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# Dynamics of structural change and the quality of institutions in the context of an open developing economy

Betty Asse

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Betty Asse. Dynamics of structural change and the quality of institutions in the context of an open developing economy. Economics and Finance. Université de Bordeaux, 2024. English. NNT : 2024BORD0052 . tel-04584346

**HAL Id: tel-04584346**

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THÈSE PRÉSENTÉE  
POUR OBTENIR LE GRADE DE

**DOCTEUR DE  
L'UNIVERSITÉ DE BORDEAUX**

ÉCOLE DOCTORALE ENTREPRISE, ECONOMIE, SOCIÉTÉ (ED EES)  
SPÉCIALITÉ SCIENCES ÉCONOMIQUES

Par Betty ASSE

**DYNAMIQUE DU CHANGEMENT STRUCTUREL ET  
QUALITÉ DES INSTITUTIONS DANS LE CADRE  
D'UNE ÉCONOMIE OUVERTE EN  
DÉVELOPPEMENT**

**"Impacts de la qualité des institutions dans le processus du changement structurel "**

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## Résumé

*"Les institutions sont les contraintes conçues par l'homme qui structurent les interactions politiques, économiques et sociales."* North (1991). Selon Levchenko (2007), le terme « institutions » réfère à un large éventail de structures qui influent les résultats économiques comme l'exécution des contrats, le droit des propriétés, etc... Se référant à la littérature sur les institutions, elle indique que les institutions jouent un rôle important dans la performance économique. En termes de changement structurel, différents modèles de changement structurel ont été observés que ce soient des pays anciennement industrialisés (PAI) ou nouveaux pays industrialisés (NPI). Vu l'importance accordée à l'étude des variables institutionnelles dans les différentes études économiques récentes, le questionnement s'est fait de façon intuitive pour comprendre *le rôle de la variable institutionnelle dans ces différents modèles de changement structurel*.

Ainsi, dans le chapitre 1, il s'agit d'étudier la relation probablement non linéaire entre la qualité institutionnelle et le changement structurel, plus précisément en considérant l'une des différentes classifications des institutions présentées par Kunčič (2014). Selon cette classification, nous regardons quels types d'institutions (politiques, juridiques et économiques) sont les plus importants dans le processus de changement structurel. Pour étudier cette relation, nous utilisons la base de données International Country Risk Guide (ICRG) de Political Risk Service Group (PRS) pour obtenir les variables proxy de la qualité institutionnelle pour 103 pays de 1984 à 2018. Nous utilisons d'abord la technique de l'analyse en composantes principales (ACP), puis celle de la classification ascendante hiérarchique (CAH) pour explorer notre ensemble de données. Cette démarche nous permet d'obtenir une image des groupes de pays ayant une mauvaise qualité institutionnelle (faible notation) et de ceux ayant une bonne qualité institutionnelle (notation élevée). Dans un deuxième temps, nous étudions empiriquement la relation à l'aide d'un modèle de panel à seuil pour les deux groupes de pays. Comme principaux résultats, nous constatons que les institutions juridiques, économiques et politique ont des effets significatifs sur le changement structurel. Cependant, ces effets diffèrent selon le niveau des seuils institutionnels. Nous constatons que la qualité des institutions n'affecte le processus de changement structurel que lorsque ces niveaux de seuil sont atteints.

En considérant l'intégration internationale dans le chapitre 2, force est de constater que l'intégration internationale est en général considérée sous l'angle de son impact sur la croissance et/ou le développement d'un pays. Ainsi, nous examinons la relation entre l'ouverture et le changement structurel, en tenant compte de la notion de seuil institutionnel. Sur la base d'un

échantillon de 98 pays entre 1984 et 2018, en utilisant le System-GMM, notre étude montre que la qualité institutionnelle est importante pour expliquer la relation entre l'ouverture et le changement structurel. Cependant, son importance n'est pertinente que lorsque les pays atteignent un certain seuil de qualité des institutions (environ 5 en termes de valeur de seuil). Par ailleurs, lorsque l'on considère le degré de similarité institutionnelle des pays de notre échantillon avec les Etats-Unis, la Chine et les pays de l'Union Européenne (UE) en particulier, notre étude montre un impact négatif et significatif des institutions différentes par rapport aux Etats-Unis, à l'UE et la Chine. Ce qui relate encore l'importance des similarités institutionnelles dans les flux commerciaux.

Toutefois, le processus de désindustrialisation observé dans les pays de l'Afrique subsaharienne (ASS) est prématuré selon certains auteurs comme Rodrik (2013, 2016). Cela signifie que la période d'industrialisation a été trop courte, avec trop peu de création d'emplois et de croissance pour garantir une trajectoire de développement. Pour ces auteurs, les conséquences sur le développement sont nécessairement négatives. Cependant, dans cette thèse, les causes économiques considérées sont la demande mondiale de services qui croît plus vite que la demande de produits manufacturés. Cette croissance laisserait trop peu d'opportunités de développement aux industries de ces pays qui souffrent de l'étroitesse de leur marché intérieur. La demande mondiale de services et la faiblesse de la demande intérieure seraient les causes de cette désindustrialisation. Cependant, selon d'autres auteurs Loungani et al., (2017), si les pays d'Afrique subsaharienne se désindustrialisent, ils devraient tout de même pouvoir bénéficier d'opportunités de développement à travers le secteur des services, qui serait une nouvelle voie de développement sans usine (Ghani et O'Connell, 2016 ; Dihel et Goswami, 2016). Ainsi, le chapitre 3 de cette thèse s'inscrit dans le cadre de cette controverse. Il teste l'impact des différentes demandes (mondiales et domestiques) sur le changement structurel et l'industrialisation, ainsi que l'impact des différents secteurs sur la croissance. Il est utilisé un échantillon de 57 pays en développement (Asie, ASS et Amérique latine) dans un modèle de données de panel sur la période allant de 1984 à 2017. L'estimateur Hausman-Taylor est ici utilisé. Les résultats montrent que les pays d'Afrique subsaharienne souffrent d'une désindustrialisation prématurée qui est enracinée dans les mécanismes de demande et non seulement dans les mécanismes d'offre. De plus, le secteur des services génère peu d'effets d'entraînement sur le revenu des pays de l'ASS, qui restent très spécialisés dans les services à faible intensité de connaissances.

**Mots clés : Pays en développement, Afrique sub-Saharienne, Changement structurel, Croissance, qualité des institutions, Insertion internationale, demande mondiale**

## Summary

*"Institutions are the human made constraints that structure political, economic and social interactions."* North (1991). According to Levchenko (2007), the term "institutions" refers to a wide range of structures that influence economic outcomes such as contract enforcement, property law, etc... Referring to the literature on institutions, he indicates that institutions play an important role in economic performance. In terms of structural change, different patterns of structural change have been observed in both old and new industrialized countries (FIC, NIC). Given the importance attached to the study of institutional variables in the various economic studies, the question was posed intuitively to understand *the role of the institutional variable in these different models of structural change*.

Thus, in Chapter 1, we investigate the probably non-linear relationship between institutional quality and structural change, specifically by considering one of the different classifications of institutions presented by Kunčič (2014). According to this classification, we show which types of institutions (political, legal and economic) are most important in the process of structural change. To investigate this relationship, we use the International Country Risk Guide (ICRG) database from Political Risk Service Group (PRS) to obtain proxy variables for institutional quality for 103 countries from 1984 to 2018. We first use the technique of principal component analysis (PCA), followed by hierarchical ascending classification (HAC) to explore our dataset. This approach enables us to obtain a picture of groups of countries with poor institutional quality (low rating) and those with good institutional quality (high rating). Secondly, we empirically investigate the relationship using a threshold panel model for both groups of countries. Our main findings are that legal, economic, and political institutions have significant effects on structural change. However, these effects differ according to the level of institutional thresholds. We find that the quality of institutions only affects the process of structural change when these threshold levels are reached.

In considering international integration in Chapter 2, we note that international integration is generally considered in terms of its impact on a country's growth and/or development. We therefore examine the relationship between openness and structural change, considering the notion of institutional threshold. Based on a sample of 98 countries between 1984 and 2018, using a System GMM, our study shows that institutional quality is important in explaining the relationship between openness and structural change. However, its importance is only relevant when countries reach a certain threshold of institutional quality (around 5 in terms of average level of twelve ICRG indicators). Furthermore, when we consider the degree of institutional

similarity of the countries in our sample with the USA, China and the EU countries in particular, our study shows a negative and significant impact of different institutions in relation to the USA, the EU and China. This again underlines the importance of institutional similarities in trade flows.

However, the deindustrialization process observed in Sub-Saharan African (SSA) countries is premature, according to some authors such as Rodrik (2013, 2016). This means that the period of industrialization was too short, with too little job creation and growth to guarantee a development trajectory. For these authors, the consequences for development are necessarily negative. However, in this thesis, the economic causes considered are the global demand for services, which is growing faster than demand for manufactured goods, the quality of institutions and trade openness. This growth would leave too few development opportunities for the industries of these countries, which suffer from the narrowness of their domestic markets. Global demand for services and weak domestic demand are said to be the causes of this deindustrialization. However, according to other authors (Loungani et al. 2017), if the countries of Sub-Saharan Africa are deindustrializing, they should still be able to benefit from development opportunities through the services sector, which would be a new development path without factories (Ghani and O'Connell, 2016; Dihel and Goswami, 2016). Thus, chapter 3 of this thesis is part of this controversy. It tests the impact of different (global/domestic) demands on structural change and industrialization, as well as the impact of different sectors on growth. It uses a sample of 57 developing countries (Asia, SSA and Latin America) in a panel data model over the period 1984 to 2017. The Hausman-Taylor estimator is used here. The results show that Sub-Saharan African countries are suffering from premature deindustrialization, which is rooted in demand mechanisms and not just supply mechanisms. What is more, the service sector has little knock-on effect on income in SSA countries, which remain highly specialized in low-knowledge-intensive services.

**Keywords: Developing countries, Sub-Saharan Africa, Structural change, Growth, Institutional quality, international integration, Global demand**

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## Acknowledgments

This work would not have been completed without the help of several people. Thus, I would like to thank all those who have contributed to the realization of this thesis. Special thanks to my father.

I would also like to thank my thesis supervisor Dalila CHENAF-NICET for her guidance, kindness, and support over the years.

I also thank my parents (Décius and Ivena ASSE) for their support during this long journey, my brother, and sisters. My thanks also go to my second family (GDM Ambarès, ACNA).

I would also like to thank my fellow doctoral students, in particular Edem ASSOGBAVI, and the professors and staff of the BSE laboratory, in particular Dephine LAHET, Eric ROUGIER and Anne Gael VAUBOURG, for their advice and support. I also thank the staff at UNU-Wider for their support and assistance during my stay as a visiting PhD Fellow, especially my mentor Abrams TAGEM.

I would also like to thank Alhonita YATIE, Amara ZONGO, Arnousse BEAULIERE, Rose Camille VINCENT, Yakub Bangane BLIMPO, Myriam and Emmanuel AIRAULT, my friends (Alloua, Christa, Rose-Bilenda, Bernadette, Hector, Kesnel, Ignace, Junior, Nadine, Nathalie, Nerlande, Schamaelle and Guichna) and all those who have contributed to the realization of this work.

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## General introduction

*Structural change, or structural transformation*<sup>1</sup>, is defined in economic literature as the decline in the agricultural sector's share of the country's production or employment, in favor of an increase in the share of the manufacturing sector, which is a component of the industrial sector. At the end of the process, there is an increase in the service sector (Kuznets, 1973).

This definition refers to the fact that a country in its development phase reallocates its factors of production from low-productivity sectors (such as agriculture) to higher-productivity sectors. Herrendorf et al. (2014) give a broader definition of structural transformation. They see it as a reallocation of economic activities between the three sectors of the economy (agriculture, manufacturing, and services). We note that they use the term manufacturing instead of industry to follow the existing literature on the subject.

However, this transformation process does not just happen. The literature suggests that there are many forces driving structural change. These forces are generally presented through two channels: *supply-side channels and demand-side channels*. Under the first channel, technological progress, and factor productivity (Świącki, 2017) or trade openness (Matsuyama, 1992; Imbs and Wacziarg, 2003; Hausmann et al., 2007) are drivers of structural change. For the second, the magnitude of income elasticities (Chenery and Syrquin, 1975; Murphy et al., 1989; Kongsamut et al., 2001) or non-homothetic preferences (Foellmi and Zweimüller, 2008 ; Van Neuss, 2017) can explain the process of structural change.

Among supply factors, some authors emphasize the quality of institutions. According to North (1991), institutions are "*the rules of the game developed by individuals to reduce uncertainty and transaction costs.*" They are made up of *formal and informal constraints*, as well as the characteristics of their application.

For a long time, most studies have focused solely on the relationship between institutions and growth, or between growth and structural change, without considering the latter's institutional conditions. We are not suggesting that certain institutional conditions are the sine qua non for a country to undergo structural change. We do believe that they are one of the important elements to be considered in the context of structural change. Their importance has become such that researchers have begun to incorporate institutional variables to study their impact on structural change (Bah, 2009; Constantine, 2017; Benhamouche, 2018).

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<sup>1</sup> Interchangeable terms according to Herrendorf et al. (2014).

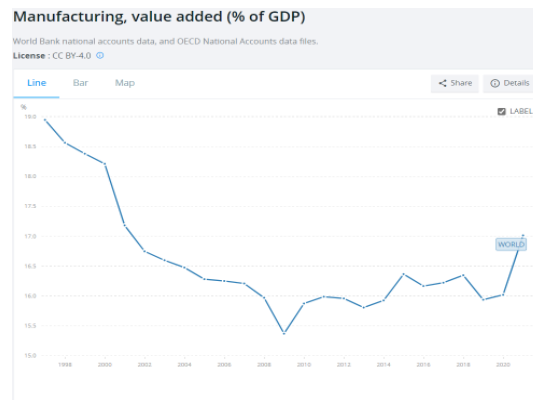
Indeed, in her speech at the 2017 African Economic Conference on "Making Governance Works for Structural Transformation", Vera Songwe, former Executive Secretary of the Economic Commission for Africa, said, *"Good governance and effective institutions are prerequisites for achieving structural transformation, on the one hand. On the other hand, structural transformation can have a disruptive effect on governance by, for example, fostering the emergence of interest groups that advocate responsible leadership and effective institutions"*. In her view, governance and structural transformation are inextricably linked.

Researchers such as Cadot et al. (2016), who have studied the causes of industrialization inhibition, consider uncertainties in the business environment and poor governance to be crucial. Gelb et al. (2014) go further, considering corruption, regulation, security, contract enforcement and political instability as obstacles to industrialization.

Over the past 15 years, Sub-Saharan Africa has enjoyed a period of growth. According to some authors, structural adjustments are beginning to bear fruit. However, it is striking to note that the share of value added is shifting firstly from agriculture to services and, to a lesser extent, to manufacturing. In recent years, manufacturing's share of production has even declined (the value added of the global manufacturing sector in relation to GDP was 19% in 1997 and 16% in 2020, and the industrial sector, which includes manufacturing, has also fallen, from 32% in 1991 to 26% in 2020 (see figure 1). In figure 2, which shows the evolution of the different sectors of the economy in Sub-Saharan Africa, manufacturing industry represents the smallest share. Some researchers are therefore wondering how the reallocation of factors in these economies can differ from that experienced by countries such as Germany, the USA or China during their development phase. They wonder about the role of institutions in this differentiated evolution of structural change.

The study of the importance of the institutional factor in this thesis will be completed by also considering the demand for services and the trade openness of countries as factors influencing the process of structural change.

Figure 1: Global manufacturing industry trends.



Source: World Bank

Figure 2: Evolution of economic sectors for Sub-Saharan African countries



Source: World Bank

The central questions of this thesis will be to determine whether:

- The quality of institutions affects the dynamics of structural transformation in developing countries. If so, which institutional components are most important for structural change (political, legal, or economic institutions)? Is there a threshold above which these institutions have an impact on structural change? (Chapter 1).
- Trade openness impacts structural change by considering the quality and similarity of institutions (Chapter 2).
- Demand (domestic and external) can play a role in the deindustrialization of countries. As most countries turn to the service sector, could this represent the new path to development? (Chapter 3).

To investigate these links between institutional quality, openness, demand, and structural change, we propose the following hypotheses:

*H1: The quality of institutions has an effective impact on structural change. Certain components of institutions linked to political, legal, or economic conditions have an impact on structural change.*

*H2: There is a threshold above which institutional conditions have an impact on structural change.*

*H3: Trade openness has a greater impact on structural change, but in terms of institutional quality.*

*H4: Countries whose institutional quality is lower than that of developed countries with better institutions will see their institutions have a negative impact on the process of structural change.*

*H5: Demand plays an important role in the process of structural change.*

*H6: The service sector is not a key growth driver.*

This work is then organized around three main chapters. The first will highlight the relationship between institutional quality and structural change. Then, in the second chapter, we will make the link between economic integration and structural change by integrating into the analysis the quality of institutions and the concept of institutional similarity. Finally, the relationship between demand and the deindustrialization process will be examined in the last chapter. At the end, a general conclusion will be presented. However, as regards the literature review on our theme of structural change, and to avoid repetition in each chapter, we propose a

preliminary chapter which will present the literature on structural change as well as that on the three main determinants studied in this thesis. This chapter will clarify the concepts used.



## INTRODUCTORY CHAPTER - STRUCTURAL CHANGE, THE STATE OF THE ART

*"Structural change has long been an important concept in development economics" Islam  
and Iversen (2018).*

This thesis focuses on structural change in developing countries, particularly in Sub-Saharan Africa (SSA). The aim is to understand, in the context of a developing economy, how the process of structural change remains at the heart of growth processes, and what the conditions for this change are.

In each of the three chapters of this thesis, we examine different conditions for change: *the quality of institutions*, *the role of demand* and *openness to globalization*. In this chapter, however, we feel it is essential to propose advanced conceptual work to define this mechanism, which is sometimes difficult to present in the literature: *structural change*.

We will see here that concepts are fluid and that the term is used differently in empirical and theoretical work. There is no single, stabilized definition. We propose here to review these approaches, definitions, and measures of structural change to clarify those we will use later in our work. These choices will be maintained throughout the three chapters. This chapter begins by presenting the foundations of structural change and the analytical framework we will be using in this work.

## I) Overview of analyses of structural change

To shed some light, we will explain why it is important to study structural change, the different meanings of the term, then how it is measured, as well as the different models for analyzing structural change. Finally, we will note some of the relevant determinants of this change.

### I.A) The importance of structural change in the development process

This section aims to highlight the various economic variables with which structural change has an important link, such as growth, economic development, or sustainable development.

#### a) *Structural change and growth: two inseparable concepts*

For Syrquin (1988) or Kelbore (2015), the main reason for studying structural change is that it lies at the heart of the *modern economic growth* process. It is important for growth and in the construction of theories on the development process." (Syrquin, 1988). Monga and Standaert (2019), meanwhile stress that structural change is the basis or foundation of sustained economic growth. Aligned with Lin and Monga (2013), indicate the importance of structural change in growth by noting that it is not often that a country moves from low-income to high-income status without a structural transformation. The latter implies a shift from a resource-based or

agricultural economy to the development of an industrial or service economy. While, for Krüger (2008), the term structural change is neglected in economic research, it remains important in growth theory, cycle theory, labor market theory and political economy.

For his part, Kuznets (1973) considers structural transformation to be one of the six main characteristics of modern economic growth. Whereas for Haraguchi (2015), economic growth is also associated with changes in economic structure.

Arandjelović et al., (2013), who analyze the link between structural change and growth, explain that growth theories attach importance to structural change because it accelerates growth. They recall the work of Kuznets (1971), who argued that structural change is necessary because without it, growth is impossible. In contrast, Nixon (1990) argues that economic growth always involves structural change.

Numerous studies have therefore focused on the relationship between structural change and growth. For some, structural change is a gas pedal of economic growth, while for others, there is a bi-causal relationship between the two. Whatever the case, for the authors, if structural changes are made in the wrong direction, they can hinder growth.

#### *b) Structural change and economic development*

Bah (2009), with a more global vision, proposes that growth should be one of the themes of economic development, alongside structural change. He stresses the importance of structural transformation in development economics, a point generally made in the literature of the 1960s and 1970s. According to this author, "an important feature of economic development is the process of *structural transformation*, i.e., the reallocation of resources between sectors that accompanies development" (Bah, 2009).

For Kuznets (1969), growth and structural change are interdependent but also complementary: "Structural change emerges as a central feature of the development process and an essential element in accounting for the rate of growth". Behera and Tiwari (2015) adopt the same position, asserting that structural transformation is the defining characteristic of the development process, both cause and effect of economic growth.

Dabla-Norris et al., (2013) focus solely on the importance of structural transformation on economic development, claiming that it is "at the heart of economic development". Islam and Iversen (2018) follow the same line, noting that structural change has come to represent the development paradigm over time. According to Alder et al., (2022), "structural transformation is ultimately a stylized fact of modern economic development". For Sen (2016), structural

transformation is then both a necessary and sufficient condition for economic development, as shown by Herrendorf et al., (2014); McMillan et al., (2014).

However, Martins (2019) sees structural change not only as a feature of economic and social development, but also as a key driver (Kuznets, 1957; Chenery, 1960; Chenery and Taylor, 1968). In their work, they consider not only economic development, but also social development. The same idea is echoed by Nixon (1990), who considers that cultural, economic, social and political phenomena all serve to characterize the development process.

*c) Structural change and sustainable development*

Given the growing importance of the sustainable development theme, it is important to link it to structural change. Sipilova (2021) confirms this, noting that sustainable economic development requires structural change. For this, we refer to the work of Islam and Iversen (2018), the few authors at the time to have developed this theme. They point out that the search for transformative change to ensure sustainable development is an old topic. For them, it dates to 1970, when societies began to consider the cumulative effects of human activities on the planet and the limits of the process. However, with the limited success of the Millennium Development Goals (MDGs) leaving many unsatisfied, some felt the need to give environmental concerns a more prominent place on the development agenda. This need came to fruition with the formulation and adoption of the "Agenda 2030" and its seventeen Sustainable Development Goals (SDGs). The "Agenda 2030" declaration calls for the strengthening of the productive capacities of the least developed countries in all sectors, notably through structural transformation. In this agenda, transformative change includes structural change. However, the question raised by Islam and Iversen (2018) is how structural change in the context of the "Agenda 2030" can align with the goal of sustainable development. To answer this question, they refer to the three dimensions of sustainable development as i) economic growth, ii) social development and iii) environmental protection.

i) With regard to the economic growth dimension, they stress the importance of paying greater attention to sectoral diversification and the creation and exploitation of a dynamic comparative advantage. Structural changes must also ensure sustainable economic growth, in order to avoid the "boom-bust" cycle (alternating phases of economic growth and decline).

ii) With regard to social development, they assert that structural changes must involve a greater increase in the share of labor in national income. They also note that the distribution of labor income must be more favorable to the most modest groups of workers.

iii) Finally, environmental protection is the most important consideration in this context. Indeed, if we go back to the time of the industrial revolution, the use of the steam engine is not without effect on environmental degradation. Taking this into account, Islam and Iversen (2018), point out that "evidence shows that while industry generally tends to be more threatening to the environment, other sectors such as agriculture and services also pose a considerable threat to the environment." Consequently, it is impossible to choose a structural change based on agriculture or services to avoid the environmental problem.

However, it is worth noting a few additional works that focus on the links between structural change and sustainable development (Bretschger, 2011; Cyrek and Cyrek. 2021; Sipilova, 2021). Bretschger (2011) argue that structural change is an effective means of promoting both efficiency and sustainable development. While Cyrek and Cyrek (2021), considering highly developed countries within the European Union (EU) confirm that structural changes in the employment sector are conducive to achieving sustainable development goals. Sipilova (2021) goes into more details, highlighting some of the factors of structural change that will lead to the sustainable development of the economy, such as energy efficiency, the introduction of new technologies and the involvement of all stakeholders, and respect for the principles of the circular economy. Technologies are seen as catalysts for structural change towards sustainable development, which in turn will lead to increased efficiency. In addition, they note the importance of the institutional environment and the involvement of all economic players as a prerequisite for sustainability.

*d) Structural change as seen by development theories.*

Our aim here is not to be exhaustive, but simply to recall the main lines of analysis.

To define the concept of development economics, Chenery et al., (1988) refer to Lewis (1984). For them, it is "the study of the economic structure and behavior of poor (or less developed) countries". Based on this definition, Chenery (1988) explains that the two areas of interaction in development economics are macroeconomics and microeconomics. The macroeconomic approach - linked to *economic structure* - analyzes the changes in economic structure that accompany growth. The microeconomic approach focuses on the behavior of individuals, households, institutions, and on the various markets in which they operate. Economic structure is thus defined as the composition of the different components of macroeconomic aggregates, the relative evolution of their size over time and their relationship with circular income flows (Jackson et al., 1990 ; Thakur, 2011).

In development economics, in Chenery's terms, structural change "therefore refers to observed changes in the relative importance of each economic sector." Islam and Iversen (2018) thus assert that the most familiar reference to the concept of structural change in development literature is: "*changes in the sectoral composition of an economy's gross domestic product (GDP)*".

While it is possible to accept that changes in the composition of GDP are often seen as responding to the concept of structural change, different approaches to this concept are possible, depending on whether we are dealing with the notion of "structural" change or that of "structure". For example, Olczyk and Kordalska (2018) argue that the term structural change is generally linked to the concept of structure. However, Syrquin (1988) and Quatraro (2010) acknowledge that, whether we speak of "structural" or "structure" change, neither term has an unequivocal meaning in the field of economics. This point will be addressed in the following paragraph.

#### I.B) Different meanings and measures of the term "structural change

As mentioned, the task of defining and measuring structural change is not an easy one, as the term covers a wide range of definitions and measures. Then, in this section, we present some of the definitions and measures most used in work on structural change.

##### *a) A vague concept*

For authors such as Syrquin (1988) and Quatraro (2010), structure and structural change have different meanings. Syrquin (1988) argues that some meanings are clear or made clear by context; but at the same time, other meanings are vague. Malchup (2020) has therefore proposed a relevant classification. He has classified the use of the terms structure and structural in different contexts according to whether they are rather clear or rather vague. His work offers a broader vision of the concepts of structure and structural change.

Malchup (2020) presents the different definitions that can be used to talk about structure. For example, according to him, the use of the term structure is considered vague when concepts are not well defined, and their meanings are only vaguely specified in the contexts in which they are used. In this case, the author believes that an unsophisticated reader could misinterpret the terms. On the other hand, Malchup's (2020) various definitions encourage us to recognize that the terms (structure and structural change) may have several definitions, but that these definitions, even if clear, may be equivocal.

Consequently, to explain these concepts (structure and structural change), we follow the analytical logic proposed by Quatraro (2010). He uses four approaches: the econometric approach, the industrial organization approach, the localized technological change approach, and the traditional approach.

1) The econometric approach to structure and structural change

Quatraro (2010) and Syrquin (1988) refer to the field of econometric theory to explain the two expressions: structure and structural. Thus, for Syrquin (1988), since an economic model is an abstraction, a simplified illustration of an economy or part of it, the structure of a model in the econometric sense then presents the postulated relationships between the variables and parameters of the equations of the economic model. *The term structure refers to the specificity of the economic model, while the term structural change reflects the model's degree of generality.*

In a similar vein, Quatraro (2010) states that "the question of *structural change* in econometrics refers to the behavior of a model's parameters over time". Referring to the general assumption that, in econometrics, model parameters must be constant over time (the stationarity assumption), he asserts that changes in any of these parameters can be observed at any time during the sample period. Structural breaks thus represent structural change.

2) The industrial organization approach to structure and structural change

For this approach, it is rather the concept of "economic structure" that plays an important role, particularly regarding the Structure-Conduct-Performance (SCP) paradigm developed by Bain (1959). The SCP paradigm is seen as an analytical framework for linking market structure, market conduct (firm behavior) and market performance. For some researchers, SCP is therefore considered the foundation of industrial organization theory and the first step in the analysis of markets and industries.

Caves (1974, 2003) notes that industrial organizations focus on the *structure of markets* and their effect on economic well-being. For Caves (1974, 2003), firm behavior (conduct) is used to describe how sellers present their own strategies and make them consistent with *market structure*. Market performance reflects a normative assessment of resource allocations, which is affected by market conduct subject to the constraints of *market structure*.<sup>2</sup> Similarly, Tan (2016) argues that *market structure* determines firm behavior, which then determines firm

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<sup>2</sup> See Tan (2014,2016)

performance. He points out that only a few factors measure this market structure, such as the number of competitors in an industry, product heterogeneity and entry and exit costs.

3) The localized technological change approach to structure and structural change

In this approach, the term "*structural change*" is used to distinguish changes in the relative price of production factors (such as labor, capital and land) in relation to technological innovations (Quatraro, 2010).

Antonelli (2008) defines localized technological change as a sustainable outcome resulting from the innovative response of companies faced with unexpected changes in their technology. Quatraro (2010) notes that change in relative factors is characterized by *irreversibility* and *bounded rationality*. These two elements can influence the reaction of economic agents, who may adapt or innovate. Innovation is therefore a better option when the transition from adaptation to innovation is costly. For example, Antonelli (2008) argues that firms have an incentive to change technology when market conditions for products and factors are not compatible with their expectations, and when irreversible choices make adjustment costly.

4) The traditional perspective of structure and structural change

Finally, in the traditional perspective, *structural change* refers to "changes observed in the sectoral composition of countries and regions during the process of economic development". For this traditional approach to structural change, Quatraro (2010) refers to the work of Kuznets (1930) and Burns (1934). These two authors empirically analyzed the rise, growth and decline of the industrial sector and the change linked to the main sources of industrial leadership in different countries. Chenery (1988) develops the same analytical logic in the Handbook of development economics. In this work, he notes that the use of the term structure in development and economic history generally refers to the relative importance of sectors in the economy in terms of production and factor uses.

Among the authors who have developed approaches in terms of the "relative importance of sectors", we find Streissler (1982)'s definition of *structural change*. He presents structural change as "the long-term change in the composition of the economic aggregate". On this basis, Haraguchi and Rezonja (2011) developed a definition and asserted that structural change "refers to long-term changes in the composition of an aggregate". For them, this is attributable to changes in the relative importance of sectors in the economy, changes in the location of economic activity (urbanization), and other concomitant aspects of industrialization which, taken together, are called structural transformation."



Bhatta (2014) completes the definition of structural change by noting that economic structural change is often seen as a definitive shift in the fundamental structure of an economy, from an agrarian to an industrial or service economy.

It is the same idea for Islam and Iversen (2018), for whom structural change is "change in the sectoral composition of an economy's gross domestic product (GDP)". However, for Islam and Iversen (2018), the terms structural change and structural transformation are interchangeable. The same is true for other authors, such as Herrendorf *et al.*, (2014). Therefore, for the sake of completeness, we will also consider definitions of *structural transformation* in our research.

For Herrendorf *et al.*, (2014), structural transformation is "the reallocation of economic activity in three major sectors (agriculture, manufacturing and services) that accompanies the process of modern economic growth". The same applies to Dabla-Norris *et al.*, (2013), who associate structural transformation with the reallocation of economic activity from low-productivity to high-productivity activities and sectors.

Timmer *et al.*, (2012), Jha and Afrin (2017) have also provided a broader definition of what structural transformation can be. They defined structural transformation as a process whereby: **i)** Agriculture's share of GDP (related to the work of Kuznets and Chenery) and employment (related to the work of Fisher and Clark) declines over time. **ii)** There is an increase in migration because people move from rural to urban areas (related to the work of Lewis). **iii)** Agriculture and the rural-based economy are replaced by an industrial and urban-based economy. **iv)** A demographic transformation whereby high birth and death rates are replaced by low birth and death rates. In Chenery's (1988) work, we find the same elements, but he adds increases in the rate of accumulation and changes in income distribution.

Nevertheless, Syrquin (1988) distinguishes between structural change and structural transformation. For him, "*structural change*" is a modification of the relative importance of sectors of the economy in terms of production and factor uses. But *structural transformation* refers to all the processes dependent on structural change that accompany economic development" (Syrquin,1988). For Chenery (1988), "*structural transformation*" is also a set of structural changes (industrialization, migration, urbanization, and changes in comparative advantages) which are considered essential to economic growth.

In this thesis (Chapter 1, Chapter 2 and Chapter 3), we will use structural change and structural transformation interchangeably. We will refer to the traditional approach to structural change and the definition of Herrendorf *et al.*, (2014), considering the three-sector hypothesis:

"The reallocation of economic activity into three main sectors (agriculture, manufacturing and services) that accompanies the process of modern economic growth.

*b) Measures of structural change*

As mentioned above, the terms "structural change" and "structural transformation" can have different meanings. The same is true when it comes to measuring them. According to Herrendorf et al., (2014), there are three most common measures of economic activity at sector level: *employment, value added and the share of final consumption expenditure*.

Raiser *et al.*, (2004), along with many other authors, use the share of employment in agriculture, industry, and services (business and non-business) to measure structural change in transition economies. However, Van Neuss (2017) notes that to measure employment, there are two widely used indicators: the total number of workers or the total number of hours worked. He points out that these two indicators can give different results, not least because the "total number of workers" is a less precise measure.

Similarly, the value added used by Herrendorf et al., (2014) and Van Neuss (2017), for example, may be presented in nominal terms (current prices) or in real terms (constant prices), which can also lead to different results in the estimates.

Herrendorf et al., (2014) note that in many works, the three measures (share of employment, share of value added and share of final consumption expenditure) are often used interchangeably. Yet, for them, these measures need to be distinguished because the first two are linked to production and the last to consumption. The arguments they use to underline these differences between production and consumption are that the two can behave differently, and that value added is not the same thing as final output. In addition, they point out that there may be different information between the two production-related measures. They cite the study by Kuznets (1969), which shows that in the case of the US economy, the share of employment in services increased during the take-off period, while the share of value added in services remained constant. Dietrich (2009), in a study of seven OECD economies (France, Germany, Italy, Japan, the Netherlands, the United Kingdom and the United States of America) between 1960 and 2014, shows that empirically there is a difference between the results obtained on the employment share (sectoral employment) and those obtained on the value-added share (sectoral real value added). However, Herrendorf et al., (2014) explain that each of these three measures has its own limitations, and none is perfect.<sup>3</sup> If ratio measures have limitations, indices face the same criticism.

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<sup>3</sup> For more details, see Herrendorf et al., (2014).

Cortuk and Singh (2015) and Dietrich (2009) indicate that there are two different indices for measuring structural change, namely the Norm of Absolute Values (NAV) index, also known as Michaely's index (Michaely, 1962) or Stoikov's index (Stoikov, 1966), and the Modified Lilien Index (MLI)<sup>4</sup>. They propose using these indices to measure structural change (NAV and MLI) because they capture the speed of change measured either in terms of employment shares or real value-added shares. These indices also summarize the changes observed in the sectoral composition of an economy between two periods in time.

To calculate change, Dietrich (2009) uses the NAV, which is considered the most famous and probably also the simplest measure of structural change. He suggests first calculating the differences in sector shares (noted  $x_i$ ) between two periods "s" and "t"; then sum up the absolute value of these differences. Finally, he divides the sum by two, as all changes are counted twice<sup>5</sup>.

The NAV formula given by Dietrich (2009) is as follows:

$$NAV_{s,t} = 0.5 * \sum_{i=1}^n |x_{[it]} - x_{[is]}|$$

The magnitude of structural change is equal to the share of sectoral movements (agriculture, industry and services) as a percentage of the economy as a whole. The value of the NAV index is between zero and one. When the NAV index is equal to zero, the structure remains unchanged, but if all sectors have changed, the index is equal to one. This means that the economy has changed radically.

The second index presented by Dietrich (2009) is the MLI. Ansari *et al.*, (2014) present the LI in detail, from which the MLI is derived. They indicate that the Lilien index is:

- An important measure of structural change in many areas of economic research, particularly when used as a measure of structural change to determine the share of structural unemployment. Indirectly, it represents the extent to which labor demand is affected by changes in the productive structure. When LI is equal to zero, this means that there have been no structural changes over the period.
- Important for calculating the speed of structural change. It is assumed that the higher the value of the indicator, the faster the structural change and the greater the reallocation

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<sup>4</sup> (Stamer, 1998)

<sup>5</sup> He thus follows Schiavo-Campo (1978), who indicates the method for calculating a simple index. This is equal to the sum of the absolute values of the percentage variations of each sub-group in the category under consideration, divided by two to avoid problems of double counting.

of jobs between sectors. This index therefore gives an indication of an economy's ability to respond flexibly and rapidly to changes in aggregate demand.

However, while Ansari *et al.*, (2014) or Stamer (1998) see advantages in the LI index, they also point out its weaknesses. Indeed, Stamer (1998) argues, like Dietrich (2009), that any indicator of structural change should ideally satisfy five conditions:

- The index should take the value 0 if there are no structural changes during a period.
- The structural change between two periods must be independent of the time sequence.
- The structural change within a period must be less than or equal to the structural change between two sub-periods.
- The index should be a measure of dispersion.
- The index must take into account the weight (size) of the sectors.

