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JOBLESS ECONOMIC GROWTH:
LESSONS FROM AFRICA

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Jobless Economic Growth: Lessons from Africa

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Abstract

Following the 2008-2009 global financial crisis, economic growth has eluded many countries. Africa, on the other hand, is projected to host seven of the ten fastest growing economies in the period from 2011-2012. It has long been understood that high economic growth is a prerequisite for job creation, causing analysts to worry about the projected low global growth scenario and its implications for economies that have either high or stubborn levels of unemployment. However, long run comparisons across Africa have shown differential performance, with some countries having better outcomes in terms of job creating economic growth. Furthermore, many African countries were long trapped in low growth scenarios yet managed to create jobs. Such patterns have led many critics to question why high economic growth rates have not led to job creation in some countries while they have in others. Critics also question whether the high economic growth rates projected for Africa will lead to job creation in the coming years. In this paper we investigate the performance of African economies with respect to job creation and its relation to economic growth. We submit that the main drivers, among others, appear to be the ***creative use of the agricultural sector,*** the success in growing market size, and ***the level of innovation in the country.*** The insights provide some lessons for countries seeking to speed up job creation under low growth scenarios as well as those seeking to ensure that high economic growth scenarios maximize the potential for job creation.

Key words: Africa, agricultural sector, economic growth, innovation, job creation

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Introduction

Africa's economy has undergone fundamental structural change since most of its countries got independence in the 1960's, with most of the change occurring during the thirty years between 1980 and 2010. This period has seen the goods sector dominate the export markets attaining a level of US$568 billion in current terms in 2008, compared to US$104 billion for services, and US$31 billion for agriculture (AfDB, 2012; also World Bank, 2011a).

The pattern of growth of exports by category is another factor of interest when looking at the change in the structure of Africa's economy. During the period 1980 to 2008, agricultural exports grew by 4.29% per year. But this growth, impressive as it is, was dwarfed by the 12.4% per year growth of goods exports and 20.24% growth per year in services exports. Yet the export of its human capital, which can be measured by the level of remittances flowing into the countries by the diaspora, grew by a whopping 21.62% during the period under consideration, surpassing all the other categories in annual growth in the flows from exports.

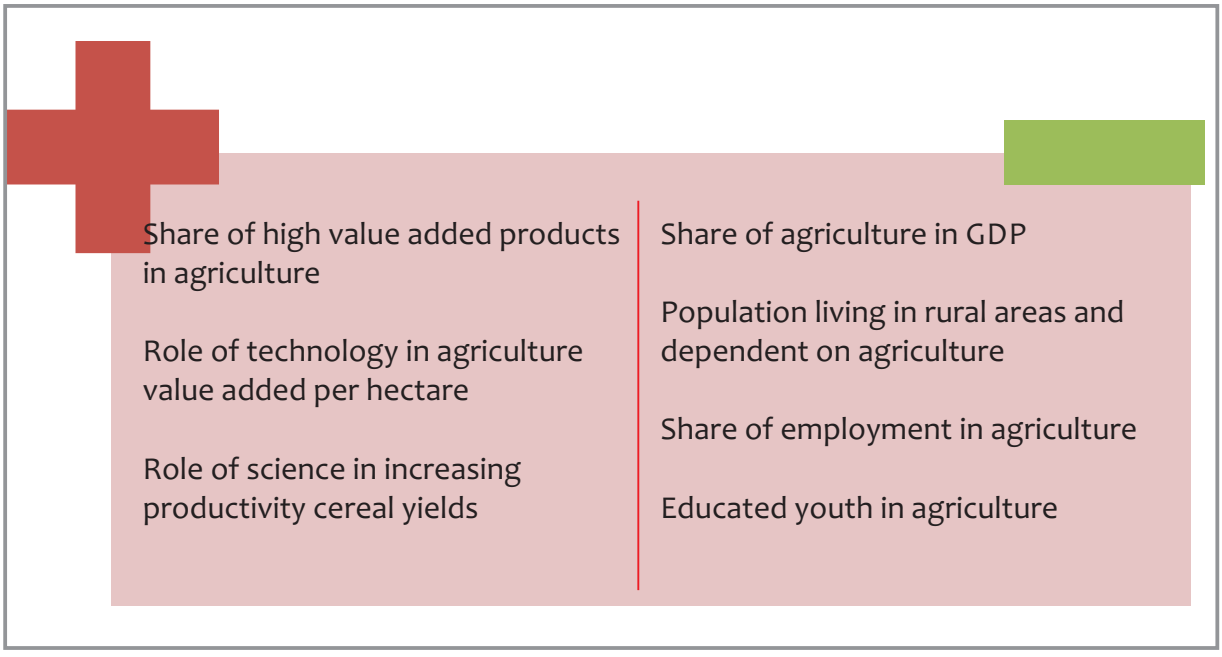
Despite these changes in the structure of the economy, Africa, remains a rural, agriculture-based society, and will need to look to the agriculture sector to generate the bulk of the needed employment in the coming years. Agricultural labor comprised 59% of the total labor force in sub-Saharan Africa (FAO, 2011), with agriculture contributing 13% of value added to GDP in 2009, with $322 value added per worker in agriculture (World Bank, 2011b). Enhancing the productive capacity and consequently the economic returns of agriculture has crucial effects on poverty and job creation in three key ways. It increases the productivity and incomes of the majority of Africa's populace, who work primarily in agriculture. It engenders employment opportunities with related industries/enterprises. It also generates important spillovers to the rest of the economy. Just like South Asia, a region that has used the agricultural sector to tackle poverty, Africa will thus need to seek ways to improve the performance of this critical sector, even as it seeks to join East Asia and Latin America on the path to increasing its footprint in manufactured and service exports.

The agricultural sector has had mixed performance over the last thirty years. On the plus side for agriculture, is the sheer size of the sector, employing more than half a billion people currently. This is a potential force to be reckoned with, as over the next decade the literacy

rate of Africa's agricultural population due to the focus on education for all is going to massively improve. Also on the plus side is the importance of agriculture for Africa's development, which has increased over the last ten years; the population employed in the sector has been growing at a steady 1.7% per year from 319 million in 1980 to 505 million in 2008. Agriculture, thus, clearly provides a direct source of employment and livelihood for a sizeable proportion of the society, contributing to gross domestic production and essential for creating value as well as wealth (Chuhan-Pole and Angwafo, 2011; World Bank, 2008). There is therefore a general understanding and expectation that the development and job creation prospects in Africa are inexplicably linked to the performance of the agricultural sector.

On the minus side, the non-agriculture population grew faster by 6.97% per year from 163 million in 1980 to 481 million in 2008, and agriculture did not attract educated youth (Figure 1).

Figure 1: Africa's Agriculture Sector: Pluses and Minuses



Source: Authors' analysis

The population dynamics are not all a plus; while Africa remains largely dependent on agriculture, with the share of the population engaged in agriculture Africa-wide at 51% in 2008, this share has been declining from 66% in 1980. However, the growth in the goods and services sectors could bode well for Africa in creating value-adding activities which are also of great interest to young people. Agribusiness has done well in Africa, having 43 companies by size in the top 500 largest companies in Africa. Beverage companies, many of which use agricultural inputs also have 16 in the top 500 largest companies (see Figure 2). The job potential in agribusiness is very promising.

Figure 2: Top 500 companies by size

<10 companies in the sector Africa-wide	10-20 companies in the sector Africa-wide	>30 companies in the sector Africa-wide
ICT (9) Tourism (8) Real Estate (8) Refineries (8) Engineering (5) Media, Water (4) Paper, Postal Services (3) Cosmetic, Dairy, Finance, Health, Packaging (2) Education, Human Resources (1)	Electrity (27) Insurance (19) Petroleum (18) Beverages (16) Chemicals (11) Pharmaceuticals (10)	Petroleum Services (31) Agribusiness (43) Telecoms (43) Diversified (32) Mining (31) Retail (30) Transport (25) Automobile (21) Construction (20)

Source: Constructed using data taken from The Africa Report 2, 2012

As economies grow, the footprint of agriculture, as measured by the share of agriculture to GDP, declines (Meijerink and Roza, 2007). Consider the impressive performance of the goods and services sector, as can be seen by their dominance not only in exports but also in the top 500 largest companies in Africa and the shifts from agriculture to non-agricultural employment in the last thirty years. The share of agriculture in the economy has declined but Africa remains largely an agricultural economy. The agriculture sector is still employing the majority of the labor force, and the population remains largely rural, offering the best prospects for future growth as the sector has underperformed relative to its potential, especially when looking at the potential in the whole value chain. The share of high value added products in agriculture which has increased, could swell even more as farmers get better access to information and as the use of science and technology contributes further to agriculture value added and productivity.

There have been competitive policy recommendations for Africa's development, particularly from the World Bank. One set of policies supports the focus on agglomeration economies and the role of intermediate goods and services as key drivers of economic growth (World Bank, 2009). Yet another set of policies (World Bank, 2008) support the need for focus on the agriculture sector and rural development as a key driver of poverty

reduction and inclusive growth. The policy mix has not helped countries transform the agriculture sector as Africa has a large number of countries with very low to low capacity (Table 1). Many of them have not invested enough in the training and innovation as well as research needed to transform the agriculture sector and guarantee food security, or even to generate skilled jobs in the sector (ACBF, 2012).

Table 1: The lowest rated countries by capacity to transform agriculture and guarantee food security

Country	ACI Agric	Country	ACI Agric
Lesotho	53.8	Guinea	42.4
South Africa	53.7	Angola	41.7
Namibia	51.5	Botswana	40.5
Congo, Rep	49.9	Mauritania	39.1
Liberia	48.9	CAR	39.1
Mauritius	47.9	Congo, DRC	36.5
Djibouti	45.9	Burundi	34.9
Gabon	45.4	Côte d'Ivoire	33.2
Mozambique	45.3		

All countries have weak component ranking on training and innovation. Burundi needs specific attention to information systems. Djibouti and Congo, DRC need Special attention to the role of the Private Sector. Swaziland, Madagascar, Tanzania, South Africa, Namibia and Mozambique need improvement in Agriculture Strategy.

Source: Computed from Africa Capacity Indicators Report 2012 (ACBF, 2012)

The World Development Report of 2009 provided recommendations for economic growth, job creation and poverty reduction by seeking "efficient and inclusive urbanization" as a way to tackle the spatial imbalances in economic development around the world, including Africa (World Bank, 2009). Africa is fast urbanizing and could advance from better functioning land markets at the local level, migration from rural to urban areas, and improved international trade, especially trade in intermediate goods. The differentiated pattern by which countries have benefited from these policy prescriptions calls for pause and reassessment of the recommended policies. More particularly, the reason for the civil unrest and revolutions in North Africa have put front and center the question of whether such structural changes were positive for Africa, as they took place without the requisite job creation, particularly in North Africa.

Consider that the population in North Africa engaged in agriculture in 2008 was 25%, a figure that is less than half that for Africa as a whole. Exports from agriculture in North Africa grew

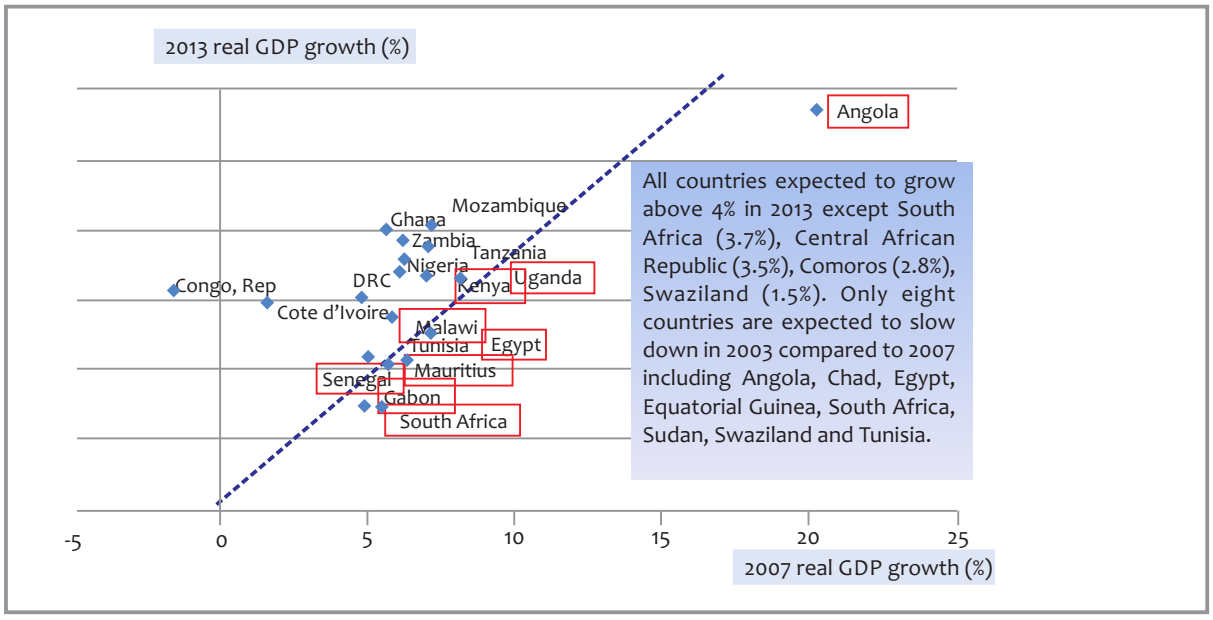
by 8.9% per year between 1980 and 2008 compared to 1.7% per year for the rest of Africa. Yet, youth unemployment, and especially of the educated youth has been cited as one of the main reasons for the uprisings in North Africa. All these conflicting evidences challenge the traditional model for approaching economic development and particularly question the role of agriculture and its attractiveness to the educated and skilled young people.

