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The New Political Economy of Agricultural Development and Food Security in sub-Saharan Africa

(Rサプサハラ・アフリカにおける農業開発と食糧安全保障の新政治経済学)

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‘Dis ducibus, benigne numine, Deo optimo maximo!‘

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Abstract

From a political economy perspective, this thesis explains why the recent agriculture and food security policy in sub-Saharan Africa, adopted by development institutions alongside with the private sector – is not working and seeks to advocate solution to tackle it. The thesis problematises the topic according to three narratives: first, introducing the topic of agriculture in the theme of development; second, mobilisation of resources as a big push to agriculture and finally, the stabilisation of the grain markets to ensure global food security.

The thesis argues that the introduction of the mechanism of public, private partnership (PPP) and value chain is marginalising the ability of African countries to manage their agricultural development and food security programme. The thesis elaborates that such mechanism which concentrates on agricultural development inhibits the path of structural transformation of the region, which in turn affect the sustainability of the food system, the social and economic development.

This thesis concludes that the reintroduction of the PPP mechanisms and the market-driven value chain are marginalising African smallholders economically, socially and politically. Global food security that transcends through the global to national and household level represents an impossible trinity, firstly, due to the difference in market mechanisms. Secondly, due to the self-driven interest pursued by countries to secure their own food control, and finally, to the trade-off faced by smallholder between the production of food for self-consumption and high-value commodity for export. Although agriculture represents an important share of the Gross Domestic Product, its role as a leading sector was outstripped by other industries since 1990s. This leading role since then has been led by a hybrid dualism between manufacturing and agriculture.

The contributions of the thesis are threefold: to the background theory of political economy while dealing with the interplay between the economy and politics relative to the present theme.
To the focal theory that arises from the theoretical and empirical evidences stemming from this study and conceptualised as ‘capacity-driven approach’ and to the data theory, presenting the technique of orbit analysis and its application to the analysis of economic information.
サブ・サハラにおける農業開発と食料安全保障の新政治経済学

要旨

政治経済学の観点から、本論文はサハラ南部アフリカに展開する開発機関や民間セクターを通じて近年採用されている農業ないし食料安全保障政策がなぜ機能していないのかを説明し、問題解決に向けた政策提言を行う。

本論文は3つの視点にそってその課題を問題化する。それらは、
第一に、開発分野における農業の課題
第二に、農業に大きなインパクトを与える資源の動員
第三に、グローバルな食糧安全保障のための資本市場の安定化
である。

本論文は、アフリカの農業ならびに食料安全保障政策を理解するため、複数の異なる方法を組み合わせつつ、二つのシステムティックなアプローチをとる。そうすることで、市場主導のパラダイムと官民協力ならびグローバルな価値連鎖が現地の小規模農業主の課題に結び付いていることを明らかにする。

そのようなアプローチに加えて、本論文はグローバルな食の安全保障を確保するためにグローバル市場を安定化させる基盤にも目を向け、アフリカ農業構造のメカニズム、政治的な動機、技術的ないし物理的条件を考察する。

本論文は、食糧安全保障に関する現代的課題に対するたんなる技術的な解法を超えることをめざし、そうしたアプローチは南部サハラの国々が自らの経済状況に依拠しつつ、農業との連関性を確立することが重要であると主張している。

本論文のおもな貢献は3つある。ひとつは、理論的バックグラウンドとなっている政治経済学に対する貢献であり、ぶたつには、ここから導かれた能力主導アプローチとして概念化される研究に対する貢献である。最後に、軌道分析の手法を経済情報分析に応用することに対する貢献である。
## Content

Acknowledgements......................................................................................................................................i
Abstract.......................................................................................................................................................ii
要旨............................................................................................................................................................iv
List of Figures...........................................................................................................................................vii
List of Tables........................................................................................................................................... viii
Acronyms ...................................................................................................................................................ix

### Chapter 1: The new political economy of agricultural development and food security in sub-Saharan Africa — an introduction

1. Introduction .............................................................................................................................................1
1.1. Keeping track on the recent food problem: general backgrounds.....................................................4
1.2. Aim and significances.....................................................................................................................14
1.3. Research questions..........................................................................................................................15
1.4. Theoretical framework....................................................................................................................16
1.5. Methodology ...................................................................................................................................21
1.6. Structure of the dissertation............................................................................................................24

### Chapter 2: Food and human security in sub-Saharan Africa

2.1. Introduction....................................................................................................................................26
2.2. A new modus operandi to tackle food security...............................................................................27
2.3. The paradigm of ‘market-led food security’ .........................................................................................35
2.4. The process of altered marginalisation...........................................................................................41
2.5. Centring ‘population’ in policy design ...............................................................................................46
2.6. Conclusion......................................................................................................................................54

### Chapter 3: The Trilemma of Agricultural Development and Food Security in sub-Saharan Africa

3.1. Introduction....................................................................................................................................56
3.2. Analytical framework and scope of the analysis ............................................................................58
3.3. Market, security and pro-poor approach: the food security trilemma.............................................62
3.4. Discussions.....................................................................................................................................70
3.5. Conclusion......................................................................................................................................78

### Chapter 4: Differences in Intersectoral Linkages and its Implications for sub-Saharan Africa: Evidences from the orbit analysis

4.1. Introduction....................................................................................................................................80
4.2. Method, data and specifications........................................................................................................83
4.3. Results.............................................................................................................................................87
4.4. Discussions: policy implications ....................................................................................................101
List of Figures

Figure 1 - Conceptual Framework.............................................................................................21
Figure 2 - Map of the GAFSP and G8 New Alliance for Food Security and Nutrition........29
Figure 3 - Illustration of the GAFSP and G8 New Alliance segments of value chain..........34
Figure 4 - Hard and soft commodity index 1970-2015..............................................................40
Figure 5 - Demographic transition in SSA 1960-2010..............................................................48
Figure 6 - Yield, land and share of employment in SSA ...........................................................50
Figure 7 - Share of employment male and female in percentage of employment in agriculture for SSA ..............................................................................................................................51
Figure 8 - Pattern of inequality in the Non-New Alliance and New Alliance countries 1980-2010 ...................................................................................................................................53
Figure 9 - Results of the orbit analysis for SSA ........................................................................90
Figure 10 - Weighted results of orbit analysis, decomposition 1972-2011 ...........................91
Figure 11 - First and last scores of each sector; GDP decomposition 1973-2011 .................92
Figure 12 - Leading-following relations between agriculture and manufacturing in SSA ......96
Figure 13 - Leading-following relations between agriculture and other activities in SSA......97
Figure 14 - Leading-following relations between agriculture and mining in SSA ...............98
Figure 15 - Leading-following relations between agriculture and transport in SSA ..........99
Figure 16 - Leading-following relations between agriculture and wholesale in SSA.........100
Figure 17 - Leading-following relations between agriculture and construction in SSA......101
Figure 18 - Distribution by group, agriculture and mining in percentage of GDP, SSA ....112
Figure 19 - Intensity of activity, mining and agriculture in % share of GDP.........................113
Figure 20 - Construction leading over agriculture, SSA, 2008-2013 ........................................122
Figure 21 - Wholesale leading over agriculture, SSA, 2008-2013 ........................................123
Figure 22 - Transport leading over agriculture, SSA, 2008-2013........................................124
Figure 23 - Other activities leading over agriculture, SSA, 2008-2013..................................125
Figure 24 - Mean of the 9-year moving average for 38 SSA countries, 1970-2012 ..........135
Figure 25 - Extreme points of the kick-starters of 38 countries SSA in 1972 and 2012 ......136
Figure 26 - Leading-following relations by sub-regional decomposition, ............................139
Figure 27 - Leading-following relations among G8 and non-G8 New Alliances and institutional settings.........................................................................................................141

Figure 28 - Leading-following relations considering the business environment for 38 countries in SSA.........................................................................................................................................143

Figure 29 - Main aggregates in Percentage of GDP for 38 SSA countries, 1970-2013........144

Figure 30 - Homogeneous panel of leading-following relations for 38 countries in SSA 1972-2012 .........................................................................................................................................204

List of Tables

Table 1 - Profile of the GAFSP and G8 New Alliance countries......................................................30
Table 2 - GDP Sectoral Decomposition SSA, in percentage, 1970-2013.........................................88
Table 3 - Leading-following relations across countries, SSA 1972-2011.......................................93
Table 4 - Count outcome of a leading agriculture, SSA countries, 2000-2012...............................106
Table 5 - Count outcome of leading mining sector in SSA 2000-2012 ........................................111
Table 6 - Count outcome of leading manufacturing sector from 2000-2013 in SSA .................115
Table 7 - List of 38 SSA countries and their geographic distributions .........................................134
Table 8 - Leading-following relations across sub-regional category, 38 SSA countries 1972-2012 .........................................................................................................................................137
Table 9 - Pattern of the leading-following relations in of trade and investment, SSA, 2003-2012.151
Table 10 - Capacity-driven matrix..................................................................................................161
Table 11 - Description of the variables from the World Bank Development Indicators............200
Table 12 - Summary Statistics of WDI data...................................................................................200
Table 13 - Description of the raw data SSA ...................................................................................201
Table 14 - Correlation table of the intersectoral data by industry.................................................202
Table 15 - Correlation table of the aggregate demand data ...........................................................202
Table 16 - Summary statistics of the orbit analysis output 9-year moving average .................202
Table 17 - Summary statistics of the results of orbit analysis at a country level .........................203
Table 18 - Summary statistics of the results of orbit analysis for the aggregate demand ..........203
Acronyms

ADB Asian Development Bank
AfDB African Development Bank
BRICS Brazil, Russia, India, China and South Africa
CAADP Comprehensive Africa Agriculture Development Programme
CFS Committee on World Food Security
EGARCH Exponential Generalised Autoregressive Conditional Heteroscedastic
EIU Economist Intelligence Unit
FAO Food and Agriculture Organization of the United Nations
FDI Foreign Direct Investments
G20 Group of Twenty
G8 Group of Eight
GAFSP Global Agriculture and Food Security Program
GDP Gross Domestic Product
IAASTD International Assessment of Agricultural Knowledge, Science and Technology for Development
ICMM International Council of Mining and Minerals
ICT Information and Communications Technology
IFAD International Fund for Agricultural Development
IFC International Finance Corporation
IFPRI International Food Policy Research Institute
ISIC International Standard Industrial Classification
Kcal Kilocalorie
MBA Market-Based Approaches
NEPAD New Partnership for Africa's Development
NGOs Non-Governmental Organization
OECD Organisation for Economic Co-operation and Development
R&D Research and Development
<table>
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<tr>
<th>Acronym</th>
<th>Full Form</th>
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</thead>
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<tr>
<td>ReSAKSS</td>
<td>Regional Strategic Analysis and Knowledge Support System</td>
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<tr>
<td>SMEs</td>
<td>Small and Medium-sized Enterprises</td>
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<td>TNCs</td>
<td>Transnational corporations</td>
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<tr>
<td>UK</td>
<td>United Kingdom</td>
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<tr>
<td>UN-DESA</td>
<td>United Nations Department of Economic and Social Affairs</td>
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<tr>
<td>UNDP</td>
<td>United Nations Development Program</td>
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<td>UNSCN</td>
<td>United Nations Standing Committee on Nutrition</td>
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<td>UNSD</td>
<td>United Nations Statistics Division</td>
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<tr>
<td>US</td>
<td>United States of America</td>
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<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
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<td>WFP</td>
<td>World Food Program</td>
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Chapter 1: The new political economy of agricultural development and food security in sub-Saharan Africa – an introduction

‘...Yet food is something that is taken for granted by most world leaders despite the fact that more than half of the population of the world is hungry.’ Norman Borlaug (1914-2009)

Introduction

It goes without saying that the world saw great changes in recent years. With the emergence of countries like China, Brazil and India, where the economic and social transformations were impressive, the epicentre of the global economy has therefore shifted from its past location. New players are also rapidly advancing on the world stage, having as a consequence a political, economic and social reconfiguration in the relations between countries. Indonesia, Malaysia, Saudi Arabia and Mexico are among the countries that have experienced significant progress in their economies in the recent decade. However, these transformations are also bringing with them far-reaching consequences. One of these major consequences concerns food and its future production. As a matter of fact, a real threat is hanging over the sustainability of food production as the earth is losing its capacity to soften scarcity (Brown, 2011).

Addressing food insecurity is, by and large, the biggest challenge of the 21st century. Indeed, according to the FAO (2009), an additional 80 million people need to be fed every year. On the top of this figure, the current hunger and malnutrition issues also have to be taken into consideration in the future policies. In 2010 for instance, due to income failure, 950 million people did not have access to adequate food, and out of
this figure, 98 percent were located in developing countries (FAO, 2010). Therefore, to be able to meet the demand of the 2 billion additional world populations by the horizon 2050, food production needs to be increased 70-100 percent of its current level (FAO, 2009). However, feeding the world population poses a complex policy challenge due to the fact that the food problem is jammed in the top of multifaceted global issues such as climate change, agricultural trade and poverty to name a few. These multidimensional elements impose major constraints to develop independent policies that could rapidly unravel the issues.

Agriculture and food security are nowadays repeatedly debated at the highest international stages and prominent forums as they constitute a global threat to the world stability. The rapid emergence of the responses of these recent years reflects the importance of the issue on the agenda of the majority of international institutions. The United Nations (UN) and the G20, with the Global Agriculture and Food Security Program (GAFSP) in 2009, the World Economic Forum with the ‘New Vision for Agriculture’ created in the same year, the G8 with the ‘New Alliance for Food Security and Nutrition’ (New Alliance) in 2012, The World Bank Group Agriculture Action Plan in 2013, the African Union (AU) with the Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods in 2014 – are few examples of initiatives that have emerged since 2008. Furthermore, individual states, private companies, civil societies and NGOs are also harnessing their efforts to work on a comprehensive agenda towards a sustainable food and agricultural systems to combat poverty and eradicate hunger.

Technical solutions were quickly found to address this issue. If the problem is about food scarcity, then, it is necessary to scale-up agricultural productivity where it is still possible to do so. Moreover, these solutions presented themselves as a boon, as
millions of people are suffering from poverty and hunger in the regions such as sub-Saharan Africa (SSA), South and Central America where agricultural development is still achievable. For that reason, bringing solutions in these regions could bring a significant impact for economic and social development.

SSA was identified as a major player in this new saga given the richness of its natural resources and its large reserve of arable land. However, this new role is also giving rise to an intertwined social, political, economic and strategic interest subjugated by a power struggle. Three major narratives have been constructed to embrace this new context. First, the reintroduction of the topic of agriculture in the development thinking which consequently led to the classification of SSA as an ‘agriculture-based’ economy. Second, resource mobilisation coupled with supports channelled through the PPP and value chain. And finally, the stabilisation of the food and grain markets with the idea that the trade mechanism would help food import dependent countries to ensure their future supply. Unequivocally, at first glance, these solutions appear as a salvation, and timely for SSA, where agriculture has been under-valued for a long time. However, the way how these policies are arranged and carried out contradict the realities that prevail in the countries towards which they are intended for.

This thesis seeks to shed light on the three narratives mentioned above. In pursuing such endeavour, it aspires to provide theoretical as well as empirical evidences on the change in modus operandi in the governance of the global food system. It seeks to highlight how the mechanisms of PPP and value chain are introduced in SSA’s development strategies to enhance private control of the African food system. Furthermore, this manuscript explores to what extent the recent agricultural development and food security policies are in contradiction with the ostensible realities in SSA, particularly, with regards to economic conditions, poverty, as well as food
access and availability. In a nutshell, the central theme of this thesis is why the recent policies intended to promote agriculture and eradicate food insecurity in SSA are not working and what can be done about it.

The main objective of this chapter is to familiarise the readers to the general framework of this study and to present the major stakes that justify the ‘new’ within the discipline of political economy when the topic of agriculture, food security and SSA are placed at the core of the discussions.

The remainder of this chapter is organised as follows. The next section presents further details about the three narratives mentioned above and documents the literature that informs the subject. The aim and significances of the thesis are laid out in section two. The subsequent section presents the conceptual framework that guides this manuscript. This framework identifies the logical sequences, the context and theoretical foundations of the concept of ‘capacity-driven approach’ – focal contribution of this thesis. The choice of the methods of analysis is introduced in the ensuing section. It briefly presents the qualitative and quantitative approaches to support the arguments of the present thesis. In addition, the section covers the scope and limitations of this study and its framework within time and space. The last section of this chapter introduces the structure of this manuscript.

1.1. Keeping track on the recent food problem: general backgrounds

In late 2007, the World Bank released its annual World Development Report 2008 (WDR2008) entitled ‘agriculture for development’. This publication was not trivial as the last report focusing on the topic dated back to 1982\(^1\). Special emphasis was placed

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\(^1\) The World Development Report 1982 concentrates on agriculture and reckons the importance of the sector to be the main source of income for the poor. (see: World Bank, 1982)
on the role that agriculture can play for the poor, in particular as a means of livelihood, and as a source of income as well as food security (World Bank, 2007, p. 8).

Agricultural development and food security are two concepts that are closely linked together, albeit they are intertwined within a different space. Agricultural development in its broad sense is a set of processes and strategies, to enhance agricultural productivity, embracing land and labour. From the viewpoint of the mainstream economic literature inspired by the modernisation theory, agricultural development can be understood as an early stage of structural transformation (Rostow, 1960, p. 4-16). According to the mainstream point of view, structural transformation is both equally a cause and effect of economic growth (Timmer, 2009, p. 5). Syrquin (2006, p. 602) points out the main changes highlighted in development literature driven by structural transformation: increase of the rate of accumulation, changes in the sectoral composition of the economic activities characterised by industrialisation, relocation of the economic activities in urban areas, demographic transition and income distribution (Kuznets, 1966; Lin, 2012, p. 3; Syrquin, 2006, p. 602; Timmer, 2009, p. 5). Accordingly, agriculture has been considered as the starting point of economic and social development. To this extent, Timmer (2009, p. 3), stated that with the exception of Hong Kong and Singapore, no single country was able to sustain a rapid transition out of poverty without enhancing its agricultural productivity.

Food security is related to the problem of food and its physical availability, sufficiency and access. Although there are a dozen definitions of food security, this thesis is particularly interested in the definition which emerged from the 1996 World Food Summit, stipulating that:

Food security, at the individual, household, national, regional and global levels (is achieved) when all people, at all times, have physical and economic access to
sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO, 1996).

The WDR2008 acknowledged that agriculture can contribute to food security, especially for the poor who directly produce their food through their activities (World Bank, 2007, p. 8). As such, bringing back the topic of agriculture in development has been the focal points to poverty reduction and food security, not only for the World Bank but also for other major international public institutions particularly after the price spike of 2007-2008. The new solutions advanced to address the food problem were crafted on the basis of the three narratives mentioned earlier, which present themselves as the main problems of the present manuscript.

1. The Silver lining: bringing back the topic of agriculture in development with the WDR2008

The fact of bringing back the topic of agriculture in development is on one hand, problematised with the fuzziness of the empirical evidences between agriculture and growth and on the other hand, to the fact that African countries are nowadays at a different stage of their development.

The positive analysts underline the fact that sustained economic growth reduces poverty (Nallari & Griffith, 2011, p. 64). A wide range of empirical evidences supports the role of agriculture in development, particularly the role of the growth stemming from agriculture on poverty reduction (Bravo-Ortega & Lederman, 2005; Christiaensen & Demery, 2007; De Janvry & Sadoulet, 2010; Diao, Hazell & Thurlow, 2010; Foster & Rosenzweig, 2003; Gollin, Parente, & Rogerson, 2002; Irz et al., 2001; Ravallion & Datt, 1996). Furthermore, De Janvry and Sadoulet (2010), specified that growth can
offer multiplicity of pathways out of poverty, depending on the sector where it is generated.

It is important to note that the effects of growth on poverty differ in time and space and therefore, growth strategies should not only focus on agriculture but also on other strategic sectors. Gemmell, Lloyd, and Mathew (2000) for instance, illustrate the importance of other sectors of the economy and its relations to agriculture using time series data of Malaysia. The study assessed how manufacturing and service are affecting the expansion of agriculture from 1966 to 1991. Their findings underlined that over the long run, expansion in the manufacturing sector is associated with the expansion of agriculture. Conversely, service sector showed a little incidence on agriculture. Other studies by Hasan and Quibria (2004) used cross-country data to examine the relationship between poverty, growth and sectoral variation across regions. The two authors observed that agriculture was a key driver of poverty reduction in South Asia and SSA while the industrial and service sectors respectively played a key role in East Asia and Latin America. Furthermore, Loayza and Raddatz (2010), who emphasised on the importance of unskilled-labour intensity, specified that agriculture and construction are the sectors that have a robust effect on poverty reduction compared to the other industries.

Nonetheless, Tsakok and Gardner (2007) raised some issues about these empirical findings, particularly the ones that seek to establish causal relations between agriculture and growth. The two authors stated that ‘the results of econometric analyses are inconclusive and even contradictory with one another’. Although, Gollin (2010, p. 3825–3866) attempted to bring some clarification to the debate, the results of the findings are still constructed on empirical assumptions and techniques that led to the same discussions. Such inconsistency matters insofar development strategies are
devised and defended according to the empirical evidences and that policy towards an agriculture-based country is different from resource-rich or industrialised one in terms of factor and resource allocations.

The categorisation of SSA as an agriculture-based economy stems from two metrics: on the one hand, the share of agriculture in the GDP and on the other hand, the proportion of the poor engaged in activities related to agriculture. However, this classification poses a major problem to the trajectory of the African structural transformation since the continent already experienced structural transformation yet with the missing agricultural linkages. Since 2000s, SSA saw a new wave of social and economic changes characterised by rapid growth of the economy and the population. Nonetheless, the real problem lies at the level of the capacity of absorption of these industries to create sustainable economic activities and livelihood for the people who migrate to urban areas.

The demographic transition driven by the new wave of social and economic progress also poses major problems to the African food security. According to the studies of the Population Reference Bureau (2013), 1.3 out of the 2 billion people who need to be fed by 2050 will be hailing from the African continent. This rapid increase of population in majority young is also expected to cause rapid urbanisation having as a consequence the recrudescence of poverty and inequality in urban areas (AfDB, 2012). In this regards, differences in economic classification matters for an appropriate policy as a wrong signal given to a particular sector of the economy might undermine or reverse the path of structural transformation in SSA.
2. The mobilisation of resources: a big push towards agriculture

Resource mobilisation is the second narrative explored and discussed in this essay. African countries have been historically locked on a pathway leading to a framework, reducing government’s power to undertake their own development policies. Agricultural aid channelled through the PPP and value chain is today the new elements embedded in the African development program to facilitate the private control of SSA food system. As a matter of fact, the African countries initiative to promote agriculture has barely obtained the support from the community of donors for many decades. In 2003 for instance, the African head of states gathered at the AU summit in Maputo, created a new initiative called ‘Comprehensive Africa Agricultural Development Program’ (CAADP) under the framework of the New Partnership for Africa’s Development (NEPAD). The CAADP main target was to increase public expenditures going to agriculture up to 10 percent of the GDP and to achieve an annual growth of 6 percent by 2008 (AU, 2003; Zimmermann, 2009). Nevertheless, despite the political will to enhance the productivity and reduce the dependency to the international markets, as the initiative was led by the African leaders, the majority of the stakeholders struggled to find further supports to carry out their agenda. This failure to carry out independent policies is not trivial, due to the strong ties of the NEPAD framework to an embedded neoliberal proclivity. The NEPAD has, indeed, often been criticised since its establishment in 2001 for its features modelled on the so-called Washington Consensus. Such model is contextualised on the idea of partnership and ownership (Bush, 2007; Owusu, 2003; Sahle, 2008). Consequently, after the failed attempts to implement an African-led agricultural policy coupled with the recent food crisis, SSA was tamed by a group of transnational corporations that have sought to integrate the region’s market for a long time (Steinbrecher, 2003).
The 2007-2008 food crisis offered new openings for transnational corporations (TNCs) to integrate the African food systems with the PPP and value chain. By the time these new waves of proposal came in, food price had increased dramatically and global markets have since then become very volatile. To soften this hike, the solutions suggested by the international community were to call the private giant corporations who were eager to bring the skills and knowledge to scale-up the poor agricultural performance in the region and to contribute to the stabilisation of the international markets. However, the private sector part of the new initiative represents a small group of interest from the food industry. This group specialises in biotechnology and together controls about half of the global certified seed market (ETC Group, 2008). The participation of this group of interest in the new food system can now threaten the proper functioning of market mechanisms as monopolies may arise, particularly for vulnerable countries, including most of the African economies which are net food import dependent since the 1980s (Rakotoarisoa, Lafrate, & Paschali, 2011).

3. The stabilisation of the grain markets to ensure food security

Since most of the SSA countries are nowadays net food import dependent, a tendency to stabilise the international markets has gradually nested the international policies. The idea behind the market stabilisation was motivated by the fact that import dependent countries could rely upon trade mechanisms to ensure their future supply at a reasonable price and that such process would transcend through the global, national and household level.

Getting back on some episodes that occurred in 2008, the impact of the global financial crisis started to spread all over the western countries creating a general malaise and social unrests. In line with these events, a series of heat waves affected major grain
producers such as Russia and Kazakhstan while floods prompted crop losses in Pakistan and its neighbouring countries. In other parts of the world, mainly in North and Latin America, the increase of demand for biofuel was incentivising farmer’s choices to divert their activity rather than sticking to the usual grain-fed cultivation (Levi, 2013, p. 120-125). More importantly, climate conditions were not very favourable as many developing countries faced crop failures for successive years (Dinar, 2008, p. 49-50). These series of events engendered a general panic within the grain markets (Jeffries, 2011, p. 736-737). An export ban was adopted by Russia, leading to the same response in Argentina and other grain exporting countries. Given the supply was less than the demand: the price of foodstuff skyrocketed, hitting the most vulnerable food import dependent countries (Williams, 2012, p. 121-122).

With the major advances in the financial industries in recent years, food commodity markets have become a very volatile environment. Taking into consideration all these conditions, ‘business as usual’ under so many uncertainties is no longer a viable option for agriculture as pointed out by the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD, 2009). The so-called ‘market’ – supposed to transcend through the three levels: global, national and household, reacts to different forces driven by incitation. Market forces, in an uncertain environment might yield into a marginalisation of the poor and import dependent countries. Market failures and externalities together with other uncertainties represent a danger for vulnerable countries since they are sources of political and social instability. Evidences from the World Bank research indicated that 51 food riots occurred between the periods of 2007-2014 causing severe social unrest across the globe with waves of violence, destabilising governments and social order (World Bank, 2014a).
The elusive debate on large versus small agriculture

The size and the style of the reforms intended to be implemented in SSA are other important debates that need to be untangled in the present thesis. These elements bridge policies to theoretical grounds as well as to the different practices that have emerged from the recent food crisis. These are about the 'large versus small agriculture' and the problem of land grabbing.

The severity of the threats to global stability, particularly for African countries, led to a multitude of responses which bring into conflicts: political, economic, security, social as well as public and private interests. These conflicts of interest are addressing the challenge of feeding the world by 2050, yet, they are also posing some issue on the practical side. The various issues such as environmental problems, changes in the global economic order, the financial crisis and many other risks, have been recently added to the pressures on food security. Consequently, producing more food has become a hard-hitting battle not only in third world countries, but also for the developed ones. In addition, the future food production, therefore, will have to take into consideration a very complex environment, climate, economic and institutional conditions (Pretty, 2012; Sachs et al., 2010).

With regards to the practice that emerged from the crisis, three groups of countries were identified in the literature as the main players in the new food game:

- Group 1: resource-rich and high-income countries (China);
- Group 2: non-oil resource-poor but high-income countries (Japan, South Korea, etc.);
- Group 3: oil-rich, resource-poor countries (Saudi Arabia, Qatar, etc.).

The modus operandi of these players also varies according to their degree of resilience, or their capacity to absorb shocks in an event of a price spike. Group 1 for
instance, is generally using its long-term presence in the continent to integrate different projects and secure the supply of food (Brautigam, 2010, p.236-241). Group 2 is mainly relying on its private sector to secure its food supply in the long run via Foreign Direct Investments (FDI) in the countries where arable land is abundant (Cotula, 2012). This group also uses the support of the multilateral public institutions to integrate its targeted countries. Group 3 is mainly relying on petrodollar and the financial resources from its own sovereign wealth funds to secure its supply over the long run (Cotula, 2012). Further discussions about these actors will be presented throughout this study, but what is worth mentioning so far is the fact that to date, different sets of literature on land and water grabbing, have been presenting the negative consequences of these investments on the smallholders’ live in the targeted countries (Bormas et al., 2011; De Schutter, 2011; Hall, 2011).

Ideas are also divided in the academic community with regards to the size and the style of the reforms to be implemented in the region. On the one hand, the positive analysis school is fostering the idea that agriculture should be market-oriented. Such perspective postulates that downstream and upstream actors in and organised global value chain would share mutual benefits while interacting together (Farole & Winkler, 2014). On the other hand, a school of thought that brings together sociologists, anthropologists, geographers, alongside with Marxist, neo-Marxist, activists, anarchists and feminist ideologies are promoting the idea of ‘food sovereignty’ concentrating on the smallholders’ rights (Bormas, 2008). However, the large versus small agriculture conundrum has been too much focused on ideological debates, and has provided little practical solutions that address the social and economic conditions of individual countries in SSA.
1.2. Aim and significances

This thesis looks beyond the simple approach to agricultural development implemented as a technical fix to solve the current issue of food security. It stresses that such development should take place in a manner that SSA countries would be able to establish the missing linkages between agriculture and the modern sector, based on the potential and real economic conditions. This approach beyond the simple agricultural development would contribute to the sustainability of the policies aiming at eliminating poverty and ensuring food security. A concept referred to as ‘capacity-driven approach’ is theoretically and empirically developed in order to embrace this process.

The objectives of this thesis are twofold. The thesis sets forth the wave of changes in the governance of the African food system influenced by international development institutions and discusses the impacts of these transformations on the way of life of the African smallholders. Moreover, examines the interplays between agriculture and food security at the global, national and household level to identify the future trajectories agricultural development and food security in the region. Furthermore, this manuscript examines the categorisation of SSA countries as agriculture-based economy and discusses whether such categorisation is justified albeit the dynamics of the other industries supporting the growth of the recent years. Additionally, this thesis seeks to investigate the driving forces of the SSA economy to draw some policy implication for agriculture and food security. Second, this thesis explores and proposes a framework to address the current agriculture and food security inconsistency with the concept of capacity-driven approach.

As part of the theoretical contribution, the paper also, offers new insight on the debates on political economy while considering the role of the international policies that influence national government decision and the interplay between politics and economy.
Moreover, the approach to data theory also explains to the readers how data can be interpreted through the lens of orbit analysis.

This thesis also brings an innovative solution to policy approaches towards agriculture and food security which discards the one size-fits-all consideration while dealing with policies in SSA. It is however prudent to mention some caveats regarding this thesis to avoid misunderstanding that can lead the readers to a hasty conclusion. The paper recognises the importance of agriculture in Africa and does not embrace a pessimistic idea of the role of agriculture in food security. Rather, it believes that agriculture can play a role in the rapidly transforming Africa.

1.3. Research questions

As previously introduced, this thesis investigates why the recent policies promoted by international development institutions with their partners are not working, and what can be done about it?

This question sets forth five sub-research questions asking:

- Why and how the changes in modus operandi in agricultural development and food security policies, particularly, the market-led paradigm, affect the modes of production and the way of life of the smallholders in a holistic manner in SSA? How this modus operandi socially, politically and economically marginalises the people in this region?

- Does the stabilisation of the international markets and the interplay between international, national and household level converge homogeneously? Does it enable the food import dependent countries to ensure their future food supply and security?
To what extent does the classification of the region as an agriculture-based inhibits the development of the other sectors of the economy and the trajectory of its structural transformation?

What are the driving forces of the economy in the region?

What lessons can be drawn from a ‘capacity-driven approach’ to devise agricultural and food security policy?

In order to address these questions, the argumentation of this thesis is structured around five propositions: first, agricultural development and food security guided by market forces and the incentives from the donors and of their partners lead to an economic, political and social marginalisation of smallholders in the target countries. Second, stabilising the world grain market via the reliance on trade mechanism to ensure that food security would transcend through the global, national, and household level is not a viable option in the long run due to the numerous inconsistency of policies at each level. Third, SSA has already embraced the shifts from the missing agricultural linkages in which other modern sector of the economy is leading. Fourth, the structural transformation of SSA is accompanied by one or more driving forces that support and stimulate the recent economic performance. Hence, the classification of the region as ‘agriculture-based’ is sending a wrong signal that might undermine the expansion of investments in other promising sectors. Fifth, ‘capacity-driven approach’ constructed over three pillars: 1) facing rural challenges, 2) handling urban migration, 3) embracing globalisation – is presented as policy recommendations to tackle the current African agriculture and food security issues.

1.4. Theoretical framework

Something ‘new’ is taking place in SSA, qualitatively and quantitatively important and
different from the earlier time, mainly after 2008, that deserves to be discussed in depth. For a long time, debates about development policies have been centred on technical solutions to technical problems as argued by Easterly (2014, p. 13). However, agricultural development as we shall see in this thesis is more than a technical problem that justifies a close outlook. For this reason, in this essay, political economy is adopted as an organisational method. This discipline is par excellence, the most appropriate tool to analyse the various changes that occurred over the past years, particularly in the way how food is produced and its modes of production. Also, the richness of the discipline makes it possible to conduct analysis through different angles, and in this sense, ‘political economy’ should be understood as suggested by Peet and Thrift (2001, p. 3): ‘a whole range of perspectives which differ from one another and yet share common concerns and similar viewpoints’.

The theoretical sources of this dissertation arise from the combination of three branches of political economy: structuralism, agency and positive analysis schools of thought. The first two schools see ‘economy’ in ‘political economy’ as a way of life based on production related to ‘social economy’ (Peet & Thrift, 2001, p. 3), constructed on a class-oriented approach. The third school derives its theoretical groundwork from ‘objective-oriented’ method which seeks to develop theories and hypotheses based upon ‘what is’ but not ‘what ought to be’ (Friedman, 1953, p. 4).