Stamer (1998) has therefore shown that the LI index does not satisfy all five conditions (in particular, conditions 2 and 3). He therefore proposed an alternative solution to the problem, using the MLI index, which meets all the required conditions. To construct the MLI index, the LI index was improved by weighting it by the share of the sectors in the two periods. In this way, the influence of sector *i* increases in proportion to its size and relative growth in value. Both the LI and MLI indices use the same formulas. However, the only difference lies in the calculation of the value of  $s_{irt}$  which is the share of employment in sector *i* in the regional total in period *t*.<sup>6</sup>

The formulas presented by Ansari *et al.*, (2014) are:

$$LI = \sqrt{\sum (s_{irt}) \times \{\ln(x_{irt}/x_{irt-1}) - \ln(X_{rt}/X_{rt-1})\}^2}$$

$$MLI = \sqrt{\sum (S_{irt}) \times \{\ln(x_{irt}/x_{irt-1}) - \ln(X_{rt}/X_{rt-1})\}^2}$$

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<sup>6</sup> See Ansari *et al.*, (2014)

Table 1 below summarizes the difference between the two indices.

Table 1 : Differences between MLI and LI indices

LI index	MLI Index
$s_{irt}$ : the share of employment in sector i in the regional total at period t. $s_{irt} = x_{irt}/X_{rt}$	$S_{irt}$ : average share of employment in sector i in the regional total between t and t-1. $S_{irt} = \text{avg\_} x_{irt}/X_{rt}$
$x_{irt}$ employment in sector i in region r.	$\text{avg\_} x_{irt}$ is the average regional share of sector i in regional employment over period t, or the average sectoral employment in region r over period t.
$X_{rt}$ The region as a whole.	$X_{rt}$ The region as a whole.
$\ln(x_{irt}/x_{irt-1})$ employment growth in sector i in period t.	$\ln(x_{irt}/x_{irt-1})$ employment growth in sector i in period t.
$\ln(X_{rt}/X_{rt-1})$ employment growth in the region in period t.	$\ln(X_{rt}/X_{rt-1})$ employment growth in the region in period t.

Source: reprinted by the author based on work by Ansari et al., (2014)

Regarding the absolute value index standard, Vu (2017) notes that the method has its own limitations, as it is only an elementary measure of the overall magnitude of structural change. Nevertheless, it does not indicate whether the observed structural change is the cause of the increase or decrease in productivity. He points out that both measures are commonly used to study the pace of structural change and its effects on economic growth. Based on these limitations, Vu (2017) suggests using the Effective Structural Change (ESC) index as an alternative to overcome these limitations, as it combines the strengths of the labor productivity decomposition method with those of the NAV. This index is constructed based on two existing approaches, namely the shift-share method and the absolute value norm index. Vu (2017) uses the shift-share method to study the role of structural changes in labor productivity growth within an economy. This method decomposes labor productivity growth according to the role played by technological progress and structural change.<sup>7</sup> The formula for calculating the ESC index is as follows:

<sup>7</sup> For more details on the methods, see Vu (2017).

$$ESC = 0.5 * \sum_{i \in X} |S_{iT} - S_{i0}| \quad X = \{i\} \text{ such that } C_i > 0$$

$S_{i0}$  and  $S_{iT}$  respectively represent the share of employment in sector  $i$  at times 0 and  $T$ .

$n$ : represents the number of sectors in the economy.

$X$  is the set of sectors  $i$  such that  $C_i > 0$

$C_i$  sector  $i$ 's total contribution to productivity growth in the economy as a whole.

In his work, Vu (2017) studies the effects of structural change on economic growth. He therefore uses the ESC index, dividing it into two parts:  $ESC_{i,t-1}$  and  $\Delta ESC_{i,t}$  with  $ESC_{i,t-1}$  which refers to the lagged value of the index.  $\Delta ESC_{i,t}$  is the variation in actual structural change observed between year  $t-1$  and year  $t$ . When the ESC variation ( $\Delta ESC_{i,t}$ ) is positive, it means an acceleration in effective structural change, and when it is negative, it means a deceleration.

Havlik (2015), which studies the extent and impact of structural change on overall economic growth in the new EU member states (Hungary, Poland, Slovenia, Slovakia, Lithuania, Latvia, Estonia, Czech Republic, Romania, and Bulgaria), uses the structural change indicator called  $S^*$  to measure overall changes in sectoral changes (structural change). The formula for calculating this indicator is as follows:

$$S^* = \sqrt{\sum_k (sh_k^{t_2} - sh_k^{t_1}) \cdot (sh_k^{t_1} / 100)}$$

Where  $k$  is the sector (at NACE rev.1 or NACE rev.2 level).

$sh_k$  is the  $k$  sector's share of total production or employment (in %).

$t_i$  is the time index, where  $i$  refers to the different years.

These results are not conclusive, as it has not been possible to clearly demonstrate what explains the speed of structural change. According to Havlik (2015), this could be explained to some extent by differences in data availability, or by differences in the phases of structural adjustment in different countries, or finally by differences in the speed of restructuring.<sup>8</sup>

However, Chenaf-Nicet (2018) points out that structural change is a dynamic process, measured over the long term. Next, she notes that when we use the share of value added of a given sector such as manufacturing value added, this value simply indicates a country's level of industrialization at a given period. In addition, to consider the process of structural change, she proposes the use of an indicator called SC (structural change). Its formula is given by:

$$SC = MVA_t / MVA_0$$

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<sup>8</sup> For more details, see Havlik (2015).

The ratio is a calculation between value added in the manufacturing sector for period  $t$  ( $MVA_t$ ) and the value added in the initial period ( $MVA_0$ ).

Chenaf-Nicet (2018) considers the manufacturing sector, as she wishes to study only the industrialization process. Nevertheless, it is possible to do the same for each sector (agriculture, industry and services) in order to capture their evolution. To justify her choice of the  $SC$ , she notes that its advantages are that it is easy to calculate and allows us to consider the evolution of the production structure over a period. At the same time, she argues that the indicator is easy to interpret. Indeed, when the ratio increases over the whole period for developing countries, this means that there is a structural change (industrialization); on the contrary, if it decreases, there is either reprimarization (growth of the agricultural sector) or deindustrialization (growth of the service sector).

Temple and Wößmann (2006) use a more elaborate measure to assess the extent of structural change. They refer to the basic measures of employment share and nominal value added. But, at the same time, they also use the "propensity to migrate", which is thus defined as follows:  $= -\Delta a/a$  where  $a$  is the share of agricultural employment in total employment. For them, this migration propensity refers to the proportions of agricultural workers who migrate during a given period. They assume that this propensity depends on wage differences in the two sectors (agricultural and non-agricultural). Nevertheless, they also consider the ratio of the average product of labor in the two sectors to take account of the change in sectoral structure. The average product of labor productivity is thus defined as follows:

$$RLP = \frac{q Y_m / L_m}{Y_a / L_a} = \frac{(1 - s)}{s} \frac{(a)}{(1 - a)}$$

Where  $q$  is the relative price of the modern sector and  $Y_a$  and  $Y_m$  are respectively the quantities produced in the agricultural and non-agricultural sectors.  $L_a$  and  $L_m$  are respectively the labor variable for the agricultural and non-agricultural sectors, " $a$ " is taken as the share of agriculture in total employment and " $s$ " is the share of agriculture in total value added.

They refer to the work of Temple (2005) to justify their indicator, pointing out that differences between average outputs will generally be a feature of efficient allocation if output is maximized by equalizing marginal rather than average outputs.

However, Temple and Wößmann (2006), Parente *et al.*, (2000) and Schmitt (1989) criticize the use of the  $RLP$ . For example, Temple and Wößmann (2006) note the weakness of the measure  $RLP$  and point out that a substantial proportion of agricultural production is not measured in the national accounts of the poorest countries, and that urban labor is on average more skilled. Furthermore, Schmitt (1989) points out that part of the agricultural workforce is

assigned to non-agricultural activities. He therefore highlights the risk of misinterpreting the measure *RLP* as the relative productivity of non-agricultural workers may be overestimated.

Regarding measures focusing mainly on domestic aspects, we can also mention the work of Moore (1978). His approach is based on the observation that structural change can only take place if there are differences in growth rates between the different elements of the production set. Moore refers to the use of two elements:

- The (weighted) average of the ratios between the growth rates of the various sectors and the average growth rate of the economy (Roman, 1969).
- The standard deviation of the (unweighted) growth rates of the individual components of the production vector. (Kovac and Madzar, 1970; Korosic, 1970).

Finally, about international aspects, we can mention authors such as Badibanga *et al.*, (2009). They use the Center of Gravity Density (CGD) metric: "The CGD value is high when a country has a diversified export basket surrounded by many new goods, and low for a country whose export basket is less diversified".

Between the measures indicated above, we opt in this thesis for the use of the share of value added, which will enable us to respect the three-sector hypothesis and facilitate our empirical study, as this type of data is always available.

### I.C) Structural change models

We have already indicated that structural change has different meanings and measures. The same is true when it comes to presenting analytical models of structural change. Here, we present various models of structural change developed in the literature.

#### *a) Key production sectors in the analysis*

Talking about models of structural change allows us to introduce the two and three-sector hypothesis developed in the literature by Kuznets (1955, 1969). To present this hypothesis, we can refer to Krüger (2008)'s study. In his work, he identifies all the sector classifications by referring to the analyses of various authors. He begins with Fisher (1939), who classifies sectors according to a hierarchy of needs. The classification is as follows: *goods for basic needs* to designate the primary sector, *standardized products* for the secondary sector, including manufactured goods, and *new products* linked to the tertiary sector. Fisher (1952) associates these three sectors with their income elasticity of demand. He uses Engel's law, which links as Islam and Iversen (2018) note: "The share of income devoted by a person to food (agricultural



products, in general), decreases as the level of income increases, while the share of income devoted to manufactured products increases (Islam and Iversen, 2018).

Lewis (1954) is another author who has worked on the two-sector hypothesis. In Lewis (1954)'s model, the two sectors considered are the traditional sector (agriculture in rural areas) and the modern sector (industry in urban areas) (Syrquin, 1988). For other authors, such as Bourguignon and Morrisson (1998), the two sectors are simply the agricultural and non-agricultural sectors.

Krüger (2008) also refers to Clark (1967), who classifies sectors according to their common characteristics. He classifies agriculture, forestry and fishing in the *primary sector*, all goods-producing and goods-processing industries in the *secondary sector*, and other industries (such as construction, transport, communication, finance, public administration, and personal services) in the *tertiary sector*. Krüger (2008) also refers to the work of Wolfe (1955), who groups together industries with the same dominant factor of production that favors their growth. Thus, he notes that there are industries based mainly on natural growth factors (primary sector), industries based mainly on mechanical growth factors (secondary sector) and industries based more on human skills (tertiary sector).

Another classification is made by Fourastié (1949, 1969) based on technical progress, which is measured by the growth rate of labor productivity (Krüger, 2008). In this classification, Fourastié (1949) notes the existence of three rates of technological progress: an average rate of technological progress (for the primary sector), a relatively high rate of technological progress (for the secondary sector) and finally a relatively low rate of technological progress (for the tertiary sector). Today, all economic activities are classified by ISIC (International Standard Industrial Classification). This is ISIC rev4 was published in 2008 (see Annex I-1).

It should also be noted that for some authors, the term "structural change" refers essentially to the industrialization process. For example, Syrquin (1988) explains that industrialization is the central process of structural change. Arandjelović *et al.*, (2013) note that industrialization refers to structural changes in a country that is moving from an agricultural to an industrial economy, with certain repercussions on the social system. According to these authors, this development phenomenon has led many economists to assert that the industrial sector is an engine of economic growth.

Nixson (1990) states that "industrialization promotes a number of changes in economic structure, including: an increase in the relative importance of manufacturing; a change in the composition of industrial production; and changes in production techniques and sources of supply for industrial products".

In most publications, we find that the terms structural change and industrialization are used interchangeably. However, in the literature on structural change, it is recognized that structural change occurs when the industrial sector, and more specifically the manufacturing sector, undergoes a certain evolution. Indeed, it was this change in the productive structure of formerly industrialized countries such as England, the United States of America and France that led to industrialization being associated with a process of growth. This idea persists today.

Given the importance of industrialization in the literature, this thesis will pay particular attention to this issue, notably the various reasons why developing countries have experienced a different trajectory of structural change from that of former industrialized countries (FICs) or even newly industrialized countries (NICs). Nevertheless, Arandelović *et al.*, (2013) acknowledge that the global economic game has changed and that the tertiarization process has become a key element of structural change. This point will be discussed in Chapter 3, where we will address the issue of low growth in developing countries.

*b) The various stages of structural change leading to development.*

Nixson (1990) notes that Kuznets was one of the first economists to draw attention to the observed trajectories of structural change that occur when a country's per capita income rises based on data from many developed economies, Kuznets (1961) indicates that the pattern (which induces take-off) is characterized by:

- A steady decline in agriculture's share of the national product.
- A steady increase in the industrial sector's share of the national product.
- There is no clear trend in the share of the service sector.

Considering the share of the workforce employed in the various sectors, Nixson (1990) thus establishes a link between these stages of structural change:

- Firstly, the proportion of the working population engaged in agriculture has fallen.
- Secondly, in most countries, the proportion of the workforce in the industrial sector has risen, but less sharply than its share of national output.
- Finally, the share of employment in the service sector has risen as a proportion of total employment, with transport and trade seeing the steadiest increase.

In his work, Bah (2009) refers to the structural transformation process described by Kuznets (1971). He notes that Kuznets defines *two phases of* structural transformation. Following the

logic of the three sectors (agriculture, industry, and services), during the first phase (or the beginning of the development process), most resources are allocated to the agricultural sector. Then, as the economy develops, resources are reallocated to industry and services. In the second phase, resources are reallocated from agriculture and industry to services.

Based on these stages, Sen (2019) identified three stylized facts of economic development:

- A drop in agricultural employment.
- Growth, then decline in industrial employment (hump-shaped trend).
- More jobs in the service sector

For him, low-income economies do not follow this model.

For Timmer *et al.*, (2012), four persistent and interdependent processes define the process of structural transformation. Firstly, agriculture's share of GDP and employment is declining, as people migrate from rural to urban areas. This phenomenon is linked to a rapid process of urbanization, the growth of the modern industrial sector and the development of a service economy. Finally, we are witnessing a demographic transition characterized by a decline in the growth rate of births and deaths.

#### *c) Reallocation of factors and drivers of structural change*

Generally, to explain these different stages of structural change, authors refer to per capita income (Kuznets, 1971; Ballance *et al.*, 1982); others consider overall productivity linked to technical change (Ngai and Pissarides, 2007 ; Havlik, 2015) and still others consider the determinants of supply and demand simultaneously (Syrquin, 1975 ; Haraguchi, 2015).

Nixson (1990) states that many works have attempted to identify and quantify the structural changes that occur in an economy as per capita income increase. He obviously focuses on the work of Kuznets, which groups countries according to their per capita income and shows the pattern of structural change as per capita income increases. But he also refers to the work of Ballance *et al.*, (1982) to indicate that the main assumption for studying the normal or standard pattern of industrial growth is that: "industrialization occurs with a sufficient degree of uniformity across countries to produce consistent patterns of change in resource allocation as per capita income increases". The industrial sector is considered here because it is the main sector to be analyzed when observing structural change and growth.

Havlik (2015) chooses to analyze not the industrial sector but its impact on productivity and growth. Following Maddison (1987), he stresses the importance of structural change for growth

and productivity. Thus, Havlik (2015) argues that the model to observe is one that shows that surplus employment in less productive sectors such as agriculture moves to a higher-productivity sector such as industry. In this way, structural change will have an impact on overall economic growth. At the same time, he points out that if the industrial sector shifts from less productive to more productive branches, this is also an important element in improving overall productivity. Thus, structural change occurs not only when less productive sectors are replaced by more productive ones, but also when less productive branches are replaced by more productive ones within the same industry. The same idea can be found in the work of Nixon (1990), who indicates that there is inter-sectoral change (when reference is made to the three-sector hypothesis) and intra-sectoral change (when changes are observed within different industries, and particularly within the manufacturing sector). However, for the model to be valid, labor employment must not be reallocated to the wrong sectors, for example to the least productive industries in the service sector, particularly non-market services. Indeed, in recent studies by Sen (2023), he documents the fact that structurally underdeveloped countries<sup>9</sup> experience a movement of employment from the agricultural sector to the service sector, but non-commercial services do not have the same productivity gains observed in manufacturing industry; however, he does report an increase in manufacturing industry employment over recent periods.

For Nixon (1990), the factors that definitively enable the transition from the traditional to the developed economy (including growth in per capita income) are the following:

- The changing composition of consumer demand as per capita income rises. This is identified by the declining share of food products and the increasing share of manufactured goods in consumer spending.
- Accumulation of capital (physical and human) with a higher growth rate, leading to an increase in per capita production.
- Access to the same technology for all countries; access to international trade and capital flows.

Concisely, he defines all these factors as determinants of structural change. Indeed, Nixon (1990) notes that accumulation variables (labor and capital), resource allocation, demographic and distribution processes are determinants of structural transformation (see Syrquin, 1975).<sup>10</sup>

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<sup>9</sup> In other words, where the share of employment in agriculture represents around 51% or more (Sen, 2023).

<sup>10</sup> Nixon (1990) (referring to the work of Syrquin (1975): The groups of processes are: accumulation processes (investment, government revenue and education); resource allocation processes (domestic demand structure, production, and trade), demographic and distribution processes (labor allocation, urbanization, demographic transition and income distribution).

In a more specific analysis of the resource allocation process, Nixon (1990) points out that as the level of per capita income rises, there are systematic changes in the sectoral composition of domestic demand, international trade, and production. For him, changes in international trade are linked to the size of the economy and the endowment of natural resources.

Haraguchi (2015) reinforces this view. He argues that structural changes, particularly in the manufacturing sector, are linked to changes in supply and demand that are associated with income levels, the country's geographical and demographic conditions, and the conditions created by the country itself. To explain the elements behind the changes, Haraguchi (2015) refers to numerous works such as those by:

- Lin (2011), which considers the supply and evolution of endowment factors and per capita income required by the manufacturing sector.

- Pasinetti (1981), who argues that consumer demand influences (increases) the share of the category of goods or services when income rises. This view refers to Engel's law. The lower a country's per capita income, the greater the proportion of income devoted to agricultural products. However, as income rises, demand shifts from agricultural products to manufactured goods. This law indicates that an increase in income modifies the structure of demand, which in turn affects the production structure of the economy.

In addition, Haraguchi (2015) indicates that low-income countries specialize in labor and resource-intensive activities, while higher-income countries focus on capital and technology-intensive industries.

Katz (2000) notes that it is also the geographical and demographic conditions of a country that provide natural advantages or disadvantages for the development of certain industries. The UNIDO (2018)' study indicates that the abundance of natural resources can also have a negative impact on the development of manufacturing industry, while Lin and Chang (2009) indicate that elements such as the country's history, politics and culture must also be taken into account.

In addition, the UNCTAD (2016) report states that the structure of the economy changes continuously as long as there are technological changes.

Although there are many determinants of structural change, Nixon (1990) argues that it is easy to describe the process of structural change. However, it is more difficult to identify and quantify the causes of structural change, considering the complex interactions between income and price elasticities and the growth rate of labor productivity. However, many recent studies have attempted to identify the drivers of structural transformation. In this section, we highlight some of the relevant studies that have attempted to identify these drivers (factors).

Syrquin (1988) classifies certain elements that influence change in the structure of the economy. He notes the transformation of final demand, trade and production, and factor uses in his list. For final demand, he indicates that there is a rapid decline in the consumption of food goods, while the consumption of non-food goods increases. This corresponds to Engel's law hypothesis. Regarding international trade, he asserts that, considering both large and small countries, this is the *most variable element influencing the structure of an economy*. In his view, small countries generally have a relatively high share of trade and capital in gross domestic product (GDP), while the production structure is more concentrated than in large countries. Similarly, he argues that in small countries, the choice of specializations remains based mostly on the availability of natural resources and the development policy choices adopted. For example, Syrquin (1988) points out that changes in the terms of comparative advantage and trade policies have led some countries to shift their trade structure from raw materials extraction to industry. The final variables he considers are production and factor use. As he points out, changes in demand, trade and sectoral productivity growth patterns determine the transformation of production and factor-use structures. By way of illustration, he points out that when income levels rise, the share of non-tradable goods in GDP and employment increases. However, he points out that the normal trend observed during a transformation is a shift in production from primary sectors to manufacturing.

Święcki (2017) or Syrquin (1988) point to similar determinants of structural change, and international trade is considered in the same way by both authors. However, there are some differences in the way the mechanisms are explained. For example, Święcki (2017) refers to Matsuyama (2009) to explain that the same forces (determinants) can have different implications for structural change depending on whether we are in a closed economy or a globalized world (interdependent world). To illustrate this, Matsuyama (2009) uses the example of rapid productivity growth in the manufacturing sector, which would lead to a decline in the share of the manufacturing workforce in a closed economy, but to an expansion of manufacturing employment in an open economy due to specialization based on comparative advantage.

Badibanga *et al.*, (2009) identify drivers of structural transformation such as research and development, which stimulate innovation by facilitating the acquisition of knowledge to improve the quality of industrial products. They also identify economic policies and the impact of institutions.

In a simple way, Van Neuss (2017) takes up the drivers of structural change<sup>11</sup>. He argues that the forces affecting structural change are changes in income, changes in relative (sectoral) prices, changes in input-output or sectoral linkages, and changes in comparative advantage via globalization and international trade. For him, real income effects remain the main determinants of structural change.

For Van Neuss (2017), income effects are the result of a non-homothetic, and therefore demand-related, preference. To argue this point of view, he refers to the work of Foellmi and Zweimüller (2008). He points out that when income rises, the marginal rate of substitution varies from one good to another, allowing a certain reallocation of activity between sectors. When this reallocation occurs, it is to meet the most urgent needs of the population. Foellmi and Zweimüller (2008) note that structural change occurs because Engel curves are not linear. For them, each new good goes through the Engel consumption cycle, i.e., the good first has a high-income elasticity (luxury goods), then a lower income elasticity (necessities). Thus, changes in sectoral composition and the ongoing reallocation of labor between sectors are due to the coexistence of stagnating industries (goods in lower demand) and expanding industries (goods in higher demand). As for the relative effects of sectoral prices, according to Van Neuss (2017), structural change results from sectoral differences in technology. There would therefore be a link between structural change, intersectoral differences in productivity, the intensity of factor uses and their elasticity of substitution.

In this thesis, we will focus on **the weight of institutions** (chapter 1), the **effects of globalization** as determinants of trade (chapter 2) and **demand**, in particular global demand (chapter 3). However, in the empirical estimates, other determinants will be introduced to give them a certain robustness.

## II) The analytical framework of the thesis

In this section, we will focus on the theoretical analysis of the three main drivers of structural change studied in this thesis: institutional quality, trade openness and demand (domestic and foreign).

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<sup>11</sup> See Herrendorf *et al.*, (2014)

## II.a) Structural change and institutional quality

In addition to the traditional drivers of structural change, much recent work has focused on the role that institutional quality might play in the structural change process. Certainly, much of the works has focused on the links between institutions and growth. In this thesis, in order to contribute to the literature on structural change, we address the role of institutional quality on structural change and not only on growth.

Which institutions are involved? How are they classified? What impact do they have on structural change? Here, we present some elements of analysis.

### *a) Institutional quality and its various definitions*

According to Edokat and Njong (2019), institutions have been used in several social science fields such as political science, economics, sociology, and anthropology. They refer to the definition of North (1991), who is considered one of the major authors on the subject to emphasize that in all the fields mentioned, institutions are formal or informal mechanisms or structures that govern behavior in every society.

According to North (1991), "institutions are the human-made constraints that structure political, economic and social interactions". They are seen as rules of the game devised by individuals to reduce uncertainty and transaction costs. They can be formal constraints (rules, laws, constitutions) or informal (norms of behavior, conventions, and self-imposed codes of conduct). Furthermore, North (1991) argues that, in terms of standard economic constraints, institutions first define the set of choices and then determine transaction and production costs, and hence the profitability and feasibility of economic activities. He argues that institutions provide incentives to an economy and determine the direction of economic change towards growth, stagnation, or decline.

Aligned with Ostrom (1990), Kunčič (2014) refers to institutions as:

*"The set of working rules that are used to determine who is eligible to make decisions in a certain arena, what actions are allowed or constrained, what aggregation rules will be used, what procedures must be followed, what information must or must not be provided, and what payoffs will be assigned to individuals based on their actions."* The arena concept could be seen as equivalent to North's game concept for Kunčič (2014).

Levchenko (2007) states that the term institutions "refers to a wide range of structures that affect economic outcomes: contract enforcement, property rights, investor protection, the political system, etc."



However, Massil(2016) relates a more structured consideration and highlighting of the polysemous nature of the term institutions as indicated by Bessy and Favereau (2003). We will refer to his work in this section.

Massil (2016) clearly points out in his work that the concept of institutions does not have a universally accepted definition and that it is difficult to identify this concept. Thus, he considers that this makes it difficult to study the quality of institutions. To this end, he attempts to propose definitions of the concept, grouping them according to whether he considers institutions to be "rules and constraints", "instruments of governance" and "equilibrium of games".

Regarding the consideration of institutions as rules and constraints, Massil (2016) refers to the works of Commons (1931); Veblen (1899) and (North and Weingast, 1989; North, 1990; North and Ménard, 2005).

The work of Commons (1931) defines institutions as "collective action that controls, liberates and extends the scope of individual action". And he distinguishes three forms of institutions: economic, political, and cultural<sup>12</sup>.

In relation to Veblen's (1914) definition, Massil (2016) highlights the fact that Veblen (1914) considers institutions to be the dominant habits of thought and action in the social community. The institutions of the present are inherited from the institutions of yesterday. Institutions are either rules (Commons) or regularities of behavior (Veblen).

Schmoller (1905), for his part, defines institutions as the set of moral rules, habits, rights, and customs that hold together and constitute a system. Institutions are legal, political, and economic. They are arrangements within the community that serve as a frame of reference for generations. For Schultz (1968), institutions are a set of behavioral rules that can be observed by individuals in a society. Lin (1989) considers institutions to be human processes designed to cope with uncertainty and increase individual utility. In this sense, they are rules of behavior observable by the supporters of a society.

Considering the faithful classification of different definitions proposed by Massil (2016), we will consider the part where institutions are seen as "instruments of governance." He refers to various authors such as Coase (1960), Demsetz (1967) and Alchian and Demsetz (1972), Yong (1994), Williamson (2000), as well as Brousseau (1989).

According to Massil (2016), the pioneering work considering institutions as instruments of governance is that of Coase (1960), which deals with resource allocation through property rights and constitutes an approach to institutions in terms of governance. The later property rights

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<sup>12</sup> See Massil (2016).

movement, developed by Demsetz (1967) and Alchian and Demsetz (1972), follows this logic, in which property rights are institutions that serve as instruments of governance. Institutions serve as a framework for defining the interests of everyone; they define the initial allocation of resources and deter and punish behavior that violates the rules (Yong,1994). From this perspective, Williamson (2000)'s third institutional level is constituted by governance institutions. From this point of view, institutions establish the governance structure of a society and foster the creation of organizations such as government and state agencies. Institutions serve as the legal framework for defining management structure and contractual relations. To illustrate this perspective, Massil (2016) refers to the diagram presented by Williamson (1993), which shows how institutions, as an instrument of governance, frame the different levels of institutions.

Regarding the definition of institutions as game equilibria, Massil (2016) specifically cites the work of (North, 1990 ; North and Ménard, 2005 ; North, 1994 ; North *et al.*, 2010) and Walliser (2003). He refers to the distinction introduced by North (1990) between organization and institution, and which is developed in (North and Ménard, 2005 ; North *et al.*, 2010). In these works, North considers the framework of game theory to formalize institutions. Thus, for North (1990), institutions are the rules of the game and organizations are the players. As rules of the game, institutions define the institutional environment that frames institutional arrangements. Furthermore, considering the work of Walliser (2003), which focuses on the creation of institutions, Massil (2016) highlights the fact that Walliser (2003) sees an opportunity to treat institutions as emergent structures of the game and equates them with an equilibrium state of the game.

As mentioned above, there are many definitions of institutions. In Chapter 1, we will mainly consider Kunčič (2014)'s operational perspective. Our framework will focus more on institutions as instruments of governance.

We find that institutions have different definitions. They also have different classifications and measurements.

#### *b) Classification and measurements of institutions*

*Kunčič (2014) states "while the importance of institutions is today well recognized and widely used in studies of growth and income levels between countries, as well as assiduously within the general research agenda of new institutional economics, a common sense of what institutions are and how they can be classified is still lacking. This is not so much a consequence of the different definitions, but a consequence of the different frameworks used to study*

*institutions, which have not yet, to our knowledge, been evaluated and discussed in relation to each other."*

In line with the work of Joskow (2008), Kunčič (2014) therefore classifies institutions into three categories: *legal, political, and economic*. When considering the classification based on the degree of formality, he refers to North's definition, which divides institutions *into formal* (laws, regulations and any other rules to which people explicitly subscribe) and *informal* (norms, conventions, codes of conduct, trust, etc.). For the latter, which refers to the degree of entrenchment, the work of Williamson (2000) is used. His classification, as Kunčič (2014) notes, helps to illustrate the nature of the links between formal and informal institutions. He notes that lower-level institutions are more entrenched and explains that they evolve more slowly than higher-level institutions. Thus, we have four levels in this typology, which are:

- a) Level 1 (100 to 1000 years of time to change) where institutions are mainly informal (customs, traditions, norms, and religion).
- b) Level 2 (10 to 100 years' time to change) refers to formal institutions or rules of the game (property rights, political system, judicial system, and bureaucracy).
- c) Level 3 (1 to 10 years' time to change) refers to governance institutions (in line with governance structures aligned with transactions, notably contracts with their transaction costs).
- d) Level 4 (continuous basis) concerns institutions that present the rules governing resource allocation and employment.

Kunčič (2014) also notes that, regardless of the type of classification chosen, groups of institutions generally overlap, both within and between classification systems. This means that there is more than one way to classify institutions, even within a chosen classification type.

Here, we consider Kunčič (2014)'s classification (subject category: legal, political, and economic institutions), excluding social and organizational institutions due to the heterogeneity for these groups and the unavailability of these indicators for which few empirical proxies exist<sup>13</sup>. We will briefly define each type of institution and the measures used in our thesis for each category.

- Legal institutions: Kunčič (2014) explains that we can have public legal institutions created by the state and private legal institutions, which are embodied in contracts. Referring to the degree of formality, he considers legal institutions to be a large part of formal institutions.

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<sup>13</sup> See Joskow (2008)

Legal institutions are important when we examine *questions of property rights, the origins of legal systems and their effects, and the application of laws*.

- Political institutions: for this category, according to Kunčič (2014) talking about political institutions leads to discussing polity in the broad sense, voters, electoral rules, political parties, rules and limits of government or the state. According to Acemoglu *et al.*, (2005), political institutions "*are linked to the characteristics of government and the design of the constitution*". In other words, *political institutions distribute de jure political power between groups*". In a similar vein, Vitola and Senfelde (2015) stress that political institutions must guarantee political stability to encourage investment, and at the same time have an appropriate level of political competitiveness to facilitate political action that can benefit most of the society, not just the political elite. For them, the most important political institutions are the form of government and the degree of constraints on politicians.

- Economic institutions: these are considered to largely overlap with legal institutions and are necessary for the proper functioning of the market, along with the legal system, the enforcement of property rights, regulatory elements, etc. (Kunčič, 2014). For example, Docquier (2013) in connection with the work of Acemoglu *et al.*, (2005), states that economic institutions "*comprise the factors governing the structure of incentives in society (i.e. the incentives of economic actors to invest, accumulate factors, carry out transactions, etc.) and the distribution of resources. For example, the structure of property rights, barriers to entry, the set of contract types for business proposed in contract law, redistributive tax transfer systems affect economic performance and growth*". In addition, Vitola and Senfelde (2015) note that economic institutions are characterized by the extent of the rule of law and the quality of the regulatory framework, as well as by the level of corruption. Indeed, corruption distorts the functioning of markets by limiting fair competition. They emphasize that the most important economic institutions are the structure of property rights and the perfection of markets.

Rodrik and Subramanian (2003) present a different classification. They indicate that there are four types of institutions: *Market-creating institutions*, which aim to protect property rights and guarantee contract enforcement; *Market-regulating institutions*, which manage externalities, economies of scale and imperfect information; *Market-stabilizing institutions*, which guarantee low inflation, minimize macroeconomic instability and avoid financial crises; finally, *Market-legitimizing institutions* provide social protection and insurance, organize redistribution and manage conflict.

To consider the different measures of institutional quality, we first refer to the work of Belaid *et al.*, (2009), who present a global vision for defining the institutional environment. They

define the institutional environment as the organization of relations between several mechanisms that structure its internal transformation capacities. They specify that this institutional environment is made up of five elements: legislative and executive institutions, judicial institutions, administrative capacity, the nature of conflicts of interest, customs, and informal appointments. They stress the difficulty of formalizing the last two characteristics (customs and informal norms). According to them, in empirical studies, the first three characteristics are therefore the most widely used, the existence or non-existence of laws protecting private property and the degree of compliance with laws by the various actors, as well as the constraints imposed on political leaders by checks and balances. For example, in their studies, they considered the quality of institutions by referring to the quality of the political process (measured by an ordinal variable that provides information on the distribution and balance of powers (executive, legislative and judicial)) and the quality of the institutional environment (captured by five variables that indicate the degree of corruption: the strength of the judicial system, the degree of law enforcement, the quality of the state's administrative apparatus, the risk of expropriation by investors and the exchange rate risk).

Hali (2003) confirms that these same measures are used by recent empirical studies to investigate institutional quality, i.e., the quality of governance (corruption, political rights, public sector efficiency and the weight of existing regulations), the existence of laws protecting private property and the enforcement of these laws, and the limits imposed on political leaders. He points out that these measures are not objective, but rather subjective assessments and evaluations by national experts, or assessments by the population through surveys carried out by international organizations and non-governmental organizations.

He proposes the following classification of these measures: i) the Global Governance Index, which is the average of six measures of institutions found in a study by Kaufmann *et al.*, (1999), which are: citizen participation and accountability, political stability and absence of violence, government effectiveness, regulatory burden, rule of law and absence of corruption. ii) The second measure refers to property rights, i.e., the protection of private property. iii) Control of executive power, which refers to the institutional and other limits imposed on political leaders.

Aron (2000) presents an analysis that relates the components of institutional measurement indicators into five categories: quality of formal institutions; measures of social capital; measures of social characteristics and ethnic, cultural, historical, and religious categories; and characteristics of political institutions, constitutional rights, and regime types (dictatorship, democracy), and measures of political instability, riots, strikes, civil war, regime duration and

executive change. For example, Benhamouche (2018) used political regime type in his empirical study of the relationship between institutional quality and growth.

Many studies examine the role of institutions in relation to the proper functioning of the market, so that institutions will be qualified as good if they can guarantee the various functions mentioned above. Hence the use of variables such as property rights, absence of corruption, settler mortality rates, etc. to measure institutional quality. On the other hand, other authors, referring to the role of the state as a producer of social order, use the tradition of the state as a variable of institutional quality (Bardhan, 2005).

Acemoglu *et al.*, (2005), although their work takes a particular view of the role of institutions on growth. For them, institutions can explain why some countries are poor and others rich. And to measure economic institutions, they consider a broad measure of property rights, namely protection against the risk of expropriation, based on Political Risk Services (PRS) data. Based on this point of view, we can understand that institutions could constitute a threshold for growth through structural change.

In general, studies consider different types of indicators. Yahyaoui et Rahmani (2009) refer to the PRS Group's International Country Risk Guide (ICRG) databases, which measure different aspects of governance.

They contain twelve components<sup>14</sup>: government stability, socio-economic conditions, investment profile, external conflict, internal conflict, ethnic tensions, religious tensions, corruption, military in politics, law and order, democratic accountability, and quality of bureaucracy. They also refer to the various composite indicators of the World Bank (WB), whose database is derived from the following authors: Kaufmann *et al.*, (2008). There are six such indicators (control of corruption, government effectiveness, political stability, absence of violence/terrorism, regulatory quality, and rule of law).

In the same vein, we pay particular attention to the work of Kunčič (2014) who assumes that there are 30 indicators of institutions that can be grouped into 3 categories of institutions: legal, political, and economic. Although he noted that there are many ways to classify and measure the institutional indicator as we can see above as an example for Rodrik and Subramanian (2003), Acemoglu *et al.*, (2005).

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<sup>14</sup> ICRG database measures use for INST counts 12 components: government stability (0-12), socioeconomic conditions (0-12), investment profile (0-12), internal conflict (0-12), external conflict (0-12), military in politics (0-6), religious tensions (0-6), law and order(0-6), corruption(0-6), ethnic tensions(0-6), democratic accountability(0-6) and bureaucracy quality(0-4). The higher is the score, the lower is the political risk.

