Trade policy and structural transformation: Towards services economy in Africa?

Bouraima SAWADOGO[1+], Constant FOUOPI DJIOGAP[2], Moukaila Mouzamilou TAKPARA[3]

Abstract

The objective of this paper is to make an empirical appraisal to identify the key drivers of structural transformation in Sub-Saharan Africa (SSA) by focussing on the effect of services trade. The study focuses on 18 SSA selected countries over 1991 – 2018. By using Fabricant's (1942) decomposition method, total factor productivity growth is divided into within-sector productivity growth, static labour reallocation between sectors, and dynamic labour reallocation. The findings reveal that SSA's total labour productivity grew by 2.33% from 1991 to 2018, driven mainly by static inter-sectoral reallocation. The empirical strategy combines the Pool Mean Group (PMG), the Dynamic Common Correlated Effects (DCCE) methods to estimate the parameters of our models. We then used local projection analysis approach to identify the impulse response of the structural change indicators to shock in services trade and to the global financial crisis (GFC). The results reveal on the one hand that, in Long-term trade openness in services, particularly in transport, travel, and ICT services, positively influences productivity growth and labour movement towards productive sectors. On the other hand, the robustness of these results is confirmed using the DCCE estimator. Global shocks on trade in services as well as the GFC have varying effects, highlighting the transient and unpredictable nature of economic shocks on structural transformation in SSA. Policy recommendations include enhancing the role of services in productivity growth, liberalizing the services sector to attract FDI, and improving economic resilience to external shocks.

Key words: structural transformation, productivity, shock, trade in services, local projection, Sub Sharan Africa

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1 Introduction

Structural transformation as seen from the angle of productivity growth and the inter-sectoral reallocation of labour is a subject of great interest in the literature. This has largely relied on theoretical models based on an aggregate production function (such as Solow's neoclassical growth model), thus emphasizing the role of factor accumulation and productivity at the economy-wide level (Martins, 2019). International trade is at the heart of the literature on labour productivity growth and the movement of labour between sectors of an economy. Labour productivity growth is understood as the increase in total national output per unit of labour (M. S. McMillan & Rodrik, 2011). It has several effects, including the reallocation of labour within sectors of the economy. Intersectoral reallocation of labour is understood as the movement of labour between sectors of an economy. Some authors(De Vries et al., 2013; M. S. McMillan & Rodrik, 2011; C. P. Timmer & Akkus, 2008; M. P. Timmer & Szirmai, 2000) view labour productivity growth as a process that gives rise to average productivity growth within sectors (termed the intra effect), a movement of labour to sectors with above-average productivity levels (the inter static effect) and a movement of labour to sectors experiencing positive productivity growth (termed the conjoint or intra dynamic effect).

Recent trade statistics (UNCTAD, 2020, 2022; WTO, 2020, 2021) show that the share of services in international trade has increased over the years. For a long time, trade in services was the preserve of industrialized countries, but in recent years, emerging countries and the developing world have been making a growing contribution. In fact, developing countries, particularly African ones, have received increasing attention in recent years in the literature on trade in services(Anderson & Ponnusamy, 2019; Arnold et al., 2011; Balchin et al., 2016; Catteneo et al., 2010). The theoretical link between international trade and structural transformation appeared in the seminal works on structural transformation (Baumol, 1967; Fisher, 1939; Kuznets, 1957, 1973). This is followed by attempts to bring services and structural transformation together, which are mentioned in the literature (Anderson & Ponnusamy, 2019; Berthélemy & Chauvin, 2000; Lopes et al., 2017; Swiecki, 2017). However, Faïz, (2007) considers that, despite the growing share of services in international trade and their important contribution, the attention given to trade in goods in the literature remains far behind that dedicated to trade in services.

The economic boom observed in countries south of the Sahara in the aftermath of independence has been followed by a series of difficulties that have affected the structure of

production and the dynamics of the workforce in those countries. In addition, African countries' involvement in globalization, characterized by the opening of trade to the rest of the world, has also led to mixed economic results in terms of production (productivity) and labour dynamics between sectors of activity in SSA (Hugon, 1994). Indeed, despite a downward (albeit slow) trend in the agricultural sector, the service sector is experiencing labour attraction, while the manufacturing sector is stagnating (WDI, 2022).

Beyond the mixed results of labour dynamics in SSA, total factor productivity growth remains a major concern for policy makers in the region. Given this situation, we need to examine the nature of the relationship between international trade in services and factors productivity dynamics such as labour productivity, as well as reallocation across sectors. To this end, the aim of this paper is to assess the induced effects of the main aspects of international trade in services on productivity growth and the sectoral reallocation of labour in SSA. Therefore, we first present a review of the relevant literature. Then, following the canonical method, we decompose total labour productivity growth into three indices: the within effect (representing productivity growth within sectors), the between static effect (static reallocation of labour across sectors) and the between dynamic effect (dynamic reallocation of labour across sectors). This decomposition will enable us to highlight the stylized facts and, above all, provide data for assessing the effects of international trade in services on productivity and labour reallocation in some selected countries in SSA.

2 Literature review on international trade in services and labour productivity/reallocation

This section reviews the literature on the effects of international trade in services on productivity and labour reallocation. To do this, we will first highlight the theoretical and empirical relationships between trade in services and total factor productivity. The third phase will see the theoretical relationship between trade in services and the movement of labour between sectors of activity.

2.1 Theoretical and empirical review of the effects of international trade in services on total factor productivity growth

The literature shows a controversy in theoretical explanations of the factors that generate labour productivity. Firstly, the theoretical underpinnings of labour productivity can be found in Smith, (1776) work on the nature of the wealth of nations, which is largely based on the idea of division of labour. For Smith, (1776), labour productivity derives from the specialization of labour. In his logic of specialization, he explains that a separation of the

different stages of the production flow is possible in an industry. This not only increases productivity but also leads to the diversification and development of different professions and industries, since the separate processing stages result in professional specialization.

On the other hand, some Marxist authors (Marx, 1964; Moseley, 1983) believe that only the labour factor is a source of productivity. This view stems from the Marxist concept of productive labour[4], which in turn stems from Karl Marx's theory of surplus value. A final group of authors (Cobb & Douglas, 1928; Nelson & Winter, 1985) explain productivity in terms of better use of factors of production and technology. The main idea behind this school of thought is that technological progress is at the root of significant changes in the productivity of production factors, including labour. It also shows that research and development (R&D) is a major factor in technological progress.

International trade, considered as a means of efficiency gain and technological diffusion in the continuum of work from Smith, (1776), through the classical and then neoclassical schools, via Ricardo, (1817) to the new theory of international trade, does not appear to be the subject of unanimity in the literature. For example, Chand and Sen, (2002) consider that the impact of trade liberalization on productivity growth is still an empirical question, as the theoretical literature is not yet clear on the direction of such an association. Services are an integral part of international trade, and their role as inputs in production is a factor in labour productivity growth. Imports of services have a positive impact on productivity growth within an economy. In this respect, Alam et al., (2008) consider that high-quality market services such as transport or telecommunications have an impact on production costs and, consequently, on the competitiveness and degree of integration of companies in all sectors in global markets. High-quality services encourage foreign investors to invest more directly in promising sectors of the economy. The liberalization of services can help raise the average productivity of incumbent companies, and can also facilitate the entry of new companies likely to be more innovative and better able to meet consumer

[4] For Moseley (1983), the basic definition of Marx's concept of productive labor is labor that produces surplus value. Marx's concept of productive labor is intimately linked to his theory of surplus value. Marx's theory of surplus value, in turn, is based on the fundamental premise that the value of commodities is determined by the total labor time required to produce those commodities. From this fundamental premise, it follows that the magnitude of surplus value produced in a given period is equal to the difference between the value added by the labor employed in commodity production during that period and the wages paid to purchase that labor. Productive labor is therefore the labor employed in the production of commodities for capitalist enterprises, which thus produces surplus value. As Marx said, the concept of productive labor is simply an "abbreviation" of his theory of surplus value.

demands, while encouraging the exit of less productive companies (Alam et al., 2008; Malchow-Møller et al., 2015; Su et al., 2020; Witt & Gross, 2020).

Trade in R&D services not only increases technological progress, but also enhances the skills and know-how of an economy's workers. Imports of R&D services, through training, research, and experimental workshops, help to develop the know-how of a company's workers and increase its human capital. This process generates a transfer of technology that will increase labour productivity. Nelson and Winter (1985) point out that R&D expenditure is considered as if it were the purchase of a fixed, indivisible, and infinitely durable input (what they call "knowledge"), the presence of which improves the productivity of other inputs.

On the other hand, by exporting services to foreign markets, domestic companies improve, innovate, and become increasingly efficient, while contributing to the development of human capital, which is a source of growth in labour productivity. This is made possible by the constraints posed by the international market, and to be competitive, companies are obliged to innovate in the provision of services (graph 1).

Empirically, some studies make connections between trade in services and factor productivity in sectors of economic activity (Arnold et al., 2011; Beverelli et al., 2017). As such, Arnold et al. (2011) examines the link between service sector reforms and the productivity of the manufacturing industries that depend on them. Their study is carried out on firm-level data from the Czech Republic, and the results show a positive relationship between service sector reform and increasing productivity of domestic firms operating downstream in the manufacturing sector.

Chand and Sen (2002) empirically test whether trade liberalization in the Indian manufacturing sector increases total factor productivity (TFP). Their results confirm a positive effect of trade liberalization on TFP growth. Their results also support a key postulate of new growth theories, according to which liberalization of intermediate goods sectors has a greater favorable impact on TFP growth than that of final goods sectors.

Majeed et al. (2010) empirically analyse the relationship between trade liberalization and total factor productivity (TFP) growth in Pakistan's large-scale manufacturing (LSM)[5] sector over the period 1971-2007. Using an autoregressive distributed lag (ARDL)[6] modeling

[5] Large Scale Manufacturing

[6] Auto Regressive Distributed Lag

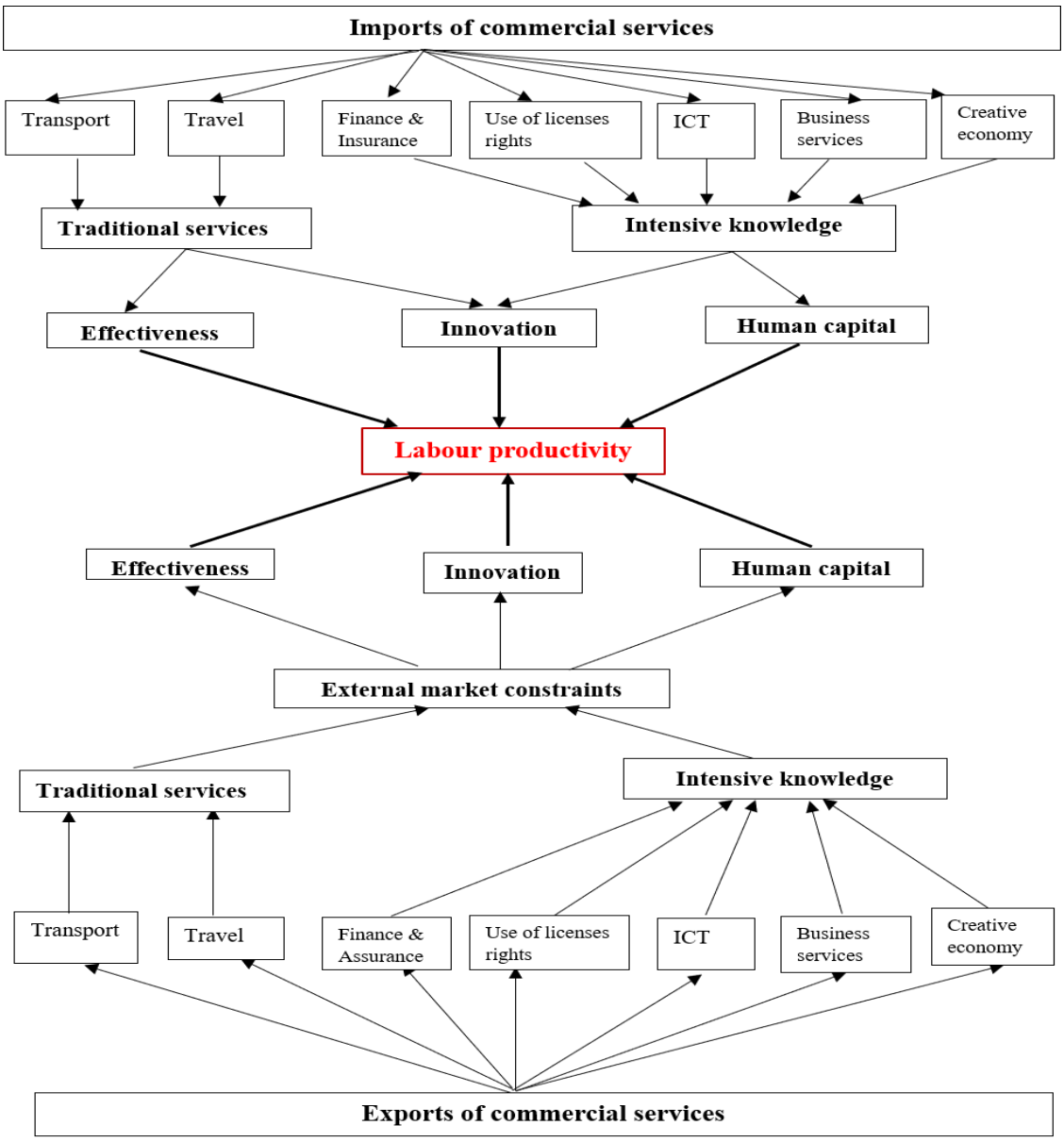
approach, they find that trade openness has a negative impact on total factor productivity growth in Pakistan's manufacturing sector. They explain this by the fact that the government's long-term policy has yet to produce significant economic results, particularly in terms of TFP growth rates in the manufacturing sector.

Malchow-Møller et al. (2015) analyse and compare the role of trade in productivity growth in the service and manufacturing sectors. Distinguishing between trade in goods and trade in services at the firm level, they find that exports and imports lead to significant increases in productivity and size. On the other hand, they find that the effects of trade in services are generally weaker, limited to exports, and vary from country to country. At the sectoral level, they find that international trade plays a potentially more important role in productivity development in the services sector than in manufacturing, but it is trade in goods rather than services that matters most. This suggests that trade intermediaries play an important role in productivity growth in the economy.

Lee and McKibbin (2018), with a focus on the service sector, explore the historical experience of productivity growth in Asian economies over recent decades. They mobilize an empirical general equilibrium model on a panel of 10 Asian countries over the period 1975 - 2005. Their results show that faster productivity growth in the service sector in Asia contributes to growth in Asian economies, but the dynamic adjustment is different from one economy to another. Beverelli et al. (2017) estimate the effect of services trade restrictions on manufacturing productivity on a panel of 57 countries at different stages of economic development and 18 manufacturing sectors over the period. Reducing restrictions on trade in services has a positive impact on the productivity of manufacturing sectors that use services as intermediate inputs in production. Beverelli et al. (2017) find that countries with high institutional quality benefit most from a reduction in restrictions on trade in services in terms of increased productivity in downstream industries.

Kim et al. (2021), study the contribution of information and communication technologies (ICT) to productivity both directly - and indirectly, through externalities that originate in other sectors or countries. They include several features to account for two important aspects of ICT: complementarity with other intangible assets and externalities between different sectors.

Graph 1: Transmission channels of the effects of international trade in services on labour productivity



Source: Authors' construction

They find that results are affected by the way spillovers are measured. Evidence in favor of domestic externalities is only found when the second measure is used, meaning that spillover effects only exist among industries that are connected through international trade. In contrast, foreign spillover effects are not detected (Kim et al., 2021).

2.2 Theoretical and empirical motivations on trade in services and inter-sectoral reallocation of labour

Modification of the distribution of a country's workforce between the agricultural, industrial, and service sectors during its economic development has been the subject of in-depth research since the pioneering work of Fisher (1939) and Clark (1940). Clark (1940) in a period marked

by the Great Depression, launched an analysis of the dynamics of the American economy in his book "*The conditions of economic progress"*. His analysis focused on a new division of national income into three categories: primary industry (agriculture, forestry, and fishing); secondary industry (manufacturing, mining, and construction); and tertiary industry (trade, transport, and services).

Pandit and Casetti (1989), following the pioneers, argue that the classical explanations of changes in the distribution of labour during development emphasize the interaction between the income elasticity of sectoral demand and the sectoral labour productivity differential. For these authors, in the first case, it was noted that the elasticity of demand is lowest for agricultural products and highest for services. Therefore, a given increase in income is associated with the lowest increase in agricultural output, while the highest increase is in the production of services and labour, with manufacturing in this case being intermediate.

Catteneo et al. (2010) argue that modernization of the services sector, because of endogenous innovation and domestic modernization or the arrival of foreign competitors (as a result of sector liberalization) that offer new service offerings and new service delivery options, requires skills upgrading. For them, this will involve a significant consideration of labour adjustment costs. Most services need to be produced at the point of consumption, and the liberalization process implies a positive or negative change in the absolute level of employment in the sector. Task trading has also entered the debate on the impact of service offshoring on the labour market (Grossman & Rossi-Hansberg, 2008; Jensen & Kletzer, 2010). The idea is that individual tasks that can be codified and digitised can be cut up, outsourced, and relocated, for example to low-wage countries. This would lead to a deepening of the division of labour and increased efficiency, but also to a fragmentation of employment. However, the debate has largely overlooked the possibility that there may be strong economies of scale in business service jobs.