Political economy is also, deeply embedded in the analysis of the major shifts in the mode of production, such as the transition from subsistence farming to commercial agriculture (Atkins & Bowler, 2001, p. 21). As the present inquiry is focused on the study of different social groupings such as TNCs, smallholder farmers, and the role of the states, the adoption of political economy falls into what Redclift (1984, p. 5 cited in Atkins & Bowler, 2001, p. 22) described as the economic analysis of the changes within
a social group in terms of costs and benefits it might bring to them. Also, as stated by Atkins and Bowler, when it comes to the study of the agro-food system, political economy pinpoints all chain across the production process, from the farm gate to the marketing, and thus, extracts analytical meaning of the changes and the interactions that occurs within it. Such perspective known as ‘structuralism’ places the society before the individual. Hence, concepts such as the ‘food regime’ developed by Friedman and McMichael (1989) are used as a tool to understand the historical restructuration of the food system in a capitalist world (see also: McMichael, 2009a; McMichael, 2009b; McMichael, 2012a; McMichael, 2012b).

From another lens, the individual is placed prior the society when it comes to discussing food security. This shift in the analysis of the subject matter is primarily guided by the fact that the purpose of food security policies is intended and directed to an agent-based approach. A concept such as ‘food sovereignty’ pioneered by la Via Campesina in 1996, makes it possible to draw some analytical tool in regard to the rights of the smallholders in developing countries, particularly about their rights as an ‘individual’ to produce what they want in a way they want. A compendium of studies which presents informed survey by Desmarais (2007) for instance, puts forth the struggles of peasants in developing countries to stay on their land to cultivate what they want and build a viable community while facing the pressure and competition from the multinational corporations supported by international institutions government policies. In another case study, Tansey and Rajotte (2008, p. 176-196), describe the responses of activists, social movements and the social groups defending ‘food sovereignty’ against the propagation of intellectual property and other similar instruments to control the food system. Madeley (2008, p. 26-46) points out how TNCs seek to impose this control through instruments such as seeds, patents, terminators, pesticides, trade and the land
causing the impoverishment of millions of people in developing countries. Considering these cases, ‘food sovereignty’ is regarded by the agency school as an alternative solution for food security (Schanbacher, 2010, p. 53-76).

Lastly, the sources of this present inquiry would not be complete without the theoretical works stemming from the positive analysis school, particularly, when the subject matter shifts to ‘policy’. Positive analysis has been for a long time influencing policy making. The school’s ideas are often approached with the understanding of what interests the government officials are defending and why – in the view of the inconsistency between policy and democratic norms\(^2\). Barrett, Carter and Timmer (2010) argue that public policy formation occurs based on a self-interested rationality of policy makers (see: Krueger, Schiff, & Valdes, 1991; Lindert, 1991; Thies & Porche, 2007). To this end, Gorter and Swinnen (2010) identified four key elements that the positive analysis model took into account in policy making: individual preferences of citizens; the collective action of lobby groups; the preferences of politicians and political institutions. Positive analysts also conceptualise food security in different ways: availability-based view, which is aiming at achieving self-sufficiency; entitlement approach, built over human rights, legal institutions, and the state (Sen, 1981); and finally, the population health/risk management approach which pays close look to the issue of poverty (Barrett, Carter & Timmer, 2010). Furthermore, the positive analysis school puts an emphasis on empirical analysis to defend policy recommendations. The reintroduction of agriculture in the theme of development for example, empirically assumes that growth originating from agriculture is more effective in poverty reduction compared to the ones generated in other industries (World Bank, 2007, p. 28).

\(^2\) African agriculture received less support despite the proportion of rural population engaged in farming activities. However, rural populations are used to gain votes during elections.
Accordingly, the concept of intersectoral linkages is also an important analytical tool used in the present manuscript. It offers a wide range of perspectives to study the dynamics of economic sectors and to identify the role played by agriculture among other industries. The major framework of the intersectoral analysis derives from the work of Chenery, Syrquin, and Elkington (1975); Johnston and Mellor (1961); Lewis (1954); Ranis and Fei (1961) as well as Jorgenson (1961).

After presenting the various sources of the theoretical foundation of this study, the following section is therefore presenting how it can be represented as a conceptual framework.

1.4.1. Conceptual framework

The conceptual framework builds on two systematic approaches combining qualitative and quantitative analyses constructed from the theoretical framework presented earlier. The combination of these two approaches gives rise to the concept of ‘capacity-driven approach’.

The underpinnings of the theoretical, factual and institutional issues constructed on agency/structuralist-oriented political economy are illustrated in Figure 1 below, in the box on the left side. It outlines the elements that influence the changes in the global food system and the inconsistency of policies, particularly in SSA.
The second approach, shown in the middle, depicts a series of quantitative studies constructed on positive analysis approach, illustrates the importance of elements such as economic conditions, intersectoral linkages and economic transition at a macro-level. The last part of the framework embarks on the synthesis of the empirical and qualitative evidences to build a new policy approach based on a ‘capacity-driven’ agricultural development and food security.

1.5. Methodology

The qualitative method mainly builds on the studies of the relevant literature covering the research field of the political economy of agricultural development and food security. With regards to data theory, the technique of orbit analysis is used as an alternative method to inferential statistics to avoid the risks of empirical biases.

Establishing causal relations is one of the main goals of social sciences. Such attempts are nowadays, often understood in a sense of ‘Granger-causality’ (Itaki, 2014). However, despite its popularity among the academic community, the method is flawed and presents many risks that might lead to spurious results. In this section, we present
some of the theoretical features of the regression methods and the risks it might induce. Let us have a simple look at the definition of this causal relation:

Variable x is said to Granger-cause a variable y if, given the past value of y, past value of x are useful for predicting y. A common method for testing Granger causality is to regress y on its own lagged value and on lagged value of x and tests the null hypothesis that the estimated coefficients on the lagged value of x are jointly zero. Failure to reject the null hypothesis is equivalent to failing to reject the hypothesis that x does not Granger-cause y. (StataCorp, 2011, p. 595).

Techniques build on regression analysis, such as the autoregressive models are common methods to test these causal relations. However, this method presents some risks due to the rigours of the conditions of its assumptions that should be meticulously observed and meet to obtain a reliable estimation results. An example of these rigorous assumptions is the ones derived from the classical linear regression model: linearity and additivity, statistical independence of the errors, homoscedasticity, and the normality of the error distribution (Mamingi, 2005, p. 10). All violations of these assumptions are leading to a regression bias. Econometricians correct bias by transforming the data or by using other rigorous techniques of estimations. Berk (2010) however, mentioned that ‘for both diagnostics and the remedies, new and untestable assumptions are required even before one gets to a number of thorny technical assumptions’.

The inconsistency of empirical evidences casts doubt on the relevance of the inferential techniques adopted by the positive analysts to test the relations between agriculture and economic growth. Albeit this contradiction, econometric analyses has become a main empirical tool used by the international development institutions to defend policy prescriptions. To avoid the empirical biases, orbit analysis is adopted as a core method to data theory. Further information on the basic principles and assumptions
of orbit analysis will be provided with details in the empirical part of this essay, but for now, let us mention a few words about the description of the method.

Orbit analysis is a statistical method applied to a consistent time series, whose main analytical framework is based on leading-following relations. The technique was developed by Itaki (2014) to analyse one or multiple variables that implicitly has a ‘pulling’ and ‘being pulled’ relations. In contrast to the inferential method such as regression or autoregressive models, orbit analysis traces one by one, across time, the position of each analysed variable. As the original technique of orbit analysis was devised for time series analysis, this paper, therefore, contributes to the extension of the method of graphical and cross-country analysis.

1.5.1. Data sources

Since this study reviews and critiques the various policies on agricultural development and food security, the data used for this purpose are retrieved from secondary sources. The main data supporting the empirical part of this thesis are retrieved from different databases provided by various international development institutions. The UN database national accounts for the main aggregates, the World Bank’s World Development Indicators for the data on land, population, urbanisation, etc. lastly, political freedom and civil liberty from the Freedom in the World, the World Bank Doing Business Indicator (DBI), etc., are used to construct a new dataset for the empirical analysis. The detailed information regarding these data is presented in the supplement of information of this manuscript.

1.5.2. Scope and limitations

This thesis focuses on the study of agricultural development and food security policies
carried out within the framework of the GAFSP and G8 New Alliance projects in Africa. The geographic scope of this study covers SSA defined by the UN as follows: ‘The designation sub-Saharan Africa is commonly used to indicate all of Africa except northern Africa, with the Sudan included in sub-Saharan Africa’ (UNSD, 2014).

Due to limited data availability, 38 countries, covering four sub-region of SSA (organised through geographic, political and institutional classifications) have been selected for this study. The study covers the period 1970-2013 and sets forth some major changes before and after 2008.

1.6. Structure of the dissertation

This dissertation is organised into seven chapters. The present introductory chapter sets the scene and the framework of this thesis. Chapter 2 seeks to approach the paradigm of human security from the perspective of food security, which brings in the discussions of the new patterns of policies adopted in six countries in SSA. It discusses about the emergence of a market-led food security, guided by market forces and incentives created by the GAFSP and New Alliance project. Furthermore, the chapter identifies the impact of these changes on the smallholders in the targeted countries.

In line with this topic of transformation, Chapter 3 investigates and discusses the relations between global, national and household food security and its implication on agricultural development policies and food security in SSA. It seeks to understand whether such goals are converging towards the same direction or diverging – taking into consideration the ideological debates on the topic. It will be argued that the three goals constitute a ‘trilemma’ which consequently affects the ultimate goal of combating hunger and poverty in the region. This chapter bridges the qualitative analysis to the empirical analysis of this dissertation.
Chapter 4 discusses the arguments presented by the international development institutions to categorise SSA as an agriculture-based economy. Using multivariate orbit analysis, the chapter constructs new dataset to compare different arguments based on sectoral linkages to draw some implications for policy making with respect to agriculture in the region. Furthermore, the chapter presents a ‘sector-to-sector’ comparison between agriculture and other industries of the economy. In addition, the chapter compares the performances of the countries benefiting from the supports of the donor agencies with the rest of the other countries in SSA.

Chapter 5 draws some diagnostic tools from the aggregate demand, and examines the structural transformation using panel orbit analysis. Variables such as consumptions, government expenditures, investments and trade, are incorporated into the main study to partly build the notion of ‘capacity’.

Chapter 6 focuses on policy advocacy regarding the management of agricultural and food policy in SSA. The chapter elaborates on the concept of capacity-driven approach to address the issue of agricultural development and food security in the region as opposed to the policies advocated in the three narratives mentioned earlier.

The conclusion chapter summarises the findings and draws policy implications for sustainable agriculture and food security in Africa. The last chapter also presents further researches for a better understanding and the application of the concepts presented in the present manuscript.
Chapter 2: Food and human security in sub-Saharan Africa

2.1. Introduction

When related to the notion of ‘freedom from fear and freedom from want,’ a definition of the UNDP (1994) often used by ‘human security’ scholars, without any doubt, the concept of food security is nested under the paradigm of ‘human security’. However, as the concept of ‘human security’ per se remains a bit vague and very often idealistic, the study of concrete examples is essential to formalise meaningful contributions.

Since 2008, two multilateral programmes have influenced agricultural development and food security policies in SSA. On the one hand, the UN GAFSP pioneered by the G20 at the summit in Pittsburgh in 2009 and on the other hand, the G8 New Alliance for Food Security and Nutrition in Africa – an initiative adopted at the Camp David summit in May 2012. The two programmes brought together 12 countries of SSA\(^3\) where the mechanisms of the PPP and value chain were introduced as a framework to tackle food security and to some extent, chronic poverty (UNSCN, 2015).

Using political economy as a method of analysis, this chapter attempts to describe the institutional framework governing the new changes within SSA food system. It seeks to approach the paradigm of human security from the perspectives of food security, which brings into play discussions of the new patterns of policies adopted in 12 countries in the region. Furthermore, it puts forth the existing partnership between the public and private sectors to tackle the issue via the GAFSP and New Alliance programmes, and its impact on the smallholder’s organisation of production.

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\(^3\) The numbers of recipient countries are based on information compiled from the GAFSP and USAID as of 2013.
The central questions the chapter will attempt to answer are the followings: Why and how the changes in modus operandi in agricultural development and food security policies, particularly, the market-led paradigm, affect the modes of production and the way of life of the smallholders in a holistic manner in SSA? How this modus operandi socially, politically and economically marginalises the people in this region?

This chapter argues that the incentives signalled by the GAFSP and New Alliance are creating a market-led food security which in turn, engenders a cycle of altered marginalisation of the African smallholders.

The remainder of this chapter is structured as follows: firstly, it discusses the general background of the GAFSP and New Alliance and the countries targeted by the two initiatives. It stresses on the model that emphasises on the role of private and public sectors and their approach to food security. Secondly, the chapter discusses the paradigm of market-led food security as a result of food commoditisation and the different market incentives that are favouring it. Thirdly, the chapter identifies the various impacts on the SSA smallholders resulting from the market-led model of the organisation of production. And finally, the chapter briefly explores two concepts: productive and absorptive capacity as two elements to conceptualise the ‘capacity-driven approach’ developed in Chapter 6 of this manuscript. The last section concludes and bridges the present chapter to discussions related to policy mechanisms.

2.2. A new modus operandi to tackle food security

Recent changes in policy by various multilateral organisations are sending signals to a particular group of interests, for the most part, the giant corporations that are dominating the world food system. As a global response to the price spike of foodstuff in 2008, in September 2009, the G20 created the GAFSP – a special fund that aims to
improve income and food security in low-income countries through the increase of agricultural productivity. This programme consists of two components: the public one, led by a steering committee comprising major international institutions such as the World Bank, the FAO, IFAD, WFP, Regional banks such as the AfDB and ADB, civil society, and the representative of the Secretary General of the UN. The second component is a private one, led by the private arm of the World Bank Group: the IFC. This private window aims to provide funding to increase the commercial potential of the agribusiness and SMEs by bridging the local, national and international value chain. With this regard, the IFC’s programme focuses on credit to smallholders to improve productivity, support to companies to develop technologies related to agriculture, and finally, investment and support in the riskiest sector which cannot attract investment. Although the GAFSP was born under the G20, 10 donors principally committed to fund the programme: Australia, Canada, Ireland, Japan, Korea, Netherlands, Spain, United Kingdom, United States and the Bill & Melinda Gates Foundation. As of May 2014, the public sector window already contributed to $979.20 million and the private sector window $238 million (GAFSP, n.d.).

Nearly two years later, on May 18-19th, 2012, the G8 held its annual meeting at Camp David in Maryland, United States, to discuss usual agenda related to global governance, such as the global economy, climate change or security issues. However, what marked this summit was the fact that specific measures were adopted to support the African continent with regards to agriculture and food security. The New Alliance was devised to foster the role of the private sector by mobilising private capital, scaling up technology and reducing the risk faced by the most vulnerable people.

The compilation of the information related to the GAFSP and G8 New Alliance, gives rise to the map illustrated below.
Figure 2 - Map of the GAFSP and G8 New Alliance for Food Security and Nutrition

Source: Author. Information compiled from GAFSP and USAID as of 2013
Table 1 depicts the total area of these 12 countries which represents about 6,376,137 square kilometres, of which agricultural land is roughly estimated at 2,692,838 square kilometres and home by nearly 353.414 million people (World Bank, 2012a). Agricultural land represents, on average, about 50 percent of the total area (World Bank, 2012a).

Table 1 - Profile of the GAFSP and G8 New Alliance countries

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</thead>
<tbody>
<tr>
<td>Ethiopia*</td>
<td>1,127,127</td>
<td>364,880</td>
<td>36.5</td>
<td>94.1</td>
<td>Landlocked</td>
<td>Not-Free</td>
<td>132</td>
</tr>
<tr>
<td>Ghana*</td>
<td>238,535</td>
<td>157,000</td>
<td>69.0</td>
<td>25.9</td>
<td>Coastal</td>
<td>Free</td>
<td>70</td>
</tr>
<tr>
<td>Kenya</td>
<td>582,650</td>
<td>274,300</td>
<td>48.2</td>
<td>44.35</td>
<td>Coastal</td>
<td>Partly-Free</td>
<td>136</td>
</tr>
<tr>
<td>Liberia</td>
<td>111,370</td>
<td>27,100</td>
<td>28.1</td>
<td>4.294</td>
<td>Coastal</td>
<td>Partly-Free</td>
<td>174</td>
</tr>
<tr>
<td>Malawi*</td>
<td>118,480</td>
<td>57,350</td>
<td>60.8</td>
<td>16.36</td>
<td>Landlocked</td>
<td>Partly-Free</td>
<td>164</td>
</tr>
<tr>
<td>Mali</td>
<td>1,240,000</td>
<td>416,510</td>
<td>34.1</td>
<td>15.3</td>
<td>Landlocked</td>
<td>Partly-Free</td>
<td>127</td>
</tr>
<tr>
<td>Mozambique*</td>
<td>801,590</td>
<td>499,500</td>
<td>63.5</td>
<td>25.83</td>
<td>Coastal</td>
<td>Partly-Free</td>
<td>46</td>
</tr>
<tr>
<td>Rwanda</td>
<td>26,338</td>
<td>18,568</td>
<td>75.3</td>
<td>11.78</td>
<td>Landlocked</td>
<td>Partly-Free</td>
<td>161</td>
</tr>
<tr>
<td>Senegal*</td>
<td>196,190</td>
<td>90,150</td>
<td>46.8</td>
<td>14.13</td>
<td>Coastal</td>
<td>Free</td>
<td>150</td>
</tr>
<tr>
<td>Tanzania*</td>
<td>945,203</td>
<td>406,500</td>
<td>45.9</td>
<td>49.25</td>
<td>Coastal</td>
<td>Partly-Free</td>
<td>111</td>
</tr>
<tr>
<td>Uganda</td>
<td>236,040</td>
<td>142,620</td>
<td>71.4</td>
<td>37.58</td>
<td>Landlocked</td>
<td>Not-Free</td>
<td>127</td>
</tr>
<tr>
<td>Zambia</td>
<td>752,614</td>
<td>238,360</td>
<td>32.1</td>
<td>14.54</td>
<td>Landlocked</td>
<td>Partly-Free</td>
<td>46</td>
</tr>
<tr>
<td>Total/average</td>
<td>6,376,137</td>
<td>2,692,838</td>
<td>50.98b</td>
<td>353.414b</td>
<td>-</td>
<td>-</td>
<td>-</td>
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Notes: * indicates that the country is recipient of the GAFSP and the New Alliance; a indicates the total calculated from the data on the 10 countries; b indicates average calculated from the data on the 12 countries. NA: not available.

Additionally, according to the EIU Food Security Index (2014), a database that ranks countries based on the level of the affordability, accessibility and quality of food, the 12 countries scores are, on the average 90th out of 109 countries. Furthermore, the
Freedom House Index of Civil and Political Liberty (Freedom House, 2014), a comparative index, assessing the global political rights and civil liberties indicated that, among the 12 countries, 2 are categorised as ‘free’, 8 ‘partly-free’ and 2 ‘not-free’. In addition to these indicators, the World Bank’s Doing Business Index (World Bank, 2014b), which ranks countries corresponding to the quality of their business environment, on average, places these countries, around the 120th position out of 189.

At first glance, these figures might prove to be confusing to understand as the data in Table 1 shows heterogeneous characteristics relative to each country. However, viewed from the lens of the value chain one finds that the recipient countries are concentrated on Eastern and Western Africa. Furthermore, the compilation of the information in Table 1 indicates that six countries are serving as rallying points of the GAFSP and the New Alliance, namely: Ethiopia, Ghana, Malawi, Mozambique, Senegal and Tanzania.

With the three major crises that hit the world simultaneously in 2007-08, the so-called ‘triple crises’: the financial, food and climate change (Addison & Tarp, 2010), a new modus operandi was gradually embedded in the global food production system, transforming the relations and the role of different economic actors at different levels.

Two major causes have triggered this turning point in food security policy. On the one hand, there is a strong belief in the need to reduce the social divide, in line with the Millennium Development Goals (MDGs) with the ambitious target of halving poverty by 2015 which represents about 980 million people in 2012 (Pretty, 2012, p. 37-52; UNDP, 2012). On the other hand, the very characteristics of food security have taken on new dimensions. If prior to 2008, insecurity was either chronic, i.e. long-term and persistent food security; or transitory, short-term inability to cope with food security – it now occurs under mixed patterns, repetitive and uncertain.
As the prevailing idea is to increase production by maintaining an affordable price to keep pace with the increasing food demand within a short period of time, the involvement of the private sector was perceived as the most appropriate way to tackle the issues of food security. The long-term experiences in R&D as well as the potential to enhance private investment are the strong leverage advocated by the GAFSP and the New Alliance (Chambers et al., 2014, p. 64-65). Moreover, as land productivity has always been low in SSA, the integration of the private sector was consequently believed to enhance this capacity. In 2009, for instance, land productivity in value, accounted for an average 239 US$ per hectare of agricultural land in the twelve countries (IFPRI, 2012) with an average yield of 1.35 tonnes per hectare (World Bank, 2013b). Nevertheless, such process would require the control of the means of production either by an overtaking of the farmland or the integration of the production system. Moreover, SSA government capabilities to deliver public goods are very limited and as the time factor is playing a crucial role in the adaptation process, delaying any actions to improve agricultural productivity would afflict a disastrous consequence especially for the poor people as shocks would be frequent and uncertain. Such additional difficulty suggests that if African governments do not find the necessary and appropriate resources to address these new challenges, any constraints or new burden on future public expenditures would result in the deterioration of the social welfare (Nelson et al., 2010). The New Alliance for instance, is trying to embrace this context with three guiding principles: i) mobilising private capital; ii) taking innovation to scale and iii) managing risks. Points that are believed to get 50 million people out of chronic poverty within the next ten years (White House, 2012, May 18). As of April 2013, 27 TNCs and 21 local companies across SSA have signed a letter of intent pledging an investment of nearly $3 billion US (USAID, 2013).
With the heated debate propelled by some NGOs on the fact that the G8 project is spreading land grabbing\(^4\) (see: GRAIN, 2012), the value chain approach was gradually introduced to defend the new policy, particularly for the companies involved in the GAFSP and New Alliance.

The concept of value chain is defined as the process that involves different activities brought together, from the design\(^5\) of a given product (or service), the different phases of its production – to the delivery to the final consumers. Gereffi and Fernandez-Stark (2011) define global value chain as follows:

A value chain identifies the full range of activities that firms undertake to bring a product or a service from its conception to its end use by final consumers. At each step in the chain, value is added in some form or other. Driven by offshoring and mounting interconnectedness, the activities that make up the value chain of many products and services have become increasingly fragmented across the globe and between firms. Various tasks along the production chain can be carried out in distant locations, depending on the respective comparative advantages of different countries. The interconnected production process that goods and services undergo from conception and design through production, marketing and distribution is often referred to as a global value chain or an international production network. (Gereffi & Fernandez-Stark, 2011 cited in AfDB, OECD, & UNDP, 2014, p. 124).

The definition given above is placing an important focus on the role of the private sector, the main stakeholder in the GAFSP and New Alliance. Nonetheless, one thing that is noticed about the two programmes is the fact that it regroups most of the prominent TNCs specialised in banking, biotechnology, agricultural equipment,

\(^4\) Such event sparked a series of controversy about the global land deals giving rise to hostile tension in the host countries

\(^5\) Design can also embrace conception.
irrigation, insurance and food distribution. The interactions between the public and private sectors within the framework of the two programmes can be regrouped under the following segments highlighted in Figure 3: inputs, capital, equipment and irrigation, distribution, risk management, and information.

Figure 3 - Illustration of the GAFSP and G8 New Alliance segments of value chain

Source: Author.

The segments under which the GAFSP and New Alliance are operating are presented as follows:

- **Inputs** – one the one hand, a segment that brings into plays giants TNCs mainly specialised in biotechnology companies such as DuPont, Monsanto, Syngenta AG and United Phosphorus Limited and one the other hand, Yara, a company specialised in fertiliser.

- **Capital** – involves private institutions such as the Rabobank, the investment firm Armajaro, the IFC and public financial institution such as the AfDB. This initiative is believed to give a new dimension to the long-term ‘underinvestment’ in agriculture in the region.
- Equipment and irrigation – a unit that regroups TNCs specialised in agricultural equipment and irrigation such as AGCO, Jain Irrigation and Netafirm.
- Distribution – a segment that involves giant corporations specialised in food and beverages such as Diageo plc, SABMiller plc, and Unilever.
- Risk management – involving the Swiss RE specialised in reinsurance to guaranty the investments.
- Information - In addition to the risk packages, Vodafone a giant mobile industry was also taking part of this consortium to offer new mobile services and technology that might serve farmers.

Indisputably, the way these public and private sectors are organised demonstrates the fact that for the GAFSP and New Alliance to be successfully carried out within the next ten years, the twelve African countries targeted by the project would have to experience a shift towards the market-oriented ‘agriculture’. However, the main issue that poses critical debates is about the dimension and direction towards which the transition is heading to – as the notion of market-oriented can take two forms: ‘pro-poor’ and ‘pro-corporatist’ market-oriented agriculture. Hence, the major concerns with regards to human security are related to the ‘degree of control’ that African countries would have on their agriculture, and the real beneficiaries of these transformations. After a brief description of the institutional framework designed by the New Alliance, the next section is addressing the question of why food security in SSA is falling into a market-led paradigm.

2.3. The paradigm of ‘market-led food security’

As mentioned in the previous section, there are two forms of agricultural transition that
are influencing African governments’ policies: ‘pro-poor’ and ‘pro-corporatist’ market-oriented agriculture. One of the discourses in the New Alliance postulates on the fact that the initiative would lift 50 million people out of chronic poverty – an argumentation that seeks to find its ground in the modernisation traditions with respect to the role that agriculture plays in such process. Modernisation theory however failed to provide clarifications regarding the process under which this transformation would take place. It is within this gap that the proponent of the private sector draws their main arguments by keeping the idea of transforming the economy of subsistence into a market-oriented economy, yet governed by a very corporatist penchant. Two main arguments are advanced here to explain the driving force of market-led food security: first, the dynamic of the market and secondly, the incentives created by the New Alliance.

Revisiting the literature on the role of agriculture in development, Timmer (2009, p. 5) underlines that from an historical perspective, with the exception of Singapore and Hong Kong, ‘no single country was able to sustain a rapid transition out of poverty without raising productivity in its agricultural sector’. An earlier interpretation of the role of agriculture in development was established by Lewis (1954) who suggests that developing countries are characterised by a dual economy composed by a low productivity sector (agriculture) and a modern high-productivity sector (manufacturing, service, etc.). Lewis proposes that under this form the role of agriculture is to supply cheap foods and provide low wage labour in the modern sector. In addition, Johnston and Mellor (1961) put forward the following direct linkages that highlight the role of agriculture in development: supply of labour for the industry, supply of food for domestic consumption, supply of savings for industrial investments, sources of foreign currencies through the export of agricultural products, which allows the import of intermediate and capital goods. To these direct linkages, Timmer (1995) emphasises
that the improvement of the agricultural sector indirectly enables the poor to have access to better food, rich in nutrients, and at the same time it contributes to food availability, price stabilisation and poverty reduction. In addition, various empirical evidences support the contribution of agriculture to economic growth and poverty reduction as stated in the previous chapter. Despite the reluctance and criticism on these linkages for the African countries, other literature such as the World Bank (2007) and Diao, Hazell and Thurlow (2010) argue that African countries cannot bypass agriculture to transform their economy. Therefore, in line with the global belief that aims at eradicating poverty, the New Alliance project found a solid background to channel its effort in transforming African agriculture.

The context under which the role of agriculture is interpreted through these different theories saw dimensional and directional shifts where market forces and incentives are playing driving forces that influence the organisation of the production on a global scale. Today’s food price formation is the result of the interaction of several factors such as the supply and demand of food, the market information, the quality of the products, geographical organisation of the production, and industrial conditions. Economists called these factors ‘market forces’ which are described as the mechanism that determines the price of a given product (Dwivedi, 2009, p. 27). Over these last years, the dynamics of the market forces saw a dramatic alteration within time and space which explains the rising interest of the private sector, and particularly the TNCs to invest in agrarian capitalism with a new dimension that embraces the developing countries. ‘Food regime’ is a concept of political economy that will be partly used in this section to explain the relations through which food is produced under a specific form of hegemony. In this section, a special attention would be paid on the neoliberal/corporate hegemony (McMichael, 2009b).
Seminal work of food regime was elaborated by Friedmann and McMichael (1989) by the late 1980s, which interprets the process of agricultural development at different periods with a specific institutional framework combined with a relevant standards regarding the organisation of production, income distribution, exchange and consumption to explain the functioning and reproduction of global capitalism (see also: Atkins & Bowler, 2001; Holt Gimènez, 2011).

Albeit the different interpretations of the period in which food regime changes the relations of production and consumption of food, McMichael (2009b) listed three distinct periods. The first food regime (1870-1930s) was characterised by the cheap food and raw materials hailing from the tropical and colonised countries to support industrialisation in Europe. Such structure is marked by the development dynamics stressing on the agriculture-industry nexus. The second regime (1950-1970) was characterised by the spread of industrial agriculture marked by advances in research in biotechnology which led to the ‘Green Revolution’. This period was coupled with the massive use of subsidies, fertiliser, pesticides, irrigation and agricultural machinery in some countries in the global south. In the meantime, the surplus of food generated in some industrialised countries like the United States, was also used to serve ideological purposes, during which, food aid was used to fight against the rise of Communism (Holt Gimènez, 2011). The third regime 1980-present, emerged from the global economic crisis of the 1970s and 1980s, which was also marked by the advent of the neoliberal agenda (McMichael, 2009b). Furthermore, ‘getting the price right’ was the maxim during the adjustment era in Africa which limited the progress in agricultural researches and led to the suppression of several policies that support smallholders such as agricultural extension and services (Chang, 2009). Additionally, the boom of the
supermarkets and the wave of globalisation gave more room for the commercial agriculture to take control of the global food system.

Despite the increasing power of the corporate food industries during the third regime, food problems in Africa remained unsettled over several decades. The corporate regime rather enabled industrialised countries to generate a surplus over a long period. Nonetheless, the market forces driven by the three crises of 2007-08 reversed these trends. The rapid growth of the world population coupled with the pervasive effects of climate change, the economic recession, thorny global energy policy and the transformation in some emerging countries – had a considerable impact on the global production and consumption. The era of cheap food has reached its limit as described by the magazine The Economist (2008, December 6), which stresses that food prices have increased dramatically despite the fact that we still live in a period of abundance.

The supply and demand of food experienced major changes since the late 2007. On the one hand, the emergence of a new middle class in countries like China and India has boosted demand for meat, which production requires the use of more grain (3kg per kilo of pork and 4-8kg per kilo of beef6). But the villain of the 2007-2008 food crises was the rush to biofuel production supported by industrialised countries. Biofuel production increased by 800 percent over 2004-2008 (McMichael, 2012a, p. 60-82). In addition, since the ethanol has become more profitable than food production, producers responded positively to the price signals. On the other hand, from the other side of the equation, supply has been affected by climate change which reduced the capacity of net-exporting countries to meet the market demands. The result of these market forces triggered the change in land use and export restrictions causing the general malaise in the rest of the world and particularly, for the net-importing countries.

6 See: The Economist (2014, January 18)
In addition to market forces, the New Alliance squared another signal by incentivising the private sector via deregulations and important financial commitment to agriculture and food security. As part of the declaration of Aquila the G8 pledged an investment of 22 billion US$ (Dethier & Effenberger, 2012). Therefore, since 2008, agriculture in itself has become a speculative investment and a safe haven to hedge against the market risks (McMichael, 2012a, p. 60-82). As a matter of fact, the way markets react since 2008, show that the soft commodity index was nearly behaving like the hard ones. Figure 4 depicts this degree of high volatility of the agricultural index among metals and minerals and crude oil.

Figure 4 - Hard and soft commodity index 1970-2015

![Hard and soft commodity index 1970-2015](source: author, data adapted from the World Bank (2015))

The linkages between incentives and market forces as part of the New Alliance project have strengthened the targeting of African countries where agricultural expansion is still possible. However, these countries have recorded weak governance and limited financial capabilities – a weak linkage that enables to channel international
investments and facilitate the overtaking of the private sector in the food system. The incentives and market forces are not limited to TNCs – they are also transposable to African producers who might respond in the same way to the signals dictated by the food industries. In this case, what African countries will produce will depend on the incentives channelled from the upstream level. For that reason, food security which is already fragile in the continent might be subdued to the two main drivers which in turn could lead to ‘market-led’ food security.

2.4. The process of altered marginalisation

The second question this chapter is trying to answer is to what extent this new modus operandi affects the way of life and the smallholders organisation of production in a holistic manner. This section shifts the focus of analysis to the conditions related to the changes that go along the new system based on this market-led food security in the 12 targeted countries. This section stresses on the discussions that put forth the degree of control that SSA countries would have on their own food system as well as its impact on the smallholder’s way of life from an agent-based perspective. Seven points divided in two groups are here used to discuss about this degree of control in the context of market-led food security, namely: first, seeds, patents, genetic modification and terminator; second, pesticides, trade and land use.

2.4.1. Seeds, patents, genetically modified seeds, and terminator

In recent years, seeds have become a very profitable business for the TNCs. According to Madeley (2008, p. 28-29), 10 companies are actually controlling nearly half of the global certified seed market, among which, companies such as DuPont, Monsanto, Syngenta AG and United Phosphorus Limited, stakeholders of the New Alliance are playing a key leading role. TNCs are selling their seeds as technical
packages which require its user to purchase other products such as pesticides and fertilisers. Hence, the inherent risk for smallholders is here linked to such kind of technical packages under an oligopolistic market conditions. Moreover, the technical packages form a single unit that is protected by patents. The discourses that TNCs are very often using with regards to patents lay on the fact that no company can run the risk of investing in R&D without a guaranty to yield return on their investments. Therefore, smallholders could lose the control of their own system of production and could become increasingly dependent on the TNCs. The real danger in this process is the fact that market-led leanings that is prevailing today may push some companies to speculate over the future African agricultural produce, a process that would be developed in depth in Chapter 3.

Furthermore, another topic that fuels heated debates is about crop adaptation that relies on genetic engineering. The problem in the use of genetically modified products (GM) is related to the choice of the product and the risks related to its use. Madeley (2008, p. 29) explained that a wrong choice can ruin the genetic basis of all production, making it impossible to plant another crop and thus endangering the livelihood of small farmers. Moreover, Madeley added that coexistence of GM plants with other species is almost impossible since there is a risk that the wind will carry these seeds to a long distance up to another plot of land. Such an event has led to many legal disputes as the agrochemical industries claimed that no matter the unintentional use of the GM, farmers must pay royalties. From 1997 to date, for instance, Monsanto has recorded 145 legal suits related to these disputes mentioned previously (Monsanto, n.d.). Furthermore, another problem associated with GM seeds is about herbicide applications which can kill other animal or vegetal species. Although African governments have always been reluctant to the use of GM, the GAFSP and New Alliance projects are giving new
opportunities for TNCs to introduce and commercialise their products in SSA. Nevertheless, the use of these types of seeds can engender political tensions between African states insofar that invasive GM could reach and affect species in non-GM users.

