and the two shares start to converge. Analyzing the data from a large sample of countries over several decades, Timmer finds that the turning point or the level of per capita income when the gap starts to narrow has been occurring at progressively later stages of the growth process, that is at more and more higher per capita income levels. Different structural transformation paths are introduced and used to analyze the experience of major developing regions.

Douglas, G., Parente, S., and R. Rogerson. 2002. The role of agriculture in development. *The American Economic Review* 92(2): 160-164.

The paper uses historical parameters derived from growth experience of the United Kingdom to study the relationship between the onset of industrialization and long-term income growth, on the

one hand, and the pace of productivity growth in agriculture, on the other. The authors link the difference in incomes and economic structure across countries to the pace of agricultural productivity growth. They further analyze data from 62 developing countries from 1960-1990 and find the following: (i) a negative relationship between agricultural productivity growth and the share of agriculture in employment; (ii) a negative relationship between the share of employment in agriculture and the ratio of agricultural to non-agricultural productivity; and (iii) a positive relationship between agricultural productivity growth and labor migration out of agriculture. They also examine the relative contributions of growth in agriculture and the non-agricultural sector as well as of structural change to overall GDP growth.

Maggie, M. and D. Rodrik. 2011. *Globalization, structural change, and productivity growth*. National Bureau of Economic Research: Working Paper Series No. 17143. Washington, DC.

Structural transformation is the movement of labor from less to more productive sectors, such that overall labor productivity rises even with constant sectoral productivity levels. After examination of inter-sectoral productivity gaps, the authors decompose the change in overall labor productivity to isolate the impact of structural change among African, Asian, and Latin American countries. The results show that the productivity gaps, which are reflective of allocative inefficiencies, are largest at lower levels of development. The decomposition results indicate that structural change has been productivity-reducing in Africa and Latin America, in particular. The opposite holds for Asian countries.

Badiane, O. and J. Ulimwengu. 2009. *The growth-poverty convergence agenda: Optimizing social expenditures to maximize their impact on agricultural labor productivity, growth, and poverty reduction in Africa*. IFPRI Discussion Paper No. 906. Washington D.C.: IFPRI.

The paper reviews past growth and poverty reduction performance among African countries, projected growth and poverty outcomes under the Africa-wide development initiative, the Comprehensive Africa Agriculture Development Programme (CAADP), and the required levels of public expenditure to finance the Programme and achieve the above outcomes. The authors stress the significant challenge arising from competing needs of raising investments in productive sectors such as agriculture to accelerate long term growth, on the one hand, and expanding the provision of social services to mitigate the short-term impact of large scale poverty, on the other. Noting the tight budget constraints facing most African countries, the authors argue for a strategy that would optimize public expenditures on social services such as to maximize their impact on labor productivity among farm households. An analytical framework is developed to support such a strategy, which would approach social services delivery from a productivity enhancing rather than an entitlement point of view.

Hausmann, R. and D. Rodrik. 2003. *Economic development as self discovery*. *Journal of Development Economics* 72: 603-633.

The authors' starting point is the fact that the process of economic development is one through which countries produce a larger share of higher value products. They show that knowing and investing in activities that an economy can produce at low cost determines the patterns of

specialization and thus the pace of structural transformation and growth. Hausmann and Rodrik then argue that there is uncertainty in finding out what products an economy will be good at producing and that it is the role of individual entrepreneurs to make that discovery. Successful entrepreneurs have to bear the costs, risks, and uncertainties associated with discovery of such products. But they fail to capture the full benefits of their discovery due to fact that other entrepreneurs can imitate their products and enter the market to compete with them. They demonstrate that unless governments adopt policies that reduce the above cost, risk, and uncertainty, the number of entrepreneurs and investments in new activities to produce higher value goods will remain low. The process of structural transformation would thereby be delayed.

Hausmann, R., Hwang, J., and D. Rodrik. 2007. What you export matters. *Journal of Economic Growth* 12: 1-25.