The earliest work on labour dynamics in Africa dates to the colonial era in the 1930s. Buell in 1928 through his collection entitled" The Native Problem in Africa" was the first in this exercise (Scott, 1929). Freund (1984) describes Buell's collection (1928) as a liberal capitalist guide to Africa, and the contemporary reader will find his volumes rich in pages comparing how labour was administered and supplied in the various African colonies in the mid-1930s. It is in this same logic that Freund in 1984 focuses his research on labour and the history of labour in Africa through a theoretical approach. Following this work, recent studies

have been undertaken either to analyse the dynamics of total factor productivity in Africa (De Vries et al., 2013) or to analyse sectoral employment (Bigsten et al., 2004).

Cadot and De Melo (2016) complement this by suggesting that in SSA, manufacturing is not the main beneficiary of labour reallocation, and its productivity is not much higher than that of other sectors. Overall, the sectors that gain the most in terms of employment tend to be those least exposed to international competition (wholesale and retail trade in most countries, especially Ghana and Zimbabwe; construction in Ethiopia; transport in Senegal and Tanzania). For them, Mauritius is experiencing significant job losses in manufacturing and job creation in finance. The first empirical work on inter-sectoral reallocation of labour dates to the 1950s. Early studies on the sectoral distribution of labour tend to rely on time series data for selected countries, the majority of which were emerging countries Clark (1940); Fourastié J. (1989); Fuchs (1968); Kuznets (1973, 1957). In general, these studies consist of comments and inferential statements on tabular data or data points collected from various sources and translated into a common format to ensure comparability. Most of these inferences are generalizations, which play a major role in the social sciences (Pandit & Casetti, 1989).

Rigorous analysis of structural transformation through statistical or econometric analysis emerged from the 1970s onwards (Helleiner, 1976; McCord, 1982; Oberai, 1981; Pandit, 1990; Pandit & Casetti, 1989; Thompson & Black, 1975; Thompson & Stollar, 1983). Most of these researchers have turned to cross-sectional data that have been available in standardized formats for the past few decades, and this is due to the lack of time series data over sufficiently long periods for the Least Developed Countries (LDCs). In 1975, Thompson and Black (1975) introduced a first attempt at modelling to understand the variation in service sector employment as a percentage of total employment. They estimate the parameters of this model using regional data from the United States. Following their work, Thompson and Stollar (1983) test the original Thompson and Black (1975) model but in an international setting. They include several variables in the original model so that the model can be used as a descriptive device both inter-regionally in the US and internationally. Their study covers a panel of sixty-five (65) countries over the period 1960 - 1970. The results of their estimation show that per capita income, urbanization, and tourism have a positive effect on the reallocation of labour into services. Only the labour force participation rate has a negative effect on the variation of employment in the service sector.

To answer the question of why current trends in the distribution of labour deviate from past trends, Pandit and Casetti (1989) perform an empirical analysis of intersectoral labour reallocation. Their study covers a panel of ninety-five (95) countries and a period of twenty (20) years and uses the expansion method. Their analysis confirms the existence of a time variation in the relationship between Gross National Product (GNP) and the sectoral distribution of employment and gives a mathematical picture of this drift. Their specific time model obtained can produce very plausible longitudinal patterns for any less developed and more developed country. The recent literature on the issue indicates some empirical work (Berthélemy & Chauvin, 2000; De Vries et al., 2013; Mouelhi & Ghazali, 2021; Swiecki, 2017). Swiecki (2017) uses a general equilibrium model to assess the determinants of structural transformation through four factors: (i) sectoral technological progress, (ii) non-homogeneous tastes, (iii) international trade and (iv) the evolution of factor costs between sectors. His study covers forty-five (45) different countries and the period 1970-2005. To better understand the impact of openness on sectoral labour shares, he considers trade imbalances at both the sectoral and aggregate levels. He finds that sectoral technological change is globally the most important mechanism and that it is key to understanding the decline in the share of manufacturing labour and the corresponding growth of services in developed countries. He also realises that, while international trade (including trade in services) and changes in relative factor costs across sectors are important for each country, their impact on labour reallocation is less systematic (Swiecki, 2017).

McMillan et al. (2014, 2017) provide a detailed analysis of structural change in developing and emerging countries (in Latin America, Asia, and Africa) with some reference to developed countries. They show that" labour flows from low productivity activities to high productivity activities are a key driver of development". They use an equation to decompose labour productivity growth into an inter-sectoral component and an intra-sectoral component (which is defined as structural change). Their main results suggest that structural change has a positive effect on growth in Asian countries during the 1990s and 2000s, while it has a negative effect on growth in Latin American and African countries, as labour shifts from low to high productivity sectors (Mouelhi and Ghazali, 2021).

The study contributes to the literature in several ways. Firstly, it is one of the few studies to approach structural transformation with such rigor, insofar as it first decomposes total labour productivity growth into three key indicators using Fabricant's method. Secondly, to the best of our knowledge, this study would be the first not to combine theoretical and empirical

assessment of the effects of international trade in services on structural transformation. Thirdly, it uses several empirical methods of analysis, including local projection, not only to quantify the effects of trade in services, but also to propose a graphical representation of the effects of structural shocks to trade in services and the global financial crisis of 2008 on the dimensions of structural transformation. To this end, we adopt the following working hypotheses:

H1: Imports and exports of services have mixed effects in the short and long term on the dimensions of structural transformation in SSA,

H2: Global shocks to international trade in services and the international financial crisis of 2008 have various effects on the dimensions of structural transformation in SSA.

3 Stylized facts on trade in services, labour reallocation and productivity

In this section, we use data from the African Sectors Database to make a stylized factual analysis of the evolution of output, employment, and productivity in 18 countries south of the Sahara.

3.1 Stylized facts on the dynamics of trade in services in SSA

Graph 2 illustrates the evolution of trade in services and tourism in SSA from 1991 to 2018. The graph shows rapid growth in all three variables over the period. Trade in services represented 10.97% of GDP on average between 1991 and 2018. In 2018, services trade represented 11. 25% of GDP, compared to 9. 04% in 1991. In SSA, imports of services dominate trade in services with the rest of the world. Indeed, imports of services in SSA grew by an average of 8.28% compared with 7.93% for exports of services from 1991 to 2018. However, while trade in services really took off from 2005 onwards, this momentum was to falter in 2009, with a 12.91% drop in service imports compared with a 5.30% drop in exports over previous years. Services imports fell again in 2015 and 2016. In general, the dominance of service imports over exports contributes to the widening of the trade deficit in services, which averaged 1.47% of GDP over the period 1991-2018, with the deficit worsening from 2006 onward.

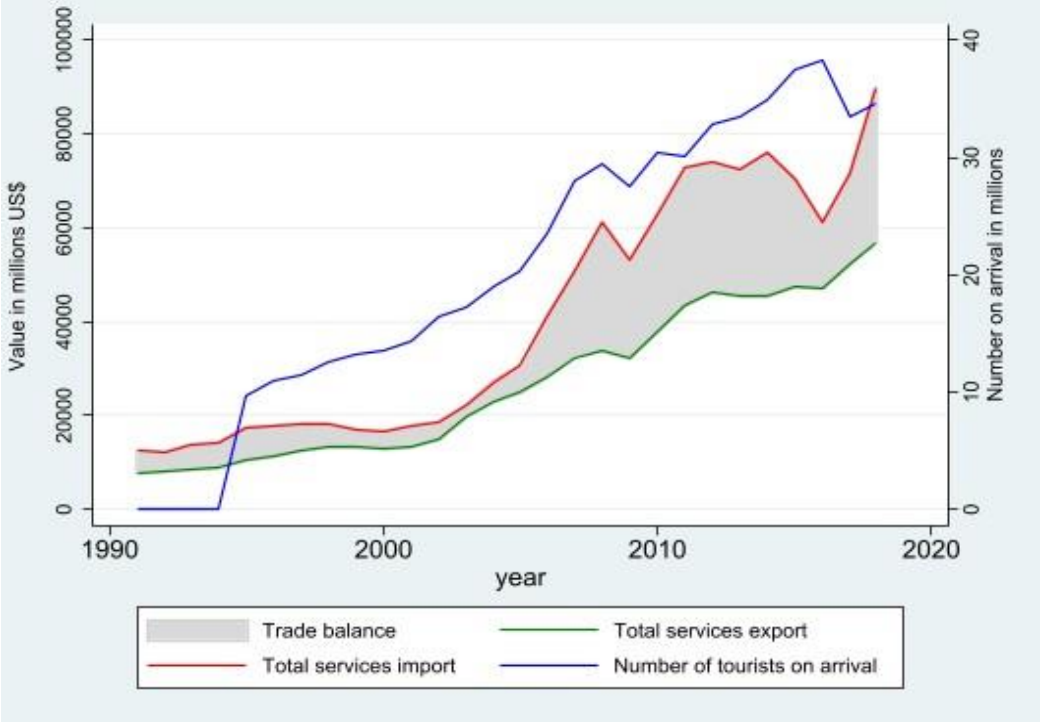
The tourism sector in SSA has been booming over the same period, from just 9.71 million visitors in 1995 to over 34.62 million in 2018. This is partly attributable to tourism development policies and the vision of certain states with tourism potential to make tourism a lever for economic growth. Graph 3 shows the evolution of trade in services in SSA by constituted dimension. Firstly, the graph illustrates a remarkable evolution of trade in

traditional and modern services in the region. Secondly, in both directions, traditional services are more important than modern services. The dominant weight of traditional services is explained by their indispensable presence in the production and distribution processes of goods in the real sphere of the economy.

3.2 Trends of GDP, employment, and productivity in SSA

Graph 4 shows average sectoral employment growth and productivity in SSA over four periods. In Sub-Saharan Africa, the agricultural sector remains the main labour absorbing sector. Over the period 1991 to 2018, on average, employment growth in the market services sector is higher, with an average growth rate of 5.2% over the period, compared with 3.3% in the manufacturing sector and 1.6% in agriculture. The Sub-chart 4A shows strong employment growth in the manufacturing sector over the period 2011-2018, rising from 6.1% (Table 18) as a share of total employment in 2011 to 8.2% in 2018. However, while employment is increasing in both the manufacturing and service sectors, Chart 18B shows a deterioration in the level of productivity in these two sectors. Productivity in the service sector grew by an average negative 1.4% over the period 1991-2018, but productivity fell by a considerable 3.05% over the period 2011-2018. While the manufacturing sector saw relatively weak productivity growth of 0.7% from 1991 to 2018, it experienced negative growth of -0.4% over the period 2011 - 2018.

Graph 2: Dynamics of trade in services and tourism in SSA



Source : author's construction, data UNCTADStat (2022)

Graph 3: Dynamics of trade in traditional and modern services in SSA

Source : author's construction, data UNCTADStat (2022)

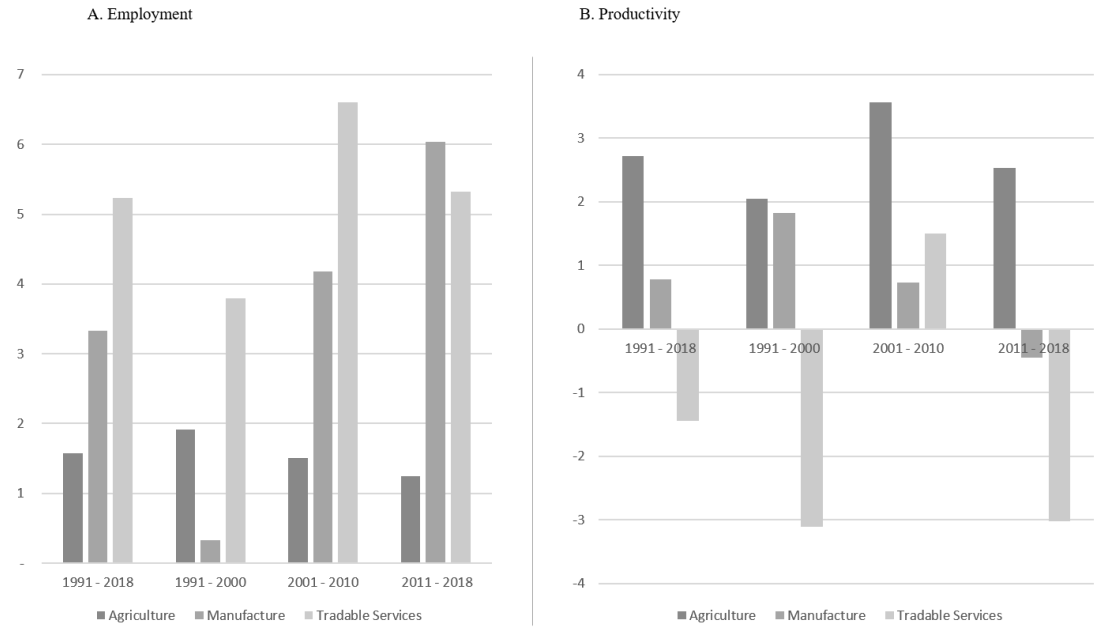
Table 1: GDP Level, Employment and Relative Productivity in SSA

Agriculture	Value added					Employment					Relative productivity				
	1990	1997	2004	2011	2018	1991	1997	2004	2011	2018	1991	1997	2004	2011	2018
	29.0	**30.5**	**29.8**	**25.4**	**24.3**	**71.0**	**70.1**	**66.6**	**58.6**	**51.8**	**0.4**	**0.4**	**0.6**	**0.7**	**0.8**
Industry	**26.3**	**25.2**	**24.0**	**22.9**	**24.0**	**10.1**	**8.9**	**9.0**	**10.4**	**12.4**	**14.8**	**17.6**	**21.6**	**17.4**	**14.44**
Mining	8.9	8.0	7.6	5.2	3.8	1.2	0.9	0.6	0.7	0.7	6.7	8.8	11.8	7.5	5.14
Manufacture	12.6	11.3	9.9	9.6	9.8	7.0	5.9	6.1	6.9	8.2	1.8	1.8	1.6	1.3	1.1
Utilities	1.4	1.6	1.7	1.7	1.9	0.4	0.4	0.3	0.3	0.3	3.9	4.5	5.7	6.2	5.5
Construction	3.5	4.3	4.9	6.4	8.5	1.5	1.7	1.9	2.6	3.1	2.4	2.5	2.5	2.4	2.7
Services	**44.7**	**44.3**	**46.2**	**51.7**	**51.7**	**18.9**	**21.0**	**24.4**	**31.0**	**35.9**	**24.6**	**19.1**	**18.5**	**15.9**	
Tradable services	33.3	33.7	35.4	41.5	42.0	15.1	16.8	19.7	25.5	29.4	21.6	16.6	16.3	14.1	10.4
Commercial services	13.3	13.7	13.8	16.8	15.9	9.3	9.9	11.4	14.1	14.7	1.4	1.3	1.2	1.1	1.0
Transport services	4.0	4.6	4.4	4.3	4.7	1.2	1.3	1.5	2.1	2.6	3.2	3.5	2.8	2.0	1.8
Business services	4.2	4.0	6.0	9.0	9.7	0.9	1.4	1.7	2.4	3.8	4.1	2.9	3.5	3.7	2.5
Financial services	3.0	3.0	3.1	3.4	3.7	0.2	0.4	0.4	0.5	0.8	12.3	8.4	8.4	7.0	4.8
Real estate	6.6	6.3	6.0	6.0	5.4	0.1	0.1	0.1	0.1	0.1					
Other services	2.2	2.1	2.1	2.0	2.6	3.4	3.8	4.6	6.2	7.4	0.6	0.5	0.4	0.3	0.3
Non-tradable Services	11.4	10.7	10.8	10.2	9.7	3.8	4.2	4.8	5.5	6.5					
Government services	11.4	10.7	10.8	10.2	9.7	3.8	4.2	4.8	5.5	6.5	3.0	2.5	2.2	1.8	1.4
Total economy	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**

Author construction, data from African Sectors Database (ASD, 2021)

Notes: Market services include commercial services, transport, business services, financial services, real estate. Unlike De Vries et al. (2013) who associated other services with market services, here other services are associated with market services insofar as the services in this section have a market value and can be exported or imported. We have called these services the creative economy. The level of relative productivity is the ratio between the level of the sector and that of the total economy.

Graph 4: Average annual growth of employment and sectoral productivity in SSA



Author construction, data from African Sectors Database (ASD, 2021)

The reasons why the increase in the workforce in the service and manufacturing sectors is accompanied by a fall in productivity can be found by exploring the mode of

redistribution and the quality of the marginal workforce migrating to these sectors. According to De Vries et al. (2013), only the decomposition of changes in productivity levels can explain such a phenomenon.

3.3 Results of the canonical decomposition of labour productivity growth

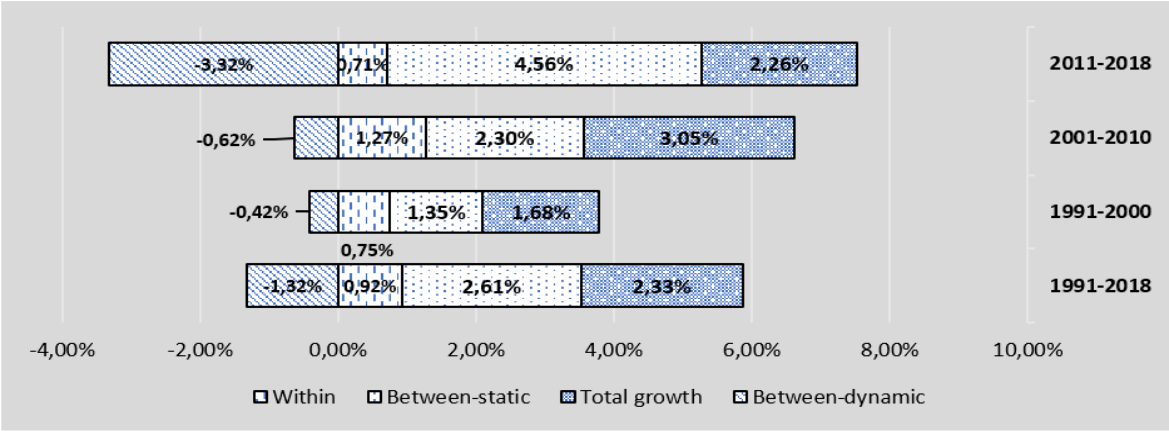
Equation (2) has enabled us to decompose the change in productivity into three components: the within effect, the between static effect and the between dynamic effect. Graph 5 illustrates the dynamics of intra-, inter-static and inter-dynamic labour productivity in Sub-Saharan Africa and North Africa over four periods during the African development process. The period 1991 - 2018 is marked by an increase in total factor productivity of 2.33% in SSA, compared with an increase of 2.19% in North Africa. Total productivity growth in Sub-Saharan Africa is linked to the predominance of within effect productivity growth of 2.61%. In general, over the period, given that the between static effect is positive and of the order of 0.92%, this implies that workers are migrating to sectors with above-average productivity.