The use of GM seeds is limited and cannot be re-used in the cultivation process. Advances in genetic engineering enabled the agrochemical industries to terminate the plant reproductive capacity. Farmers who are adopting such kind of techniques are therefore subjugated in a long-term contract with the seed suppliers. Last but not least, the effect of the GM on human organism remains unclear. Indeed, Seralini et al. (2012)\(^7\), who conducted experiments using Monsanto GM maize to feed rats, found that GM maize caused tumour to their experimental subjects. This gives rise to very critical questions of food safety to human beings and therefore, presents an inherent risk to the future African consumers, particularly in the 12 countries part of the GAFSP and G8 New Alliance.

2.4.2. Pesticides, trade and land use

The New Alliance is regrouping the most prominent TNCs specialised in pesticide production such as DuPont, Monsanto and Syngenta. These three companies are among the big six corporations controlling over 85 percent of the world’s pesticide sales of 28.8 billion US\(^8\) (ETC Group, 2008). TNCs are seeking to introduce a modern type of farming which will increase the use of fertiliser and other chemicals. To date a vast array of literature is also dealing with the negative effects of pesticides in developing countries such as the poisoning cases (see: World Bank, 2007), which can threaten the

\(^7\) The first article created a polemic among the academic community was retracted by the Journal Food and chemical toxicology and republished by the Environmental Sciences Europe in 2014.

\(^8\) Data for the year 2007
sustainability of future food production. In addition, the same three TNCs part of the New Alliance are controlling global maize seed markets, which accounts for 10.2 billion US$, nearly 42 percent of the world maize seed market (ETC Group, 2008). Not only had the TNCs integrated the African production system through vertical integration, but also expanded their business with other investments. Cargill, one of the giant food and beverage corporations whose world market share represents about 26.5 billion US$ in 2007, has for instance established its control over the cocoa processing in Cote d’Ivoire (ETC Group, 2008).

Barriers to trade and competition are among the main arguments supported by the World Bank to explain the lack of performance in African agriculture. Five obstacles were mainly highlighted by a World Bank report on Africa (World Bank, 2012b)9, namely:

- Inputs of seeds, fertiliser and extension services;
- High transportation cost;
- Opaque and unpredictable trade policies that are curbing private sector investments;
- Relative risks when crossing borders;
- And finally, inefficient distribution services.

The World Bank Group via its active role in the GAFSP is also playing an influential role in African countries through the policy advocacy that matches with the New Alliance targets. Similar points such as: facilitating private sector investment, facilitating access to land for the local people and the private investors, removing trade barriers are often occurring in the series of document describing the cooperation

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9 The report is prepared by the World Bank is entitled: ‘Africa can help to feed Africa: removing barriers to regional trade in food staples’ released in October 2012.
framework for the GAFSP recipient countries issued by the USAID (2013) and UK Government (2013).

The GAFSP and New Alliance initiative are seeking to alter the land use and distribution to acquire property rights in SSA. GRAIN (2012, p. 131-134) argues that support for private investment was conditioned by the facilitation of land titling programme so that private companies would be able to buy this right from the smallholders. Since land plays an important role in the development of any agricultural project, land titling was used to overcome the problems of land rights issue. The Millennium Challenge Account, one of the US new schemes of foreign assistance was aiming at easing land titling in many developing countries including SSA. The Millenium Challenge Account program enables private companies to operate under sound legal framework when acquiring property in the host countries (GRAIN, 2012, p. 135). Indeed, there is no guaranty that the smallholder once awarded a land title would not sell this right with an appropriate incentive. This explains the rush in land titling project, which takes different forms in various countries of SSA: facilitation of the registration of communal land like in Burkina Faso, Tanzania, Ghana, Cote d’Ivoire, and Mozambique; or the use of base map to register individual land rights in Ethiopia (Byamugisha, 2013, p. 2-3).

The new modus operandi towards agriculture is marginalising the African smallholders in an altered manner: economic, social and political. Economic marginalisation is mainly related to the dispossession of the sources of livelihood. The way policies are gradually imbedded these recent years unveil some inconsistencies with the main findings acknowledged by development institutions such as the World Bank. On the paper, the WDR2008 underlines the importance of agriculture as a source of livelihood and food security. This economic marginalisation closely relates to social
marginalisation as a result of the cycle of poverty trap, and which might transcend from one generation to another one. Furthermore, economic and social discontents are not only restricted to the way of life of the smallholders but also take a wider dimension when political element is taken into consideration. Both governments and the population are likely to be affected directly or indirectly due to the decreasing degree of control over food. This declining degree of control is a potential source of political instability and the social unrests. To this regards, according to the World Bank (2014a) Food Price Watch report, 51 food riots associated with hunger occurred during the period 2007-2014 due to price inflation and shortage of food supply.

Given the major stake brought forth by the new change in modus operandi in agricultural development policy and food security, the rest of this chapter, will elaborate on a few points that could be corrected through transformative and accompanying policy, which, at the end of this thesis, will help to conceptualise the notion of capacity-driven approach.

2.5. Centring 'population' in policy design

The previous sections focused on the impact of the market-led food security on smallholders and the altered marginalisation that they are likely to experience under the institutional framework of the GAFSP and New Alliance. In these processes, the PPP and the value chain approaches gained a great popularity in recent years and were incorporated into the new policies designed to promote agriculture and food security through the private sector. Nonetheless, the adoption of the value chain approach is also subject to strong criticism as its final purpose is not serving the interest of the smallholders but rather that of the giant corporations in control of the food system. Cotula (2013, p. 33) explains that agricultural value chain has become 'buyer-driven'—
pushing TNCs to concentrate on commercial returns in processing and distribution. Lee, Gereffi and Beauvais (2012) put forth that in a buyer-driven commodity chain, TNCs are integrating a global sourcing network of smallholders. Therefore, producers (smallholders in developing countries) are bound to the sophisticated requirements of the buyers such as food standards. To comply with these requirements poor smallholders would not have choices other than the integration into the TNCs value chain which can provide the necessary items to maintain their activities. Furthermore, the buyer-driven model is closely connected to markets which dictate trends and preferences. Thus, countries that cannot keep pace with these trends can encounter a severe shock when the network is shifted in other locations.

In addition, the main motive of the PPP mechanism remains vague, especially regarding the notion of ‘public’, which often refers to governments instead of governments and populations. Yescombe (2007, p. 2) pointed out that in international development, PPP is referred to as joint government, aid agency and private sector initiative. Populations are often called beneficiaries – who are receiving the government and donor’s policy prescriptions. However, this policy prescriptions are rejected by Easterly (2014, p. 13) who claims that the cause of poverty is due to the absence of political and economic rights of the poor. Easterly explained that economic development is viewed by donors and governments as a technical problem that can be solved with technical solutions crafted on policy prescriptions which bypass the rights of the poor (Easterly, 2014, p. 13). In the case of agricultural development and food security in SSA, the new modus operandi favouring TNCs violates these smallholders’ rights. The economic, social and political marginalisation as well as the constraints associated with the new modes of production guided by markets, impose a burden to
smallholders and their freedom to cultivate what they want, when they want, commonly known as ‘food sovereignty’.

The movement and the dynamics of the population is one of the factors that make possible policy makers to understand the future mechanism of production in the rural and urban area. Hence, centring population in policy is an essential component that would contribute to the conceptualisation of what will be developed later as ‘capacity-driven approach’. As mentioned in the introduction in Chapter 1, population is one of the major problems that policies have to address in SSA. Indeed, rural and urban population are both increasing at a very rapid pace in SSA. The proportion of people in the urban and rural area is almost equal as depicted in the following graph.

**Figure 5 - Demographic transition in SSA 1960-2010**

![Demographic transition in SSA 1960-2010](image.png)

Source: Author, data compiled from the World Bank Development Indicator (World Bank, 2012a)

Figure 5 on the left side, shows that about 64 percent of the population is rural, and this proportion is following a sharp declining trend, meaning that both rural and urban agglomeration will home the same number of people in the future. As shown in the right side of the same figure, the annual growth of rural populations accounted for
nearly 1.7 percent (World Bank, 2012a). Although in decline, this rate is still considered very high since the ability of African governments to handle demographic pressures are very limited.

African governments are facing two types of demographic pressures within the rural and urban areas. Pressures in the rural area are characterised on the one hand by the rapid growth of the population, and on the other hand, the decline in the share of employment related to agriculture. In the urban area, population growth is growing rapidly and is intensified by rapid urbanisation. As a result, due to the decline of activities related to agriculture, rural populations are migrating to the urban agglomeration. However, the transition from rural to urban areas is also creating poverty and inequality. People who are migrating into the urban area are facing difficulties to find adequate jobs to sustain their livelihood as the labour market is highly competitive and very often requires skills and knowledge (AfDB, 2012). And since the people from rural area, in most instances, do not have enough and appropriate skills and knowledge, they are again trapped in the cycle of poverty.

Two major concepts are proposed in this chapter to address policy design centring on population, namely: the productive capacity and the absorptive capacity. These two concepts are organised according to the rural and urban world. This gives rise to the notion of rural productive and absorptive capacity and the urban productive and absorptive capacity.

The ‘productive capacity’ is the ability of one sector of the economy to sustain economic activity and employments. Nevertheless, even if jobs are created, it does not translate into a perfect match with the supply of labour. Therefore, the ability of this sector to match with the supply of labour is defined as to ‘absorptive capacity’. The absorptive capacity, in the rural and urban area, is conditioned by a well-designed
modern sector, which can attract the surplus of labour when it is freed from farming activities.

Figure 6 - Yield, land and share of employment in SSA

![Graph showing yield, land, and share of employment in SSA 1960-2012]

Source: Author, adapted from the World Development Indicator (World Bank, 2012a)

Notes: the upper graph depicts the surface of arable land under cereal production in million hectares in SSA between 1960 and 2012. During this period, the surface dedicated for cereal cultivation increased nearly fourfold its size in 1980. The lower graph, however, exhibits a stagnating yield, which indicates declining land productivity in region across time. Moreover, the relation between land and yield for cereal exhibits a negligible positive correlation of 0.2643 implying that an increase of one unit in cultivated surface is not followed by a significant increase of yield.

In the majority of SSA countries, the rural productive capacity is characterised by a stagnating condition. Although the size of the land under cereal production has
increased significantly since 1980, the yield, instead, did not follow that trend as depicted in Figure 6 above.

Figure 7 - Share of employment male and female in percentage of employment in agriculture for SSA

Source: Author, adapted from the World Development Indicator (World Bank, 2012a).

Notes: This graph depicts the relations between the share of employment in agriculture by gender and the yield of cereals. The correlation test indicates a moderate positive coefficient of 0.4266 for male and 0.4693 for female. These figures provide some basic information on the fact that an increase of one unit of yield is followed by a positive movement of the share of employment in SSA rural area.

In addition, Figure 7 above is conveying important information about the share of employment for both female and male, which are increasing as yield is increasing. Nonetheless, despite the potential to enhance the absorptive capacity through the increase in yield, this share of employment is declining considerably across time which suggests a diminishing rural productive capacity.

With regards to the productive capacity in the urban area, if one refers to the percentage share of GDP of the modern sector as a metric, construction and manufacturing are still recording a very low performance, as they respectively, represent 9.54 and 3.87 percent (World Bank, 2012a). These two sectors however, carry
a huge potential of absorptive capacity. If properly developed with the right package of policy, construction and light manufacturing can offer opportunities to create unskilled-labour intensive activities (Loayza & Raddatz, 2010).

The absorptive capacity at the rural level can be addressed with the rural nonfarm activities. In recent years, the importance of the rural nonfarm economy has been gradually recognised as one of the ways to diversify the source of livelihood for farmers in Africa. A wide range of literature indicates that, most of African farm households are relying heavily on nonfarm activities to diversify their earnings (Barrett, Reardon & Webb, 2001), which represents on average 45 percent of the share of SSA rural population’s income (Reardon, 1997).

The last element that needs to be pointed out in this section is about poverty and inequality among the two groups of countries subject of this study. One of the major contrasts between the two groups is the pattern of inequality. Figure 8 provides an overview of the evolution of the between the New Alliance and non-New Alliance countries. The Gini coefficient in the New Alliance countries depicts an upward trend whereas that of the non-New Alliance countries shows a declining tendency.
As of 2010, countries targeted by the New Alliance home about 353.41 million people, of which about 105 million rural poor are estimated to live under the poverty line of 1.25$ a day (IFAD, 2010). In view of these circumstances, SSA still needs a comprehensive programme that supports not only agriculture but also the other sectors of the economy that have a relatively significant absorptive capacity to address the problem of poverty. The New Alliance programme for instance, aims at lifting 50 million people out of poverty over the next 10 years. Nevertheless, even if the programme will be carried out successfully, with the rapid population growth, other development programmes will be needed to embrace the rest of the population living under the poverty line.
Increasing the productive and the absorptive capacity both in urban and rural area, is therefore, crucially needed, to avoid that 90 million people fall into another poverty cycle, while the continent’s agriculture is transforming.

2.6. Conclusion

This chapter attempted to answer the question why and how the changes in modus operandi in agricultural development and food security policy, are affecting the way of life of the smallholders in SSA. To this question, this chapter describes the institutional framework of the GAFSP and G8 New Alliance programmes, and their approach through the PPP and the concept of value chain.

The chapter highlighted the existing discourse on the need to scale-up agriculture in SSA where theories of development are differently interpreted to channel a transformation of a subsistence economy to a market-oriented economy, but yet governed with a very corporatist leaning. Similarly, discussions drawn from the case of the GAFSP and the New Alliance underline that the two models are marginalising their targeted countries. The altered marginalisation would give rise to a weakening degree of control of the African state on their food via the different clusters on which the framework of the GAFSP and G8 stakeholders was constructed.

Finally, to contribute to the conceptualisation of the ‘capacity-driven approach’, developed in Chapter 6, the last section was centring ‘population’ in policy design while addressing the notions of productive capacity and absorptive capacity at the rural and urban level. An important point can be drawn from this process, which takes the shape of three arrows. The first arrow, with an upward movement, is indicating a positive relation between land productivity and the share of employment in the rural area. The second arrow is the straight type. It represents stagnating land productivity. The last
arrow, with a downward movement, is representing the decline of the share of employment in agriculture over time. Those three arrows are conveying important information about the direction and the dimension of the agricultural and food security policy in SSA – particularly, with regards to the structural transformation and the intersectoral linkages that would be addressed in Chapter 4 and 5.

While the present chapter addressed the changes in the new modus operandi to tackle poverty and food security with the market-led food security or pro-corporatist approach, the following chapter will discuss whether this quest for food security through the stabilisation of international markets and the interplay between international, national and household level converge in a homogenous way to enable all the food imports dependent countries to ensure their future food supply and their food security.
Chapter 3: The Trilemma of Agricultural Development and Food Security in sub-Saharan Africa

3.1. Introduction

Since the price spike of the major grain commodities in 2008, global food security has become an international issue which has engendered new policy challenges. Business as usual is no longer a viable option and therefore, future policies will have to take into consideration complex environmental conditions and sustainable use of the scarce resources. In addition, these future policies should incorporate the increase of food production, poverty reduction and social justice (Godfray et al. 2010; Rosin, Stock & Campbell, 2013).

The food crisis of the recent years has been interpreted as a technical issue that can be fixed with technical solutions. In other words, the disruption of food supply is a phenomenon caused by market failure. Stabilising the international grain market has therefore become another policy target followed by the international development institutions. Policy makers from the positive analysis school advance that net food import dependent countries can rely upon trade mechanism to ensure their future supply. In addition, stabilising the grain markets would enable importing countries to enjoy the benefit of a trickle-down effect where food security would transcend through the global, national then to the household level.

Three main patterns of policy goals, then, emerged from this turnaround namely: global, national and household food security. Pinstrup-Andersen (2009), explains that global and national food security are focused on the supply side of the food equation, often related to the availability of food. Global food security therefore encompasses the accessibility of food within the international markets, while national food security
embraces the existence of enough production to meet the local food demand. Household food security, as suggested by Pinstrup-Andersen (2009), is an “anthrometric measure” that deals with daily food intakes of an individual.

Such a multitude of responses matters for two main reasons. First, the three multifaceted goals: global, national, and household food security are influencing and dragging agricultural development policies in SSA. Second, if not properly conducted, the effect of the failures would have a tremendous impact on the region insofar as 1.3 billion out of the 2 billion additional people that need to be fed by the middle of the century will be hailing from an African country (Population Reference Bureau, 2013).

The purpose of this chapter is therefore to investigate and discuss the relations between the global, national and household food security and their implications on agricultural development policies in SSA. It seeks to understand whether such goals are converging towards the same direction or diverging heterogeneously. Moreover, this chapter will discuss the great divide between large versus small agriculture by examining the ideologies and their extent to future policies related to agricultural development and food security in SSA.

The chapter argues that the way these three goals are arranged today constitute a trilemma which, consequently, have a significant impact on the ultimate goal of combating hunger and eradicating poverty in the region for the coming years – and that the weakness of SSA countries to handle their own agricultural and food security programmes is giving room the neoliberal/corporatist ideology to influence policy making.

For this purpose, the chapter presents different cases that embrace each dimension of food security and discusses the following elements: market, security and
poverty, stemming from the ideas presented in the previous chapter, alongside with the ideological perspectives dominating the debate on the present issue.

The remainder of this chapter is organised as follows: the next section will present the analytical framework and the scope of this chapter. The ensuing section will elaborate on the main arguments that explain the existing trilemma between the three goals. The third section will present the discussions on the implications of the interactions of each food security goal. The last section will conclude the chapter and draws some implications for the conceptualisation of the ‘capacity-driven approach’.

3.2. Analytical framework and scope of the analysis

The political economy of agriculture and food security in the context of African countries is influenced by different driving forces and interactions between international institutions, governments and local population that animate policy making. Accordingly, this section will begin to present the three patterns of the food security within the scope of this analysis. Second, it highlights its linkages with agricultural development. Third, it briefly presents the cases discussed in the chapter.

3.2.1. Food security in a broad sense and its three patterns

To begin with, two broad definitions of ‘food security’ which grasp the present analysis will be retained in this chapter:

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for a healthy and active life.’ (FAO, 1996).

A household is considered food secure if it has the ability to acquire the food needed by its members to be food secure. A distinction is frequently made between
transitory and permanent food insecurity, where the former describes periodic food insecurity as for example, seasonal food insecurity, while the latter describes a long-term lack of access to sufficient food.’ (Pinstrup-Andersen, 2009).

As these two definitions are too broad, three themes will be explored here to guide the present analysis: availability, affordability and sustainability.

Food Availability is the first element of food security closely linked to agricultural development. Availability embraces the physical existence of food – at any time and any places. Availability depends enormously on the proper functioning of all the food chain process from the production, transportation, storage to the marketing.

Food Affordability is the second element that comes after the ‘availability’ condition. Available food may not be always reasonably cheap enough for the people in low-income countries where major share of the income is spent on food. Income matters in food security, particularly if the country is a net food importer. Although SSA is classified as an agriculture-based region (see: World Bank, 2007), most of its countries have been net food importers since the 1980s.

Sustainability is closely related to the two previous elements, particularly when they are fulfilled over the long run. In a normal condition, the ‘access’ condition at the national level could be fulfilled if a given country can manage properly its own food system from the farm to the final consumers. Moreover, this condition could also be satisfied at the household level if the individual in question has the adequate financial resources to purchase food at the market price over the long run. When a country becomes food secure, the surplus it generates also contributes to the global food security.
3.2.2. The three patterns of food security and their approaches: market, security and pro-poor

To fulfil the three conditions mentioned above, three approaches are today dominating the policy making processes, as presented as follows:

- Global food security through the market approach: The first pattern of food security is located at the global level and aims at stabilising the supply within the international markets. This approach takes into consideration the fact that international trade mechanisms are the most effective tools to achieve food security at all levels. Therefore, net food surplus countries can trade with the net food importing ones, which in turn would achieve national and household food security. This approach rests on the argument that international market would provide higher quality food with lower prices. This pattern is supposed to transcend through the global, national and then household level. The advocates of this approach are mainly the international institutions and TNCs.

- National food security by achieving self-sufficiency (security approach): Four categories of countries fall under this context: Group 1, resource-rich and high-income countries; Group 2, non-oil resource-poor but high-income countries; Group 3, oil-rich, resource-poor countries, the last category, and main element of the present analysis, regroups the countries of SSA food import dependent, rich in land but low-income economies. Although the level of security differs significantly among the four categories, policy options can be casted to one or the combination of the followings: increase of productivity both in quantity and quality, outsourcing via the use of FDI or bilateral agreements, trade and food aid. Two major narratives of food
security arise from this classification: on the one hand, SSA countries – in quest of self-sufficiency and on the other hand, the other three groups motivated by resource-seeking.

- Household food security via pro-poor approach: deals with the smallholders or those who are engaged directly in the agricultural activities.

In developing countries, a great part of the produce is consumed by the farmers themselves. Advocates of household based approach are constituted by school of thought regrouped as agrarian populists, Marxists, anarchists, environmentalists and feminists (see: Borras, 2008).

3.2.3. Some financial challenges to ensure food security

As introduced in the very beginning of this manuscript, based on different estimates and scenarios, the world population is projected to reach 9 billion by 2050 (FAO, 2009). The FAO (2009) emphasised that to be able to feed the world population by 2050, food production needs to increased 70-100 percent of its current level. Since business as usual is not anymore a possible option, solutions to increase food production will have to consider the effects of climate change, economic uncertainty, global energy policy and the transformation in some emerging countries. The same report pointed out that doubling food production will require an annual net investment of about 83 billion US$ (FAO, 2009). Moreover, other experts who contributed to the report estimated an indispensable cumulative investment of approximately 9.2 trillion US$ (in 2009 dollars) over the period of 2007-2050 (Schmidhuber, Bruinsma & Boedeker, 2009). To mitigate the effect of climate change Msangi, Tokgoz, Batka, and Rosegrant (2009) weighed up the amount of required investments of 392 billion US$ for developing countries of which 171 billion US$ in SSA, 78 billion US$ in South Asia, and 68 billion US$ in
Latin America. In addition, Ramasamy (2011) outlined four dimensions that would be mainly affected by climate change: the availability of food from domestic production and imports, access to resources to produce or buy food, the stability of food supply, both ecological and macroeconomic, the use of food, including consumer preferences and safety of food and water.

3.3. Market, security and pro-poor approach: the food security trilemma

This chapter critically analyses the three approaches to tackle food security: market, security and pro-poor approach and then look at the ideological debates that might influence policies. It draws its arguments from historical narratives over several case-highlights. The view of SSA is here approached from a broad perspective based on the similar characteristics that the countries in the region share with respect to challenge of improving food security.

3.3.1. The market approach and the differences of mechanisms

The ‘market’ is one of the institutions that dominate modern society and the organisation of the economy. Although there are several forms of markets, this section focuses on domestic and international markets. As mentioned earlier, the main challenge of global food security is to ensure the availability of the supply at the international level at an affordable price so that all net food importing countries are able to enjoy the benefit of trade with more choices and better quality. However, international incentives are mainly signalling the TNCs which consequently adopted a resource-seeking behaviour by integrating and creating a monopoly within the global food system. Additionally, the way food is exchanged within the international markets gave room to speculations and made the grain market more volatile.
Linking the smallholders to markets and mainly to the international markets is one of the strategies frequently advocated in the agricultural development policies of the recent years, and this through the value chain approach. However, domestic markets often do not exist or do not operate properly. Hence, during the last fifteen years, development institutions and scholars have attempted to address the issue through the concept of market-based approaches (MBAs). Accordingly, with the increasing demand for food, the idea was taken up in the programmes such as the GAFSP and G8 New Alliance through the PPP, joint government, aid agency and private sector initiatives (Yescombe, 2007, p. 2) – and the value chain, in order to establish linkages with the international market. In agriculture, such approach takes place through three steps: 1) the development of the private supply chain; 2) the development of the value chain; and 3) the transformation of traditional industries (Heierli, 2008).

The development of supply chain seeks to create products or services that directly address the needs of the poor. The GAFSP and New Alliance are promoting special packages such as seeds, finance, irrigation, agricultural machinery, information technology and risk management that address these specific needs. For example, Syngenta, the leading agribusiness corporation has invested in a project known as ‘Seeds2B’ that seeks to develop a regulated seed system in 20 African countries. Also, as part of its expansion, the company announced the acquisition of two leading seed developers in Zambia: MRI Seed Zambia Ltd and MRI Agro Ltd (Syngenta, 2013). In the development of value chain, the GAFSP and New Alliance underscore the importance of PPP which aims to link small farmers to the market. To this extent, the MBAs are believed to contribute extensively to the improvement of rural livelihood and enhance food security as agricultural products can be produced on a large-scale, with
higher quality and at a lower cost replicating the Lewis, Johnston-Mellor, and Timmer linkages discussed in an earlier chapter.

The MBAs nevertheless leave many questions unanswered, particularly regarding the linkages between poverty reduction and food security. Recalling the importance of structural change in the goal pursued by SSA countries, the emergence of the modern sector plays an important role in the process. Although the initiative is quite recent, its effect on the 10 countries of the New Alliance for instance, appears to be disproportionate taking into consideration the 220 companies and the 10 billion US$ investment portfolio committed to this end (Ford, 2014). According to Ford (2014), the US development authority claimed that the programme has created 650,000 jobs and would have benefited 5 million smallholders across the New Alliance countries. It is however worth mentioning that these 10 countries account for about 476 million people (Ford, 2014) of which rural poor represents about 105 million\(^{10}\) (IFAD, 2010).

As a source of cheap food, international markets are likely to become unstable due to the growing tendency of a monopolistic control of the markets coupled with the speculative practices on the new financial instruments related to grain commodities. Between 2004 and 2008 for instance, in line with the financial crisis, the price of staple crops peaked at 101.9 percent (Headey & Fan, 2008), this price increase lingered in the subsequent years and picked to 130.06 in February 2011 (World Bank, 2015).

TNCs seek to secure their strategic position, devise strategic choice for the future and then turn these strategies into actions (Johnson, Scholes, & Whittington, 2005, p. 15-16). To materialise these actions, TNCs use vertical integration and different mode of entry such as exporting, joint venture, strategic licensing or FDI. The

\(^{10}\) Estimates of 2010, data compiled from the Rural Poverty Portal World Bank (2013)
branded seeds market for example, reflects how the New Alliance stakeholders are materialising their strategic management. According to the ETC Group (2011), about 67 percent of the total market share was dominated by only 10 companies in 2007, of which Monsanto, DuPont and Syngenta (top three leading companies and stakeholders in the New Alliance) accounted respectively for 23, 15 and 9 percent of the proprietary seed market, representing about $US10,278 million. Therefore, to keep this oligopolistic position, and with the emergence of the new demand for food globally, these companies seek to control the chain of production at the upstream level giving rise to the recent massive investment in farmland in SSA.

Moreover, the mechanism, under which international markets operate, particularly for the commodity markets where staple food is traded, is different from the traditional type. Unlike the latter, commodity markets use financial instruments called ‘derivatives’ defined by Chisholm (2004, p. 1) as ‘asset whose value is derived from the value of some other assets, known as the underlying’. ‘Futures, forwards, swaps and options’ are today the most used derivatives in the commodity transactions. Generally, TNCs use derivatives to hedge against various risks such as changes in interest rates, commodity prices, debts, or fluctuations of exchange rates. Monsanto for instance, indicates that a 10 percent change in commodity prices might engender a negative effect of $57 million loss in its financial instruments (USSEC, 2012). However, with the spectacular progress in the financial world with an increasingly integrated and globalised financial system, derivatives, in most instances, are circulating among financial institutions as an instrument of speculations. As explained in the World Development Movement reports (World Development Movement, 2010: 2013), due to the financial crisis of 2008, financial institutions were speculating on food commodities.
In 2012, for instance, Goldman Sachs earned about 400 million US$ in 2012 from speculations on food (World Development Movement, 2013).

Market-led agricultural development and food security therefore still show a large difference in terms of market mechanism which does not bridge the local, global and then national markets to capture the linkages to poverty reduction and food security issues.

3.3.2. Security approach: human versus traditional security

National food security is an ultimate goal pursued by all countries in the world. This aspect of food security is mainly focused on the improvement of the domestic conditions by making food accessible at an affordable price. Global food security therefore would be achieved when all the countries would be able to secure their own food. Nevertheless, this also creates a conflicting situation among the four types of countries cited above. With the recent global instability engendered by the price spike, the dimension of security also saw a slight drift not only within the SSA countries, but in the other resource-poor but financially rich economies. The interactions between human security and traditional security will therefore be used as a tool of analysis in this section.

The concept of human security and traditional security are entangled in a complex relations guided by different interests and motivated by different purposes. At the level of the SSA countries, human security prevails over national security, owing to the fact that reducing poverty is likely to enhance food security and to this extent provides more stability at the national level. Since the early 1990s, vast arrays of literatures have been burgeoning dealing with the issue of ‘human security’, particularly the benchmark of the UNDP Human Development Report (UNDP, 1994). The UNDP
key document emphasised that human security is focused on a concept called People-Based Approach. Jahan (2006, p. 266-271) described other features of human security such as: local, national or global issue, whose components are interdependent, and whose solutions are often focused on ‘early preventions’11. In line with such principle, all initiatives related to human security are seeking to address ‘conditions that menace survival, the continuation of daily life and dignity of human beings’ (UNESCO cited in Martin & Owen, 2010).

For the groups of countries (Group 1, 2 and 3), when related to food security, traditional security is leading over the human security due to the differences in terms of magnitude and exposure to various shocks such as price spike or supply disruption. As part of the global governance, PPP approach influenced policies since 2008. Nevertheless, these actions were not-free of interests. Countries in the three groups are also facing uncertain and inherent risk relating to food insecurity today (Daniel, 2011, p. 27), which in turn gives rise to land and water grabbing as well as other forms of appropriations.

Land grabbing or land acquisition demonstrates the enormous discrepancy between collective and individual actions towards food security. The individual actions of these three groups via their multinationals, sovereign wealth funds or state-owned enterprises are demonstrating the resource-seeking behaviour aiming at stabilising their food supply for the future. Despite the existence of common platform such as the GAFSP and the New Alliance, individual countries are also independently implementing their own programmes. Brazil, China, Japan and US, for example, are

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11 The UN Human Security Unit explains that ‘a distinctive feature of human security is its focus on early prevention to minimize the impacts of insecurity, to engender long-term solutions, and to build human capacities for undertaking prevention.’ (UN, 2009)
part of the G20 which pioneered the GAFSP in 2009 at the summit of Pittsburgh. However, US and Japan instead of supporting this initiative have created with the other members of the G8 the New Alliance which is very comparable to the GAFSP. Similarly, China and Brazil created their own programme ‘China Brazil Africa Agriculture’. Nevertheless, despite their collective actions towards agricultural development in Africa, the two countries are also competing to defend their own interests (Scoones, Cabral, & Tugendhat, 2013).

Hence, as countries are pursuing a security-led policies (human and national), such self-centred policies give rise to a conflicting interests among SSA and other countries. Under such situation, the pursuit of national food security for rich countries could affect the national food security in SSA to the extent of household and global food insecurity.

3.3.3. Pro-poor approach

By the 1990s, a new concept had emerged with an idea centred on the poor, more precisely, the idea of ‘pro-poor growth’. Nallari and Griffith (2011, p. 70) explains that pro-poor growth is the ‘growth that increases the income of the poor’. The two authors added more technical explanations as a result of literature studies, and retained two major definitions presented as follows:

The first focuses on whether the distributional shifts accompanying growth favour the poor—that is, whether poverty falls in response to growth by more than it would have if all incomes had grown at the same rate. The second focuses on whether economic growth benefits poor people in absolute terms, as reflected by changes in an appropriate measure of poverty. (Nallari & Griffith, 2011, p. 70).
A pro-poor agricultural growth is concentrated on the development of small and medium-sized farms. A thematic issue on pro-poor growth in agriculture conducted by the OECD (2006) explains that the increase of the incomes of the poor stimulates the demand for consumer goods and services which in turn boosts the economy and produces a positive effect on poverty reduction. Household food security is expected to transcend through the national and global level.

Pro-poor growth in the agricultural sector focuses on the transformation of the economy and rural diversification (Timmer, 2005). Timmer explains that this process follows two steps: first, diversifications marked by a shift from the grain production to high-value commodities, and second, a step that links and shifts the base of economic growth from agriculture to the modern sectors. However, such shift depends on population density and the quality of human capital.

Rural diversification implies the reallocation of production resources such as land, which remains a major issue in African agriculture. Indeed, producing high-valued commodities requires an adoption of new techniques of cultivation and technology upgrading if one wants to improve land productivity while meeting the demand in cash crops. However, the size of land matters as the average holding in SSA is less than two hectares (Lowder, Skoet & Singh, 2014). Hence, market and security are two inherent risks impending on the linkages between pro-poor approaches, both of which are related to land issues.

Smallholders are facing a trade-off between income and food security under the scenario of diversification. Smallholder type of farming contributes directly to household food security as the farm products are partly auto-consumed. Therefore, choosing diversification implies that rural household income will only depend on the marketing of high-value commodities, whose gains will be used to purchase food and
other goods. Nonetheless, given the size of the smallholder’s activities, and the degree of exposure to diverse types of risk, such as crop loss due to climate change or increasing barriers to trade with respect to standards and regulations – African smallholders might lose the source of income and food.

In addition, diversification affects national food security as land for food production is diverted to other purposes. Most of the countries in SSA are today food import dependent. To meet food demand, SSA countries compensate their local production with imports. Diversification might induce changes in land use\textsuperscript{12} depending on market trends, and have as a consequence the decline of the local crop production. Therefore, decline in grain production might have huge effect on the food bill if the exchange value of the high-value commodity does not offset the food imports.

Given the condition of agriculture and food security in SSA, a theoretical approach based on a poverty-led initiative still shows a theoretical gap in terms of capturing the linkages between markets and security. It further fails to address transitions through national and global food security.

3.4. Discussions

The previous sections underlined the complexity of achieving food security in a broad manner, i.e. at a global, national and household level. Such complexity was referred to as to the trilemma of agricultural development and food security brought forth by the impossible trinity of markets, security and poverty. The remainder of this chapter will reflect discussions on food security elements towards SSA. These discussion points will look at food availability and the limits of interventions as well as food affordability. The

\textsuperscript{12} Land use change could be land for food production to biofuel or land for food crops to non-food crops. See: Borras and Franco (2012).
final point of discussions will focus on the polarised debate on large versus small agriculture and the influences that ideologies have on the trajectory of policy in SSA.