In this paper, we start from the endogenous development model formulation by Romer (1994) to compare the performance of African countries under different policy choices, including how the sophistication of the agriculture sector can increase its attractiveness to educated youth as a sector for employment. Building on the work of Aghion et al (1998) we investigate how modern innovations in the agriculture sector—such as use of mobile communication platforms to inform farmers of market prices or cold-chain logistics to support high value-added exports from perishable agriculture products, can be further enablers for ensuring the high levels of projected economic growth in the coming years in Africa can translate into jobs for the burgeoning number of young people entering the job market. We further argue, building on the work of Pieterse (2010) that the best way to generate jobs for an economy that is highly dependent on agriculture is to follow the "modernization of tradition" where local knowledge is used to generate change and advancement of a society from within. We draw on analysis using data from the African Development Indicators as well as experience from rural India on how to address the challenge of jobless growth (Novotný and Ramachandran, 2010) to uncover the dynamics driving employment creation and economic growth on the continent. Finally, we draw on the work done by Meijerink and Roza (2007) on the role of agriculture in economic development and investigate particularly the job creating potential of the sector and the factors that need to be in place for agriculture to really drive job creating economic growth.

Economic Growth and Employment

Following the 2008-2009 global financial crisis, economic growth has eluded many countries. Africa, on the other hand, is projected to host seven of the ten fastest growing economies in the period from 2011-2012 and even towards 2013. As Robin Bew, Chief Economist of the Economist Intelligence Unit in a recent (2011) article titled Africa pulls ahead notes, as "global economic conditions dipped over the course of 2011, sub-Saharan Africa emerged as the fastest-growing region in the world". In fact, economic growth across Africa before the global financial crisis of 2008 was certainly healthy as can be seen in Figure 3.

Figure 3: Growth Patterns in Africa in 2007 and 2013

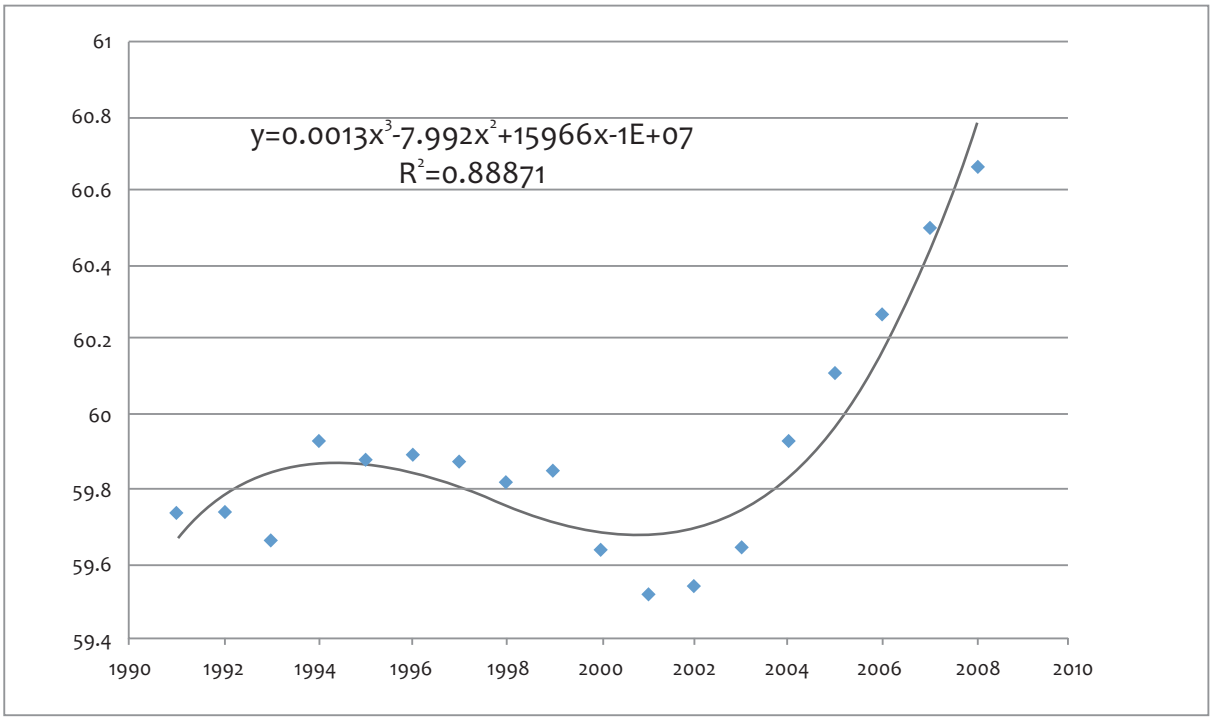


Source: Calculated using data from World Bank and Stanbic Bank

Post financial crisis, the fastest growing countries in Africa following in 2011 according to the World Bank (2012) were Ghana (13.6%), Rwanda (8.8%), Eritrea (8.2%), Ethiopia (7.2%), Mozambique (7.4%), Nigeria (7.0%), Angola (7.0%), Congo, DR (6.5%), Zambia (6.8%), Botswana (6.8%), and Tanzania (6.4%). Projections for 2013 indicate that one third of African countries are expected to grow by more than 6%, another third between 4.7% and 6%, and the remaining third at less than 4.7%. Only four countries are expected to grow by less than 4%, including South Africa (3.7%), Central African Republic (3.5%), Comoros (2.8%), and Swaziland (1.5%). Only eight countries are expected to slow down in 2013 compared to 2007 - i.e. Angola, Chad, Egypt, Equatorial Guinea, South Africa, Sudan, Swaziland, and Tunisia. The projected growth levels are very healthy for Africa as whole and expectations are high that the African renaissance is really taking place this time. The performance of the agriculture sector in buffering Africa from the risks in the global economy bears well for the future. Similarly, its potential to generate inter-regional trade and jobs for the growing number of young people is also high.

The good growth performance of Africa over the decade from 2000 to 2010 has resulted in a burgeoning middle class according to the African Development Bank (AfDB, 2011). However, the same report warns that the vast majority of the middle class is fragile and can fall into poverty when economic prospects change. A key factor to remaining in the middle class is the ability to have a job or to be self-employed in an economic activity that is income generating. So the ability of Africa to continue to generate and sustain employment for its growing population is an important factor for securing the status of the middle class and indeed reducing poverty.

Figure 4: Employment to population Ration, 15+, Total (%)



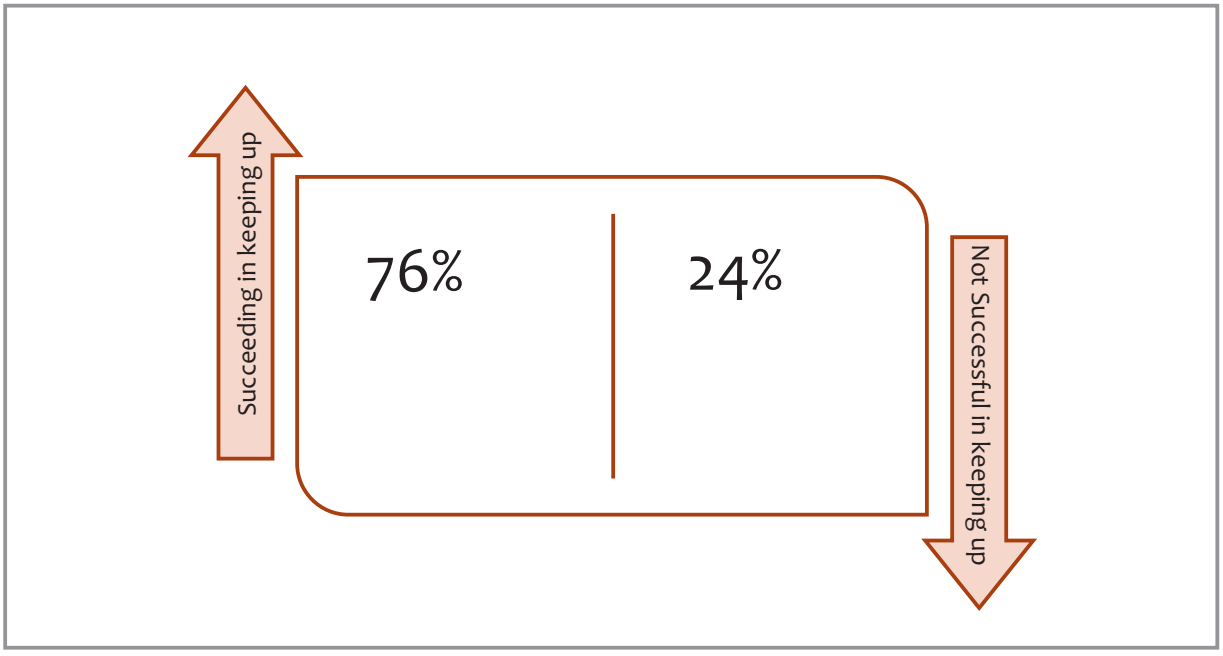
Source: Constructed using The Africa Development Report (World Bank, 2011b)

It has long been believed that high economic growth is a prerequisite for job creation causing African policymakers to worry about the projected low global growth scenario and its implications for economies that have either high or stubborn levels of unemployment. Africa has had a cyclic performance with respect to unemployment in the last 20 years, as can be seen in the employment to population ratio of people aged 15 or more from the period 1990-2010. The continent was able to improve the ratio in the early 1990's but lost the capacity to generate sufficient jobs to keep up with population growth in the late 1990's and early 2000's. The performance over the last eight years has been highly favorable with an increase in the ratio of employment to population aged 15 or more. However, long run comparisons across Africa have shown differential performance, with some countries having better outcomes in terms of job creating economic growth. What have been the main patterns of Africa's performance in the last twenty years and what does it tell us about endogenous development theory?

The first pattern is the differential performance of countries in creating jobs over a twenty year period. Using data from the African Development Indicators, we observe that the majority of African countries (76%) were successfully creating jobs as their employment to population ratio for ages 15 and above is greater than 50%. Seven countries did particularly well, including Ethiopia (80.6%), Guinea (81.2), Burkina Faso (81.9%), Uganda (83%),

Madagascar (83.3%), and Burundi (84.2%). All of the countries in North Africa did poorly in this indicator, including Tunisia (41%), Egypt (43.2%), Morocco (46.1%), Mauritania (47.2%), Sudan (47.3%), Algeria (49.4%), and Libya (48.6%). However, so did some countries in sub-Saharan Africa including South Africa (41.1%), Namibia (42.9%), Botswana (46%), Mali (47%), and Swaziland (50.4%). What is interesting about the countries that did poorly in sustaining job creation in sub-Saharan Africa is that they are all highly dependent on the global economy for their export earnings.