Over the period 1991 - 20018, the migration of workers to sectors with above average productivity is higher in North Africa (1.93%) than in SSA (0.92%). Over the recent period, i.e. between 2011 and 2018, Figure 2 shows that the dynamics of productivity and labour movement in SSA and North Africa are moving in opposite directions. Indeed, while in SSA there is a continued increase in productivity within sectors, another important phenomenon is that the joint effect of changes in sectoral employment and productivity levels in the region is deteriorating further (from -0.42% between 1991 and 2000 to -3.32% between 2011 and 2018). This implies that workers in the region are migrating to low-productivity sectors. Over the same period, agriculture lost 6.8 percentage points of its contribution to employment to the service sector. The share of labour in agriculture fell from 58.6% in 2011 to 51.8% in 2018, while the share of total labour in services rose from 31% in 2011 to 35.1% in 2018. This influx of labour from agriculture into low-productivity services explains the deterioration in dynamic inter-sectoral reallocation between 2011 and 2018.

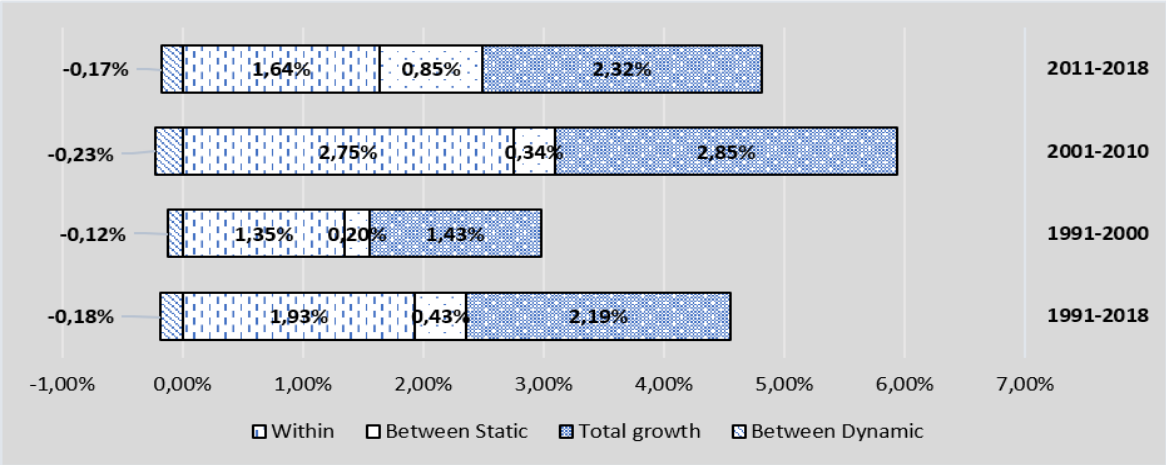
However, sub chart 5B shows that in North Africa, the increase in total productivity of around 2.26% over 2011 - 2018 is due to the increase in productivity within sectors, but above all to the fact that there has been a remarkable movement of workers towards sectors with above-average productivity, accompanied by a significant drop in the migration of workers to low-productivity sectors.

Graph 5: Dynamics of structural transformation in Sub-Saharan and North Africa

A. Sub-Saharan Africa



B. North Africa

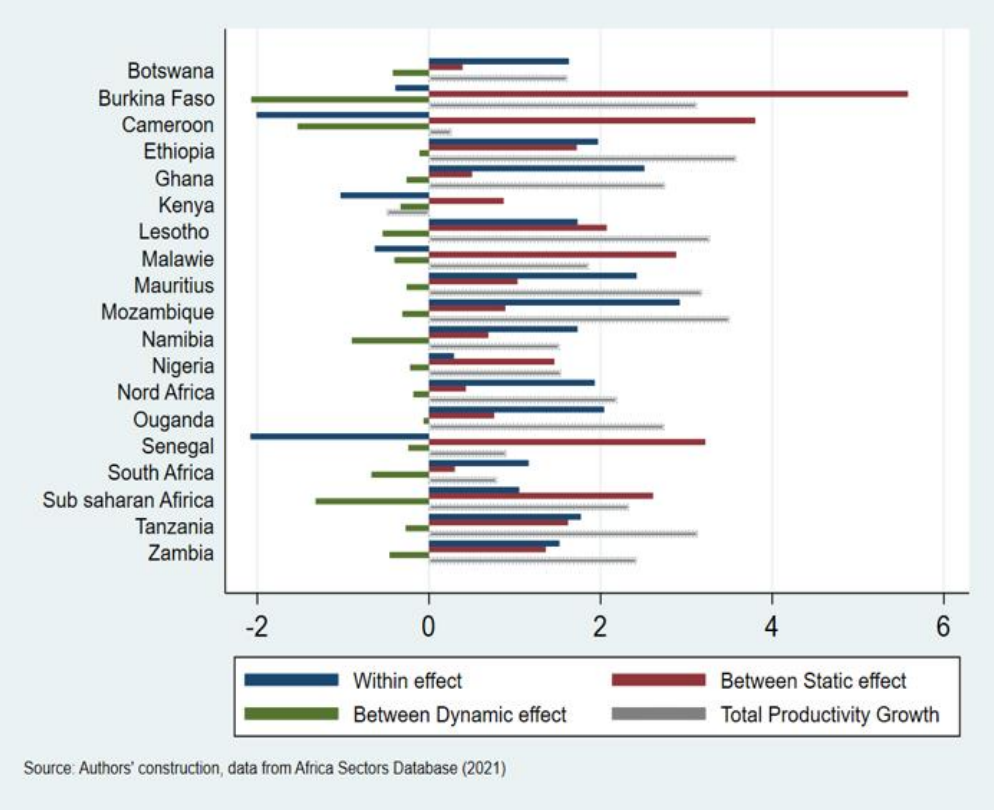


Source: Author's construction, data (UNCTADStat, 2022)

Graph 6 illustrates the state of structural transformation in the countries studied in SSA and a few countries in North Africa. The figure shows that static intersectoral reallocation is dominant over the period 1991 - 2018 in SSA. This implies that from 1991 to 2018, the movement of labour in SSA is towards sectors with above-average productivity. This dynamic is also accompanied by a significant loss in the dynamic inter-sectoral reallocation of labour (between dynamic effect), explaining why the joint effect of changes in sectoral employment and productivity levels is negative over the period. In contrast, in North Africa, the graph shows that productivity growth within sectors (within effect) prevails over the same period, but the dynamic is also sustained by a weak joint movement of changes in sectoral employment and productivity levels, reflecting a weak movement of labour towards sectors with low productivity levels. The dynamics are quite contrasting when we look at individual countries (graph 6). In terms of average productivity growth within sectors

of the economy, only Burkina Faso, Cameroon, Kenya, Malawi and Senegal are experiencing negative average productivity within sectors over the period 1991 - 2018.

Graph 6: Structural transformation in selected SSA and North African countries



All other countries in SSA and North Africa are experiencing positive growth. Mozambique, Ghana, Uganda, Mauritius and Ethiopia are respectively the countries with the best scores in terms of productivity growth within sectors. When considering static inter-sector reallocation, all the countries studied in SSA with the three North African countries record positive growth in static inter-sector reallocation during the period 1991 - 2018. Respectively, Rwanda, Burkina Faso, Cameroon, Senegal and Malawi are the countries recording strong growth in labour reallocation to sectors with above-average productivity levels
(intra-static effect).

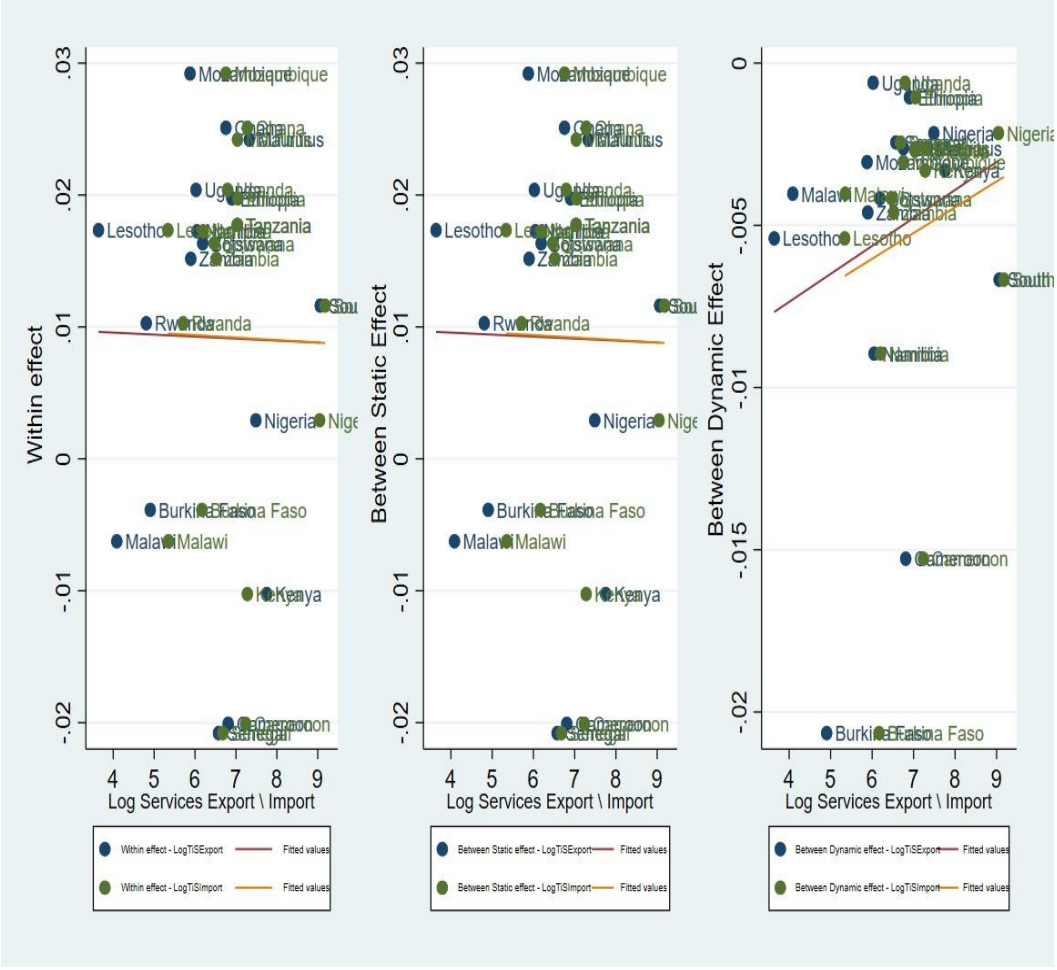
In line with the work of De Vries et al. (2013) and Mouelhi and Ghazali (2021), the decomposition results also show that in SSA there is negative growth in dynamic inter-sectoral reallocation, expressing the joint effect of changes in sectoral employment and productivity levels (intra-dynamic effect). All the SSA and North African countries studied experienced negative growth between 1991 and 2018. This situation reflects the fact that the workforce in these regions is migrating to sectors experiencing a decline in labour

productivity. Burkina Faso, Cameroon, Namibia and Zambia are, respectively, the countries experiencing a strong reallocation of labour to sectors experiencing declining labour productivity. One plausible explanation for this phenomenon is that the reallocation of labour in these regions is towards the service sector. Yet this sector is largely dominated by the informal sector and has low productivity.

4 Correlation between trade in services, reallocation, and total labour productivity in SSA

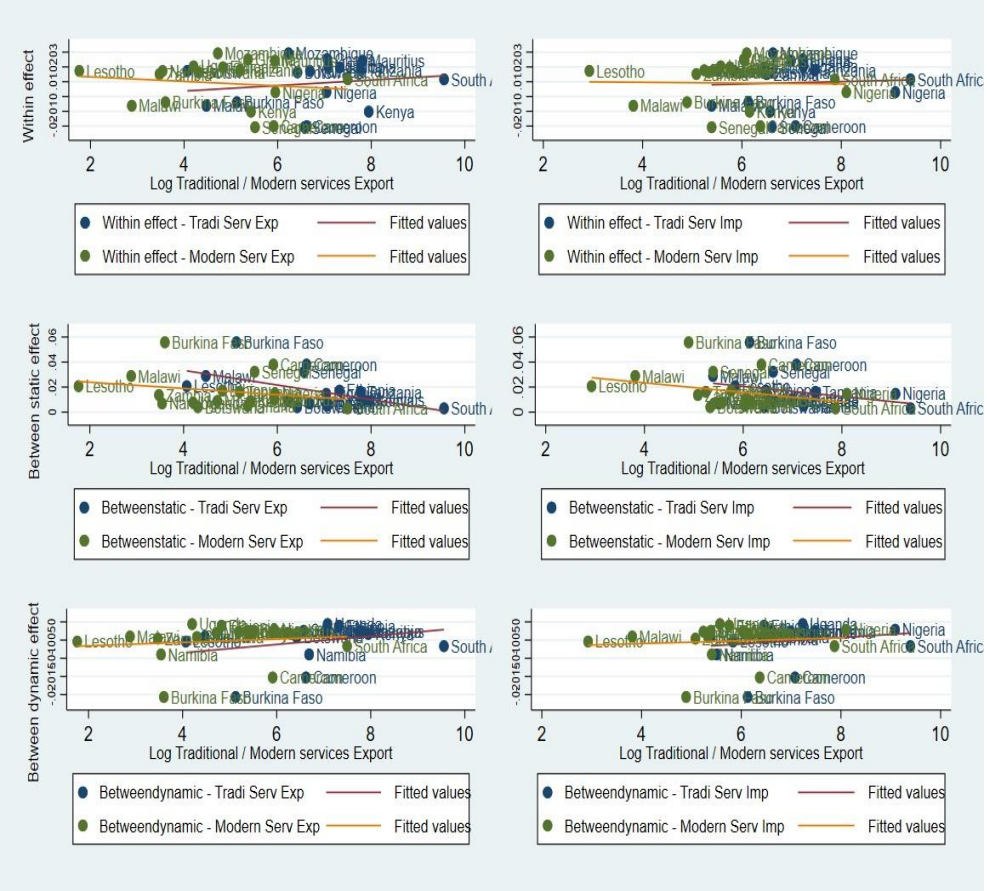
In this section, we analyse, on the one hand, using correlation graphs, the relationship between trade in services in terms of total exports, imports, and tourism with average productivity within sectors, static and dynamic inter-sectoral reallocation of labour in SSA. On the other hand, we analyse the nature of the relationship between the merged dimensions of trade in services (traditional and modern) and within sectors productivity growth, static and dynamic inter-sectoral reallocation of labour in SSA. The aim is to shed light on the relationships between trade in services variables and structural transformation indices.

Graph 7: Correlation between TiS and structural transformation indices



Source: Authors construction, data from Africa sectors database (2021)

Graph 8: Correlation between merged TiS and structural transformation indices



Source: Authors construction, data from Africa sectors database (2021)

5 Methodology

5.1 Decomposition of the total labour productivity growth

The literature devote to structrual transformation measured on the labour productivity perspective have mobilized several We mobilize the canonical decomposition method of Fabricant (1942) for the total productivity growth decomposition. This method is developed is widely used in the literature to measure the contribution of labour reallocation to overall productivity growth, particularly in sub-Saharan Africa, Latin America and Asia (De Vries et al., 2013; M. McMillan et al., 2014, 2017; M. P. Timmer & Szirmai, 2000). Recent studies (Timmer and Szirmai, 2000; McMillan and Rodrik, 2011; etc.) that used this method show that labour productivity can grow either through improvement within sectors via capital accumulation and technological progress, or through the movement of labour to more productive sectors.

Let consider a multi-sector model consisting of n-sectors in the same country (here we use 10 sectors of the economy), two periods 0 and t, the value added in sector *i* at time *t* and L_t the employment in sector *i* at time *t*. The aggregate level of labour productivity at time t for the whole economy (LP_t) can be written as the sum of the labour productivity of each sector (y_{it}) weighted by the share of employment ($\varphi_{i,t}$) of sector i in total employment at time t :

$$\boldsymbol{LP_t = \frac{Y_t}{L_t} = \frac{\sum_{i=1}^{n} Y_{i,t}}{L_t} = \sum_{i=n} \frac{Y_{i,t}}{L_{i,t}} \frac{L_{i,t}}{L_t} = \sum_{i=n} y_{i,t}\varphi_{i,t}} \qquad (1)$$

Thus, the overall productivity growth for the economy between t and 0 can be written in first difference as follows:

$$\boldsymbol{\Delta LP_t = \underbrace{\sum_{i=1}^{n} \varphi_{i,0}\Delta y_{i,t}}_{within-effect} + \underbrace{\sum_{i=1}^{n} y_{i,0}\Delta\varphi_{i,t}}_{Between-static\ effect} + \underbrace{\sum_{i=1}^{n} \Delta\varphi_{i,t}\Delta y_{i,t}}_{Joint\ (between-dynamic)\ effect}} \qquad (2)$$

This method, inspired by De Vries et al. (2013) and McMillan & Rodrik (2011), allows us to decompose the level of aggregate labour productivity into three distinct terms. The first component (within effect W) captures productivity changes within industries between 0 and *t*. The second (static effect between sectors BS) captures the movements of labour between sectors between 0 and *t*. The third component, the dynamic reallocation (dynamic effect between sectors, BD) represents the effects of marginal variations in sectoral employment and productivity. Thus, we obtain three indices W, BS and BD with BS and BD representing two dimensions of structural change.