To investigate the links between institutions and structural change, we base our Chapter 1 on Kunčič (2014)'s classification, as it should give us a clearer picture of the relationship between institutional quality and structural change. And we also use the twelve ICRG indicators as proxies for institutional quality, in addition to the 3 synthetic measures presented by Kunčič (2014).

*c) The role of institutions in the process of structural change*

Samadi (2008) indicates that the main role of institutions is to organize groups, facilitate interaction and coordination between them, reduce uncertainty in economic activities and encourage economic development. Samadi and Alipourian (2021) note that institutions can also play an important role in improving economic performance by using resources as efficiently as possible, encouraging factor accumulation, and stimulating innovation (all of which are linked to the process of structural change). Nevertheless, *they point out that the impact of institutions on economic performance depends on **institutional quality***. For them, institutional quality measures the power, coherence, and robustness (sovereignty, influence, real power) of institutions in each country.

In this section, we look at the various links between institutional quality and structural change. We assume that this list is not exhaustive.

1) Good institutions foster a favorable business climate.

Starting from the idea that the industrial revolution enabled an acceleration of the process of reallocation of economic activity, Van Neuss (2017) highlighted the role of the institutional and political environment in the industrial revolution. He refers to authors such as North (1990), Acemoglu *et al.*, (2005), Greif (2006), North *et al.*, (2010), and Greif and Mokyr (2016) who argue that the Industrial Revolution began in Britain because the country had the right institutions, particularly the right political institutions. For these authors, institutions play an important role in the process of economic development. Van Neuss (2017) also noted that institutionalists saw the Glorious Revolution as the start of a long period of relative peace and political stability, enabling a favorable business climate and the strengthening of property rights and contractual institutions. These latter points are therefore important for structural change.

In the theory of structural change, as Dietrich (2009) notes, structural change occurs in the light of two opposing components: one linked to demand (Engel's law) and the other to supply, which is generally linked to technological progress. In this respect, if a country has a favorable

business climate, this can encourage new investment, which can modify the structure of production. In addition, the country must have a certain level of infrastructure.

2) Good institutions help reduce costs.

According to North (1990), institutions affect investment in physical and human capital, as well as the organization of production (Vitola and Šenfelde, 2011). North (1990) also shows that the importance of institutions lies in the high transaction costs that contain the cost of protecting rights and the cost of enforcing agreements. Moreover, according to institutionalist theory, if they are efficient, they reduce these costs by reducing information costs, risks (risk on product quality and risk of product confiscation) and increase contract enforcement.

De Janvry and Sadoulet (2015), who belong to the New Institutional Economics (NIE) current, highlight the fact that the emergence of innovative institutions reduces market failures and transaction costs due to adverse selection, moral hazard and cooperation failures. Institutions are considered extremely important for economic development. Resources, geography, technology, and institutions are therefore complementary in fostering development.

For the authors, institutional innovations should increase (economic) efficiency and reduce risk. They increase efficiency because they can make the market work, reduce transaction costs, internalize externalities, avoid the tragedy of the commons, increase specialization, and redistribute assets to increase productivity. They reduce risk because they can share it.

3) Good institutions facilitate structural change.

North (2005) stresses the importance of an incentive structure rather than slavish imitation of Western institutions (about property rights and judicial systems). This point is echoed in the work of Otando (2011), who argues that countries with poorly functioning economies have a non-incentive institutional matrix that fails to improve productivity. Existing institutional structures are said to produce change-averse organizations. Samadi and Alipourian (2021) take a closer look at Veblen's view that institutions influence economic agents' behavior and performance through multiple channels. They thus indicate that a society's institutions affect the structure of individuals' economic incentives.

4) Good institutions are the engine of growth.

Traditionally, many studies have established a link between structural change and growth. They indicate that the process of structural change (reallocation of labor from low-productivity to higher-productivity sectors) plays an important role, particularly in the growth of developing countries. Benhamouche (2018) points out that *"labor flows from low-productivity to high-productivity activities are a key driver of development. Growth can occur through productivity*



*improvements within sectors, but also through the reallocation of resources from low- to high-productivity sectors" (McMillan et al., 2014).*

However, Benhamouche (2018) focuses on the impact of institutional quality on growth by considering the channel of structural change. According to Benhamouche (2018), there are several reasons why an improvement in institutional quality plays an important role in structural transformation. Institutions could have a negative impact on structural change in non-democratic countries. For him, in non-democratic countries, institutions are not a public good as they are in democratic societies. In this sense, institutions are put at the service of political elites. The negative effect is felt if elites have advantages in low-productivity sectors, as they prevent the reallocation of factors from low-productivity to high-productivity sectors. This limits productivity growth and structural change.

A similar idea is found in the work of Caballero and Hammour (1996), for whom in the presence of a specific quasi-rent, resources are underutilized, factor markets are segmented, production suffers from technological sclerosis and job destruction is unbalanced in relation to job creation. Benhamouche (2018) indicates that all these elements limit the scope of structural transformation, and in his empirical study, he confirms a positive medium-term impact of institutional quality on structural change in low-income countries. He also finds a positive long-term impact, but at a lower level.

5) Good economic and political institutions encourage the reallocation of resources.

Dutraive (2009) argues that economic institutions not only determine economic outcomes, but also the distribution of resources. This redistribution gives power ("de facto power") to certain agents who can therefore influence political institutions in favor of their interests or rents. They favor political institutions (government) that give de jure power and decide on economic rules (economic institutions), particularly those concerning redistribution and property rights.

Referring to North's work, Dutraive (2009) points out that the main function of institutions is to provide security and reduce the uncertainty associated with any type of economic transaction. In other words, they generate economic incentives that lead to capital accumulation and investment. Thus, as soon as relationships cross the threshold of personal relations and become more impersonal (extension of markets, more distant and anonymous transactions), institutions enable contracts to be enforced and guarantee legal rules.

Constantine (2017) refers to two types of institutions. Production institutions (industrial policies: tariffs, subsidies). These could be related to economic institutions if we refer to

Kunčič's classification. Industrial policies (tariffs, subsidies, etc.) are production institutions that create growth more conducive to structural transformation. Indeed, the state, when it decides to introduce public subsidies, tax breaks and when it applies them appropriately, can have direct effects on production levels and induce the production of certain goods rather than others. For Constantine (2017), the structural changes that lead to growth take place when appropriate production institutions are put in place by the state (Khan, 2010). Exchange institutions (property rights, rule of law) could be linked to legal institutions<sup>15</sup>. For Constantine (2017), exchange institutions such as property rights, law and money are allocative institutions that optimize exchange in economic structures.

For Reinert (2006), the history of innovation is largely explained by state support and the vagaries of history, rather than by the application of patent laws (property rights) and exchange institutions. A minimum of rule of law and certain forms of property ownership are necessary for production to be undertaken. However, this is not enough to generate production or the production of high-yield goods. Reinert (2006) notes that the impact of production institutions lies more in the structural change that leads to growth. Even if exchange institutions have a significant effect, they are not enough to bring about this structural change. More specifically, they note that there are many sources of structural change, but they can be grouped into two broad categories: (1) government intervention and (2) external shocks. Government intervention includes deliberate changes in market incentives and the creation or destruction of markets. External shocks include wars, natural disasters, economic shocks and so on.

Chang (2011) points out that the state is the institution of all institutions, emphasizing the role of institutions in structural change and growth. The "right" institutions, such as property rights, can only trigger structural change if they are properly implemented, and he shows that this depends on the type of economic structure. The work of Chang (1994) provides a comprehensive overview of theories advocating the role of state intervention and political institutions. In his work, he presents an alternative theory (which takes into account the fundamental uncertainties and conflicts associated with economic life) to the institutionalist theory of state intervention, particularly in the process of structural change. For Chang (1994), the state should play two major roles to have an impact on structural change. These roles are entrepreneurship and conflict management.

- Entrepreneurship: at this level, the state must provide a vision of the future and set up new institutions. According to Chang (1994), upstream, the state must provide a vision rather

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<sup>15</sup> See: Kunčič's classification (2014)

than simply coordinate a transition to a higher equilibrium. For example, it can encourage private-sector agents to take concerted action by bearing the cost of collecting and processing information.

- Conflict management: For Chang (1994), conflict increases during the process of structural change. In this process, factors of production move from one sector to another. If all factors were mobile, relocation would not be a problem. However, if this is not the case, conflicts may arise. In such situations, even if the state is in favor of market freedom, it must intervene because it is the only agent able to represent the general interest.

Finally, Acemoglu *et al.*, (2005) and Acemoglu and Robinson (2010) distinguish between "extractive" and "inclusive" institutions. The former refer to undemocratic political institutions, on the one hand, and a weak rule of law and lack of private property rights, on the other. "Inclusive" institutions are democratic political institutions, a strong rule of law and the protection of private property rights for a broad cross-section of society. The dominant discourse on institutions asserts that "inclusive" institutions are the determinants of long-term growth.

Indeed, the different definitions, measures and classifications of institutions are presented, as well as the different roles of institutions in this section. In the same vein, the empirical relationship between structural change and international trade via the institutional quality threshold will be discussed in the following chapter (chapter 2).

## II.b) Structural change and openness

In the previous section, we considered trade openness as one of the factors that can influence structural change. In this thesis, we will develop the role that international trade can play, considering the level of institutional quality. We will also examine the importance of institutional similarities.

Numerous studies linking structural change and international trade are clearly developed in Huang (2015)'s literature review. For example, he mentions the work of (Echevarria, 1995; Teignier, 2009; Yi and Zhang, 2010; Mao and Yao, 2012; Betts et al., 2017; Uy et al., 2013; Świącki, 2017), Using different methodologies, all these studies conclude that international trade is an important driver of structural change. Some focus on employment or the share of industry, while others examine the impact of FDI or the natural resources sector. The question here is: do institutions play a role in the analysis? The answer depends on the indicator used to measure the productive structure: the share of employment or value added.

a) *Share of employment or share of value added as a measure of productive structure.*

As we saw earlier, structural changes can be measured in terms of value added (the sector's share of GDP) or in terms of the sector's share of employment. Regarding employment share, Yi and Zhang (2010) find that productivity changes and the removal of trade barriers affect employment share in different sectors. Uy et al., (2013), in the case of South Korea between 1971 and 2005, conclude that openness is one of the factors explaining the evolution of the labor share in agriculture and services. It also explains the accelerating growth in the share of employment in the manufacturing sector. In their view, the fundamental role of international trade is to facilitate specialization and the efficient reallocation of human and physical capital between sectors. The study therefore suggests that international trade has played a fundamental role in Korea's structural transformation.

Alessandria et al., (2023) go further, noting that international trade impacts structural change through two main channels, which are:

- The lowering of trade barrier costs through technology (lower international shipping costs, adoption of containerization) or policy (lower tariff rates, reduced use of quotas) can facilitate specialization, affecting the composition of economic sectors in terms of employment or value added.
- Policy changes or shocks such as fiscal shocks (changes in tax rates), productivity shocks which then affect economic sectors (both value added and employment).

Świącki (2017) studies four determinants of structural change (sectoral technological progress, non-homothetic tastes, changes in factor cost differentials between sectors and international trade) for a group of 45 countries between 1970 and 2005. He finds that trade is important for each country, but that its impact on labor reallocation is less systematic. In his work, Świącki (2017), echoing the findings of Matsuyama (2009), argues that the impact of openness on structural change depends on the type of economy (closed or interdependent). Using the same example as Matsuyama (2009), shows that in a closed economy, productivity growth in the manufacturing sector could lead to a reduction in the labor share in this sector due to a substitution effect. Conversely, in an open economy, an expansion of the labor share in manufacturing could be observed, as suggested by Ricardian comparative advantage theory.

Smitkova (2018), using the model developed by Eaton and Kortum (2002), in which trade cost shocks and trade imbalances are introduced, finds that these two shocks play an important role in structural changes. She concludes that the changes observed in the value added of the manufacturing share are mainly explained by this type of shock, particularly in the USA and China.

For Sako et al., (2021), four elements influence structural change, namely:

- The increase in income resulting from trade integration, which encourages exporters to improve their technology. In this case, they refer to the study by Bustos (2011).
- Exposure of domestic companies to foreign competition. "In this case, competition leads to a reallocation of resources towards more productive uses and induces structural changes".
- Access to capital equipment and advanced R&D, which increases output per worker and thus learning by doing. In this case, they refer to the work of Goh and Olivier (2002).
- Finally, when foreign suppliers put pressure on domestic suppliers, the latter respond by improving product quality and productivity. This point is in line with the findings of Weiss (2005).

According to Teignier (2009), international trade in agricultural products can accelerate the structural transformation of countries with low agricultural productivity. He explains that autarkic countries produce all the food consumed by their population. But if they are open, they must import part of their food, enabling them to reduce employment in the agricultural sector and transfer this workforce to another productive sector. Using a neoclassical growth model with an agricultural and a non-agricultural sector, he shows the important role of international trade in structural change in the UK and South Korea.

Betts et al., (2017) attempt to quantify the role of international trade in industrialization. They determine the extent to which international trade and trade reforms affect industrialization, and thus the share of the secondary sector in growth. Using a hybrid two-country, three-sector model, they examine these effects using data for South Korea and OECD countries from 1963 to 2000. They find that international trade affects structural change in three ways:

- By changes in per capita income,
- By changes in relative labor productivity between sectors,
- Through changes in tariff levels and subsidies between sectors.

Fiorini et al., (2013), use a structural change index to assess the role of trade in structural change. They find that both growth and slower trade flows affect the sectoral composition of output, but that the effect of slower trade flows is stronger and more significant. They also argue that, in terms of employment, structural change has been more influenced by increased trade openness than by trade contraction.

However, some studies indicate that openness may have positive effects on structural change only under certain conditions ((Sharma, 2000; Chang et al., 2009).

Secondly, Sharma (2000) suggests that liberalization does have some impact on industrial structure, but only in Least Developed Countries (LDCs) such as Nepal. Jayanthakumaran (2002) and Sharma (2000) note that openness and exchange rate reforms are important for improving productivity growth in LDCs. However, other conditions need to be considered, such as the lack of human capital, infrastructure, and appropriate investment policies (Sharma, 2000).

Huang (2015) examines the situation in the United States between 1950 and 2005 using a three-sector model. He finds that international trade plays an important role in the structural transformation of the United States. He explains that there are three channels through which trade can affect the structural transformation process (in terms of reallocation of employment shares). Two are direct: i) intersectoral trade (with reference to Ricardian theory, according to which a country produces goods in which it is relatively efficient and exports other goods); ii) trade imbalances. Another effect is indirect: the way in which trade can affect productivity growth and the industrial sector. The study shows that these effects account for 35.5% of the decline in the labor share in US manufacturing. What is more, trade imbalance is the main channel through which international trade affects the decline in labor in US manufacturing.

Coricelli and Ravasan (2017), attempt to compare the relevance of the trade and productivity channels for employment and value-added shares. Their results suggest that the trade channel has more frequent and stronger effects on structural change in advanced economies. In their view, the effect of trade therefore depends on the type of technological progress observed in emerging economies.

In their study, Kaba et al., (2022), examine the role of short- and long-term openness in the reallocation of activities from the agricultural to the non-agricultural sector. They find that the main determinants of the nature of structural change are industrial and trade policies. In their view, industrial and trade policies can play a role in the pace of structural change through industrialization or deindustrialization. Using a sample of 34 sub-Saharan African countries between 1970 and 2016, they show that the long-term evolution of trade openness has a negative impact on the long-term dynamics of structural change. Distinguishing between global exports of raw materials and manufacturing exports, they show that the former have a negative impact, while the latter have a positive impact on the process of structural change.

In their empirical study, Comunale and Felice (2022) show that international trade contributes directly to structural change. They find that, in the long term, imports are negatively

associated with employment shifts to the tradable goods sector. Exports and employment shifts to the tradable goods sector are positively associated with structural change.

McMillan et al., (2014) explain that globalization affects a country according to its degree of integration into the world economy. They draw on the experiences of Asian and African countries. They find that globalization has helped Asian countries to achieve high-productivity employment opportunities and structural change that has contributed to growth. For sub-Saharan Africa and Latin America, however, the effects are not the same. In these countries, globalization is not driving structural change in the right direction. For example, the workforce is shifting from more productive to less productive activities, particularly in the informal sector.

For Hausmann et al., (2007), globalization can be beneficial for a country depending on its ability to position itself on the globalization stage. They highlight the differentiated impact of globalization on the manufacturing sector. In their view, offshoring encourages certain countries to redevelop their manufacturing sectors. At the same time, they argue that globalization offers greater opportunities for the disruption and decline of local manufacturing through ill-conceived or inappropriate liberalization policies.

Globalization also raises questions about the role of FDI. Baldwin and Okubo (2018) argue that for a deeper understanding of trade and comparative advantage in the context of globalization, FDI is therefore the key factor. They refer to horizontal and vertical FDI (Navaretti and Venables, 2004). However, the effects of FDI are only realized under certain conditions, such as a country's sufficient capacity to absorb these flows (Stojčić and Orlic, 2016).

Alagidede et al., (2020), who establish a link between structural transformation and trade and financial integration in 28 sub-Saharan African countries between 1985 and 2015, show that opening facilitates the mobility of production factors and the relocation of production within sectors and geographical areas. This can contribute to the development of the concept of global value chains (GVCs).

For Sakyi and Egyir (2017), a country's gains or losses depend on various country-specific factors, such as the poor design and implementation of national trade policies, weak institutions, the trade structure resulting from low diversification of production and exports.

#### *b) Inward FDI*

Inward FDI mainly refers to a logic of technology transfer (Keller, 2010 ; Tomi and D'Estaing, 2015 ; Stojčić and Orlić, 2016), but also to increasing firms' overall productivity (Tomi and D'Estaing, 2015). Thus, Stojčić and Orlić (2016) point out that FDI improves export

competitiveness in open economies. Tomi and D’Estaing (2015) add that FDI inflows also help to bridge the savings gap and thus the investment gap. Alagidede *et al.*, (2020) who establish a link between structural transformation and trade and financial integration in 28 sub-Saharan African countries between 1985 and 2015, show that when countries open to international markets, this facilitates the mobility of production factors and the relocation of production within sectors and geographical areas. This can contribute to the development of the concept of Global Value Chains (GVCs).

However, the effects of FDI are only realized under certain conditions, such as a country's sufficient capacity to absorb these flows (Stojčić and Orlić, 2016). For Sakyi and Egyir (2017), a country's gains or losses depend on various country-specific factors such as poor design and implementation of national trade policies, weak institutions, trade structure resulting from low diversification of production and exports.

*c) The natural resources sector.*

The World Trade Organization Report (2010) notes that the resource curse and resource abundance are not always conducive to economic growth or development. The report shows that in a country where natural resource revenues are rising, this can lead to a process of de-industrialization due to an increase in the exchange rate. This leads to an increase in the price of manufactured goods, and the manufacturing sector becomes less competitive. As a result, production and exports of these goods are reduced. The deindustrialization process observed after a commodity boom can be direct or indirect. If it is direct, it occurs when factors are reallocated to the natural resource sectors. On the other hand, when the process is indirect, it is due to additional spending caused by an increase in resource revenues, which leads to an appreciation of the real exchange rate. Botta (2010), who provides a historical overview of work analyzing the impact of natural resource wealth on economic development (see also Corden and Neary, 1982 ; Sachs and Warner, 1995), concludes that the deindustrialization process is the result of the discovery of natural resources or the explosion in raw material prices.

*d) Institutional quality*

Alagidede *et al.*, (2020), Dollar and Kraay (2004) and Matthew and Adegboye (2014) mention weak institutions as a determinant. In the literature, institutions can affect both trade and structural change. The relationship is therefore often presented as bidirectional. If the quality of institutions is good<sup>16</sup>, the impact can be positive, but if the quality of institutions is

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<sup>16</sup> Abreo *et al.*, (2021) relate the work of Chavance (2008) which indicates that “good institutions are based on economic freedom, rule of law, private property, flexible labor markets, clearly delineated property rights, and share-holder oriented corporate governance”.



poor, the impact will be the opposite. This point is confirmed in Jansen and Nordås (2004), they argue that high quality institutions expected to have positive effect on economic activity, notably on international trade; while for them, inefficient institutions could represent serious obstacles for trade. As example, they relate that the inefficiency would increase uncertainty and transaction cost, which impact negatively domestic exporters' competitiveness because their final products will be more expensive than imported products. Referring to Bigsten et al., (2000), in terms of inefficiency, Jansen and Nordås (2004) notice the illustration of the legal system, where it could hinder the interaction between manufacturing firms and potential foreign importers in the sense that contractual flexibility is used as a rational response to risk.

Méon and Sekkat (2004) reinforce to say that poor institutional quality could block trade and lead to poor performance in manufactured exports.(Abreo et al., 2021).

Similarly, if we look at the relationship between trade and structural change through the lens of institutional quality, we can see that if institutional quality is low, the country may face problems such as corruption or rent seeking, which can have a negative impact on economic growth and structural change. On the other hand, if a country has good institutional quality, this can facilitate structural change by providing access to new markets, technology, and knowledge, and increasing productivity, thereby improving overall economic performance and structural change. Overall, improving institutional quality is essential if countries are to reap the benefits of international trade and achieve structural transformation. Carraro and Karfakis (2018) or Aron (2000) argue that good institutions promote the accumulation of physical and human capital through improved technology, investment, and reduced transaction costs. On the contrary, weak institutions discourage the implementation of research and development, contribute to the immobilization of resources in low-productivity sectors and make it difficult to manage FDI.

Abreo et al., (2021) present an extensive literature on the role of institutional quality in international trade. Referring to Bilgin et al., (2018), they take up the idea that better institutions and governments will increase international trade flows. More extensively, they note the work of Jalilian et al., (2007), which observe that institutional development reduces information imperfections, increases economic incentives, and reduces transaction costs.

For De Groot et al., (2004), the level of institutional quality thus has a significant and positive effect on trade (Abreo et al., 2021). These authors highlight the notion of institutional distance<sup>17</sup> of Kostova (1997), Álvarez et al., (2018) and that of similarity in the quality of institutions (De

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<sup>17</sup> In other words, the difference between the institutional profiles of the country of origin and the host country.

Groot et al., 2004). Álvarez et al., (2018) indicate that most bilateral exchanges take place when the difference between institutional indicators is small. De Groot et al., (2004) make a similar point, indicating that countries with similar governance quality trade more with each other, while others with a greater difference have lower levels of bilateral trade flows.

## II.c) Structural change and demand (domestic and international): the various links

In this section, we present the various demand-side elements that could influence the process of structural change. They will form the basis of chapter 3 of the thesis.

Debates about the determinants of structural change are not new. Already in "The Wealth of Nations", Smith (1776) asserted that a greater proportion of the capital of any growing nation should be directed first to agriculture, then to manufacturing, and finally to services. The reasons still cited by Smith (1776) for this three-stage reallocation are that agriculture is the most important sector at the beginning of a country's development since food is the priority for a population's subsistence. After this stage, when it is necessary to meet the survival needs of the population and a country's production capacities increase, the manufacturing sector can progress and become more important. However, this process does not uniformly observe in all countries. One of the reasons Kim (2015) suggests, referring to the work of Smith (1776), is that endogenous demand forces play a decisive role in the process of structural change. This point is echoed in the work of Ballance (1988), that classifies structural change factors into two distinct categories: "universal factors", which can explain the uniformity of certain structural change patterns, and "group factors", which explain their specificity instead.

The "universal factors" are supply factors such as access to capital markets, the state of technology or an increase in the quantity of skilled labor. On the supply side, recent works (Herrendorf *et al.*, 2014 ; Alia, 2014) or older ones (Lewis, 1954 ; Rostow, 1959 ; Chenery, 1960 ; Kuznets, 1971 ; Chenery and Syrquin, 1975), indicate that structural change is enabled by a process of reallocation of factors of production between the three sectors of the economy (agriculture, industry, and services) favorable to industry.

In this context, it is assumed that the most productive modern sectors - i.e., the manufacturing industries - attract labor, particularly the most skilled, who then leave the less productive primary activities located in rural areas. Industrialization is accompanied by a rural exodus, strong urban growth, and the emergence of a middle class. The modern manufacturing sector, which creates greater added value and more jobs, raises incomes, enabling more people to escape poverty.

Three "group factors" help to explain differences in the pattern of structural change: firstly, the size of domestic markets, then the stage of development, both of which have an impact on the structure of domestic demand. Finally, the abundance of natural resources can lock a country into non-industrial specializations.

In Ballance (1988)'s early work, which gave a prominent role to demand, group factors can slow down or accelerate structural change, depending on the country. More recent work has also considered these factors, but as having the potential to promote structural change. For example, Alia (2014) points out that forces other than relative labor productivity (Ngai and Pissarides, 2007) explain structural change, such as the size of domestic markets (Leukhina and Turnovsky, 2016), trade openness and global demand (Matsuyama, 1992), international market access and proximity to an already industrialized country (Breinlich and Cuñat, 2013), and finally differences in income elasticity (Murphy *et al.*, 1989; Kongsamut *et al.*, 2001).

Similarly, Van Neuss (2017) and Alia (2014), indicate that while technology (Ngai and Pissarides, 2007; Acemoglu and Guerrieri, 2008; Alvarez-Cuadrado *et al.*, 2018), the links between inputs and outputs Berlingieri (2013) and, international trade (Matsuyama, 2009; Autor *et al.*, 2013; Uy *et al.*, 2013) have a definite impact on structural change, the role of agents' preferences should not be overlooked (Kongsamut *et al.*, 2001; Foellmi and Zweimüller, 2008).

For his part, Święcki (2017) examines the channels that drive structural change, such as differences in factor costs between sectors and technological progress, focuses on agents' non-homothetic tastes and international trade as drivers of structural change.

#### *a) Domestic demand and structural change*

The process of reallocation of economic activities between sectors may be due to changes in the structure of demand, which in turn is linked to changes in real income (Chenery and Syrquin, 1975; Murphy *et al.*, 1989; Kongsamut *et al.*, 2001). If income rises, the structure of demand changes. Thus, consumer demand for durable goods increases and demand for primary goods decreases.

According to Foellmi and Zweimüller (2008), this phenomenon increases as populations become wealthier. Indeed, in a poor society, most of the income is spent on basic products, particularly food. Consequently, most of the population works in the agricultural sector. However, as society becomes wealthier, consumers devote an increasing proportion of their income to satisfying fewer basic needs. The more mature society becomes, the more consumers will demand goods produced by the service sector. The logic that demand is a driving force

behind structural change therefore refers to Engel's Law, which states that the share of expenditure allocated to agricultural products will decline as household income rises. Thanks to this new demand, the production of manufactured goods should increase and accelerate structural change. There is therefore a body of work (Kongsamut *et al.*, 2001 ; Foellmi and Zweimüller, 2008) that focuses on differences in income elasticity to explain the increase in demand for manufactured goods when incomes rise. According to them, agents' preferences mean that the income elasticity of demand for agricultural products is less than 1, equal to 1 for manufactured goods and greater than 1 for services. Thus, any growth in income has a greater impact on the manufactured goods and services sectors; and accelerates structural change.

For his part, Van Neuss (2017) emphasizes the non-homothetic preferences that lead to a non-linear Engel's law curve. He indicates that when income increases, the marginal rate of substitution between goods varies, leading to a reallocation of goods production between sectors. The production of goods in greater demand will be favored over other goods in less urgent demand (Foellmi and Zweimüller, 2008).

*b) The size of the domestic market and structural changes*

The size of domestic markets is often seen as one of the channels leading to structural change (Leukhina and Turnovsky, 2016). For example, Ho (2015) shows in a theoretical model that population growth leads to an increase in manufacturing output relative to agricultural output. In his two-sector (agricultural and manufacturing), two-factor (labor and land) model, where agricultural production has diminishing returns, the representative household sees agricultural and manufactured products as complementary. When the population increases, demand for manufacturing grows relatively more than demand for agriculture. This leads to an increase in the relative price of agricultural products. The result is an increase in labor in both sectors, but a reduction in marginal production in the agricultural sector (relative marginal production effect). According to this work, there is a positive relationship between population size (or increased per capita income) and industrialization, whereas a small market can only slow down the process. A large domestic market (measured by population size or per capita income) is a catalyst for structural change. Similarly, for Leukhina and Turnovsky (2016), the small size of domestic markets in developing countries, unable to absorb new supply, may explain the absence of structural change. This idea is in line with the earlier theoretical work of Krugman (1980), which shows that the larger the size of markets, the greater the capacity of countries to diversify and develop their manufacturing exports.

*c) Urban growth rates and demand for services in the process of structural change*

All the above works attempt to explain the demand mechanisms by which structural change, involving a decline in the agricultural sector and greater industrialization, can take place. However, other, mainly empirical, work shows that, in resource-rich countries, industrialization may not take place because the demand for non-durable goods and services is too high. Thus, in the case of resource-producing and exporting countries, this is partly explained by the development of what Gollin *et al.*, (2016) call "consumer cities".

Indeed, in theory, industrialization should be accompanied by greater urbanization, as workers leave unproductive agricultural activities for new industrial activities located in cities. This process is accompanied by rising incomes, enabling households to consume more tradable industrial goods. Urbanization and industrialization go hand in hand, and cities that follow this development model are called "production cities" (Gollin *et al.*, 2016). However, some empirical studies (Gollin *et al.*, 2016 ; Chenaf-Nicet, 2020) show that in resource-producing countries, this link does not necessarily exist. Urbanization can be explained by the fact that a growing proportion of the population does not seek urban employment, but buys non-tradable goods and services, which are mainly found in cities. In some resource-producing countries, large urban areas are becoming "consumer cities", where certain households can spend their primary resource rents. Urbanization and growth in the service sector therefore go hand in hand. Ghana, Nigeria, South Africa and Zambia are all experiencing this phenomenon (Chenaf-Nicet, 2020).

*d) Foreign demand, openness to trade and structural change.*

Openness to trade and capital flows, which accelerates the diversification of economies, technology transfers and, according to some, stabilizes the growth process, is often seen as a channel for structural change (Matsuyama, 1992 ; Hausmann and Rodrik, 2003 ; Imbs and Wacziarg, 2003 ; Hausmann *et al.*, 2007 ; Javorcik, 2008, 2010 ; Cadot *et al.*, 2011) .

In a globalized world, if an agricultural sector is not productive, trade openness and access to new markets will drive labor into manufacturing sectors. Rodrik (2011) shows that internationalization accompanied by the removal of trade barriers puts pressure on local producers to align themselves with the standards of global competitors. However, if local companies are unable to keep up with global competition, they disappear, but those that do manage to do so gain in productivity. Consequently, the opening of trade enhances competition and leads to productivity gains, mainly in modern sectors, often manufacturing.

Hausmann *et al.*, (2007) point out that trade openness also enables access to new technologies and promotes structural change, but only if institutions are good. Chang *et al.*, (2009) also examine the conditions under which trade openness can affect structural change. They point out that international integration only has positive effects in terms of structural change if complementarities are put in place, such as free entry of firms, labor mobility, investment in education and financial development. International trade can therefore boost productivity in sectors exposed to foreign competition. According to Van Neuss (2017), this in turn promotes income growth, which in turn influences the share of spending in the three sectors of the economy. It should be noted that the initial situation of countries, in terms of specialization, income, factor endowments or protectionist policies, is a determining factor in the more or less favorable impact of international trade. Indeed, according to Matsuyama (2009), international trade can have different impacts on factor reallocation depending on whether a country is protectionist or more open.

Świącki (2017) in fact shows that rapid growth in manufacturing productivity leads to a decline in manufacturing labor in the case of closed economies. Whereas the opposite situation is observed in the case of an open economy, as manufacturing employment can grow through specialization according to comparative advantage. Similarly, according to Galor and Mountford (2008), in high-income countries, income growth generated by international trade is used by the population to extend children's schooling (human capital investment). In low-income countries, this additional income would enable people to have more children. This would then delay the demographic transition of the poorest countries and explain the "Great Divergence". For Bourguignon and Verdier (2005), opening to world trade, before protecting skilled labor-intensive activities, can lock poor economies into a low-level equilibrium due to a decline in both the relative price of skilled labor and investment in human capital. Trade openness can therefore discourage the allocation of skills in circumstances where specialization is less export oriented (Muendler, 2010). Similarly, it has been shown that a low level of trade diversification reduces the impact of Foreign Direct Investment (FDI) on growth (Chenaf- Nicet and Rougier, 2011). These earlier studies confirm the idea that poorly diversified economies face too few complementary factors and absorption capacities to produce positive spillovers.

Access to the international market and proximity to an already industrialized country are also seen as channels influencing structural change. Thus, in the context of economic geography and for developed countries, we can cite the theoretical work of Helpman and Krugman (1987), Behrens *et al.*, (2014). In an empirical framework of Organization for Economic Co-operation

and Development (OECD) countries, there is notably the work of Davis and Weinstein (2003), which shows that domestic market effects are important for a large segment of manufacturing industry in OECD countries. Regarding NICs, there is the work of Breinlich and Cuñat (2013), who use a market centrality indicator to construct a simple linear model based on the assumption that developing countries close to foreign markets experience higher demand for both agricultural and manufactured products. They show that higher aggregate demand leads to higher wages, which push local production towards manufacturing when preferences are not homothetic and trade costs are low. They thus explain that access to the international market and proximity to an already industrialized country are key factors in industrialization, particularly in the cases of Hong Kong, Singapore and Taiwan. The latter benefited not only from their outward-looking trade policies, but also from their proximity to the large Japanese market.

*e) Global demand for resources and structural change*

Factor reallocation towards more productive activities is not systematic when global demand locks a country into a resource-based specialization and when new activities appear riskier (Hausmann and Rodrik, 2003 ; McMillan and Rodrik, 2011). For example, Dasgupta *et al.*, (2003) show that the low impact of trade and FDI on employment in the countries of the Middle East and North Africa (MENA) region can be explained by a high concentration of exports both in downstream activities, such as capital-intensive energy industries (refined gas, fertilizers or plastics), and in low-growth, low-value-added goods, as in the case of non-oil products. More recently, in the case of China's resource-rich provinces, Xu and Wang (2006) suggest that these factors are not conducive to economic development or industrialization, as the resource sector concentrates too much capital to the detriment of other sectors.

Finally, we might mention the work of Sachs (2003), who points out that many developing countries producing natural resources have weak institutions that can neither counter rent capture nor ensure a reorientation of profits from the primary to the secondary sector.

This introductory chapter provides the theoretical basis for the three chapters of the thesis. The thesis is then divided into three chapters:

➤ *Chapter 1: The role of institutional quality in the process of structural change.*

In Chapter 1, the aim is to study the impact of institutional quality on the process of structural change. Using a dynamic panel threshold estimator on a sample of 103 countries from 1984 to 2018; and the hypothesis of a non-linear relationship between structural change and institutional quality and the existence of thresholds, we find that institutions affect the process of structural

change differently according to the level of institutional quality. Economic, legal and political institutions all play a role in the process.

- *Chapter 2: The link between trade and structural change in the light of institutional quality and similarities.*

Chapter 2 focuses on the impact of trade openness on structural change. Considering the institutional threshold and institutional similarities with a Syst-GMM estimator on 98 countries from 1984 to 2018, our results show that trade openness has a positive and significant impact on the structural change process when using institutional quality as an interactive term with openness. In addition, we also show that countries whose institutional quality is lower than that of the US, China and the EU have a negative impact on the process of structural change.

- *Chapter 3: Premature deindustrialization or development without factories. Is demand for services a lever for development in sub-Saharan Africa?*

In chapter 3, the aim is to study the impact of different demands (global and national) on structural change and industrialization. We will empirically analyze the importance of the service sector in sub-Saharan African countries. We will use a large dataset of 57 developing countries from 1984 to 2017 using a Hausman-Taylor (H-T) estimator. We find that sub-Saharan African countries are suffering from premature deindustrialization, which has its roots in demand-side mechanisms, not just supply-side ones. We find that the service sector has little knock-on effect on income in Sub-Saharan African countries, which remain highly specialized in low-knowledge-intensive services.



# CHAPTER I: THE ROLE OF INSTITUTIONAL QUALITY IN THE PROCESS OF STRUCTURAL CHANGE

## I) Introduction

As indicated in our preliminary chapter, according to the literature, structural change is affected by several factors, including institutions. Some authors (including Buitrago and Camargo ,2021), have given particular attention to institutions in their studies, where they are considered to have an impact on several countries' economic variables. The importance of institutions has its genesis in the work of North (1990), who states that institutions represent the constraints (formal and informal) that structure political, economic, and social interactions. According to Levchenko (2007), they comprise a broad structure that will affect economic outcomes, such as contract enforcement, property law, investor protection, the political system and so on.

Other authors, such as Vijayaraghavan and Ward (2001), focus instead on the ability of institutions to affect economic performance and the reallocation of resources that leads to structural change. However, Samadi and Alipourian (2021) indicate that the impact of institutions on economic performance depends above all on their quality. They indicate that institutional quality measures the power, coherence, and strength of each country's institutions. However, Sawyer (2010) acknowledges that institutional quality is a very broad term, and that there is no standard definition for the notion of "institutional quality" (see Introductory Chapter). This makes studies based on institutional quality complex. According to Sawyer (2010), data on institutional quality are questionable, as they are generally based on surveys that capture perceptions rather than objective measurements.