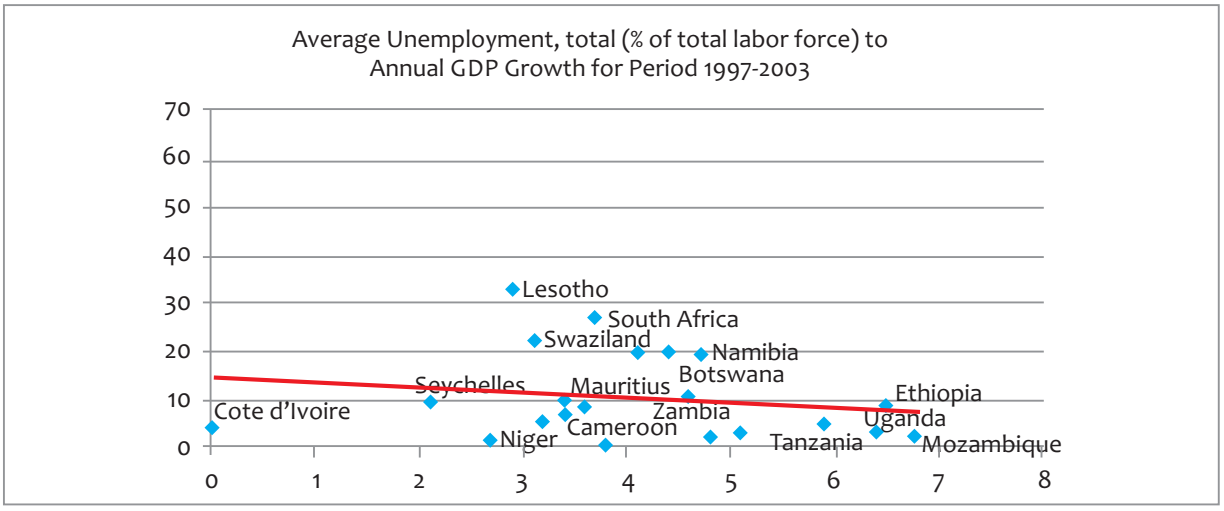
Figure 5: Pattern of Success in Keeping up with Job Demands from Population Growth



Source: Authors' analysis

The second visible pattern is the differential job-creating ability of dissimilar types of economies. Economies more dependent on agriculture, such as Ethiopia, Tanzania and Uganda had high economic growth coincide with low unemployment, while commodity dependent economies such as Botswana, Lesotho and South Africa had high economic growth which was jobless as their rates of unemployment were high despite achieving good GDP growth (Figure 6). Such a pattern is consistent with the local knowledge argument by Pieterse (2010) which suggests that modernization of a sector using local skills and knowledge would contribute to change and advancement from within.

Figure 6: Africa's Differential Performance, despite a general decline in unemployed (%) with annual increase in GDP growth per year (%)



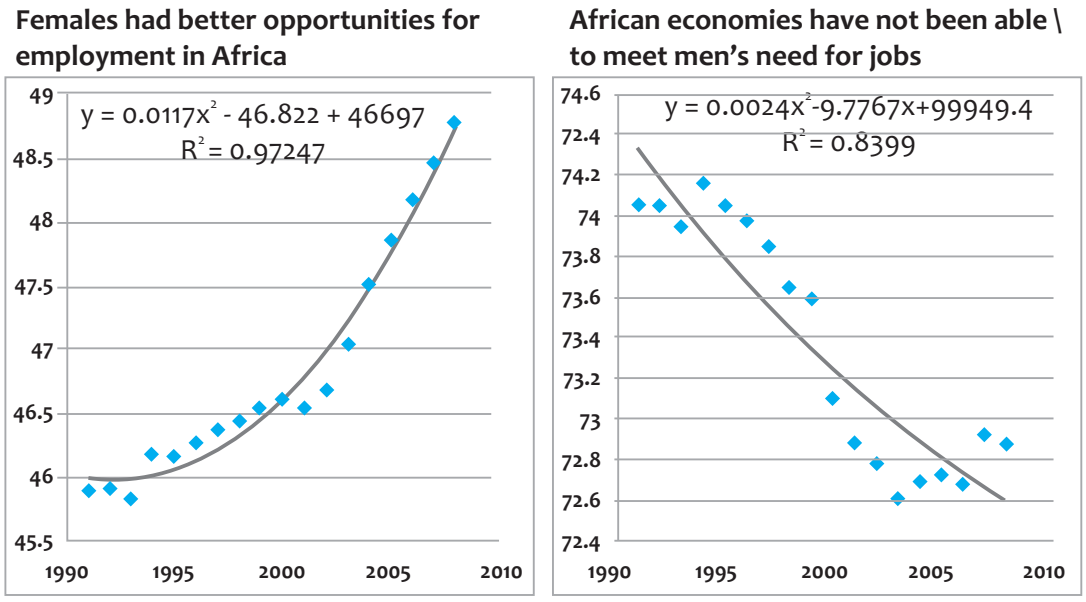
Source: Authors' analysis

A couple of countries have been trapped in a low level equilibrium, mostly because of conflict, notably, Côte d'Ivoire and Niger. Some countries that depend exceedingly on the global economic prospects like Seychelles with tourism and Mauritius with exports of goods and services have managed to keep unemployment in reasonable levels, if higher than the agricultural dependent countries like Tanzania and Uganda.

The third visible factor is the gender dimension of job creation across Africa. A number of studies have looked at the differential access to employment by men and women. Arbache et al (2010) have done an analysis of gender disparities in Africa's labor market, indicating that economic context and conditions matter for the effect of gender on access to jobs. They show in particular that in countries where male employment is relatively high, the employment prospects for women were relatively favorable, and the level of gender disparities in employment is low.

We use data from the last twenty years Africa wide to see whether there is any difference in the employment to population ratio for men aged 15 or more compared to women. Analysis indicates that there has been an important difference between the employment opportunities for men compared to women as measured by this ratio. African economies have been able to provide better opportunities for women than men in the last 20 years by a factor of five (Figure 7). These results, however, must be interpreted with caution as Arbache et al (2010) warn us that for the case of Africa, and in particular in trying to understand the gender disparities in access to employment, it is important to look at underemployment than unemployment.

Figure 7: Gender Dimensions of Employment to Population Ration, 15 (%)



Source: Constructed using the Africa Development Indicators (World Bank, 2011a)

The effect is even more visible when looking at the change in the employment to population ratio over time as shown in Table 2 below. The table compares the correlation coefficients from a linear regression of the employment to population ratio for people aged 15 and above with respect to time in years. The coefficient is positive when looking at the total employment to population ratio indicating that Africa is winning the game of creating jobs over time, with 3.4 employed for every 100 people aged 15 or more. However, the continent is not doing as well when it comes to employment for men, where coefficient is negative.

On average, in the last decade, Africa has been carrying a deficit in the employment of men aged over 15, with 10 fewer jobs for every 100 men in the labor market. In the case of women, we see that the coefficient is positive; indicating that women over 15 years of age in Africa have had more access to employment, with the continent creating in a given year 16 jobs for every 100 women aged 15 or more. So while there is an employment deficit overall, when looking at the employment to population ratio in Africa, the situation is more severe for men than women.

Table 2: Employment to Population Ratio for 15+ (%), total, male, and female

Indicator	Coefficient	R-Squared
Employment to population ratio, 15+ total (%)	+0.034	0.34
Employment to population ratio, 15+ male (%)	-0.102	0.83
Employment to population ratio, 15+ female (%)	+0.160	0.87

Source: Constructed using the Africa Development Indicators (World Bank, 2011a)

There is a fourth factor that is at play which is the dependency on wage and salaried employment, especially by women. An assessment of the access to wage and salaried work is important in order to determine the ability of the continent to create not only employment for men and women, but to do so in ways that increase incomes and decrease poverty. This is important as Arbache et al (2010) show that earnings were correlated to education and whether employment is formal or informal. Workers in Africa with a tertiary level of education earned on average over eight times more than individuals with no education, and four times more than individuals with only primary education.

It has long been observed that the informal sector is an important safety net for job creation, especially for young people and women. Countries in Africa that have high employment to population ratios (which means they are keeping up with the job demands of a growing population) have lower dependency by women on wage and salaried work, as can be seen in Table 3. Countries would do well in offering opportunities for self-employment, especially to women, in order to better handle the issue of unemployment and to ensure that economic growth delivers on job creation.

Table 3: Employment to Population Ratio 15+ total (%) versus wage and salaried female workers

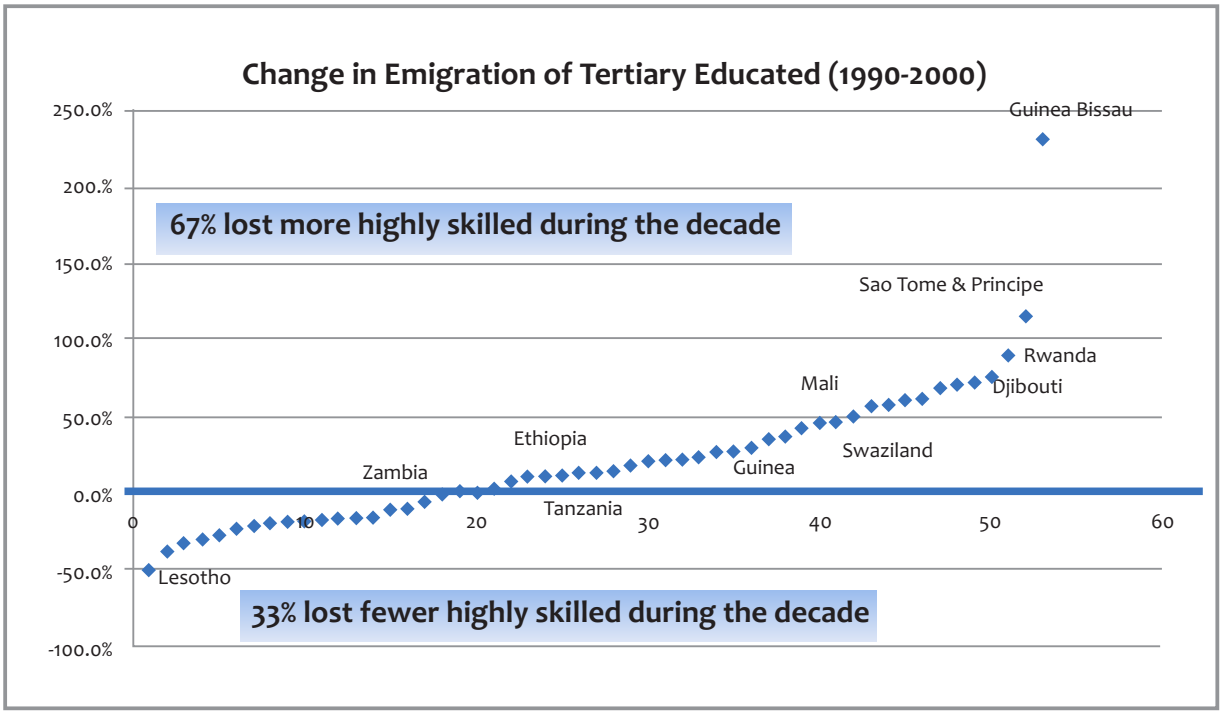
Country	Wage and salaried workers, female (%)	Employment to Population ratio, 15+ total %
Sierra Leone	3.7	64.8
Tanzania	6.1	78.0
Uganda	7.5	83.0
Cameroon	8.7	59.1
Zambia	9.0	61.2
Madagascar	10.8	83.3
Mali	11.4	47.0
Zimbabwe	23.1	64.9
Lesotho	29.9	54.1
Cape Verde	33.0	55.7
Morocco	34.1	46.1
Ethiopia	42.7	80.6
Algeria	49.8	49.4
Egypt	53.7	43.2
Botswana	53.7	43.2
Namibia	80.3	42.9
South Africa	80.8	41.1
Mauritius	83.2	47.2

Source: Constructed using the Africa Development Indicators (World Bank, 2011a)

This result is supported when looking at the number of African countries that were long trapped in low growth scenarios yet managed to create jobs, such as Tanzania and Uganda, as they have very low dependency of women on wage and salaried jobs.

The fifth factor to consider has to do with whether an economy has been able to retain its highly skilled people, who are critical in creating the space for job creation for others, by innovating in the work place, creating their own companies that can employ others, or contributing to higher economic growth due to their high skills being used in policy formulation and public sector service delivery. An assessment of emigration of tertiary educated people as a share of the total tertiary educated population is a good variable to measure this effect. The African Development Indicators provide such data for 54 countries between the period 1990 and 2000. During this decade 67% of African countries lost more of their tertiary educated people than at the beginning of the decade in 1990 (Figure 8). The countries with the largest brain drain during the period are Guinea Bissau (231% increase between 1990 and 2000) and Sao Tome and Principe (115% increase between 1990 and 2000). Countries that succeeded in slowing down brain drain during this decade are Lesotho (-49.7%) and South Africa (-38.2%). South Africa succeeded in decreasing unemployment from very high levels in the outer years; for example it managed to bring unemployment down from 26% in 2006 to 24% in 2009, even though it still remained high.