The within effect (W) captures productivity growth within the sectors of the economy. When the within effect has a positive sign, it implies that there has been an increase in productivity within sectors over the period. The between static effect (BS) measures whether workers are moving to sectors with higher average productivity levels. Then when the sign of BS is positive (negative) that implies that over the period there is a movement of workers to sectors with productivity levels above (below) the average. The between dynamic effect (BD) measures the joint effect of changes in sectoral employment and productivity levels. It is positive (negative) if workers move to sectors with positive (negative) productivity growth.

5.2 Empirical strategy

Few studies have tried to link empirically trade in services to structural transformation. However, the decomposition of total labour productivity into several dimensions allows us to use a linear model that assesses the effects of the main aspect of commercial services on the three components of total labour productivity. Subsequently, the functions are defined as follow:

$$\boldsymbol{W_{it} = \beta_0 + \beta_1 W_{it-1} + \beta_2 X_{it} + \beta_3 TS_{it} + \eta_i + \mu_t + \varepsilon_{it}} \quad (\mathbf{3})$$

$$\boldsymbol{BS_{it} = \vartheta_0 + \vartheta_1 BS_{it-1} + \vartheta_2 \chi_{it} + \vartheta_3 TS_{it} + \eta_i + \mu_t + \varepsilon_{it}} \quad (\mathbf{4})$$

$$\boldsymbol{BD_{it} = \alpha_0 + \alpha_1 BD_{it-1} + \alpha_2 \chi_{it} + \alpha_3 TS_{it} + \eta_i + \mu_t + \varepsilon_{it}} \quad (\mathbf{5})$$

Where $\boldsymbol{W_{it}}$, $\boldsymbol{BS_{it}}$ and $\boldsymbol{BD_{it}}$ represent respectively the three components of structural transformation (within effect, Between Static and Between Dynamic effect). X_{it} represents a vector of control variables (FDI, income per capita, human capital and trade openness), TS_{it} represents a vector grouping the disaggregated trade in services, η_i and μ_t capture respectively the individual effect and the time effect and ε_{it} the error term with E(ε_{it}) = 0, i represents the country and t the year. $\boldsymbol{\beta}$, $\boldsymbol{\vartheta}$ and $\boldsymbol{\alpha}$ are the parameters to be estimated.

5.3 Data

The data in this study are essentially secondary data, with trade in services data taken from UNCTAD's MBP5 and MBP6 tables. Given the lack of data on trade in services for certain countries, we first used Principal Component Analysis (PCA) to reconcile the dimensions of services to group them together. Unfortunately, this did not produce convincing results, as almost all dimensions are on the same vector. Data on the three structural transformation indices are calculated from value added and sectoral employment data taken from the Africa Sector Database (ASD): "Expansion and update" (Mensah and Szirmai, 2018) constituting an extension of the Groningen Growth and Development Center (GGDC) 10-sector productivity database originally developed by Timmer and de Vries (2009). Data on other control variables such as FDI, population, financial development, percentage of rural population come from the World Bank's World Development Indicators (WDI) database and human capital data from the Pen World Table (PWT). Institutional variables such as political stability and control of corruption are taken from the World Bank's World Governance Indicators (WGI). The study focuses on a sample of 18 countries south of

the Sahara (these countries account for around 80% of SSA's GDP), due to the lack of data on other Sub-Saharan African countries. The temporal scope of the study covers the period 1996-2015, the choice of the year 2016 is justified by the fact that data on institutional variables start from 1996, and the choice of 2015 is also justified by the unavailability of data on subsequent years.

5.4 Variables description

The variables in our three empirical models are grouped into dependent and explanatory variables. The dependent variables group together the indices derived from the canonical decomposition (the within effect, the between static effect and the between dynamic effect) and the explanatory variables of interest group together the dimensions of international trade in services. Control variables include FDI, per capita income, population size, human capital, openness to trade in goods, terms of trade, natural resources and rural population share.

Structural transformation is a long-term process that considers the dimension of transformation in the structure of production as well as in the dynamics of production factors. In the literature, it can be measured by aggregate indicators(Herrendorf & Valentinyi, 2012; Mensah & Szirmai, 2018) and by disaggregated indicators (Timmer and Szirmai, 2000; Timmer and de Vries, 2009; McMillan et al., 2014; de Vries et al., 2015; Mouelhi and Ghazali, 2021). The variables or three indices derived from the canonical decomposition are meant to capture the structural transformation and they constitute our dependent variables. To determine the factors involved in explaining the evolution of these three indices, econometric regression using an estimator will enable us to assess the effects of international trade in services on productivity and labour reallocation in SSA.

The independent variables of interest are the dimensions of trade in services that we have rescaled. These include the dimension of exports and imports of distribution services. Distribution services, which include transport, travel and ICT services, are expected to have positive effects on intra-sector productivity growth, and on the static and dynamic reallocation of labour in SSA. The expected effects of trade in banking and insurance services, as well as trade in producer services through exports and imports, are likely to be favorable to productivity growth within sectors, and to static and dynamic inter-sectoral movements of labour.

Human capital is a strong catalyst for structural transformation, insofar as a country with sufficient human capital is likely to experience growth in total factor productivity as well as

a better reallocation of these factors of production. In this sense, Martins (2019) and Mensah et al. (2016) find that human capital is a determining factor in structural transformation. As a result, an increase in human capital (captured here by the number of years of education of the population) should produce positive effects on productivity growth within sectors of the economy (within effect) and the static and dynamic inter-sectoral reallocation of labour (between static and dynamic effect).

Tourism's knock-on effects on other sectors of the economy are a determining factor in the structural changes taking place in economies (Catteneo et al., 2010; Lejárraga & Walkenhorst, 2013; Romão, 2020). The growth in the number of tourists arriving in the host country leads to an increase in domestic demand, which in turn leads not only to an increase in production, but also to a redistribution of the workforce between sectors of activity. Hence, any increase in tourism intensity must lead to an increase in productivity within sectors, as well as a static and dynamic inter-sectoral reallocation of labour in SSA.

The flow of foreign direct investment (FDI) into a country is a source of technology transfer, leading to increased productivity and a better allocation of resources. As a result, any increase in FDI must have the effect of raising productivity within sectors, as well as increasing the static and dynamic reallocation of labour between sectors. Per capita income is also a key element in theoretical and empirical analysis of the determinants of structural transformation (Timmer and de Vries, 2009; de Vries et al., 2015; Mensah et al., 2018; Martins, 2019). Thus, when per capita income rises, an increase in productivity within sectors and an increase in static and dynamic inter-sectoral reallocation of labour are therefore expected.

Table 2: Description of variables, sources and expected signs

Variable	**Variable name and measure**	**Expected sign**	**Source**
W	Within effect		Authors
BS	Between Static effect		Authors
BD	Between Dynamic effect		Authors
LTotalServ_exp	Log of total exports of services	+	UNCTAD (2022)
LTotalServ_imp	Log of total imports of services	+	UNCTAD (2022)
LDistributive_exp	Log of export of distribution services	+	UNCTAD (2022)
LBankAss_exp	Log exports of banking and insurance services	+	UNCTAD (2022)
LProducer_exp	Log exports of production support services	+	UNCTAD (2022)
LDistributive_imp	Log imports of distribution services	+	UNCTAD (2022)
LBankAss_imp	Log of imports of banking and insurance services	+	UNCTAD (2022)
LProducer_imp	Log imports of production support services	+	UNCTAD (2022)
Tourism	Tourism (Total number of inbound tourists)	+	WDI (2022)

IDE	Foreign direct investment measured as a % of GDP	+	WDI (2022)
LGDPCA	Logarithm of GDP per capita measured in thousands of US dollars	+/-	WDI (2022)
Human capital	Education index (HC)	+	World Pen Table
Urbanization	Urban population growth rate	+	WDI (2022)

Source: Authors' construction

5.5 Diagnostic tests

5.6 Descriptive statistics

The descriptive statistics in table 3 show substantial variability across key economic indicators, with significant differences in trade, productivity, and population metrics. Variables like Tourism, total export and import of services exhibit particularly wide ranges, indicating the need to reduce the gap by applying the natural logarithm.

Table 3: Descriptive statistics of variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Within	504	.009	.045	-.193	.295
Betweenstatic	504	.026	.165	-.267	3.618
Betweendynamic	504	-.013	.157	-3.517	.081
TotalProctivity	504	.022	.047	-.438	.336
Openess gdp	437	63.09	30.021	20.723	165.059
Tourism	384	1491401	2422906.3	103000	15121000
MerchTrade gdp	504	51.802	28.797	4.909	152.674
TradeServ gdp	452	15.682	9.921	2.635	63.177
TotalServices exp	504	1493.746	2716.902	0	17639.8
TotalServices imp	504	2243.371	4324.276	0	30883.664
fdi gdp	504	2.777	3.818	-6.898	39.456
GDPCA const15	504	1841.195	2019.79	204.024	10335.849
pop	504	27.495	34.538	1.068	195.875
hc	504	1.806	.456	1.034	2.912
UrbanPop growth	504	4.027	1.901	-1.477	17.499

Source: Authors' calculations, data from ASD (2021), UNCTAD (2021)

5.7 Stationarity test of variables

Most applications of time series methods to panels include panel unit root tests, panel cointegration tests and the estimation of long-term mean relationships (Baltagi, 2021)[7]. In general, we denote two broad categories of unit root tests, the first-generation concerns panel-level unit root tests assuming intersectoral independence and the second category groups panel unit root tests taking intersectoral dependence into account. The former includes: the Levin, Lin and Chu test, the Im, Pesaran and Shin test, the Breitung test, the Combination of

[7] A time series of data is said to be stationary if its value tends to return to its long-term mean value and if the properties of the data series are unaffected by change over time alone (Shrestha and Bhatta, 2018).

p-value tests and the residual-based LM test. The second generation of tests includes the Chang IV test, the Choi test, the Phillips and Sul test, the Pesaran test (2007) and the cross-sectional augmented Dickey-Fuller test (CADF). Fisher-type tests perform unit root tests for each panel individually, then combine the p-values of these tests to produce an overall test. Fisher-type tests support both ADF and Phillips-Perron tests. The advantage of the Fisher-type test supporting ADF tests is that it does not require a highly balanced and cylindrical panel (Baltagi, 2021). Thus, the choice of Fisher-type unit root tests incorporating ADF tests gives us the results shown in table 4. The results show the absence of unit roots in the dependent variables, which are all I (0), whereas all our explanatory variables of interest are of order I (1), which explains why they are stationary only in first difference.

Table 4: Stationarity tests for variables in the analysis of productivity and labour reallocation

Variables	**A niveau**	**Différence première**	**Nature**
Within	-8.5498***	-23.7691***	I (0)
Between static	-9.1698***	-22.3139***	I (0)
Between dynamic	-8.2224***	-20.8277***	I (0)
Log Total Services Export	1.9732	-17.7197***	I (1)
Log Total Services Import	1.9616	-12.1020***	I (1)
Log Tourisme	1.0238	-15.4637 ***	I (1)
Log Services de Distribution exp	1.7918	-18.0071***	I (1)
Log Services Banque – Assurance exp	-0.6283	-18.8940***	I (1)
Log Services à la Production exp	-0.3212	-20.8308***	I (1)
Log Services de Distribution imp	2.6147	-16.4905***	I (1)
Log Services Banque – Assurance imp	-0.5174	-19.8968***	I (1)
Log Services à la Production imp	0.5169	-18.6637***	I (1)
Urbanisation	-0.5757	-10.3318***	I (1)
IDE	-8.1543***	-25.2776***	I (0)
Capital humain	-5.7578***	2.3571	I (0)
Log GDPCA	7.1418	-15.4188***	I (1)

Note: *, **, ***, represent significance at 10%, 5% and 1% respectively.
Source: Author's calculations, data from UNCTAD (2022), African Data Base (2021)

5.8 Diagnostic tests for variables of interest

Diagnostic tests of our data include Woodridge tests for autocorrelation of panel data, Wald tests for heteroscedasticity and tests for cross-sectional dependence of individuals. The results (Table 5) from the Wald tests show that the errors from the regressions on within-sector productivity growth (Within = W), from the regression on static inter-sector reallocation (Between Static = BS) and from the regression on dynamic inter-sector

reallocation of labour (Between Dynamic = BD), the residuals are heteroscedastic. This implies that the variance of the residuals is not constant, or that there is unequal dispersion of the residuals. The significance results of Pesaran and Yamagata (2008) imply that the slope coefficients of our models are not homogeneous. The Wooldridge tests (Table 5) show near-significance at 5% for all our variables of interest, and this implies that we reject the null hypothesis of no first-order autocorrelation.

Table 5: Results of Wald, Pesaran Yamagata and Wooldridge's tests

Tests	**Wald test for heteroscedasticity**			**Test for slope homogeneity**			**Wooldridge test for autocorrelation in panel data**		
Equation	W	BS	BD	W	BS	BD	W	BS	BD
Openness in services	294.78	1.6e+06	9.8e+07	7.928	3.521	-2.164	4.599	362.763	1996.017
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.030)	(0.0467)	(0.000)	(0.000)
Log Total services exp	299.22	5.0e+05	3.2e+07	8.665	2.180	-2.658	7.087	425.921	4794.206
	(0.000)	(0.000)	(0.000)	(0.000)	(0.029)	(0.008)	(0.0164)	(0.000)	(0.000)
Log Total services imp	295.63	5.0e+05	2.9e+07	8.753	0.575	-2.641	5.941	408.937	4890.429
	(0.000)	(0.000)	(0.000)	(0.000)	(0.566)	(0.008)	(0.0261)	(0.000)	(0.000)
Log Tourism	145.73	8.8e+05	2.3e+07	6.332	1.384	-2.152	4.692	372.102	1427.493
	(0.000)	(0.000)	(0.000)	(0.000)	(0.166)	(0.031)	(0.0448)	(0.000)	(0.000)

Note: W = Within effect, BS = Between Static effect and BD = Between Dynamic effect.
Modified Wald test for groupwise heteroscedasticity of cross-sectional (panel) time series, H0: sigma(i)^2 = sigma^2 for all *i*. Wooldridge test for autocorrelation in panel data, H0: no first-order autocorrelation. Test for slope heterogeneity (Pesaran, Yamagata. 2008), H0: slope coefficients are homogeneous.
Source: Authors' calculations, data from UNCTAD (2022), African Data Base (2021)

Table 6 shows the results of Pesaran (2015) tests for the presence of cross-sectional dependence of panel individuals. The CD test practically rejects the null hypothesis of low cross-sectional dependence of the errors and the alpha coefficients of the explanatory variables of interest are greater than 0.5. In this case, Pesaran (2015) suggests that the presence of strong cross-sectional dependence of residuals requires the use of estimation techniques that take cross-sectional dependence into account.

Table 6: Results of cross-sectional dependence test

Variables	Alpha	CD	P-value	Nombre d'individus	Période
Within	.	-1.462	0.144	18	28
Between-static	0.007	3.557	0.000	18	28
Between-dynamic	0.008	1.888	0.059	18	28
FDI	0.546	14.547	0.000	18	28
Human capital	1.006	54.749	0.000	18	28
Urbanization	0.517	5.008	0.000	18	28
GDP per capita	1.006	61.073	0.000	18	28
Openness (Services)	0.936	-1.684	0.092	14	28
Log Total Services export	0.982	44.119	0.000	15	28
Log Total Services import	1.007	40.015	0.000	14	28
Log Distribution Services export	1.007	47.932	0.000	14	28
Log Financial– Insurance Services export	0.871	22.264	0.000	10	28

Log Production Services export	1.000	17.089	0.000	13	28
Log Distribution Services import	0.952	36.222	0.000	15	28
Log Financial– Insurance Services import	0.908	29.701	0.000	13	28
Log Production Services import	1.007	35.660	0.000	14	28
Log Tourism	0.990	43.780	0.000	14	14

0.5 <= alpha < 1 implies strong cross-sectional dependence between individuals. Pesaran (2015) test for weak cross-sectional dependence between individuals. H0: errors are weakly cross-sectionally dependent.
Source: Author's calculations, data from UNCTAD (2022), African Data Base (2021)

5.9 Estimation strategy

Most empirical work on panel data is based on cylindrical or non-cylindrical panels, with cases where the number of individuals (N) is greater than the number of periods (T). The generic estimators used are Ordinary Least Squares (OLS) with fixed or random effects to estimate the parameters of the models, which are generally linear. However, in the presence of autocorrelation of error terms and heteroscedasticity, these estimators can generate estimation biases. Also, the presence of endogeneity means that using these estimators leads to biased estimates. The literature suggests alternative estimators that can address the issues of endogeneity, autocorrelation, and heteroscedasticity of error terms. These estimators include the system - Generalized Moment Method (GMM) and the Ordinary Double Least Squares (OLS) method. The use of the latter requires, according to Arellano and Bond (1991) and Arellano and Bover (1995), that the number of individuals (N) be greater than the number of years (T). Another advantage is that these estimators take non-cylindrical panels into account.