The authors argue that not all goods are alike in terms of their consequences for economic performance. Goods that face elastic demand in global markets so that a country can export large quantities of them without negative terms of trade effects are more associated with higher levels of productivity and incomes. The more a country produces such goods, the richer it gets. The authors compute the level of income associated with specific products by taking the weighted average of the per capita GDP of all countries exporting that good. They then calculate individual countries' productivity levels as the weighted average of income associated with all the goods exported by these countries, using as weights the shares of each good in each country's export basket. Their analysis shows that countries that develop the capacities to produce and export such goods are not only richer but are also more likely to grow faster in the future.

Hausmann, R. and B. Klinger. 2006. *Structural transformation and patterns of comparative advantage in the product space*. CID working Paper No. 128. Harvard University.

This paper expands the work by Hausmann and Rodrik (2003) on product specialization and the economic growth process. The authors argue that the capacity of a country to competitively produce new goods depends on the level and nature of assets and capabilities acquired in the production of similar goods at relatively low cost. The number and value of potential new goods that can be produced based on a given country's acquired assets and capabilities determine the scope for and speed of structural transformation in that economy. The authors introduce a measure of the degree of similarity in required capabilities between a given pair of goods, using as a proxy the probability that both goods are found in the export baskets of a same country. The total number of goods being produced by all countries at any given time defines what they call the product space. The total number of goods that require assets and capabilities that are closely related define the product density in that part of the space. The pattern of specialization of a country and the structure of the product space, determine its pace of structural transformation.

Sonobe, T. and K. Otsuka. 2006. *Cluster-based industrial development: An East Asian model*. New York: Palgrave Macmillan.

The process of formation and development of industrial clusters as part of long-term industrial development among Asian countries is analyzed. The authors propose a model of endogenous cluster-based industrialization which describes the role of geography, transactions costs,

innovation, imitation, and spillovers on the creation and expansion of industrial enterprises. They outline a strategy of industrial development which is based on the above model and encourages support for cluster formation and innovations with the combined effect of reducing transaction costs, stimulating enterprise creation, expanding production quantities, and improving product quality.

Teece, D. J.. 2000. Firm capabilities and economic development: Implications for newly industrializing economies. In Kim, L. and R. Nelson (Eds). *Technology learning and innovation: the experience of newly industrializing economies*. Cambridge: Cambridge University Press.

Teece's central message is that the firm is the engine of growth and that understanding the development process requires understanding development inside the firm. He defines two transformational challenges faced by enterprises in an industrializing economy from a developmental point of view. One challenge is how to leverage existing assets into new and/or related businesses. Another is how to learn, and how to combine and recombine assets to establish new businesses and address new markets. Teece discusses the role of firm competences and capabilities and distinguishes static and dynamic elements that determine firm growth and thus the pace of structural change and development.

Lall, S.. 2000. Technological change and industrialization in the newly industrializing Asian economies: Achievements and challenges. In Kim, L. and R. Nelson (Eds). *Technology learning and innovation: The experience of newly industrializing economies*. Cambridge: Cambridge University Press.

The importance of technological capabilities and technological learning and their role in the development of a nation's economy are the focus of this work. Lall defines national technological capabilities as "the complex of skills, experience, and efforts that allow a country's enterprises to efficiently buy, use, adapt, improve, and create technologies". Technology learning and innovation are seen as path dependent and cumulative, creating a pattern of specialization and comparative advantage which is hard to break out from. Incentives and institutions that promote investment in technology learning are therefore discussed systematically. Examples of Asian countries are used to illustrate indicators and determinants of technological competence.

Dogson, M.. 2000. Policies for science, technology, and innovation in newly industrializing economies. In Kim, L. and R. Nelson (Eds). *Technology learning and innovation: The experience of newly industrializing economies*. Cambridge: Cambridge University Press.

Creating the capacity to acquire and use science and technology developed elsewhere as well as scaling up domestic scientific research and linking it with industry are seen as two major challenges facing countries on the road to economic development. Both challenges exist simultaneously, although the first would predominate in countries at the very early stages of the industrialization process. The aim of science, technology, and innovation policies is to overcome these challenges and create conditions for structural change and growth. The paper defines each of these policies and illustrates how they have been used by Asian countries to foster economic diversification and growth.

Sonobe, T. and K. Otsuka. 2011. Cluster based industrial development: Comparative study of Asia and Africa. New York: Palgrave Macmillan.