These elements represent a challenge in the context of our study. This prompts us to refer firstly to Samadi and Alipourian (2021)'s definition of institutional quality, then to use indicators from the ICRG database and, finally, to mobilize the classification of institutions made by Kunčič (2014).

The importance of institutional quality is such that in the World Economic Forum report (2018), it is noted that differences in institutional quality are often the factors that explain the differences observed between countries in terms of technology, physical and human capital and even differences in income. In particular, the report states that stable and efficient institutions are important for the productivity of economic activities. For Siyakiya (2017), the quality of institutions also affects countries' comparative advantages and their participation in the global value chain.

This chapter builds on the work of Dabla-Norris *et al.*, (2013) and Mensah *et al.*, (2016). The contribution of our work is twofold. First, we consider different types of institutions as

specified by Kunčič (2014). Indeed, many works integrate the quality of institutions in their empirical studies, but they do not explain which type of institutions they consider<sup>18</sup>. This represents a novelty in studies of structural change, since institutions are studied by considering a precise classification that makes it possible to identify the institutions that would most favor the process of structural change.

The second contribution is that we consider the notion of institutional threshold in the process of structural change. Similarly, few authors specify the level at which institutional quality can influence the process of structural change.

In this chapter, we first present the empirical literature on the links between institutions and structural change (II); some facts about structural change in sub-Saharan African countries, since the focus is on this region (III); and the discussion of the various results of our econometric study dealing with the links between institutional quality and structural change (IV), and the conclusion at the end (V).

We therefore focus on a particular vision of institutional quality as one of the drivers of structural change.

## II) Empirical analysis of institutional linkages and structural change

We first describe the various measures of institutional quality used in the literature, and then present our data in relation to those we have chosen.

### II.a) Some measures of institutional quality.

Hali (2003) provides a list of recent empirical studies that measure the quality of institutions, namely the quality of governance (corruption, political rights, public sector efficiency and the weight of existing regulations), the existence of laws protecting private property and the enforcement of these laws, and the limits imposed on political leaders. He points out that these measures are not objective, but rather subjective evaluations, assessments by national experts or evaluations of the population through surveys carried out by international organizations and non-governmental organizations. He proposes to classify these measures into three groups: First, the Global Governance Index, which is the average of six measures of institutions obtained from studies by Kaufmann *et al.*, (1999). These are citizen participation and accountability, political stability and absence of violence, government effectiveness, regulatory

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<sup>18</sup> Except for the work of Carraro and Karfakis (2018), which establishes a link between structural transformation and political and economic institutions.

burden, rule of law and absence of corruption. The second measure concerns property rights, i.e., the protection of private property. Finally, the third measure concerns the control of executive power.

To facilitate the reading of this classification, Aron (2000) presents a table detailing the components of institutional measurement indicators in five categories:

- *the quality of formal institutions.*
- *measures of social capital; measures of social, ethnic, cultural, historical and religious characteristics and political institutions.*
- *constitutional rights and types of regimes (dictatorship, democracy).*
- *and measures of political instability such as riots, strikes, civil wars, regime duration and executive change.*

In general, different types of indicators are considered in the studies. Yahyaoui and Rahmani (2009) refer to the PRS Group indices known as the ICRG database, which measure different aspects of governance. The ICRG database comprises twelve components: *government stability, socio-economic conditions, investment profile, external conflict, internal conflict, corruption, military policy, law and order, democratic accountability, and bureaucratic quality.* In our study, we will use the ICRG database.

Yahyaoui and Rahmani (2009) also refer to various World Bank (WB) composite indicators derived from those of Kaufmann *et al.*, (1999). There are six such indicators: *control of corruption, government effectiveness and political stability, absence of violence/terrorism, regulatory quality, and rule of law.*

Finally, there are the various measures used by Kunčič (2014) that classify institutions into legal, political, and economic institutions (Table 2).

Table 2: Institutional quality proxies (Kunčič's classification)

Institutional group and measure	Source	Code
<b>Legal institutions</b>		
Index of Economic Freedom: Property rights	The Heritage Foundation and WSJ	L1
Freedom of the Press: Legal Environment*	Freedom House	L2
Freedom in the World: Civil Liberties*	Freedom House	L3
EFW Index: Judicial independence	Fraser Institute	L4
EFW Index: Impartial courts	Fraser Institute	L5
EFW Index: Protection of property rights	Fraser Institute	L6
Law and order	ICRG	L7
Religion in Politics	ICRG	L8
Rule of Law	WB WGI	L9
<b>Political institutions</b>		
Freedom of the Press: Political Environment*	Freedom House	P1
Freedom in the World: Political Rights*	Freedom House	P2
Institutionalized Democracy - Institutionalized Autocracy	Polity IV	P3
Checks and balances	WB DPI	P4
Democratic accountability	ICRG	P5
Corruption	ICRG	P6
Bureaucratic quality	ICRG	P7
Internal conflict	ICRG	P8
Military in politics	ICRG	P9
Control of Corruption	WB WGI	P10
Corruption perceptions index	Transparency international	P11
Political terror scale*	Political terror scale	P12
<b>Economic institutions</b>		
Index of Economic Freedom: Financial Freedom	The Heritage Foundation and WSJ	E1
Index of Economic Freedom: Business freedom	The Heritage Foundation and WSJ	E2
Regulatory Quality	WB WGI	E3
Freedom of the Press: Economic Environment*	Freedom House	E4
EFW Index: Freedom to own foreign currency bank accounts	Fraser Institute	E5
EFW Index: Regulation of Credit, Labor, and Business: Credit market regulations	Fraser Institute	E6
EFW Index: Regulation of Credit, Labor, and Business: Labor market regulations	Fraser Institute	E7
EFW Index: Regulation of Credit, Labor, and Business: Business Regulations	Fraser Institute	E8
EFW Index: Foreign ownership/investment restrictions	Fraser Institute	E9
EFW Index: Capital controls	Fraser Institute	E10
Investment profile	ICRG	E11

\* Scale is inverse, a higher number implies lower quality.

Source: Classification taken from Kunčič (2014).

In our work, we will only use those dimensions of the table that refer to the ICRG database. In fact, as we wish to carry out a comparative study, we will only use the indicators found in both databases.

II.b) What do the data say about the links between institutional quality and structural change: particularly in the case of SSA countries?

First, we provide a brief overview of the evolution of structural change and GDP income in Sub-Saharan African countries. We then establish a link between GDP, institutional quality, and structural change. To carry out a meaningful analysis of our data, we will use a PCA on institutional quality indicators (twelve ICRG indices) and present the different groups of countries through a HAC.

Our study covers the period from 1984 to 2018. The choice of this period was based on the availability of institutional indicator data. In addition, this study covers 103 countries, including

29 Sub-Saharan African countries (ICRG data not being available for all Sub-Saharan African countries).

*a) Principal component analysis*

As we manage a large dataset, we opt first for PCA, which is one of the oldest and most widely used methods for this kind of analysis, as noted by Jolliffe and Cadima (2016). This makes it possible to reduce the size of the data to be considered and, at the same time, preserve as much variability (statistical information) as possible (Jolliffe and Cadima, 2016). The interest of the technique is that it also enables correlations between variables to be visualized.

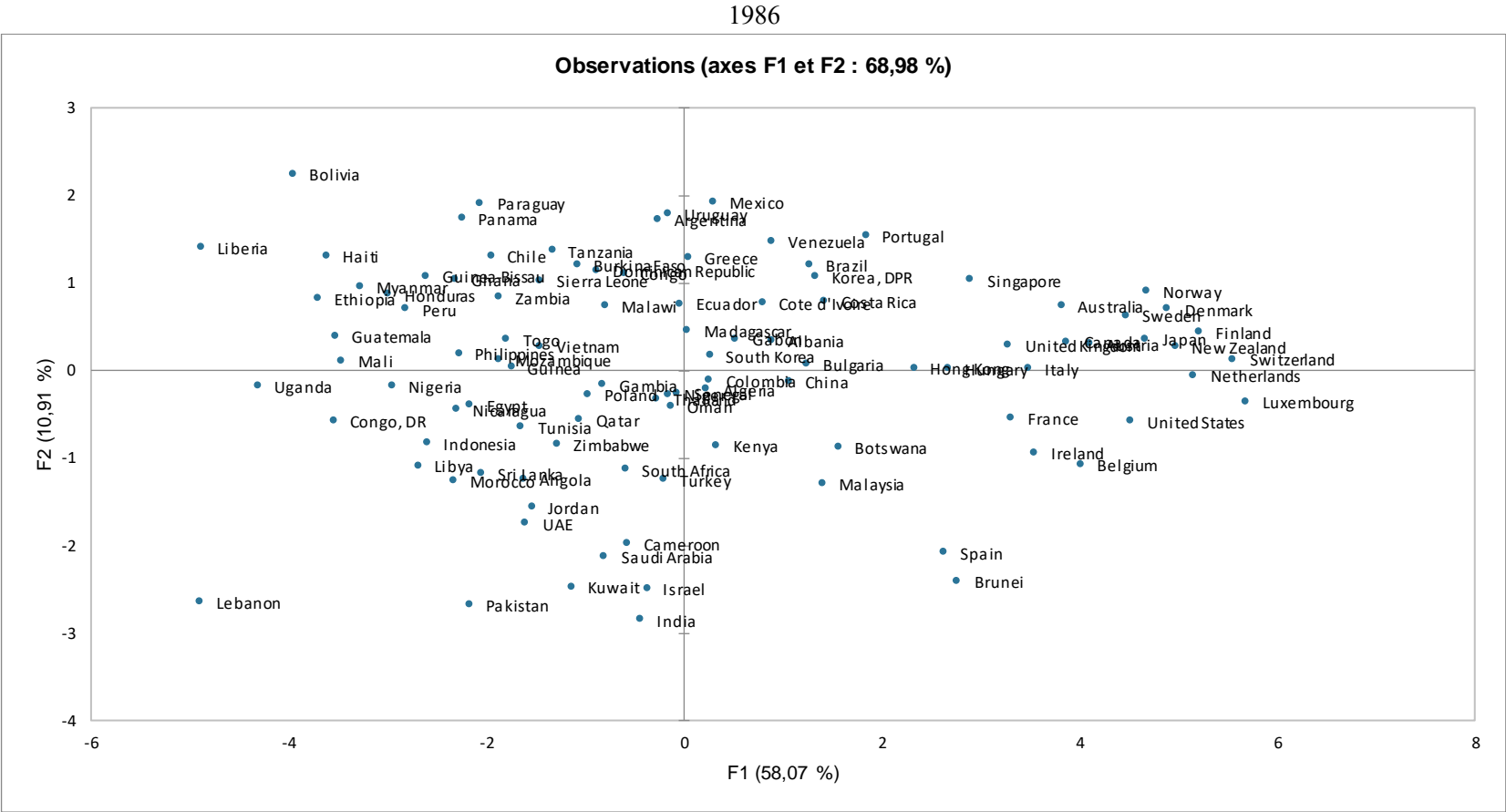
To compare the evolution of countries' institutional quality, we compare the PCA results for 1986 with those for 2018. The data considered are the twelve institutional quality indices of the PRS group.

Figure 3 shows that our data are represented by two axes (F1: horizontal and F2: vertical). Note that the axes were chosen based on relative criteria and insofar as they indicate the most represented values. We can see that most of our institutional indicators are represented on the F1 axis. Overall, our variables are correlated.

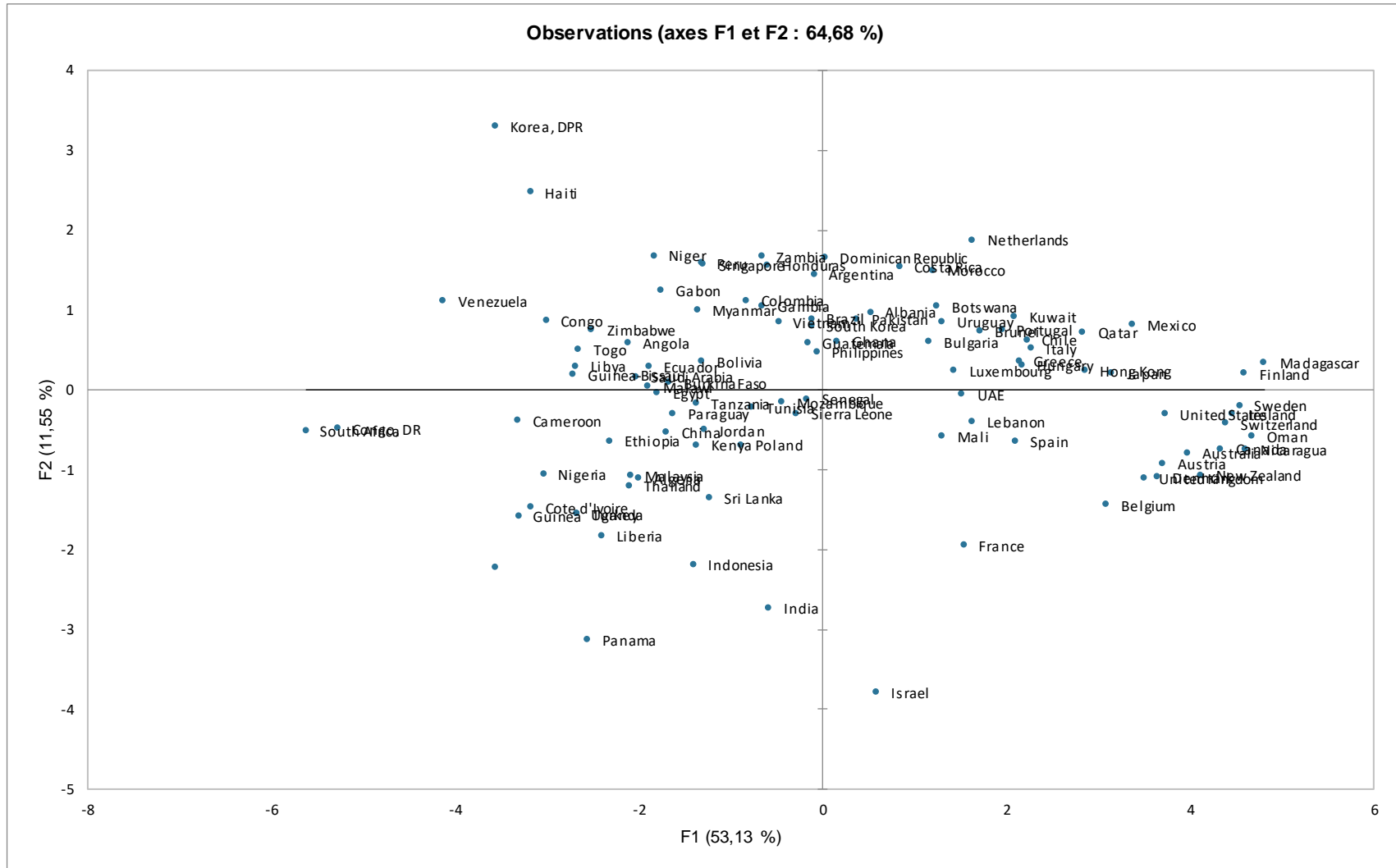
This classification enables us to identify the type of institutions and their correlation. For example, democratic accountability, corruption and the military in politics are positively correlated. Another group is formed by government stability, investment profile, quality of bureaucracy and socio-economic conditions, which are positively correlated (see illustrations in figure 3).

For ease of interpretation, we consider two classes of countries. Those on the right are those with a higher value for institutional quality, and those on the left are those with a lower value. However, given that for the year 2018, some variables are less represented on the axes, we assume that they will be more represented on another axis (F3 for example).

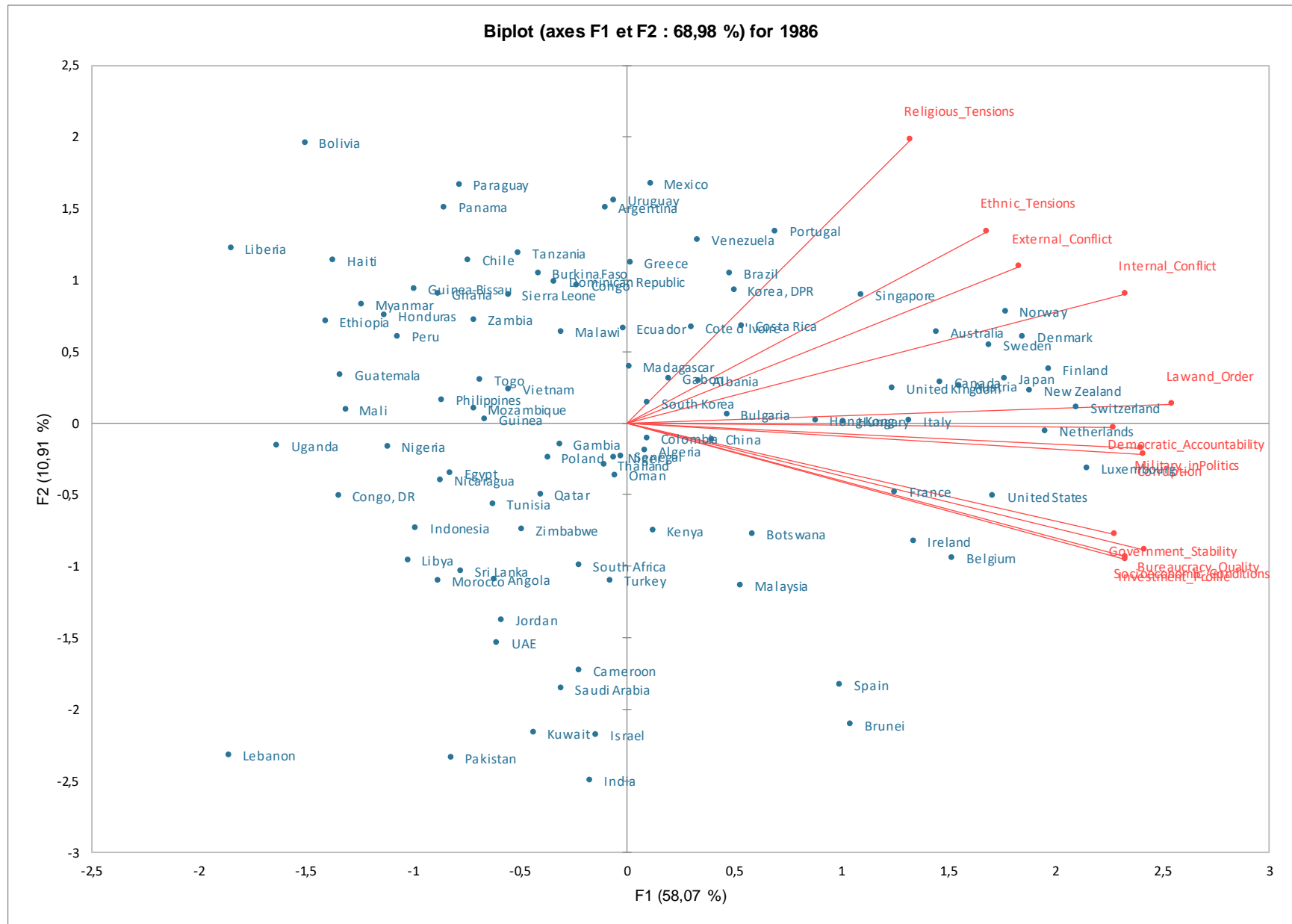
Figure 3: Results of PCA analysis for 1986 and 2018

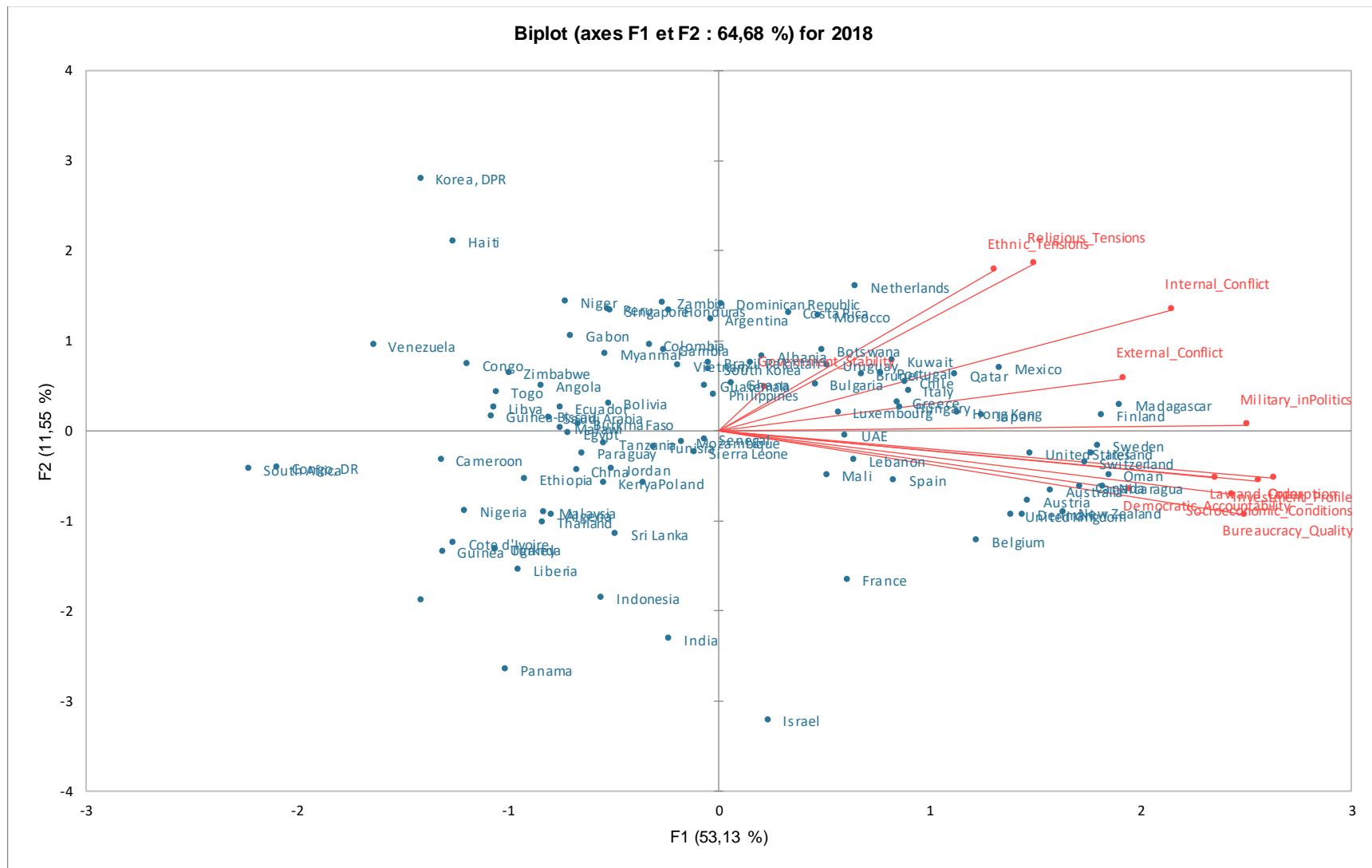


2018









Source: Author's calculations (PCA using the 12 institutional quality indices for 1986 and 2018)

If we look at the lowest-ranked countries, most of them are indeed developing countries, particularly those in the Sub-Saharan Africa region. HAC will provide more details on the ranking of countries in our database.

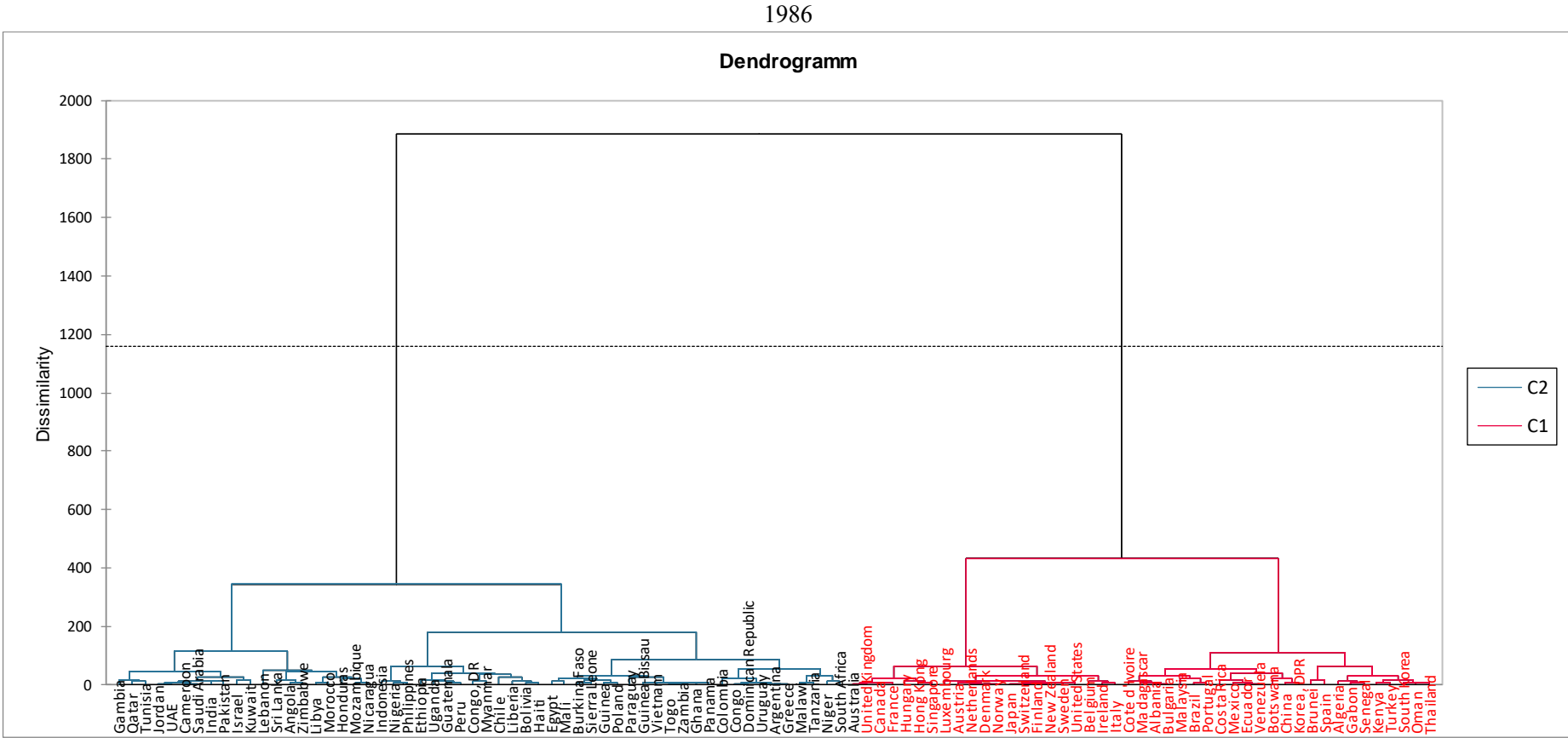
*b) Hierarchical ascending classification (HAC)*

The HAC dendrograms shown in Figure 4 demonstrate the heterogeneity of our database. The data are divided into two broad classes, which are in turn segmented. The first class (C1) contains countries with better institutional quality, and the second class (C2) contains countries with poorer institutional quality.

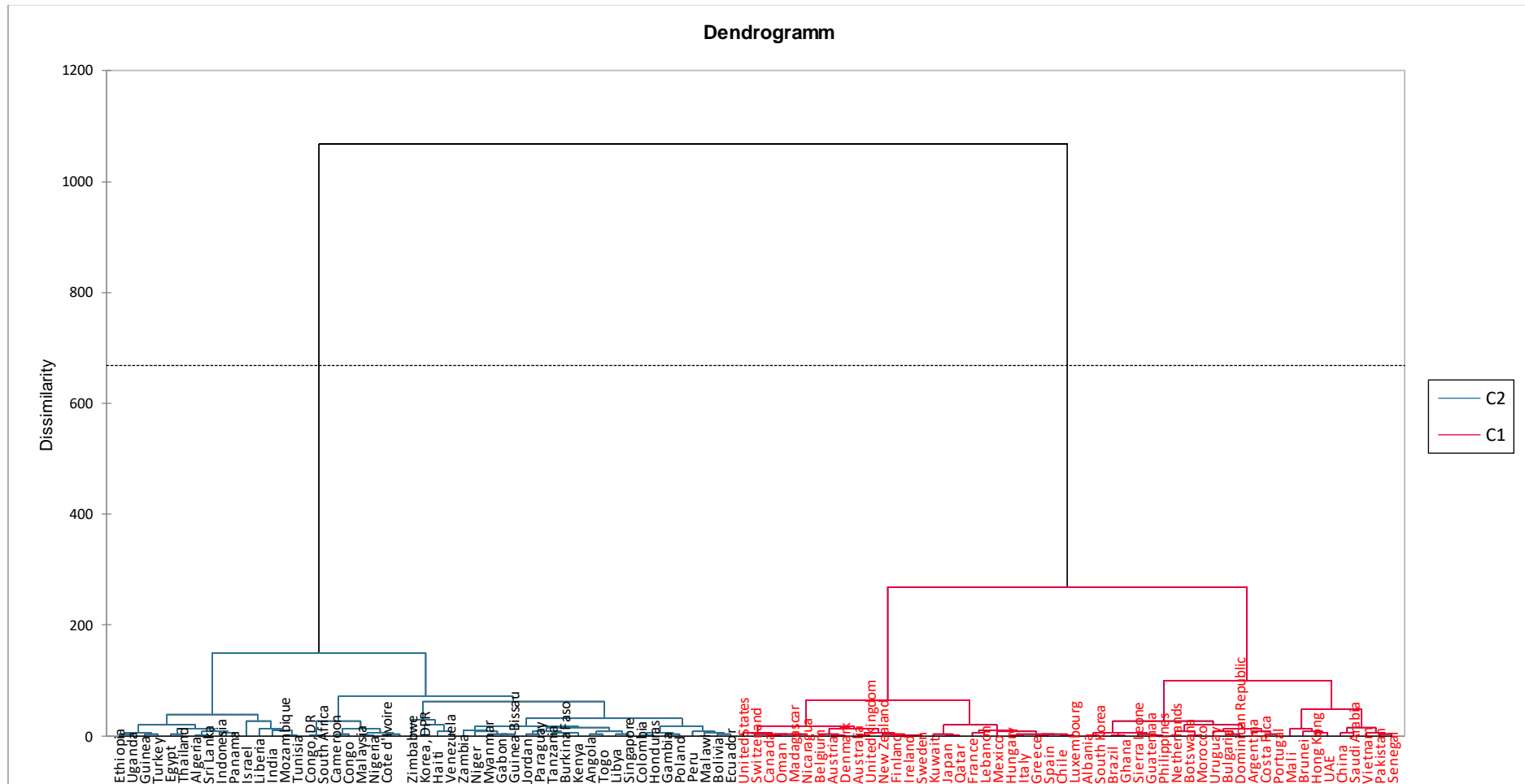
Over the period, we can see that some countries that were in the first class (the best rated) have moved up to the second class, such as Algeria, Côte d'Ivoire and Ecuador. Conversely, other countries that were in the second class in 1986 have moved up to the first class in 2018, such as Argentina, Chile, the Dominican Republic and Ghana. At the same time, some countries remain in the same category. For example, Albania, Botswana and Belgium remain in category C1, while Haiti, Angola, Bolivia and Burkina Faso remain in category C2 (see Appendix I-2).

Most of our sample is made up of countries with poor institutional quality. This classification is not surprising, as the second group contains countries of low institutional quality with low-income levels.

Figure 4: HAC dendrogram.



2018



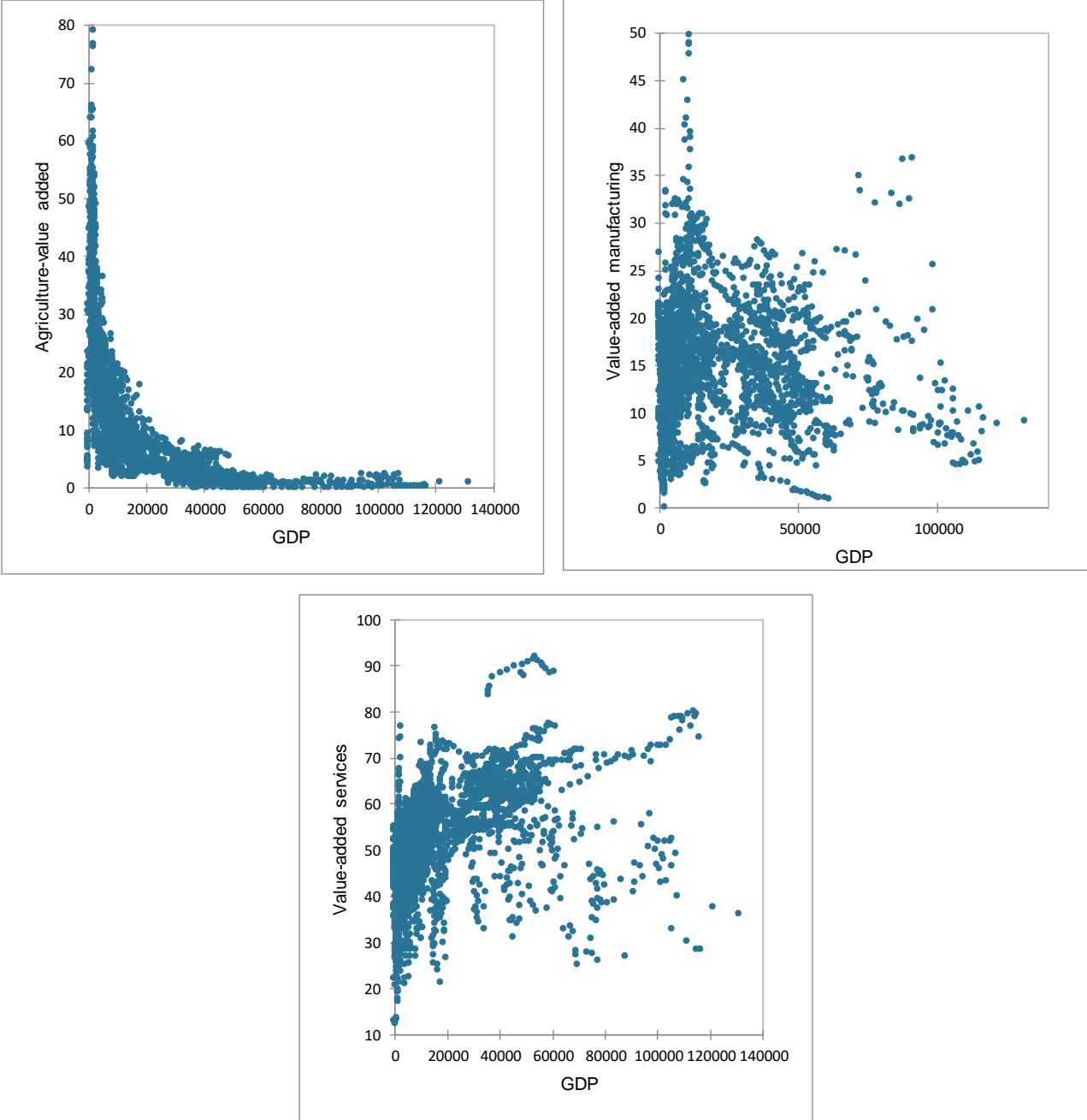
Source: Author's calculations of institutional quality for each period in 1986 and 2018.

Following this classification, we present our data by relating countries' level of development to institutional quality, and the latter's link to the country's economic structure.

*c) Economic structure and GDP per capita*

In the scatterplots below, we compare per capita income with production trends in each sector.

Figure 5: Trends in the relationship between each sector and GDP per capita.



Source: Author's calculations based on World Bank data.

These graphs (above in figure 5) show the evolution of each economic structure of the countries in our sample as a function of their income level. These graphs confirm the structural

transformation model predicted by Kuznets and even Engel's law of demand. If we take the first graph into account, when incomes rise, agricultural production declines, as consumers demand less of these products, shifting their demand to other goods as their need for agricultural goods diminishes. We can see that the value added of services increases when personal income rises. In the latter, we can identify the inverted-U curve of the relationship between the manufacturing sector and income levels.

Given the importance of the industrialization process (job creation and value added, higher productivity than the primary and tertiary sectors) in the development process, we will focus our analysis on the manufacturing sector. Similarly, as the objective of this work is to examine the impact of institutional quality on structural change, we will examine in this section the evolution of manufacturing value added as a function of institutional quality. To do so, we will follow Kunčič (2014)'s classification, i.e. we will consider the proxies of institutional quality linking first legal institutions (law and order)<sup>19</sup> ; then political institutions (democratic accountability, corruption, quality of bureaucracy, internal and military conflict in politics) and finally economic institutions (investment profile).

We take into account the hierarchical ascending classification performed earlier to select the countries that best represent our groups for our empirical analysis. Thus, the sample will be divided into two groups. The first contains 52 countries and the second 49 (for 2018 data). The table in Appendix I-2 lists these countries.