However, it is quite common to have panels in which both T, the number of time series observations, and N, the number of groups, are quite large and of the same order of magnitude, or even that the number of time series (T) is larger than the number of individuals (N). In such a configuration, Pesaran et al. (1999) consider that the usual practice is either to estimate N separate regressions and calculate the means of the coefficients (Pesaran, 2015), known as the Mean Group (MG) estimator, or to group the data and assume that the slope coefficients and error variances are identical. However, this estimator does not consider the fact that some parameters may be the same in all groups. Also, another limitation of traditional pooled estimators, such as fixed- and random-effects estimators, is that they allow intercepts to differ from group to group, while all other coefficients and error variances are constrained to be identical (Pesaran et al., 1999).

When N < T, the GMM and DMCO estimators are no longer effective. Pesaran et al (1999) propose an alternative method, the pooled mean estimator (PMG), which constrains long-

term coefficients to be identical, but allows short-term coefficients and error variances to differ between groups. One of the advantages of the PMG estimator is that it allows us to study long-term homogeneity without imposing short-term parameter homogeneity, since this estimator involves both pooling and averaging.

Thus, to estimate the parameters of our models, the PMG estimator is preferred for three main reasons. Firstly, our study covers a few countries (N =18) that is smaller than the study period, which spans twenty-eight years (T = 28, 1991 - 2018). Secondly, structural transformation is a long-term process, so being able to study the long-term homogeneity of parameters without imposing their short-term homogeneity will give us a better grasp of the factors explaining structural transformation. Thirdly, the constraints on intercepts, slope coefficients and error variance are more applicable to the SSA case. This is a judicious constraint, given that these countries have different initial conditions, such as infrastructure endowments, FDI attraction, human capital, and income levels.

6 Results and interpretation

6.1 Drivers of the within sectors productivity growth in SSA

The result form the PMG estimation in table 7 show that in the long term, trade openness in the services sector favors productivity growth, while exports and imports of services have a negative impact in the short and long term respectively. A 100% increase in trade openness increases productivity by 0.0268 units, while a similar increase in imports reduces productivity by 0.00827 units. Trade openness enables technology transfer, but imports of services, often linked to capital-intensive industries such as mining, reduce productivity. On the other hand, per capita income improves productivity in both the short and long term, while FDI, which is mainly directed towards extractive industries, has a negative effect on intra-sector productivity in SSA.

Table 7: Results of PMG regression, effects of trade in services on average productivity within sectors (within effect) in SSA

Pooled Mean Group (PMG) Regression, dependent variable: Within effect				
Variables	(1)	(2)	(3)	(4)
	Short term			
ECT	-0.853***	-0.801***	-0.807***	-0.839***
	(0.0928)	(0.0781)	(0.0768)	(0.0905)
D.Human Capital	-0.410	-0.357	-0.255	0.863
	(1.457)	(0.662)	(0.660)	(0.864)
D. FDI	0.000580	0.000393	-6.02e-05	-0.000944
	(0.00110)	(0.00102)	(0.00104)	(0.00175)
D.Log GDP per capital	0.718***	0.667***	0.669***	0.759***
	(0.118)	(0.119)	(0.126)	(0.166)
D.Openness (services)	-0.00113			
	(0.000742)			

D.log Total services (export)		-0.0104*		
		(0.00561)		
D.log Total services (import)			-0.000932	
			(0.00800)	
D.log Tourism				0.0102
				(0.0134)
	Long term			
Human Capital	-0.109***	-0.0966***	-0.0849***	-0.0953***
	(0.0151)	(0.0165)	(0.0168)	(0.0170)
FDI	-0.00160***	-0.000632	-0.000538	-0.0012***
	(0.000508)	(0.000574)	(0.000557)	(0.000357)
Log GDP per capital	0.000998***	0.0175	0.0324**	0.00380
	(0.000318)	(0.0147)	(0.0165)	(0.0157)
Openness (services)	0.0268**			
	(0.0125)			
Log Total services (exports)		-0.000789		
		(0.00381)		
Log Total services (imports)			-0.00827*	
			(0.00450)	
Log Tourism				0.00468
				(0.00561)
Constant	-0.00201	0.0435***	-0.0207*	0.0671***
	(0.0135)	(0.0112)	(0.0106)	(0.0196)
Observations	433	468	466	365
Time FE	Oui	Oui	Oui	Oui

Note: Robust standard errors of estimated coefficients are in brackets; *, **, ***, represent significance at 10%, 5% and 1% respectively.
Source: Author's calculations

Appendix Tables A4 and A5 summarize the results of the model's PMG estimates analysing productivity growth within sectors in SSA. In the short term, exports of business services and imports of transport services have negative effects on productivity, contrary to the results of Alam and Azhar (1987). In the long term, however, exports of business services and imports of financial services boost productivity, while exports of transport, travel and ICT services have a negative effect. These results are consistent with the work of Francois and Woerz (2008), who show that trade in certain services increases productivity by supporting local production. Finally, in the long term, human capital and FDI have a negative effect on productivity, while per capita income improves it.

6.2 Drivers of static intersectoral reallocation of labour in SSA

Table 8 shows that in the short term, none of the explanatory variables of interest exerts a significant effect on the static intersectoral reallocation of labour in SSA. Among the control variables, only per capita income exerts a positive effect in the short term.

In the long term, tourism leads to a static intersectoral reallocation of labour in SA. This result confirms the work of Catteneo et al. (2010), Lejárraga and Walkenhorst (2013) and Romão (2020), who find that tourism demand, through its knock-on effect on real output, puts pressure on firms and local production, leading to productivity gains and the movement

of labour between sectors. Indeed, a country whose tourism sector is booming will also see a gradual migration of labour to this sector and to the other sectors affected by the demand generated by the tourism boom. The other explanatory variables of interest have rather mixed long-term effects. Human capital and FDI have positive effects on the reallocation of labour to sectors with above-average productivity (see appendixes A6 and A7 for more insight on the effect of TiS dimensions effects).

Table 8: Results of PMG regression, effects of trade in services on the static intersectoral reallocation (between static effect) in SSA

Pooled Mean Group (PMG) regression: dependent variable: Between static effect				
VARIABLES	(1)	(2)	(3)	(4)
		Short term		
ECT	-0.738***	-0.774***	-0.783***	-0.781***
	(0.0874)	(0.0869)	(0.0863)	(0.0843)
D.Human Capital	1.814	1.031	1.077	-0.269
	(1.232)	(1.162)	(1.125)	(0.788)
D. FDI	-0.0171	-0.00106	-0.00638	-0.00254
	(0.0185)	(0.00251)	(0.00783)	(0.00396)
D.Log GDP per capital	-2.370	0.170***	0.161**	-1.651
	(2.552)	(0.0642)	(0.0724)	(1.839)
D.Openness (services)	-0.00881			
	(0.00994)			
D.log Total services (export)		0.0118		
		(0.00768)		
D.log Total services (import)			-0.0522	
			(0.0636)	
D.log Tourism				0.126
				(0.147)
		Long term		
Human Capital	0.0181	0.0337**	0.0216*	0.0167
	(0.0123)	(0.0131)	(0.0120)	(0.0134)
FDI	-0.000375	0.000499	0.000427	0.000580*
	(0.000553)	(0.000330)	(0.000338)	(0.000307)
Log GDP per capital	-0.00547	0.00303	-0.0136	-0.0194*
	(0.00824)	(0.00997)	(0.0120)	(0.0111)
Openness (services)	**-0.000479****			
	(0.000239)			
Log Total services (exports)		**-0.00658****		
		(0.00257)		
Log Total services (imports)			0.00145	
			(0.00344)	
Log Tourism				**0.00955****
				(0.00452)
Constant	0.122	-0.0344***	0.0398***	0.0646
	(0.115)	(0.0111)	(0.00708)	(0.0683)
Observations	433	468	466	365
Time FE	Yes	Yes	Yes	Yes

Note: Robust standard errors of estimated coefficients are in brackets; *, **, ***, represent significance at 10%, 5% and 1% respectively.
Source: Author's calculations

6.3 Drivers of dynamic intersectoral reallocation of labour in SSA

Table 9 shows that, in the short term, none of the variables of interest significantly affects the dynamic reallocation of labour to sectors experiencing positive productivity growth in SSA. This is because the reallocation of labour to sectors with positive productivity growth is a long and dynamic process (De Vries et al., 2015). In the long term, trade openness in services positively affects the movement of labour to sectors with positive labour growth. Indeed, any 100% increase in openness in services leads to an increase in the movement of labour towards sectors with positive productivity growth. As previous work points out (Timmer and De Vries, 2009; McMillan and Rodrik, 2011; De Vries et al., 2015) the reallocation of dynamic inter-sectoral labour is a lengthy process that affects the overall structure of the economy (see appendixes A8 and A9 for more insight on the effect of TiS dimensions effects).

Table 9: Results of PMG regression, effects of trade in services on the dynamic intersectoral reallocation (between dynamic effect) in SSA

Pool Mean Group (PMG) regression: dependent variable: Between Dynamic effect				
VARIABLES	(1)	(2)	(3)	(4)
		Short term		
ECT	-0.759***	-0.811***	-0.796***	-0.844***
	(0.0818)	(0.0840)	(0.0825)	(0.0953)
D.Human Capital	-1.239	-1.346	-1.327	-0.529
	(0.975)	(1.225)	(1.204)	(0.393)
D. FDI	0.0185	0.00249	0.00785	0.00531
	(0.0184)	(0.00248)	(0.00781)	(0.00440)
D.Log GDP per capital	2.384	0.000545	-0.00996	1.673
	(2.410)	(0.0126)	(0.0214)	(1.787)
D.Openness (services)	0.00979			
	(0.00991)			
D.log Total services (export)		0.00303		
		(0.00511)		
D.log Total services (import)			0.0579	
			(0.0616)	
D.log Tourism				-0.149
				(0.145)
		Long term		
Human Capital	0.00355	0.00127	0.00237	0.00323
	(0.00271)	(0.00230)	(0.00238)	(0.00299)
FDI	1.49e-05	6.73e-05	6.36e-05	0.000111**
	(8.45e-05)	(5.44e-05)	(5.71e-05)	(4.67e-05)
Log GDP per capital	-0.00683***	-0.00464**	-0.00631***	-0.00745**
	(0.00216)	(0.00214)	(0.00220)	(0.00321)
Openness (services)	**0.000200*** **			
	(7.03e-05)			
Log Total services (exports)		-0.000304		
		(0.000488)		
Log Total services (imports)			0.000192	

			(0.000576)	
Log Tourism				-0.00101
				(0.000954)
Constant	-0.0646	0.0374***	0.0384***	-0.0196
	(0.0940)	(0.0141)	(0.0107)	(0.0714)
Observations	433	468	466	365
Time FE	Yes	Yes	Yes	Yes

Note: Robust standard errors of estimated coefficients are in brackets; *, **, ***, represent significance at 10%, 5% and 1% respectively.
Source: Author's calculations

7 Robustness check of the results

7.1 Addressing cross-sectional dependence issue with Dynamic Common Correlated Effects (DCCE) estimation method

The robustness of the results can be verified by several methods, either by adopting a dependent variable other than the one already used, or by adopting a new estimation technique. It can also be achieved by introducing new explanatory variables or withdrawing certain ones. In our case, we opt for the introduction of a new explanatory variable, namely the urban population growth rate (representing urbanization) and a new estimator (the Dynamic Common Correlated Effects (DCCE) estimator) that is even more robust according to the literature. Urbanization is a major factor in the long-term modification of productivity and the movement of labour between sectors of activity, and therefore in structural transformation. Kuznets (1973) argues that structural change brings with it pervasive social transformations such as urbanization and secularization, as well as demographic transitions to low fertility rates.

Furthermore, for Lopes et al. (2017) based on empirical evidence, the main drivers of structural transformation to improve productivity are technology, capital accumulation, institutions, and urbanization. For these authors, rapid urbanization generated by rural exodus or the creation of production towns in rural areas, as well as a demographic transition characterized by low birth and death rates, are factors that explain structural transformation. Thus, we integrate the growth rate of the urban population (capturing urbanization) into the initial empirical models to obtain the following functional forms:

$$\boldsymbol{W_{it} = \vartheta_0 + \varphi_1 W_{it-1} + \varphi_2 \chi_{it} + \varphi_3 TS_{it} + \varphi_4 \phi_{it} + \eta_i + \tau_t + \varepsilon_{it}} \quad (6)$$

$$\boldsymbol{BS_{it} = \delta_0 + \delta_1 BS_{it-1} + \delta_2 \chi_{it} + \delta_3 TS_{it} + \delta_4 \phi_{it} + \eta_i + \tau_t + \varepsilon_{it}} \quad (7)$$

$$BD_{it} = \psi_0 + \psi_1 BD_{it-1} + \psi_2 \chi_{it} + \psi_3 TS_{it} + \psi_4 \phi_{it} + \eta_i + \tau_t + \varepsilon_{it} \quad (8)$$

With W_{it} , BS_{it} et BD_{it} respectively representing the three components of structural transformation (within effect, Between Static and Between Dynamic effect). χ_{it} groups together control variables such as per capita income, FDI and human capital. TS_{it} represents a vector of variables grouping the main types of commercial services, ϕ_{it} represents the urban population growth rate (indicator of urbanization). η_i and τ_t capture the individual and time effects respectively, and ε_{it} the error term with E (ε_{it}) = 0, i represents the country and t the year. φ, δ and ψ are the parameters to be estimated.

Cross-sectional dependence is a common problem in estimating panels with many observations over time and cross-sectional units. Cross-sectional dependence implies that cross-sectional units depend on each other, for example by sharing the same factor. For Ditzen (2021), ignoring this dependence can lead to biased and inconsistent estimation results. Ditzen (2021), explains how to test for cross-sectional dependence and estimate the exponent of cross-sectional dependence using a technique provided by the stata community. Following this improved technique of Ditzen (2021), the test of Pesaran (2015) whose results are illustrated in table 6 shows the presence of strong cross-sectional dependence between individuals.

Cross-sectional dependence can be addressed using principal components or by adding cross-sectional means. The Dynamic Common Correlated Effects (DCCE) estimator accounts for this dependence in both static and dynamic panel models, including clustered and mean group estimators. It approximates cross-sectional dependence by incorporating the means of independent and dependent variables into the regression. Stata has implemented this estimator in both static and dynamic versions. Ditzen (2021) extended the estimator to directly estimate short- and long-term coefficients, differing from traditional methods like PMG and MG. In this study, the DCCE estimator replaced earlier methods, and FDI was substituted with urban population growth to test result stability, with detailed results provided in A1, A2 to A3 in the appendix.

The regression results (Appendixes A1, A2, A3) show that, overall, our findings are robust. In effect, the results indicate that in the short term, exports and imports of services, tourism, exports and imports of construction services, exports of creative services and imports of licensing services have positive effects on average productivity growth within sectors in SSA. In the short term, urbanization to some extent contributes favourably to

average productivity growth within sectors, while in the long term it becomes unfavourable. The results of the various regressions with the DCCE estimator are broadly like those obtained with the PMG estimator. Thus, the use of the DCCE estimator and the introduction of the urbanization phenomenon in SSA confirms the robustness of our results.

7.2 Addressing endogeneity and structural shock issues using local projection analysis

By addressing the cross-sectional dependency issue, the DCCE method cannot address some keys issues that if not fixed make the regression biases with inconsistent results. We made use of the local projection analysis for many reasons. First, local projection analysis introduced by Jordà (2005), effectively addresses the cross-sectional dependence in panel data by estimating impulse responses directly without relying on a full dynamic model like Vector Autoregressions (VAR). Moreover, il also tackles endogeneity by allowing for the use of instrumental variables and direct estimation of dynamic responses, thereby reducing bias, and improving the robustness of the results(Jordà, 2005; Pesaran, 2006, 2015) . With the impulse response, it allows to project potential response of the dependent variable to shocks. We the, analysed the impulse responses of the total productivity growth, the within sector effect, the between static effect and the between dynamic effect to trade in services and the global financial crisis (GFC 2008). To do so, we incorporated the instrumental variable (IV) regression in the local projection analysis by using the lags of our interest independent variable as instruments. We use the default time horizon that is 12 and the automatic specification (shock and lags). The results of the local projection analysis are presented on the following graphs. The graphs show that service trade shocks, whether in exports or imports and whether traditional or modern, have varying impacts on structural transformation indicators over a 12-month period.