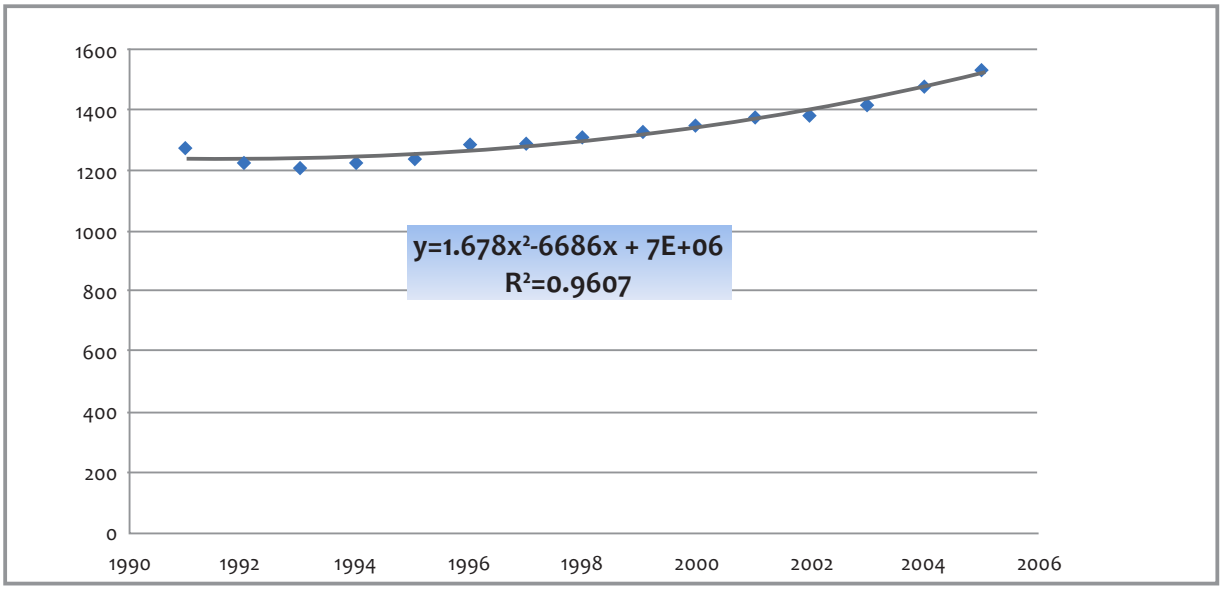
Figure 8: The majority of African Countries lost more educated people in the decade from 1990-2000 which was so crucial for its development



Source: Constructed using the Africa Development Indicators (World Bank, 2011a)

Focusing on the loss of skilled people and its relationship to unemployment is important because of the link it has not only to economic growth but to the value to GDP. Using data from African countries we see that initially, in the early 1990's, the contribution of each additionally employed person to GDP was negative. However, the GDP per person employed then grew exponentially in the outer years. The ability to retain skilled people who can create more jobs is important for the cluster economies and effects that raise the GDP per person employed (Figure 9). Countries should aim to retain as many as possible of its educated people so they can get to this higher order of contribution to the economy.

Figure 9: GDP per person employed (constant 1990 ppp $)



Source: Constructed using the Africa Development Indicators (World Bank, 2011a)

Such patterns have lead many critics to ask why high economic growth rates have not led to job creation in some countries while they have in others. Critics also question whether the high economic growth rates projected for Africa will lead to job creation in the coming years.

In the following sections of the paper we investigate the performance of African economies with respect to job creation. We submit that the main drivers, among others, appear to be the creative use of the agricultural sector, the success in growing market size, and the level of innovation in the country. The insights provide some lessons for countries seeking to speed up job creation under low growth scenarios as well as those seeking to ensure that high economic growth scenarios maximize the potential for job creation.

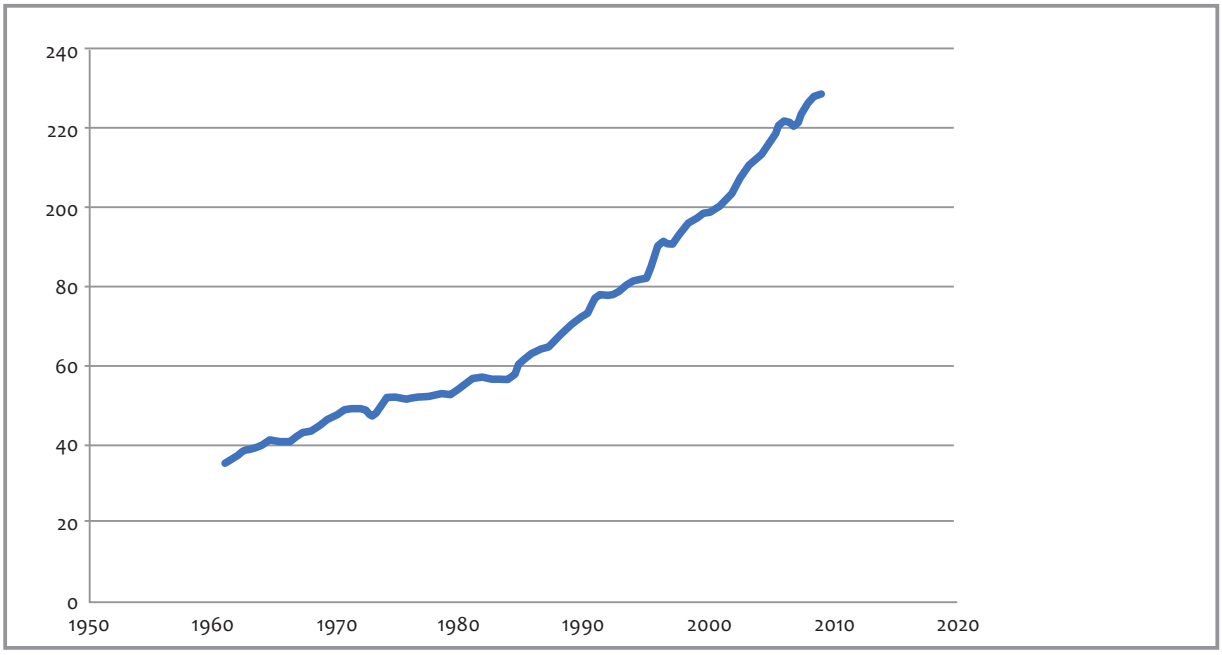
Job Creation in the Agricultural Sector: What matters?

Most African countries are dependent on the agricultural sector for economic growth and job creation. Three factors should matter in how important the sector is to employment. The first is the size of the sector and its ability to absorb a large population seeking opportunities

for engagement in the sector. The second important factor is how fast the sector is growing, and whether it can absorb the growing population and its needs for employment. The third is the sophistication level of the sector and whether it is attractive particularly to the educated young people.

We use the agriculture production index over time, which measures the gross production over time to see what opportunities have been provided for jobs in agriculture in Africa. The index has been steadily increasing between 1990 and 2010, indicating that there have been many opportunities for jobs in this sector (see Figure 10).

Figure 10: Agriculture production index (gross, 1999-2001 = 100)

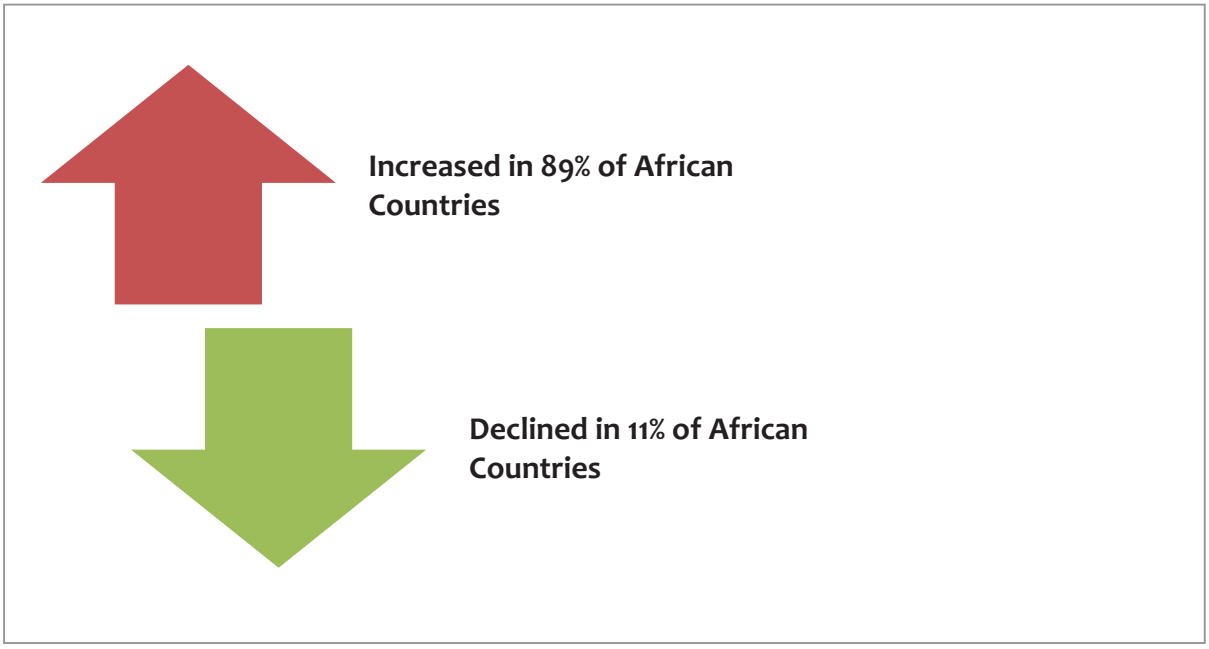


Source: Constructed using the Africa Development Indicators (World Bank, 2011a)

In Fig. 10, we note a significant change in the agriculture production index around 1985—this is mainly due to the severe drought in the Sahel between 1983 and 1985. The drought was so severe that a country like Mauritania had food aid accounting for 61% of the available supply of grain (Library of Congress, 1988). Mauritania and many other countries in the Sahel also depend on livestock, particularly during the drought season. This may explain why the overall agriculture production index is so similar to the livestock production index. In drought-prone countries, the livestock may predominate in the overall index. In livestock dependent countries, issues of land tenure are particularly pressing and binding for the agricultural sector to solve the challenge of jobless economic growth.

The production index improved in 47 out of 53 African countries, representing 89% of all countries, so there were good prospects for absorbing the growing population of Africa during this period (Figure 11).

Figure 11: Patterns in agriculture production index, (gross, 1999-2001 = 100)



Source: Constructed using The Africa Development Report (World Bank, 2011b)

The performance across countries was highly differentiated as can be seen in Figure 10 that shows the index in 2009. The top five performing countries in terms of increasing production in the decade since the 1999-2001 period and 2009 include Sierra Leone, Angola, Niger, Algeria, and Ghana while the bottom five include the Seychelles, Botswana, Lesotho, Equatorial Guinea and Congo, DR. There were also countries that showed stagnation including Namibia, Gabon, Somalia, Mauritius and Swaziland (Figure 12).

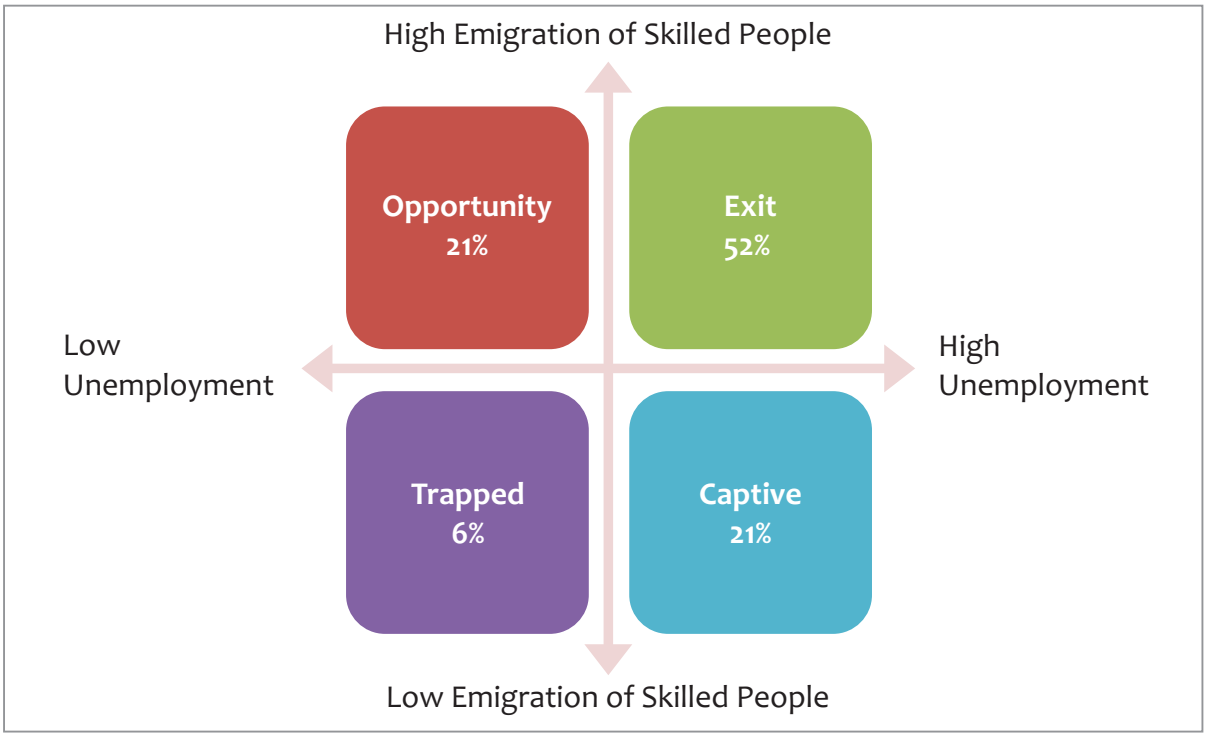
Figure 12: Agriculture Production Index (Gross, 1999-2001=100)

Top 5	Little Change	Bottom 5
Sierra Leone 200	Namibia 100	Seychelles 49
Angola 197	Gabon 103	Botswana 70
Niger 183	Somalia 104	Lesotho 75
Algeria 161	Mauritius 106	Equatorial Guinea 91
Ghana 154	Swaziland 109	Congo, DR 97

Source: Constructed using the Africa Development Indicators (World Bank, 2011a)

Loss of skilled people depends on conditions in the country of origin. When opportunities for employment are limited people can exit if they can by emigrating or they can remain in the country if they are captive with few options for exit. There may be good prospects for jobs in the country of origin, but in a globally competitive labor market, skilled people may emigrate to seek better opportunities. In some cases, the skilled population may be trapped in a low level equilibrium for a number of reasons. The quality of the education system and how well it has prepared youth for the job market is also a factor.