### III) Empirical analysis

To test this relationship econometrically, we draw on the work of Dabla-Norris *et al.*, (2013) and Mensah *et al.*, (2016). We therefore take into account some of the variables they used. However, based on the literature on the determinants of structural change, we add other variables. Our work therefore differs from that of Mensah *et al.*, (2016) in that we use a larger dataset, including more countries than SSA, and more recent data. Finally, we use the empirical methodology of dynamic panel threshold. We use the ICRG database for institutional quality. We test each of these institutional indicators one by one in our sample. The aim is to analyze the "probably" non-linear relationship between countries' productive structure and institutional quality.

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<sup>19</sup> We consider only law and order, as we have no data for the religious in politics in our sample.

The dynamic panel threshold estimator we use is based on the work of Hansen (1999). This model is suitable for our work due to certain restrictive features such as the static case of the model and the exogeneity assumption of the regressors and/or the threshold variable (Seo and Shin, 2016). In other words, the exogeneity assumption means that the fixed effect of the model estimator requires the covariates to be strongly exogenous for the estimator to be consistent (Seo et al., 2019). This model has been extended to a dynamic setting by authors such as Dang *et al.*, (2012), Ramírez-Rondán (2015), Kremer *et al.*, (2013), (for endogenous regressors but assuming the threshold is exogenous), Seo and Shin (2016) (with a threshold variable and endogenous regressors) and Seo *et al.*, (2019) who have made this model testable on Stata software. The extension we consider in our work is the latest version where the authors implement dynamic GMM estimation in first difference. (Seo and Shin, 2016; Seo *et al.*, 2019). As mentioned, the threshold effect in the model allows for the asymmetric effect of exogenous variables depending on whether the threshold variable is above or below the unknown threshold (Seo et al., 2019).

Using the latest extension by Seo *et al.*, (2019) allows us to identify the threshold effect with critical values or p-values of the tests that are easily evaluated by bootstrapping. In addition, it allows us to assess whether the threshold variable is exogenous based on a Hausman p-type test procedure (Seo and Shin, 2016).

Our model is specified as follows:

$$y_{it} = (1, x'_{it}) \phi_1 1 \{q_{it} \leq \gamma\} + (1, x'_{it}) \phi_2 1 \{q_{it} > \gamma\} + \varepsilon_{it}, i = 1, \dots, n; t = 1, \dots, T,$$

Where:

$y_{it}$  is a stochastic variable of interest.

$x'_{it}$  represents the  $k_1 \times 1$  vector of time-varying regressors (independent variables) and may include the lagged dependent variable.

$1 \{.\}$  is an indicator function.

$q_{it}$  is the transition variable (threshold variable). In our work, this is the level of institutional quality.

$\gamma$  is the threshold parameter.

$\phi_1$  and  $\phi_2$  are the slope parameters associated with the different regimes.



$\mathcal{E}_{it}$  represents the error and the component.  $\mathcal{E}_{it} = \alpha_i + u_{it}$  with  $\alpha_i$  as an unobserved individual fixed effect and  $u_{it}$  is assumed to be a Martingale Difference Sequence (MDS)<sup>20</sup>.

Our extended model is written as follows:

$$\begin{aligned}
 SC_{it} = & \phi_1 SC_{it-1} + \theta_{11} INST + \theta_{21} \ln POP + \theta_{31} Mineralrents + \theta_{41} Arableland \\
 & + \theta_{51} \ln Gdpperccap + \theta_{61} Tradeopeness + \theta_{71} FDI) 1\{q_{it} \leq \gamma\} \\
 & \phi_2 SC_{it-1} + \theta_{12} INST + \theta_{22} \ln POP + \theta_{32} Mineralrents + \theta_{42} Arableland \\
 & + \theta_{52} \ln Gdpperccap + \theta_{62} Tradeopeness + \theta_{72} FDI) 1\{q_{it} > \gamma\} + \alpha_i + u_{it}
 \end{aligned}
 \tag{1}$$

Where:  $SC_{it}$  represents the added value of the manufacturing industry share (% of GDP).

$INST$ , represents the institutional quality variables from the ICRG database (added one by one in our estimates).

$\ln POP$ , represents the log of total population of each country.

$Mineralrents$ , represents the country's natural resource endowment.

$Arableland$  takes into account the country's land factor endowment.

$\ln Gdpperccap$ , represents the log of GDP per capita.

$Tradeopeness$  indicates each country's level of trade openness.

$FDI$  is foreign direct investment, which is seen as one of the channels for technology transfer to developing countries.

### III.a) Data and variables

We present here the list of data used for the empirical study of the links between institutional quality and structural change, as well as the expected signs.

**Institutional variables:** for all indicators, the lower the value, the higher the risk in that country, but the higher the indicator value, the lower the risk. For these indicators, the

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<sup>20</sup> This is related to the martingale considered as a sequence of random variables for which, at a given moment, the conditional expectation of the next value in the sequence is equal to the current value, independently of all previous values.

hypothesis is that, due to a threshold, the expected sign will be + for low-risk countries and - for high-risk countries.

**Population:** Population size is used to consider the effect of domestic market size. According to the literature, a large domestic market enables companies to achieve economies of scale (Leukhina and Turnovsky, 2016). According to Ho (2015), population growth increases relative manufacturing output compared to agricultural output, which increases the relative price of agricultural products. (The expected sign for this variable is +).

**GDP per capita:** According to the literature, the higher the income, the less the population will turn to consuming agricultural products (Engel's law). Demand will be redirected towards higher-quality or more sustainable products. A positive effect on industrialization and structural change should therefore be observed when per capita income rises. However, according to Mijiyawa (2017), at a certain income level, it is very likely that an increase in per capita income will be followed by a decrease in the share of manufacturing production due to specialization towards the service sector. The expected sign is therefore uncertain (+/-).

**FDI inflows:** We consider the stock of inward FDI, which corresponds to the values of equity and net loans from international investors to firm's resident in the country under consideration. Countries with developed manufacturing sectors are assumed to be those that have invested in the accumulation of knowledge and technological capabilities (Mijiyawa, 2017). Thus, as the stock of FDI represents one of the channels through which technology is transferred from developed to developing countries, we expect a positive effect on structural change. (The expected sign would therefore be +).

**Openness to trade:** we used the "openness" variable from the World Bank database. Openness is defined as the sum of exports and imports of goods and services relative to GDP. In the literature on structural change, companies in countries open to international trade are obliged to improve their productivity to keep up with other global companies. For example, Rodrik (2011) has shown that globalization accompanied by the removal of trade barriers puts pressure on local producers to conform to the standards of global competitors. Thus, trade openness increases competition and leads to productivity gains. However, Hausmann and Rodrik (2003) ; Hausmann *et al.*, (2007) agree that trade openness enables access to new technologies and promotes structural change only if the country has good institutions. We would expect a positive effect of trade openness on industrialization and structural change

unless the country is trapped in low-productivity specializations. The expected sign is therefore uncertain (+/-).

**Mineral rents (% of GDP):** These represent the difference between the production value of a mineral stock valued at world prices and its local production costs. The minerals included in the indicator are tin, gold, lead, zinc, iron, copper, nickel, silver, bauxite, and phosphate (World Bank). If the institutions are not efficient, the revenues from mineral rents could have a negative impact on structural change process, especially in terms of lack of diversification. The expected sign is -.

**Arable land (% of surface area):** The World Bank and FAO define arable land as land temporarily under cultivation, temporary grassland for mowing or grazing, market or kitchen garden land and land temporarily fallow. The expected sign is - because countries with land endowment factors tend to focus their production in the agricultural sector. Thus, a land-rich country would have a positive impact on the agricultural sector but would be at the expense of other sectors if no policy were defined upstream by the authorities with a view to diversifying this economy.

### III.b) Data statistics

As we lack empirical studies that applied the dynamic threshold panel model defined by Seo and Shin (2016), including the applicable version of Seo *et al.*, (2019), we applied the methodology presented in the work of Bolarinwa and Akinlo (2021).

Our analysis data (PCA/HAC) is based on 103 countries and covers the period from 1984 to 2018. The sample includes both developed and developing countries. However, the dynamic panel threshold used in this paper limits the use of all data, as this method accepts no missing values. In addition, we must have balanced panel data. This also reduces our sample and the number of exogenous variables. Our econometric tests are therefore carried out over the period from 2001 to 2018.

The table in Appendix I-3 presents statistics on the data used for dynamic threshold panel regression. We note that for the institutional quality indices, the average is 6.657, and that the minimum value of institutional quality in this database is 3.3 and the maximum value 9.608. We also produced a composite index based on the twelve indicators of a PCA for each country (*noted PCA*); we obtain an average index value of 0, with a minimum value of -2.141 and a maximum value of 1.977. We have also calculated a simple average of the value of these indicators for each country (*noted INST*), with a value of 6.57 for the period.

In Table 3, we show the correlation between the independent variables and the dependent variable, which is the manufacturing sector's share of value added as a percentage of GDP.

Table 3: Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Manufacturing VA	1.000							
(2) INST	0.034	1.000						
(3) Total population	0.329	-0.231	1.000					
(4) Mineral rents	-0.107	-0.168	0.045	1.000				
(5) Arable land	0.036	-0.038	0.283	-0.106	1.000			
(6) Trade openness	-0.010	0.334	-0.378	-0.088	-0.099	1.000		
(7) FDI inflows	-0.102	0.203	-0.200	0.002	-0.012	0.539	1.000	
(8) Gdp per capita	0.114	0.746	-0.179	-0.267	-0.094	0.361	0.139	1.000

*Source: Author's calculations*

Using the average "INST" variable and the index obtained from PCA, we observe a positive relationship between average institutional quality and share of manufacturing value added. We also note that the coefficients range from -0.102 to 0.746. We obtain an extreme value for Gdp per capita and INST due to a potential endogeneity problem between these two variables. However, for the entire model, the mean of the VIF test, with a value of 1.81 (less than 5), allows us to affirm that our model does not suffer from severe multicollinearity (appendix I-4).

Results on variable stationarity are presented in Appendix I-5. Most of our variables are level stationary. However, as Bolarinwa and Akinlo (2021) point out, having a mixture of level-stationary and first-difference data means that using fixed- and random-effects methods is not efficient. This therefore justifies the choice of using a non-linear method such as dynamic threshold regression on panel data.

In our estimation, we obtain a bootstrap p-value equal to 0, which confirms the non-linearity of our relationship and the hypothesis of non-linearity in the relationship between institutional quality and the process of structural change.

### III.c) Estimates

We regress the INST and PCA variables to obtain an overall picture of this relationship. Then, we introduce each indicator based on the classification presented by Kunčič (2014). In our model, institutional quality indicators are both regressors and potentially thresholds. In this

general model, we are interested in the effects of variables according to the level of institutional quality considered. For low levels of institutional quality, we refer to the "lower regime", and for high levels to the "higher regime". Threshold levels determine the division between the two regimes.

As mentioned above, based on the dynamic threshold panel model, missing values are not accepted and due to the multicollinearity problem, some independent variables are excluded from our model.

In the table below (Table 4), we can study the impact of institutional quality in the lower scheme (variable with indicator `_b`) and in the higher scheme (variable with indicator `_d`).

Table 4: Institutional quality as a regressor and threshold for structural change (average of 12 indicators)

VARIABLES	(1) INST	(2) PCA
<b>Lower Regime (_b)</b>		
Lagged dependent variable_b	0.792*** (0.0115)	1.183*** (0.0524)
Ln (Totalpopulation)_b	-0.651** (0.261)	-0.990 (0.628)
Mineralrents_b	-0.234*** (0.0329)	-1.192*** (0.0779)
Arableland_b	-0.140*** (0.0299)	-0.141*** (0.0244)
Tradeopenness_b	0.00968*** (0.00164)	0.0102** (0.00517)
FDInflows_b	0.0112*** (0.00261)	0.0179*** (0.00630)
Ln (Gdppercapita)_b	-1.756*** (0.201)	1.177*** (0.334)
INST_b	-0.416*** (0.124)	
PCA_b		-12.85*** (0.986)
<b>Upper regime (_d)</b>		
cons_d	-4.419*** (1.290)	11.28 (11.51)
Lagged dependent variable_d	-0.0414*** (0.00648)	-0.295*** (0.0526)
Ln (Totalpopulation)_d	0.0670 (0.0527)	0.212 (0.612)
Mineralrents_d	0.274*** (0.0242)	1.491*** (0.103)
Arableland_d	0.0226*** (0.00582)	-0.0584** (0.0248)
Tradeopenness_d	0.00380*** (0.00104)	-0.00389 (0.00575)
FDInflows_d	-0.0173*** (0.00224)	-0.0403*** (0.00709)
Ln (Gdppercapita)_d	0.316*** (0.0768)	0.557* (0.310)
INST_d	2.120*** (0.196)	
PCA_d		12.83*** (1.028)
r	-0.0561 (0.0547)	-0.830*** (0.0565)
Observations	91	90
Bootstrap p-value for linearity test	0	0

Standard errors in brackets \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

We observe significant coefficients for the INST and PCA variables. This means that institutional quality plays a role in the process of structural change. For countries in the lower regime (those with low institutional quality scores), there is a negative impact on the process of

structural change. However, for countries in the higher regime, there is a positive effect in this process.

We note, however, that for the first model using the INST variable, the threshold (noted  $r$ ) is not significant. However, when we use the PCA variable, it becomes significant. In the context of this variable, this means that in the lower regime, the effect is negative, while in the higher regime, it is positive.

When countries are in the lower regime, we observe positive and significant coefficients for the variables FDI, trade openness and GDP per capita. According to Mijiyawa (2017), the positive sign for FDI is explained by the fact that it is one of the channels through which technology can be transferred to developing countries. They would therefore have a positive impact on structural change. We note that this relationship does not hold true for higher-regime countries. This may be explained by the fact that in the most industrialized countries in our sample, FDI is directed towards the service sector and therefore has no impact on industrialization.

For trade openness, we find significant and positive coefficients for countries in the lower regime. The work of Borrmann *et al.*, (2006) in fact establishes a positive link for countries with low-quality institutions. They note that trade improves welfare by increasing specialization and encourages productivity growth within industries. However, they note that trade has little impact if the movement of factors is restricted between industries (which can only block structural change). They argue that in many economies, the low quality of institutions (measured by strict forms of regulation), prevents, for example, labor from moving between sectors or between firms. They note that if the structure of economic activity is rigid, trade has only a modest impact on the allocation of resources between and within industries, so low institutional quality can encourage poor specialization, particularly in goods where the country has no comparative advantage. Similar results can be found in Chang *et al.*, (2009), who suggest that trade would have a positive impact depending on certain conditions established in countries.

We identify a positive and significant impact of the coefficient of the variable GDP per capita for both regimes. Mijiyawa (2017) finds a negative impact of GDP per capita on manufacturing; however, he also finds a positive effect of GDP per capita squared. He explains this U-shaped relationship by the fact that if a country is uncompetitive, the increase in income is linked to an increase in demand for manufactured goods, which will be met by importing these goods, thus reducing the share of manufacturing in GDP that has become more capital- and skill-intensive (Rodrik, 2013). This point explains why deindustrialization occurs at lower income levels.

For mineral rents and arable land, we find negative and significant coefficients for countries in the lower regime. However, for countries in the higher regime, the coefficients for rents and arable land are positive and significant. However, for the arable land variable, we find a negative and significant result when PCA is used in the model. Dabla-Norris *et al.*, (2013) also find a negative relationship between arable land and manufacturing industry. They underline the importance of land endowment for the agricultural sector, whatever the level of development of countries. The work of McMillan and Rodrik (2011), Dabla-Norris *et al.*, (2013) also confirm that a high share of mining activity translates into lower shares of value added in all sectors. Mensah *et al.*, (2016) also find this negative relationship for the manufacturing sector. However, in our estimates, this relationship is positive for high-regime countries, suggesting that they have been able to better diversify their economies.

Overall, we find that, depending on the level of institutional quality, the independent variables have an impact in line with the literature that asserts that institutional quality plays a role in structural change. However, these impacts manifest themselves in different ways depending on the countries' initial conditions.

As the main objective of this chapter is to study which component of institutions matters most for the process of structural change, in connection with the work of Kunčič (2014), we use indicators of institutional quality considering each type of institution (legal, political, and economic).

In Table 5 (for legal and economic institutions), we note a negative and significant coefficient for the "law and order" variable (referring to the legal institution), in the case of both regimes. A positive and significant coefficient is obtained for the "investment profile" variable only for countries in the higher regime. On the other hand, this coefficient is negative for countries in the lower regime but is not significant.



Table 5: Indicators of legal institutions (Law and order (LO)) and economic institutions (investment profile (invprof))

<b>VARIABLES</b>	(1) LO	(2) Invprof
<b>Lower Regime</b>		
Lagged dependent variable_b	0.948*** (0.0163)	0.840*** (0.0149)
Ln (Totalpopulation)_b	-0.0782 (0.480)	1.294*** (0.372)
Mineralrents_b	0.0590 (0.0379)	-0.0200 (0.0393)
Arableland_b	-0.0569* (0.0341)	0.0853*** (0.0268)
Tradeopenness_b	0.0190*** (0.00135)	0.00951*** (0.00158)
FDInflows_b	-0.0286*** (0.00382)	-0.0133*** (0.00381)
Ln (Gdppercapita)_b	0.780** (0.303)	-0.498*** (0.170)
Law and Order_b	-1.241*** (0.223)	
Investment profile_b		-0.0233 (0.0539)
<b>Upper regime</b>		
cons_d	-28.49 (18.51)	-11.65 (7.485)
Lagged dependent variable_d	0.137*** (0.0408)	0.105*** (0.0304)
Ln(Totalpopulation)_d	3.132*** (0.767)	-0.895*** (0.281)
Mineralrents_d	-2.060*** (0.690)	0.913*** (0.148)
Arableland_d	-0.349*** (0.0576)	0.00640 (0.00663)
Tradeopenness_d	-0.0229*** (0.00720)	-0.0236*** (0.00300)
FDInflows_d	0.153*** (0.00629)	0.0799*** (0.00579)
Ln(Gdppercapita)_d	1.933 (1.187)	1.132*** (0.293)
Law and Order_d	-3.912*** (0.900)	
Investment profile_d		1.369*** (0.303)
r	5*** (0.0706)	10.44*** (0.302)
Observations	90	90
Bootstrap p-value for linearity test	0	0

Standard errors in parentheses: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

For political institutions (Table 6), the ICRG indicators used are those of democratic accountability, quality of bureaucracy, and internal conflict. These variables are assumed to have a negative and significant impact for lower-regime countries, but positive and significant for higher-regime countries (only the variables "corruption" and "military in politics" have negative and significant coefficients in higher-regime countries). For example, in the work of Mijiyawa (2017), or Chang (2013) and Altenburg (2011), a country with high bureaucratic quality is likely to succeed in pursuing a good industrial policy. Nevertheless, corruption seems to have a positive impact on lower-regime countries and a negative impact on higher-regime countries. These results seem to confirm the "oil in the wheels" hypothesis for lower-regime countries and the "sand in the wheels" hypothesis for higher-regime countries. Finally, we find a negative coefficient for the "military in politics" variable for high-regime countries.

Table 6: Indicators of political institutions (democracy accountability, corruption, quality of bureaucracy, internal conflict, and military in politics)

<b>VARIABLES</b>	(1) Demoacc	(2) Corrup	(3) Burqual	(4) Intconf	(5) Milpol
<b>Lower regime</b>					
Lagged dependent variable_b	0.760*** (0.0186)	0.955*** (0.0167)	0.893*** (0.0383)	0.930*** (0.0158)	0.983*** (0.0129)
Democracy accountability_b	-1.610*** (0.209)				
Corruption_b		0.884*** (0.223)			
Bureaucracy quality_b			-4.097*** (0.620)		
Internal conflict_b				-0.134*** (0.0491)	
Military in politics_b					-0.0234 (0.123)
Ln(Totalpopulation)_b	3.459*** (0.344)	-0.643 (0.501)	-0.625 (0.448)	2.629*** (0.270)	0.136 (0.343)
Mineralrents_b	-0.0363 (0.0474)	-0.568*** (0.0644)	-0.236*** (0.0526)	-0.0822** (0.0322)	0.0804*** (0.0216)
Arableland_b	-0.117*** (0.0257)	-0.407*** (0.0283)	0.301*** (0.0671)	-0.0887*** (0.0254)	-0.0659** (0.0298)
Tradeopenness_b	0.00794*** (0.00119)	-0.00486* (0.00261)	0.0203*** (0.00370)	0.00798*** (0.00102)	0.00541*** (0.00116)
FDInflows_b	-0.0280*** (0.00741)	0.0263*** (0.00555)	0.00956 (0.00736)	-0.0372*** (0.00576)	-0.0115*** (0.00290)
Ln (Gdppercapita)_b	-0.428** (0.199)	-0.681*** (0.260)	-0.871*** (0.161)	-0.613*** (0.174)	0.165 (0.154)
<b>Upper regime</b>					
cons_d	18.28*** (2.863)	-7.283** (3.560)	-23.15*** (7.343)	-3.113 (8.309)	100.1*** (22.96)
Lagged dependent variable_d	0.192*** (0.0112)	-0.398*** (0.0234)	-0.0719** (0.0336)	-0.0381 (0.0441)	0.0823*** (0.0287)
Ln(Totalpopulation)_d	-1.355*** (0.136)	0.620*** (0.204)	1.685*** (0.387)	0.523*** (0.202)	-3.739*** (0.826)
Mineralrents_d	0.0890 (0.0597)	0.630*** (0.0898)	0.412*** (0.0860)	0.217 (0.178)	-0.548*** (0.139)

Arableland_d	0.129*** (0.0149)	0.119*** (0.0250)	-0.314*** (0.0722)	0.00814 (0.0112)	-0.0605 (0.0495)
Tradeopenness_d	-0.00681** (0.00280)	0.0255*** (0.00515)	-0.0120** (0.00494)	-0.00186 (0.00337)	0.0207*** (0.00408)
FDInflows_d	0.0739*** (0.00838)	0.0116 (0.00723)	0.0284*** (0.00991)	0.0837*** (0.00988)	0.0565*** (0.00650)
Ln(Gdppercapita)_d	-0.0634 (0.152)	-0.147 (0.167)	-0.513** (0.238)	-1.369*** (0.403)	-0.808** (0.365)
Democracy accountability_d	0.880*** (0.323)				
Corruption_d		-0.642** (0.261)			
Bureaucracy quality_d			4.908*** (0.728)		
Internal conflict_d				1.005** (0.451)	
Military in politics_d					-6.074** (2.701)
r	3.631*** (0.257)	2.465*** (0.0899)	1.551*** (0.214)	10.50*** (0.174)	5.111*** (0.0995)
Observations	90	90	90	90	90
Bootstrap p-value for linearity test	0	0	0	0	0

Standard errors in parentheses: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

We test the other indicators not ranked by Kunčič (2014) such as government stability, socio-economic conditions, religious tensions, external conflicts, and ethnic tensions (see Appendix I-6). We find significant but differentiated coefficients according to regime level. This confirms that the quality of institutions has an impact on the process of structural change, but this depends on the threshold levels. This implies the existence of thresholds in the relationship between structural change and institutional quality.

To test the robustness of our estimates we introduce the data used by Kunčič (2014) into our estimates. In Table 7, we find that legal, economic, and political institutions have an impact on the structural change process, but differently depending on the level of institutions. We find that the coefficients of the "legal and political institutions" variables have negative and significant impacts for countries in the lower regime and positive ones for those in the higher regime. These results are consistent with the fact that low-regime countries are those with weak legal and political institutions, which would explain the negative signs. As far as economic institutions are concerned, the coefficients are positive and significant for lower-regime countries. This is consistent with the findings of Carraro and Karfakis (2018) that institutional quality and economic freedom measures positively and significantly affect structural transformation in all sectors (agriculture, industry, and services), particularly in the case of Sub-Saharan African countries.

Table 7: Legal, economic, and political institutions and structural change (classification by Kuncic, 2014).

VARIABLES	(1)	(2)	(3)
	Legal Institutions	Economic Institutions	Political Institutions
<b>Lower regime</b>			
Lagged dependent variable_b	0.402*** (0.00933)	0.428*** (0.0177)	0.340*** (0.0220)
Legal institutions_b	-10.04*** (3.881)		
Economic institutions_b		13.44*** (2.913)	
Political insitutions_b			-6.874*** (1.876)
Ln (Totalpopulation)_b	0.272 (0.661)	-5.134*** (0.583)	-0.300 (0.541)
Mineralrents_b	-0.161*** (0.0358)	0.754*** (0.0974)	0.302*** (0.0446)
Arableland_b	-0.0574*** (0.0212)	-0.0915*** (0.0271)	0.0875*** (0.0168)
Tradeopenness_b	0.00846* (0.00484)	-0.00263 (0.00709)	0.000983 (0.00420)
FDInflows_b	0.0399** (0.0167)	-0.0952*** (0.0245)	-0.0556*** (0.0156)
Ln (Gdpper capita)_b	0.307** (0.128)	0.377*** (0.112)	1.388*** (0.253)

<b>Upper regime</b>			
cons_d	-1.965 (8.353)	23.62*** (4.953)	68.57*** (6.706)
Lagged dependent variable_d	0.144*** (0.0329)	0.148*** (0.0182)	0.290*** (0.0158)
Ln(Totalpopulation)_d	0.623* (0.366)	-1.255*** (0.214)	-3.704*** (0.354)
Mineralrents_d	0.208*** (0.0620)	-0.829*** (0.104)	-0.432*** (0.0647)
Arableland_d	-0.00387 (0.0318)	0.115*** (0.0293)	-0.149*** (0.0244)
Tradeopenness_d	0.0167*** (0.00642)	0.0221*** (0.00783)	0.0274*** (0.00628)
FDInflows_d	-0.0295* (0.0178)	0.133*** (0.0263)	0.0893*** (0.0177)
Ln (Gdppercapita)_d	-1.889*** (0.343)	-1.070*** (0.176)	-1.779*** (0.296)
Legal institutions_d	16.23*** (5.073)		
Economic institutions_d		1.822 (5.013)	
Political institutions_d			8.812*** (3.098)
r	0.512*** (0.0395)	0.459*** (0.0185)	0.423*** (0.0207)
Observations	78	78	78
Bootstrap p-value for linearity test	0	0	0

Standard errors in brackets \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

#### IV) Conclusion

In this chapter, our main objective is to present which type of institutions matter most for the dynamics of structural change. Based on the work of Kunčič (2014), we use a classification of institutions (legal, political, and economic). As indicators of institutional quality, we refer to both the ICRG database and the one developed by Kunčič (2014). Considering the average of the twelve institutional indices in the ICRG database, we find a negative relationship between institutional quality and structural change (share of manufacturing industry measuring industrialization) for lower-regime countries, but positive for higher-regime countries. However, when we consider each index separately, we find differentiated links according to the level of institutional quality. We find that legal, political, and economic institutions are all important. Our results are broadly consistent with many studies such as Dabla-Norris *et al.*, (2013), Mensah *et al.*, (2016) and Mijiyawa (2017). It allows us to confirm the work of North (1991), who explains that political and economic institutions are essential elements of an effective institutional matrix. In this chapter, we use a dynamic threshold regression on panel data that allows us to introduce potentially endogenous regressors.

This analysis enables us once again to underline the importance of institutional quality in the process of structural change. What we have found during this study is that there is an institutional threshold to be reached before institutional quality can foster this change. This prompts us to encourage improvements in institutional quality, particularly in developing countries.

In this work, the institutional channel is directly linked to structural change. However, institutions can represent channels in many ways that explain more economic phenomena. The quality of institutions is even more important at a time when environmental issues are at stake. For example, as developing countries are encouraged to industrialize to achieve a certain level of wealth, state intervention is increasingly crucial if they are to adopt a logic of reducing gas emissions. This involves, among other things, encouraging environmentally friendly industries in their production processes, or encouraging them through international trade to reduce their carbon footprint.



## Appendices Chapter 1

### Appendix I- 1 : Classification of economic activity ISIC rev 4

AGGREGATE ECONOMIC ACTIVITY			SECTIONS ISIC- REV. 4	SECTIONS ISIC- REV. 3	SECTIONS ISIC- REV. 2
Agriculture			A	AB	1
No Agriculture	Industry	Manufacturing	C	D	3
		Construction	F	F	5
		Mining and quarrying; Electricity, gas and water supply	B, D, E	C, E	2, 4
	Services	Market Services (Trade; Transportation; Accommodation and food; and Business and administrative services)	G, H, I, J, K, L, M, N	G, H, I, J, K	6, 7, 8
		Non-market services (Public administration; Community, social and other services and activities)	O, P, Q, R, S, T, U	L, M, N, O, P, Q	9
Not elsewhere classified			X		0

### CITI REV. 4

- A. Agriculture, forestry and fishing
  - 01 - Plant and animal production, hunting and related services
  - 02 - Forestry and logging
  - 03 - Fisheries and aquaculture
- B. Mining and quarrying
  - 05 - Coal and lignite mining
  - 06 - Crude oil and natural gas extraction
  - 07 - Metal ore mining
  - 08 - Other mines and quarries
  - 09 - Mining support service activities
- C. Manufacturing
  - 10 - Manufacture of food products
  - 11 - Beverage manufacturing
  - 12 - Manufacture of tobacco products
  - 13 - Textile manufacturing
  - 14 - Manufacture of wearing apparel
  - 15 - Manufacture of leather and related products
  - 16 - Woodworking and manufacture of articles of wood and cork, except furniture; manufacture of articles of straw and basketware
  - 17 - Manufacture of paper and paper products
  - 18 - Printing and reproduction of recorded media
  - 19 - Manufacture of coke and refined petroleum products
  - 20 - Chemical manufacturing
  - 21 - Manufacture of pharmaceutical, medico-chemical and botanical products
  - 22 - Manufacture of rubber and plastic products
  - 23 - Manufacture of other non-metallic mineral products
  - 24 - Manufacture of base metals
  - 25 - Manufacture of fabricated metal products, except machinery and equipment
  - 26 - Manufacture of computer, electronic and optical products
  - 27 - Manufacture of electrical equipment
  - 28 - Manufacture of machinery and equipment n.e.c.
  - 29 - Manufacture of motor vehicles, trailers and semi-trailers
  - 30 - Manufacture of other transport equipment

31 - Furniture manufacturing  
 32 - Other manufacturing industries  
 33 - Repair and installation of machinery and equipment  
 D. Electricity; gas, steam and air conditioning supplies  
 35 - Electricity, gas, steam and air conditioning supplies  
 E. Water supply, sanitation, waste management and remediation activities  
 36 - Water collection, treatment and distribution  
 37 - Sanitation  
 38 - Waste collection, treatment and disposal activities; materials recovery  
 39 - Sanitation and other waste management services  
 F. Construction  
 41 - Building construction  
 42 - Civil engineering  
 43 - Specialized construction activities  
 G. Wholesale and retail trade; repair of motor vehicles and motorcycles  
 45 - Wholesale and retail trade and repair of automobiles and motorcycles  
 46 - Wholesale trade, except of motor vehicles and motorcycles  
 47 - Retail trade, except of motor vehicles and motorcycles  
 H. Transport and storage  
 49 - Land and pipeline transport  
 50 - Water transport  
 51 - Air transport  
 52 - Warehousing and support activities for transport  
 53 - Postal and courier activities  
 I. Accommodation and catering  
 55 - Housing  
 56 - Food and beverage services  
 J. Information and communication  
 58 - Publishing activities  
 59 - Motion picture, video and television program production, sound recording and music publishing  
 60 - Programming and broadcasting activities  
 61 - Telecommunications  
 62 - Computer programming, consulting and related activities  
 63 - Information service activities  
 K. Financial and insurance activities  
 64 - Financial service activities, except insurance and pension funding  
 65 - Insurance, reinsurance and pension financing, excluding compulsory social security  
 66 - Activities auxiliary to financial services and insurance  
 L. Real estate activities  
 68 - Real estate activities  
 M. Professional, scientific and technical activities  
 69 - Legal and accounting activities  
 70 - Head office activities; management consulting activities  
 71 - Architectural and engineering activities; technical testing and analysis  
 72 - Scientific research and development  
 73 - Advertising and market research  
 74 - Other professional, scientific and technical activities  
 75 - Veterinary activities  
 N. Administrative and support service activities  
 77 - Rental and leasing activities  
 78 - Employment-related activities  
 79 - Travel agencies, tour operators, reservation services and related activities  
 80 - Security and investigation activities  
 81 - Services to buildings and landscape activities  
 82 - Office administrative, office support and other business support activities  
 O. Public administration and defense; compulsory social security  
 84 - Public administration and defense; compulsory social security  
 P. Education  
 85 - Education  
 Q. Human health and social work activities

86 - Human health activities  
87 - Residential care activities  
88 - Social work activities without accommodation  
R. Arts, entertainment and leisure  
90 - Creative, artistic and entertainment activities  
91 - Libraries, archives, museums and other cultural activities  
92 - Gambling and betting activities  
93 - Sports, leisure and entertainment activities  
S. Other service activities  
94 - Activities of member organizations  
95 - Repair of computers and personal and household goods  
96 - Other personal service activities  
T. Activities of households as employers; undifferentiated activities of households as producers of goods and services for own use  
97 - Activities of households as employers of domestic staff  
98 - Undifferentiated goods- and services-producing activities of private households for own use  
U. Activities of extraterritorial organizations and bodies  
99 - Activities of extraterritorial organizations and bodies  
Not elsewhere classified  
X. Not elsewhere classified

*Source: Ilostat*

Appendix I- 2: List of countries with HAC results

Class of 1986		Class of 2018	
1(45 countries)	2(56 countries)	1(53 countries)	2(48 countries)
Albania	<b>Angola*</b>	Albania	Algeria
<b>Algeria</b>	Argentina	<b>Argentina</b>	<b>Angola*</b>
Australia	Bolivia	Australia	Bolivia
Austria	<b>Burkina Faso*</b>	Austria	<b>Burkina Faso*</b>
Belgium	<b>Cameroon*</b>	Belgium	<b>Cameroon*</b>
<b>Botswana</b>	Chile	<b>Botswana</b>	Colombia
Brazil	Colombia	Brazil	<b>Congo*</b>
Brunei	<b>Congo*</b>	Brunei	<b>Congo, DR*</b>
Bulgaria	<b>Congo, DR*</b>	Bulgaria	<b>Ivory Coast*</b>
Canada	Dominican Republic	Canada	Ecuador
China	Egypt	<b>Chile</b>	Egypt
Costa Rica	<b>Ethiopia*</b>	China	<b>Ethiopia*</b>
<b>Ivory Coast*</b>	<b>Gambia*</b>	Costa Rica	<b>Gabon*</b>
Denmark	<b>Ghana*</b>	Denmark	<b>Gambia*</b>
<b>Ecuador</b>	Greece	<b>Dominican Republic</b>	<b>Guinea*</b>
Finland	Guatemala	Finland	<b>Guinea-Bissau</b>
France	<b>Guinea*</b>	France	Haiti
<b>Gabon*</b>	<b>Guinea-Bissau</b>	<b>Ghana*</b>	Honduras
Hong Kong	Haiti	Greece	India
Hungary	Honduras	<b>Guatemala</b>	Indonesia
Ireland	India	Hong Kong	Israel
Italy	Indonesia	Hungary	Jordan
Japan	Israel	Ireland	<b>Kenya*</b>
<b>Kenya*</b>	Jordan	Italy	Korea, DPRK
<b>Korea, DPRK</b>	Kuwait	Japan	<b>Liberia*</b>
Luxembourg	Lebanon	<b>Kuwait</b>	Libya
<b>Madagascar*</b>	<b>Liberia*</b>	<b>Lebanon</b>	<b>Malawi*</b>
<b>Malaysia</b>	Libya	Luxembourg	Malaysia
Mexico	<b>Malawi*</b>	<b>Madagascar*</b>	<b>Mozambique*</b>
Netherlands	<b>Mali*</b>	<b>Mali*</b>	Myanmar
New Zealand	Morocco	Mexico	<b>Niger*</b>
Norway	<b>Mozambique*</b>	<b>Morocco</b>	<b>Nigeria*</b>
Oman	Myanmar	Netherlands	
Portugal	Nicaragua	New Zealand	Panama
<b>Senegal*</b>	<b>Niger*</b>	<b>Nicaragua</b>	Paraguay
		Norway	
<b>Singapore</b>	<b>Nigeria*</b>	Oman	Peru
South Korea	Pakistan	<b>Pakistan</b>	Poland
Spain	Panama	<b>Philippines</b>	Singapore
Sweden	Paraguay	Portugal	<b>South Africa*</b>
Switzerland	Peru	<b>Qatar</b>	Sri Lanka
<b>Thailand</b>	Philippines	<b>Saudi Arabia</b>	<b>Tanzania*</b>
<b>Turkey</b>	Poland	<b>Senegal*</b>	Thailand
United Kingdom	Qatar	<b>Sierra Leone*</b>	<b>Togo*</b>
United States	Saudi Arabia	South Korea	Tunisia