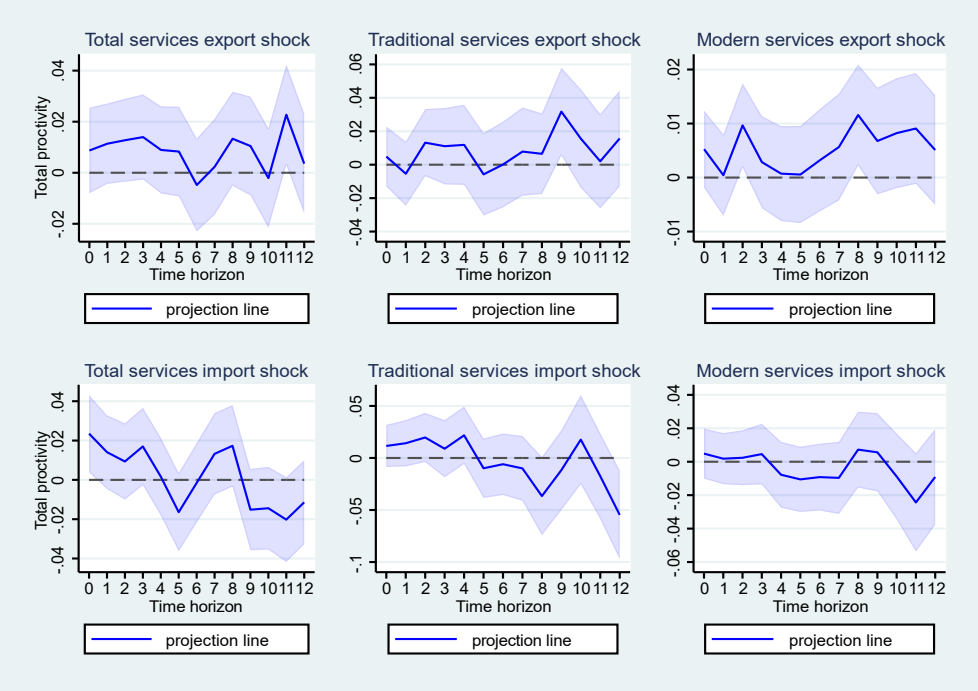
On the graph 9, it appears that the different types of service trade shocks (exports and imports, traditional and modern) have varying impacts on total productivity. Traditional service imports seem to have the most significant negative impact, while total services exports initially boost productivity before stabilizing[8]. Graph 10 indicates that both export and import shocks in services (whether traditional or modern) generally have limited and inconsistent effects on within-sector productivity over time. The graph11 shows that both export and import shocks in services, whether traditional or modern, generally have short-lived and inconsistent effects on the reallocation of productivity between sectors. The most

[8] The shaded areas represent confidence intervals, indicating the degree of uncertainty around these estimates.

significant effects are seen in traditional services, particularly around the 4th period, but these are not sustained in the long term. On graph 12, one can observe that traditional services show more pronounced effect, especially around the 4th period, but these effects are not sustained long-term.

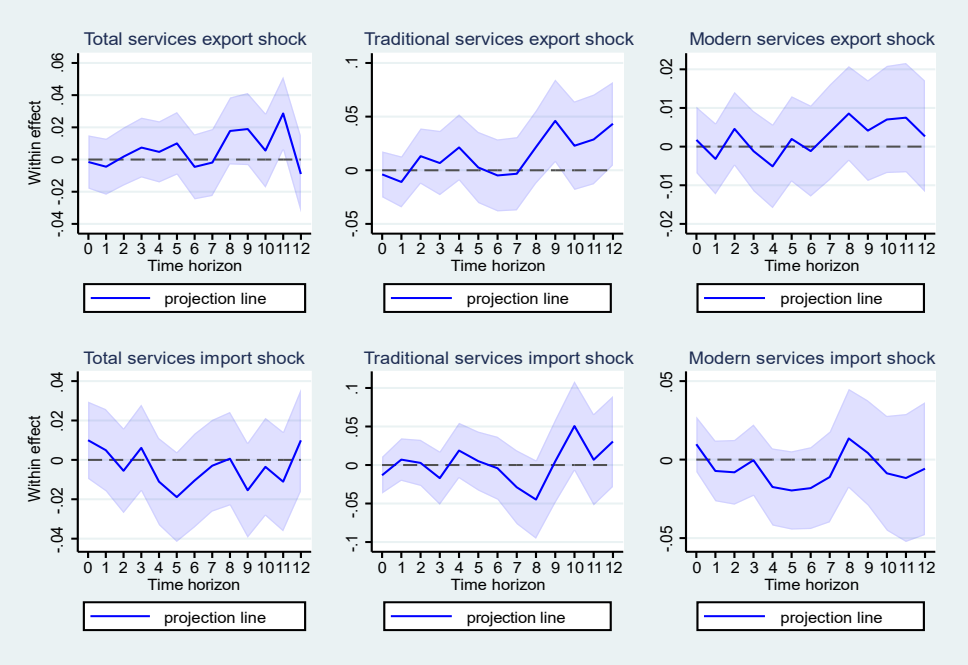
The graph 13 shows that the Global Financial Crisis (GFC) had short-lived and marginal effect on the structural transformation dimensions. Compared to previous findings, it appears that trade in services shocks also exercise limited, inconsistent, and short-lived effects on productivity, highlight the transient and unpredictable nature of economic shocks on productivity measures in SSA.

Graph 9: Impulse responses of total productivity growth



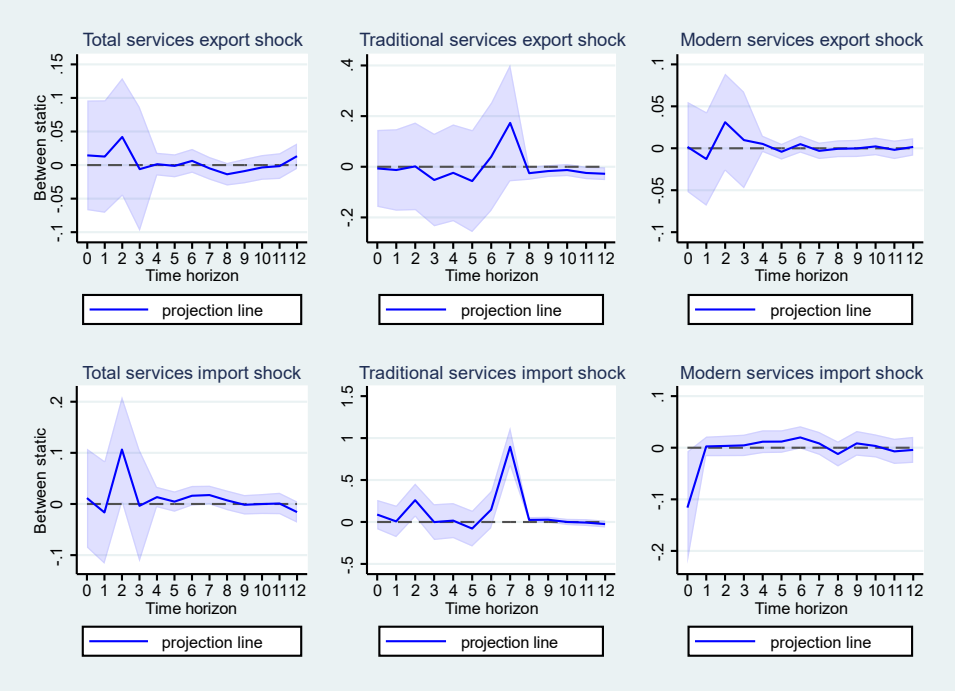
Source: Authors construction, data from Africa sectors database (2021)

Graph 10 Impulse responses of within effect



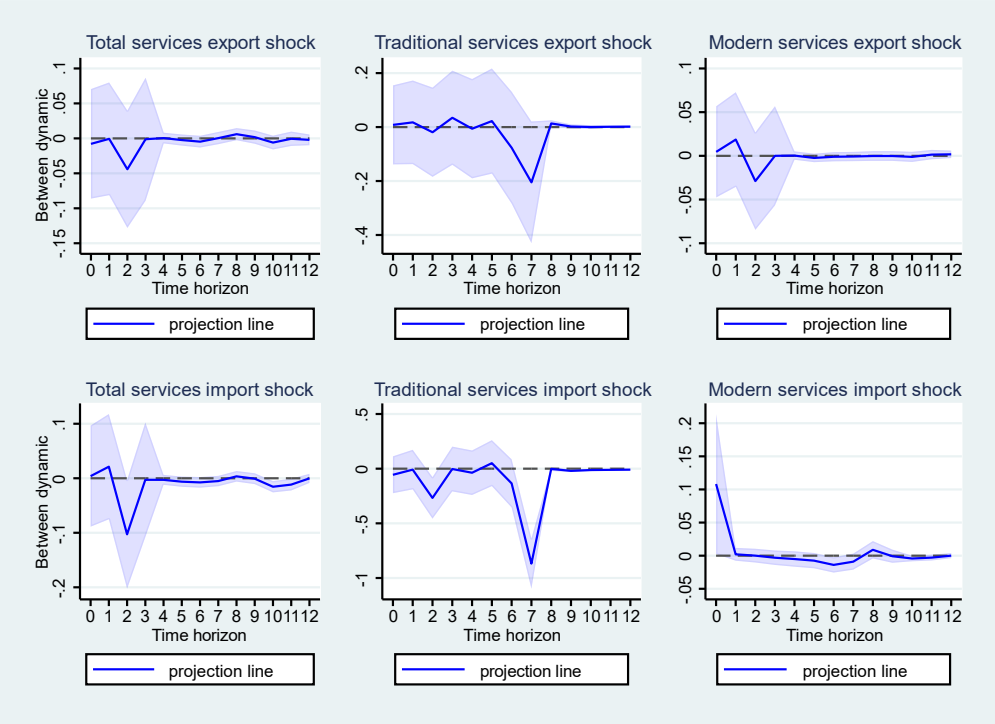
Source: Authors construction, data from Africa sectors database (2021)

Graph 11 Impulse responses of between static effect



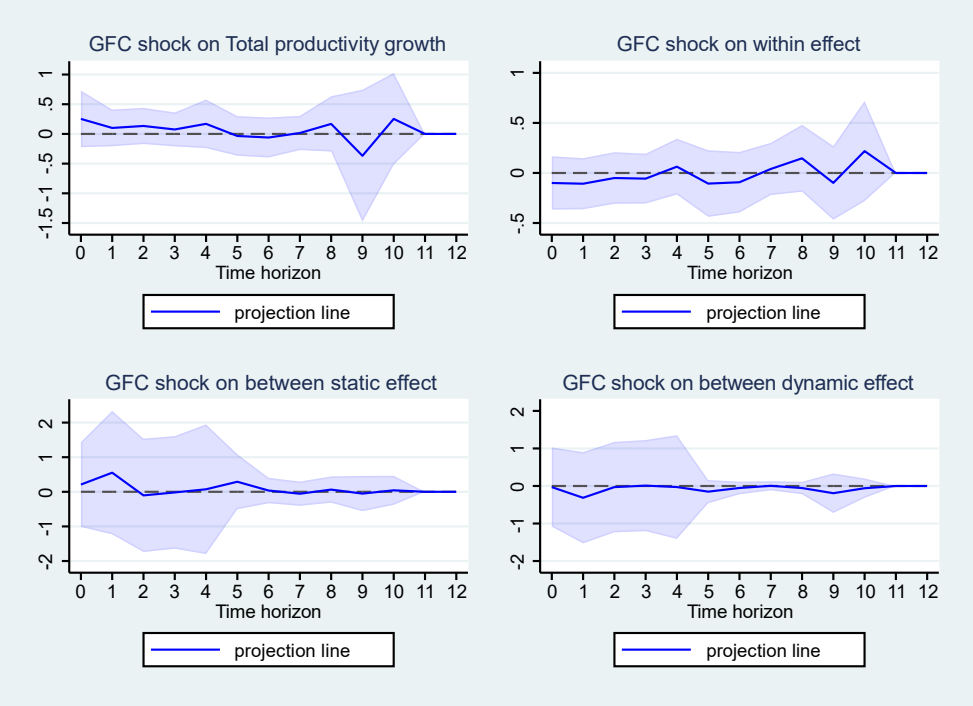
Source: Authors construction, data from Africa sectors database (2021)

Graph 12: Impulse responses of between dynamic effect



Source: Authors construction, data from Africa sectors database (2021)

Graph 13: Impulse responses to Global financial crisis (GFC 2008)



Source: Authors construction, data from Africa sectors database (2021)

8 Conclusion

This research paper aims to assess the effects of trade in services on productivity growth and labour reallocation in Sub-Saharan Africa (SSA) in an environment of uncertainty linked to structural shocks. To this end, stylized fact-based analyses are followed by an empirical analysis of the relationships. Total factor productivity growth is decomposed into three indices according to Fabricant's (1942) method: the "within effect (W)", which measures productivity growth within sectors, the "between static effect (BS)", which reflects the static reallocation of labour between sectors, and the "between dynamic effect (BD)", which captures the dynamic reallocation of labour between sectors.

The results of the decomposition provide us with some insights: total productivity grew by 2.33% in SSA over the period 1991 to 2018. This growth is driven more by static inter-sectoral reallocation, which grew by 2.61%, followed by intra-sectoral productivity growth of 0.92%. Total productivity is also accompanied by a 1.23% increase in the movement of labour to sectors where productivity is falling (dynamic and joint labour effect). This movement represents the state of play in the dynamics of the structural transformation taking place in SSA.

The estimation results show that in the long term, trade openness in the services sector, exports of transport services, travel services and ICT services positively affect productivity growth within sectors. While in the long term, tourism is the factor that positively contributes to the static intersectoral reallocation of labour in SSA. In the short term, on the other hand, exports of transport and travel services positively affect the reallocation of labour to sectors with above-average productivity. Furthermore, our results show that in the long term, trade openness in services positively affects the movement of labour towards sectors with growth (dynamic inter-sectoral reallocation of labour). To check the stability of the results, we use the Dynamic Common Correlated Effects (DCCE) estimator and add the urban population growth rate, confirming that the results obtained with the PMG estimator remain robust despite these adjustments.

We denote that the various service trade dimensions shocks have varying impacts on the structural transformation indicators. Traditional service imports have the most significant negative impact on total productivity while services exports initially boost productivity before stabilizing, and both export and import shocks in services generally having limited and inconsistent effects on within-sector productivity and the reallocation of productivity

between sectors over time, with the most significant effects seen in traditional services but not sustained in the long term.

Thus, considering its findings, the following economic policy recommendations for can be suggested. Policy makers may adopt strategies and policies to make services an important source of growth in total labour productivity in SSA. They must strengthen their progressive liberalization process in the services sector to attract more FDI, which through the effect of technology transfer increases productivity and enables an efficient reallocation of labour to the most productive sectors. SSA economies must strengthen their resilience strategies to overcome and limit potential impact of shocks resulting from internation disruption of services supply as well as external shocks like COVID19 and GFC. Therefore, trade in services must be considered as a key priority int eh implementation of the AfCFTA to strengthen trade in services between African countries, which can lead to an efficient reallocation production factor as labour between sectors and total factor productivity growth. The main limitation of this study is that it does not cover many African counties (18 countries) and the second is that the data are collected only till 2018 that could not allow us to capture the Covid19 effect on the structural transformation pattern in SSA. Futures research may consider these issues to have better understanding of the structural transformation dynamics in Africa.

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10 Appendixes

A1: Results of the effects of trade in services on average productivity within sectors - ECCD regression

VARIABLES	Regression using the Dynamic Common Correlated Effects (DCCE) estimator, dependent variable: Within effect				
	(1)	(2)	(3)	(4)	(5)
		Court Terme			
D.Human capital	0.904	-0.754	-1.388	4.713	-0.845
	(2.163)	(1.954)	(2.186)	(4.241)	(0.647)
D.FDI	0.000724	0.00304*	0.00274	0.00240**	0.00137
	(0.00147)	(0.00173)	(0.00168)	(0.00105)	(0.00119)
D.GDP/capital	0.421***	0.637***	0.418***	0.578***	0.431***
	(0.153)	(0.197)	(0.141)	(0.180)	(0.145)
D.Urbanization	0.108	-0.0494	0.00730	0.0214	0.0283
	(0.0716)	(0.0691)	(0.0537)	(0.107)	(0.0437)
D.Openness (merchandises)	0.000387				
	(0.000293)				
D.Openness (Services)		0.00495			
		(0.00403)			
D.Log Total services export			**0.0174****		
			(0.00694)		
D. Log Total services import				**0.0382****	
				(0.0166)	
D.Log Tourism					**0.0258***
					(0.0148)
		Long Terme			
L.Within (W)	-1.092***	-0.997***	-1.132***	-1.156***	-1.230***
	(0.101)	(0.265)	(0.0737)	(0.297)	(0.140)
Human capital	-0.494	-0.321	-0.165	-0.274	-0.181
	(0.627)	(1.279)	(0.243)	(0.890)	(0.472)
FDI	-0.000268	-0.00520	-0.00170	-0.00236	-0.00158
	(0.00274)	(0.00831)	(0.00150)	(0.00319)	(0.00131)
GDP/capital	0.000309	0.0470	0.181**	0.106	0.0831
	(0.350)	(0.190)	(0.0724)	(0.203)	(0.102)
Urbanization	-0.0108	-0.0481	-0.00829	-0.0314	-0.00315
	(0.0198)	(0.0543)	(0.0129)	(0.0265)	(0.0173)
Openness (merchandises)	-0.000489				
	(0.00103)				
Openness (Services)		0.00132			
		(0.00264)			
Log Total services export			**-0.0236***		
			(0.0125)		
Log Total services import				-0.00929	
				(0.0292)	
Log Tourism					-0.0207
					(0.0277)
Observations number	402	364	468	387	294
R-squared	0.196	0.138	0.167	0.169	0.156
Number of id	15	14	18	15	13
Time effect	Yes	Yes	Yes	Yes	Yes

Note: Robust standard errors of estimated coefficients are in brackets; *, **, ***, represent significance at 10%, 5% and 1% respectively.
Source: Author's calculations

A2: Results of the effects of trade in services on the static intersectoral reallocation of labour (Between static) - ECCD regression