3.4.1. Food availability: the limits of interventions of SSA countries

Today, according to the FAO (2002), there is enough food to feed the global population considering the fact that the world produces more food than it consumes. According to this organisation, the current production could meet a dietary intake of 2,720 kcal per day per person for the entire population in the world (FAO, 2002).

However, even if this statistics seems to be promising, it does not reflect the conditions at the regional level, particularly the region of SSA. The FAO (2013) annual report on the State of Food Insecurity showed that the region recorded a high prevalence of malnourished people, with a proportion of one to four people of the total population. The same report emphasised that such occurrence is mainly due to social, political and institutional conflicts coupled with a precarious condition of the soil and physical environment which represent a barrier for sustainable agricultural activities.

Political and social instability is, for instance, one of the major barriers to stable agricultural development as agriculture requires a considerable time to be sustained, from sowing to the harvest period. Increase in food prices leads to national insecurity. Fluctuation within the international markets between 2008 and 2011, strongly affected the capacity of net food importing poor countries to smoothen the price shock on their domestic markets, causing waves of violent protests and serious impact on the economy. A report released by the World Bank (2014a) for instance, reported that 51 food riots against hunger occurred during the period 2007-2014. This research categorised two types of food riots: Type 1 related to movement motivated by food price inflation and generally directed towards the government and other public
authorities’ and Type 2 includes ‘riots that usually arise in response to severe shortages of food supply’ (World Bank, 2014a).

In addition to the social and political unrests, most of the African countries have failed to strengthen public policies intended to promote agriculture. As mentioned in Chapter 1, the failure to realise the Maputo Declaration of 2003 demonstrates a clear standing with respect to the initiative to invest in the sector. The declaration aimed at increasing public expenditure in agriculture up to 10 percent of the GDP and an annual agricultural growth of 6 percent by 2008 (NEPAD, 2003). However, according to the Regional Strategic Analysis and Knowledge Support System (ReSAKSS, 2013), the overall expenditure of African governments to agriculture saw a considerable increase, from 0.39 billion $US in 2003 to 0.66 billion $US in 2010. Nonetheless, on the overall, only 13 countries out of the 54 members of the AU, managed to reach this target.

Since 2012, the EIU has compiled data and scores from 0-100 (not available to totally available) relative to the global food security. One of its indicators is ‘availability’. According to the EIU methodology, food availability item measures ‘the sufficiency of the national food supply, the risk of supply disruption, national capacity to disseminate food and research efforts to expand agricultural output’ (EIU, 2014). The assessment is built on comprehensive indicators: sufficiency of supply, public expenditure on agricultural R&D, agricultural infrastructure, volatility of agricultural production, political instability, corruption, urban absorption capacity, and food loss. The item ‘availability’ illustrates that the 28 countries of SSA subject of the study, scored on average 37.7 out of 100 (EIU, 2014).

3.4.2. Food affordability

Dependency on foreign markets makes SSA countries vulnerable to price volatility. To
avoid any shocks, governments must allocate significant subsidies to smooth social and political risks. However, this cannot be always sustained, as the capacity of governments to manage their risk portfolio could be overwhelmed and end up in escalating tension as it was the case in 2007-2008.

Similar to the availability indicator, the SSA region is also scoring low: 27 out of 100 with respect to food affordability (EIU, 2014). The EIU methodology indicated that this item measures ‘the ability of consumers to buy food, their vulnerability to price shocks and the presence of programmes and policies to support clients when shocks occur’, and consider the following indicators: consumption of food as a share of household expenditure, proportion of population below the poverty line, GDP per capita, agricultural import tariffs, access to finance for farmers and the presence safety net programmes (EIU, 2014).

Thus far, this chapter has unveiled the trilemma between agricultural development and food security policies at three levels: global, national and household. The ensuing sections will discuss the ideologies directly and indirectly influencing agriculture and food security towards SSA.

3.4.3. Ideological debates and the influences on policy making

As the debate on contemporary agricultural development policy is diverse, and is interpreted through different perspectives, highlighting discussions about ideologies and their attributes is also an essential step to understand their linkages to policy making. First, epistemologically, ideology is defined as the study of ideas. Definition in the dictionary describes it as: ‘a system of general ideas constituting a body of philosophical and political doctrine based on individual or collective behaviour’ (Advanced Oxford Learner's Dictionary, 2015). Ball, Dagger and O'Neil (2014, p. 4-5),
put it in a simple way, conceptualising it as a ‘set of ideas that attempts to link thought to actions’.

More precisely, ideology performs four functions: explanatory, evaluative, indicative and programmatic. First, it gives explanations on why economic, political and social conditions are as they are, especially during the time of crisis. Its second function is to provide a standards and norms that allow people to evaluate and judge economic, political and social conditions and therefore, distinguish things from what is right or wrong. Ideology’s third attribute is to give a sense of orientation and identity\textsuperscript{13}, and finally, it provides a political agenda which tells about what to do and how to do it, and translated into a prescriptive function with comprehensive economic, political and social actions (Ball, Dagger, & O’Neil, 2014, p. 5-6).

a. Neoliberal/corporatist approach to agriculture

Today, there is an amalgam of literatures that deals with neoliberalism referring to this ideology as a set of policy that puts particular focus on economic liberalisation, privatisation, free trade, deregulation, market liberalisation, reduction of government interventions in the economy to give room for the private sector. Neoliberal proponents argue that poverty reduction is best achieved through the ‘trickle-down’ economics, which is a policy focused on the private sector. To this extent continuous increases in productivity will therefore lead to growth and will in turn have an effect on poverty (Harvey, 2005, p. 64; Jilberto, 2004; Stiglitz, 2012). As a political agenda, Steger and Roy (2010) illustrate the deregulation-liberalisation-privatisation formula.

\textsuperscript{13} Ball, Dagger and O’Neil (2014, p.6) explained the sense of orientation as follows: ‘An ideology supplies its adherent with an orientation and a sense of identity—of who he or she is, the group (race, nation, sex, and so on) to which he or she belongs, and how he or she is related to the rest of the world.’
If the objective is to raise agricultural productivity, for the proponent of the neoliberal/corporatist agricultural development, the use of biotechnology, massive investment in irrigation and mechanisation is the way forward to address the African issue (Smith, 2010). As core competences, the neoliberal/corporatist agricultural development and food security approach is structured on interrelated segments namely: finance, technology, distribution, risk and information. Finance segment plays a pivotal role to get agriculture moving in SSA and represents a remedy to the underinvestment in the sector. Banks and private institutions are now at the forefront of this segment, especially for the case of IFC and Rabobank. TNCs also possess innovative technologies to meet the challenge of agriculture, such as: GM seeds, farm equipment, machinery, fertilisers, pesticides, and irrigation systems. Moreover, agro-industry and major retailing firms also have a strong distribution network implanted in the various targeted countries. In addition, with the recent development in the mobile industries in SSA, ICT can now be used to disseminate information effectively. Finally, the security of the investments can be achieved in two ways through the risk and information segment in which the IFC and insurance company such as Swiss RE are playing a fundamental role.

However, such kind of approach is confronted with some obstacles. Internal and external political barriers are the most challenging issues to implement the neoliberal agenda. Internal political obstacles can be reflected by the fragility of the political institutions and the lack of capacity of government to smooth social unrest with respect to land use management and the policies it embraces. In many instances, the large-scale type of farming involves the use of a huge surface of cultivated area which translates into an appropriation of the smallholders land described by the peasant movement as ‘land grabbing’. The main policy challenge to face such an issue should therefore be
addressed in the structural transformation strategies. The external political obstacle could result from the altercations between different actors that privilege the power of market-oriented food security. Indeed, countries like China and India are now playing a major role in global governance alongside with their peers within the BRICS forum. These latter are today seeking to strengthen their relations with African countries through the South-South cooperation and offer alternatives to carry out the African agricultural development. However, as these countries cited earlier are pursuing different objectives, their actions could be an element of discord with respect to policy outcomes.

Within the coming years, SSA countries could then expect more supports from the international public institutions with regards to the development of infrastructures, irrigation facilities on the one hand, and a more integrated rural development project in which TNCs could intervene through the use of improved seeds, fertiliser, pesticides and various agricultural equipment on the other hand. Likewise, a dynamic lobby to deregulate the agricultural sector and to promote free trade is likely to continue to influence future policies in SSA particularly from the community of donors on their policy recommendations and programmes. In addition, a vast land titling program to secure private land property is likely to occur as a stage in the appropriation to create in a second stage a land market where international investors can buy land rights.

b. The nature of movements: small-scale approach

Neoliberalism and the corporate agro-industry political agenda face major criticism from the ‘agrarian movements’ led by transnational activist. Unlike the neoliberal/corporatist ideology which is influenced by the discipline of mainstream economics, the agrarian movements are rather influenced by the disciplines of sociology
and anthropology whose ideas are carried out through ‘movement’ (Borras et al., 2008, p. 1).

‘Movement’ is resulting from the actions and works of people who share the same beliefs and cause. The peasant or agrarian movement explains that neoliberalism has completely transformed the dynamics of agricultural production and gave rise to a wide disparity between the North–South Relations (Borras et al., 2008, p. 1). In addition, it stresses the fact that globalisation and the neoliberal political agenda have undermined rural agrarian society through restructuring that privilege the private sector represented by a minority of powerful multinationals, agro-industry and agribusinesses – whose actions makes the poor poorer Borras et al. (2008, p. 76).

As an alternative political agenda, the agrarian movements are advocating the idea of ‘food sovereignty’. The concept was defined in the declaration of Nyéléni of 2007 as follows:

People’s right to healthy and culturally appropriate food produced through ecologically sound and sustainable methods and their right to define their own food and agriculture systems. (Via Campesina, 2007).

Holt-Giménez (2009) emphasised that the concept of ‘food sovereignty’ embraces higher targets than the concept of ‘food security’: the former highlights the right to have enough food, the peasants’ freedom to have a democratic control over their food system. Food sovereignty stands against all forms of idea that seeks to speculate or to make profits or simply, the ‘commodification’ of food. In this scenario, the control of the food system should always be under the control of those who are at the base of the pyramid and excludes a market approach to agriculture, particularly one that bypasses the circuit of local, regional and national levels. Such approach puts more emphasis on
people, on those who are producing the food, namely, the local farmers. It also seeks to build knowledge and skills at the local level and more importantly, it promotes agro-ecology to preserve the environment.

3.5. Conclusion

This chapter discusses the relations between food security at the international, national and household level and tried to analyse whether these three elements are moving in the same direction or in different paths. The chapter assesses whether the recent policies promoted by the international institutions, with the private sector, can match with their goals to connect the African smallholders to markets.

The arguments and cases presented here show that the three dimensions of food security carry many significant differences among, within and across the three goals: market, security and poverty – making it a trilemma. At the global level, arguments mainly discuss the discrepancy on the tendency of the market approach to create more instability due to the strategic management pursued by the TNCs and the speculative practices made possible by an advanced market mechanism. At the national level, driven by security, discussions are related to the human versus the national interest conundrum. Such discussions highlighted that the quest for food security is first and foremost serving national interest, both for the resource-seeking countries as well as the SSA economies. Lastly, household food security or pro-poor approach presented complex conditions to really capture food security in a broad sense due to the constraint and the limitation of the productive and absorptive capacity, as introduced in the earlier chapter.

Furthermore, while bridging the discussions to the notion of food security, the capacity of SSA countries to ensure availability and affordability are still weak. Such
weakness is giving more room for the market approach food security to influence agricultural development policies. Since policy cannot be separated from ideological debates, especially when international institutions and African governments are brought into play, issues related to the size and the style of the reforms intended to be carried out in the continent, are dividing the neoliberal and the transnational movements. Thus far, the ideas presented by each camp failed to offer a clear and sound solution when centring the population in policy design as their approach are either too utopic or too technical. Nonetheless, when assessing the core competences of each camps to address the issues of agricultural development and food security in the region, the resources-seeking type of policies are likely to lead the way in SSA.

The two previous chapters looked closely at the change of the modus operandi in agriculture and food security policy and offered critical arguments towards the narratives presented by international institutions to promote development and tackle food security. The introduction of the agriculture in the development and the quest for the stabilisation of the grain markets were at the centre of that inquiry. In this process, SSA was tagged as an agricultural-based economy, a conceptual approach that fuelled a wrong signal to policy makers as investments are going massively into agriculture, without an accompanying policy that seeks to establish the linkages that enhance the productive and the absorptive capacity in rural and urban area.

Hence, examining the World Bank approach, categorising SSA as agriculture-based economy and identifying the sectors with potential productive and absorptive capacity through the concept of structural transformation and intersectoral linkages, will therefore, be the object of the next chapter. Thus far, if the analytical framework was arranged under agency and structuralism perspectives, the ensuing chapter will examine this inquiry through the lens of the positive analysis school.
Chapter 4: Differences in Intersectoral Linkages and its Implications for sub-Saharan Africa: Evidences from the orbit analysis

4.1. Introduction

The relations between agriculture and other sectors of the economy known as ‘intersectoral linkages’ have been widely studied in development literature, particularly in economic discipline. However, with the progress of the empirical studies on economic growth of the recent decades, the scholarship regarding this topic has gradually lost its momentum until the publication of the World Bank WDR2008, with a focus on the role of agriculture in development presented briefly in Chapter 1.

With the challenges of feeding the world population by the mid of this century, recent development policies are advocating that SSA should seek to increase its agricultural productivity and take advantage of this opportunity to address the issues of poverty and food security, a policy recommendation that has been addressed via the PPP and value chain approaches as presented in the previous chapters. Moreover, such advocacy is defended by the idea that agriculture can reduce poverty three to four times higher compared to the other industries. In this regards, the WDR2008 classifies the region of SSA as an ‘agriculture-based economy’ (see: World Bank, 2007). Such categorisation is, in many instances, based on the share of GDP and employment. The World Bank report stated:

Agriculture is a major source of growth, accounting for 32 percent of GDP growth on average—mainly because agriculture is a large share of GDP—and most of the poor are in rural areas (70 percent). This group of countries has 417 million rural
inhabitants, mainly in Sub-Saharan countries. Eighty-two percent of the rural Sub-Saharan population lives in agriculture-based countries. (World Bank 2007, p. 4).

The African economy is however at a different stage of its development path. The dynamics of other industries such as mining, manufacturing, transportation or ICT industries are today playing an important role alongside with agriculture with respect to the GDP composition. Accordingly, the categorisation of SSA as an ‘agriculture-based’ economy will have enormous implications for development support and policy making in the region.

Theories of intersectoral linkages are often associated with the concept of structural transformation and its effect on the other sectors of the economy – historically characterised by a decline in the share of agriculture in percentage of GDP and employment related to farm activities, accompanied by a demographic transition from the rural to the urban area (Timmer, 2009, p. 4). A comprehensive review of literature on these linkages are covered by Barrett, Carter and Timmer (2010) as well as Dethier and Effenberger (2012), underlining various topics of the role of agriculture in economic development and poverty reduction.

Three major interrelated connections therefore stem from this topic. Firstly, early development literature pioneered by Lewis (1954), extended by the work of Ranis and Fei (1961) as well as Jorgenson (1961) put forth the transition through a dual-sector model. As argued by Chenery, Syrquin and Elkington (1975), lately revisited by Zhao and Zhang (2009), transfer of low productivity labour from the rural to the urban area is the major source of growth. Second, on this form of transition, Johnston and Mellor (1961), underline the relations between the urban and rural economy through the linkages such as: supply of labour for the industry, supply of food for domestic consumption, supply of savings for industrial investments, sources of foreign currencies
through the export of agricultural products, which allows the import of intermediate and capital goods. The third linkages look at the elements bridging the two previous worlds through the examination of the relations between rural and non-rural farm economy, extensively studied by Haggblade, Hazell, and Reardon (2007) and briefly discussed in Chapter 2, on policies to enhance rural absorptive capacity.

As recommended by Sachs (2005, p. 50): ‘a good plan of action begins with a good differential diagnosis of the specific factors that have shaped the economic conditions of a nation’. It is therefore important to capture the dynamics of each sector to address new policy making with regards to agriculture in the region. Hence, the objectives of this chapter are, firstly, to discuss whether the percentage share of GDP and the share of the population engaged in the rural area, justify the so-called ‘agriculture-based’ categorisation. This objective takes into consideration the context in the region with respect to the dynamics of the other industries and the fact that SSA already shifted to another stage of development with the missing linkages in agriculture. Secondly, to identify the leading sectors in SSA economies, where the productive and absorptive capacity is higher that can be connected to the missing agricultural linkages as proposed by the recent neoliberal/corporatist agricultural development and food security policies.

To avoid the empirical hunch, the chapter uses the method of orbit analysis as an alternative to inferential statistics on the GDP sectoral decomposition of the value added aggregate for the region, for the period 1970-2012. It is argued that SSA has already shifted from being an agriculture-based economy and therefore, agricultural development strategies should seek to embrace the dynamics of the other sectors as they are likely to exert influential policy leverage in decision making.
The remainder of this chapter is organised as follows: the next section describes the methods, the principle of calculation of orbit analysis and the data specifications. The third section reports the results. Section four discusses the policy implications of the findings. Section five concludes.

4.2. Method, data and specifications

The orbit analysis, a method developed by Itaki (2014), is a statistical technique revealing ‘leading-following’ relations between two or multiple variables in a consistent time series. The method offers a wide range of analytical perspectives, particularly for smaller and larger data which may not apply to the regression analysis subject to various conditions to be valid.

Some example of a very primitive form of orbit analysis is for instance used by Cairo (2013, p. xix) to illustrate the relationship between the GINI index versus the GDP in Brazil in 1980-2011 under different presidencies. The result of this study indicates that across time inequality was falling while the GDP was increasing, particularly under President Lula. Parlapiano and Giratikanon (2013) use an orbit chart to represent the long run analysis of inflation and unemployment in the US. Vucevic and Yaddow (2012, p. 64-67) point out the example of Tufte to exhibit the Napoleon’s disastrous campaign in Russia in 1812-1813. In agriculture, the WDR2008 also uses similar chart to show the declining share of agricultural employment while agricultural GDP increases (World Bank, 2007, p. 28). Similar graphics are also used by De Janvry and Sadoulet (2010) and the CFS (2013).

In econometric analyses, very often a large set of data is required to ensure reliable results. These regression results are sensitive to the model specification. Freedman (2009) explains that statistical procedure is often defended on the basis of its
asymptotic property when the sample is large. Moreover, econometric estimations are subject to rigorous assumptions such as: linearity of the parameter, statistical independence, homoscedasticity and normality of the error distribution (see: Mamingi 2005, p. 39). In case of violation of these assumptions, econometricians are correcting their estimation techniques by transforming the data until the assumption is exhibiting acceptable results.

This transformation matters insofar the data might lose their real meaning, but more importantly, wrong estimation method or biased model may lead to a spurious empirical results. One example that illustrates the problem of econometric analysis often cited in academic literature is the so-called Lucas’ Critique which stresses on the fact that decisions of economic agents vary systematically with changes in policy, which implies that regression coefficients, usually invariant, would not be the best predictor in case of policy changes (Ljungqvist, 2008). Although new techniques have been developed to deal with the estimation problems this approach does not exclude the possibility of errors during the statistical procedures.

Thus, this chapter takes a different approach to handle economic data with the method of orbit analysis. This technique seeks to explain to the most accurate way the interactions of the studied variables without major transformations, particularly in the case of the presence of heteroscedasticity. It also seeks to interpret analytical information from the outliers. One important principle in orbit analysis is the assumption that ‘pulling’ and ‘being pulled’ logical relations exist among the variables.

Additionally, the size of the observation and the goodness-of-fit do not matter for the orbit analysis, to this regards Itaki (2014) explains:

Orbit analysis … does not recognise all points as a whole at one time, but rather, traces them along time, if they are time series data, and attempts to extract certain
statistical information out of the rotation of an orbit that the points linked together depict. It is not a high correlation coefficient or determination coefficient that matters; on the contrary, a low coefficient or even an ‘abnormal’ value would convey an important statistical meaning to observers. (Itaki, 2014).

‘Leading’, in the sense of orbit analysis means ‘leading changes in other variables’ or ‘heralding their changes’ in a kind of chain reactions among variables. Although the power of traction exerted by a leading variable might be weak, its cumulative effect (or resultant force effect) would be massive and could tract large variables one after another.

4.2.1. Principle of calculation and patterns of the direction of orbit

According to Itaki (2014), in principle, a minimum of three points is needed to calculate the direction of orbit rotation. The calculation is based on the parallel transport of triangle formed by the three points. The inverse tangent is then used to calculate the degree of the newly formed angle. If the angle is between 0 and $\pi$ in radians (i.e. between 0 and 180 in degrees), the rotation is anticlockwise; if the angle is between 0 and $-\pi$ in radians (i.e. between 0 and -180 in degrees), the rotation is clockwise (Itaki, 2014). Six patterns therefore can be observed from this process:

- Positive correlation and an anticlockwise rotation (x leading, y following);
- Positive correlation and a clockwise rotation (y leading, x following);
- Negative correlation and a clockwise rotation (x leading, y following);
- Negative correlation and an anticlockwise rotation (y leading, x following);
- An anticlockwise circular movement;
- A clockwise circular movement.
In practice, the direction and rotation of the variables are analysed with the help of a pre-programmed spreadsheet showing both the rotation in radians and in degrees as well as the ‘leading-following’ position. The data are then treated in a specific Excel format programmed by Itaki (2014). The result of this step reveals over the long run the ranking position occupied by each variable subject of this study. It also shows the 5-, 7- and 9-year moving average of this ranking. Given the medium-term variation of the data, Itaki (2014) recommends the use of the 9-year moving average out of the 5 and 7.

4.2.2. Data and specifications

The data were retrieved from the UN national accounts main aggregates current $US. Two types of data are then extracted for the purpose of this study. First, time series data with 42 observations from 1970 to 2012. Second, a cross-sectional data of 1970-2013 composed of 1672 observations regarding the economic sectors of the 38 countries of SSA. The collected data are for the following variables: agriculture, hunting, forestry, fishing (ISIC A-B), mining, manufacturing, utilities (ISIC C-E), manufacturing (ISIC-D), construction (ISIC-F), wholesale, retail trade, restaurants and hotels (ISIC G-H), transport, storage and communication (ISIC-I), and other activities (ISIC J-P).

The following identity formalises the model explored in this chapter:

\[ GDP = \sum \text{value added} \]  \hspace{1cm} (1)

Where:

GDP is Gross Domestic Product and value added is the sum of the value added of each sector described in detail in the preceding paragraph.
The variables are computed using an Excel spreadsheet designed by Itaki (2014). Furthermore, the initial form of orbit analysis applies to two or multiple variables if they are time series but not to a panel data. To construct a cross-sectional data, first, orbit analysis is replicated individually for each country and then, the results of this process are compiled together to construct a new dataset treated with STATA®. The cross-sectional data take the form: \( X_{it}, i = 1, \ldots, N, t = 1, \ldots, T \) where \( i \) is the individual dimension and \( t \) is the time dimension. A series of descriptive and graphical analysis are conducted with the new dataset in order to highlight the dynamics of the GDP aggregates, and to draw implications for policy discussions.

For the rest of this chapter, unless specified otherwise, ‘agriculture’ will refer to agriculture, hunting, forestry, and fishing (ISIC A-B), ‘manufacturing’: manufacturing (ISIC-D), ‘construction’: construction (ISIC-F), ‘wholesale’: wholesale, retail trade, restaurants and hotels (ISIC G-H), ‘transport’: transport, storage and communication (ISIC-I).

4.3. Results

This section reports the different ways in which economic sectors are presented. It begins with the common representation of an economy based on the percentage share of GDP. The second part of the section presents the output results of the computation from orbit analysis as it is depicted in the Excel spreadsheet. The last part will focus on the results of the sector-to-sector analysis with respect to agriculture and other industries.

\[ \text{Itaki (2014): Orbit analysis of leading following relations among multiple variables. Ritsumeikan Kokusai Kenkyu, 27, 1-34.} \]
4.3.1. Sectoral decomposition in percentage share of GDP

The following table summarises the main activities by sector. The data based on 38 countries from the UN database reported in Table 2 show that on average, for the last decade, more precisely 2000-2013, the share of agriculture in percentage of GDP accounted for 25.31 percent; mining 22.35 percent; manufacturing 9.18 percent; construction 4.03 percent, wholesale 12.26; transport 6.35 and other activities 20.51. Sorted according to its weight, the table ranks agriculture at the first position, followed by mining, other activities, wholesale, manufacturing, transport and construction.

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>31.06</td>
<td>28.88</td>
<td>28.62</td>
<td>25.31</td>
</tr>
<tr>
<td>Mining</td>
<td>17.50</td>
<td>17.94</td>
<td>18.60</td>
<td>22.35</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>9.62</td>
<td>9.89</td>
<td>9.66</td>
<td>9.18</td>
</tr>
<tr>
<td>Construction</td>
<td>4.24</td>
<td>3.58</td>
<td>3.53</td>
<td>4.03</td>
</tr>
<tr>
<td>Wholesale</td>
<td>12.28</td>
<td>13.03</td>
<td>13.33</td>
<td>12.26</td>
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<tr>
<td>Transport</td>
<td>5.34</td>
<td>5.73</td>
<td>5.73</td>
<td>6.35</td>
</tr>
<tr>
<td>Other activities</td>
<td>19.95</td>
<td>20.95</td>
<td>20.53</td>
<td>20.51</td>
</tr>
</tbody>
</table>

Source: Author. Compiled data from UNSD (2014) based on a data of 38 SSA countries

When looking at the data expressed in percentage share of GDP, agriculture is playing an important role. However, a large share of GDP, however, does not imply that agriculture is playing a leading role in the economy among other variables such as mining or other activities, this, type of relations is addressed in orbit analysis presented as follows.

4.3.2. Results of the orbit analysis

Three types of outputs are delivered by the Excel computation: 5-, 7- and 9-year moving averages. The results of the 9-year moving average are then used to reconstruct a new set of data in STATA® for a descriptive analysis. In addition to the main SSA, data on 38 individual countries were also compiled in a dataset, according to different attributes,
such as the sub-region cluster, geographic conditions, the fact of being part of the New Alliance project, political freedom and the business environment.

The graphical output from the Excel spreadsheet is reproduced in Figure 9 below, which reports the output of the 9-year moving average and its summary statistics are reported in the appendix. Then, extreme points, comparing the ‘first’ and ‘final’ value of each sector, are plotted to look how they changed over time. It shows how agriculture interacted with other industries. Accordingly, agriculture will be used as the key variable in this analysis.

The results of the output table of the 9-year moving average are showing the broad picture, how the data interacted among each other across time. Nevertheless, with multiple variables, the figure presented below might be slightly problematical for the interpretation. Hence, for a more detailed analytical purpose, descriptive statistics using the ‘mean’ and ‘extreme points’ are supplementing the information presented in Figure 9 to understand this concept of intersectoral linkages.
Figure 9 - Results of the orbit analysis for SSA

9-year moving average of the ranking points

Source: Author
Figure 10 shows the scores recorded by each sector on average to compare how each variable outperformed during the period of study. This graph compares two data. First a weighted average of the aggregated data of SSA and second the individual analysis.

Figure 10 - Weighted results of orbit analysis, decomposition 1972-2011

On average, manufacturing (3.25797) was leading in the sense of orbit analysis followed by agriculture (3.1436), other activities (3.12602), mining (3.05734), transport (2.93066), wholesale (2.068545) and construction (2.4075). In other words, manufacturing exerts a stronger pulling force that heralds changes among other variables.

To understand the changes over the studied period, the first (non-missing value) and last value of the score recorded by each sector are depicted below showing the extreme points i.e. the initial and final period (here 1973-2011). This study points out
two types of kick-starter. Type 0 (1972 kick-starter) considers all the time span of the period of analysis and type I (2011 kick-starter) which is the highest score at a time t within a period of analysis.

Figure 11 - First and last scores of each sector, GDP decomposition 1973-2011

In Figure 11, the first graph (on the left side) exhibits that in the initial period (1973), other activities, construction, agriculture, manufacturing, and transport are the ‘kick-starters’ and its sequential followers. On the right hand side of the same figure, manufacturing, mining, other activities, agriculture, construction, transport and wholesale sectors are respectively ranked in the same manner in the final period.

The results of the disaggregated data according to geographical decomposition are slightly different from time series type. Therefore, the average score of the first year will therefore be applied to the analysis. The data are also presented according the sub-regional category, namely: Western, Southern, Eastern and Middle Africa.
Table 3 - Leading-following relations across countries, SSA 1972-2011

<table>
<thead>
<tr>
<th>Rank</th>
<th>Western Africa</th>
<th>Southern Africa</th>
<th>Eastern Africa</th>
<th>Middle Africa</th>
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<td>Agriculture</td>
<td>Mining</td>
<td>Manufacturing</td>
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<td>(3.077)</td>
<td>(3.336)</td>
<td>(3.083)</td>
<td>(3.109)</td>
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<td>Agriculture</td>
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<td>(3.032)</td>
<td>(3.053)</td>
<td>(3.066)</td>
<td>(3.012)</td>
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<td>Transport</td>
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<td>(2.962)</td>
<td>(2.989)</td>
<td>(3.012)</td>
<td>(3.010)</td>
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<td>(2.926)</td>
<td>(2.934)</td>
<td>(2.961)</td>
<td>(2.926)</td>
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<td>5</td>
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<td>Construction</td>
<td>Construction</td>
<td>Mining</td>
</tr>
<tr>
<td></td>
<td>(2.916)</td>
<td>(2.844)</td>
<td>(2.865)</td>
<td>(2.825)</td>
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<td>(2.893)</td>
<td>(2.783)</td>
<td>(2.837)</td>
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<td>7</td>
<td>Other</td>
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<td></td>
<td>(2.808)</td>
<td>(2.675)</td>
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<td>(2.705)</td>
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1972 kick-starters

<table>
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<td></td>
<td>(3.240)</td>
<td>(3.750)</td>
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<td>(3.219)</td>
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<td>(3.146)</td>
<td>(3.167)</td>
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<td></td>
<td>(2.625)</td>
<td>(2.250)</td>
<td>(2.682)</td>
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2011 kick-starters

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<td>(2.250)</td>
<td>(2.341)</td>
<td>(2.339)</td>
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<td>Agriculture</td>
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<tr>
<td></td>
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<td>(2.125)</td>
<td>(2.045)</td>
<td>(2.089)</td>
</tr>
<tr>
<td>3</td>
<td>Manufacturing</td>
<td>Other</td>
<td>Transport</td>
<td>Transport</td>
</tr>
<tr>
<td></td>
<td>(1.969)</td>
<td>(2.000)</td>
<td>(2.034)</td>
<td>(2.071)</td>
</tr>
<tr>
<td>4</td>
<td>Transport</td>
<td>Construction</td>
<td>Other</td>
<td>Manufacturing</td>
</tr>
<tr>
<td></td>
<td>(1.875)</td>
<td>(1.939)</td>
<td>(1.807)</td>
<td>(2.054)</td>
</tr>
<tr>
<td>5</td>
<td>Mining</td>
<td>Agriculture</td>
<td>Agriculture</td>
<td>Wholesale</td>
</tr>
<tr>
<td></td>
<td>(1.852)</td>
<td>(1.844)</td>
<td>(1.693)</td>
<td>(1.789)</td>
</tr>
<tr>
<td>6</td>
<td>Wholesale</td>
<td>Transport</td>
<td>Construction</td>
<td>Other</td>
</tr>
<tr>
<td></td>
<td>(1.742)</td>
<td>(1.500)</td>
<td>(1.614)</td>
<td>(1.536)</td>
</tr>
<tr>
<td>7</td>
<td>Other</td>
<td>Wholesale</td>
<td>Wholesale</td>
<td>Construction</td>
</tr>
<tr>
<td></td>
<td>(1.703)</td>
<td>(1.469)</td>
<td>(1.591)</td>
<td>(1.536)</td>
</tr>
</tbody>
</table>

Degree of variations

<table>
<thead>
<tr>
<th>Rank</th>
<th>Western Africa</th>
<th>Southern Africa</th>
<th>Eastern Africa</th>
<th>Middle Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Other</td>
<td>Agriculture</td>
<td>Agriculture</td>
<td>Construction</td>
</tr>
<tr>
<td></td>
<td>(0.714)</td>
<td>(0.857)</td>
<td>(0.838)</td>
<td>(0.774)</td>
</tr>
<tr>
<td>2</td>
<td>Transport</td>
<td>Construction</td>
<td>Wholesale</td>
<td>Agriculture</td>
</tr>
<tr>
<td></td>
<td>(0.683)</td>
<td>(0.731)</td>
<td>(0.664)</td>
<td>(0.762)</td>
</tr>
<tr>
<td>3</td>
<td>Mining</td>
<td>Transport</td>
<td>Mining</td>
<td>Mining</td>
</tr>
<tr>
<td></td>
<td>(0.679)</td>
<td>(0.724)</td>
<td>(0.648)</td>
<td>(0.729)</td>
</tr>
<tr>
<td>4</td>
<td>Wholesale</td>
<td>Mining</td>
<td>Other</td>
<td>Other</td>
</tr>
<tr>
<td></td>
<td>(0.669)</td>
<td>(0.675)</td>
<td>(0.642)</td>
<td>(0.688)</td>
</tr>
</tbody>
</table>
The degree of variation indicates the intensity of the changes of one variable across time measured by the standard deviation. The degree of variation helps to understand the deviation of the leading and following variables. The results in Table 3 indicate that across the region, on average:

- Manufacturing was a leading sector in Western and Middle Africa; agriculture in Southern Africa and finally, mining in Eastern Africa. For the four regions, with the exception of Southern Africa, agriculture is playing the role of a following variable.

- Among the 1972 kick-starters, the variables recording highest scores at the beginning of the period of analysis across the region are construction in Western, Eastern and Middle Africa, whereas in the Southern region, it was led by transport.

- The variables that are leading at the end of the period of study, or 2011 kick-starter are agriculture in Western Africa, manufacturing in Southern Africa, and mining in Eastern and Middle Africa.

- The variables that recorded the great degree of variation or the sector of activity that has changed actively across time are other activities in Western Africa, agriculture in Southern and Eastern Africa and construction in Middle Africa.