Venezuela	<b>Sierra Leone*</b>	Spain	Turkey
	<b>South Africa*</b>	Sweden	<b>Uganda*</b>
	Sri Lanka	Switzerland	Venezuela
	Tanzania*	<b>UAE</b>	<b>Zambia*</b>
	<b>Togo*</b>	United Kingdom	<b>Zimbabwe*</b>
	Tunisia	United States	
	UAE	<b>Uruguay</b>	
	<b>Uganda*</b>	<b>Vietnam</b>	
	Uruguay		
	Vietnam		
	<b>Zambia*</b>		
	<b>Zimbabwe*</b>		
<p><b>*In red, countries that did not evolve from 1986 to 2018.</b></p> <p><b>*In green, countries have gone from bad to good institutions between 1986 and 2018.</b></p>			

*Source: HAC grouping table for 1986 and 2018 for all 12 PRS indices in the institutional quality database.*

### Appendix I- 3: Descriptive statistics

Variable	Obs	Average	Std. Dev.	Min	Max
Manufacturing VA	1681	13.664	6.391	1.027	49.879
INST	1751	6.657	1.315	3.3	9.608
PCA	1751	0	1	-2.141	1.977
Government stability	1751	8.122	1.591	1.5	11.5
Socioeconomic conditions	1751	5.718	2.671	0	11
Investment profile	1751	8.683	2.27	1	12
Internal conflict	1751	9.14	1.563	2.58	12
External conflict	1751	9.915	1.263	3.96	12
Corruption	1751	2.709	1.234	0	6
Military in politics	1751	3.725	1.781	0	6
Religion tensions	1751	4.531	1.305	0	6
Law and order	1751	3.731	1.363	.5	6
Ethnic tension	1751	4.043	1.241	0	6
Democracy accountability	1751	4.044	1.672	0	6
Bureaucracy quality	1751	2.21	1.161	0	4
Total population	1751	16.604	1.452	12.737	21.057
Minerals	1731	.761	1.914	0	16.767
Arableland	1751	14.574	12.96	.084	60.8
Trade openness	1679	82.878	58.271	.175	442.62
FDI inflows	1730	4.866	8.774	-57.605	103.337
Gdp per capita	1734	9.331	1.308	4.289	11.666

*Source: Author's calculations*

#### Appendix I- 4: VIF test

<b>Variables</b>	<b>VIF</b>	<b>1/VIF</b>
Ln (Gdppercapita)	2.87	0.348655
INST	2.62	0.382276
Domestic credit	2.34	0.427373
Trade openness	1.91	0.523136
Ln (Totalpopulation)	1.64	0.608819
FDlinflows	1.46	0.683749
Manufacturing VA	1.22	0.822708
Arableland	1.15	0.869745
Mineralrents	1.12	0.890102
<b>Average VIF</b>	<b>1.81</b>	

Appendix I- 5: Panel unit root test (individual effects and trends)

Variables	LLC	Breitung	IPS	ADF-Fisher	PP-Fisher
<b>Level</b>					
INST	-4.8293*	-0.6546	-1.3761***	2.3629	4.3329 *
	(0.0000)	(0.2564)	(0.0844)	(0.9909)	(0.0000)
PCA	-2.2e+03*	1.7269	-0.9672	-5.9e+06 *	37.3295*
	(0.0000)	(0.9579)	(0.1667)	(0.0000)	(0.0000)
Ln(Totalpopulation)	-21.9074 *	-3.2805*	14.4877	-11.3815*	55.6926*
	(0.0000)	(0.0005)	(1.0000)	(0.0000)	(0.0000)
Mineralrents	-6.4684*	-6.1648*	-3.3617*	-2.1568**	0.7167
	(0.0000)	(0.0000)	(0.0004)	(0.0155)	(0.2368)
Arableland	-0.2454	-2.1041**	0.0846	-4.4042*	2.2790*
	(0.4031)	(0.0177)	(0.5337)	(0.0000)	(0.0113)
Tradeopenness	-4.0469*	-1.0388	2.2099	-1.1226	-0.7980



	(0.0000)	(0.1495)	(0.9864)	(0.1308)	(0.7876)
FDInflows	-11.7434*	-1.0867	-10.2940*	-0.9827	26.3225*
	(0.0000)	(0.1386)	(0.0000)	(0.1629)	(0.0000)
Ln(Gdppercapita)	-7.2499*	0.1046	2.4456	-6.4053*	-0.1342
	(0.0000)	(0.5417)	(0.9928)	(0.0000)	(0.5534)
<b>Difference</b>					
INST	-11.1586*	-2.9153**	-14.4270*	-1.1122	37.8807*
	(0.0000)	(0.0018)	(0.0000)	(0.1330)	(0.0000)
PCA	-1.0e+04 *	1.8265	-14.9592*	-1.6e+06*	70.3488*
	(0.0000)	(0.9661)	(0.0000)	(0.0000)	(0.0000)
Ln (Totalpopulation)	-16.1357 *	0.2754	3.7163	-3.2642*	9.2878*
	(0.0000)	(0.6085)	(0.9999)	(0.0005)	(0.0000)
Mineralrents	-16.1355*	1.2286	-12.4072*	-1.9017**	38.0776*
	(0.0000)	(0.8904)	(0.0000)	(0.0286)	(0.0000)
Arableland	-16.1963*	1.2916	-16.1312*	-87.4255*	53.9664*

	(0.0000)	(0.9018)	(0.0000)	(0.0000)	(0.0000)
Tradeopenness	-15.9491*	-2.9112*	-14.1333*	7.9972	52.0245*
	(0.0000)	(0.0018)	(0.0000)	(1.0000)	(0.0000)
FDIinflows	-16.8324 *	-0.2411	-18.6555*	8.7595	110.6044*
	(0.0000)	(0.4047)	(0.0000)	(1.0000)	(0.0000)
Ln (Gdppercapita)	-63.1888*	-1.7839**	-19.1976*	21.3445	36.1511*
	(0.0000)	(0.0372)	(0.0000)	(1.0000)	(0.0000)

\* p<0.01, \*\* p<0.05, \*\*\* p<0.1

Variables	LLC	Breitung	IPS	ADF-Fisher	PP-Fisher
<b>Level</b>					
Government stability	-5.3881*	-1.3851**	-4.3003*	-0.6731	5.5346*
	(0.0000)	(0.0830)	(0.0000)	(0.2505)	(0.0000)
Socioeconomic conditions	-3.5150*	-2.2603**	-0.1769	4.0540	1.7500**
	(0.0002)	(0.0119)	(0.4298)	(1.0000)	(0.0401)
Investment profile	-1.9735**	-2.3888*	-1.0366	12.8143	10.9176*

	(0.0242)	(0.0085)	(0.1500)	(1.0000)	(0.0000)
Internal conflict	-8.0341*	0.2765	-3.7217*	-2.8870**	11.6456*
	(0.0000)	(0.6089)	(0.0001)	(0.0019)	(0.0000)
External conflict	-4.0e+03*	0.1238	-2.2246**	-5.1e+05*	12.7815*
	(0.0000)	(0.5493)	(0.0131)	(0.0000)	(0.0000)
Corruption	0.0503	0.0306	-2.9528**	17.6772	17.5243*
	(0.5201)	(0.5122)	(0.0016)	(1.0000)	(0.0000)
Military in politics	-2.3e+03*	0.6904	2.2862	19.9528	12.9662*
	(0.0000)	(0.7550)	(0.9889)	(1.0000)	(0.0000)
Religious tensions	-3.8e+02*	1.1473	-6.2569*	26.5772	9.8071*
	(0.0000)	(0.8744)	(0.0000)	(1.0000)	(0.0000)
Law and Order	-3.1e+02*	1.7979	-0.9672	8.6061	11.3257*
	(0.0000)	(0.9639)	(0.1667)	(1.0000)	(0.0000)
Ethnic tensions	1.1504	1.4536	-0.0343	16.7201	12.1755*
	(0.8750)	(0.9270)	(0.4863)	(1.0000)	(0.0000)
Democracy accountability	-1.3e+02*	2.0093	-2.9578**	11.8356	12.2070*
	(0.0000)	(0.9777)	(0.0015)	(1.0000)	(0.0000)

Bureaucracy quality	14.6392	-0.1317	3.6905	-3.2e+02*	-3.5235
	(1.0000)	(0.4476)	(0.9999)	(0.0000)	(0.9998)
<b>Difference</b>					
Government stability	-18.0814*	-2.2913**	-15.6319*	7.0966	50.0094*
	(0.0000)	(0.0110)	(0.0000)	(1.0000)	(0.0000)
Socioeconomic conditions	-7.8422*	-0.5768	-13.4818*	13.9883	35.2968*
	(0.0000)	(0.2820)	(0.0000)	(1.0000)	(0.0000)
Investment profile	-11.8235*	-2.2114**	-14.7261*	23.0196	52.1525*
	(0.0000)	(0.0135)	(0.0000)	(1.0000)	(0.0000)
Internal conflict	-16.4238*	0.6851	-16.3602*	22.7647	65.7215*
	(0.0000)	(0.7533)	(0.0000)	(1.0000)	(0.0000)
External conflict	-3.1e+03*	0.7515	-14.9989*	-4.7e+05*	52.4358*
	(0.0000)	(0.7738)	(0.0000)	(0.0000)	(0.0000)
Corruption	-6.0498*	0.7907	-16.3410*	39.7373	72.2028*
	(0.0000)	(0.7855)	(0.0000)	(1.0000)	(0.0000)
Military in politics	-2.3e+03*	2.6327	-14.9122*	50.3161	34.6442*

	(0.0000)	(0.9958)	(0.0000)	(1.0000)	(0.0000)
Religious tensions	-2.7e+02*	1.1699	-16.5250*	34.2946	24.9346*
	(0.0000)	(0.8790)	(0.0000)	(1.0000)	(0.0000)
Law and Order	-2.0e+02*	1.8884	-14.9592*	30.9122	37.5932*
	(0.0000)	(0.9705)	(0.0000)	(1.0000)	(0.0000)
Ethnic tensions	4.7489	1.4749	-16.7790*	27.0700	33.5456*
	(1.0000)	(0.9299)	(0.0000)	(1.0000)	(0.0000)
Democracy accountability	-76.9000*	1.7381	-12.0140*	26.7036	32.2075*
	(0.0000)	(0.9589)	(0.0000)	(1.0000)	(0.0000)
Bureaucracy quality	23.1208	1.5648	-15.1942*	-56.5816*	7.3306*
	(1.0000)	(0.9412)	(0.0000)	(0.0000)	(0.0000)

\* p<0.01, \*\* p<0.05, \*\*\* p<0.1

Appendix I- 6: Estimation for other unclassified institutional quality variables.

<b>VARIABLES</b>	(1)	(2)	(3)	(4)	(5)
	Government	Socioeconomic	External	Religious	Ethnic
	Stability	Condictions	Conflict	Tensions	Tensions
<b>Lower regime</b>					
Lagged dependent variable_b	0.690*** (0.0143)	0.789*** (0.0218)	0.707*** (0.0177)	0.855*** (0.0155)	0.802*** (0.0192)
Government stability_b	-0.135** (0.0552)				
Socioeconomic conditions_b		-2.671*** (0.196)			
External conflict_b			-0.375*** (0.104)		
Religious tensions_b				-0.894*** (0.246)	
Ethnic tensions_b					-0.751*** (0.193)
Ln(Totalpopulation)_b	-1.740*** (0.341)	-2.868*** (0.443)	0.0785 (0.203)	2.439*** (0.334)	-0.690 (0.455)
Mineralrents_b	0.0760** (0.0363)	-0.322*** (0.0507)	-0.0794*** (0.0194)	-0.256*** (0.0776)	-0.664*** (0.0370)
Arableland_b	-0.0729** (0.0287)	-0.273*** (0.0455)	0.103*** (0.0197)	0.0168 (0.0288)	-0.158*** (0.0480)
Tradeopeness_b	-0.0155*** (0.00270)	-0.0344*** (0.00365)	0.0276*** (0.00166)	0.0121*** (0.00315)	0.0337*** (0.00300)

FDInflows_b	0.0910*** (0.00991)	0.0463*** (0.00542)	-0.0128*** (0.00176)	0.0420*** (0.00587)	-0.0133* (0.00705)
Ln(Gdppercapita)_b	1.094*** (0.295)	-0.601*** (0.204)	0.103 (0.115)	-0.367* (0.194)	-0.583*** (0.173)
<b>Upper regime</b>					
cons_d	20.00*** (2.984)	-45.76*** (4.095)	-2.181 (5.431)	9.168 (6.014)	-48.20*** (5.455)
Lagged dependent variable_d	0.0719*** (0.0105)	-0.0337 (0.0228)	0.151*** (0.0128)	-0.0814** (0.0371)	-0.0231 (0.0382)
Ln(Totalpopulation)_d	-0.0233 (0.124)	1.894*** (0.221)	-0.658*** (0.175)	0.0978 (0.234)	0.105 (0.247)
Mineralrents_d	-0.108* (0.0624)	0.197** (0.0818)	0.171** (0.0782)	0.389*** (0.0724)	0.919*** (0.106)
Arableland_d	-0.00351 (0.00567)	-0.0364 (0.0360)	-0.00762 (0.00995)	0.0376* (0.0219)	0.390*** (0.0610)
Trade openness_d	0.0119*** (0.00152)	0.0580*** (0.00474)	-0.0336*** (0.00278)	-0.0121*** (0.00301)	-0.0438*** (0.00335)
FDInflows_d	-0.120*** (0.0110)	-0.0643*** (0.00606)	0.00716** (0.00340)	-0.0148* (0.00803)	0.186*** (0.00856)
Ln (Gdppercapita)_d	-1.694*** (0.146)	-0.0992 (0.238)	-0.733*** (0.163)	-1.178*** (0.262)	4.026*** (0.294)
Government stability_d	-0.425*** (0.139)				
Socioeconomic conditions_d		2.794*** (0.238)			
External conflict_d			1.979***		

			(0.250)		
Religious tensions_d				0.945	
				(0.598)	
Ethnic tensions_d					1.510***
					(0.574)
r	8.212***	4.974***	10.44***	4.909***	4.515***
	(0.105)	(0.175)	(0.0956)	(0.500)	(0.0926)
Observations	90	90	90	90	90
Bootstrap p-value for linearity test	0	0	0	0	0

Standard errors in brackets

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1



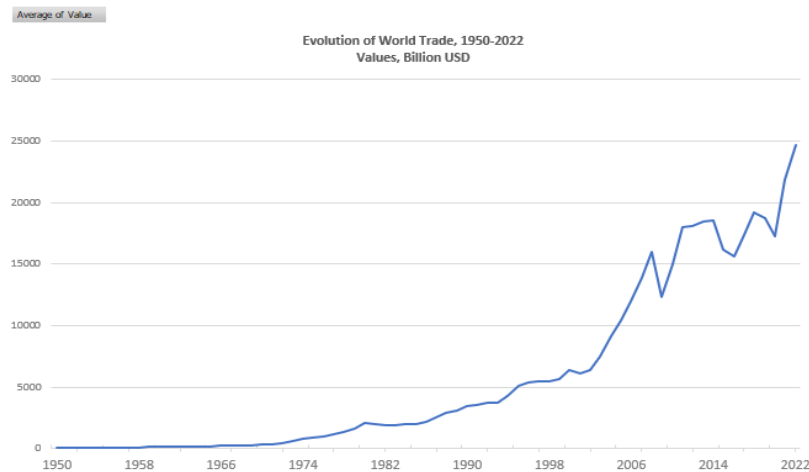
CHAPTER II: THE LINK BETWEEN STRUCTURAL CHANGE  
AND OPENNESS IN THE LIGHT OF THE INSTITUTIONAL  
QUALITY CHANNEL

## I) Introduction

The economic literature on the effects of trade openness is abundant (Smith, 1776; Wacziarg and Welch, 2008; Were, 2015). In general, international trade, like structural change, is seen as a key determinant of growth. International trade is also seen as enabling an efficient allocation of resources, which brings us back to the notion of structural change<sup>21</sup>. Kelbore (2015) notes that the bi-causal relationship between trade and structural change is evident.

Since the signing of the GATT agreements, world trade has grown considerably. As shown in the figure (6) below, world trade has been on an upward trend, accelerating since 1990. Lewis et al., (2022) point out that when trade grows faster than production, economies become more sensitive to changes in trade flows, trade policies and trade patterns. This also has implications for developing countries.

Figure 6: Trends in world trade since the end of the Second World War



Source: WTO

However, several studies suggest that trade liberalization offers economies significant potential gains. The United Nations Conference on Trade and Development(2022), which uses the trade openness index<sup>22</sup>, suggests that trade openness should bring several benefits, such as improved welfare and productivity gains. (Alagidede et al., 2020; Ben-David and Loewy (1997, 2000, 2003); Grossman and Helpman, 1993) explain that international trade enhances economic growth through, among other things, technological spillovers, knowledge transfer and increased competition. Dupuy (2015), in a literature review of older works (Smith, 1776; Ricardo, 1821)

<sup>21</sup> Herrendorf et al., (2014) define structural change as the reallocation of economic activity in three main sectors (agriculture, manufacturing, and services) that accompanies the process of modern economic growth.

<sup>22</sup> Measures the importance of international merchandise trade in the national production of an economy (exports and imports have the same weight).

and more recent ones (Bernhofen and Brown, 2005), recalls the theoretical and empirical work that confirms the positive role of international trade in the development process.

The promise of gains from openness is such that developing countries have often been encouraged to open to trade. However, not all the promises and benefits have materialized. A common criticism of trade openness is that some resource-rich countries may find themselves locked into the production of low-productivity or low-value-added goods. Some studies highlight the asymmetrical role of international trade depending on whether the country in question an emerging market is or not (Galor and Mountford, 2008; Muendler, 2010; Chenaf-Nicet and Rougier, 2011; Chenaf-Nicet, 2020) ; or depending on institutional differences between countries in the North and South (Levchenko, 2007).

Regarding trade openness, developing countries have adopted a variety of strategies over the years. These include import substitution and export promotion policies. For some, the successive implementation of these strategies has been beneficial, as in the case of South Korea and Turkey, which have switched from an import substitution policy to an export promotion policy. The latter strategy has led these countries to rapid growth. However, some countries, such as those in sub-Saharan Africa, have found it more difficult to achieve gains from such policies (Krueger, 1983; Kaba et al., 2022). This point is also confirmed by the work of Ko et al., (2023), in which they note that Asian tigers became net exporters of manufacturing products, while African countries are net importers during the 1990s. Between 2001 and 2018, Asian countries became net importers of resource sectors, while African countries followed different paths. This shows that the effects of trade can differ from country to another.

Another point of view related in the literature is the importance of FDI. In the work of Hasan (2010), in the list of the many benefits of trade liberalization, the ability of countries to attract significant FDI is one of the important elements. For example, Kaya and Çiçekçi (2023) link Turkey's growth between 1980 and 2021 to increased trade and financial openness. Furthermore, Mühlen and Escobar (2020) note that inward FDI has a positive impact on structural transformation, which contributes to growth and then to economic development. Pereira et al., (2012) explain the different effects of FDI at the microeconomic level. Looking at inward FDI flows, they show that structural and political reforms coincide with an improvement in foreign investment performance. At the same time, they indicate that political instability has a negative impact on FDI flows. Because political stability is one of the measures

of institutional quality,<sup>23</sup> this last point leads us to question the role of FDI in the process of structural change via the logic of institutional quality thresholds. However, in this work, we will focus solely on trade openness, but we will assume, as in previous studies, that FDI is one of the benefits of trade liberalization.

In general, industrialization is presented as the key element that can lead to growth, just as international trade is the preferred growth vector for countries. However, different industrialization strategies have been identified in the literature, and some authors point out that if they are not implemented at the right time, in the right way and within the right institutional framework, they can lead to changes in the wrong direction. Levchenko (2007) points out that institutions refer to a wide range of structures that affect economic outcomes, such as contract enforcement, property rights, investor protection and so on. Referring to other authors such as La Porta et al., (1997, 1998) or Acemoglu et al., (2001, 2002), he notes that institutions play an important role in economic performance. As an example, he points out that developed economies have better institutions than developing countries. He therefore argues that interactions between institutional quality and trade are important.

In this chapter, we therefore ask what the impacts of trade in the process of structural change are, considering the institutional quality threshold. We then empirically analyze the interactive relationship between institutional quality and trade openness.

Secondly, we consider the notion of institutional similarity, which to our knowledge has not been studied in the context of structural change. Institutional similarity is mainly studied in trade relationship, notably by Lavallée (2006) and Bouattour (2020). Levchenko (2007) notes that institutional differences are an important determinant of trade flows. To fill these gaps, we study the relationship by linking both institutional similarity and trade, in connection with the process of structural change, since trade is one of the driving factors behind structural change. Thus, we build on the findings of Farrell and Knight (2003), who indicate that institutional similarity helps countries to better adapt to the partner's institutions. Similarity (proximity) increases mutual trust between them, which has a positive impact on trade between partners. To test this hypothesis, we use the similarity measure of Bergstrand and Egger (2007) and Cezar and Escobar (2015) as well as the institutional distance measure used by Bouattour (2020) and Lavallée (2006).

The aim of this paper is first to examine the relationship between international trade and structural change, and then to examine this relationship in the light of the institutional threshold.

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<sup>23</sup> Samadi and Alipourian (2021) indicate that institutional quality measures the strength, coherence and solidity of each country's institutions.

We also highlight the effect of institutional similarity in the study of structural change. This represents our contribution to the empirical study of the links between trade and structural change via the institutional quality threshold.

The rest of the paper is structured as follows. Section II presents theoretical work on the importance of trade openness. Section III presents some stylized facts on international trade and structural change. Section IV describes the empirical analysis (methodology, data, model specification and discussion of results). Finally, concluding remarks are presented at the end of the chapter (V).

## II) A global vision of international trade theory to assess its importance.

### II.a) Different visions of international trade over time

For many authors, such as Sen (2010) and Dorobat (2014), the first work on international theories dates to the 18th century with the work of Smith (1776). However, Dorobat (2014)'s work shows how thinking on the subject has evolved since antiquity, starting with ethical and political, then economic considerations. In her work, she relates the different schools of thought on international theories such as ancient Greek thought (Plato, Xenophon), Scholastic and Christian thought (Aristotle, Aquinas, Grotius, and Suarez), mercantilism (Mun, De Malynes) and physiocracy (Quesnay and Turgot).

Plato (1930) and Xenophon (1918) note the positive effects of the division of labor and the voluntary exchange of goods. For them, everything (or almost everything) is beneficial to both parties involved in the transaction. According to Plato (1930), "the division of labor favors higher productivity and production than autarky and allows both parties to specialize according to their natural aptitudes and available natural resources". For his part, Xenophon (1918) demonstrates the advantages of international trade by giving examples of profit-seeking traders. They make good decisions by arbitraging prices or taking advantage of access to a larger market. For Aristotle (1932), on the other hand, the advantages are not so obvious since he believes that autarky (self-sufficiency) is preferable in order to keep trade to a minimum.

As far as scholastic and Christian economic thought is concerned, it follows the thinking of Aristotle(1932), for whom "international trade is indispensable, but to a certain extent" (Dorobat, 2014). Dorobat (2014) cites as example theologians such as Saint Augustine, for whom "international trade encouraged fraud and triviality". The same goes for Aquinas (1947), who stresses that "international trade (import and export) is important for countries, but they

must be careful of its possible bad consequences". However, Grotius (1916) and Suárez (1934) are in favor of international trade. They emphasize the benefits to countries of total freedom of international trade, while Suárez (1934) sees free trade as an inalienable right.

Mun (1664) and De Malynes (1622)'s main concern was the well-being of the population. To achieve this, they encouraged the reduction of other nations' wealth in favor of their own, by accumulating precious metals from other countries. For them, "international trade is a zero-sum game". According to Grimwade (2000) and Dorobat (2014), the mercantilist school's idea is that exports are good because they bring gold into the country, which was seen as the currency that finances trade, and imports are bad because they cause gold to leave. In their view, countries should do their best to produce what they need most. This would make them less dependent on imports. The policy of the day was autarky or self-sufficiency. They encouraged the government to reduce imports by imposing tariffs and limiting the number of foreign products allowed into the country. As Grimwade (2000) explains, "one country's export surplus is another country's import deficit".

For Quesnay and Turgot, a nation's well-being depended on the development of its agricultural sector. They advocated trade liberalization. For Turgot (2011), all sectors of trade should be completely free. These authors were precursors of classical thought.

To trace the evolution of standard international trade theory, we obviously need to refer to the work of Smith (1776). However, Dorobat (2014) classifies two schools of thought for the classical period: the British classical school and the French school.<sup>24</sup>

Grimwade (2000) explains that the main concern of classical economists was to refute the misconceptions about trade developed by the mercantilist school. According to the mercantilists, trade is a zero-sum game, since one country's export surplus is equal to another country's import deficit. Smith (1776) argues the opposite, asserting that trade is beneficial because of differences between countries based on the cost of producing different types of goods (Grimwade, 2000). For Smith (1776), who uses the concept of labor value, the cost of production refers to the labor time required to produce a good. Thus, according to Smith (1776), it is preferable for a country to produce those goods for which it has a cost advantage over other countries, rather than trying to produce all goods. What matters is a country's absolute advantage in the production of a good over other countries. Dorobat (2014) points out that Smith (1776) showed the importance of the division of labor for increasing production. Division helps countries specialize in the production of the cheapest goods, thus modifying the country's

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<sup>24</sup> The British school is represented by Adam Smith, David Ricardo and John Stuart Mill, and the French school by Jean-Baptiste Say, Frédéric Bastiat and Paul Leroy Beaulieu.

productive structure. The link between openness and structural change can be traced back to the work of Adam Smith.

As Dorobat (2014) and Hasan (2010) point out, for both Smith (1776) and Ricardo (1821), international trade between nations is mutually beneficial, so cooperation between them is a positive-sum game.

For Ricardo (1821), however, it is preferable to evaluate comparative advantage rather than absolute advantage in the production of different goods. To evaluate this comparative advantage, Ricardo (1817) proposes to compare the relative cost ratios existing in the two countries before the exchange.

The French liberal school shares the same ideals as the British classical school. However, there are differences of opinion, notably on the theory of the value of work and the dichotomous vision of the economy (real and monetary economy, domestic and international trade).

Classical thinking was extended by the work of Heckscher (1919) and Ohlin (1967). Neoclassical economists explain differences in comparative costs by the different quantities of factors (land, capital, or labor) with which each country is endowed, and by the proportions of factors involved in the production of each good. Some countries are better endowed with land, others with capital or labor, so that the relative prices of these factors differ in each country: countries must specialize in the production of goods that require relatively more of the factor they have in abundance.

II.b) A more recent view of the effects of openness.

According to Were (2015), there is now a consensus that trade plays an important role in growth. However, it is acknowledged that trade has positive effects for some countries, but not necessarily in all situations and for all countries. Sometimes, the positive effects may be smaller than the negative ones. We will therefore distinguish between different categories of work, depending on whether the advantages of openness are emphasized or not. We will see under what conditions developing countries can benefit from trade.

For Hasan (2010), it is possible to identify some of the benefits of trade liberalization in the current literature: reallocation of resources and specialization in products with comparative advantage; increased exports and imports; absorption of new technologies and skills; greater attraction of FDI to sectors with comparative advantage and acceleration of the pace of industrialization. Similarly, in outlining the benefits of trade liberalization, Haley (2018), points out that it improves *production efficiency* and offers consumers greater choice. In the long term, this latter effect would be more important than the effect on employment.

Hasan (2010), like others, distinguishes two categories of gains from trade: static gains and dynamic gains. For static gains, he mentions increases in output, employment, consumption, and output per worker. For dynamic gains, he notes increases in FDI flows; research and development expenditure; industrialization rate and pace of development.

For Lam (2015) and Thirlwall (2008), dynamic gains include economies of scale and, via FDI, the transfer of new technologies and skills, as well as higher production productivity. However, Lam (2015) points out that competition can hamper the development of infant industries and lead to unemployment. Similarly, developing countries may remain locked into specialization in labor-intensive sectors.

Were (2015) specifies the channels through which trade affects growth. For her, these channels are technological diffusion and increased factor mobility. Fetahi-Vehapi et al., (2015), drawing on a large body of work, show *that countries that are heavily involved in world trade are indeed more productive than those that produce only for their domestic market*. In their study, which focuses on a panel of 10 Southeast European (SEE) countries between 1996 and 2012, they show that international trade promotes an efficient allocation of resources and can help a country achieve higher growth. Greater factor accumulation, technology diffusion and knowledge diffusion are also expected effects. They are thus part of a long tradition of work highlighting the positive effects of international integration<sup>25</sup>. However, the study by Fetahi-Vehapi et al., (2015) shows that the positive effect of trade on growth is nonetheless conditional on initial per capita income.

Little et al. (1975) ; Bhagwati (1975) ; Krueger (1978) and Papageorgiou et al., (1990) show that trade liberalization leads to faster export and GDP growth without significant transition costs in terms of unemployment. Wacziarg and Welch (2003) find that trade liberalization has a positive and robust effect on growth.

Although classical and neoclassical theories of international trade postulate that trade is a positive-sum game regardless of the partner, studies show that the gains from trade, and therefore the positive impact on growth and development, are not guaranteed. However, Rodríguez and Rodrik (2001), suggest that many empirical results are not as solid as they seem. There is not even necessarily a close relationship between trade and growth. Studies even show that international trade is not necessarily synonymous with gains (Winters, 2004; Winters et al., 2004; Harrison and McMillan, 2007; Goldberg and Pavcnik, 2007).

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<sup>25</sup> (Sachs et al., 1995; Edwards, 1998; Frankel and Romer, 1999; Dollar and Kraay, 2004; Calderón et al., 2004; Freund and Bolaky, 2008; Chang et al., 2009).



Winters, 2004 and Winters et al., (2004) show that in many cases, international trade leads to adjustments in countries open to trade that are unfavorable to the most vulnerable populations. Instead of reducing poverty, international trade can increase it. Harrison and McMillan (2007) also show that gains from trade do not systematically reduce poverty levels in countries open to trade. To be effective, poverty reduction must be accompanied by appropriate policies. Kelbore (2015) also does not believe in a direct link between trade openness and poverty reduction, believing that trade openness must be accompanied by other conditions such as human capital development and *institutional reforms*. Goldberg and Pavcnik (2007), who examine the channels through which the globalization of economies can increase inequalities between rich and poor, find that international trade has an income redistribution effect that can be unfavorable to the poorest.

For Chang et al., (2009), the gains depend on certain conditions, such as the size of countries, the nature of inter or intra trade and the specialization of countries in natural resources. Similarly, the impact of openness may depend on the sectoral composition of GDP and the impact of international trade on changing the composition of GDP. This brings us back to structural change.

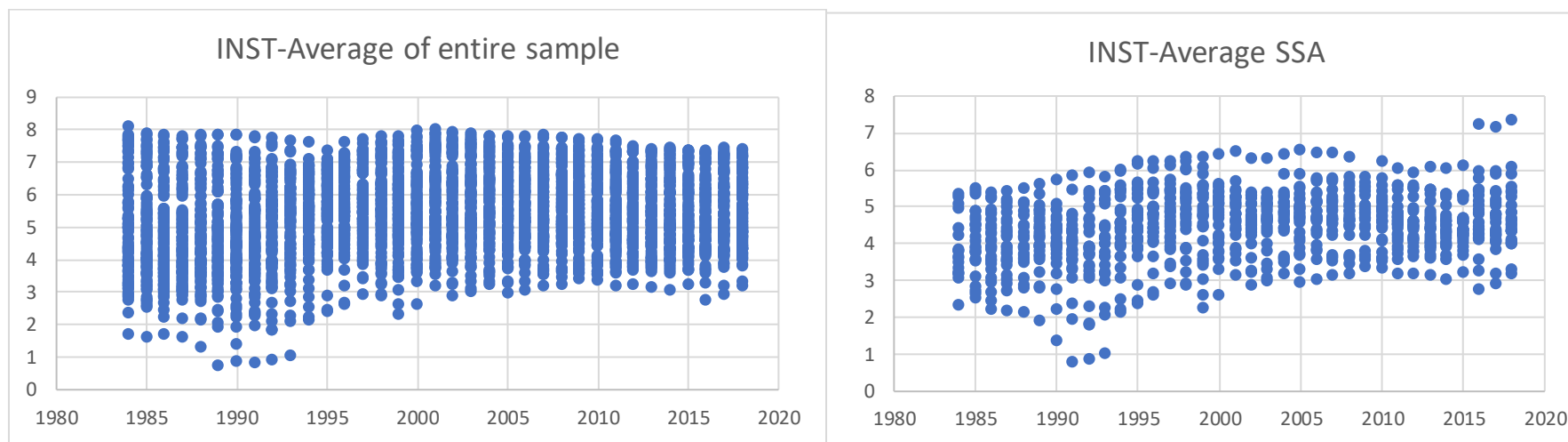
### III) Trade and structural change in the light of data

To illustrate the link between trade openness and structural change, we present a few stylized facts. We also examine the evolution of institutional quality variables. We use them as index composed of the average of the twelve indicators in the ICRG database.

In Figure 7, we compare the evolution of institutional quality in our full study sample (list of countries in appendix) with that of Sub-Saharan Africa. We see that average institutional quality becomes less heterogeneous over time. However, if we consider only Sub-Saharan African countries, the institutional quality indicator is less homogeneous, and in at least one country the level is close to seven. This may indicate that most of our Sub-Saharan African countries are below the critical threshold.

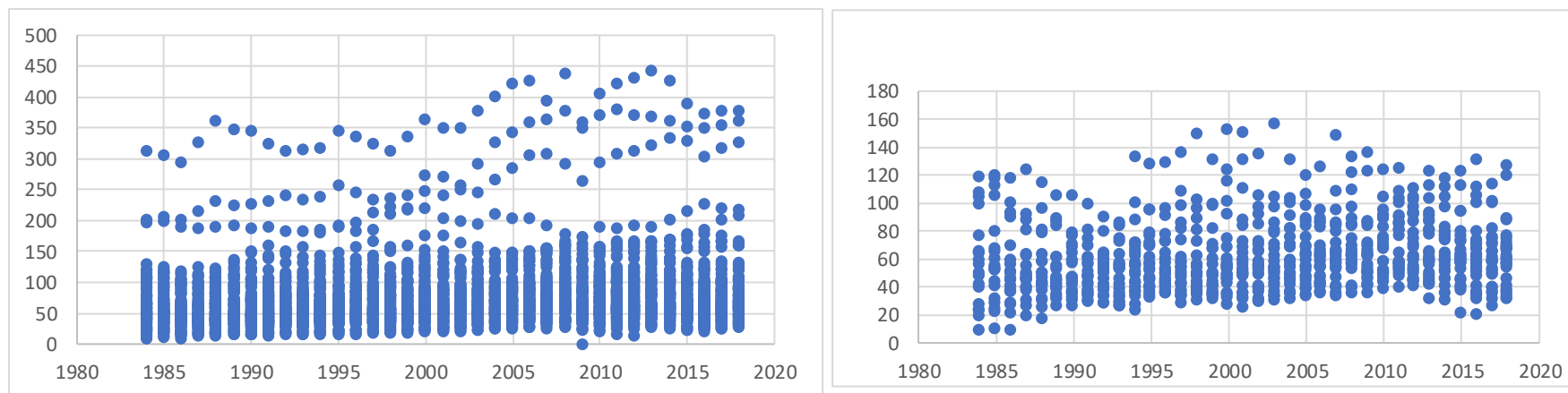
In terms of trade openness (Figure 8), there is a clear difference between Sub-Saharan African countries and the whole sample. Sub-Saharan African countries have a lower level of openness, around 80%, while most countries are between 100 and 150%, except for three countries which are around 300-400%. Our data clearly show that most of the countries in our database are relatively open.

Figure 7: Average institutional quality for the whole sample compared to the sub-Saharan African countries in our sample.



Source: Author's calculations based on ICRG database

Figure 8: Openness rates for the overall sample and for SSA countries



Source: Author's calculations based on UNCTAD database

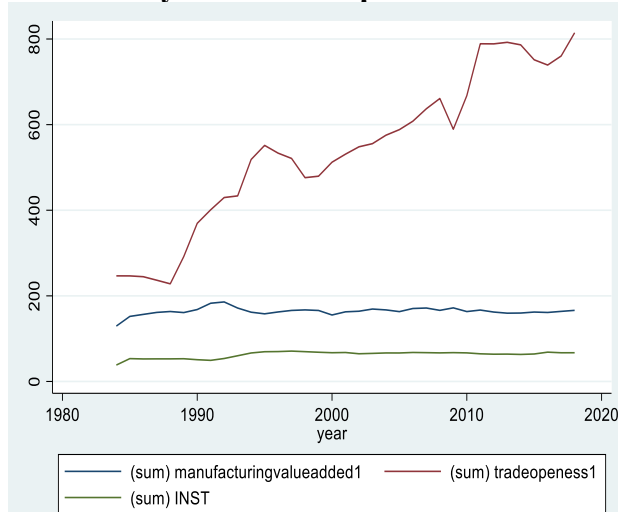
In line with the work of Sen (2023), which notes the recent classification in terms of structural change: structurally underdeveloped, structurally developing and structurally developed<sup>26</sup>, we examine in detail the evolution of (share of manufacturing value added, institutions and trade openness) of these countries by averaging them. Figure 9 shows that the structurally developed countries in our data have the highest openness rates. The structurally underdeveloped category, in which we find most Sub-Saharan African countries, has the lowest trade openness rate, institutional quality level and share of manufacturing value added. This confirms the findings of the literature asserting the asymmetrical role of trade openness.