This is an application of the endogenous industrialization theory developed by Sonobe and Otsuka (2006) to study the evolution of industrial clusters in Africa. The authors compare the development of the garment, leather, and metalwork industrial clusters in Kenya to comparable clusters in Bangladesh, China, Pakistan, and Vietnam. They find similarity in the patterns of cluster formation between the African and Asian countries. A major source of difference in cluster formation and evolution between the two regions relates to the occurrence or absence of multifaceted innovation, which is less prevalent among African clusters. The implications for enterprise profitability and growth as well as sector expansion are discussed in details.

Binswanger-Mkhize, H., A.F. McCalla, and P. Patel. 2010. Structural transformation and African agriculture. *Global Journal of Emerging Market Economies* 2(2): 113-152.

Binswanger-Mkhize, McCalla, and Patel note hopeful signs for African agricultural development despite structural transformation having not yet occurred. Hopeful signs include the recent renewed economic growth, an end to the circular decline in agricultural prices, growing food demand at the national and regional levels, and increasing agricultural commitments by African governments. The authors recommend that countries seize the moment to support economic growth through country specific sound macroeconomic policies, removal of disincentives in the agricultural sector, increased agricultural technology investments, and improved agricultural institutions and services for farmers. The importance of aligning these strategies with the ongoing Comprehensive Africa Agriculture Development Programme implementation agenda is highlighted.

Discussant comments on “Agriculture and Structural Transformation in Africa” - April 7, 2011

Peter Timmer, Thomas D. Cabot Professor of Development Studies, *Emeritus*, Harvard University

I want to thank the organizers of this Stanford symposium series on global food security issues for inviting me to be a discussant at today’s presentation by Dr. Ousmane Badiane. We have just heard a quite profound analysis of Africa’s agricultural problems, its structural history, and the possible ways forward.

The scope of the presentation was truly impressive—not only is the task one of “getting agriculture moving,” the title of Art Moshier’s influential little book (1966), but also of “getting industry moving.” Badiane understands that part of the failure of Africa’s agriculture lies with an even more depressing failure of its industrial sector. And although he covered all the ground in his allotted one hour, I think full justice to the topic requires a full course, not a lecture.

I come to this task with a reputation as a “professional Africa skeptic.” I tend to view the world through my Asian experience—I first started working in the National Planning Agency in Indonesia in April 1970, and gained nearly all of my professional understanding of the economic growth process by working in East and Southeast Asia.

My first experience in Africa was in the early 1980s, when the Kenyan parliament tabled its first “White Paper” (1981) on food policy. I was asked to discuss the paper after I had spent time in the field. There I observed the vast differences in multi-crop farming systems in Kenya from the much more uniform, rice-based farming systems with which I was familiar on Java. My conclusion at the time was that agricultural development would be more difficult in Africa, even in such favored regions as Kenya, because of the great diversity of the farming systems and the complexity of developing profitable new technologies for them.

But more troubling for me was the policy approach being followed by the government—my report argued that “you are raping your countryside.” Despite significant success in raising agricultural output between 1970 and 1980, the economic framework for agriculture was highly exploitive and urban oriented, especially because of macroeconomic policies and marketing regulations. It was hard to imagine how the country could continue to develop its smallholder agriculture with such an anti-rural bias.

As the 1980s played out, this concern seemed amply justified. Africa went through a series of economic crises and more-or-less forced structural adjustment programs imposed by the donor community, and agricultural productivity fell in many countries. At the same time, Asia struggled with low commodity prices but continued to invest in its smallholder agriculture, especially rice and the labor-intensive export crops such as rubber, coffee, palm oil and cocoa. Over the decade, agricultural productivity continued to rise, the structural transformation was quite rapid, and poverty was significantly lower in Asia in 1990 than it was in 1980.

By the end of the 1980s and early 1990s, it became fashionable to seek “lessons from Asia for Africa.” USAID sponsored a series of conferences on the topic, with assistance from Winrock

International (Seckler 1993). As a commentator in that series, I laid out three major concerns for Africa's agricultural development from the perspective of Asia's historical record.

First, and somewhat paradoxically, wages in Africa were not low enough to compete with Asian workers, in either labor-intensive manufactured goods, or in agricultural export crops. It was hard to see how Africa could develop a dynamic *urban* economy that would help pull up labor productivity in rural areas as well. And this was before the hundreds of millions of surplus workers in China entered the world labor market as additional competitors.