Nonetheless, comparing the value of each sector at the beginning and the end of the period of study is not enough to appreciate the changes across time. For the rest of
this section, ‘agriculture’ will be used as the benchmark variable to be compared with other sectors of the economy.

4.3.3. Sector-to-sector analysis

The sector-to-sector analysis isolates ‘agriculture’ and other industries and shows the leading-following relations and major turning points among the two. Various graphs compiled around the 9-year moving average output of the orbit analysis are used to support this step in which the scores are compared in a time series with the differences between the two scores referred to as ‘impulse bar’.

a. Agriculture and manufacturing (ISIC-D)

The result of the 9-year moving average is showing that over the period of the study, manufacturing and agriculture scored respectively, on average, at the first and second position, followed by other activities, mining, transport, wholesale, and finally by construction. Figure 12 depicts the interactions between agriculture and manufacturing in the region for 1973-2011.

In the initial period, both variables are recording the same scores and are among the ‘1972 kick-starters’. Manufacturing lagged behind agriculture until 1991 when it started to thrive. Indeed, for the region of SSA, the major turning point took place in 1992-onward where manufacturing took the lead over agriculture whose progress was heading towards a downward movement as depicted by the impulse bar in the same figure.

The agricultural sector is also the most dynamic regarding the density of changes in the overall economy. According to the implicit correlation tests agriculture and manufacturing show a weak positive correlation. However, the resultant force of the
The manufacturing sector makes it one of the leading industries in the region followed by agriculture.

**Figure 12 - Leading-following relations between agriculture and manufacturing in SSA**

![Diagram showing leading-following relations between agriculture and manufacturing in SSA](image)

**Source: Author’s calculation**

b. Agriculture and other activities (ISIC J-P)

In percentage share of GDP, for the period 2000-2013, the sector ‘other activities’ occupies the third position after the mining industries. In the initial value of the orbit analysis, its score is one of the highest making it one of the most important ‘1972 kick-starter’ in the SSA economy.

Likewise, in the final value of the same analysis, it ranks at the third position. Across time, as highlighted in Figure 13, the sector was exceeded by agriculture in 1993. Then after this period, it again saw a steady growth, leaving agriculture lagging behind. The impulse bar is also revealing two major periods with respect to agriculture and
other activities. First, 1976-1993 in which agriculture was leading and second, 1993-2011 when other activities took the lead over agriculture. Looking at the summary statistics, on average, this sector is positioned at the third place after manufacturing and agriculture. Over this period of study, it accounted for 2 to 4.22 points. This sector was also one of the most dynamic after agriculture accounting for greater variability over the years.

Figure 13 - Leading-following relations between agriculture and other activities in SSA

![Graph showing 9 year moving average from 1970 to 2011 with lines for Agriculture, Other, and Agriculture vs. Other.]

Source: Author’s calculations.

c. Agriculture and mining (ISIC C-E)

The mining curve saw a scattered progression over time. Independently from its evolution vis-à-vis agriculture, a booming period of the mining sector could be noticed from the 1990s.

Figure 14 shows the interactions of the scores between agriculture and mining as well as their differences across time, here expresses as an impulse bar, representing the
period between 1973 and 2011. The major turning point appeared in 1992 when mining surpassed agriculture. For this period, mining held leading position as exhibited by the impulse bar. Mining activities in percentage share of GDP represent the second industry in the region. The results of the orbit analysis show that on average, mining ranked at the fourth position over 1972-2011 (see: Figure 10).

Figure 14 - Leading-following relations between agriculture and mining in SSA

![Graph showing leading-following relations between agriculture and mining in SSA.]

Source: Author’s calculation.

d. Agriculture and transport, storage and communication (ISIC-1)

Transport, storage and communication has on average scored at the fifth position. This sector saw a scattered progress from 1970 to the mid-2000s. The impulse bar is revealing two important periods with respect to agriculture and transport. The first period is 1973-1991 in which agriculture was leading in the sense of orbit analysis, over transport and second, 1991-onward when transport took the lead over agriculture. This leading-following relation is shown in Figure 15.
e. Agriculture and wholesale, retail trade, restaurants and hotels (ISIC G-H)

The wholesale, retail trade, restaurant and hotels recorded a steady development between 1970 and 1980. It started to decline significantly after the 1980s. On average, this sector ranks at the sixth position after transport and accounted for 1.44-3.77 with a variation 0.62 point over 1970-2011. Similar to the other sectors of the economy, a turning point also occurred in 1991 in this sector in which a major convergence could be noticed in terms of ranking points. The only difference with the other industries is the fact that it tumbled around 2010.

Figure 16 exhibits the relations and differences across time between agriculture and wholesale over the period 1973-2011.

Source: Author’s calculations.
The relations between agriculture and wholesale saw up and down movements across time. Wholesale lagged behind agriculture, according to their differences across time, except for the period between 1991 to 1999 when wholesale was leading over agriculture.

f. Agriculture and construction (ISIC-F)

The construction sector is also one of the ‘1972 kick-starters’. As it can be noticed from Figure 17, it soon saw a declining phase, following the agriculture trend line. On average, it accounted for 1.66-3.55 point with a variation of 0.51 overall the period covered by the study. The construction sector ranks at the seventh position on average, following the wholesale sector.

Furthermore, the difference shows that agriculture has been leading over construction across time. The first value of the construction makes it one of the ‘1972
kick-starters’ in the initial period. Its final value however ranks it at the fifth position after agriculture. The impulse bar is also revealing that the differences in score across time were greater in 1972-1991. However, these differences started to narrow from 1992 to the present.

Figure 17 - Leading-following relations between agriculture and construction in SSA

After the brief presentation of the results of orbit analysis, the following section presents the discussions around the question posited at the beginning of this chapter.

4.4. Discussions: policy implications

Thus, through the results of the previous analysis, agriculture will be used as a core element to be compared with other industries, highlighting its linkages and implications in policy making.

To begin with, it is necessary to mention some caveats regarding the fundamental question inquired in the present case. Second, as part of the core
discussions on policy implications, four points will be explored here: firstly, the assumption, i.e. SSA is an agriculture-based economy. This first point was presented as a new concept in the WDR2008 (World Bank, 2007) and is often cited in academic literature. The second point highlights the case derived from Table 2 in which mining represents the second largest industry after agriculture in percentage of GDP. The subsequent element of discussion takes the result of orbit analysis highlighting the fact that SSA is led by manufacturing sectors. A close look at the regional decomposition will be appended to this analysis in order to exemplify the differences and similarities across countries and industries. In addition, the implications of the orbit analysis will be discussed and connected to the notion of productive and absorptive capacity that was discussed in Chapter 2. Regarding the non-policy implications, this chapter brings some clarification on the role of each industry in SSA over and across time according to leading-following perspectives.

4.4.1. Some caveats regarding the analysis

This chapter discusses whether SSA is an agriculture-based economy and looks at the implications of this attribute on policy making. It also attempts to identify the leading industries across countries and regions to contribute to the conceptualisation of the ‘capacity-driven approach’. The chapter highlights the factors that are leading the economy of the region which could enhance the productive and absorptive capacity of a given economy, to contribute to a policy design which centres ‘population’. In addition this chapter also identifies some missing linkages that can be connected together in agricultural development and food security.

The caveat is about the method to treat SSA as a whole regional economic block due to the existence of recent policy convergence with respect to agriculture namely the
CAADP on which international development institutions, forums and other private sectors are aligning their one-size-fits-all policy. Nonetheless, even if the region is considered as a single economic block, the chapter also acknowledges the importance of individual country-strategy, and thus, presents an additional analysis into the discussion.

4.4.2. SSA as an agriculture-based economy

As introduced in the very beginning of this thesis, one of the narratives of the development institutions and their stakeholders was to categorise SSA as an agriculture-based economy, signalling the strategic positioning of the aid allocation for the coming years. This assumption emerged from the sidelines of the major food price spike of 2008 coupled with the new challenge to feed the world population by the middle of this century projected to reach the threshold of nine billion. The main discussion point to this assumption, therefore, is whether the percentage share of GDP and the proportion of people in the rural area are sufficient criteria to categorise the region as an ‘agriculture-based’ given the fact that other sectors also have played an important role to support the growth of the region in the recent years. The section begins with the description of the World Bank’s arguments and conceptual approach with regard to the role of agriculture in development. It then looks at the recent responses from the international community in terms of investments and discuss about its impacts. Finally, the section draws some comparative grounds between agriculture and mining and their importance in the economy to bridge the discussion to the next assumption showing that SSA is a mine-based economy.

The Bank, through its WDR2008 (World Bank, 2007) emphasised three important role agriculture can do for development: as an economic activity, as a livelihood and as a source of environmental services. The report explains, as an
economic activity, agriculture contributes to economic growth, which is two to four times more effective for poverty reduction compared to the other sectors of the economy (World Bank, 2007).

African agriculture has often been ignored due to its low performance and competitiveness. But, with the increase of the demand for food from the emerging, resource-rich and high-income countries, such as China, India, Japan, Korea and the countries in the Gulf (Group1, 2 and 3), the sector has become a new opportunity for FDI. This flow of FDI is believed to contribute to global food security and job creation which in turn would raise productivity and generate positive externalities with respect to food security especially for the import dependent countries. Such a process not only would hedge the country against the foreign currencies risks and constraints but also, will make possible the investment in other social sectors (see: Farole & Winkler, 2014, p. 163-205).

Furthermore, agriculture is not only an economic activity, but also a livelihood for millions of people living in the rural areas. Rural employment, farm and nonfarm activities resulting from agriculture engage a large proportion of the poor in developing countries. One of the major issues in the region is the rapid increase of both urban and rural populations, accounting respectively, for 4 and 1.7 percent annual growth (World Bank, 2012a). The major task for policy making is therefore to create sufficient economic activities at two levels. First, at the rural level through the rural nonfarm economy and second at the urban level (nationwide perspective) by promoting other industries to establish the Lewis as well as the Johnston and Mellor linkages. To achieve such goals, the World Bank, in its Action Plan, entitled ‘World Bank Agriculture Action Plan 2013-2015’ (World Bank, 2013a) focused on five programmes: increased productivity in the targeted countries, linking farmers to markets, reducing risks and
vulnerabilities, improving non-rural farm and rural employment, develop a more environmentally friendly agriculture. Moreover, the Bank reported that it has committed to finance agricultural development with a portfolio of 8-10 billion $US, on which, the major part of its assistance would be directed to SSA (World Bank, 2013a). In addition, the Bank also underlined that in 2010-2012, it has financed the region’s agriculture for an amount of 1.4 billion $US, of which 73 percent was allocated to enhance productivity and 20 to improve access to markets (World Bank, 2013a).

Not only had the categorisation of the World Bank propelled the enthusiasm of the community of donors, civil society, NGOs, as well as African leaders, but also sparked the interest of many private entities. Nonetheless, the PPP and value chain approaches towards agricultural development in SSA raise major concerns as a growing land and water grabbing issues hindered the rights of the poor and creates negative social impacts. A vast array of literature is today highlighting the inconsistency of the large-scale investment in land and water in SSA with the idea of reducing poverty and enhancing food security (see: Allan, 2013; Borras et al., 2011; GRAIN, 2012; Matondi, et al. 2011; Pearce, 2012). According to various studies on land deals summarised by Cotula (2012), 40-67 million hectares were subject to transactions for foreign ownership, most of which relates to African countries. The main criticisms of these transactions are firstly related to the appropriation of the small-scale lands on which the majority of the rural poor derived their source of livelihood. Second, land use is also diverted into the production of biofuels or food for exports, which leaves a little room for small-scale farmers to ensure their own food security as most of the production is self-consumed (Borras & Franco, 2012).

Chapter 3 explains the strong tendency in policies aiming at stabilising the international food markets to enable food deficit and import dependent countries to rely
upon trade mechanisms to ensure future food supply. The outcome of such policy is built over the fact that once the market stabilised, its benefit would transcend through three levels: global, national and household. However, the chapter adds that such approach presents a trilemma since the market mechanism at the global level is neither concomitant with the self-centred objectives pursued by each country at the national level, nor suitable to the trade-off faced by smallholders regarding land use. Furthermore, it is difficult to apply crop diversification as the land size is relatively small, which makes this approach virtually risky.

Not all of the African countries are recording a vibrant agricultural sector. The following table disaggregates the data at sub-regional level. Using categorical variables it compares two periods: 2000-2008 (benchmark) and 2008-2012. The count outcome of ‘leading’ agriculture is used to identify the country and the frequency when agriculture was outstripping all other sectors\textsuperscript{15}. The count outcome identifies over the two periods the robustness of the power of agriculture to herald changes over other variables. Higher frequency is translated into a robustness of the sector analysed.

Table 4 - Count outcome of a leading agriculture, SSA countries, 2000-2012

<table>
<thead>
<tr>
<th>Countries</th>
<th>2000-2008 (8 years)</th>
<th>2008-2013 (4 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Freq.</td>
<td>Agriculture % GDP*</td>
</tr>
<tr>
<td>New Alliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malawi</td>
<td>7</td>
<td>33.35</td>
</tr>
<tr>
<td>Mali</td>
<td>5</td>
<td>33.93</td>
</tr>
<tr>
<td>Senegal</td>
<td>1</td>
<td>14.23</td>
</tr>
<tr>
<td>Non-New Alliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equatorial Guinea</td>
<td>7</td>
<td>3.88</td>
</tr>
<tr>
<td>Niger</td>
<td>7</td>
<td>42.22</td>
</tr>
<tr>
<td>Mauritania</td>
<td>6</td>
<td>28.85</td>
</tr>
<tr>
<td>Swaziland</td>
<td>6</td>
<td>6.68</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>2</td>
<td>19.57</td>
</tr>
</tbody>
</table>

\textsuperscript{15} A strict condition that the ranking point recorded by agriculture over the other sectors. The frequency (Freq) indicates the number of time agriculture was leading over all sectors, across the benchmark period (8 years) and the post 2008 period (4 years).
The count outcome exhibits that three New Alliance countries Malawi, Mali and Senegal record robust scores of agriculture in the benchmark period. However, from post-2008, only Malawi managed to keep this robust performance of agriculture. In contrast, 12 countries of the non-New Alliance group saw the agricultural sector leading: Equatorial Guinea, Niger, alongside Mauritania and Swaziland are ranked at the top performers with sustained scores. Comparing this benchmark with the period after 2008, the results reported in Table 4 show that six countries from the non-New Alliance, namely, Chad, Equatorial Guinea, Gambia, Swaziland, Guinea and Togo show good agricultural performances. With regards to other attributes such as political freedom and civil liberty in addition to the geographical conditions, one can find that ‘partly-free’ non-New Alliance countries in the Western and Middle Africa are accounting for a sustained leading agriculture. However, the share of agriculture in percentage of GDP is very different among those countries. While looking at the period 2008-2012 for instance, it accounted for a very small part in Equatorial Guinea and Swaziland, respectively, 1.41 and 5.27 percent, whereas in other countries such as Mauritania, Gambia, and Guinea it was on average between 20-25 percent. Nonetheless, the key information conveyed by the leading-following relation is that, most of the few agriculture-led economies, for 2008-2013, are located in the Western and Middle Africa, in these two regions, agriculture represents 1-42 percent of the GDP and ranks at the

<table>
<thead>
<tr>
<th>Country</th>
<th>Freq</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Côte d’Ivoire</td>
<td>1</td>
<td>23.18</td>
</tr>
<tr>
<td>Gambia</td>
<td>2</td>
<td>23.53</td>
</tr>
<tr>
<td>Botswana</td>
<td>1</td>
<td>2.44</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>1</td>
<td>31.95</td>
</tr>
<tr>
<td>Central African Rep.</td>
<td>1</td>
<td>39.32</td>
</tr>
<tr>
<td>Chad</td>
<td>1</td>
<td>27.86</td>
</tr>
<tr>
<td>Gabon</td>
<td>1</td>
<td>5.39</td>
</tr>
<tr>
<td>Guinea-Bissau</td>
<td>1</td>
<td>44.61</td>
</tr>
<tr>
<td>Lesotho</td>
<td>1</td>
<td>8.19</td>
</tr>
</tbody>
</table>

Source: Author. Note: Freq indicates ‘frequency’. * indicates data adapted from UNSD (2014).
second position of the leading-following relations i.e. the expansion of agriculture follows the expansion of manufacturing.

4.4.3. SSA as a mine-based economy

Mining is an important industry of which share in percentage of GDP represents about 25.31 percent for the period 2000-2013. Given the importance of this sector, this section turns to the political economy of natural resource management to enrich the element of discussion of the perspective of SSA as mined based economy. According to the UNSD (2008, p. 79), mining activities are defined as follows:

Extraction of minerals occurring naturally as solids (coal and ores), liquids (petroleum) or gases (natural gas). Extraction can be achieved by different methods such as underground or surface mining, well operation, seabed mining etc.

African countries are renowned for the abundance of their underground resources, including oil, gas, uranium, diamond, rare earth, as well as the various gemstones to name a few – which are strongly demanded in the industrialised economies (Moyo, 2013, p.10-20). Based on the representation in percentage share of GDP, mining is also generating economic growth and constitute a large share of value added in the SSA economic aggregate. Hence, the importance of mining activities is also having a significant influence on policy making.

Similar to agriculture, mining contributes to economic growth as an economic activity through several linkages namely: exports, which generate foreign currencies. It also attracts FDI and to some extent source of job creation, but more importantly, taxes and royalties from mining is a major source of government revenue. According to the International Council of Mining and Minerals (ICMM, 2012) which compiled a database on the Mining Contribution Index from a panel of 212 countries, for low and
middle income economies, mining represents about 60-90 percent of the total FDI and 30-60 percent of the total exports. Furthermore, its contributions to the host countries are estimated about 3-20 percent as part of the government revenues, 3-10 percent of the total national income, and 1-2 percent of the total employment (ICMM, 2012).

Nevertheless, being a resource-rich country can cause various social, economic, political and institutional issues: such as corruption, bad governance or rent-seeking behaviour and to some extent, it could be a trap for the low-income countries. For developing economies endowed with abundant natural resources, access, use and the control can turn into a thorny issue that can create instability. Collier (2000) for instance, argued that for any period of years, the risk of civil war in an African country rich in natural resource is 23 percent against only one percent for resource-poor countries. Because the natural resources are concentrated in a few places, access and the distribution of the revenue resulting from mining exploitation are sources of potential conflicts (UNEP, 2009, p. 15). The UNEP emphasised that this exploitation might affect the degradation of the natural environments and land needed for agriculture as a direct impact (UNEP, 2009, p. 15). Furthermore, several case studies show that corruption is caused by the abundance of natural resources. As a matter of fact, Askari, Rehman and Arfaa (2010, p. 59) suggest that corruption is determined by a number of factors, including: the size of government and the calibre of its bureaucracy, the extent of the distortion in the economy, low government capacity to manage privatisation process, low rule of law and enforcement mechanism, low government salaries and the abundance of natural resources (see also: Campbell, 2009; Mbaku, 2007; Petermann et al., 2007).

The second knotty elements that need to be discussed here is the relations between agriculture and mining. Both are still considered as primary sectors in which a
large proportion of people could be engaged in albeit the two activities are not compatible. Indeed, both industries are using the land on which underground and above ground resource are overlapping. Also, mining and agriculture are using water, which might cause environmental depletion. Usher and Vermeulen (2006), for instance, highlight the case of water surface pollution due to the extent of mining in South Africa. Such kind of situation is not an isolated case, but could happen in many countries where agriculture is still playing a key role in the economy.

The third element of discussion in this section is about the relations of these two sectors and the market forces/externalities. In the past decades, agricultural markets have been stable until 2008, after which food commodity prices skyrocketed and futures contracts related to agricultural sectors became speculative instruments for banks and financial institutions. In addition, mining products are also subject to the same law of volatility which could be a curse or a blessing for the mining exports dependent economies. Those two types of commodities are therefore subject to market signals which might affect decision making to opt either for a mining-led or agriculture-led growth strategies. Under this perspective, policy orientation would be directed towards the sector that has the strongest market signal and the lowest negative externalities.

Agriculture and mining are falling respectively into the designated category of ‘soft’ and ‘hard’ commodities. The former includes agricultural commodities such as: corn, wheat, coffee, sugar, cotton, cocoa, soybean, rice, etc. The subcategory of hard commodities includes: precious metals (gold, silver, platinum, etc.), industrial metals (aluminium, copper, nickel, zinc, etc.), and energy (crude oil, gasoil, natural gas, heating oil, etc.). Both sectors are sensitive to market signals and to a greater extent, to
economic information. Chevallier and Ielpo (2013, p. 117-143) used an EGARCH\textsuperscript{16} model to build a ‘sensitivity score’ to study the reactions of commodity markets to economic news in 2008-2009 using 16 Bloomberg database comprising times series of 1999-2011, derived from three geographic regions: US, European Monetary Union and China. One of the empirical findings of the study concluded that agricultural commodities and precious metals are the most sensitive to economic news (Chevallier & Ielpo, 2013, p. 128). This sensitivity to economic information for the two sectors implies that policies towards agriculture and mining industries in the coming years are likely to be subject to stronger influences of market forces. On the other hand, the emergence of these new changes could be a catalyst of foreign investment for the region especially for countries endowed with a vast territory. A similar count outcome is used to identify the countries where mining was leading and its robustness for before and after 2008. The benchmark period and the categorical variables remain unchanged.

Table 5 · Count outcome of leading mining sector in SSA 2000-2012

<table>
<thead>
<tr>
<th>Country</th>
<th>Freq.</th>
<th>%GDP mining</th>
<th>Country</th>
<th>Freq.</th>
<th>%GDP mining</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopia</td>
<td>5</td>
<td>5.95</td>
<td>Ethiopia</td>
<td>3</td>
<td>5.90</td>
</tr>
<tr>
<td>Kenya</td>
<td>1</td>
<td>14.41</td>
<td>Zambia</td>
<td>3</td>
<td>12.27</td>
</tr>
<tr>
<td>Liberia</td>
<td>1</td>
<td>8.54</td>
<td>Ghana</td>
<td>2</td>
<td>15.81</td>
</tr>
<tr>
<td>Uganda</td>
<td>2</td>
<td>12.54</td>
<td>Rwanda</td>
<td>1</td>
<td>7.59</td>
</tr>
<tr>
<td>DRC</td>
<td>1</td>
<td>25.08</td>
<td>Burundi</td>
<td>1</td>
<td>10.35</td>
</tr>
</tbody>
</table>

Source: Author. Note: * indicates data adapted from UN Database (UNSD, 2014). Frequency (Freq) indicates the number of time mining was leading.

\textsuperscript{16} Exponential generalized autoregressive conditional heteroscedastic
Table 5 shows that only Ethiopia accounts for a robust score with regards to mining as a leading variable. For the non-New Alliance group, Burundi and Nigeria rank among the countries where this leading role has been sustained over time.

Figure 18 – Distribution by group, agriculture and mining in percentage of GDP, SSA

![Box plot graphs](image)

Source: Author’s calculation, data compiled from the UN Database (UNSD, 2014)

Note: This graph shows the distribution agricultural and mining in percentage of GDP for member countries not members of the alliance in SSA. The graph is given the following information from bottom to top: the minimum value, the lower quartile, the median, upper quartile, maximum value, and the outliers. A great number of countries in the New Alliance are recording a share of agriculture above the median. In the non-New Alliance countries, a great number of countries are recording agriculture lower than the median. Mining in the New Alliance are to a great extent located under the median, whereas for the non-New Alliance it is a great numbers of countries are recording mining above the median.

The share of GDP in mining in the New Alliance countries is significantly distributed under the median 12.38 percent, whereas in the non-New Alliance countries it is almost distributed around the median 23.52 percent. The agriculture share in percentage of GDP, for the New Alliance countries, is, in majority distributed above the median 26.43, with less disparity in contrast to the non-New Alliance, where the points are concentrated under the 20.18 percent.
Three patterns of structure can be drawn from the figure above. From the left side high-intensity of mining with less agriculture for countries like the Congo, Gabon, Swaziland, and Botswana and from the right side, high-intensity of agriculture, less mining for Ethiopia, Rwanda, Sierra Leone, Liberia, Burundi etc., and finally, the ‘balanced’\(^\text{17}\) structure for countries like Cameroon, Nigeria, Cote d’Ivoire. A huge gap in the economic structure is not a very good sign as it might create an economic and social divide in a given society. As a matter of fact, natural resources are not equally distributed among the population of a resource-rich SSA economy, and this can cause social tensions as well as an economic marginalisation of those living in the non-resource regions.

The long run decline of agriculture to mining activities illustrated in Figure 14, particularly from 1991, implies that, during these last years, mining activities were gaining more importance to lead in the SSA economies, particularly in Eastern Africa. Although mining is playing a major role in macro-economy, as a source of government revenue and foreign exchanges, its absorptive capacity is however still weak and

\(^{17}\) ‘Balanced’ in the sense that, there is no presence of huge gap between the two sectors.
hazardous. Unlike agriculture, mining is attracting fewer unskilled labours (Loayza & Raddatz, 2010). Furthermore, with regards to the problem of food security and agricultural development, the environmental degradation caused by mining can affect in the long run agriculture, making it a competing rather than a complementing industry. Such kind of condition might happen in case where the gap across sector between mining and agriculture is large.

4.4.4. SSA manufacturing-led economy

The last discussion point in this section concerns the manufacturing sector. To understand these interactions, it is important to capture the role of manufacturing in economic development. Such a step would make it possible to bridge some linkages towards agriculture. Manufacturing is defined by the UNSD (2008) as:

The physical or chemical transformation of materials of components into new products, whether the work is performed by power-driven machines or by hand, whether it is done in a factory or in the worker's home, and whether the products are sold at wholesale or retail. Included are assembly of component parts of manufactured products and recycling of waste materials. (p. 85).

Similar to the previous sections, a variety of studies show that manufacturing sector is the activity that offers the greatest opportunity in terms of sustainable growth, a source of employment and catalyst for poverty reduction in Africa (UNCTAD, 2011). Similarly, studies conducted by Ciarli and Di Miao (2014) underlining the importance of manufacturing in the modern economy, show that industrialisation is the pathway to sustained economic growth and modernisation via the following linkages: technology diffusion and innovation, synergy and spillover effects towards other sectors of the
economy, source of demand, backwards and forwards linkages that induce investments, employment and productivity as well as trade.

Similar to the count outcome presented above, this section presents the results of orbit analysis and identifies the countries where manufacturing was playing a leading role during the two periods ranging from 2000-2013.

Table 6 - Count outcome of leading manufacturing sector from 2000-2013 in SSA

<table>
<thead>
<tr>
<th>Country</th>
<th>Freq.</th>
<th>% GDP 2008</th>
<th>Country</th>
<th>Freq.</th>
<th>% GDP 2013</th>
</tr>
</thead>
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<td>12.34</td>
<td>Mozambique</td>
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<tr>
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<tr>
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<td>Rwanda</td>
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<tr>
<td>Burkina Faso</td>
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<td>Gabon</td>
<td>3</td>
<td>5.91</td>
</tr>
<tr>
<td>Guinea</td>
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<td>6.98</td>
<td>Lesotho</td>
<td>3</td>
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<td>1</td>
<td>2.46</td>
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Source: Author’s calculation and data adapted from data compiled from UN database (UNSD, 2014). Frequency (Freq.) indicates the number of times manufacturing was leading. Countries highlighted in grey color are the ones recording robust performance of manufacturing in the two compared periods.

For the benchmark period (2000-2008), Table 6 indicates that manufacturing was robust in Mozambique and Tanzania for the New Alliance group. This performance was moderate in Ghana and Rwanda, very modest in Kenya and Mali. In the post-2008 timeframe, only Mozambique managed to sustain a leading manufacturing sector despite the declining share of its manufacturing in percentage of GDP recorded in 2013.
Burkina Faso, Guinea, Chad and Lesotho accounted for a vigorous performance in the non-New Alliance group. The other seven countries recorded moderate and poor performances during the benchmark period. Nonetheless, the sustained manufacturing sector was disrupted in the post-2008 period for the majority of the non-New Alliance group except for Burkina Faso.

Despite the disparity of the manufacturing sector at the individual level, the results of the long run analysis of the driving force of the SSA economy are firm. The power of the manufacturing sector to herald changes on the other sectors is clearly indicating that the expansion of manufacturing can lead to the change among other variables, particularly for agriculture which immediately follows manufacturing in Western, Eastern and Central Africa. A dualism between manufacturing and agriculture can be noticed from the leading-following relations analysis given the importance of the agriculture in SSA’s economy. Discussion on the factors that matter in the development of manufacturing is therefore necessary to draw policy implication for the region.

Technology diffusion and innovation do matter in SSA. Innovation is essential for developing economies insofar it can improve well-being and promotes the access to business opportunities. In this regards, the OECD reports on innovation and development highlighted that in the early stage of development, these two elements can improve efficiency of business and public services which in turn lead to the improvement of the well-being but more importantly induces economic growth (OECD, 2012).

Manufacturing is correspondingly inducing synergy and the spillover effect towards the other sectors of the economy. To this regards, UNCTAD (2011) illustrates that this sector is a key source of demand for other services industries such as banking, transport, insurance and communication but more importantly, it also boosts growth in
the agricultural sectors, a key linkage highlighted in the early literature of economic development (Lewis, 1954; Johnston & Mellor 1961). As there are linkages between manufacturing sector and other sectors of the economy, such a process, in turn, gives a momentum to the demand. With such impetus, Engel’s law is likely to apply in this case, taking into consideration that with an increase of per capita income the share of expenditure in food falls while demand for manufactured goods would rise (UNCTAD, 2011; Ciarli & Di Maio, 2014).

Lastly, manufacturing is also a source of job creation and to a greater extent supports the transition of an economy during the process of structural transformation. The theories of structural transformation suggest that the excess of labour in the agricultural sector would shift towards the modern sectors. In this regards, during the process of urbanisation, manufacturing also would help to absorb the surplus labour from the rural area.

In the context of sustainable development strategy, agriculture and manufacturing are and should be closely interrelated and interdependent. De Janvry and Sadoulet (2010) in this regards, argue that agriculture can foster competitive advantage in the manufacturing sector. In the present days, agriculture and manufacturing offers opportunities for African trade, particularly, for countries endowed with a great agricultural potential. Export derived from agriculture and manufactured goods would also provide an important source of foreign currencies that enable to purchase capital goods and services to enhance productivity. The UNCTAD (2013) for instance, is promoting a new concept that links the two sectors across the short and long run via the ‘developmental regionalism’. Under this approach, agriculture would create trade opportunities in the short run due to the rising global and regional demand of food and arable land. And, in the long run, the industry would take the lead to boost the intra-
African exports, which accounts for only 11 percent of its total exports (UNCTAD 2013). Furthermore, the result of orbit analysis is also confirming such pathway, where manufacturing has been supporting the economy on the average since the 1990s. The results of our findings suggest SSA is not an agriculture-based economy and the difference and ambiguity of economic classification controvert such assumption.

4.4.5. Identifying the potential in the enabling sectors

Construction is also, one of the sectors that can enhance the absorptive capacity of the rural and urban world. In point of fact, when people in the rural area are migrating to the urban agglomeration, the sector that carries more unskilled-intensive labour opportunity is in construction. The definition of the UNSD (2008, p. 172) stated that:

‘[Construction] includes general construction and specialised construction activities for buildings and civil engineering works. It includes new work, repair, additions and alterations, the erection of prefabricated buildings or structures on the site and also construction of a temporary nature.’

Nevertheless, across time, construction has always been weak representing on average 3.76 percent of the GDP. Nonetheless, construction has been leading over agriculture in recent years, as presented in Figure 20. Angola, Burundi, Cote d’Ivoire, Democratic Republic of Congo, Guinea-Bissau, Kenya, Madagascar, Nigeria, Rwanda, Senegal, Sierra Leone and Tanzania, are the most vibrant countries where construction has been playing a leading role.

As stated by the definition given above, construction is related to general building and civil engineering. Accordingly, construction is related to the public investment and aid in road constructions, schools, hospital, programmes that has been
tremendously promoted by the development institutions since the 1960s. Millions if not billions of dollars are invested every year to develop infrastructures. Nevertheless, the impact of construction sector on the life of the poor is still small compared to the investments dedicated to it. Policy challenge and implication is therefore, to make ‘construction’ work. Governments when devising their plans, particularly, those related to the development of infrastructures should find the best option to create more unskilled-labour intensive employment and a more inclusive construction.

Wholesale industry is another potential cluster that has been compared to agriculture, which enabled to identify the following countries presented in Figure 21. Burundi, Central African Republic, Cameroon, Cote d’Ivoire, Kenya, Liberia, Mozambique, Rwanda, Senegal, Sierra Leone and Zimbabwe among other countries exhibit a leading position over agriculture. Wholesale is defined by the UNSD (2008, p. 179) as follows:

Wholesale and retail sale (i.e. sale without transformation) of any type of goods and the rendering of services incidental to the sale of these goods. Wholesaling and retailing are the final steps in the distribution of goods. Goods bought and sold are also referred to as merchandise.

Wholesale, in percentage share of GDP, for all countries represents about 12 percent. Wholesale and retail activities carry an important linkage with respect to markets and all the sectors of the economy. Indeed, the activities generated by wholesale and retail can be connected to the urban and rural area and can work in a bidirectional way. In this sense, wholesale and retailing activities are playing a profound role that can contribute to ensure food security and connect the rural world to the market. Although the rise of supermarkets in SSA these recent years, saw a major change, given
the fact that most of the local people do not have appropriate tools to conserve their food. Retailing industries, more precisely, micro retailing industry is therefore playing the role as a ‘food network’ and ‘storage’ where people can purchase some basic consumers good and services. What makes retailing industry as a good tool to connect people to market is the fact that the sector has not been touched by the supply chain. Across the sub-regions, the percentage share of GDP in agriculture decreases as wholesale GDP increases in Western and Eastern Africa, whereas it increases alongside wholesale in Southern and Middle Africa. Therefore, policy design should devise the best policy interface to interconnect this activity to the other sectors of the economy to generate positive linkages.

Alongside with wholesale, construction, manufacturing and agriculture, transport sector is also an important vehicle of development and food security. As defined in Chapter 3, availability and accessibility of food are two essential elements to ensure food security. The transport sector is defined by the UNSD (2008, p. 194) as:

The provision of passenger or freight transport, whether scheduled or not, by rail, pipeline, road, water or air and associated activities such as terminal and parking facilities, cargo handling, storage etc. Included in this section is the renting of transport equipment with driver or operator. Also included are postal and courier activities.

Transport industry is accounting on average, about 6 percent in percentage share of GDP. Figure 22 depicts in details the countries where transport has been leading over agriculture.