VARIABLES	Regression using the Dynamic Common Correlated Effects (DCCE) estimator, dependent variable : Between static effect				
	(1)	(2)	(3)	(4)	(5)
Court Terme					
D.Human capital	-2.906	-0.0890	-2.152	1.473	0.472
	(2.673)	(0.965)	(2.299)	(3.177)	(0.943)
D.FDI	0.000489	0.000133	0.000316	0.00393	-0.000103
	(0.00228)	(0.000729)	(0.000967)	(0.00331)	(0.00194)
D.GDP/capital	0.182*	-0.0713	0.00862	0.150	0.0288
	(0.0968)	(0.0701)	(0.0499)	(0.1000)	(0.0796)
D.Urbanization	0.00792	0.00792	-0.0488	0.145	-0.00907
	(0.0268)	(0.0426)	(0.0558)	(0.150)	(0.0332)
D.Openness (merchandises)	**-0.000606****				
	(0.000277)				
D.Openness (Services)		**-0.00464***			
		(0.00236)			
D.Log Total services export			**-0.0280*****		
			(0.00768)		
D. Log Total services import				0.0360	
				(0.0261)	
D.Log Tourism					-0.0185
					(0.0128)
Long Terme					
L.Betweenstatic	-0.975***	-1.409**	-1.303***	-1.005***	-0.974***
	(0.247)	(0.647)	(0.197)	(0.0771)	(0.146)
Human capital	0.721	-0.122	-0.117	0.114	0.0273
	(0.677)	(3.172)	(0.332)	(0.0966)	(0.139)
FDI	0.000473	4.82e-05	-0.000227	0.000827	0.00254
	(0.00916)	(0.0174)	(0.00259)	(0.00410)	(0.00458)
GDP/capital	0.246	0.0686	0.0408	0.174*	0.0509
	(0.417)	(0.920)	(0.148)	(0.0936)	(0.162)
Urbanization	-0.0115	0.0121	0.0166	0.00132	0.0151
	(0.0486)	(0.0601)	(0.0281)	(0.0132)	(0.0319)
Openness (merchandises)	0.000377				
	(0.00188)				
Openness (Services)		0.00114			
		(0.00533)			
Log Total services export			0.0169		
			(0.0125)		
Log Total services import				-0.0107	
				(0.0147)	
Log Tourism					0.0379
					(0.0419)
Observations number	402	364	390	466	294
R-squared	0.053	0.202	0.222	0.071	0.286
Number of id	15	14	15	18	13
Time effect	Yes	Yes	Yes	Yes	Yes

Note: Robust standard errors of estimated coefficients are in brackets; *, **, ***, represent significance at 10%, 5% and 1% respectively.
Source: Author's calculations

A3: Results of the effects of trade in services on the dynamic reallocation of labour between

VARIABLES	Regression using the Dynamic Common Correlated Effects (DCCE) estimator, dependent variable : Between Dynamic effect				
	(1)	(2)	(3)	(4)	(5)
Court Terme					
D.Human capital	0.434	-0.0102	1.725	-0.915	-0.640
	(0.505)	(0.231)	(1.767)	(0.950)	(0.886)
D.FDI	0.000372	0.000537*	0.000669**	0.000322	0.00100
	(0.000775)	(0.000286)	(0.000313)	(0.000593)	(0.000663)
D.GDP/capital	-0.0252	-0.0323	-0.139*	-0.0264	0.0269
	(0.0266)	(0.0320)	(0.0733)	(0.0356)	(0.0435)
D.Urbanization	-0.0277	-0.0519	-0.00959	-0.0817	0.0129
	(0.0204)	(0.0499)	(0.0246)	(0.0764)	(0.0123)
D.Openness (merchandises)	-9.47e-05				
	(0.000185)				
D.Openness (Services)		**-0.000579*** **			
		(0.000215)			
D.Log Total services export			**-0.00547***		
			(0.00295)		
D. Log Total services import				0.00251	
				(0.00583)	
D.Log Tourism					0.000965
					(0.00499)
Long Terme					
L.Betweendynamic	-1.020***	-1.115***	-1.370***	-1.033***	-1.212***
	(0.103)	(0.108)	(0.251)	(0.281)	(0.139)
Human capital	-0.0256	0.0290	0.0313	0.0144	0.0170
	(0.495)	(0.0681)	(0.0685)	(0.201)	(0.0403)
FDI	-4.71e-05	-9.48e-05	-0.000610	0.000103	-0.000568
	(0.00381)	(0.000554)	(0.00143)	(0.00301)	(0.000759)
GDP/capital	-0.0114	0.00839	0.0269	-0.0317	-0.0391
	(0.253)	(0.0626)	(0.0542)	(0.104)	(0.0672)
Urbanization	0.00878	0.000310	0.000655	0.00354	0.00163
	(0.0259)	(0.0122)	(0.0200)	(0.0171)	(0.00585)
Openness (merchandises)	4.17e-05				
	(0.000543)				
Openness (Services)		0.000256			
		(0.00129)			
Log Total services export			-0.000324		
			(0.00649)		
Log Total services import				0.00581	
				(0.0164)	
Log Tourism					-0.00831
					(0.0170)
Observations number	402	399	390	466	294
R-squared	0.014	0.434	0.149	0.019	0.311
Number of id	15	15	15	18	13
Time effect	Yes	Yes	Yes	Yes	Yes

sectors (Between dynamic) - ECCD regression

Note: Robust standard errors of estimated coefficients are in brackets; *, **, ***, represent significance at 10%, 5% and 1% respectively.
Source: Author's calculations

A4: Results of the effects of services exports on average productivity within sectors (within effect) in SSA - Pooled Mean Group (PMG) regression

VARIABLES	**Regression in Pooled Mean Group (PMG), dependent variable Within (W)**			
	(1)	(2)	(3)	(4)
Short Term				
ECT	-0.813***	-0.818***	-0.843***	-0.857***
	(0.0775)	(0.0917)	(0.107)	(0.0715)
D.Human capital	0.0773	0.153	0.305	-1.136
	(0.459)	(0.606)	(0.993)	(1.054)
D.FDI	0.000480	0.00104	-0.000127	0.00232*
	(0.00105)	(0.000943)	(0.00117)	(0.00138)
D.Log GDP/capital	0.585***	0.631***	0.863***	0.694***
	(0.0990)	(0.106)	(0.168)	(0.144)
D.Log Transport Services Exp	0.00175			
	(0.00676)			
D. Log Travel Services Exp		-0.00477		
		(0.00563)		
D. Log ITC Services Exp			-0.00577	
			(0.0109)	
D. Log Business services Exp				**-0.0113*** **
				(0.00289)
Long Term				
Human capital	-0.0831***	-0.0567***	-0.0453**	-0.109***
	(0.0167)	(0.0161)	(0.0184)	(0.0160)
FDI	-0.000702	-0.00101***	-0.000974***	-0.000987*
	(0.000565)	(0.000287)	(0.000303)	(0.000532)
Log GDP/capital	0.0329**	-0.000966	-7.45e-05	0.0489***
	(0.0148)	(0.0125)	(0.0121)	(0.0123)
Log Transport Services Exp	**-0.00738*** **			
	(0.00267)			
Log Travel Services Exp		**-0.00420***		
		(0.00222)		
Log ITC Services Exp			**-0.00387** **	
			(0.00194)	
Log Business services Exp				**0.00401*** **
				(0.000952)
Constant	-0.0466***	0.108***	0.0543*	-0.130***
	(0.0121)	(0.0161)	(0.0303)	(0.0254)
Observations	460	463	352	418
Time FE	Yes	Yes	Yes	Yes

Note: Robust standard errors of estimated coefficients are in brackets; *, **, ***, represent significance at 10%, 5% and 1% respectively.
Source : Authors' calculations

A5: Results of the effects of services imports on average productivity within sectors (Within) in SSA - Pooled Mean Group (PMG) regression

VARIABLES	*Regression en Pooled Mean Group (PMG), variable dépendante Within (W)*					
	(1)	(2)	(3)	(4)	(5)	(6)
Short Term						
ECT	-0.781***	-0.818***	-0.943***	-0.872***	-0.823***	-0.772***
	(0.0776)	(0.0899)	(0.100)	(0.0886)	(0.0796)	(0.166)
D.Human capital	0.0965	0.410	-1.109	0.00444	-0.289	-0.569
	(0.415)	(0.705)	(1.306)	(0.991)	(0.647)	(1.027)
D.FDI	0.000203	0.000401	0.000125	-0.000479	0.00113	-0.00211
	(0.00102)	(0.000939)	(0.00130)	(0.000915)	(0.00126)	(0.00291)
D.Log GDP/capital	0.635***	0.602***	0.802***	0.781***	0.656***	0.667***
	(0.0984)	(0.103)	(0.150)	(0.131)	(0.107)	(0.215)
D.Log Transport Services imp	**-0.0185****					
	(0.00875)					
D. Log Travel Services imp		-0.00409				
		(0.00396)				
D.Log Financial Services imp			0.00636			
			(0.00769)			
D. Log ITC Services imp				-0.00588		
				(0.00577)		
D. Log Business Services imp					0.00396	
					(0.00375)	
D. Log Creative Services imp						-0.0109
						(0.0126)
Long Term						
Human capital	-0.0965***	-0.0651***	-0.0627***	-0.0476**	-0.0952***	-0.0677***
	(0.0157)	(0.0151)	(0.0200)	(0.0196)	(0.0160)	(0.0215)
FDI	-0.000877	-0.00101***	-0.000887***	-0.00102***	-0.000586	0.000701
	(0.000537)	(0.000270)	(0.000292)	(0.000300)	(0.000556)	(0.000457)
Log GDP/capital	0.0348**	-0.00743	-0.0247	0.0164	0.0249*	0.00465
	(0.0163)	(0.0121)	(0.0152)	(0.0160)	(0.0132)	(0.0166)
Log Transport Services imp	-0.00548					
	(0.00333)					
Log Travel Services imp		-0.00281				
		(0.00243)				
Log Financial Services imp			**0.00376****			
			(0.00184)			
Log ITC Services imp				-0.00458		
				(0.00316)		
Log Business Services imp					**-0.00416****	
					(0.00174)	
Log Creative Services imp						0.000216
						(0.000811)
Constant	-0.0377***	0.149***	0.291***	-0.0233*	0.00851	0.0505*
	(0.0108)	(0.0203)	(0.0351)	(0.0124)	(0.00972)	(0.0306)
Observations	473	457	313	350	455	221
Time FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: Robust standard errors of estimated coefficients are in brackets; *, **, ***, represent significance at 10%, 5% and 1% respectively.
Source : Authors' calculations

A6: Results of the effects of services exports on the static intersectoral reallocation of labour (Between static) in SSA - Pooled Mean Group (PMG) regression

VARIABLES	***Regression in Pool Mean Group (PMG), dependent variable Between Static (BS)***			
	(1)	(2)	(3)	(3)
Short term				
ECT	-0.792***	-0.779***	-0.768***	-0.882***
	(0.0876)	(0.0888)	(0.104)	(0.0925)
D.Human capital	0.964	0.515	-21.81	7.122
	(1.058)	(1.157)	(21.84)	(5.054)
D.FDI	-0.00107	-0.00121	0.00558	-0.0536
	(0.00248)	(0.00240)	(0.00465)	(0.0529)
D.Log GDP/capital	0.166***	0.179***	-5.655	-0.0997
	(0.0635)	(0.0625)	(5.842)	(0.286)
D.Log Transport Services Exp	**0.0109****			
	(0.00517)			
D. Log Travel Services Exp		**0.0101***		
		(0.00559)		
D. Log ITC Services Exp			0.246	
			(0.244)	
D. Log Business services Exp				0.0112
				(0.00982)
Long Term				
Human capital	0.0197	0.0267**	0.0101	0.0246**
	(0.0121)	(0.0130)	(0.0150)	(0.0111)
FDI	0.000534*	0.000728***	0.000430	0.000683**
	(0.000319)	(0.000256)	(0.000310)	(0.000300)
Log GDP/capital	-0.0160*	-0.00614	0.00816	-0.00717
	(0.00891)	(0.00911)	(0.00822)	(0.00723)
Log Transport Services Exp	0.00235			
	(0.00204)			
Log Travel Services Exp		-0.000954		
		(0.00161)		
Log ITC Services Exp			-0.00337	
			(0.00216)	
Log Business services Exp				**-0.00345*****
				(0.000893)
Constant	0.0524***	0.00146	0.959	-0.0646
	(0.0100)	(0.00864)	(1.004)	(0.0667)
Observations	460	463	352	418
Time FE	Yes	Yes	Yes	Yes

Note: Robust standard errors of estimated coefficients are in brackets; *, **, ***, represent significance at 10%, 5% and 1% respectively.
Source : Authors' calculations

A7*:* Results of the effects of services imports on the static intersectoral reallocation of labour (Between static) in SSA - Pooled Mean Group (PMG) regression

VARIABLES	***Regression in Pool Mean Group (PMG), dependent variable Between Static (BS)***					
	(1)	(2)	(3)	(4)	(5)	(6)
Short Term						
ECT	-0.782***	-0.796***	-0.877***	-0.788***	-0.795***	-0.567***
	(0.0889)	(0.0901)	(0.151)	(0.0909)	(0.0892)	(0.140)
D.Human capital	0.815	0.687	41.12	4.733	4.042	3.671
	(1.082)	(1.322)	(40.79)	(5.030)	(3.975)	(3.736)
D.FDI	-0.00195	-0.00540	0.0401	-0.0133	-0.0488	0.000988
	(0.00314)	(0.00671)	(0.0396)	(0.0144)	(0.0502)	(0.00152)
D.Log GDP/capital	0.145***	0.199***	0.437	-2.765	-0.134	0.316*
	(0.0553)	(0.0632)	(0.379)	(2.891)	(0.306)	(0.168)
D.Log Transport Services imp	0.00274					
	(0.0137)					
D. Log Travel Services imp		-0.0115				
		(0.0223)				
D.Log Financial Services imp			-0.493			
			(0.504)			
D. Log ITC Services imp				-0.0483		
				(0.0492)		
D. Log Business Services imp					0.0269	
					(0.0248)	
D. Log Creative Services imp						-0.00702
						(0.0145)
Long Term						
Human capital	0.0189	0.0164	0.0338***	-0.00421	0.0249*	0.114***
	(0.0116)	(0.0117)	(0.0128)	(0.0152)	(0.0128)	(0.00747)
FDI	0.000516	0.000707***	0.000594*	0.000605**	0.000379	-0.000252**
	(0.000316)	(0.000268)	(0.000341)	(0.000273)	(0.000353)	(0.000109)
Log GDP/capital	-0.0113	-0.00228	0.00299	-0.000965	-0.0120	-0.100***
	(0.0109)	(0.00851)	(0.00908)	(0.00913)	(0.00821)	(0.00598)
Log Transport Services imp	0.00111					
	(0.00274)					
Log Travel Services imp		-0.00178				
		(0.00165)				
Log Financial Services imp			**-0.00623*** **			
			(0.00132)			
Log ITC Services imp				0.00198		
				(0.00232)		
Log Business Services imp					-0.000721	
					(0.00131)	
Log Creative Services imp						**-0.0126*** **
						(0.000418)
Constant	0.0323***	-0.00386	-1.404	-0.00970	0.0117	0.270**
	(0.00852)	(0.01000)	(1.363)	(0.0325)	(0.0283)	(0.115)
Observations	473	457	313	350	455	221
Time FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: Robust standard errors of estimated coefficients are in brackets; *, **, ***, represent significance at 10%, 5% and 1% respectively.
Source: Authors' calculations

A8: Results of the effects of services exports on the dynamic intersectoral reallocation of labour in SSA - PMG regression

VARIABLES	***Regression in Pool Mean Group (PMG), dependent variable Between Dynamic (BD)***			
	(1)	(2)	(3)	(4)
Short Term				
ECT	-0.815***	-0.811***	-0.730***	-0.860***
	(0.0818)	(0.0839)	(0.132)	(0.227)
D.Human capital	-1.209	-1.198	22.28	-6.354
	(1.197)	(1.218)	(22.51)	(4.617)
D.FDI	0.00250	0.00252	-0.00493	0.0517
	(0.00251)	(0.00240)	(0.00494)	(0.0512)
D.Log GDP/capital	0.00534	-0.000146	5.772	0.237
	(0.0172)	(0.0151)	(5.808)	(0.280)
D.Log Transport Services Exp	**-0.00622***			
	(0.00337)			
D. Log Travel Services Exp		-0.00127		
		(0.00204)		
D. Log ITC Services Exp			-0.244	
			(0.247)	
D. Log Business services Exp				0.00242
				(0.00341)
Long Term				
Human capital	0.000477	0.00239	0.0112***	0.00134
	(0.00244)	(0.00234)	(0.00352)	(0.00238)
FDI	5.99e-05	4.50e-05	5.76e-05	5.06e-05
	(5.65e-05)	(4.41e-05)	(4.72e-05)	(5.47e-05)
Log GDP/capital	-0.00513***	-0.00488**	-0.00799***	-0.00521***
	(0.00182)	(0.00212)	(0.00207)	(0.00177)
Log Transport Services Exp	-0.000219			
	(0.000260)			
Log Travel Services Exp		-0.000314		
		(0.000382)		
Log ITC Services Exp			**0.000820****	
			(0.000414)	
Log Business services Exp				-0.000279
				(0.000188)
	0.0397***	0.0359***	-0.998	0.102*
	(0.0141)	(0.0139)	(1.024)	(0.0558)
Observations	460	463	352	418
Time FE	Yes	Yes	Yes	Yes

Note: Robust standard errors of estimated coefficients are in brackets; *, **, ***, represent significance at 10%, 5% and 1% respectively.
Source: Authors' calculations

A9: Results of the effects of services imports on the dynamic intersectoral reallocation of labour in SSA - PMG regression