Figure 13: Understanding unemployment and the emigration of highly skilled people



Source: Authors analysis based on African Development Indicators (World Bank, 2011a)

An assessment using data from the African Development Indicators indicates that 52% of countries were in the "Exit" category, 21% the "Captive" mode, 21% in the "Opportunity" category, and 6% in the "Trapped" classification (Figure 13). Two thirds of the countries that showed stagnation or decline in the agriculture production index during the period analyzed fall under the "Captive" category of countries that have high unemployment but low emigration of tertiary educated people as a share of total population with tertiary education. These are shown in Table 4, which indicates that the countries that had a declining or stagnant agriculture production index (Botswana, Lesotho, Mauritius, Namibia, Seychelles, and Swaziland) are all in the "Captive or Trapped" category.

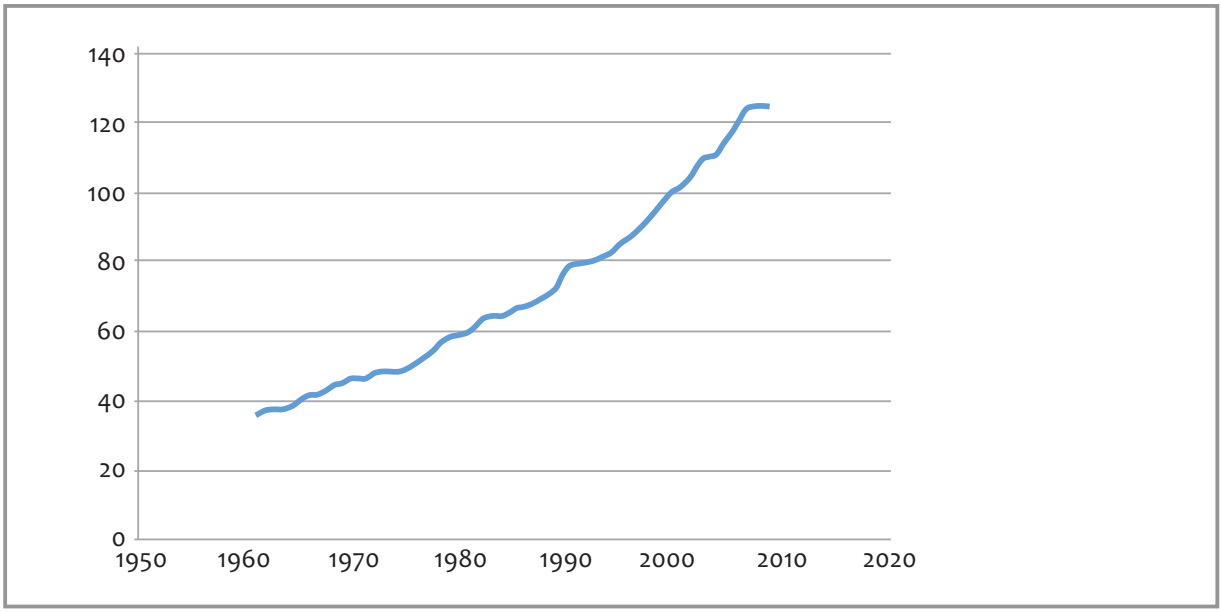
Table 4: Pattern of unemployed and the emigration of highly skilled people in Africa

Exit	Opportunity	Captivated/Trapped
Algeria	Benin	Botswana
Cameroon	Cote d'Ivoire	Burkina Faso
Ethiopia	Mali	Djibouti
Ghana	Mozambique	Egypt
Kenya	Tanzania	Lesotho
Madagascar	Uganda	Namibia
Mauritania		Niger
Mauritius		Swaziland
Morocco		
Sat Tome		
Seychelles		
South Africa		
Tunisia		
Zambia		
Zimbabwe		

Source: Constructed using The Africa Development Report (World Bank, 2011b)

Similar patterns can be seen when looking at the livestock production, where we see that production Africa-wide has increased sharply over the last 20 years (Figure 14).

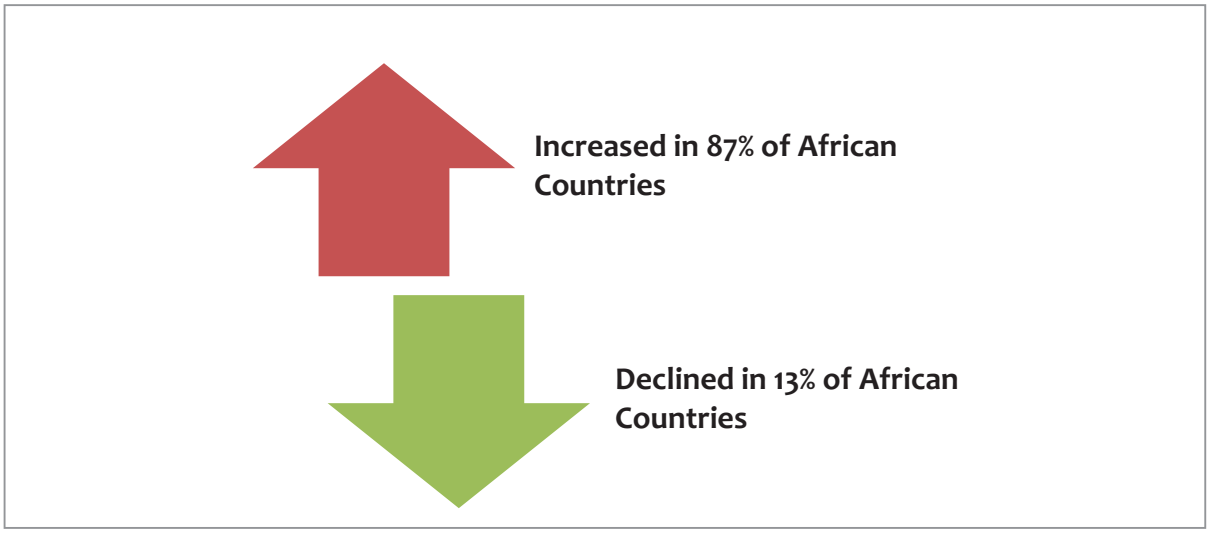
Figure 14: Livestock Production Index (Gross, 1999-2001=100) in Africa



Source: Constructed using The Africa Development Report (World Bank, 2011b)

However, there are countries that have not done as well in improving the production levels in livestock with limited visible impact on patterns of employment. About the same numbers of countries have seen an increase in their livestock production index, with only 7 out of 53 countries indicating a decline during the period analyzed. However, there is a very different mix of countries that have benefitted from improved production in the livestock area.

Figure 15: Livestock Production Index in Africa (Gross, 1999-2001 = 100)



Source: Constructed using The Africa Development Report (World Bank, 2011b)

Countries like the Seychelles and Lesotho are at the bottom five of both the agriculture and livestock production index in 2009, while Djibouti which has done poorly in agriculture production is in the top five in livestock production increases during the decade under consideration (Figure 16). Countries can trade off different aspects of agricultural production to generate jobs for the growing population. Modernizing livestock production, including better use of science, can be an important strategy to tackle the challenges of providing employment for a growing and educated population.

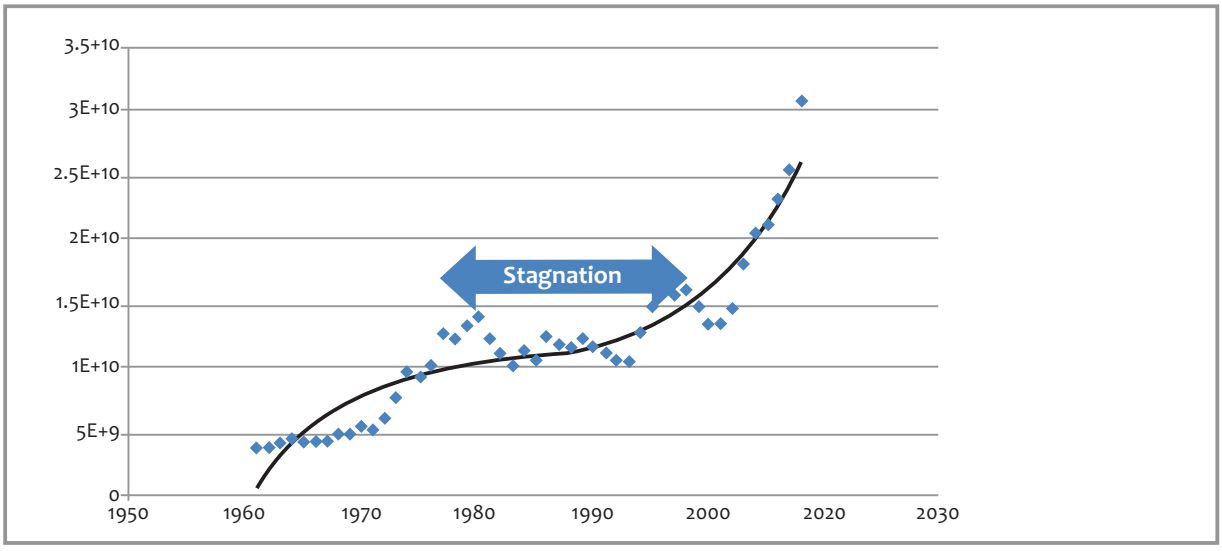
Figure 16: Livestock Production Index in Africa, (Gross, 1999-2001=100)

Top 5	Little Change	Bottom 5
Djibouti 158	Gabon 100	Seychelles 44
Congo, Rep 157	Eritrea 101	Lesotho 78
Niger 153	Equatorial Guinea 104	Mozambique 89
Malawi 152	Tanzania 104	Namibia 90
Mali 152	Swaziland 105	Angola 92

Source: Constructed using The Africa Development Report (World Bank, 2011b)

The opportunities provided by the agricultural sector (as shown by the trends in the agriculture and livestock production index) can also be considered from the perspective of the dependence for economic growth. Africa's performance in terms of total agricultural exports has been very impressive in the period 2000-2008, following a decade of stagnation.