Angola, Burundi, Central African Republic, Cameroon, Madagascar, Namibia, Nigeria, Sierra Leone, Tanzania, and Uganda, among others are showing, a dynamic and robust transport industry. Graphical analysis presented in the appendix is showing
that across Western, Eastern Africa and Middle Africa the percentage share of GDP in agriculture tends to decrease while transport increases. Whereas in Southern Africa, it tends to increase as transport rises.

Transportation sector enables the mobility of labour, goods and services, but, it also connects the other sectors of the economy through its activities, similar to the wholesale and retailing industries, the transport sector is playing an enabling role in the intersectoral linkages, and thus depends on policy interface on which it is connected with.

The last enabling sector to be explored here is the other activities, defined by the UNSD (2008, p. 262) as follows:

This section (as a residual category) includes the activities of membership organisations, the repair of computers and personal and household goods and a variety of personal service activities not covered elsewhere in the classification.
Figure 20 - Construction leading over agriculture, SSA, 2008-2013

Source: Author’s calculation. Notes: the figure is read from top to the bottom. The data on the top are sharing same time axis with the countries presented in the bottom.
Figure 21 - Wholesale leading over agriculture, SSA, 2008-2013

Source: Author’s calculation. Notes: the figure is read from top to the bottom. The data on the top are sharing same time axis with the countries presented in the bottom.
Figure 22 - Transport leading over agriculture, SSA, 2008-2013

<table>
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<tr>
<th>Country</th>
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<th>Year 2010</th>
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<td>Zimbabwe</td>
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Source: Author’s calculation. Notes: the figure is read from top to the bottom. The data on the top are sharing same time axis with the countries presented in the bottom.
Figure 23 - Other activities leading over agriculture, SSA, 2008-2013

Source: Author’s calculation. Notes: the figure is read from top to the bottom. The data on the top are sharing same time axis with the countries presented in the bottom.
In an era of new technology, other activities as an economic activity have also played an important leading role over agriculture. Despite the ambiguous definition, other activities account on average, 20.51 percent of the SSA economies. Across the sub-regions, the share of agriculture in percentage of GDP tends to decline as other activities increase in Western, Eastern and Middle Africa whereas it takes an opposite movement in Southern Africa.

Angola, Burkina Faso, Burundi, Central African Republic, Côte D’Ivoire, Democratic Republic of Congo, Kenya, Madagascar, Namibia, Sierra Leone and Uganda, among others are showing a robust leading role of other activities in the economy. Other activities as mentioned earlier are an enabling sector, which with its productive capacity supports the linkages with the other sectors. Therefore, policy challenge is to maintain the role of these activities as a provider or productive capacity to support the growth of other industries (Figure 23).

4.5. Conclusion

This chapter discussed whether SSA is an agriculture-based economy and its implication to policy making. The comparison of the different ways to represent the prevailing economic sectors demonstrated that there is a multiple pathway for the region based upon three plausible assumptions of being an agriculture-based, mine-based or manufacturing, agriculture-based economy. This amalgam of assumptions brings forth another critical question about policy making, particularly for resource allocation and the arrangement of development strategies for the continent.

While discussing the fundamental question inquired by the present chapter, based on the percentage share of GDP, agriculture is leading the economy. In a second instance, the results of the orbit analysis revealed that SSA region’s economy is led by
hybrid dualism characterised by and leading-following relations between manufacturing and agriculture. A central point that unites these elements of discussion is the ‘quest for growth’. Agriculture, mining and manufacturing show potentials for job creation, opportunities for investments and trade, as well as a potential source of foreign currencies. The differences probably lie in the policy arrangement and choices. As each sector has its own pros and cons, the context across time and space is likely to influence decision making for individual countries in SSA and in this regards, key issues such as the land management, human capital development, business environment among other elements would play an essential role to spur sustainable development.

The chapter also, identified the countries where all of those sectors have been leading over agriculture. Each sector of the economy demonstrated some potential tool in policy arrangement and choices. The discussion section, in this regard, highlighted elements that enabled to draw two types of tools, namely the ‘driving forces’ (manufacturing, agriculture and construction), and the ‘enabling sectors’ (wholesale, mining, transport, and other activities). The identification of such tools will therefore be used in Chapter 6 to conceptualise the notion of ‘capacity-driven approach’ alongside with the productive capacity and absorptive capacity.

The findings deriving from orbit analysis underline sequences of period from which major turning points occurred in the region starting from 1990 when agriculture lost its position as a leading sector to mining, then manufacturing, transport and wholesale in 1991, construction in 1992 and other activities in 1993. The sector-to-sector comparisons clearly indicate that agriculture was superseded by other industries, which imply that SSA economy has reached another stage of its development that goes beyond the classification of ‘agriculture-based economy’. Although agriculture matters for poverty and food security, sustaining the resource allocation and strengthening the
transfer-linkages with other industries is also an important point to be taken into consideration in the future policy making which could be shadowed by the fact that all signals are now directed to investments in agriculture.

Regarding non-policy implications, this chapter contributes to the application of orbit analysis to the intersectoral linkages between aggregate macroeconomic data. It presented a new way to interpret the results of its output based on the seminal chapter of Itaki (2014) through the use of descriptive statistics and graphical presentation. The method also contributes to the better understanding of the relationship between agriculture and other industries from the perspective of leading-following rather than the preceding-lagging relations which test the causal effect of variable x on y, and if this causal link is unidirectional or bidirectional in the short or long run depending on the adopted estimation methods.

The structural transformation theory requires an outlook of both sectoral linkages and aggregate demand. Therefore, to complement this chapter with more empirical evidences, the next chapter will play a close look to macroeconomic conditions.
Chapter 5: In the search of the driving force of sub-Saharan Africa's economy: an approach from orbit analysis

5.1 Introduction

The economy of SSA has been one of the most dynamic in recent years, albeit the financial turmoil of 2007-2008 causing a general malaise in the majority of the advanced financial economies in North America and Europe. As a matter of fact, SSA records an annual average growth rate of 5-6 percent since 2000 and continues to grow steadily (World Bank, 2015).

A vast ground of literature highlights that the recent African growth stems from different sources. The McKinsey Global Institute (2010), for instance, explains that one third of the growth is due to the rise of commodity prices. The other two thirds, from the increase in productivity in wholesale and retail sectors accounting for 13 percent, transport and telecommunication 10 percent and manufacturing 9 percent. Other accounts for this economic boom underscore the importance of six factors, namely: i) political stability, ii) intensity of interregional trade, iii) young, growing labour force, iv) a better education and schooling achievement, v) the booming of the mobile industry, and vi) the potential for commercial agriculture with the untapped stock of arable land (The McKinsey Global Institute, 2010). In addition, the report not only highlights the sustainability of this growth due to the emergence of a new demand of primary commodities from emerging economies such as China and India, but also emphasises on the size of the African consumers estimated to reach an important maturity by 2030 (the McKinsey Global Institute, 2010).

Despite the importance of the six factors mentioned above, agriculture chiefly dominated the debates on the African political economy of development in recent years,
noticeably, in the early 2008, when the price of food commodities saw a sharp rise in the international markets. World Bank’s initiative through the WRD2008 resulted in a strong signal to private sectors as well as rich countries to invest in agriculture beyond their borders. Despite the fact that African agriculture has often suffered from a lack of investment, the major turning point of 2008 led to a considerable inward capital flow into the region (see: Deininger et al., 2011; UNCTAD, 2009). Nonetheless, two major problems arise from this turnaround. The first is related to the negative externalities engendered by these investment flows, particularly with the problem of land and water grabbing and the rights of the poor. The nature of the resource-seeking behaviour of the investments is weighted in favour of the TNCs and foreign countries, but not to the local farmers, which in the process are losing their source of livelihood (De Schutter, 2011; Deininger, 2011; Li, 2011; Matondi, 2011). The second is related to what the famous development economist Easterly (2014, p. 13) described as ‘technocratic solutions to technical problems’ – a policy fix without a consideration of the prevailing historical and dynamic conditions in the continent, the latter is associated to the fact that SSA is today categorised as ‘agriculture-based’ albeit all the economies in the region already shifted to a different stage of their development as presented by the McKinsey reports or by other academic publications advancing evidences on the existing structural changes in Africa (IMF, 2012; OECD, 2013). Furthermore, the previous chapter underlines that manufacturing is leading the economy of SSA despite its small share in percentage of GDP.

Using the technique of panel orbit analysis, this chapter investigates what is driving the economy of SSA from the perspective of aggregate demand. It seeks to understand what is leading the economy from a long run perspective and how factors such as regional location, geographical condition, and the fact of being a donor-
supported or less supported country affect this dynamic. It draws policy implications for the region with respect to the recent massive flow of investments in agriculture.

The organisation of this chapter is as follows: the next section presents some key literatures related to the present inquiry. The ensuing section describes the data and other specifications required for the panel orbit analysis. The fourth section reports the results. The fifth section discusses the results and draws policy implications for development policies for the region. The last section concludes this chapter.

5.2. Literature review

Development experts and particularly, the mainstream economists have always been fascinated by the study of the factors that can induce economic growth, which in recent years was central to poverty reduction. This proclivity is justified by the development of theoretical and empirical studies showing that sustained growth can reduce poverty (Nallari & Griffith, 2011, p. 64). The two authors presented stylised facts on the development of research on growth from the 1990s to 2005, and identified different positive empirical results stemming from education, financial development, low government burden, infrastructures, governance, trade openness and macroeconomic stabilisation (Nallari & Griffith, 2011, p. 58-59). The WDR2008 also, argued that growth coming from agriculture is more effective for poverty reduction compared to the other sectors of the economy (De Janvry & Sadoulet, 2010; World Bank, 2007, p. 22). However, it is important to note that the effects of growth differ in time and space. The study of Hasan and Quibria (2004) for instance, indicated that agriculture played a key role in poverty reduction in SSA and South Asia, whereas, in Latin America and East Asia, industry and service sectors played this role. Another essential element to sustained economic growth, and therefore poverty reduction, is the linkages between the
different sectors of the economy and the cycle of structural transformation (Barrett, Carter, & Timmer, 2010; Kuznets, 1966). Structural transformation is characterised by a decline in the share of agricultural GDP and the rise of the modern sector, a demographic shift, accompanied by a migration to urban area (Timmer, 2009, p. 5).

Agriculture in Africa, unlike East Asia has missed the Green Revolution that has made possible the rise of productivity and the improvement of food security conditions. African agriculture experienced a paradox characterised by a concept described by Lipton (1977) as ‘urban bias’ in which development policies weighted in favour of the urban areas albeit the majority of the population are rural. Under such conditions, the lack of investments and heavy taxation system was mainly paralysing the farmers. However, the policy fixes advocated by the WDR2008 are now favouring a ‘rural bias’, which concentrate all the attention and support to the rural area and pay little attention to urban migration expected to double by 2030 in SSA (Hove, Ngwerume, & Muchemwa, 2013), and the intersectoral linkages that should accompany the decline of rural population alongside with the process of structural transformation. A new framework for development, however, was presented by the former Vice-President and Chief Economist of the World Bank, Justin Yifu Lin on the ‘New Structural Economics’ (Lin, 2012). Lin puts emphasis on three important elements to take into consideration: i) infrastructure endowments, the level of development and the economic structures of developing countries; ii) the role of the state and market at each level as well as the mechanism of transition from each stage; and iii) the focus on economic distortions and government strategies to handle them (Lin, 2012, p. 38). Nonetheless, these ideas did not see any further development after Lin’s departure from the World Bank in 2012.
5.3. Model, method and data calibration

The method section of the previous chapter explains the principle of calculation in orbit analysis. The same principle is used in this chapter. The model of structural transformation is written according to the following identity:

\[ Y = (C + G + I) + (E - M) \]  

(2)

Where \( Y \) is GDP, \( C \) is household consumption expenditure (including non-profit institutions serving households), \( G \) is general government final consumption expenditure, \( I \) is gross capital formation, \( E \) is exports of goods and services, \( M \) is imports of goods and services.

5.3.1. Data and treatments

The data were retrieved from the United Nations database under the section national accounts main aggregates database for 38 countries listed in Table 7. These countries were divided and categorised into four geographical regions composed by Western, Southern, Middle and Central Africa. Data are in current $US for 1672 observations for the period 1970-2013 for the following variables: \( C, G, I, E, M \) defined above.

To construct a cross-sectional data, first, orbit analysis is replicated individually for each country and then, the results of this process are used to construct a new dataset treated with STATA®. The data therefore take the following form:

\[ X_{i,t}, i = 1, \ldots, N, t = 1, \ldots, T \], where \( i \) is the individual dimension and \( t \) is the time dimension.

After the treatment and calibration, the output of orbit analysis retains 1558 of the 5-, 7- and 9-year moving averages. The 9-year moving average is selected out of the 5- and 7-year moving averages given the medium-term variability of the data (Itaki, 2014). A new series of descriptive and graphical analysis are conducted with the new data sets in
order to highlight the dynamics of the GDP aggregates, and to draw implications for policy discussions.

5.3.2. Geographical definition and calibration

The countries subject to this study are divided into two main categories: the donor-supported countries receiving assistance from the New Alliance and the GAFSP (hereafter G8NA) and the less supported countries (hereafter non-G8NA).

These countries are sorted by geographical regions composed by Western, Southern, Middle and Southern Africa. Other categorical variables are used as a dummy instrument to assess variations across the groups and regions. These factors are the sub-regional location, the geography (landlocked or coastal), the political freedom and the ease of doing business. The following table summarises the structures of these specifications necessary for these stages.

Table 7 - List of 38 SSA countries and their geographic distributions

<table>
<thead>
<tr>
<th>G8 countries</th>
<th>non-G8 countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopia, Ghana, Kenya, Liberia, Malawi, Mali, Mozambique, Rwanda, Senegal, Tanzania, Uganda, Zambia</td>
<td>Angola, Benin, Botswana, Burkina Faso, Burundi, Central African Republic, Cameroon, Chad, Congo, Cote d'Ivoire, Democratic Republic of Congo, Equatorial Guinea, Gabon, Gambia, Guinea, Guinea-Bissau, Lesotho, Madagascar, Mauritania, Namibia, Niger, Nigeria, Sierra Leone, Swaziland, Togo, Zimbabwe</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coastal</th>
<th>Landlocked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angola, Benin, Cameroon, Congo, Cote d'Ivoire, Democratic Republic of Congo, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Mauritania, Mozambique, Namibia, Nigeria, Senegal, Sierra Leone, Togo, Tanzania</td>
<td>Botswana, Burkin Faso, Burundi, Central Africa, Republic, Chad, Ethiopia, Lesotho, Malawi, Mali, Niger, Rwanda, Swaziland, Uganda, Zambia, Zimbabwe</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Western Africa</th>
<th>Southern Africa</th>
<th>Eastern Africa</th>
<th>Middle Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angola, Benin, Burkina Faso, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo</td>
<td>Botswana, Lesotho, Swaziland</td>
<td>Burundi, Ethiopia, Kenya, Madagascar, Malawi, Mozambique, Rwanda, Uganda, Tanzania, Zambia</td>
<td>Cameroon, Central Africa, Democratic Republic of Congo, Chad, Congo, Democratic Republic of Congo, Equatorial Guinea, Gabon</td>
</tr>
</tbody>
</table>

Source: Author
5.4. Results

On average and without any geographical distinction, exports historically leads the SSA economy, followed by the gross capital formation (investments), imports, household consumption and finally the government expenditures, all in the sense of orbit analysis. These results are depicted in Figure 24.

Figure 24 - Mean of the 9-year moving average for 38 SSA countries, 1970-2012

Source: Author

Orbit analysis uses various concepts to describe the changes and variations in a given analysis. A kick-starter indicates the variable that records the highest ranking points. It also carries the ‘pulling’ power to herald changes over other variables. This study points out two types of the kick-starter. Type 0 (1972 kick-starter) considers all the time span of the period of analysis and type I (2012 kick-starter), the highest score at a time t within a period of analysis.

The degree of variation indicates the intensity of the changes of one variable across time measured by the standard deviation. The degree of variation helps to understand the deviation of the leading and following variables.
Figure 25 shows that across the 38 countries, investments play the role of kick-starter at the beginning of the period of analysis. At the end of this period, imports lead the economy supported by investments. Four major important periods can be associated to this long run dynamics across countries, namely: 1974-1983; 1989-1991; 1993-2000 and finally, 2002-onward (see: Figure 30 in the appendix).

Figure 25 - Extreme points of the kick-starters of 38 countries SSA in 1972 and 2012

- 1974-1983 is a period marked by the oil shock of 1973 and 1979. The positions of the imports and the government expenditures slightly rise while exports and private investment are declining.

- 1989-1991 coincides with the implementation of the Structural Adjustment Policy in Africa, and is marked by a significant rise of the rank of the government expenditures in the leading-following relations.

- 1993-2000 depicts a rising investment which is heralding changes during this period. Household consumption significantly rises while export tumbles.

- 2002-onward: exports lose its pace, whereas public and private investments pick-up. Major convergence is taking place, that is to say, all the variables
are pointing towards one point. SSA also started to record robust growth. At the end of the period of analysis in 2012, the imports are leading the economy.

With respect to the degree of variation, across time and countries, gross capital formation, exports, government expenditures, household consumption and finally imports are respectively recording a variation from a greater to a lesser extent.

5.4.1. Changes across sub-regional category and geographical conditions

The decomposition at a sub-regional level indicates that the leading-following relation is changing across time and countries. Table 8 reports these changes across sub-regions, the kick-starters and the degree of variation across time. The weights of the data are structured by regions as follows: 42.11; 10.53; 28.95 and 18.42 percent respectively for the: Western, Southern, Eastern and Middle Africa.

Table 8 - Leading-following relations across sub-regional category, 38 SSA countries 1972-2012

<table>
<thead>
<tr>
<th>Rank</th>
<th>Western Africa</th>
<th>Southern Africa</th>
<th>Eastern Africa</th>
<th>Middle Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>E</td>
<td>I</td>
<td>E</td>
<td>I</td>
</tr>
<tr>
<td></td>
<td>(2.07)</td>
<td>(2.12)</td>
<td>(2.15)</td>
<td>(2.10)</td>
</tr>
<tr>
<td>2</td>
<td>I</td>
<td>E</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>(2.06)</td>
<td>(2.02)</td>
<td>(1.99)</td>
<td>(2.01)</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>C</td>
<td>I</td>
<td>E</td>
</tr>
<tr>
<td></td>
<td>(1.96)</td>
<td>(1.96)</td>
<td>(1.96)</td>
<td>(1.96)</td>
</tr>
<tr>
<td>4</td>
<td>C</td>
<td>M</td>
<td>G</td>
<td>C</td>
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<tr>
<td></td>
<td>(1.93)</td>
<td>(1.90)</td>
<td>(1.89)</td>
<td>(1.84)</td>
</tr>
<tr>
<td>5</td>
<td>G</td>
<td>G</td>
<td>C</td>
<td>G</td>
</tr>
<tr>
<td></td>
<td>(1.82)</td>
<td>(1.82)</td>
<td>(1.84)</td>
<td>(1.82)</td>
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<table>
<thead>
<tr>
<th>1972 kick-starters</th>
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</thead>
<tbody>
<tr>
<td>Rank</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>1</td>
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<td>5</td>
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<table>
<thead>
<tr>
<th>2012 kick-starters</th>
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</thead>
<tbody>
<tr>
<td>Rank</td>
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<tr>
<td>------</td>
</tr>
<tr>
<td>1</td>
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<tr>
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<tr>
<td>2</td>
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<tr>
<td></td>
</tr>
<tr>
<td>3</td>
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<tr>
<td></td>
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<tr>
<td>4</td>
</tr>
</tbody>
</table>
Table 8 shows that on average, whereas investments take the lead in Southern and Middle Africa. In other words, exports and investments in Western Africa, investments in Southern Africa, exports in Eastern Africa and imports for Middle Africa. The order of the degree of variation indicates which variable is changing more than others. Table 8 for instance as the top changing variables within the GDP aggregates. In Southern Africa this deviation is moderate, while in Eastern and Middle Africa the changes of the leading variables rank

5.4.2. Leading-following relations under coastal and landlocked conditions

The previous section broadly shows which variable is leading the economy of one specific sub-region. On the one hand, exports lead the economy of Western and Eastern Africa, and on the other hand, investments lead in Southern and Central Africa. Adding an instrumental variable, such as the fact of being ‘coastal’ or ‘land locked’ makes it possible to better understand the effects of geographical conditions on SSA economies as well as the stability of the factors that trigger the growth.
Figure 26 - Leading-following relations by sub-regional decomposition,
38 SSA countries 1972-2012

Box whisker diagrams depicted in Figure 26 are used to compare the variation of the leading-following relations. The diagram makes it possible to visually compare the variables across the region based on five elements: the lowest and highest value highlighted by the whisker, the lower and upper quartiles and finally the median. The length of the whisker enables to understand the variation of the ranking points for one
variable over time. The density of the box gives information on the distribution of one variable vis-à-vis the median and vis-à-vis the other variables.

When disaggregated, the leading variable (exports) in Western Africa shows slight differences across the coastal and landlocked countries. The distribution of the ranking points in the Western coastal Africa (WCA) is more stable among the other variables. Interpreted from the viewpoint of convergence, this stability suggests that exports carry stronger pulling forces on other variables over time.

Exports are slightly dispersed in Western landlocked Africa (WLA) compared to other variables. The graphical interpretation indicates that exports and investments are playing an alternate role to herald changes among variables. In other words, over time, exports are not stable enough to exert traction on other variables.

Similar to the case of Western Africa, the pattern of the distribution and the deviation of the leading variable investments show a significant contrast when disaggregated. In Southern coastal Africa (SCA), investments are exerting a stronger traction on government expenditures and exports compared to household consumption and imports. In Southern landlocked Africa (SLA), the pulling force of the investments is more significant on exports and household consumption compared to its pulling effects on government expenditures and imports.

In Eastern Africa, both coastal (ECA) and landlocked (ELA) countries reveal a convergence relative to the pulling force exerted by exports on other variables. The graphical representation of Middle Africa illustrates a significant contrast between coastal and landlocked countries. In Middle coastal Africa (MCA) the patterns of the whisker box are similar to the ones in ECA and WCA where investments are almost equally exerting traction on the other variables. In Middle landlocked Africa (MLA),
investments are concentrated despite some lower outliers. Investments are exerting more significant pulling force on government expenditures than on other aggregate.

5.4.3. Leading-following relations under G8 New Alliance and non-New Alliance countries and Political freedom

The previous section gives important information of the leading component of the GDP, its stability, differences as well as similarities across the region. This section explores the patterns of the convergence among the GDP components while considering political freedom and the fact of being a donor-supported and less supported country. The weights of the data are distributed as follows: 13.16 percent of the countries subject to this study as ‘free’, 47.37 percent ‘Partly-free’ and 39.47 percent ‘not-free’.

Figure 27 - Leading-following relations among G8 and non-G8 New Alliances and institutional settings

Source: Author
The whisker box makes it possible to compare vertically and horizontally how institutional settings influence the performance of the countries within the two groups. For the G8 New Alliance countries, horizontally, one can observe that in ‘free’ and ‘not-free’ countries the pulling force of the leading variables is not equally the same on the following variables. In other words, exports/investments (leading variable) exert more pulling traction on investments compared to other following variables. For the non-New Alliance countries, the pulling traction of the leading variable is almost equally distributed across the three categories. In other words, when exports/investments are leading, the other following variables are following in a similar way like a chain reaction.

The vertical comparison indicates that the ‘partly-free’ countries show much more stability from the perspective of convergence, i.e. the pulling traction of the leading variable is leading to a general movement or chain reaction on other variables.

5.4.4. Leading-following relations and the investment climate

Five ranges of interval sorted in a quintile were constructed to classify all the countries from the best to the lowest performing category. The quintiles were distributed as follows: the first top ten represents 13.51 percent, the second quintile 27.03, the third quintile 18.92, the fourth quintile 27.03 and the fifth quintile 13.51 percent. In other words, the majority of the countries is falling under the range [10-20] and [30-40] while the rest are equally distributed across the extreme ranges. The results of this classification in Figure 28 can be interpreted horizontally across the quintiles.

Figure 28 shows that countries in the second, third and fourth quintiles demonstrate that the pulling forces generated by the leading variable create a nearly
equal chain reaction on the following variables. That is to say, the responses of other variables are similar when the leading variable exports/investments are moving.

Figure 28 - Leading-following relations considering the business environment for 38 countries in SSA

For countries in the first and the fifth categories, the pulling force of the leading variable is disparate. Investments for example react to a great extent to exports in the first quintile group. For the case of the fifth quintile, consumption to a great extent reacts to the pulling force triggered by the investments. After the presentation of the results the next section is presenting some discussion points about the implications of these findings for policy making.

5.5. Discussions

To begin, it is necessary to recall the main purpose of this chapter which is the inquiry of the long run dynamics of the leading-following relations of the driving forces
of the African economy. Hence, this discussion section will emphasis on the main leading components of the GDP.

The results section showed that on average, exports of goods and services and investments have played an important role in the African economy across time (see: Table 8). From this perspective, it is therefore important to make some comparison on how the raw data are represented within the GDP aggregate.

Figure 29 - Main aggregates in Percentage of GDP for 38 SSA countries, 1970-2013

![Figure 29](source)

5.5.1. Investments

Investments, on average, represent 20.49 percent of the GDP across the regions (see: Figure 29). In the leading-following relations, investments rank among the highest element of the economy, particularly, for Western, Southern and Middle Africa. Also, the regional breakdown shows that investments played the role as a 1972 kick-starter in the four regions. Conversely, a major difference is noticed in the decomposition across the region when it comes to applying categorical variables considering geographical conditions. A set of duality between investments and exports exists in Western and
Southern Africa, both for coastal and landlocked. For the New Alliance and non-New Alliance, both for ‘free’ and ‘partly-free’ economies, mixed form of duality exists for investments, with imports and exports. While looking to the business environment, investments are positioned at the core of the leading-following relations where the same three-way relationship with imports and exports exist.

Despite its small proportion to the percentage share of GDP, its rank in the leading-following relations makes it one of the important determinants of economic development across time and countries. Moreover, albeit the reluctance about African investment environment, return on investments in the continent is today one of the highest in the world as stated by Cooke and Downie (2014), making the region one of the most attractive place for investment. In policy, such dynamic force implies a potential for an investment-driven growth. However, there is a little information about the composition of these investments, whether they are formed by domestic or foreign sources. Traced across time, investments in the 38 countries were playing a kick-starter role over time and rank among the highest in the hierarchy of leading-following relations, but some contractions can be noticed during the period 1986-1989, when investments were falling while government expenditure increased. A test of correlation indicates a medium and negative relation (-0.3011) between government expenditures and investments for 1986-1992.

In macroeconomic theory, domestic investment has been understood as a function of saving, yet over time, policies stressed more on the importance of FDI to create positive linkages to the host countries. Indeed, early development theories underline the importance of saving as a means for private companies to invest, create jobs and enhance their productivity. Nonetheless, when most of African countries gained their independence, the saving was missing and was replaced by foreign aid to
spur economic growth (Moyo, 2009, p.30). However, this policy did not yield into the expected results as many countries saw their domestic saving declining while aid was increasing (Moyo, 2009, p.71). As policies were seeking to replace foreign aid, in the late 1980s, theories highlighting the importance of FDI were burgeoning, giving account to its effect on growth. From 2000-2010, the FDI inflows going to Africa accounted for $40 billion, and are expected to reach the $ 150 billion by 2015. A wide range of literature highlights that the FDI inflows depend on: market size, price level, trade barriers, production cost, cost of capital, the indicator of stability and so on. Also, there is an important debate with regards to the effects of FDI on development in the host countries. The nature and type of the investments might have positive, negative or mixed effects on the host countries’ development (see: Moran et al., 2005; Alfaro et al., 2010). Recent studies of the World Bank on FDI, combining theoretical and field research concluded that: ‘the spillover effects of FDI in developing countries are not necessarily positive in the short-term, but can be beneficial to local participants and suppliers in the medium to long-term’ (Farole & Winkler, 2014). Nevertheless, as mentioned earlier, the mixed effect can be misleading. Not only are the FDI effects different from time and space, but its type also plays a key determinant in the positive development in the host countries.

The destination of the FDI going into Africa, both for greenfield and mergers and acquisitions (M&A), is primarily in the secondary and tertiary sector; however, in the recent years, international institutions led by the World Bank is persistently fostering investment in agribusiness. FDI going into Africa are two types: Greenfield-type, which is establishing a new business in the host country and M&A-type in which a foreign company is taking over the control of a domestic one. These investments can be directed to the different sector of the economy, such as agriculture, manufacturing,
telecommunications and new technology, services and so on. Studies conducted by Moran et al. (2005) explain that these mixed results are due to the differences at the level of the host countries in terms of human resources, the sophistication of the private sector (related to the existence of supply chain linkages) and the politics of the host governments towards investments and trade. The World Investment Report of 2014 indicates that for Africa, greenfield investments are constantly growing, the announced value of these FDI amounted a total of $281 billion distributed across the region for 2009-2013, furthermore, the reports stated that 3 percent in primary sector, 48 and 49 percent, respectively in the secondary and tertiary sectors (UNCTAD, 2013).

Nonetheless, since the publication of the WDR2008, the Bank unremittingly embarked on a series of policies aiming at developing value chain in the continent under the framework of PPP, and the transformation of African agriculture into a market-oriented model. The timeline of the publications of the Bank for instance, highlighted such eagerness to pursue the idea of scaling up African agriculture. All of these technical documents were stressing the importance of the agribusiness, the creation of value chain and PPP. Although, the McKinsey report projected that African food, apparel and consumer goods would worth $185 billion by 2030, the World Bank report of 2013 stated that Africa can create a $3 trillion food market which represents an

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important business opportunity more than the investments in other sectors. The agribusiness lobby was changing their approach to enter SSA through a new modus operandi which stresses on the PPP. However, such model poses some issues as the agro-corporation which already controls 60-70 percent of the world food markets are teaming up with governments, other transnational companies and the international institutions to increase their control over the food system (Rajaonarison, 2014). Moreover, recent policy aiming at developing agriculture and ensuring food security, such as the G8 New Alliance is putting an emphasis on the stabilisation of international markets that will be organised by value chain (Rajaonarison, 2015). Nonetheless, this organisational framework also failed to generate the expected effect, especially about job creation relative to the size of their investments. In addition, other important problem such as the difference in market mechanism as well as the objective pursued by the investors and the host countries and the missing linkages at the household level, policy makers are facing a trilemma while solving the problem of scaling up agriculture (Rajaonarison, 2015). And finally, the categorisation of the World Bank ‘agriculture-based economy’ is inhibiting the potential of the other sectors of the economy to attract FDI and expand its absorption capacity relative to the rapid population growth and the urbanisation.

For policy implications, this means that it is necessary for African countries to devise a new approach to investments taking into considerations the context mentioned above, such as the population growth, urbanisation, growing consumer markets, and the need for an upgrade of the skills and knowledge. These sets of policies are crucial for host countries to create enough room for the modern sectors to absorb the migrating rural population. Furthermore, the results of the orbit analysis that use the investment climate as a categorical variable show that investments are accompanied by trade
regardless of the regional distribution. Therefore, future policies should be accompanied by an enabling investment and trade policies in a first stage and promoting a consumption-driven growth in the long run.

5.5.2. Exports and imports of goods and services:

In this section, the analysis of exports and imports of goods and services are combined together, as the two variables directly interact each other to form trade. Hence, the discussions in this section will touch briefly on the results of the orbit analysis, then, it will focus on the characteristics of trade across the continent and its sub-regions.

In the hierarchy of the leading-following relations, exports alongside with the investments are playing the role of kick-starters across countries. These two variables are also among the most influential ones across time. In the percentage share of GDP, exports represent, on average, 28.47 percent, and for the period 2000-2013, it saw a steady rise of about 6 points compared to its value in 1972-1982. Nonetheless, despite this slight increase, the results of the orbit analysis show that the ranking position of the exports is homogeneously declining. While looking at the sub-regional decomposition, the results of the orbit analysis does not show a major difference across the regions in their distributions, except for Western coastal and landlocked, Eastern landlocked in which the ranking point across countries is slightly scattered, yet, not much different from the other regions. For the fact of being part or not being part of the New Alliance countries associated with the political freedom and liberty, exports are predominantly leading in the New Alliance and ‘free’ countries (Ghana and Senegal). Major contrast can be noticed for the New Alliance not-free countries (Ethiopia and Uganda), where exports and imports are mainly leading. Additionally, the categorisation of the business
environment shows mixed results highlighting a leading-following altered sequence between investment, exports, imports.

Imports of goods and services in percentage share of GDP represent on average 38.23 percent, while the results of orbit analysis rank it, on average, at the third position. At the regional decomposition, imports show feature similar to the general ranking for Western coastal and landlocked, Southern coastal and landlocked, and Eastern coastal and middle coastal Africa. This feature is slightly different in Eastern and Middle landlocked Africa. While looking at the differences, whether these relations change with the category of being a G8NA or non-G8NA, associated with the political freedom, imports are leading in the free, non-G8 countries, partly-free G8NA and non-G8NA and in the not-free G8NA and non-G8NA. Furthermore, while looking at the business environment conditions, imports are playing more important role in the countries ranked in the second and third quintile. Although the findings present mixed results with regards to the geographical decompositions, coastal countries are more involved in imports of goods and services than the landlocked ones. Beside, political freedom coupled with the fact of being a G8NA or non-G8NA does not show major difference among countries, a new opening for further research is to know whether free, and partly-free countries are doing better than the ‘not-free’ country. Lastly, the analysis of how the hierarchy of leading-following relations is changing while looking at the business environment indicated that; countries having medium quality are more engaged in the activity of imports of goods and services.

The characteristics of leading-following relations are a dynamic alteration of investment, imports and exports. By looking at the pattern of the interaction of these variables between 2003-2012, three main features are as follows: first, countries, predominantly engaging in trade, in which imports and exports are playing a dynamic
role of leading/following (EM/ME). The second pattern that could be extracted from the analysis is the IE/EI type, in which investments and exports are playing a dynamic role of leading/following, and finally, the IM/MI pattern, in which investments and imports are dynamically leading and following. Countries that exhibit these different types are regrouped in the following table:

Table 9 - Pattern of the leading-following relations in of trade and investment, SSA, 2003-2012

<table>
<thead>
<tr>
<th>Western</th>
<th>Southern</th>
<th>Eastern</th>
<th>Middle</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM/ME: Imports exports</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angola</td>
<td>Ethiopia</td>
<td>DRC</td>
<td></td>
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<tr>
<td>Gambia</td>
<td>Kenya</td>
<td>Cameroon</td>
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<tr>
<td>Mauritania</td>
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<td>IE/EI type: Investment Exports</td>
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<td>Benin</td>
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<td>IM/MI type: Investment Imports</td>
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<td>Ghana</td>
<td>Botswana</td>
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<td>Liberia</td>
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Source: Author.