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<sup>26</sup> Sen (2023): Structurally underdeveloped (51% or more of workers in the agricultural sector), structurally developing (agriculture is the second most important sector) and structurally developed (more workers in manufacturing than in agriculture). See also to find out the complete list of each category.

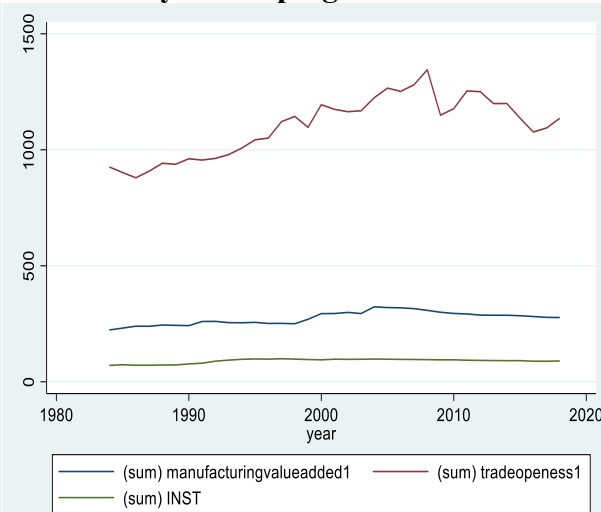
Figure 9: Trade openness, institutional quality, and manufacturing industry over time for each category.

### Structurally Underdeveloped



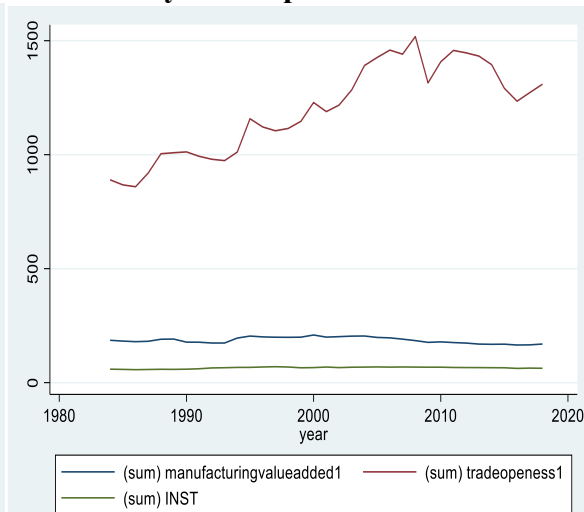
\* Burkina Faso, Cameroon, Ethiopia, India, Kenya, Myanmar, Mozambique, Malawi, Nigeria, Pakistan, Tanzania, Uganda, Vietnam, Zambia

### Structurally Developing



\* Bolivia, Botswana, China, Colombia, Costa Rica, Ecuador, Egypt, Ghana, Indonesia, Sri Lanka, Morocco, Namibia, Peru, Philippines, Senegal, Thailand, Turkey, South Africa

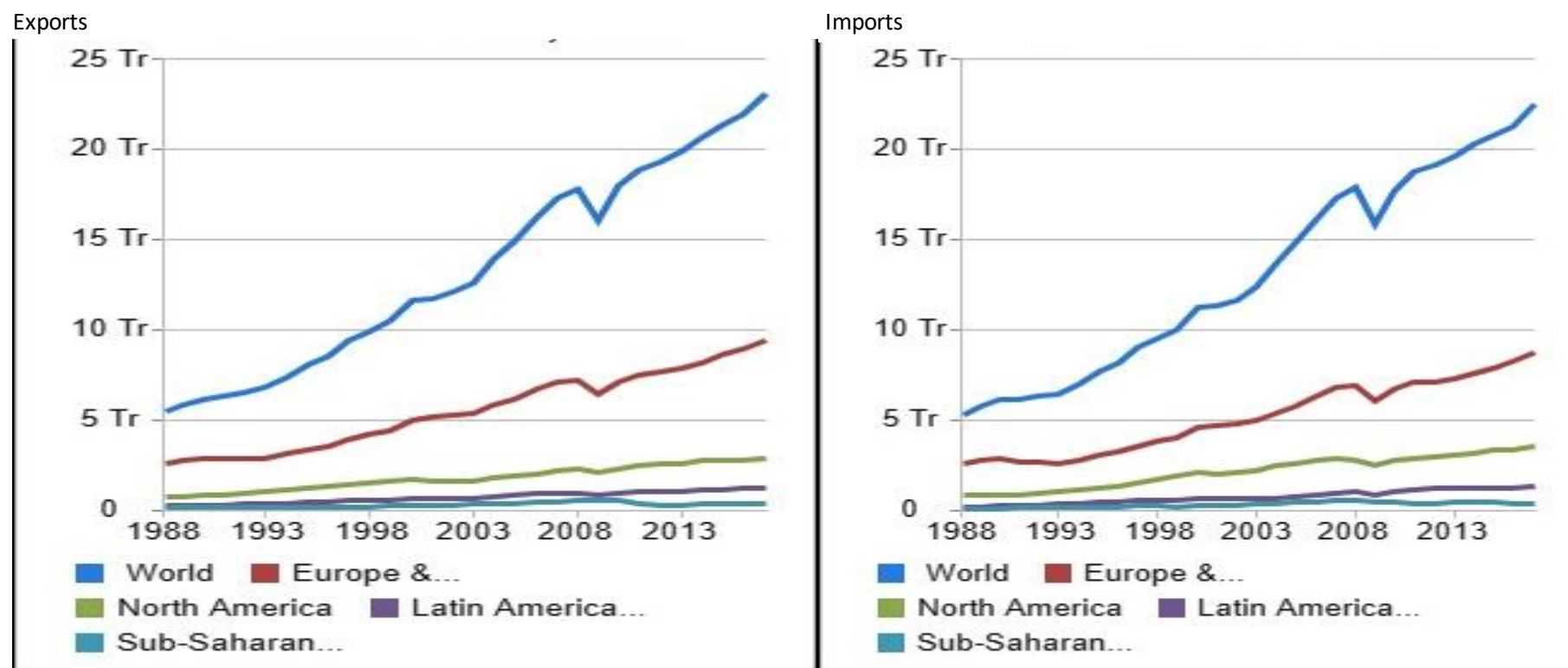
### Structurally Developed



\* Argentina, Brazil, Chile, Hong Kong, Israel, Japan, South Korea, Mexico, Malaysia, Singapore, Tunisia

Figure 10 shows exports and imports of goods and services by region. We can see that Sub-Saharan Africa has the lowest values (constant 2010 US) both for export and import, the Latin America and Caribbean. Europe and central Asia have the highest. However, the UNCTAD Handbook of Statistics (2022) notes that developing countries in Africa saw the biggest increase in exports in 2021 (+42.2%), but only for goods. It also shows that the African region is the least diversified in terms of exports. Primary products account for 60% of merchandise export revenues for 45 of the 54 African countries.

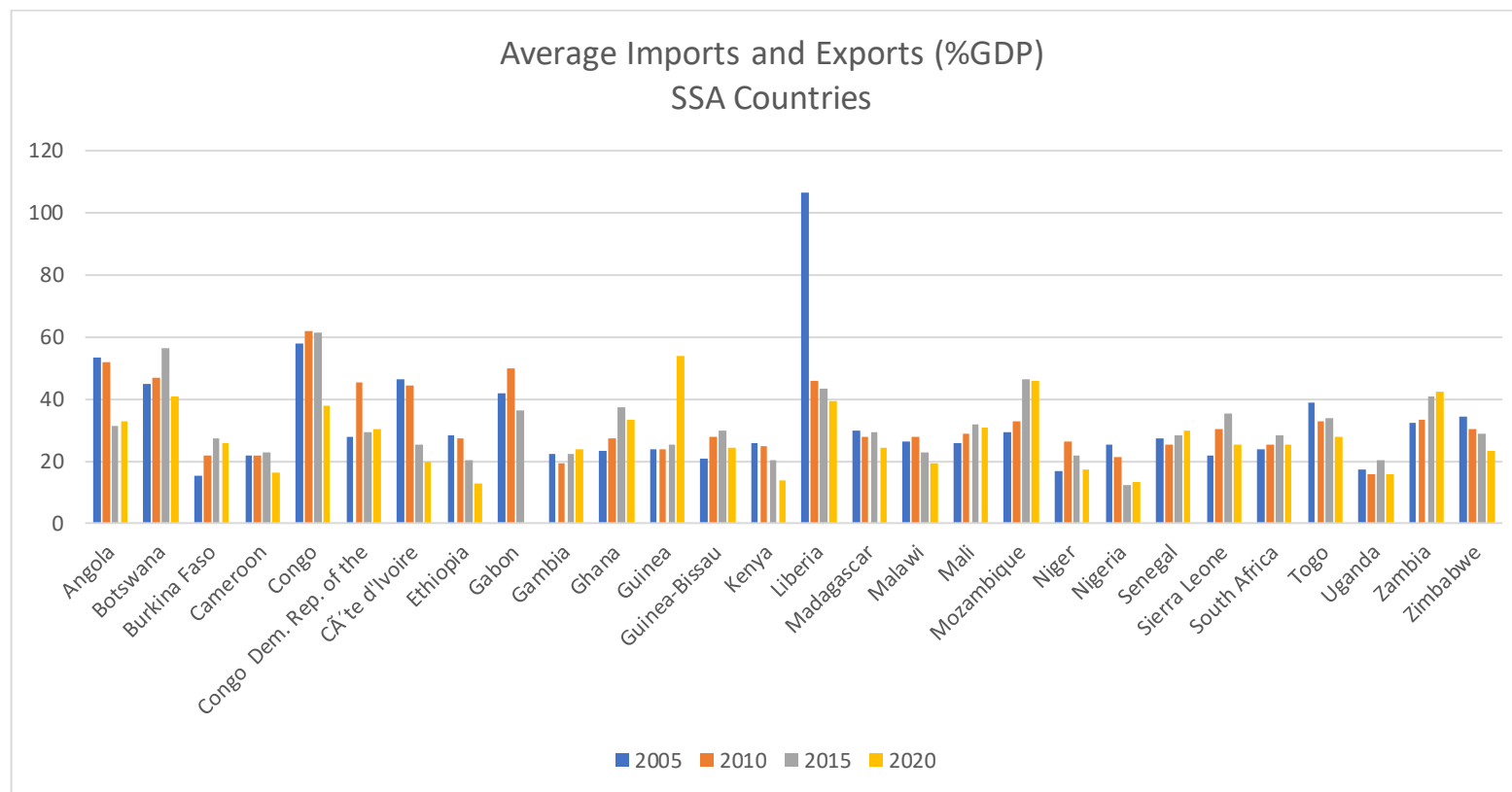
Figure 10: Exports and Imports of goods and services for each region (constant 2010 US).



Source: WTIS (World Integrated Trade Solution)  
 Region: (World, Europe and Central Asia, North America, Latin America and Caribbean and Sub-Saharan)

If we look at a disaggregated level (considering each SSA countries in our sample (Figure 11), we can relate a certain heterogeneity between these countries. For example, for the recent year 2020, the maximum average openness rates attempted is approximatively 40% of their GDP, except for Guinea and Mozambique. However, if we look at the share of exports (of goods and services) in their GDP (Figure 12), most countries are between 20 and 30% of GDP, except Angola, Congo, Guinea, and Zambia (for the recent year). Imports represent between 50 and 60% of GDP (Figure 13). Based on this data, we can notice that Sub-Saharan African countries are still net importers in world trade.

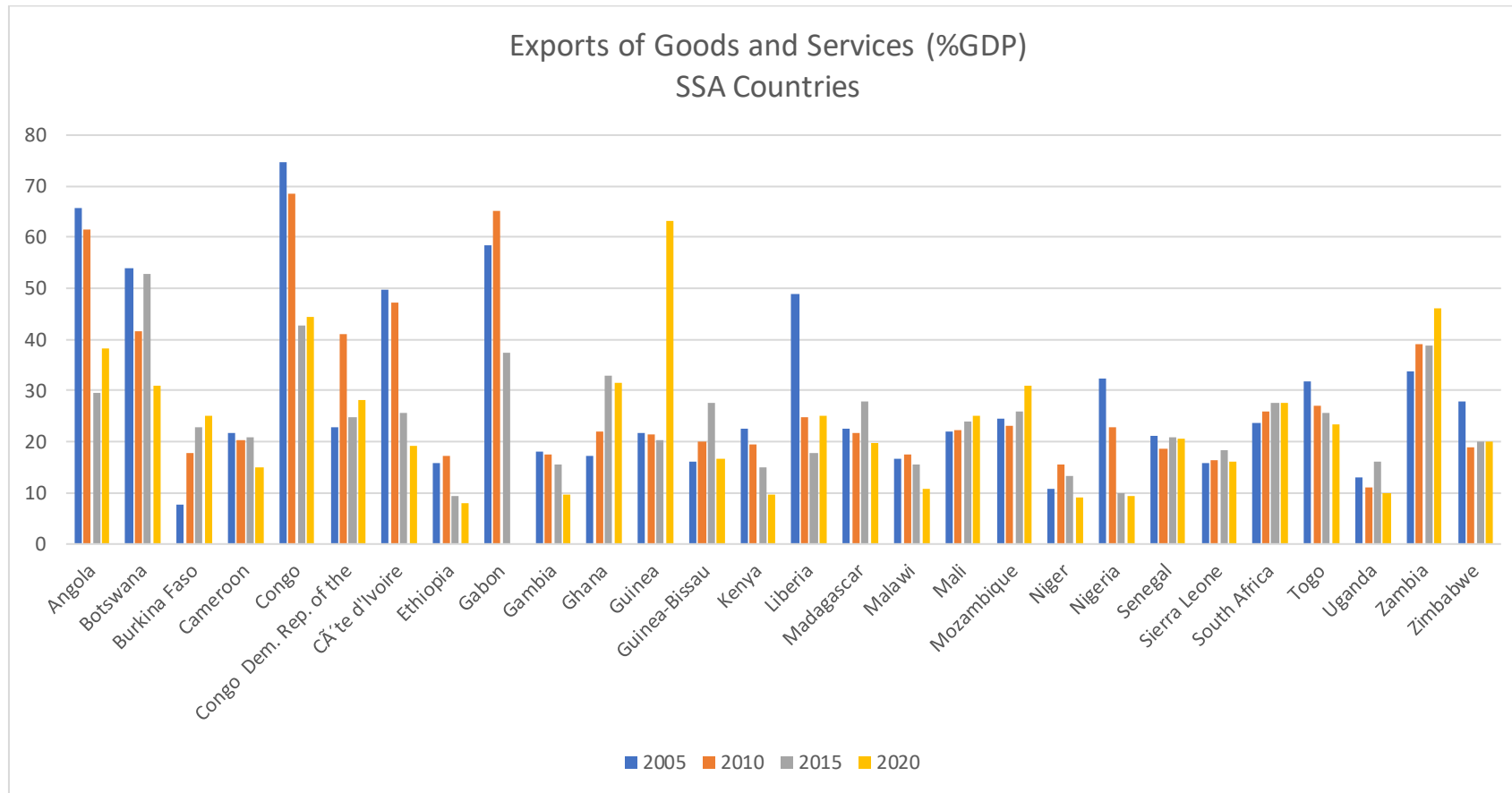
Figure 11: Average imports and exports of goods and services for the Sub-Saharan African countries in our sample.



Source: Author based on UNCTAD database

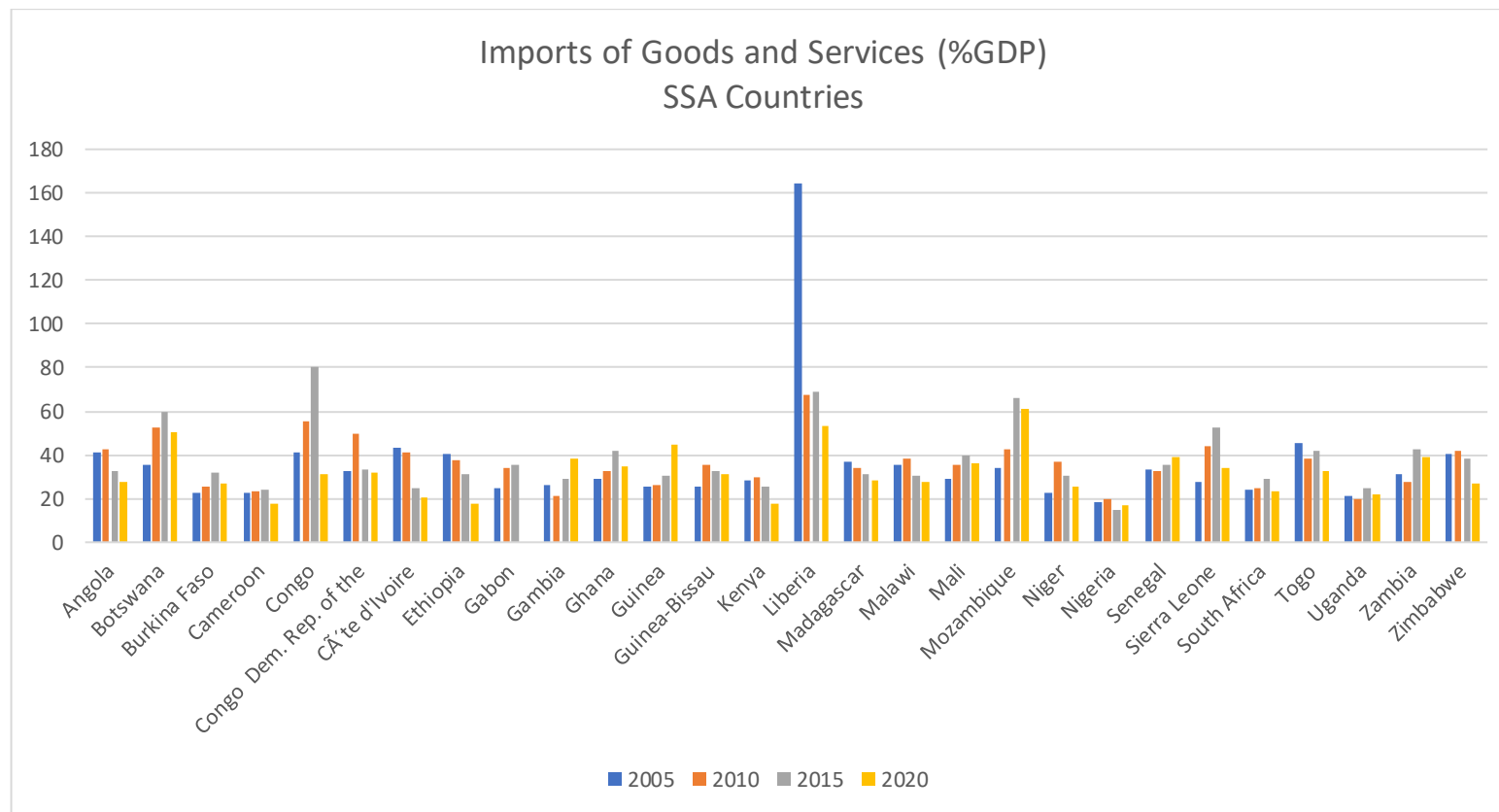


Figure 12: Exports of goods and services as a percentage of GDP



Source: Author based on UNCTAD database

Figure 13: Imports of goods and services as a percentage of GDP

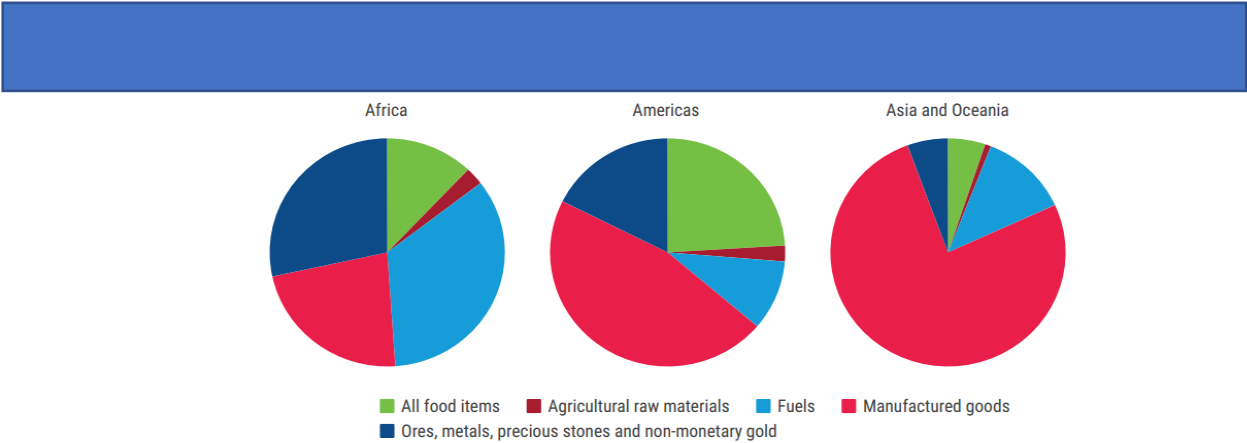


Source: Author based on UNCTAD database

And we go deeper in our analysis, we look at the structure of exports by product (Figure 14), this confirms that Africa mainly exports fuels and other raw materials such as metals, ores, etc. Most of the SSA countries are resources rich countries. For example, we can cite the economy of Liberia, Congo, Angola, Guinea and so on.

While the Americas, Asia and Oceania mainly export manufactured goods. Whereas for the Americas, Asia and Oceania, the most important share is the export of manufactured goods. However, it is in Asia and Oceania that the share of manufactured goods in the export structure is the highest.

Figure 14: Export structure of developing economies.

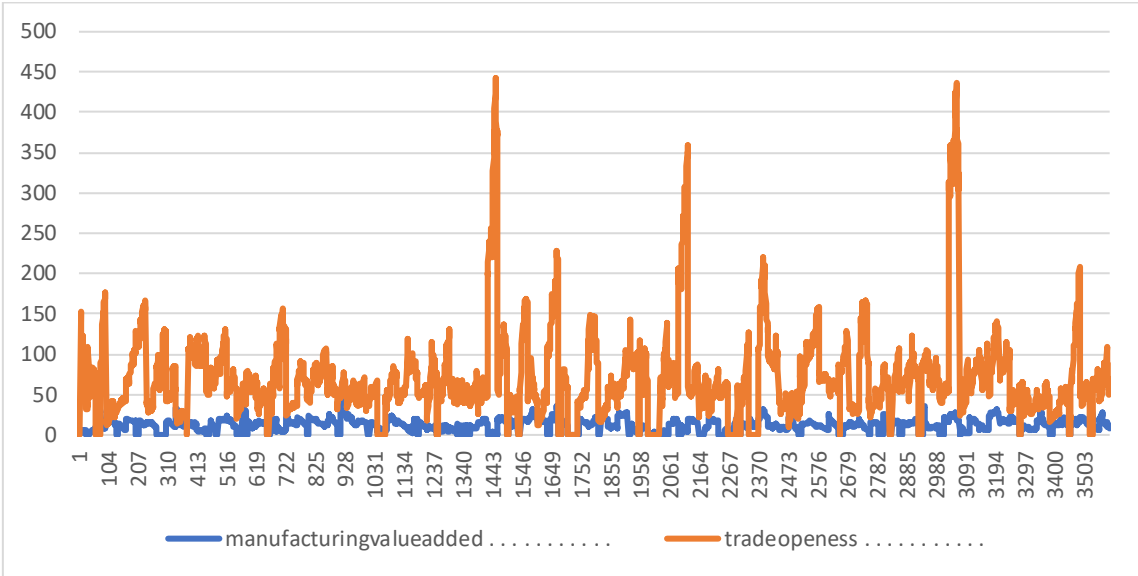


Note: Non-allocated products are not considered.

Source: Handbook of Statistic 2022, UNCTAD (2022)

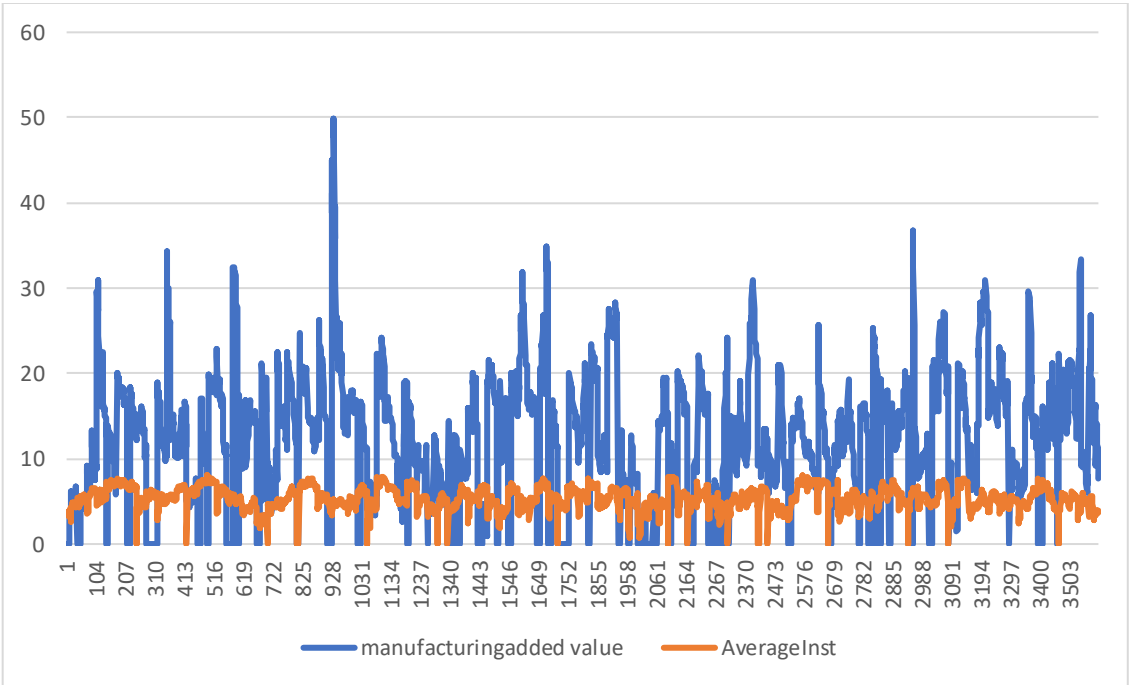
Figure 15 shows a co-movement between the share of manufacturing value added and trade openness. Both series seem to be affected by the same trend. Incidentally, Figure 16 also shows a co-movement when comparing the share of manufacturing value added with the average of the institutional quality variable.

Figure 15: Co-movement between manufacturing and trade openness



Source: Author's calculations based on World Bank and UNCTAD databases.

Figure 16: Institutional quality and share of manufacturing value added.

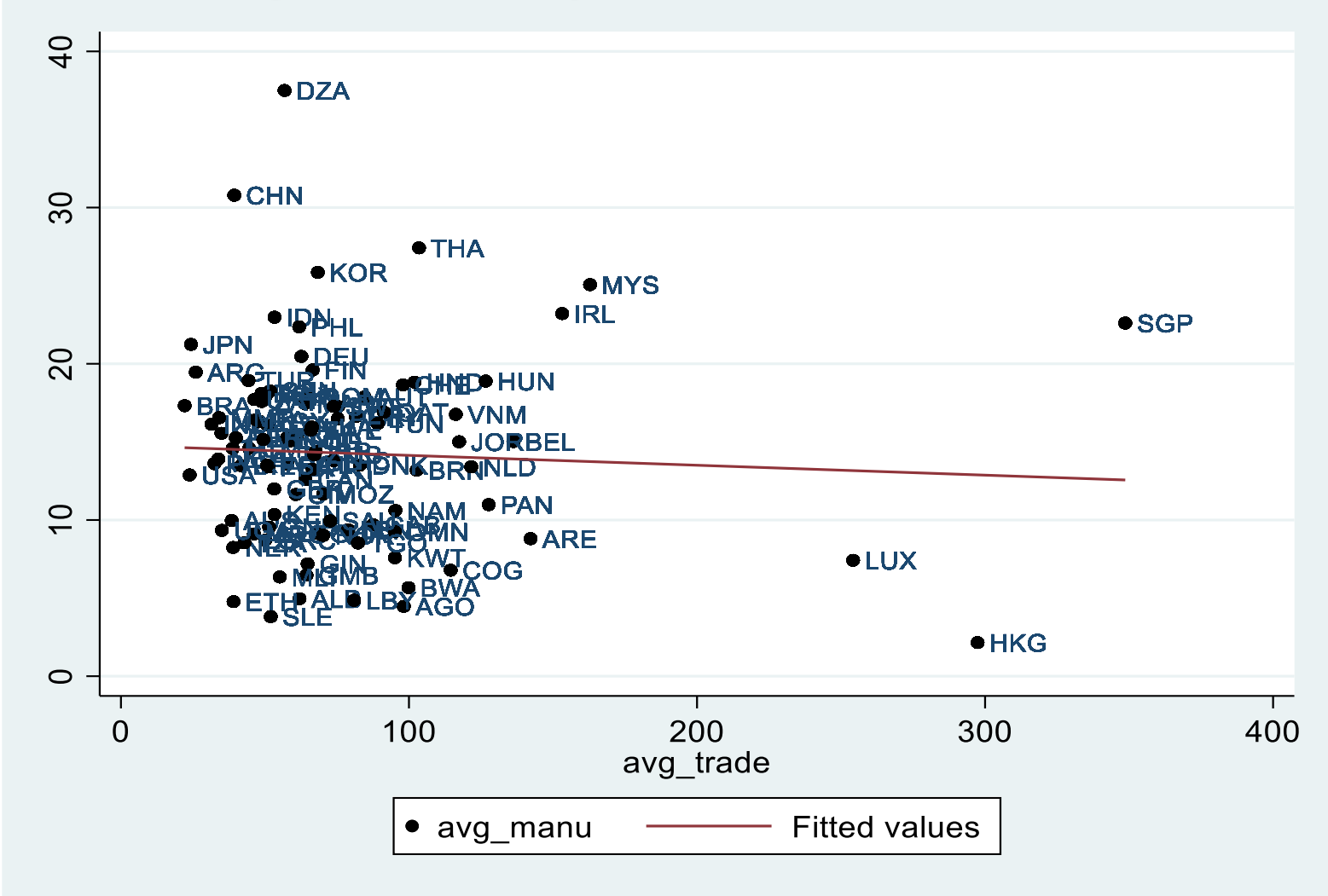


Source: Author's calculations based on World Bank and PRS database

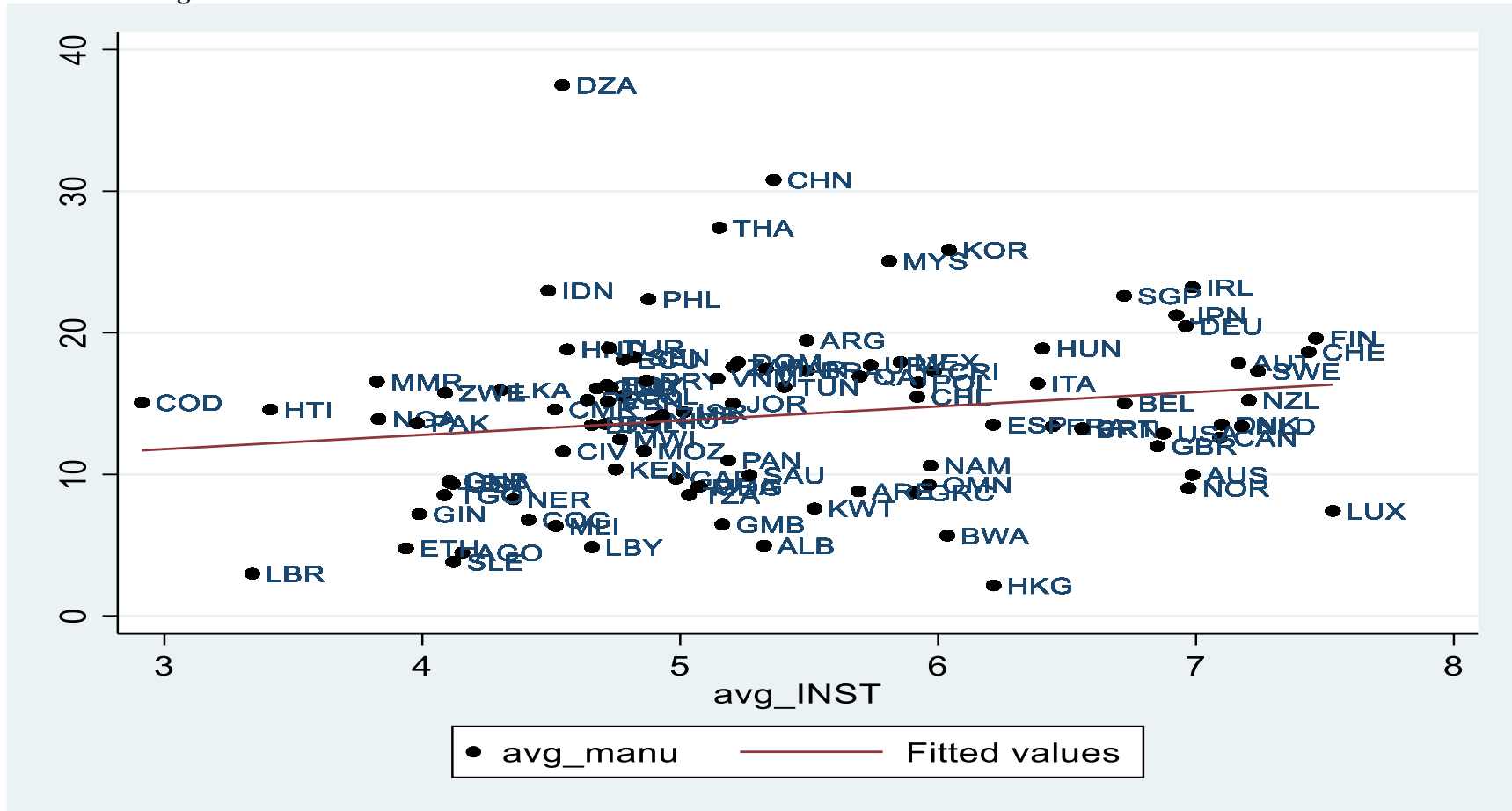
Figure 17 shows a positive relationship between the share of manufacturing value added, trade openness and institutional quality. However, when we examine the relationship between trade openness and manufacturing, the relationship appears to be in the opposite direction.

Figure 17: A clearer view of the relationship between manufacturing, trade openness and institutions

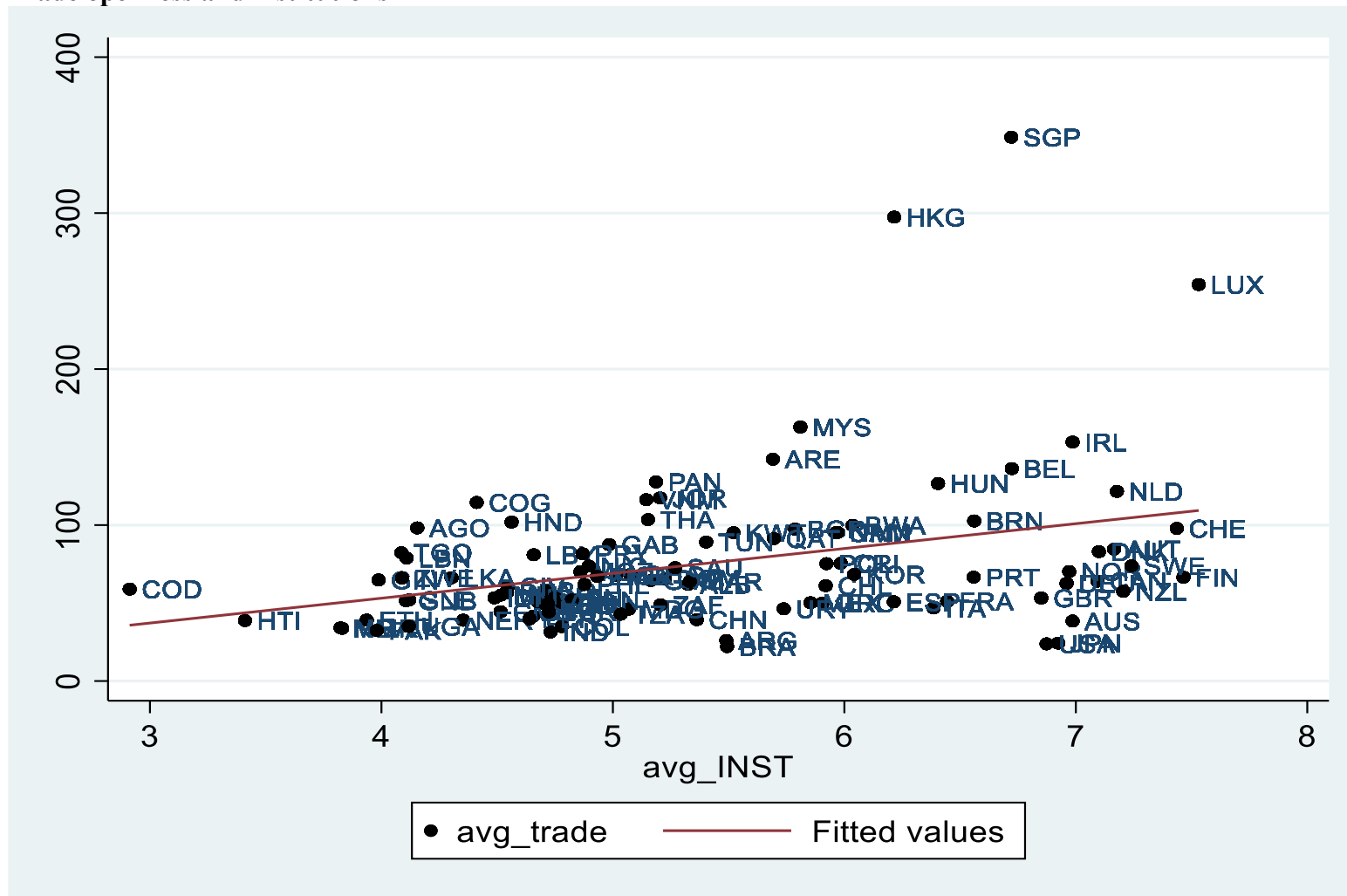
Share of manufacturing value added and trade openness.