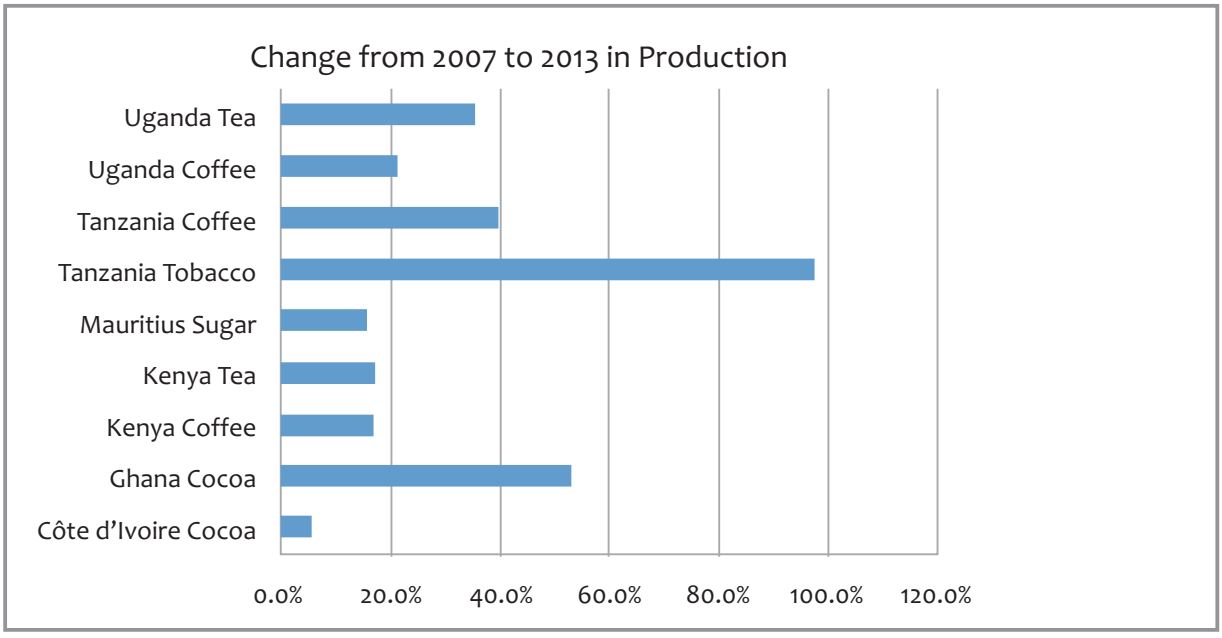
Figure 17: Total Exports in Africa (FAO, current us$)



Source: Constructed using The Africa Development Report (World Bank, 2011b)

Countries that have high agricultural exports include Uganda which depends on tea and coffee exports, Tanzania which depends on tobacco and coffee exports, Mauritius and its dependence on sugar exports, Kenya and its dependence on tea and coffee exports, and Ghana and Côte d'Ivoire and their reliance on cocoa exports. These countries have seen differential performance in the production of these agricultural products with Ghana expected to rebound faster than Côte d'Ivoire in cocoa production between 2007 and 2013, Tanzania expected to outperform Kenya and Uganda in coffee production, and Uganda projected to outperform Kenya in tea production improvement (Figure 18). We should expect to see the unemployment levels of these countries mimic the high performance if agriculture is a key factor in job creation. Indeed the employment to population ratio for Tanzania (78%) is higher than that of Kenya (73%), and Ghana (65.2%) is higher than Côte d'Ivoire (60.4%).

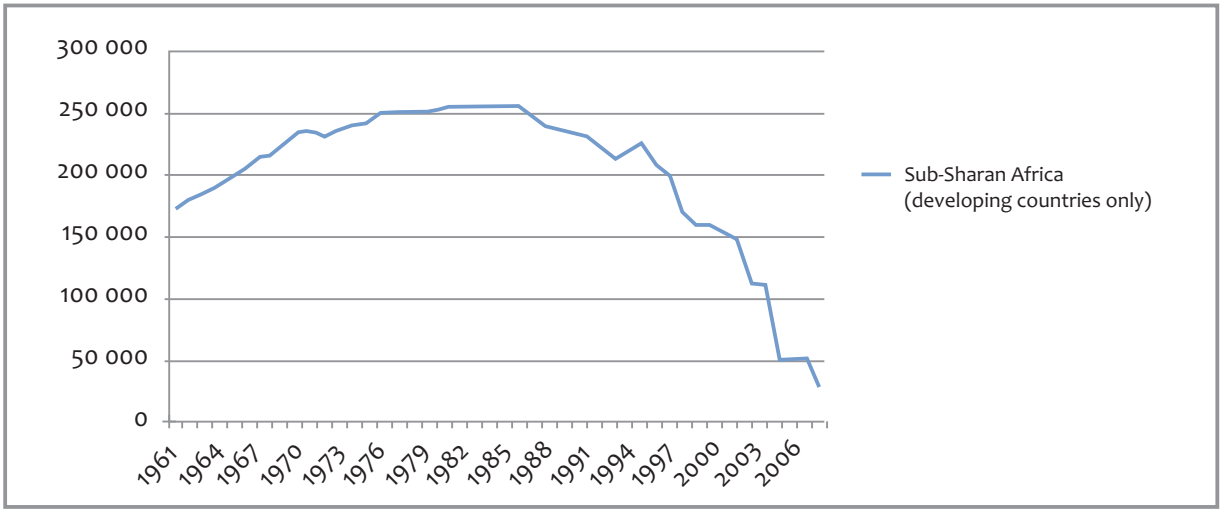
Figure 18: Countries with high dependence on agriculture



Source: Constructed using The Africa Development Report (World Bank, 2011b)

The sophistication level of the agricultural sector is also a factor to consider in terms of attracting young skilled people to the sector. A number of measures of sophistication can be considered such as the level of mechanization and use of machinery in the sector. The use of agro-machinery and tractors across sub-Saharan Africa (developing countries only) between the period 1961 and 2006 is also important to note. The pattern indicates a decline in sophistication of the sector over time, which does not bode well for attracting young skilled people to agriculture (Figure 19).

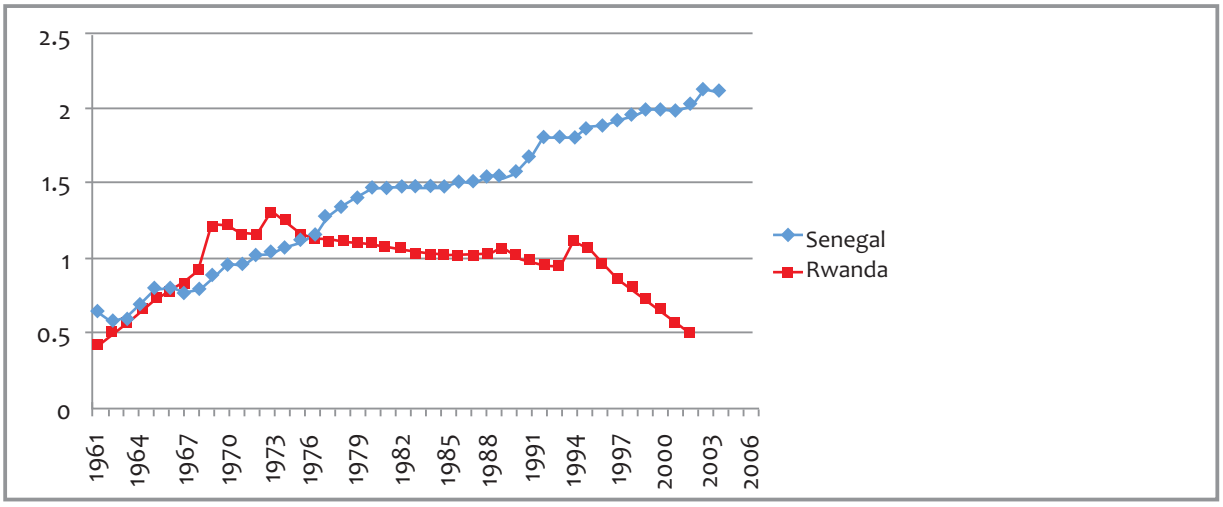
Figure 19: Agro-machinery/tractors in use in sub-Sharan Africa (developing countries only)



Source: Constructed using The Africa Development Report (World Bank, 2011b)

The cross-country variation is extremely high, however, with countries like Senegal seeing a major improvement in the use of machinery as measured by tractors per 100 square kilometer of arable land during the period under assessment, compared to Rwanda for instance (Figure 20). This means that there is a lot of room for improvement in the capacity of countries like Rwanda to attract skilled young people to the sector by improving the use of mechanization and science.

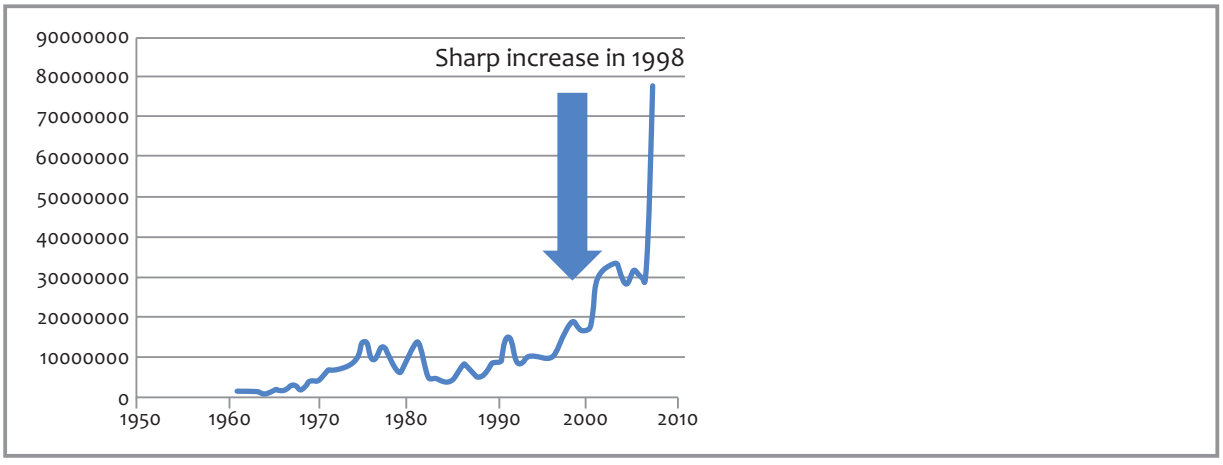
Figure 20: Agricultural machinery, tractors per 100 sq. km of arable land



Source: Constructed using The Africa Development Report (World Bank, 2011b)

Yet another important variable of sophistication in the sector is whether a country can not only use machinery in agriculture, but can manufacture and export critical machinery of relevance in the sector. A comparison of the agricultural tractor exports in Africa by value in US dollars is also noted. There has been a sharp increase in 1998 in such exports after a period of stagnation and low growth, indicating that Africa is ready for take-off in the sophistication of the agriculture sector and its ability to attract skilled labor (Figure 21).

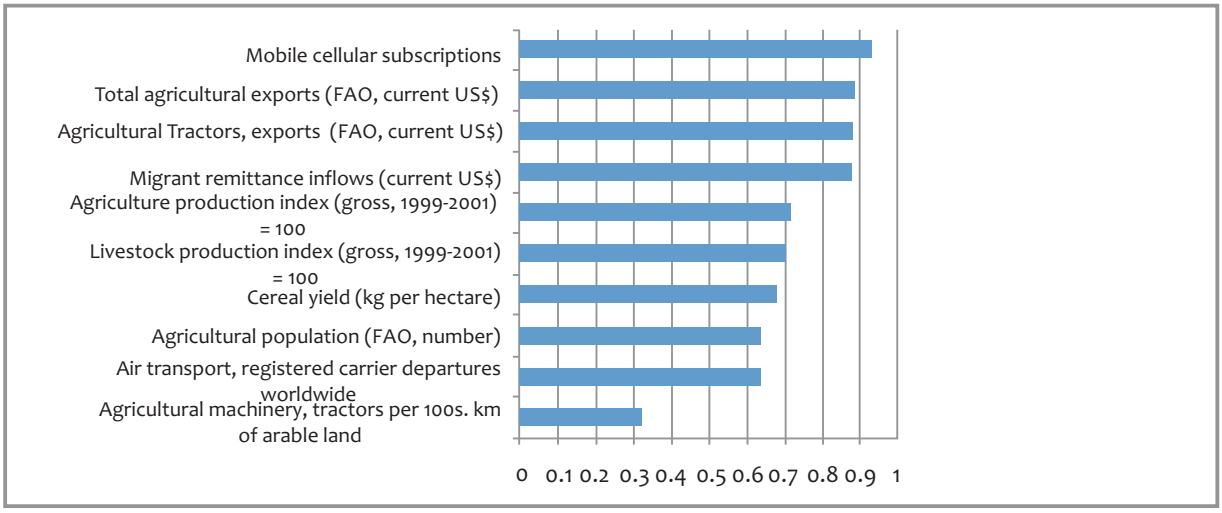
Figure 21: Agricultural tractors, exports in Africa (FAO, current US$)



Source: Constructed using The Africa Development Report (World Bank, 2011b)

An analysis of the separate effect of the level of sophistication in the agriculture sector on total employment shows further patterns of interest. The correlation is positive between the total-employment-to-population ratio and a number of important drivers of sophistication of the economy. The availability of mobile communications has the highest correlation (Figure 22). The finding supports case study evidence that the use of information technology can result in advances in the productivity and level of innovation in the agricultural sector, making agriculture more attractive to educated youth.