The categorisations of these countries, according to the patterns of the investment/trade relations give rise to the following policy implications:

- For the countries solely engaging in trade EM/ME type: to ensure that trade will be geared towards the establishment of the missing linkages not only with agriculture but also with the other leading sectors of the economy. Early literature stated that agricultural exports provide a supply of foreign currencies
that enable to purchase capital goods and services needed in the modern sector (Johnston & Mellor, 1961). And trade instruments can be used to level-up the labour-absorptive capacity of the modern industries. This latter, however, would not take off if an enabling environment and human capital are missing, therefore, policy instruments such as aid or government intervention to create a learning society are likely to accompany this pattern.

- For IE/EI type countries: exports and investments combined together have positive and negative sides. The two variables have an enormous potential to improve the productive capacity of a given country, which eventually can create jobs, but this will only have a positive externalities if the investments are not mainly coming from foreign sources and the exports not concentrated on natural resources. Indeed, a massive inflow of FDI coupled with the earnings in foreign currencies from exports might engender negative externalities such as the ‘Dutch disease’ or a major increase in foreign currencies, which will have as an effect the decline of competitiveness over time. In addition, if the investments are capital intensive, it might not create enough jobs to level-up the labour-absorptive capacity of the modern sectors. The sophistication of the exports also matters for the sustainability of its resultant force to lead the economy. The trends reported by the UNCTAD (2013) in the greenfield investments are showing that the secondary and third sectors are the targets in which the FDI inflows are directed to, hence, potential exports and development for the host countries can be derived from these two sectors in the long run while commodity driven export could be adopted as a kick-starter in the short run.

- For IM/MI type countries: Investments coupled with imports can stimulate the level of productivity of the African economies and open up another opportunity
to enhance export capacity for trade-led strategies. Nonetheless, the role of imports in the investments varies within the short and the long run and according to its composition. The trajectory of the orbit analysis indicates that over time, the role played by imports, government expenditures and consumption are shifting to an upward movement while exports and investments are following a declining trend. As stated earlier, trade openness or the importance of trade relative to the economic activities, is increasing across time and such degree of openness is getting stronger in Western, Eastern and Middle Africa while it changes a little in the Southern region. Imports of goods and services will continue to support the development of the countries in SSA taking into consideration the inflows of investments going to the secondary and tertiary sectors. It would play a key role alongside exports and investments both in the short and long run. In the short run, imports of goods and services would be associated with the investments in the leading-following relations, whereas, in the long run, it would follow the leading elements of the GDP.

Imports, investments and exports in the coming years would play a crucial role in agricultural policy and food security. Since the majority of the countries in SSA are today net food importers, creating trade and investment policies enhancing the productive and the absorptive capacity across all sectors would lead to sustainable economic activities and livelihood for the rapidly changing Africa.

5.6. Conclusion

This chapter investigated the long run driving forces of the SSA economy using the technique of panel orbit analysis to construct a dynamic hierarchy of leading-following relations across 38 countries in SSA. While pursuing such endeavour, the method
reveals that over the long run, exports and investments are, on average, leading in the sense of orbit analysis across time and countries.

Regarding the categorisation of SSA as an agriculture-based economy, this chapter draws from the previous discussions that the strong signal sent by the World Bank and its partners is inhibiting the productive and absorptive capacity of the modern sectors which are the main determinant of the future development and food security policy challenge for the rapidly growing young African population. The discussions also highlighted that the role of governments has been weakened and faces severe constraints during major reforms imposed by international institutions.

The analyses of the dynamics of the economy across sub-regions also indicated there is only a slight difference between the countries studied in this chapter. The same slight differences can also be noticed while applying categorical variable such as the fact of being landlocked or coastal economies. Furthermore, the data also show a very little difference between countries part of the New Alliance and the others, the same hold for the category of being free, partly-free or not-free country. Therefore, the chapter draws the conclusion that countries selected in the New Alliance were not chosen according to their good institutions. This opens up to further research to understand the criteria from which the countries part of this initiative were selected.

Three patterns of trade and investments were also identified in this chapter, namely: EM/ME type, IM/MI type and IE/EI type on which common policy could be devised for agriculture and its linkages to the other sector of the economy.

This chapter also, highlighted some key policy points as a determinant for a successful and sustainable structural transformation in the region of SSA. It supports the premise that SSA governments should seek to increase their potential in the other
sectors of the economy while devising an appropriate and acute policy towards investments and trade.
Chapter 6: Conceptualising capacity-driven approach – the way forward

6.1. Introduction

Food security and agricultural development policies are changing at a bewildering speed these recent years, posing new challenges to policy makers and development practitioners. Producing sufficient, safe and affordable food with fewer resources is one of the most important development challenges of the coming decades. Such amalgam of alteration, including the shift to the Sustainable Development Goals, gives rise to the issue of convergence in terms of policy making not only at the global but also at the very national level.

The purpose of this chapter is twofold. Firstly, to conceptualise a new approach that better fits to the versatile conditions of SSA with respect to agriculture and food security. Therefore, with the organisational tool of policy convergence, it identifies interfaces that connect the driving and enabling forces with the rural and urban productive and absorptive capacity. Secondly, this chapter discusses how the current agriculture and food security issues can be addressed by the capacity-driven approach.

It is argued that the issues of agricultural development and food security are not solely about bringing technical solutions such as the value chain and the PPP to the rural area in SSA. The problem of agricultural development and food security is deeply embedded in the versatility of the relationships between the various sectors of the economy and conditioned by endowments (enabling and driving forces) each country possesses.

Policy convergence, which is defined as the ‘tendency of policies to grow more alike over time’, will be guiding the analytical framework of this final chapter. This
chapter is structured as follows: the next section will be focusing on the presentation of the analytical framework of this document. The ensuing section identifies and elaborates on policy interfaces linking agriculture and food security to the different elements presented above. The last section concludes this chapter with the definition of capacity-driven approach.

6.2. Analytical framework

The objectives of this section are to clarify the analytical framework guided by ‘policy convergence’ and to explaining different concepts such as policy context, the degree of convergence and direction of convergence.

Policy convergence stems from diverse interpretations that rely on multidimensional perspectives which embrace political, sociological, economical phenomena. Among definitions that reached common grounds on public policy literature is the one of Kerr (1983, p. 3) which, stated that: ‘convergence is the tendency of policies to grow more alike, to develop similarities, processes and performances’. On a later interpretation of convergence, Bennett (1991) defined five possible features that explain the concept of convergence:

i. Policy goals which embrace the willingness to address common policy problems;

ii. Policy content described as a ‘formal manifestations of government’ i.e. official mechanism such as regulations, normalisation, legal documents, etc.;

iii. Policy instruments described as ‘institutional tool to administer policies whether regulatory, administrative or judicial’;
iv. Policy outcomes that deals with the impact or consequences, the result of the implementation whether ‘positive or negative/effective or ineffective’;

v. Policy style described as ‘a more diffuse notion signifying the process by which policy responses are formulated’.

Alternatively, due to the complex characteristic of public policy, convergence has been interpreted across different levels: macro and micro-perspectives to explain how it occurs (Bennett, 1991). Alongside with the development of industrialisation, not only had the industrial countries are facing common policy problems but also the eagerness to go beyond borders unfolds the driving forces of convergence. Therefore, at the macro-level, convergence accounts for a range of social and economic forces produced by industrialisation (Bennett, 1991). At the micro-level, the analysis of policy convergence takes upon case studies which enable to draw unique features that vary from country to country or from a given unit of analysis. Besides, there are many discrepancies about the sources of ‘convergence’ that is explained by Drezner (2001) via the ‘2×2 scheme’. The first scheme postulates that society has an influence on the convergence and emphasises the fact whether convergence occurs because of the primacy of structural forces or because of the pressures exerted by autonomous agents.

The former highlights the structuralist approach which considers ‘convergence’ as a dependent variable that implies that different national policies are homogenised into a global policy. The latter puts forth the agent-based theory using ‘coordination’ instead of the word ‘convergence’ (Drezner, 2001). ‘Coordination’ is defined as: ‘the organisation of the different elements of a complex body or activity so as to enable them to work together effectively’ (OED, 2013).
One critique of the previous study on policy convergence is the perspective from which it has been conducted, i.e. a focus on industrialised countries and their similar problems. However, policy convergence can also be extended to different context across time and space especially, when applied to the framework of global food security and the policy responses devised for it. Particularly, at a very micro-level where policy inconsistencies exist, as it is the case for the missing linkages in agriculture with the other sectors of the economy and the external approaches that seek to fix it. Hence, by ‘policy convergence’, is meant the way towards which policies are formulated and coordinated for a very specific goal.

It is also important to mention that the scope of this chapter is not about the analysis of the cause of policy convergence, but rather on the application of the theoretical analysis to specific case related to agriculture and food security at sectoral and territorial levels and their potential connection to the global policy initiative. Furthermore, as policy interpretation may differ from the angle it is perceived, this chapter will be mainly discussed from the perspective of SSA countries. Therefore, as a conceptual framework, this chapter will try to build the concept of ‘capacity-driven approach’ through three elements:

- Policy context and the scope of convergence: It is important to clarify the context of policy, the relevant elements that give impulse to countries and institutions to elaborate harmonised policies. In this case, the context is referred to as the main target towards which all actors are heading to. Agriculture finally got attention from the global society, yet the solutions to feed the nine billion populations still divide ideas. On the one hand, mainstream economists are advocating market solutions and private sector-led initiative. On the other hand, rural sociologists and anthropologists defend the importance of the peasantry. Taking a different
perspective, this study approaches the policy context of African countries according to the three arrows: the upward type, indicating a positive relation between land productivity and the share of employment in the rural area; the straight type, representing stagnating land productivity; the declining type, representing the decline of the share of employment in agriculture over time.

The main goal pursued in this case is to increase the productive and absorptive capacity, which seeks to improve people’s well-being by removing all the obstacles that cause inadequate access to food and to build a sustainable agriculture and food system alongside sectoral linkages. This choice is justified by the fact that most African countries have not yet reached their potential in terms of maximum achievable yield amid a great potential relative to large agricultural land and disconnected leading sectors.

- Degree of policy – as mentioned by (Holzinger, Knill and Arts, 2008, p. 31) some distinctions should be made between policy outputs adopted by the governments and policy outcomes, i.e. the actual effect of policy in terms of achievable goals. To this extent, policy outputs will be directed to the analysis of the achievement of some SSA countries based on results of leading-following relations.

- Direction of policies – according to Holzinger and Knill (2005), the direction of convergence consists of the upward or downward movement of policies across time. This exercise has been explored, through the orbit analysis revealed the leading-following relations which enabled to draw some patterns across the studied countries namely, the driving forces and enabling forces. However, as these patterns are not connected together to reach the policy goals of increasing the productive and absorptive capacity, policy interfaces needed are the next element to be identified.
• Policy interfaces can be described as the common ground where similar elements of policies are identical yet may differ in terms of content, instrument and style. In this manner, policy interfaces are therefore the linkages between two common spaces where policies are evolving together.

After this brief clarification, the following section is focusing on identifying interfaces for countries in SSA. In this chapter, we categorise interface into three groups: rural, urban, global interfaces which take into consideration the four elements: productive capacity, absorptive capacity, driving forces and enabling forces.

After a brief description of the analytical framework of this document, the purpose of this section is to identify policy interfaces with respect to agriculture and other sectors of the economy as a result of the previous analyses.

6.3. Identifying policy interfaces

Policy interfaces involve solving problems at three levels: rural, urban and global levels. These interfaces are constructed from the findings of the present manuscript. Since economic conditions may vary over time, policy goals, contents and instruments are ‘versatile’. The policy outcomes are the ‘desired’ type towards which the degree of direction of convergence is flowing.

<table>
<thead>
<tr>
<th>Table 10 - Capacity-driven matrix</th>
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<tbody>
<tr>
<td><strong>Rural interfaces: facing rural challenges</strong></td>
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<tr>
<td>----------------------------------------</td>
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<tr>
<td><strong>Productive capacity</strong></td>
</tr>
<tr>
<td>R1. Positive relations between land and share of employment</td>
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<td>R2. Stagnating land productivity</td>
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<tr>
<td>Absorptive capacity</td>
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<td>R3. Declining share of employment over time</td>
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<tr>
<td>Urban Interfaces: handling migration</td>
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<td>Driving forces</td>
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<tr>
<td>U1. Manufacturing/ Agriculture</td>
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<tr>
<td>U2. Mining/Agriculture</td>
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<tr>
<td>U3. Agriculture/ transport</td>
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<tr>
<td>Enabling forces</td>
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<td>U4. Construction</td>
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<td>U5. Wholesale/</td>
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</tbody>
</table>
6.3.1. Facing rural challenges

Based on the findings of this thesis, the fundamental policies related to agricultural development and food security should address the main problems of productivity and employment in the rural area. As elaborated in earlier instances, most of African countries have not yet achieved their maximum yield, which, if addressed with some government agencies’ support would have a transitory impact on employment.

Access to land is one possible way that might enhance the absorptive capacity of agriculture to create economic activities and thus create the Lewis, Johnston and Mellor...
and Timmer linkages. Two important points to be taken into consideration are about the stagnating yield and the possible effect of climate change. Government policy to increase research capabilities would soften these externalities.

In the long run, as the share of employment in agriculture would decline, rural economic activities, therefore, should be accompanied by nonfarm activities that would embrace capacity building in education and training as well as entrepreneurship. Improving rural services are crucial elements to address these issues.

There is a possibility that rural activities cannot embrace the supply of labour, as a possible outcome of an improved technology or as a result of job market friction, and other incentives, rural people, would decide to move to the urban area. The evidences presented in Chapter 2 (Figure 5) exhibit a sharp increase of the transition from the rural area to the urban agglomeration.

6.3.2. Handling migration in the urban area

The urban environment is characterised by the interaction of two elements: the ‘driving forces’ and the ‘enabling forces’. The driving forces are typified by sectors that are leading the economy. From the findings of this thesis, they can be three types: manufacturing/agriculture or mining/agriculture and agriculture/transport. To achieve some degree of prosperity, creating activities through manufacturing is an essential ingredient for a sustainable economy.

Devising industrial policy is the pathway for manufacturing to work. However, not all types of manufacturing can match with the African environment due to the degree of skills and sophistication of the industry. To avoid any major gap in terms of skills mismatch, unskilled-intensive labour type of manufacturing would enhance the absorptive capacity in the sector. Light manufacturing textile industry is one of the
possible options to direct policy focuses. Government-led initiative to create a signal and incentive for special investment in this cluster is very essential. The desired outcome would therefore be the emergence of a new light manufacturing industry with a major increase in the unskilled-labour intensive jobs.

The second type of driving forces, leading the African economy as seen in the previous chapters is the economy led by mining/agriculture activities. According to the findings of this thesis, there are three types of economic structure relying on mining/agriculture (Figure 19). The first type is characterised by mining activities that represent more than fifty percent of the percentage share of GDP and a significant gap with agriculture. The second type is the inverse form of the previous one, where agriculture takes an important share of the economic activities with a significant gap with mining. The third type of countries is those having a balanced mining and agriculture. For the two first types of countries, reducing the gap between the two sectors and balancing the economy would therefore be the policy challenges. For this to happen, there is a need to level-up the skills and knowledge to diversify the economic activities, and open other opportunities in the service industry. For the oil resource-rich countries, sovereign wealth funds, provided it exists, can offer multiplicity of support to such initiative.

For the second type of countries, where agriculture is leading over mining, the same policy goals apply, which consist of reducing the dependence on agriculture, and to reduce the gap between the sectors. For this type of countries, the problem solving starts again from U1, addressing the issue in the rural area.

Agriculture/transport is the last category of countries identified in this thesis. Similar to the previous type, problem solving for an agriculture-based economy begins at the rural level U1. The policy option for this type of countries is the specialisation in
agribusiness and transport (including international transportation). This specialisation is, however, conditioned with the presence of good infrastructure to make it possible for transport to connect by rural world to the urban, regional and international level. Trade is one of the global interfaces that goes with these activities, as it will be developed later. There are three patterns that can be matched with such form of activities EM/ME, IM/MI/ EM. The outcome of such policy option would yield an increase of agricultural exports, and the connectivity of the domestic network.

The ‘enabling forces’ are the activities that can offer multiple supports to the ‘driving forces’, which can be adjusted according to the policy goals of a given country. The enabling forces embrace, construction, transport, and other activities.

The construction sector, as discussed in Chapter 4, carries an enormous potential to create unskilled-intensive activities. Construction can connect both rural and urban areas through infrastructure development led by governments. The major policy challenge in this regard is to make construction ‘work’ for the poor, and enhance its absorptive capacity to create jobs and other economic activities that will emerge with it.

The wholesale and retail sectors are playing another enabling force to connect rural and urban area. A special focus underlined here is on micro retailing industries which are playing a key role in food security. Not only this industry can serve as a market platform where people in the rural area can trade their products, but also, it can be used as a storage system for specific goods and services to enable people in the rural area to have better access to food. Another aspect of the micro-industry is the sale in small quantity which is adjustable to the level of income in the rural area. Wholesale also depends on the transport for the mobility of the goods and services and construction for the creation of infrastructure and the activity it can generate.
Transport activities consist of improving the mobility and the connectivity of a given country through the transportation network. This activity also connects the two interfaces of urban and rural areas alongside construction and wholesale. Moreover, transport can connect the rural areas to the domestic markets and can serve as a storage facility for the food products, which contributes to better access to food.

Other activities, as described as ‘residual activities’ are also playing an enabling role to support the rest of the economy despite the limitation of its absorptive capacity. The services offered in the other activities can contribute to the maintenance of other sectors. The creation of services industries is therefore one policy option that can be addressed by governments and private sectors. Bringing such types of services to the rural area is also an important challenge in relations with U1, U2 and U3. The last interface policy can be connected to the two previous interfaces is related to trade and investment.

6.3.3. Embracing globalisation with the global interface

Globalisation is a phenomenon that should be embraced in the future policy design for SSA. One of the major findings of this thesis is the fact that trade and investments are both leading SSA economies on which three patterns of relations arise: Trade exports-imports (EM) type; exports/Investment type (IE/IE) and Imports/Investment IM/MI types.

Trade can offer a multiplicity of pathways to SSA to increase its productive capacity and the level of its technology. Nevertheless, trade should be handled with careful interpretation, as its outcome might cause an adverse effect to the entire economy. Trade therefore should be complemented with the other sectors. Particularly
to the urban interface connected to U1, U2 and U3. Governments are playing an essential role in this regard.

exports/Investment type, as discussed in Chapter 5, should be managed with caution as the outcomes of this pattern can cause severe damage to the economy. Sound macroeconomic policy and monetary policy are concomitant to the massive flow of foreign currencies in which a government and a central bank are playing an important role as a safeguard. Also, manufacturing and agriculture are connected to this type of trade as far as the degree of sophistication is concerned. Goods and services from agriculture and manufacturing in the long run should be level-up and diversified to keep pace with the changing global environment as well as the domestic condition where the relations among countries would be reshuffled.

Imports/Investment IM/MI type similar to the previous patterns of trade, IM/MI type should be approached with some degree of prudence, as explained in the discussion part of Chapter 5, IM/MI type can contribute to the improvement of the productive capacity, when imports are related to capital goods and services. This pattern, however, cannot be sustained over time as it might induce a diminishing productive capacity when domestic industries would not be able to keep their competitiveness. Therefore, governments are playing an important role to gear these policies towards the other sectors of the economy within time and space.

6.3.4. Where did the private sector go And what should be the role of donors

The private sector did not disappear in this process. Indeed, as the interface was devised to channel their activities, signalling the type of investments can therefore devised from the prevailing conditions in the other interfaces. Question therefore should be posed to understand such patterns:
These questions might yield different responses depending on the country context, and could be channelled into mining, manufacturing or agriculture.

Not all of the private sector investments in large-scale farming are bad. Indeed, in an agriculture-led economy, the private sector can play a key to increase the degree of specialisation of a given country and its competitiveness. However, left alone without accompanying policies they might induce adverse effects to the local people.

Similarly, not all of the African countries are good places to invest in large-scale farming. Depending on the patterns and structure of their economy, some sectors might be more promising than others. Investing in agriculture in a mine-led country, for instance, might be problematic due to existing trade-off between the two sectors. Also, land size, geographic conditions and business environment all matter for this type of investments.

Donors alongside governments are playing a versatile role across the three interfaces. As discussed in Chapter 5, when a major policy turnaround occurs, particularly from the donors, governments are playing a dynamic role to soften negative externalities. Therefore, alignment and harmonisation can be devised through the three interfaces depending on the degree of interaction and the interplay between governments and donors.

Conclusion

This final chapter outlined the major points explored in this thesis, in which through four chapters, the question ‘why agricultural development in SSA is not working’ was theoretically and empirically addressed. It then, summarised the major findings and attempted to answer the second question ‘what can be done about it’. Thus, this chapter
attempted to conceptualise the notion of ‘capacity-driven approach’ from the major findings of this thesis with the theoretical tool of policy convergence. To this extent, the chapter briefly introduced the notion of ‘convergence’ and its possible application at a micro-level with policy related to agricultural development and food security.

The use of this tool made possible the identification of three policy interfaces where various goals, instruments, and outcomes were embedded in the rural, urban and global interfaces – in which different interactions related to productive capacity and absorptive capacity are taking place.

Three challenges of development were presented alongside these interfaces: facing rural challenges, handling migration and embracing globalisation. In addition, the chapter underlined that not all of the private sector investments in agriculture are bad provided that they are accompanied by other measures. It also stresses on the fact that not all of the African countries are good places to invest in large-scale farming. This therefore discards the one-size-fits-all approach from the development institutions’ sides, and the imperative of peasantry from the social movements’ sides.

Lastly, let us propose a definition of ‘capacity-driven approach’:

Capacity-driven approach is a versatile policy tool centring population at the core of its purpose, to solve multi-layered, sequenced and sometimes, conflicting problems arranged through the notion of productive and absorptive capacity with the instrument of policy interfaces – productive capacity in this sense, is the ability of one sector of the economy to sustained economic activity and employments – and the absorptive capacity is the ability of this sector to match with the supply of labour arisen from different transition across the interfaces.

This contribution looks beyond the simple approach to agricultural development, implemented as a technical fix to solve the current issue of food security. It stresses that
such development should take place in a manner that SSA countries would be able to establish the missing linkages with agriculture-based on their economic conditions to support the driving forces. Such a process will determine the sustainability of their transformation.
Chapter 7: Conclusion

At the dawn of the transition from the MDGs towards the SDGs\textsuperscript{19}, combating poverty and hunger remains by far the key challenges for developing countries and particularly for SSA where one out of four people still goes to bed malnourished (FAO, 2013). The importance of these two elements is reflected in the first two SDGs’ goals. The former emphasises ending poverty in all its forms anywhere, and the latter about ending hunger, achieving food security and improved nutrition as well as sustainable agriculture. While African countries have experienced a significant progress regarding the quality of life of its population, according to the general assessment of the UN on the MDGs report of 2012 (UN, 2012), there are still much to do regarding the management of effective policies towards poverty and hunger to keep this progress moving forward and avoid potential drawbacks as it was the case after 2008. Over the last decade, the proportion of people living under extreme poverty was falling to 24 percent in 2008 compared to its 1990’s benchmark of 47 percent (UN, 2012). However, the rise of global food prices after 2008 pushed 44 million people into poverty according to the estimation of the World Bank (2011). For that reason, an effective management of food policies that are affecting poverty in a positive direction is the essential point of the issue of food sustainability for the coming years.

Additionally, the rise of the African continent is also accompanied by negative externalities which threaten the sustainability of the access to food due to rapid population growth. As a reminder, by 2030, 1.3 out of 2 billion additional population projected by the Population Reference Bureau (2013) will be hailing from the African continent. With the threat that such transformation represents, the responses of the multilateral institutions, individual countries, civil societies and the private sector have

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\textsuperscript{19} Sustainable Development Goals
been unanimous in emphasising the need to provide solutions built on three narratives: firstly, reintroduction of agriculture in development thinking which led the categorisation of SSA countries as an agriculture-based economy. Secondly, introduction of a new scheme of support based on the PPP mechanism, mainly dominated by TNCs and buyer-driven value chain into the global food system. And finally, stabilisation of international market to ensure that countries dependent on imports will no longer undergo the consequence of the severe shock due to price spikes. However, despite the fervour with regard to the African continent often ignored for long time, this thesis highlights significant inconsistencies that cast doubt on the effectiveness and sustainability to scale-up agriculture, ensure food security and poverty reduction.

Why are the recent policies not working and what can be done about it

Shedding light on the three narratives mentioned above and their implications for agricultural development and food security policies in SSA is the overarching objective of this manuscript. Additionally, the thesis seeks to propose a new framework to address the policy inconsistency detected throughout the different inquiries in this document. It provides theoretical and empirical arguments on the policies that aim to promote agriculture in the African continent based on a mode of production prioritising the PPP and value chain.

To this extent, this thesis was set out to answer how the mechanism of PPP and the concept of value chain are introduced in SSA’s development strategies to enhance the private control of the food system – and to what extent these strategies are in contradiction with the apparent realities related to economic conditions, food security and poverty. Five sub-research questions were posed in the beginning of this manuscript to address this central question:
Why and how the changes in modus operandi in agricultural development and food security policies, particularly, the market-led paradigm, affect the modes of production and the way of life of smallholders in a holistic manner and how this modus operandi socially, politically and economically marginalises the people in SSA?

Does the quest for food security through stabilisation of international markets and the interplay between international, national and household levels converge in a homogenous way to enable all the food imports dependent countries to ensure their future food supply and their food security?

To what extent does the classification of the region as an agriculture-based economy inhibit the development of the other sectors of the economy and the trajectory of its structural transformation?

What are the driving forces of the economy in the region?

What lessons can be drawn from a ‘capacity-driven approach’ to devise agricultural and food security policies?

To answer these questions, this manuscript was built on two systematic approaches with respect to the new change in African agriculture and its food security policy which led to the theorisation of the concept of ‘capacity-driven approach’, the core contribution of this manuscript. The first approach examines the problem of food from the lenses of agency and structuralist schools of political economy and addresses the first two sub-research questions.

The second approach addresses the data theory to highlight the contradictions in the implementation of agricultural development and food security policies in SSA region. The approach explores empirical evidences through the technique of orbit
analysis to highlight the contradictions on the evidences presented by the positive analysis school of political economy on the sectoral decomposition and the relations between agriculture and other sectors of the economy. Furthermore, using the same perspective, the thesis also highlights the driving forces of the African economy from the aggregate demand. The second approach gives an answer to the third and fourth sub-research question mentioned above.

The new modus operandi and the stabilisation of the world grain markets

The examination of the new modus operandi to address the current African agricultural and food security problem stresses discussions related to the market-led paradigm, the PPP and value chain as well as their effects on the African smallholders. From this perspective, the thesis underlines that the change in modus operandi marginalises the African smallholder in multiple ways: economically, due to the loss of the source of livelihood, socially due to the cycle of the poverty trap engendered by that loss, and politically, due to the loss of control over food.

Additionally, the same theoretical tools stemming from the agency/Structuralist schools were used to analyse the second narrative related to the stabilisation of the world grain markets insofar that food security would transcend through three levels, global, national and household. The thesis draws three concluding points regarding this topic. Firstly, the differences of market mechanisms, more precisely, how the local and global grain markets work and their interactions are inconsistent. Local markets are often non-existent and still need to be created notwithstanding the constraints attached to them. Global grain markets are nowadays functioning under a complex exchange mechanism using financial instruments that give room for speculations making the market more unpredictable. Secondly, the political motives that influence the food policy at the level of individual countries are other constraints to the second narrative.
Each individual country has different conditions with regards to food security and different resources to address them. The severity of these conditions and the availability of the resources are two important factors that make it possible for a given country to address and soften their vulnerabilities. Also, the priority for advanced countries and SSA countries are also different in their content and directions. High-income countries are more directed to the traditional security lenses while the African countries are more focused on policies that ensure food security through agricultural development and poverty reduction. And finally, the constraints faced by African agriculture in dealing with technical/technological barriers as well as physical conditions of the land, led this thesis to conclude that there is an existing trilemma or an impossible trinity to ensure food security at the three levels previously mentioned. Moreover, a thorough examination of the ideological debates with the focus on core competencies, strengths and expectations of pro-corporatists and the transnational movements indicates that the African agriculture is changing with the influence of the strong neoliberal proclivities. In other words, the neoliberal ideology is gaining ground to the grassroots type of agricultural development.

The thesis proposed as an alternative to the pro-corporatist approach that centres population in policy design in which productive capacity and absorptive capacity were partly presented to contribute to the conceptualisation of the capacity-driven agricultural development and food security. This thesis also gave an insight into the characteristics of the African agricultural problem represented by three arrows for policy challenges: the upward type, indicating a positive relation between land productivity and the share of employment in the rural area; the straight type, representing stagnating land

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20 Countries defined in the three Groups
productivity and the declining type, representing the decline of the share of employment in agriculture over time.

What did we learn from orbit analysis – policy and theoretical implications

Another contribution of this thesis is related to data theory, more precisely, the application of a simple but implacable technique of orbit analysis. Agricultural development and food security policies advanced by the GAFSP and the New Alliance are built on empirical evidence that derives from positive analysis. These empirical studies underline in particular the relations between agriculture and the other sectors of the economy and more precisely their incidences on poverty reduction. As technical fixes are prescribed to tackle agricultural development and food security in SSA, development institutions propel a signalling process, by tagging the region as an ‘agriculture-based economy’ built on the argumentation that agricultural growth is good for the poor. Such technical solution advances evidences built upon empirical and thorny methods, yet, with false interpretations with the one-size-fits-all policy packages. This signalling was ignoring the prevailing conditions in SSA economy, where structural transformation already took place without the agricultural linkages.

Orbit analysis was adopted to untangle the debate on the chicken-and-eggs on the role of agriculture in the economy by analysing SSA economic conditions pointed out by Tsakok and Gardner (2007). In doing so, this thesis identified various patterns of relations among industries and draws from these patterns two elements: the ‘driving forces’ and the ‘enabling forces’. The empirical findings observed from the orbit analysis clearly shows that the agricultural sector in SSA was outstripped by other industries since the 1990s. In addition, the regional decomposition, the use of categorical variables such as political freedom, geographical condition, and the business
environment, support that, on the short run\textsuperscript{21}, the leading role played by agriculture was only robust in a few countries, particularly for countries not part of the GAFSP and New Alliance. On the long run, the empirical findings suggest that economy of the continent is led by a hybrid dualism of manufacturing/agriculture.

Moreover, while investigating the long run driving force of the SSA economies from the perspective of aggregate demand, the thesis draws three other patterns resulting from the relations between the main aggregates on investments and trade, namely: trade type, imports-investment type and investment-exporting type. When coupled with the sectoral decomposition, these three types of categorisation make it possible to design a new analytical framework that goes beyond the simple classification of the SSA region as ‘agricultural-based’.

In this manuscript, we also presented the extension of the orbit analysis. The method was originally designed by Itaki (2014) to analyse time series data to highlight the leading and following relations among the analysed variables. The method also offers a new alternative to the so-called ‘Granger-cause’ often used in inferential statistics to determine causal relations. The empirical analysis in this thesis highlights that orbit analysis not only applies to time series data but also to a panel or longitudinal type of data. The extension of the method uses the same principle of treatment of the original orbit analysis and stacks the variables into panel form. Descriptive statistics and graphical analysis using statistical software (like STATA for the present case) also makes it possible to understand dynamic movements of each variable and identify on a time scale its power to pull or to be pulled. Consequently, the method offers acute and precise information on the study of the possible origins in the change of an economic

\textsuperscript{21} Based on comparative benchmarks 2000-2008 and 2008-2013.
phenomenon at a time \( t \) and therefore makes it possible to identify the policy that triggered those changes.

The concept of ‘capacity-driven approach’ was developed in the final chapter of this thesis, centring ‘population’ in policy design while addressing the notions of productive capacity and absorptive capacity at the rural and urban level. Moreover, a new insight into the concept of policy convergence was introduced in the conceptualisation of the capacity-driven approach in which three policy interfaces were identified. The thesis brought forth that the interplay between rural development, urban migration and globalisation are the essence of the new political economy of agricultural development and food security.

Sustainable agricultural development and food security in sub-Saharan Africa

The capacity-driven approach is relevant to policy thinking and policy making relative to the analysis of the nature, the dimension and the direction of policies to be implemented in the Sustainable Development Goals.

In recent years, several ideas were exchanged on the sustainable development solution network particularly influenced by Sachs (2015) on ‘the Age of sustainable development’, who outlined various ideas related to the development challenges to be addressed from 2015 to 2030. The challenges for agricultural development and food security are practically known and exposed by a vast ground of literature. However, as the initiative is relatively new, clear ideas on the ‘starting points’ are still to be debated. The theoretical and empirical foundations of the capacity-driven approach offer a framework to initiate this process. This thesis points out that the problems of agricultural development and food security begins at the rural level and is extended systematically to the national and international level. The versatility of this framework
will make it possible to devise clear policy design at different level according to the
driving, enabling, productive and absorptive capacity.

Other points however require in depth studies as the focus of this thesis were
based on the combinations of historical facts and empirical studies from data available
on the public domain about the GAFSP and New Alliance. Further country-wide and
micro-perspectives studies are necessary to assess the real conditions on the ground on
the location where agricultural development policy can be conducted, the condition of
the markets, the various economic activities, the quality of the infrastructure, and all the
elements that solely data cannot explain. Further researches that supplement the
capacity-driven approach are therefore expected in the future.
References


Global Agriculture and Food Security Program. (n.d.) Funding. Retrieved 05-08-2014 from, http://www.gafspfund.org/content/funding


Appendix

Table 11 describes the variables used in Chapter 2 regarding land, crop yield, employment, population and the Gini coefficient to measure inequality.