Second, Africa had completely lost the capacity to do state of the art agricultural research on either food crops or export crops. Asia was making rapid progress on both. As a consequence, Africa was simply no longer competitive in world markets for many of its agricultural products—especially palm oil and rubber, but coffee and cocoa were also threatened by new Asian producers.

Third, the serious governance issues that were apparent in Kenya in 1980 showed no signs of being resolved. If anything, the anti-rural bias was becoming stronger, reinforced by the availability of very cheap food in world markets to provision the major coastal cities. Much of this imported food was made even cheaper through aggressive food aid policies pushed by the OECD countries. It was clear to me that easy availability of food aid had a clear disincentive impact on the *policy environment for agriculture*, even if the econometric evidence says that it had little short run impact on local market prices and incentives for farmers.

So, question number one following Dr. Badiane's lecture: Has the Africa-Asia divergence begun to close?

My second question follows up on the implications of the startling finding that the structural transformation in Africa has been "backward," that is, it has lowered labor productivity rather than raising it. Migration of labor has been from relatively high productivity farming activities to very low productivity jobs in the informal rural and urban service sectors.

This "push" of labor out of agriculture into the service sector has important implications for the nature of the development strategy that should be pursued. In the classic "labor surplus" model developed by W. Arthur Lewis (1954), and the basis for much of Asia's strategic approach, low productivity ("surplus") labor is pulled out of agriculture and employed at higher productivity in a rapidly growing industrial sector. Wages are low in both sectors until the surplus labor runs out, and these low wages permit the industrial sector to make large profits that are reinvested in expanding factory capacity, which leads to more industrial employment.

If the Badiane story is right, the surplus labor in Africa now appears to be in the informal service sector. A strategy of raising labor productivity on farms, thus freeing up food and labor for the industrial sector, will not have the same impact it had in Asia. Raising productivity in the informal sector would seem to be a much trickier task, with no clear technological innovations available that would match the Green Revolution in its broad-scale and general equilibrium impact. These concerns are similar to those raised by the RuralStruc research program, jointly hosted by the World Bank and the French development agency (World Bank 2011).

The potential importance of this informal service sector thus highlights Dr. Badiane's concern for the role of social services in poverty alleviation. If social services focus on safety net

provisions based on entitlement mechanisms, the resources will not be available for the kind of social services needed in the health and education sectors that will build human capital and the potential productivity of workers in the informal service economy.

My third question grows out of Dr. Badiane's plea for "evidence-based" policy reforms. Although I understand the plea in terms of rejecting the traditional interest-group based approach to policies, or ideological approaches, I think it is very important to clarify what kind of evidence can be brought to bear in policy analysis.

In particular, within the economic development community in the last decade, "evidence-based" has come to mean evidence from randomized controlled experiments, where selection bias in project and program evaluations can be eliminated, thus providing accurate assessments of how well specific interventions actually work in a "with versus without" context instead of a "before and after" evaluation.

The problem is that randomized trials simply cannot be used for the key policy decisions. How should exchange rate policy be managed? What border controls on food trade are desirable? What investments need to be made by sector? Within each sector? To answer these kinds of policy questions, the only resort is to comparative policy analysis and good economic history. Virtually no Ph.D. programs in economics, or even in development economics, teach these skills.

My final question has to do with what happens if Africa does begin a "successful" structural transformation by getting both its agricultural and industrial sectors "moving." The Asian experience during this process has been a uniform widening of the gap in labor productivity between the industrial (and modern service) sectors and labor productivity in agriculture, even as that productivity is actually increasing.

A widening productivity gap had (and has) profound implications for agricultural price policy in Asia (Timmer 2009). Despite rising wages in rural economies, and rapidly falling poverty, the widening *gap* put enormous political pressure on policymakers to intervene on behalf of an agricultural economy that was falling behind in relative terms. The advent of democratic governments actually exacerbates this pressure, even if such governments are the only hope for reduced corruption and better economic governance more broadly. So the question is, how will Africa cope with these new pressures?

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<http://go.worldbank.org/3RRZVRZX90> (accessed April 14, 2011).