Figure 22: Correlation between total employment to population ratio for ages 15+ (%) and economic characteristics of African Countries



Source: Constructed using The Africa Development Report (World Bank, 2011b)

It is interesting to note that the exports of tractors is also positively correlated, a measure of the sophistication of the economy of country that is dependent on agriculture. The ability to export seems to have a stronger correlation than simply the use of agricultural machinery, supporting the theoretical expectation that sophistication of an economy is measured by the degree of industrialization. The use of local knowledge to advance the economy is also supported by these findings, as expertise garnered from using agricultural machinery can translate into expertise in making it, and the more you do so the more attractive the sector will be to the educated young people.

Another feature of sophistication is whether there is room for export of perishable products that are in high demand, such as fresh fruits and vegetables, and flowers, which depend on access to sophisticated air transport services. This aspect is captured by the air transport availability as measured by the number of registered carrier departures in the country.

The size of the sector as measured by the agriculture and livestock production index is also important in job creating growth. Access to markets is also positively correlated with the employment to population ratio, supporting the theoretical expectation that market size is

attractive to investors, including educated people who would find investing in export-oriented agriculture attractive. Migrant remittance flows are positively correlated as well, and in line with expectations that the African diaspora would invest in a more sophisticated agriculture sector and that would drive employment in the sector. Indeed Garcia-Fuentes (2009) showed that remittances are linked not only to the flow of Foreign Direct Investment to countries, but also to the market size and the quality of human capital.

Further analysis was done to go beyond correlations, by fitting a Cobb-Douglas production function which relates the job creating ability of economies to a series of variables. The results can be seen in Table 5, where the sign of the estimated coefficients based on a second order polynomial relating the total employment in Africa to five variables of sophistication are shown. The five variables include: (1) agricultural machinery as measured by tractors per 100 square kilometers of arable land which is a measure of the degree of mechanization in the sector; (2) gross agriculture production index with 1999-2001 being equal to 100; (3) gross livestock production index with 1999-2001 being equal to 100; (4) cereal yields in kilograms per hectare which is a measure of productivity; and (5) agricultural tractor exports in current US$.

All but one variable has a positive first order effect, indicating that there is a positive relation between employment and the first four variables. Making and exporting agricultural machinery has a negative effect at the beginning of the production process as it may take labor away from agriculture. However, sophistication in the sector by continuing to export agro-machinery could have positive effects on employment in the long-run as exports grow and as mechanization increases due to more domestic use of the manufactured machinery.

Table 5: Factors in the Agricultural sector that could be driving the overall level of employment

Variable	First Order	Second Order	R-square
Agricultural machinery, tractors per 100 sq.km of arable land	+	-	$R^2 = 0.35$
Agriculture production index (gross, 1999-2001 = 100)	+	-	$R^2 = 0.92$
Livestock production index (gross, 1999-2001 = 100)	+	-	$R^2 = 0.89$
Cereal yield (kg per hectare)	+	-	$R^2 = 0.70$
Agricultural tractors, exports (FAO, current US$)	-	+	$R^2 = 0.89$

Source: Constructed using The Africa Development Report (World Bank, 2011b)

Total employment may also be positively correlated to agricultural machinery use in tractors per square km of arable land, due to supporting the hypothesis that increased sophistication of the agricultural sector is good for job creation. Sophistication, as measured by agricultural tractors exports, is initially negatively correlated but the second order effects are positive. Higher production levels in both agriculture and livestock seem to lead to more potential for job creation as the coefficients for agriculture production index and livestock production index are both positive in relation to total employment. Productivity as measured by cereal yields is also positively correlated to total employment.

It is important to increase the use of local knowledge in the agriculture sector so as to attract the educated to the sector and hence deepen the sophistication level of the sector. Such policy efforts could reduce the brain drain Africa is grappling with and enhance the job creating and inclusive nature of economic growth so that the renaissance can be real.

Job Creating versus Non-Job Creating Economies

In this section, we present a methodology that relates the type of economy as characterized by its growth and job creation capacity to a set of explanatory factors. The regressions were run based on the available data. Table 6 presented below serves as a summary of the main findings.

The dependent variable in each regression is the log of jobs as measured by the total employment to population ratio. The independent variables in columns (1) and (2) are the log of the number of tractors (*ltractors*) which measures the effect of mechanization and sophistication of agriculture. The log of cell phones (*lmobcel*) is used to capture the effect of access to mobile platforms and also measures to a certain extent the degree of innovation in the economy. The log of road network (*lroadnet*) captures the access to transport and logistics, as road networks are the foundation infrastructure for most businesses and industrial as well as agricultural and service activities in an economy. Finally, the log of livestock production index (*lliveindex*) is used to capture the level of livestock production, which is a variable that also measures the activities that societies engage in to counter for inability to work or as a way to supplement their incomes during economic downturns.

In column (1), the panel regression model is run only for years where countries experience positive growth rate but with a non-positive job creation. In column (2) the same regression is run, but for years where both economic growth rates and job creation were positive. Here job creation is understood as the change in the total employment to population ratio. The two regressions help to analyze the determinants of job creation during the jobless growth years and non-jobless-growth year and can be used to separate out short-term versus sustained job creation.

In column (3) all the available data is used and a dummy variable for jobless growth years is used. This variable takes on values of 1 if the growth rate of a given year is positive and job creation for the same year is non-positive and 0 otherwise. This regression helps separate out the effects of short-term economic growth on job creation from the effects of sustainable economic growth on job creation.

In column (4), the livestock production index as well as the remittances variables is dropped from the regression. The results further corroborate the findings of the previous regressions.

It is clear that all the estimated coefficients in columns (1) – (3) are strongly significant, except for *lliveindex* and *joblessyear*. While the effect of road network is positive, those of tractors and remittances inflows (*lremittin*) are negative.

Table 6: GLS Estimation for Jobless growth in Africa (1990 -2010)

Variables	(1)	(2)	(3)	(4)	(5)
ltractors	-0.062***	-0.0999***	-0.060***	-0.111***	-0.022**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.044)
lmobcel	-0.032***	-0.001	-0.021***	-0.027***	-0.014***
	(0.002)	(0.936)	(0.008)	(0.000)	(0.001)
lroadnet	0.102***	0.154***	0.094***	0.141***	0.052***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)
lremittin	-0.064***	-0.037**	-0.060***		-0.394***
	(0.000)	(0.027)	(0.000)		(0.000)
lliveindex	0.268	0.019	0.243		
	(0.208)	(0.936)	(0.122)		
Jobless year			0.0305	0.047	
			(0.318)	(0.176)	
joblesscountry					-0.394***
					(0.000)
Constant	3.825***	3.862***	3.762***	3.740***	3.980***
	(0.000)	(0.000)	(0.000)		(0.000)
				(0.000)	
Number of observations	88	42	130	137	137
Number of countries	18	16	28	23	23
Wald test (prob)	0.000	0.000	0.000	0.000	0.000

p-values in parentheses
*** < 0.01; ** < 0.05; * < 0.10

So what can one conclude from this? That the determinants are the same and move in the same direction but they are more accentuated in Column 2 where growth is job creating.

Regardless of the countries experiencing jobless economic growth or not, the determinants of have *ltractors, lroadnet, lremittin* have the same impact on job creation. The coefficient

for *ltractors* is negative probably because having tractors mechanizes agriculture and hence generates productivity gains but not more jobs, unless countries diversify their economies and absorb the excess labor shed due to increased mechanization. The presence of cell phones is also productivity enhancing but not job creating, as the *lmobcel* coefficient is negative in both regressions, though not significant in Column 2. The lack of significance in Column 2 could be capturing the fact that some countries, like the "Silicon Savannah" in East Africa, have managed to create jobs using innovations in the mobile platforms using cell phones. The effect of remittances through the *lremmitin* is also negative but perhaps for a different reason. Remittances could be having an effect on the safety net side, supporting families that are unemployed; or on the incentive side, providing support to individuals who would otherwise be on the job market—both reasons for a negative effect in job creation. It is interesting to note that both the increase in the road network (*lroadnet*) and the increase in keeping livestock (*lliveindex*) have a positive sign in both Column 1 and 2 regressions, even though the livestock index variable is not significant on either regression. The presence of extensive road networks is linked to positive job creation in both regressions as road construction creates jobs and availability of easy transport links is a source of cost reduction and access enhancements that many job-creating activities can ride on, including agriculture produce and agri-businesses. Livestock on the other hand, can create opportunities for employment during downturns, as can be seen by the egg, milk, and chicken meat selling businesses that sprout in cities across Africa when the job market is tight. The signs of the estimated coefficients are consistent, as well as their significance. However, the coefficient of *lmobcel* become statistically not significant for the regression in column (2) as explained earlier, perhaps due to the fact that some countries, like Kenya, are able to create jobs using mobile platforms.

The result from column (4) show that the dummy for jobless growth years in not significant. This simply means that the performance of a country in a given year is not relevant to categorize it as having economic performance that cannot create jobs. This characteristic depends on the country's economic performance over years. The ability to systematically create jobs is what is being measured in this regression. Countries that grow are those that also systematically create jobs over long periods of time. The dummy could also be capturing the effects of short-term job creation, which is not sustainable. A number of countries including Senegal and Mali did manage to create short-term jobs after reforming their monetary policy and restructuring their economies in the 1980's and early 1990's. There were fewer secure jobs in the public and private sector and more insecure short-term jobs. The job creation dummy variable may be capturing this type of effect.

In column (5) the panel model is estimated by introducing a new dummy variable, jobless

country, which takes on value 1 if the economic growth was not accompanied with job creation over the sample under consideration and 0 otherwise. The coefficient of this variable is negative and significant at the 1 % level. The dummy variable, jobless country is significant and negative. What is the interpretation? In contrast to the implication drawn earlier about the dummy variable related to jobless economic years, the statistical significance of the jobless country dummy simply means that a country's characteristics are important in determining how its economic growth can be accompanied with job creation or not. This is actually the main conclusion of this whole exercise. The structure of the economy matters in job creation capacity.

Testable Hypothesis and Further Research

We have argued in this paper that jobless economic growth in Africa has refocused the attention of stakeholders of African economic development (including policymakers, donor partners, and researchers) on problems of low and stunted economic growth and consistently high unemployment rates. We have also cautioned that, as demonstrated by the Arab Spring, the consequences of neglecting these issues can be catastrophic.

A primary purpose of this study is to attempt to explain why high economic growth has had differential impacts on job creation across countries in Africa. Our research has led us to attribute the differences in country performance to the creative use of the agricultural sector, the success in growing market size, and the level of innovation. The regressions in the previous section lend empirical credibility to these arguments as we have been able to show statistically significant results between mechanization, expansion of mobile access, and the availability of remittances as factors that shift the productivity-incentive frontier, and that they have differential effects on job creation under growing or stagnant economies. We also showed that the effect of some investments like in road networks is critical to enhance the platform for job-creating activities in agricultural production and agro-processing among others.

We have further argued that the agricultural sector is suited for playing a crucial role in dealing with Africa's unemployment problems for several reasons—the size and rural character of the agricultural sector provides the opportunity for job creation and reduce unemployment, growth of the agricultural sector, and sophistication and innovative potential of the agricultural sector to attract especially the educated youth. We have also provided specific recommendations to help the process of making agriculture the foundation of Africa's growth with employment. This includes regional integration policies to expand markets, support modernization and innovation in the agricultural sector that would attract the youth and enhance value-added. The paper emphasizes that integration of improvements in the agricultural sector with youth and rural development has the potential to tackle a myriad of challenges facing African countries.

In the last section we have designed a methodology to provide a clearer understanding of jobless economic growth where we grouped countries with similar patterns of economic growth and job creation. We have seen that indeed the divergence may be coming from the ability of countries to create short term versus sustainable jobs. Two categories of countries were created using the combinations of economic growth and employment—(i) high growth & high unemployment and (ii) high growth & low unemployment. These two categories represent cases where trends in growth and unemployment are decoupled, to better understand jobless economic growth and distinguish it from the normal/expected cases. The regressions support the findings shown in Fig. 6 where we have identified countries that have "high growth and low unemployment" (i.e. Ethiopia, Tanzania and Uganda) which post conspicuously higher average growth than the "high growth and high unemployment" countries (notably Botswana, Lesotho, and South Africa).

The framework we have developed in the last section has been used to explain jobless economic growth by analyzing differences across the two groups for the various characteristics/drivers that we have identified in the study. The data has permitted performing a multivariate analysis that has helped identify which characteristics/drivers perform consistently. Indeed we have seen that countries with high access to mobile platforms and those that have mechanized agriculture have benefitted from productivity gains. But productivity gains alone are not enough to generate jobs if the jobs shed from such productivity gains are not absorbed in other sectors of a diversified economy. We have further shown that there may be a cross-effect of incentives for not seeking employment that could be present when remittances are high.