VARIABLES	*Regression in Pool Mean Group (PMG), dependent variable Between Dynamic (BD)*					
	(2)	(4)	(6)	(8)	(10)	(12)
Short Term						
ECT	-0.798***	-0.778***	-0.791***	-0.821***	-0.803***	-0.266
	(0.0842)	(0.0812)	(0.228)	(0.117)	(0.0832)	(0.347)
D.Human capital	-1.283	-1.324	-41.02	-5.623	-4.217	1.395
	(1.232)	(1.388)	(40.80)	(5.402)	(4.083)	(1.094)
D.FDI	0.00331	0.00656	-0.0383	0.0146	0.0485	0.000586**
	(0.00319)	(0.00653)	(0.0383)	(0.0145)	(0.0485)	(0.000259)
D.Log GDP/capital	0.00634	0.0117	-0.479	2.744	0.293	-0.0320
	(0.0197)	(0.0242)	(0.478)	(2.763)	(0.296)	(0.0370)
D.Log Transport Services imp	0.00895					
	(0.0126)					
D. Log Travel Services imp		0.0176				
		(0.0211)				
D.Log Financial Services imp			0.490			
			(0.490)			
D. Log ITC Services imp				0.0510		
				(0.0513)		
D. Log Business Services imp					-0.0259	
					(0.0235)	
D. Log Creative Services imp						0.00282
						(0.00465)
Long term						
Human capital	0.00225	0.00179	0.0105***	0.00923***	0.00170	0.0258***
	(0.00226)	(0.00233)	(0.00294)	(0.00357)	(0.00248)	(0.00554)
FDI	6.40e-05	4.59e-05	3.92e-05	5.11e-05	5.63e-05	0.000144**
	(5.55e-05)	(4.51e-05)	(4.95e-05)	(4.26e-05)	(5.67e-05)	(5.68e-05)
Log GDP/capital	-0.00764***	-0.00480**	-0.00419*	-0.00450*	-0.00512***	-0.0150***
	(0.00223)	(0.00200)	(0.00226)	(0.00257)	(0.00178)	(0.00290)
Log Transport Services imp	0.000638					
	(0.000447)					
Log Travel Services imp		-0.000288				
		(0.000406)				
Log Financial Services imp			-0.000148			
			(0.000291)			
Log ITC Services imp				-0.000258		
				(0.000429)		
Log Business Services imp					7.25e-05	
					(0.000232)	
Log Creative Services imp						**-0.000818*** **
						(0.000213)
Constant	0.0475***	0.0358**	1.367	0.0636	0.0602	-0.00199
	(0.0146)	(0.0152)	(1.362)	(0.0519)	(0.0369)	(0.0270)
Observations	473	457	313	350	455	221
Time FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: Robust standard errors of estimated coefficients are in brackets; *, **, ***, represent significance at 10%, 5% and 1% respectively.
Source : Authors' calculations

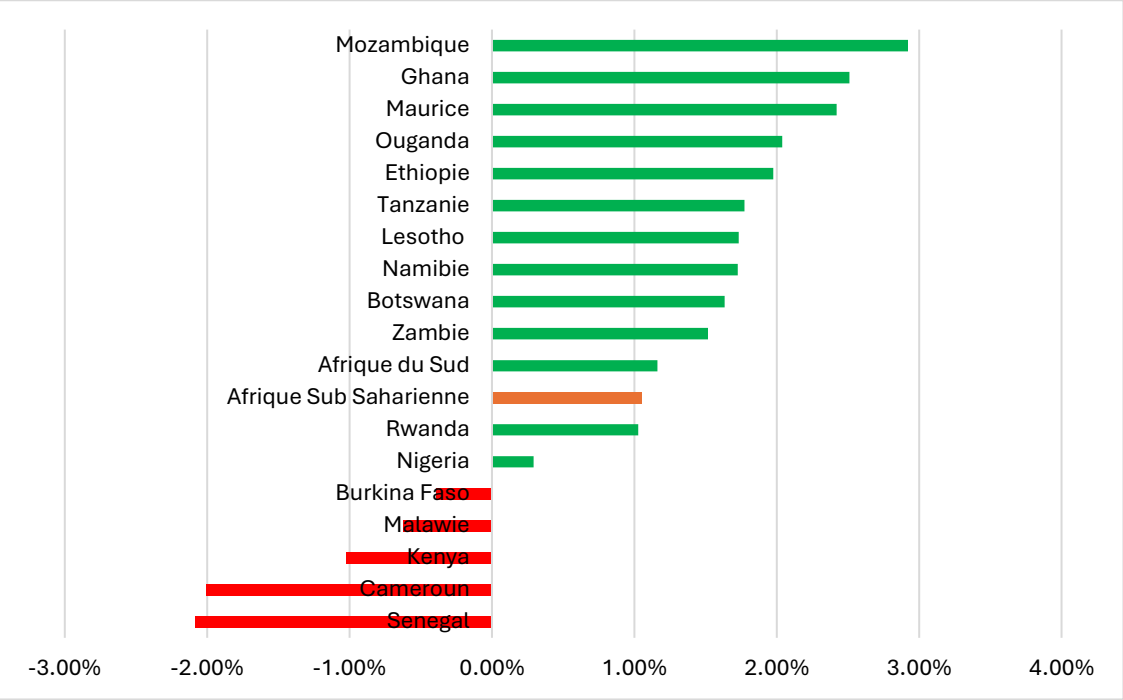
A10: Results of the canonical decomposition of productivity and labour reallocation in SSA and North Africa

Country	Period	Within	Between Static	Between Dynamic	Total growth
Sub Saharan Africa	1991-2018	1.05%	2.61%	-1.32%	2.33%
	1991-2000	0.75%	1.35%	-0.42%	1.68%
	2001-2010	1.37%	2.30%	-0.62%	3.05%
	2011-2018	1.01%	4.56%	-3.32%	2.26%
North Africa	1991-2018	1.93%	0.43%	-0.18%	2.19%
	1991-2000	1.35%	0.20%	-0.12%	1.43%
	2001-2010	2.75%	0.34%	-0.23%	2.85%
	2011-2018	1.64%	0.85%	-0.17%	2.32%
Botswana	1991-2018	1.63%	0.39%	-0.42%	1.61%
	1991-2000	4.27%	-0.51%	-0.86%	2.91%
	2001-2010	0.90%	1.02%	-0.18%	1.73%
	2011-2018	-0.75%	0.74%	-0.16%	-0.16%
Burkina Faso	1991-2018	-0.39%	5.58%	-2.07%	3.12%
	1991-2000	-0.27%	2.95%	-0.78%	1.90%
	2001-2010	2.57%	2.81%	-1.01%	4.38%
	2011-2018	-4.24%	12.31%	-4.99%	3.09%
Cameroon	1991-2018	-2.01%	3.80%	-1.53%	0.26%
	1991-2000	-3.37%	1.72%	-0.19%	-1.84%
	2001-2010	-4.44%	8.03%	-3.21%	0.38%
	2011-2018	2.74%	1.10%	-1.10%	2.74%
Egypt	1991-2018	1.78%	0.21%	-0.16%	1.83%
	1991-2000	1.64%	0.50%	-0.19%	1.95%
	2001-2010	2.36%	-0.38%	-0.14%	1.84%
	2011-2018	1.24%	0.58%	-0.16%	1.66%
Ethiopia	1991-2018	1.97%	1.72%	-0.11%	3.58%
	1991-2000	-0.67%	1.01%	-0.03%	0.31%
	2001-2010	2.77%	2.39%	-0.21%	4.95%
	2011-2018	4.28%	1.75%	-0.06%	5.97%
Ghana	1991-2018	2.51%	0.50%	-0.26%	2.75%
	1991-2000	2.72%	0.25%	-0.03%	2.94%
	2001-2010	1.85%	0.43%	-0.12%	2.16%
	2011-2018	3.07%	0.90%	-0.73%	3.25%
Kenya	1991-2018	-1.03%	0.87%	-0.33%	-0.49%
	1991-2000	-5.17%	2.58%	-0.34%	-2.93%
	2001-2010	0.51%	-0.66%	-0.11%	-0.26%
	2011-2018	2.24%	0.64%	-0.60%	2.28%
Lesotho	1991-2018	1.73%	2.07%	-0.54%	3.27%
	1991-2000	3.56%	1.55%	-0.10%	5.02%
	2001-2010	-0.19%	3.14%	-0.42%	2.53%
	2011-2018	1.85%	1.38%	-1.24%	1.99%
Malawi	1991-2018	-0.63%	2.88%	-0.40%	1.86%
	1991-2000	-1.03%	2.08%	-0.21%	0.84%
	2001-2010	-1.57%	3.57%	-0.56%	1.44%
	2011-2018	1.07%	3.03%	-0.45%	3.66%
Mauritius	1991-2018	2.42%	1.03%	-0.26%	3.18%
	1991-2000	3.21%	0.96%	-0.09%	4.08%
	2001-2010	2.27%	1.52%	-0.61%	3.18%
	2011-2018	1.61%	0.49%	-0.04%	2.07%
Maroc	1991-2018	2.03%	0.85%	-0.21%	2.68%
	1991-2000	0.61%	-0.02%	-0.14%	0.45%
	2001-2010	3.22%	1.21%	-0.30%	4.13%
	2011-2018	2.32%	1.50%	-0.17%	3.65%
Mozambique	1991-2018	2.92%	0.89%	-0.31%	3.50%
	1991-2000	1.42%	1.01%	-0.33%	2.10%
	2001-2010	5.05%	0.58%	-0.25%	5.38%
	2011-2018	2.14%	1.12%	-0.34%	2.91%
Namibia	1991-2018	1.73%	0.69%	-0.90%	1.52%
	1991-2000	3.31%	0.25%	-0.77%	2.79%
	2001-2010	0.39%	1.20%	-0.26%	1.34%
	2011-2018	1.41%	0.61%	-1.85%	0.18%
Nigeria	1991-2018	0.29%	1.46%	-0.22%	1.54%
	1991-2000	0.80%	-0.70%	-0.12%	-0.02%
	2001-2010	2.42%	2.55%	-0.09%	4.88%
	2011-2018	-3.01%	2.80%	-0.48%	-0.69%
	1991-2018	1.03%	17.76%	-14.72%	4.06%

Rwanda	1991-2000	-3.46%	9.80%	-2.62%	3.71%
	2001-2010	4.96%	2.21%	-2.40%	4.77%
	2011-2018	1.72%	47.16%	-45.26%	3.63%
Senegal	1991-2018	-2.08%	3.22%	-0.24%	0.90%
	1991-2000	-0.62%	1.31%	-0.13%	0.56%
	2001-2010	-3.52%	5.15%	0.10%	1.73%
	2011-2018	-2.11%	3.19%	-0.82%	0.26%
South Africa	1991-2018	1.16%	0.30%	-0.67%	0.79%
	1991-2000	0.00%	0.01%	-0.32%	-0.31%
	2001-2010	3.42%	0.68%	-1.24%	2.86%
	2011-2018	-0.21%	0.18%	-0.39%	-0.41%
Tanzania	1991-2018	1.77%	1.62%	-0.27%	3.13%
	1991-2000	2.17%	0.78%	-0.13%	2.83%
	2001-2010	-0.21%	2.82%	-0.42%	2.19%
	2011-2018	3.75%	1.18%	-0.25%	4.67%
Tunisia	1991-2018	1.98%	0.24%	-0.16%	2.07%
	1991-2000	1.80%	0.12%	-0.04%	1.88%
	2001-2010	2.66%	0.19%	-0.26%	2.59%
	2011-2018	1.37%	0.46%	-0.19%	1.64%
Uganda	1991-2018	2.04%	0.76%	-0.06%	2.74%
	1991-2000	2.91%	0.70%	0.02%	3.64%
	2001-2010	3.14%	0.93%	-0.08%	4.00%
	2011-2018	-0.44%	0.64%	-0.14%	0.06%
Zambia	1991-2018	1.52%	1.36%	-0.46%	2.42%
	1991-2000	3.67%	-1.40%	-0.51%	1.76%
	2001-2010	2.52%	2.95%	-0.16%	5.31%
	2011-2018	-2.43%	2.83%	-0.78%	-0.38%

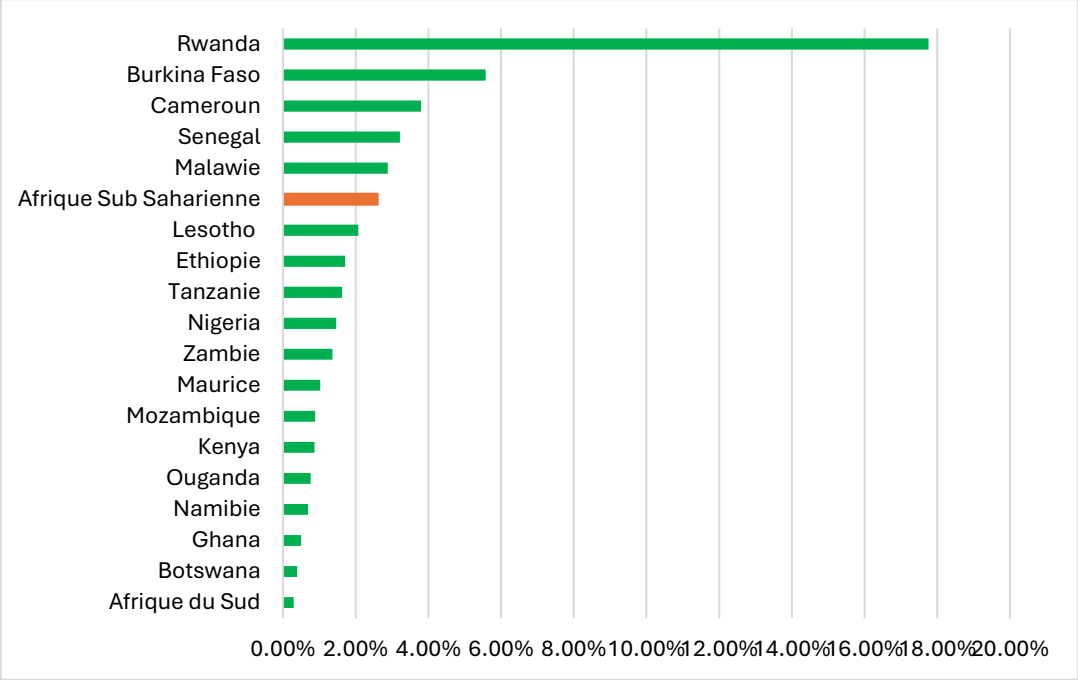
Source: Author's construction, data from African Data Base (2021)

A11: Country score, productivity growth within sectors (Within effect)



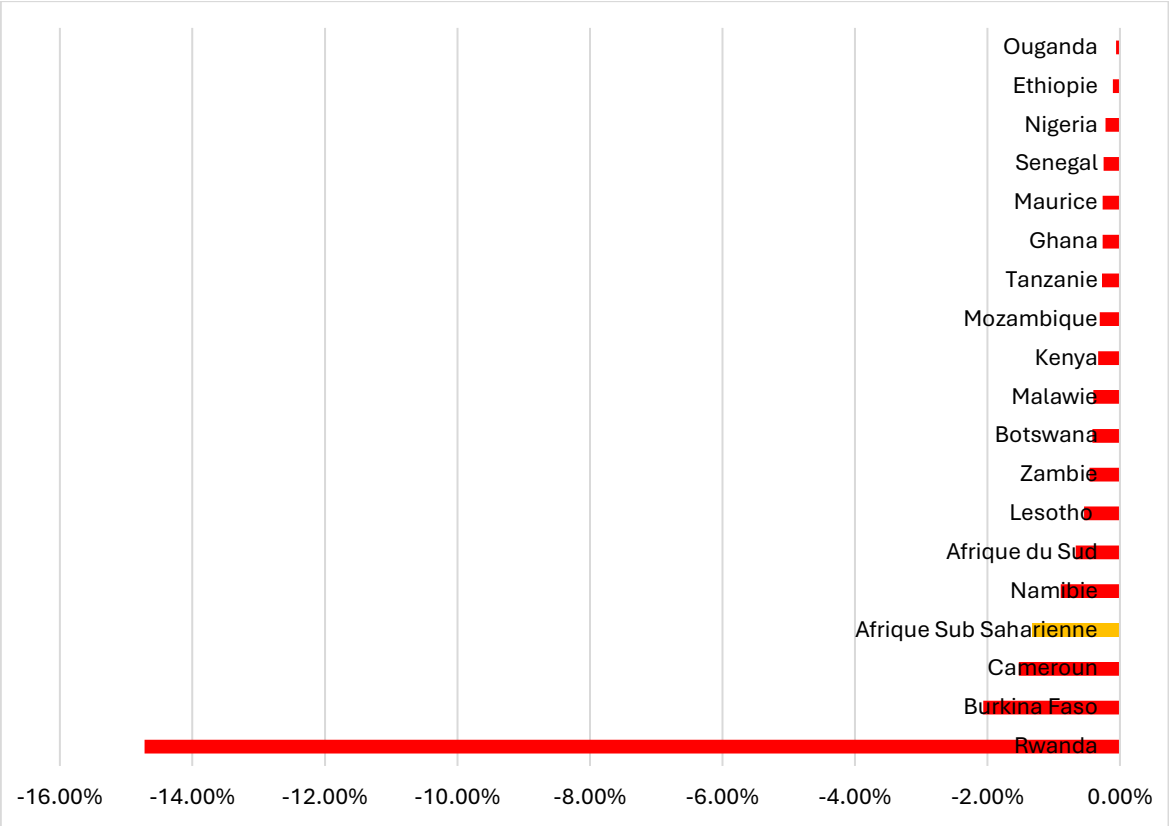
Source: Author's construction, data from African Data Base (2021)

A12: Country score, static inter-sector reallocation of labour in SSA (Between effect)



Source: Author's construction, data from African Data Base (2021)

A13: Country score, dynamic inter-sector reallocation of labour in SSA (Between effect)



Source: Author's construction, data from African Data Base (2021)