Table 11 - Description of the variables from the World Bank Development Indicators

<table>
<thead>
<tr>
<th>variable name</th>
<th>storage type</th>
<th>display type</th>
<th>value type</th>
<th>label</th>
<th>variable label</th>
</tr>
</thead>
<tbody>
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<td>str</td>
<td>%s</td>
<td></td>
<td></td>
<td>World Bank Code</td>
</tr>
<tr>
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<td>int</td>
<td>%d</td>
<td></td>
<td></td>
<td>Year</td>
</tr>
<tr>
<td>arableland</td>
<td>double</td>
<td>%g</td>
<td></td>
<td></td>
<td>Arable land (hectares)</td>
</tr>
<tr>
<td>aglandpercap</td>
<td>double</td>
<td>%g</td>
<td></td>
<td></td>
<td>Arable land (hectares per person)</td>
</tr>
<tr>
<td>aglandarea</td>
<td>double</td>
<td>%g</td>
<td></td>
<td></td>
<td>Arable land (% of land area)</td>
</tr>
<tr>
<td>pncrop</td>
<td>double</td>
<td>%g</td>
<td></td>
<td></td>
<td>Land under cereal production (hectares)</td>
</tr>
<tr>
<td>pncropland</td>
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<td>%g</td>
<td></td>
<td></td>
<td>Permanent cropland (% of land area)</td>
</tr>
<tr>
<td>syyield</td>
<td>double</td>
<td>%g</td>
<td></td>
<td></td>
<td>Cereal yield (kg per hectare)</td>
</tr>
<tr>
<td>growthdp</td>
<td>double</td>
<td>%g</td>
<td></td>
<td></td>
<td>GDP growth (annual %)</td>
</tr>
<tr>
<td>gni</td>
<td>double</td>
<td>%g</td>
<td></td>
<td></td>
<td>GNI per capita; PPP (current international $)</td>
</tr>
<tr>
<td>gini</td>
<td>double</td>
<td>%g</td>
<td></td>
<td></td>
<td>GINI Index</td>
</tr>
<tr>
<td>femalejob</td>
<td>double</td>
<td>%g</td>
<td></td>
<td></td>
<td>Employees, agriculture, female (% of female employment)</td>
</tr>
<tr>
<td>malejob</td>
<td>double</td>
<td>%g</td>
<td></td>
<td></td>
<td>Employees, agriculture, male (% of male employment)</td>
</tr>
<tr>
<td>ruralpop</td>
<td>double</td>
<td>%g</td>
<td></td>
<td></td>
<td>Rural population</td>
</tr>
<tr>
<td>ruralpopgrowth</td>
<td>double</td>
<td>%g</td>
<td></td>
<td></td>
<td>Rural population growth (annual %)</td>
</tr>
<tr>
<td>ruraltotpop</td>
<td>double</td>
<td>%g</td>
<td></td>
<td></td>
<td>Rural population (% of total population)</td>
</tr>
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<td>country</td>
<td>long</td>
<td>%d</td>
<td></td>
<td>%s</td>
<td>Country Name</td>
</tr>
<tr>
<td>inlogp</td>
<td>float</td>
<td>%g</td>
<td></td>
<td></td>
<td>Log rural population</td>
</tr>
<tr>
<td>dummy</td>
<td>float</td>
<td>%g</td>
<td></td>
<td></td>
<td>0: Non-G8 New Alliance; 1: G8 New Alliance</td>
</tr>
<tr>
<td>inyields</td>
<td>float</td>
<td>%g</td>
<td></td>
<td></td>
<td>Log cereal yield (kg per hectare)</td>
</tr>
<tr>
<td>percrop</td>
<td>float</td>
<td>%g</td>
<td></td>
<td></td>
<td>Log land under cereal production</td>
</tr>
</tbody>
</table>

Sorted by: country year

Table 12 depicts the summary statistics for all the variable mentioned above.

Table 12 - Summary Statistics of WDI data

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
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<td>Arable land (hectares)</td>
<td>1723</td>
<td>3.40e+06</td>
<td>5.16e+06</td>
<td>80000</td>
<td>3.2e+07</td>
</tr>
<tr>
<td>Arable land (hectares per person)</td>
<td>1723</td>
<td>1.78e+01</td>
<td>2.80e+01</td>
<td>1.18e+01</td>
<td>3.40e+01</td>
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<tr>
<td>Arable land (% of land area)</td>
<td>1723</td>
<td>1.00e+00</td>
<td>9.00e-01</td>
<td>9.62e-01</td>
<td>9.40e-01</td>
</tr>
<tr>
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<td>1723</td>
<td>1.00e+00</td>
<td>9.00e-01</td>
<td>9.62e-01</td>
<td>9.40e-01</td>
</tr>
<tr>
<td>Permanent cropland (% of land area)</td>
<td>1723</td>
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<td>1.59e+00</td>
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<td>Cereal yield (kg per hectare)</td>
<td>1723</td>
<td>9.79e+00</td>
<td>8.30e+00</td>
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<td>8.2e+04</td>
</tr>
<tr>
<td>GNI per capita, PPP (current international $)</td>
<td>1230</td>
<td>9.90e+00</td>
<td>7.5e+00</td>
<td>5.1e+09</td>
<td>1.0e+05</td>
</tr>
<tr>
<td>GINI Index</td>
<td>1230</td>
<td>4.50e+01</td>
<td>3.20e+01</td>
<td>3.40e+01</td>
<td>4.50e+01</td>
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<tr>
<td>Employees, agriculture, female (% of female employment)</td>
<td>40</td>
<td>5.00e-01</td>
<td>2.50e-01</td>
<td>5.00e-01</td>
<td>5.00e-01</td>
</tr>
<tr>
<td>Employees, agriculture, male (% of male employment)</td>
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<td>5.00e-01</td>
<td>2.50e-01</td>
<td>5.00e-01</td>
<td>5.00e-01</td>
</tr>
<tr>
<td>Rural population (0)</td>
<td>1723</td>
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<td>1.2e+07</td>
<td>7.63e+10</td>
<td>7.63e+10</td>
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<tr>
<td>Rural population (1)</td>
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<td>1.2e+07</td>
<td>7.63e+10</td>
<td>7.63e+10</td>
</tr>
<tr>
<td>Log rural population</td>
<td>1723</td>
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<td>1.24e+01</td>
<td>7.40e+01</td>
<td>1.51e+01</td>
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<td>Log cereal yield (kg per hectare)</td>
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<td>Log land under cereal production</td>
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<td>1.56e+00</td>
<td>8.41e+01</td>
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</tr>
</tbody>
</table>
Table 13 describes that raw data before the treatments for orbit analysis.

Table 13 - Description of the raw data SSA

<table>
<thead>
<tr>
<th>Variable Name</th>
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<th>Value</th>
<th>Label</th>
<th>Variable Label</th>
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<td></td>
</tr>
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<td>Household consumption</td>
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<tr>
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<td>Government expenditures</td>
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<td>Investment</td>
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</tr>
<tr>
<td>e</td>
<td>double</td>
<td>%8.0g</td>
<td></td>
<td>Exports</td>
<td></td>
</tr>
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<td></td>
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</tr>
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<td>%8.0g</td>
<td></td>
<td>Transport</td>
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</tr>
<tr>
<td>other</td>
<td>float</td>
<td>%8.0g</td>
<td></td>
<td>Other Activities</td>
<td></td>
</tr>
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<td>%8.0g</td>
<td></td>
<td>0: Western; 1: Southern; 2: Eastern; 3: Middle</td>
<td></td>
</tr>
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<td>dummy2</td>
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<td></td>
<td>0: Coastal; 1: Landlocked</td>
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<td>byte</td>
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<td></td>
<td>0: New alliance; 1: Non New alliance</td>
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</tr>
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<td>0: Free; 1: Partially-free; 2: Not-free</td>
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</tr>
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<td>Economy Countries</td>
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</tr>
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<td></td>
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</tr>
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<td>pcons</td>
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<td>%9.0g</td>
<td></td>
<td>Consumption in % share of GDP</td>
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<td>Government Expenditure in % share of GDP</td>
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<td>%9.0g</td>
<td></td>
<td>Investments in % share of GDP</td>
<td></td>
</tr>
<tr>
<td>px</td>
<td>float</td>
<td>%9.0g</td>
<td></td>
<td>Exports in % share of GDP</td>
<td></td>
</tr>
<tr>
<td>px</td>
<td>float</td>
<td>%9.0g</td>
<td></td>
<td>Imports in % share of GDP</td>
<td></td>
</tr>
<tr>
<td>va</td>
<td>float</td>
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<td></td>
<td>Total Value Added</td>
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<td>lnman</td>
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<td>%9.0g</td>
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<td>Log Manufacturing</td>
<td></td>
</tr>
<tr>
<td>lncstr</td>
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<td></td>
<td>Log Construction</td>
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</tr>
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<td>float</td>
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<td>Log Wholesale</td>
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</tr>
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<td>Log Transport</td>
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<tr>
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<td>%9.0g</td>
<td></td>
<td>Log Other Activities</td>
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</tr>
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<td>float</td>
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<td></td>
<td>Agriculture Value Added in % share of GDP</td>
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<td>pmun</td>
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<td>%9.0g</td>
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<td>Mining Value Added in % share of GDP</td>
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<tr>
<td>pconstr</td>
<td>float</td>
<td>%9.0g</td>
<td></td>
<td>Construction Value Added in % share of GDP</td>
<td></td>
</tr>
<tr>
<td>pwholesale</td>
<td>float</td>
<td>%9.0g</td>
<td></td>
<td>Wholesale Value Added in % share of GDP</td>
<td></td>
</tr>
<tr>
<td>ptrans</td>
<td>float</td>
<td>%9.0g</td>
<td></td>
<td>Transport Value Added in % share of GDP</td>
<td></td>
</tr>
<tr>
<td>pother</td>
<td>float</td>
<td>%9.0g</td>
<td></td>
<td>Other Activities Value Added in % share of GDP</td>
<td></td>
</tr>
<tr>
<td>openness</td>
<td>float</td>
<td>%9.0g</td>
<td></td>
<td>Trade openness</td>
<td></td>
</tr>
<tr>
<td>demand</td>
<td>float</td>
<td>%9.0g</td>
<td></td>
<td>Demand</td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>float</td>
<td>%9.0g</td>
<td></td>
<td>Net trade</td>
<td></td>
</tr>
<tr>
<td>lnd</td>
<td>float</td>
<td>%9.0g</td>
<td></td>
<td>Log Demand</td>
<td></td>
</tr>
<tr>
<td>lnl</td>
<td>float</td>
<td>%9.0g</td>
<td></td>
<td>Log Net Trade</td>
<td></td>
</tr>
<tr>
<td>wbcode</td>
<td>str3</td>
<td>%9s</td>
<td></td>
<td>World Bank Code</td>
<td></td>
</tr>
</tbody>
</table>

Sorted by: country year

Correlation table for the variables analysed in chapter 4.
### Table 14 - Correlation table of the intersectoral data by industry

<table>
<thead>
<tr>
<th></th>
<th>AGRICULTURE</th>
<th>MINING</th>
<th>MANUFACTURING</th>
<th>CONSTR</th>
<th>TRANSPORT</th>
<th>OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRICULTURE</td>
<td>1.000000</td>
<td>0.850370</td>
<td>0.929148</td>
<td>0.763699</td>
<td>0.961440</td>
<td>0.969432</td>
</tr>
<tr>
<td>MINING</td>
<td>0.850370</td>
<td>1.000000</td>
<td>0.891973</td>
<td>0.783795</td>
<td>0.848629</td>
<td>0.846756</td>
</tr>
<tr>
<td>MANUFACTURING</td>
<td>0.929148</td>
<td>0.891973</td>
<td>1.000000</td>
<td>0.801490</td>
<td>0.930290</td>
<td>0.946056</td>
</tr>
<tr>
<td>CONSTR</td>
<td>0.763699</td>
<td>0.783795</td>
<td>0.801490</td>
<td>1.000000</td>
<td>0.845083</td>
<td>0.836423</td>
</tr>
<tr>
<td>TRANSPORT</td>
<td>0.961440</td>
<td>0.848629</td>
<td>0.930290</td>
<td>0.845083</td>
<td>1.000000</td>
<td>0.985563</td>
</tr>
<tr>
<td>OTHER</td>
<td>0.969432</td>
<td>0.846756</td>
<td>0.946056</td>
<td>0.836423</td>
<td>0.985563</td>
<td>1.000000</td>
</tr>
</tbody>
</table>

### Table 15 - Correlation table of the aggregate demand data

<table>
<thead>
<tr>
<th></th>
<th>CONS</th>
<th>GOV</th>
<th>GCF</th>
<th>E</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONS</td>
<td>1.000000</td>
<td>0.640250</td>
<td>0.884038</td>
<td>0.848738</td>
<td>0.846332</td>
</tr>
<tr>
<td>GOV</td>
<td>0.640250</td>
<td>1.000000</td>
<td>0.854430</td>
<td>0.608628</td>
<td>0.617655</td>
</tr>
<tr>
<td>GCF</td>
<td>0.884038</td>
<td>0.854430</td>
<td>1.000000</td>
<td>0.809237</td>
<td>0.822343</td>
</tr>
<tr>
<td>E</td>
<td>0.848738</td>
<td>0.608628</td>
<td>0.809237</td>
<td>1.000000</td>
<td>0.948927</td>
</tr>
<tr>
<td>M</td>
<td>0.846332</td>
<td>0.617655</td>
<td>0.822343</td>
<td>0.948927</td>
<td>1.000000</td>
</tr>
</tbody>
</table>

### Table 16 - Summary statistics of the orbit analysis output 9-year moving average

<table>
<thead>
<tr>
<th></th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, hunting, forestry, fishing (ISIC A+ B)</td>
<td>40</td>
<td>3.1426</td>
<td>0.823686</td>
<td>1.75</td>
<td>4.3333</td>
</tr>
<tr>
<td>Mining, Manufacturing, Utilities (ISIC C+ D)</td>
<td>40</td>
<td>3.50734</td>
<td>0.85822</td>
<td>1.89</td>
<td>4</td>
</tr>
<tr>
<td>Manufacturing (ISIC D)</td>
<td>40</td>
<td>3.25797</td>
<td>0.55902</td>
<td>2.3323</td>
<td>4.4</td>
</tr>
<tr>
<td>Construction (ISIC E)</td>
<td>40</td>
<td>2.4075</td>
<td>0.14256</td>
<td>1.4663</td>
<td>3.5</td>
</tr>
<tr>
<td>Wholesale, retail trade, restaurants and hotels (ISIC F)</td>
<td>40</td>
<td>2.66545</td>
<td>0.625863</td>
<td>1.4</td>
<td>3.7778</td>
</tr>
<tr>
<td>Transport, storage and communication (ISIC G)</td>
<td>40</td>
<td>2.93086</td>
<td>0.33841</td>
<td>1.8</td>
<td>3.55556</td>
</tr>
<tr>
<td>Other Activities (ISIC H+ I)</td>
<td>40</td>
<td>3.12692</td>
<td>0.641258</td>
<td>2</td>
<td>4.22222</td>
</tr>
<tr>
<td>Agriculture vs. Mining</td>
<td>40</td>
<td>0.06766</td>
<td>1.05734</td>
<td>-3</td>
<td>1.66667</td>
</tr>
<tr>
<td>Agriculture vs. Manufacturing</td>
<td>40</td>
<td>-0.51456</td>
<td>1.3023</td>
<td>-2.4</td>
<td>1.77778</td>
</tr>
<tr>
<td>Agriculture vs. Construction</td>
<td>40</td>
<td>0.736301</td>
<td>0.884746</td>
<td>-0.55556</td>
<td>3.55556</td>
</tr>
<tr>
<td>Agriculture vs. Wholesale</td>
<td>40</td>
<td>0.45855</td>
<td>0.818433</td>
<td>-1.22222</td>
<td>2.22222</td>
</tr>
<tr>
<td>Agriculture vs. Transport</td>
<td>40</td>
<td>0.21937</td>
<td>0.834899</td>
<td>-1.11111</td>
<td>1.77778</td>
</tr>
<tr>
<td>Agriculture vs. Other</td>
<td>40</td>
<td>0.27879</td>
<td>1.2425</td>
<td>-1.88889</td>
<td>2</td>
</tr>
</tbody>
</table>
### Table 17 - Summary statistics of the results of orbit analysis at a country level

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>year</td>
<td>1992</td>
<td>11.83596</td>
<td>1972</td>
<td>2012</td>
<td>N = 1558</td>
</tr>
<tr>
<td></td>
<td>within</td>
<td>11.83596</td>
<td>1972</td>
<td>2012</td>
<td>N = 1558</td>
</tr>
<tr>
<td>agrie-e</td>
<td>3.070994</td>
<td>.765257</td>
<td>.5</td>
<td>5.33333</td>
<td>N = 1558</td>
</tr>
<tr>
<td></td>
<td>between</td>
<td>.392985</td>
<td>2.158473</td>
<td>3.226249</td>
<td>n = 38</td>
</tr>
<tr>
<td></td>
<td>within</td>
<td>.655311</td>
<td>.8305906</td>
<td>5.13529</td>
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</tr>
<tr>
<td>mining</td>
<td>2.855925</td>
<td>.6689066</td>
<td>.5</td>
<td>5</td>
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<tr>
<td></td>
<td>between</td>
<td>.356525</td>
<td>2.261372</td>
<td>3.97298</td>
<td>n = 38</td>
</tr>
<tr>
<td></td>
<td>within</td>
<td>.598853</td>
<td>.559019</td>
<td>6.583551</td>
<td>T = 41</td>
</tr>
<tr>
<td>manuf-g</td>
<td>3.010384</td>
<td>.6314649</td>
<td>.75</td>
<td>5.325</td>
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<tr>
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<tr>
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<td>within</td>
<td>.5732546</td>
<td>.841635</td>
<td>5.14409</td>
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</tr>
<tr>
<td>constr-n</td>
<td>2.870212</td>
<td>.6796255</td>
<td>.75</td>
<td>5.57129</td>
<td>N = 1558</td>
</tr>
<tr>
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<td>between</td>
<td>.244424</td>
<td>2.441514</td>
<td>2.484055</td>
<td>n = 38</td>
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<tr>
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<td>within</td>
<td>.654t284</td>
<td>.6068095</td>
<td>4.860804</td>
<td>T = 41</td>
</tr>
<tr>
<td>wholes-e</td>
<td>2.931663</td>
<td>.6553282</td>
<td>.75</td>
<td>5</td>
<td>N = 1558</td>
</tr>
<tr>
<td></td>
<td>between</td>
<td>.2641066</td>
<td>2.10556</td>
<td>3.609268</td>
<td>n = 38</td>
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<tr>
<td></td>
<td>within</td>
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<td>.792146</td>
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</tr>
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<td>5.33333</td>
<td>N = 1558</td>
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<tr>
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<td>3.745015</td>
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<td>within</td>
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<td>.9779176</td>
<td>5.184233</td>
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</tr>
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<td>4.777778</td>
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<tr>
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<td>3.330381</td>
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<td>.6261261</td>
<td>.6268355</td>
<td>4.768932</td>
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</table>

### Table 18 - Summary statistics of the results of orbit analysis for the aggregate demand

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>year</td>
<td>1992</td>
<td>11.83596</td>
<td>1972</td>
<td>2012</td>
<td>N = 1558</td>
</tr>
<tr>
<td></td>
<td>within</td>
<td>11.83596</td>
<td>1972</td>
<td>2012</td>
<td>N = 1558</td>
</tr>
<tr>
<td>c</td>
<td>1.883916</td>
<td>.4685137</td>
<td>.5</td>
<td>3.5</td>
<td>N = 1558</td>
</tr>
<tr>
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<td>between</td>
<td>.1959806</td>
<td>1.48853</td>
<td>3.62469</td>
<td>n = 38</td>
</tr>
<tr>
<td></td>
<td>within</td>
<td>.6245974</td>
<td>.6010825</td>
<td>3.318272</td>
<td>T = 41</td>
</tr>
<tr>
<td>g</td>
<td>1.840463</td>
<td>.4947057</td>
<td>.2</td>
<td>3.428571</td>
<td>N = 1558</td>
</tr>
<tr>
<td></td>
<td>between</td>
<td>.2213356</td>
<td>1.502323</td>
<td>2.501561</td>
<td>n = 38</td>
</tr>
<tr>
<td></td>
<td>within</td>
<td>.6465566</td>
<td>.3276467</td>
<td>3.547524</td>
<td>T = 41</td>
</tr>
<tr>
<td>l</td>
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<td>.4</td>
<td>3.666667</td>
<td>N = 1558</td>
</tr>
<tr>
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</tr>
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<td>e</td>
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<td>.5034072</td>
<td>.333333</td>
<td>3.5</td>
<td>N = 1558</td>
</tr>
<tr>
<td></td>
<td>between</td>
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<td>1.506756</td>
<td>2.44519</td>
<td>n = 38</td>
</tr>
<tr>
<td></td>
<td>within</td>
<td>.6465055</td>
<td>.3846283</td>
<td>3.441245</td>
<td>T = 41</td>
</tr>
<tr>
<td>m</td>
<td>1.970692</td>
<td>.4659003</td>
<td>.666667</td>
<td>3.444444</td>
<td>N = 1558</td>
</tr>
<tr>
<td></td>
<td>between</td>
<td>1.604812</td>
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<td>2.367431</td>
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</tr>
<tr>
<td></td>
<td>within</td>
<td>.4159058</td>
<td>.6270989</td>
<td>3.102226</td>
<td>T = 41</td>
</tr>
</tbody>
</table>
Figure 30 - Homogeneous panel of leading-following relations for 38 countries in SSA 1972-2012
**The New Political Economy of Agricultural Development and Food Security in sub-Saharan Africa**

**by RAJAONARISON Haja, Graduate School of International Relations, Ritsumeikan University**

**Last updated 20/10/2015**

**correspondance: g0079v@ed.ritsumei.ac.jp**

**users are recommended to use the do-file in stata. The present code works under STATA® 12. Some modules might be required for some codes.**

********************************************

**Variable treatment in case of raw data**

**these treatment are part of the preliminary calibration, the data are already applied to the current data.**

label variable country “Country”

label variable year “year”

label variable c “Household Consumption”

label variable g “Government Consumption”

label variable i “Gross Capital Formation”

label variable e “exports”

label variable m “Imports”

label variable dummy “Geographic category”

label variable dummy2 “Landlocked and coastal”

label variable dummy3 “G8NA Non-G8NA”

label variable dummy4 “Political freedom”

label variable dummy5 “Business Environment”

label variable country1 “Country”

drop country

********************************************

**encoding the variable country to get a variable that can be used in panel data setting**

encode country, gen(economy)

set the data as a panel***

xtset economy year

********************************************

graph bar (mean) c g i e m, blabel(bar) ytitle(score) title(Mean of the moving average) subtitle(for 38 countries in sub-Saharan Africa) legend(order(1 "Household Consumption" 2 "Government Final Consumption" 3 "GCP" 4 "exports" 5 "Imports"))

graph bar (mean) c g i e m if dummy==0, blabel(bar) ytitle(score) title(Mean of the moving average) subtitle(Western Africa) legend(order(1 "Household Consumption" 2 "Government Final Consumption" 3 "GCP" 4 "exports" 5 "Imports"))

graph bar (mean) c g i e m if dummy==1, blabel(bar) ytitle(score) title(Mean of the moving average) subtitle(Southern Africa) legend(order(1 "Household Consumption" 2 "Government Final Consumption" 3 "GCP" 4 "exports" 5 "Imports"))

graph bar (mean) c g i e m if dummy==2, blabel(bar) ytitle(score) title(Mean of the moving average) subtitle(Eastern Africa) legend(order(1 "Household Consumption" 2 "Government Final Consumption" 3 "GCP" 4 "exports" 5 "Imports"))

205
graph bar (mean) c g i e m if dummy==3, blabel(bar) ytitle(score) title(Mean of the moving average) subtitle(Middle Africa)
legend(order(1 "Household Consumption" 2 "Government Final Consumption" 3 "GCF" 4 "Exports" 5 "Imports"))

***************

graph bar (firstnm) c g i e m, blabel(bar) ytitle(score) title(Mean of the moving average) subtitle(for 38 countries in sub-Saharan Africa)
legend(order(1 "Household Consumption" 2 "Government Final Consumption" 3 "GCF" 4 "Exports" 5 "Imports"))

***************

graph bar (lastnm) c g i e m, blabel(bar) ytitle(score) title(Mean of the moving average) subtitle(for 38 countries in sub-Saharan Africa)
legend(order(1 "Household Consumption" 2 "Government Final Consumption" 3 "GCF" 4 "Exports" 5 "Imports"))

***************

**

**

**

**

**

***************

tab dummy, gen(region)
gen region1=1 if dummy==0
gen region2=1 if dummy==1
gen region3=1 if dummy==2
gen region4=1 if dummy==3

***************

graph bar (firstnm) c g i e m, blabel(bar) ytitle(score of the ranking points) title(Kick-Starters) legend(order(1 "Household Consumption" 2 "Government Final Consumption" 3 "GCF" 4 "Exports" 5 "Imports"))
name(First, replace) nodraw
graph bar (lastnm) c g i e m, blabel(bar) ytitle(score of the ranking points) title(Last Performers) legend(order(1 "Household Consumption" 2 "Government Final Consumption" 3 "GDP" 4 "Exports" 5 "Imports")) name(Last, replace) nodraw
gc1leg First Last, cols(2)

*************************************
** Dummy ans' 0 for Western, 1 for southern, 2 for Eastern and 3 for Middle Africa
** Western Africa
graph box c g i e m if dummy==0 & dummy2==0, ytitle(Score of the ranking points) title(coastal countries) name(coastal, replace) nodraw
graph box c g i e m if dummy==0 & dummy2==1, title(landlocked countries) name(landlocked, replace) nodraw
gc1leg coastal landlocked, cols(2) title(Western Africa) note(Source: Author's calculation)

** Southern Africa
graph box c g i e m if dummy==1 & dummy2==0, ytitle(Score of the ranking points) title(coastal countries) name(coastal, replace) nodraw
graph box c g i e m if dummy==1 & dummy2==1, title(landlocked countries) name(landlocked, replace) nodraw
gc1leg coastal landlocked, cols(2) title(Southern Africa) note(Source: Author's calculation)

** Eastern Africa
graph box c g i e m if dummy==2 & dummy2==0, ytitle(Score of the ranking points) title(coastal countries) name(coastal, replace) nodraw
graph box c g i e m if dummy==2 & dummy2==1, title(landlocked countries) name(landlocked, replace) nodraw
gc1leg coastal landlocked, cols(2) title(Eastern Africa) note(Source: Author's calculation)

** Middle Africa
graph box c g i e m if dummy==3 & dummy2==0, ytitle(Score of the ranking points) title(coastal countries) name(coastal, replace) nodraw
graph box c g i e m if dummy==3 & dummy2==1, title(landlocked countries) name(landlocked, replace) nodraw
gc1leg coastal landlocked, cols(2) title(Middle Africa) note(Source: Author's calculation)

******************************************************************************
** Coastal=0 and Landlocked=1
graph box c g i e m if dummy==0 & dummy2==0, title(Western coastal) name(first, replace) nodraw
graph box c g i e m if dummy==0 & dummy2==1, title(Western landlocked) name(second, replace) nodraw
graph box c g i e m if dummy==1 & dummy2==0, title(Southern coastal) name(third, replace) nodraw
graph box c g i e m if dummy==1 & dummy2==1, title(Southern landlocked) name(fourth, replace) nodraw
graph box c g i e m if dummy==2 & dummy2==0, title(Eastern coastal) name(fifth, replace) nodraw
graph box c g i e m if dummy==2 & dummy2==1, title(Eastern landlocked) name(six, replace) nodraw
graph box c g i e m if dummy==3 & dummy2==0, title(Middle coastal) name(seven, replace) nodraw
graph box c g i e m if dummy==3 & dummy2==1, title(Middle landlocked) name(eight, replace) nodraw
gc1leg first second third fourth fifth six seven eight, cols(2) rows(4) note(Source: Author's calculation)
******************************************************************************
**New alliance=0 Non/New Alliance/ Political freedom: free=0, partly-free=1; not-free=2**

```stata
graph box c g i e m if dummy3==0 & dummy4==0, title(New Alliance free) name(first, replace) nodraw
graph box c g i e m if dummy3==0 & dummy4==1, title(New Alliance Partly-free) name(second, replace) nodraw
graph box c g i e m if dummy3==0 & dummy4==2, title(New Alliance not-free) name(third, replace) nodraw
graph box c g i e m if dummy3==1 & dummy4==0, title(Non New Alliance free) name(fourth, replace) nodraw
graph box c g i e m if dummy3==1 & dummy4==1, title(Non New Alliance partly-free) name(five, replace) nodraw
graph box c g i e m if dummy3==1 & dummy4==2, title(Non New Alliance not-free) name(six, replace) nodraw
grc1leg first second third fourth five six, cols(3) rows(2)
```

*Source: Author's calculation*

** Ease of doing business in a New and Non-New Alliance country**

** top [1-10]: 1; [10-20]:2; [20-30]:3;[30-40]:4;[40-50]:5**

```stata
graph box c g i e m if dummy5==1, title(1st quintile) name(first, replace) nodraw
graph box c g i e m if dummy5==2, title(2nd quintile) name(second, replace) nodraw
graph box c g i e m if dummy5==3, title(3rd quintile) name(third, replace) nodraw
graph box c g i e m if dummy5==4, title(4th quintile) name(fourth, replace) nodraw
graph box c g i e m if dummy5==5, title(5th quintile) name(five, replace) nodraw
grc1leg first second third fourth five, cols(3) rows(2)
```

*Source: Author's calculation*

** counting** How many countries was leading under categoria

```stata
tabulate year if N<0 & dummy2==0
```

```stata
by dummy dummy2, sort : summarize c g i e m
```

**Applying some categorical variables related to the landlocked by dummy, sort : summarize c g i e m**

```stata
by dummy dummy2, sort : summarize c g i e m
```

**Applying some categorical variables related to the landlocked**

```stata
by dummy dummy2, sort : summarize c g i e m
```

208
**Analysis of Investments and trade**

```
#delimit cr
#delimit

regress lngdp lcons lngov lnGCF lX lM
```

**Note:**

1. The regression model includes the following variables:
   - `lngdp`: Natural logarithm of GDP
   - `lcons`: Natural logarithm of household consumption
   - `lngov`: Natural logarithm of government final consumption
   - `lnGCF`: Natural logarithm of gross capital formation
   - `lX`: Natural logarithm of exports
   - `lM`: Natural logarithm of imports

Additional analysis and data summaries are presented, including:

- Bar graphs depicting the share of GDP for different components (e.g., household consumption, government final consumption, investment, exports, imports).
- List commands to display data for specific dummy values and years.

This detailed analysis provides insights into the economic structure and trade dynamics, highlighting the contributions of various sectors to the GDP.
by dummy5, sort: list country if year==2008
by dummy, sort: tab country if impulse1<0 & year==2008
by dummy, sort: tab country if impulse2<0 & twithin(2008,2012)
by dummy, sort: tab country if impulse2<0 & twithin(2000,2008)
by dummy, sort: tab country if impulse3<0 & twithin(2000,2008)
by dummy, sort: tab country if impulse3<0 & twithin(2005,2012)
by dummy, sort: tab country if impulse5<0 & twithin(2005,2012)
by dummy, sort: tab country if impulse6<0 & twithin(2005,2012)
rename impulsive impulse3
by dummy, sort: list country if twithin(2005,2012) & impulse5<0
xtline impulse1 if twithin(2000,2008), recast(bar)
xtline impulse1 if twithin(2005,2012), recast(bar)
xtline impulse1 if twithin(2004,2013) & impulse1<0, recast(bar) byopts(note(source: Author's calculation))
xtline impulse1 if twithin(2005,2012) & impulse2<0, recast(bar) byopts(note(source: Author's calculation))
xtline impulse2 if twithin(2005,2012) & impulse2<0, recast(bar) byopts(note(source: Author's calculation))
by dummy, sort: tab country if impulse1<0 & twithin(2005,2012)
rename impulse3 impulse3
xtline impulse3 if twithin(2005,2012) & impulse3<0, recast(bar) byopts(note(source: Author's calculation))
xtline impulse4 if twithin(2005,2012) & impulse4<0, recast(bar) byopts(note(source: Author's calculation))
xtline impulse5 if twithin(2005,2012) & impulse5<0, recast(bar) byopts(note(source: Author's calculation))
by dummy, sort: tab country if twithin(2005,2012) & impulse5<0
xtline impulse6 if twithin(2005,2012) & impulse6<0, recast(bar) byopts(note(source: Author's calculation))
clear
***********************************************************************
by dummy, sort: list country if year==2008
twoway(scatter pMIN pAG)
twoway(scatter pMIN pAG) (lfit pMIN pAG)
twoway(scatter pMIN pAG, mlabel(economy)) (lfit pMIN pAG)
sort country
sort country year
twoway(scatter pMIN pAG, mlabel(economy)) (lfit pMIN pAG)
replace wbcode = "BEN" in 45
twoway(scatter pMIN pAG, mlabel(wbcode)) (lfit pMIN pAG)
twoway (scatter pAG pMIN, mlabel(wbcode) mlabsize(minuscule))
twoway (scatter pAG pMIN, mlabel(wbcode) mlabsize(vsmall))
twoway (scatter pAG pMIN, mlabel(wbcode) mlabsize(vsmall))
twoway (scatter pAG pMIN, mlabel(wbcode) mlabsize(vsmall)) (lfit pMIN pAG)
twoway (scatter pMIN pAG, mlabel(wbcode) mlabsize(vsmall)) (lfit pMIN pAG)
twooway (scatter pAG pMIN, mlabel(wbcode) mlabsize(vsmall), by(dummy))
***********************************************************************
by dummy3, sort: tab country if impulse1>0 & impulse2>0 & impulse3>0 & impulse4>0 & impulse5>0 & impulse6>0 &
twithin(200,2008)
by dummy3, sort: tab country if impulse1>0 & impulse2>0 & impulse3>0 & impulse4>0 & impulse5>0 & impulse6>0 &
twithin(2008,2012)
tab country if impulse2<0 & twithin(2000,2008)
tab country if impulse2<0 & twithin(2008,2012)
*manufacturing leading over variables
by dummy3, sort: tab country if impulse2<0 & impulse2> impulse1 & impulse2> impulse3 & impulse2> impulse4 & impulse2> impulse5 & impulse2> impulse6
by dummy3, sort: tab country if impulse2<0 & impulse2< impulse1 & impulse2< impulse3 & impulse2< impulse4 & impulse2< impulse5 & impulse2< impulse6
*agriculture leading over other variables
by dummy3, sort: tab country if impulse1<0 & impulse2> impulse1 & impulse2> impulse3 & impulse2> impulse4 & impulse2> impulse5 & impulse2> impulse6