On a related matter, our results show that for innovation to become one of the solutions to jobless economic growth, it has to be targeted to job creation in a new area. Examples of such job-creating innovation have been possible in East Africa, now known as "Silicon Savannah," where mobile phones have been the source of many jobs (The Economist, 2012). This is mainly because innovation could improve productivity and potentially limit employment opportunities.

The results in this paper raise some very interesting hypotheses that can be tested. The first issue to disentangle relates to the finding about the countries that did poorly in sustaining job creation in sub-Saharan Africa, where we have shown empirically from a simple classification, that they are all highly dependent on the global economy for their export earnings. This suggests that one can test Hypothesis 1: Countries that did poorly in sustaining job creation in sub-Saharan Africa are all highly dependent on the global economy for their export earnings.

Another interesting finding relates to the second visible pattern from simple analysis, which is the differential job-creating ability of dissimilar types of economies. Economies more

dependent on agriculture, such as Ethiopia, Tanzania and Uganda had high economic growth coincide with low unemployment, while commodity dependent economies such as Botswana, Lesotho and South Africa had high economic growth which was jobless as their rates of unemployment were high despite achieving good GDP growth (Figure 6). This suggests that one can test Hypothesis 2: Economies more dependent on agriculture had high economic growth coincide with low unemployment and Hypothesis 3: Commodity dependent economies had high economic growth, which was jobless.

The third visible factor is the gender dimension of job creation across Africa. A number of studies have looked at the differential access to employment by men and women. Arbache et al (2010) have done an analysis of gender disparities in Africa's labor market, indicating that economic context and conditions matter for the effect of gender on access to jobs. They show in particular that in countries where male employment is relatively high, the employment prospects for women were relatively favorable, and the level of gender disparities in employment is low. One can test Hypothesis 4: Is there a significant difference in the employment to population ratio for men compared to women.

There is a fourth factor that is at play, which is the dependency on wage and salaried employment, especially by women. An assessment of the access to wage and salaried work is important in order to determine the ability of the continent to create not only employment for men and women, but to do so in ways that increase incomes and decrease poverty. It has long been observed that the informal sector is an important safety net for job creation, especially for young people and women. Countries in Africa that have high employment to population ratios (which means they are keeping up with the job demands of a growing population) have lower dependency by women on wage and salaried work, as can be seen in Table 3. Countries would do well in offering opportunities for self-employment, especially to women, in order to better handle the issue of unemployment and to ensure that economic growth delivers on job creation. This result is supported when looking at the number of African countries that were long trapped in low growth scenarios yet managed to create jobs, such as Tanzania and Uganda, as they have very low dependency of women on wage and salaried jobs. This observation can be tested in Hypothesis 5: Job creation is higher for African countries that have very low dependency of women on wage and salaried jobs.

The fifth factor to consider has to do with whether an economy has been able to retain its highly skilled people, who are critical in creating the space for job creation for others, by innovating in the work place, creating their own companies that can employ others, or contributing to higher economic growth due to their high skills being used in policy formulation and public sector service delivery. This observation can be tested in Hypothesis 6: Job creation is higher for African countries that have lower migration rates.

The sister paper titled "Jobless Economic Growth: Hypotheses from Africa?" by Asiedu, Hanson and Léautier (2013), provides empirical tests of these hypotheses which further corroborate the findings in the case studies and cluster analysis done in this paper.

Conclusions and Recommendations

In the preceding sections, an attempt has been made to highlight the key issues facing Africa's jobless growth and prescribed solutions, notably centered on an enhanced agricultural sector, to help address the issues. We submit that the main drivers, among others, appear to be the **creative use of the agricultural sector**, the **success in growing market size**, and **the level of innovation in the country**.

A jobless growth economy has serious implications for all – policymakers and citizens alike. In fact, the long-held belief that high economic growth is a prerequisite for job creation caused African policymakers to focus on the projected low global growth scenario and its implications for economies that have either high or stubborn levels of unemployment. However, citing growth rates as a proxy for economic development does not only mislead people but it also provides policymakers a false sense of comfort. Such a combination is a recipe for enhanced social tension and political unrest. The recent Arab Spring has made clear the notion that economic growth *per se* is not enough unless it is accompanied by meaningful job creation.

Five key patterns of Africa's performance over the past two decades are mapped out to highlight endogenous development theory – a) differential performance of countries in creating jobs; b) differential job-creating ability of dissimilar economies; c) the gendered dimension of employment creation across Africa; d) dependency on wage and salaried employment, especially by females; and, e) an economy's ability to retain its intellectual capital.

Given that agriculture is the cornerstone of the African society, and the most nations depend on the sector for economic growth and employment creation, it behooves decision makers and development practitioners to ensure that as end-users, Africa's agricultural population, should have a more visible and active role in the generation and utilization of agricultural knowledge to address prevailing problems. A concerted effort to integrate local knowledge into agricultural policy and research should be taken more seriously (Lwoga et al., 2011). The paper also submits that three factors are central to the sector's impact on employment – the size of the sector and its ability to absorb a large population seeking opportunities for engagement; how fast the sector is growing, and its ability to absorb the growing population and its needs for employment; and the sophistication level of the sector and whether it is attractive particularly to the educated youth.

Regional integration policies that expand the opportunity space by increasing the size of economies and markets are critical. Also needed are regional policies that can support the development and enhancement of innovation systems including investment in science and technology education to speed up the creation of a cadre of young people that can lead the transformation of stages of production from dependencies on primary products and extraction. Policies and programs that can modernize agriculture and support effective creation of value chains that enhance the value added from agriculture that can excite youth back to the rural areas would also be needed.

Africa's population is dominantly rural and with a large share of the labor force in agriculture, making rural activities a major part of the equation of job creation. Given this reality, any development agenda must recognize that in the short term only rural activities, farm or non-farm, can effectively create occupation for most new job seekers (Kararach, Hanson and Léautier, 2011; Puplampu, 2004; World Bank, 2009). As Proctor and Lucchesi (2012:3) similarly note, governments and their development partners, going forward, need to engender a "supportive and enabling environment for agriculture and agribusiness including providing a new focus on [the] youth through rural and agricultural policy and investment." As they go on to further submit, the transformation "of agrifood value chains including the growth of modern retail, growth of regional and south-south trade in agricultural and good products offer many opportunities for business development and employment both directly within all stages of the value chain and indirectly as in input supplies, transport, storage, packaging, financial services, quality assurance auditing, etc." (Proctor and Lucchesi, 2012:57).

As we argued elsewhere, invariably a holistic approach is needed to address the problem of unemployment in general and of job creation in particular. Improvements are needed both on the supply and the demand side of labor. In many countries, more needs to be done to improve the quality of labor supply so that it better matches the skills required by firms (Kararach, Hanson and Léautier, 2011:210).

References

ACBF. (2012): *Africa Capacity Indicators Report 2012 – Capacity for Agricultural Transformation and Food Security*. Harare, Zimbabwe.

AfDB. (2012): *African Development Indicators*. www.afdb.org. [Also referenced as World Bank, 2011].

AfDB. (2011): The Middle of the Pyramid: Dynamics of the Middle Class in Africa. *AfDB Market Brief*, April 20, 2011. www.afdb.org.

Aghion, P., P. Howitt, and Garcia-Peñalosa, C. (1998): *Endogenous Growth Theory*. MIT Press.

Arbache, J.S., A. Kolev, and Filipiak, E. (eds.) (2010): *Gender Disparities in Africa's Labor Market.* A co-publication of the Agence Française de Développement and the World Bank.

Bew, R. (2011): 'Africa Pulls Ahead… fasting growing region in the world" *The Economist* (29th December, 2011).

Chuhan-Pole, P. and Angwafo, M. (eds.) (2011): *Yes Africa Can: Success Stories from a Dynamic Continent*. Washington, D.C.: World Bank.

Garcia-Fuentes, P.A. (2009): *Remittances, Foreign Direct Investment and Economic Growth in Latin America and the Caribbean*. PhD Dissertation. Louisiana State University.

FAO. (2011): *The State of Food and Agriculture – Women in Agriculture: Closing the Gender Gap for Development.* Rome: Food and Agricultural Organization of the United Nations.

Kararach, G., Hanson, K.T., and Léautier, F.A. (2011): "Regional Integration Policies to Support Job Creation for Africa's Burgeoning Youth Population." *World Journal of Entrepreneurship, Management and Sustainable Development*, Vol. 7, Nos. 2/3/4, 2011

Library of Congress. (1988): Mauritania Farming. [Internet] Available at: http://lcweb2.oc.gov/cgi-bin/query/r?frd:@field(DOCID+mr0083) [Accessed March 2012]

Lwoga, E.T., P. Ngulube and Stilwell, C. (2011): "Challenges of Managing Indigenous Knowledge with other Knowledge Systems for Agricultural Growth in Sub-Saharan Africa." *International Journal of Libraries and Information Services*, 61, 3, 226-238.

Meijerink, G. and Roza, P. (2007): The role of agriculture in economic development. *Markets, Chains and Sustainable Dvelopment Strategy and Policy Paper*, no. 5. Stichting DLO: Wageningen. Available at http://www.boci.wur.nl/UK/Publications/

Novotný, J. and Ramachandran, N. (2010): "Alternative to Jobless Growth? All-India Context and a Case for Participatory Development Scheme from Rural Tamil Nadu", GEOGRAFIE, 115, No. 3, 330-346.

Pieterse, J.N. (2010): *Development Theory*. Second Edition. SAGE Publications, London. 252 pp.

Proctor, F. and Lucchesi, V. (2012): *Small-scale farming and youth in an era of rapid rural change*. International Institute for Environment and Development (ILED), London

Puplampu, K.P. (2004): "Research and Development in Africa: An Analysis of Policies and programs in the Agricultural Sector." In S. Adjibolosoo (ed.) *The International Development Program of Activities: What Are We Doing Wrong*?, Bloomington, IN: Ist Books, 111-138.

Romer, P. (1994): The Origins of Endogenous Growth. *The Journal of Economic Perspectives*. 8, 1. Winter 1994.

The Economist. (2012): "Kenya's technology start-up scene is about to take off", in Innovation in Africa: Upwardly mobile." *The Economist*, August 25, 2012.

World Bank. (2008): *World Development Report 2008: Agriculture for Development*. Washington, D.C.: World Bank

World Bank. (2009): *World Development Report 2009: Spatial Disparities and Development Policies.* Washington, D.C.; World Bank

World Bank. (2011a): *African Development Indicators* ADI. Washington, D.C.: World Bank

World Bank. (2011b): *World Development Report 2011: Conflict, Security, and Development.* Washington, D.C: World Bank.

World Bank. (2012): *Global Economic Prospects: Uncertainties and Vulnerabilities*. Volume 4, Washington, D.C: World Bank (January)

Annex 1: Description of Variables

Variable
y = Total employment, total (ages 15+)
x1 = Agricultural machinery, tractors per 100 sq. km of arable land
x2 = Agriculture production index (gross, 1999-2001 = 100)
x3 = Livestock production index (gross, 1999-2001 = 100)
x4 = Cereal yield (kg per hectare)
x5 = Agricultural tractors, exports (FAO, current US$)
x6 = Migrant remittance outflows (current US$)
x7 = Agricultural tractors, imports (FAO, current US$)
x8 = Total agricultural exports (FAO, current US$)
x9 = Migrant remittance inflows (current US$)
x10 = Agricultural population (FAO, number)
x11 = Air transport, registered carrier departures worldwide
x12 = Air transport, freight (million ton-km)
x13 = Roads, total network (km)
x14 = Mobile cellular subscriptions

Model 1: least squares regression
Dependent Variable = Total employment

Variable	Description	Estimated coefficient	t-stat
x1	Agric machinery	-	-1.24
x2	Agric production	+	1.61
x3	Livestock production	+	0.93
x4	Cereal yields	-	-1.58
x5	Tractor exports	+	3.07
x6	Remittance outflows	+	0.50
x7	Tractor imports	-	-1.17
x8	Agric exports	+	2.37
x9	Remittance inflows	-	-1.35
x10	Agric population	-	-2.18
x11	Registered air departures	-	-1.78
x12	Air freight	+	5.79
x13	Road network	-	-1.17
x14	Cellular subscriptions	+	0.62

Observations = 40. Adj. r-squared = 0.98

Model 2: least squares regression
Dependent Variable = Total employment

Variable	Description	Estimated coefficient	t-stat
x1	Agric machinery	-	-8.72
x8	Agric exports	+	3.89
x10	Agric population	+	12.79
x11	Registered air departures	+	2.54
x13	Road network	-	-2.22

Observations = 40. Adj. r-squared = 0.97