Manufacturing value added share and institutions.



### Trade openness and institutions



Source: Author's calculations based on World bank, UNCTAD and PRS databases.

The aim of our analysis will therefore be to relate these 3 phenomena.

#### IV) Empirical analysis

##### IV.a) Model

To test this relationship, we use the same model as Alagidede et al., (2020), which empirically examines the link between trade, financial integration, and structural transformation in sub-Saharan African countries. In our work, however, we focus solely on trade openness and the interactive relationship between institutional quality and trade. Our aim is to show the impact of trade integration on structural change, particularly when we consider the institutional quality variable.

The relationship between trade openness is illustrated in the first equation.

$$\begin{aligned} SC_{it} = & \beta_0 SC_{it-1} + \beta_1 INST_{it} \\ & + \beta_2 TradeOpeness_{it} + \beta_3 Domesticcredit_{it} + \beta_4 Population_{it} \\ & + \beta_5 FDI_{it} + \lambda_i + \varepsilon_{it} \end{aligned} \quad (1)$$

Where  $SC_{it}$ ,  $SC_{it-1}$  represent country  $i$ 's share of manufacturing value added in periods  $t$  and  $t-1$  respectively.

$INST_{it}$ , represents the arithmetic mean of the twelve indicators in the ICRG database for the PRS group.

$TradeOpeness_{it}$  is our variable of interest, which is the indicator of trade openness. It refers to a country's degree of openness.

$Domesticcredit_{it}$  refers to financial resources to the private sector. Countries with domestic resources can encourage investment, particularly in sectors requiring large-scale investment. This could provide an incentive for structural change.

$Population_{it}$  is the population of a country at period  $t$ . It can either accelerate or slow down structural change.

$FDI_{it}$  represents the countries' inflow foreign direct investment.

Finally, the  $\lambda_i$  is the country-specific unobserved variable.  $\varepsilon_{it}$  is the error term.

All data and sources are presented in Table 8.

To test the impact of trade openness considering the interactive term, we use the second models presented below.



$$\begin{aligned}
SC_{it} = & \beta_0 SC_{it-1} + \beta_1 INST_{it} \\
& + \beta_2 TradeOpeness_{it} + \beta_3 (INST_{it} * TradeOpeness_{it}) \\
& + \beta_4 Domesticcredit_{it} + \beta_5 Population_{it} + \beta_6 FDI_{it} + \lambda_i + \varepsilon_{it}
\end{aligned}
\tag{2}$$

In a second step, we use the same framework to test the institutional similarity hypothesis. However, we replace the INST variable with the institutional similarity indicator. This allows us to test whether the similarity of countries' institutional environments can affect structural change. The literature uses a variety of measures. On this point, we refer to the work of Bouattour (2020).

In our work, we consider the first similarity measure of Bergstrand and Egger (2007) and Cezar and Escobar (2015). If the value is smaller (around 0), there is difference in institutional quality between country i and j. The formula used is as follows:

$$Sim_{ij} = \frac{INST_i * INST_j}{(INST_i + INST_j)^2}$$

To illustrate the similarities, we also consider the institutional distance variable. If the value is negative, there is difference between country i and j in terms of institutional quality. Its formula is as follows:

$$Dist_{ij} = |INST_i - INST_j|$$

Where  $INST_i$  is the given country and  $INST_j$  is the referee country (USA, China, EU).

#### IV.b) Methodology

Kpodar (2005) points out that both fixed-effects and random-effects models can take account of data heterogeneity, but that the assumptions about the nature of the specific effects differ from one model to the other. For example, the fixed-effects model assumes that the specific effects can be correlated with the model's explanatory variables. In the random-effects model, on the other hand, specific effects are assumed to be orthogonal to the model's explanatory variables. The Hausman test is therefore used to determine which model to use. In our case, the specification test allows us to reject the null hypothesis (Appendix II-1).

However, since we are faced with an endogeneity bias due to the introduction of institutional variables into the model, and given the two-way relationship between trade and institutions, we rely on the Generalized Method of Moments (GMM). This allows us to take endogeneity into account.

In this work, we use a syst-GMM, which is a dynamic estimator for panel data. It uses instruments that are functions of the model parameters and the data, so that their expectation is zero for the real values of the parameters. We may note that when using the GMM estimator, we have the first difference GMM estimator of Arellano and Bond (1991) and the system-GMM estimator of Blundell and Bond (1998). The latter is considered as a combination of the first difference equation and the level equation, where the variables are instrumented by their first difference. Blundell and Bond (1998) present Monte Carlo simulations to demonstrate that the syst-GMM estimator is more efficient than the first difference GMM. They show that this is particularly the case when instruments are weak, and the first-difference estimator produces biased results. All these arguments support our decision to use syst-GMM.

For the system-GMM estimator to be consistent, there must be no second-order correlation in the difference error term.  $\varepsilon_{it}$ . Next, the Sargan/Hansen over-identification test is also used to check the validity of lagged variables as instruments, and the Arellano and Bond autocorrelation test is used to check for the existence of second-order serial correlation (AR2). If we reject the null hypothesis of both tests, this means respectively that the instruments used are valid and the model is correctly specified.

However, for robustness check, we use the IV estimator, which help us to use other external instruments for either institutional quality or trade openness. Based on Paulo et al., (2022), finding an external instrument could be easy, but finding instruments which are not correlated with any other omitted variable that simultaneously correlates (with both institutions, trade openness and manufacture value added share in our case of study), also that affect manufacture value added share only through institutional quality or trade openness channel, is not always satisfied. Then, they refer to Lewbel method. This latter allows the use of IV when there are no external sources of identification, when instruments are weak or not convincing. The process is to explore heteroskedasticity in the first-stage regression to construct instruments internally (Paulo et al., 2022). We then follow this process by using as instruments for trade openness, the strategy used by Martorano (2018) to define our instruments for trade openness. This leads us to consider as instruments the average of trade openness in countries sharing same border and common language to each country(origin)<sup>27</sup>.

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<sup>27</sup> The data used is from CEPII gravity database. For a given country, we look for its commercial partners, we do the average based on common borders(contiguity), and those sharing common language. This relates to trade literature, which says countries will trade more if they share borders and speak the same language.

#### IV.c) Data

Our study is based on a sample of 98 countries from 1984 to 2018. We present here the list of data used for the empirical study.

Table 8: List of data

<b>Variables</b>	<b>Definitions</b>	<b>Information sources</b>
<b>Institutions (<math>INST_{it}</math>)</b>	Represent institutional quality (in this sense, the average indicates the overall institutional environment).	PRS Group
<b>Population (<math>Population_{it}</math>)</b>	Population size to consider the size of the domestic market, or even the workforce	WORLD BANK
<b>FDI Inflow (<math>FDI_{it}</math>)</b>	the stock of inward FDI	WORLD BANK
<b>Openness to trade (<math>Tradeopeness_{it}</math>)</b>	Sum of exports and imports of goods and services in relation to gross domestic production.	UNCTAD
<b>Domestic credit to the private sector by banks (%GDP) (<math>Domesticcredit_{it}</math>)</b>	Financial resources from the private sector	WORLD BANK
<b>Share of manufacturing value added (%GDP) (<math>SC_{it}</math>)</b>	Share of manufacturing sector	WORLD BANK

Table 9 shows the descriptive statistics and correlation matrix. For the mean of the institutional variables, the lowest value in our data set is 0.709 and the highest is 8.083 and the mean is 5.361. This indicates that our sample is heterogeneous, with different levels of overall institutional environment. We also note that the maximum share of manufacturing value added is 49.879% and the minimum is 0.972%. This confirms that some countries still suffer from a lack of industrialization. The final factors considered are openness to trade and the value of FDI. The maximum value is 442.62% and the minimum 0.175%, indicating a wide range of situations. If we consider FDI flows, some countries suffer from a capital deficit, while others do not.

Using the value of the average of the PRS group's institutional quality indicators (INST), we see a positive relationship between average institutional quality and the share of manufacturing value added (our endogenous variable). The coefficients range for correlation are from -0.086

to 0.60. We can also see a strong correlation between domestic credit and institutional quality (0.60). Another strong correlation exists between trade openness and FDI (0.493).

Table 9: Descriptive statistics and correlation matrix

Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ManufacturingVA	3030	14.311	6.331	.972	49.879
INST	3575	5.361	1.239	.709	8.083
Domestic credit	3178	44.909	41.167	.007	223.391
Trade openness	3314	75.551	53.774	.175	442.62
Total population	3602	52110277	1.643e+08	218176	1.403e+09
FDIinflows	3480	3.334	6.959	-57.605	103.337
DistiUS	3540	-1.523	1.262	-6.146	1.507
DistiChina	3540	.001	1.27	-4.993	3.056
DistiEU	3575	-1.303	1.216	-5.767	1.527
SimiUS	3540	.242	.013	.085	.25
SimiChina	3540	.246	.008	.109	.25
SimiEU	3575	.243	.012	.089	.25

Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) ManufacturingVA	1.000					
(2) INST	0.120*	1.000				
(3) Domestic credit	0.170*	0.604*	1.000			
(4) Trade openness	-0.013	0.305*	0.390*	1.000		
(5) Totalpopulation	0.193*	-0.028	0.120*	-0.176*	1.000	
(6) FDIinflows	-0.086*	0.183*	0.184*	0.493*	-0.052*	1.000

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

IV.d) Empirical results

We tested our main model (equation 1). First, we run only trade openness as exogenous variable, the result shows a negative and non-significant link between trade and structural change. However, when adding the institutional variable, trade openness become positive and significant. This step allows us to test the importance of institutions in the relationship between trade openness and structural change. Considering all our exogenous variables, our estimates (Table 10) show a positive and significant relationship between trade and structural change. Whether we use IV 2LS (Table 11), the relation remains the same. This positive relationship is also found by Alagidede et al., (2020), Dabla-Norris et al., (2013), Matsuyama (2009) and Uy

et al., (2013). However, using the interactive term for institutional quality and trade openness<sup>28</sup>, we find that trade openness becomes negative, but interactive is positively significant, which is in line with what we expect. This would imply that the effects of trade openness positively affect manufacturing sector when institutional quality is considered. The same relationship is also found when we use the IV estimates as robustness check (Table 11). This could confirm the role of institutional quality in the process of structural change. This suggests that the positive effect on structural change is conditioned by institutional quality. This allows us to consider the likely importance of the institutional threshold. We also observe the role of institutions, when we use INST and FDI as interactive term, it shows a positive relationship for the Syst-GMM (Table 10). But we could not confirm the same link in the IV estimates (Table 11).

Moreover, in table 11, we also split our database between SSA countries and NSSA (non SSA countries); High level (HI) and Low level (LI)<sup>29</sup> to see the effects in a disaggregated level, we notice a negative relationship between trade and manufacturing value added share for the SSA countries. But, the opposite, for the non SSA countries. This negative relationship for SSA countries is not surprised. Indeed, it represents one of the main questions in the literature of SSA countries. If we refer to figures show in the part below, we see that many of SSA countries are resources-rich, when they are opened, they may stick in production on lower value-added production. For example, they do not export final products, in general they export raw products. Open to international market, the demand for this type of product increases, this is why we may observe the negative relationship. The other reason, when countries are opened, the domestic companies face to international competition, then if the state does not decide which policy to be implemented upstream to protect the local companies, these latter would close. Where, the role of institutional quality remains. Good institutions relate to good governance which can implement policy and law to drive this openness. We also observe a negative link between trade openness and manufacturing sector for low-income countries, but positive for High income countries (Table 11). If we refer to Levchenko (2007), who indicated that developed countries have better institutions than developing countries, in our results we could explain this negative impact of trade openness by the low level of institutional quality.

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<sup>28</sup> This interactive term has been tested for validity (we use the joint test testparm). The probability is as follows: Prob > F = 0.0315. This means that there is significance between INST and trade openness, which supports the addition of these two terms to the model. The test is also validated for the interaction between INST and FDI, Prob > F = 0.0233.

<sup>29</sup> It is also widely discussed in the literature that institutions variables are endogenous (as example Acemoglu et al., 2014, who use the log potential settler mortality or population density in 1500 based on Glaeser et al., 2004, also colonial origin British or French). In our IV regression, our endogeneity test shows that INST is exogenous when we split the data. This could be explained by the effect of the reduction of our sample.

Table 10: Syst-GMM estimates.

VARIABLES	(1) 1-GMM	(2) 2-GMM	(3) 3-GMM	(4) 4-GMM	(5) 5-GMM	(6) 6-GMM
Lagged dependent variable	0.981*** (0.0143)	0.984*** (0.0142)	0.984*** (0.0121)	0.972*** (0.0161)	0.959*** (0.0186)	0.955*** (0.0206)
Log (Trade)	0.0607 (0.0579)	0.123** (0.0571)	0.183*** (0.0641)	0.299*** (0.0810)	-1.982* (1.004)	0.257*** (0.0959)
INST		-0.0787*** (0.0222)	-0.0857*** (0.0222)	-0.0635** (0.0265)	-1.721** (0.757)	-0.180*** (0.0539)
Log (Domestic credit)			-0.0265 (0.0315)	-0.0290 (0.0353)	0.0205 (0.0442)	-0.0108 (0.0445)
Log (Population)			0.0409* (0.0239)	0.0674** (0.0297)	0.0776** (0.0357)	0.105** (0.0444)
Log (FDI)				-0.0661* (0.0377)	-0.0675 (0.0442)	-1.163** (0.507)
INST*Trade					0.394** (0.181)	
INST*FDI						0.202** (0.0876)
Constant	-0.0654 (0.323)	0.0604 (0.286)	-0.740 (0.497)	-1.553** (0.653)	7.802* (3.993)	-1.284* (0.728)
Observations	2,809	2,803	2,608	2,351	2,349	2,349
Number of groups/countries	99	99	98	98	98	98
Number of instruments	5	6	8	9	10	10
Hansen Test Prob>Chi2	0.182	0.207	0.175	0.119	0.138	0.133
AR(2) [p-value]	0.612	0.621	0.985	0.689	0.741	0.724
Net effect of trade and FDI					<b>-1.982 if INST=0/ 1.958 if INST=10</b>	<b>-1.163 if INST=0/ 0.857 if INST=10</b>

*Robust standard errors in parentheses*

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 11: IV Estimates of whole sample, SSA and NSSA, High income and Low Income (first stage results are reported in appendix II-2)

VARIABLES	(1) Whole	(2) INST*Trade	(3) INST*FDI	(4) SSA	(5) NSSA	(6) High income	(7) Low income
INST	-0.0950*** (0.0294)	-1.017** (0.402)	-0.104*** (0.0310)	-0.126 (0.0843)	-0.0936*** (0.0301)	-0.00816 (0.0519)	-0.234* (0.133)
Lagged dependent variable	0.969*** (0.00889)	0.968*** (0.00889)	0.969*** (0.00889)	0.913*** (0.0255)	0.971*** (0.0100)	0.980*** (0.00997)	0.915*** (0.0235)
Log (Trade)	0.252*** (0.0718)	-1.012* (0.541)	0.245*** (0.0710)	-0.299* (0.178)	0.367*** (0.0864)	0.307*** (0.0942)	-0.435* (0.262)
Log (Domestic credit)	0.00912 (0.0471)	0.0167 (0.0463)	0.00869 (0.0471)	0.0870 (0.102)	-0.0731 (0.0538)	-0.0904 (0.0681)	-0.0650 (0.184)
Log (Population)	0.0618** (0.0242)	0.0667*** (0.0236)	0.0631*** (0.0240)	-0.00265 (0.0515)	0.0854*** (0.0278)	0.102** (0.0408)	0.161 (0.102)
Log (FDI)	-0.0246 (0.0224)	-0.0268 (0.0221)	-0.119 (0.105)	0.0161 (0.0342)	-0.0450 (0.0307)	-0.0299 (0.0406)	0.0280 (0.0620)
INST*Trade		0.222** (0.0954)					
INST*FDI			0.0175 (0.0202)				
Constant	-1.210** (0.576)	3.897* (2.280)	-1.163** (0.575)	2.496* (1.324)	-1.764*** (0.672)	-2.406** (1.066)	1.131 (2.097)
Observations	2,428	2,428	2,428	689	1,739	797	265
R-squared	0.959	0.959	0.959	0.897	0.963	0.967	0.898
Hansen J statistic	0.7326	0.7032	0.7161	0.6378	0.4602	0.7121	0.6249
Endogeneity test p-value	0.0394	0.0392	0.0392	0.1341	0.1783	0.2537	0.1155
Kleibergen-Paap rk LM statistic (p-value)	597.749 (0.0000)	73.654 (0.0000)	541.712 (0.0000)	185.118 (0.0000)	565.575 (0.0000)	156.953 (0.0000)	57.828 (0.0000)
Cragg-Donald Wald F statistic	9875.283	346.476	9297.758	1699.141	8040.908	3388.447	490.316
Kleibergen-Paap rk Wald F statistic	8812.457	40.562	7326.474	1613.956	6737.878	3713.600	532.008

*Robust standard errors in parentheses*

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

\* Underidentification test (Kleibergen-Paap rk LM statistic), Weak identification test (Cragg-Donald Wald F statistic, Kleibergen-Paap rk Wald F statistic), Overidentification test of all instruments (Hansen J statistic). If we reject the null hypothesis for both tests, our model is well specified.

As a robustness check, we also use another measure of trade openness, taking the average trade openness of partner countries sharing the same official language and common border with each country as instruments. These data based on CEPII. We see that the direction of the relationship remains in the same whether using an IV two stage regression or the Lewbel regression (which indicate we do not have any external instrumental variable for trade openness). when we use the interactive term. But the positive and significant character of trade openness is only noticeable in the two SLS IV (Appendix II-3).

We also find a positive and significant relationship between population and structural change; this relationship has already been found in the literature, if we consider that population represents the labor force and the size of the domestic market. Leukhina and Turnovsky (2016) and Ho (2015) also found that the size of the domestic population could play an important role in the process of structural change.

We find a negative and significant relationship for institutional variable. This result can be discussed in terms of the measure of institutional quality used. Indeed, since our variable represents an average of twelve institutional quality indices, they do not have the same weights or definitions. Index calculation bias could therefore explain this negative relationship. Or the other explanation relates on the facts in our sample, many of countries have a lower average of institutional quality. However, other results point to other considerations, such as countries' level of growth and development. Several studies suggest that countries with low institutional quality experience negative effects, while countries with high institutional quality experience the opposite. Dabla-Norris et al., (2013) also find that the quality of political institutions has a negative impact on the structural transformation process. This finding is consistent with our results, as the ICRG indices also measure the quality of political institutions.

Note the significant positive sign for lagged manufacturing value, reflecting the importance of initial conditions. In other words, the lagged value of manufacturing sector has a positive impact on the value added of manufacturing sector.

To determine the marginal effect of the relationship between trade and structural change, we derive the equation as in Alagidede et al. (2020). To illustrate the importance of this threshold (Figure 18), we consider random values of institutional quality in relation to the measurement limits in equation 1 (with respect to the range of institutional quality of the ICRG indicators: 0-10). We observe that starting from 5.5 the value of the INST average, the effect of trade is positive. This observation could indicate that a country to benefit from international insertion should attempt a certain level of quality if their institutions.



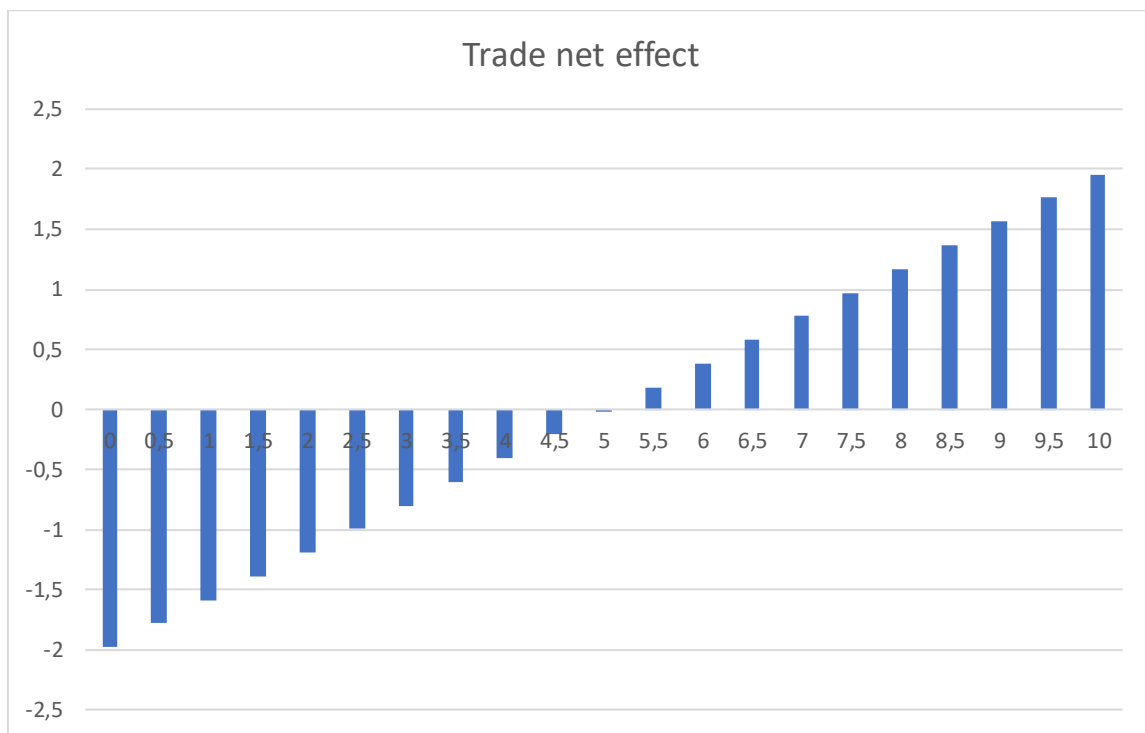
$$SC_{it} = \beta_0 SC_{it-1} + \beta_1 INST_{it} + \beta_2 TradeOpeness_{it} + \beta_3 (INST_{it} * TradeOpeness_{it}) + \beta_4 Domesticcredit_{it} + \beta_5 Population_{it} + \beta_6 FDI_{it} + \lambda_i + \varepsilon_{it}$$

**Net effect of trade liberalization =  $\beta_2 + \beta_3 * INST_{it}$**

If  $INST_{it} = 0$  Net effect =  $(-1.982) + (0.394 * 0) = -1.982$

If  $INST_{it} = 10$  Net effect =  $(-1.982) + (0.394 * 10) = 1.958$

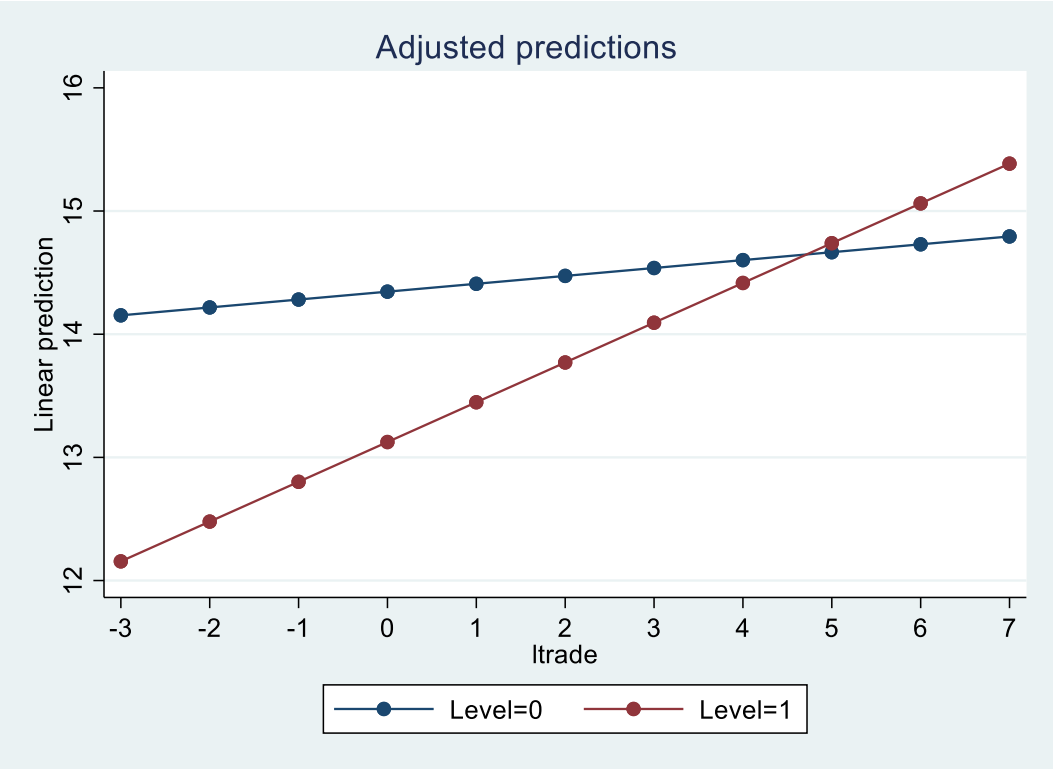
Figure 18: Net effect of trade openness as a function of the level of institutional quality



Source: Author's calculation

This relationship is also verified in the graph below. We run a simple OLS by considering the level of institutional quality found (a dummy variable was created for Level=1 if INST>5 or 0 if it is lower or equal to 5).(cf.Appendix II-4 and II-5). The relationship clearly defined for institutions in the upper regime, this implies that when institutional quality is high, trade openness affects positively the manufacturing sector. In other words, the relationship between trade openness and the manufacturing sector is more pronounced when the level of institutional quality is higher.

Figure 19: Trade openness impact by level on institutional quality



According to our estimates, the institutional threshold is an important element in the relationship between trade and structural change. When we considering the threshold level of five (5), only few countries for recent years 2015(Zambia, South Africa, Mozambique, Kenya and Botswana) in our SSA sample reached this level. (cf. Appendix II-6)

The final step in our work is to examine the importance of institutional similarities for structural change. To examine these similarities, we consider three leading economies in world trade (the USA, China, and the average of the sixteen EU<sup>30</sup> in our sample, considering the EU

<sup>30</sup> Germany, Austria, Belgium, Bulgaria, Denmark, Finland, France, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal and Spain.

group). The  $Sim_{ij}$  indicator is the main measure considered. If this value is 0.25, the two countries have the same institutional level, but if this value is close to zero or far from 0.25, there is a difference between the two countries. Our estimates show a negative and significant relationship for countries whose institutional level is further away from the USA, EU, and China (Table 12). Moreover, when we use the distance to the institutional environment ( $Dis_{ij}$ ), we observe the same results. If a country's level of institutional quality is far from that of the USA, EU and China, this indicates a negative impact on the process of structural change.

Our result confirms other works such as De Groot et al., (2004), Álvarez et al., (2018), which indicate that most bilateral trade takes place between economies with high institutional quality standards (i.e. when the difference between indicators is small). However, trade openness remains a positive variable for all considerations. It is important to note that, in terms of value for the institutional distance measure, the impact of trade is quite the same for China than for other countries. Also, when using the similarity measure ( $Sim_{ij}$ ), in percentage terms, the impact of trade openness is not too different from that of other countries. This may explain China's important role in world trade. It may indicate that institutions are not the only element to be taken into consideration, but that others such as trade policies, infrastructure and economic conditions need to be considered.

In table 13, we use the interactive term between the distance and trade to see the effects on structural change, we only find a negative and significant for distance to USA' institutions. As the country  $i$  is different from USA, the effect turns negative. But any significant links have been shown for EU and China, but trade openness remains positive and significant for China's consideration.

Table 12: Results of institutional similarity with literature measures

VARIABLES	(1) DistiUS	(2) DistiEU	(3) DistiChina	(4) SimiUS	(5) SimiEU	(6) SimiChina
Lagged dependent variable	0.986*** (0.0123)	0.980*** (0.0119)	0.977*** (0.0122)	0.982*** (0.0121)	0.980*** (0.0119)	0.980*** (0.0124)
Log (Trade)	0.184*** (0.0642)	0.184*** (0.0652)	0.185*** (0.0665)	0.191*** (0.0643)	0.189*** (0.0647)	0.187*** (0.0656)
Log (Domestic credit)	-0.0284 (0.0290)	-0.0227 (0.0329)	-0.0358 (0.0363)	-0.0466* (0.0271)	-0.0466* (0.0274)	-0.0797*** (0.0278)
Log (Population)	0.0373 (0.0249)	0.0475** (0.0231)	0.0562** (0.0219)	0.0521** (0.0233)	0.0556** (0.0223)	0.0607*** (0.0221)
DistiUS	-0.0880*** (0.0222)					
DistiEU		-0.0812*** (0.0255)				
DistiChina			-0.0560** (0.0250)			
SimiUS				-9.310*** (3.080)		
SimiEU					-8.844*** (3.363)	
SimiChina						-9.168* (5.175)
Constant	-1.296*** (0.484)	-1.375*** (0.478)	-1.329*** (0.478)	0.938 (0.838)	0.814 (0.862)	0.949 (1.223)
Observations	2,587	2,608	2,594	2,587	2,608	2,594
Number of groups /countries	97	98	97	97	98	97
Number of instruments	8	8	8	8	8	8
Hansen Test Prob>Chi2	0.192	0.155	0.160	0.175	0.156	0.158
AR(2) [p-value]	0.969	0.993	0.986	0.998	0.997	0.994

*Robust standard errors in parentheses*

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 13: Results of institutional similarity in interactions with trade

VARIABLES	(1) DistiUS*Trade	(2) DistiEU*Trade	(3) DistiChina*Trade
Lagged dependent variable	0.993*** (0.0128)	0.982*** (0.0121)	0.978*** (0.0124)
Log (Trade)	-0.0175 (0.125)	0.117 (0.112)	<b>0.211***</b> (0.0735)
Log (Domesticcredit)	-0.0459 (0.0301)	-0.0290 (0.0337)	-0.0402 (0.0367)
Log (Population)	0.0284 (0.0276)	0.0446* (0.0241)	0.0532** (0.0226)
DistiUS	<b>0.654*</b> (0.382)		
DistiUS*Trade	<b>-0.178*</b> (0.0918)		
DistiEU		0.219 (0.379)	
DistiEU*Trade		-0.0723 (0.0915)	
DistiChina			0.221 (0.313)
DistiChina*Trade			-0.0671 (0.0760)
Constant	-0.308 (0.755)	-1.035 (0.694)	-1.378*** (0.484)
Observations	2,582	2,603	2,589
Number of groups/ countries	97	98	97
Number of instruments	9	9	9
Hansen Test Prob>Chi2	0.157	0.148	0.140
AR(2) [p-value]	0.957	0.986	0.963

*Robust standard errors in parentheses*

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

## V) Conclusion

The main objective of our work is to highlight the role of international insertion in the process of structural change by considering the quality of the institutional environment and institutional similarities. This work confirms the importance of institutions and trade openness in structural change process.

Indeed, using the interactive term of institutions between trade, we find positive and significant coefficients. However, our study confirms the idea that a certain level of institutional quality must be sought to highlight this effect.

Furthermore, when we consider institutional similarity, we find that for countries whose institutions are far in terms of quality from those of countries such as the USA, the EU and China, the impact on structural change is negative and significant. Thus, a country whose institutional quality is lower, where there is uncertainty, where investors are not confident and where the environment is dysfunctional, cannot develop its productive sector through openness.

Based on our results, we can encourage countries to create a better institutional environment to attract more investors and develop the most productive sectors. Even the important role played by institutions, it remains they are not the only elements to be taken into consideration, but that others such as trade policies, infrastructure and economic conditions need to be considered. For example, trade represents an important element to shape structural transformation through specialization. As Alessandria et al., (2021) note production is not only influenced by domestic demand but also foreign demand. For them, some channels, countries could benefit in the relationship between trade and structural change is via the trade cost. They report that trade costs are higher in low-income countries; then via a better institutional quality, costs could be reduced because of the respect of contracts, the level of trust and the disposition of infrastructure or access of technology, and policies that will help partners to have confidence to do business in these areas. The state should be able to define upstream trade policies that favor their countries in this globalized world.

In this study, we could see how institutions remains important in the equation of structural change and trade openness; also consider that the production is conditioned by both domestic and foreign demand.

## Appendices chapter II

### Appendix II- 1 : Hausman test

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. hausman fe re
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	— Coefficients —			
	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) Std. err.
manufactur~1				
l1.	.8735275	.9655927	-.0920651	.0074249
INST	-.0403012	-.0791878	.0388865	.0271167
ldom	-.1090664	-.0119726	-.0970938	.0549071
ltrade	.1091154	.2066069	-.0974915	.1002668
lpop	-.2301492	.073334	-.3034832	.1549443
lgdp	-.1949631	.0197822	-.2147453	.1100259

b = Consistent under H0 and Ha; obtained from xtreg.

B = Inconsistent under Ha, efficient under H0; obtained from xtreg.

Test of H0: Difference in coefficients not systematic

$$\begin{aligned} \text{chi2}(6) &= (b-B)'[(V_b-V_B)^{-1}](b-B) \\ &= 155.32 \end{aligned}$$

Prob > chi2 = 0.0000

Appendix II- 2: Report of the first stage of the IV regression

VARIABLES	(1) Whole INST	(2) INST*Trade INST	(3) INST*FDI INST	(4) SSA INST	(5) NSSA INST	(6) High income INST	(7) Low income INST
Lagged dependent variable	0.00129 (0.000954)	-0.000502 (0.000481)	0.00128 (0.000951)	-0.000346 (0.00276)	0.000892 (0.00109)	0.00185 (0.00139)	-0.00653 (0.00528)
Log (Trade)	-0.0128 (0.0138)	-1.029*** (0.0139)	-0.0175 (0.0138)	0.0251 (0.0372)	-0.0200 (0.0151)	-0.0207 (0.0190)	-0.0826 (0.0732)
Log (Domestic credit)	0.0249*** (0.00795)	0.0127*** (0.00401)	0.0246*** (0.00793)	-0.00120 (0.0161)	0.0243** (0.0114)	0.00798 (0.0174)	0.0111 (0.0323)
Log (Population)	-0.0125*** (0.00485)	0.000835 (0.00245)	-0.0115** (0.00484)	-0.0107 (0.0110)	-0.0146*** (0.00539)	-0.00626 (0.00729)	-0.000712 (0.0202)
Log (FDI)	0.00686 (0.00479)	-2.87e-05 (0.00241)	-0.0597*** (0.0186)	0.00606 (0.00887)	0.00572 (0.00577)	0.00275 (0.00658)	0.0268 (0.0183)
L.INST	1.068*** (0.0193)	0.272*** (0.0135)	1.063*** (0.0193)	1.072*** (0.0369)	1.058*** (0.0225)	1.049*** (0.0306)	1.089*** (0.0605)
L2. INST	-0.134*** (0.0193)	-0.0368*** (0.00978)	-0.135*** (0.0192)	-0.164*** (0.0371)	-0.122*** (0.0225)	-0.118*** (0.0307)	-0.201*** (0.0625)
INST*Trade		0.180*** (0.00214)					
INST*FDI			0.0124*** (0.00334)				
Constant	0.527*** (0.117)	4.277*** (0.0739)	0.557*** (0.117)	0.527* (0.287)	0.600*** (0.128)	0.583*** (0.176)	0.895* (0.509)
Observations	2,428	2,428	2,428	689	1,739	797	265
R-squared	0.941	0.985	0.942	0.877	0.943	0.912	0.855

*Standard errors in parentheses*  
\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$



Appendix II- 3: Estimates for external instruments of trade (Common Language and Contiguity) and Lewbel

VARIABLES	(1) IV-(contig comlang)	(2) Lewbel
Log (Trade)	0.647*** (0.237)	1.191*** (0.263)
Lagged dependent variable	0.962*** (0.0119)	0.964*** (0.00468)
Log (Domestic credit)	-0.101 (0.0703)	-0.197*** (0.0642)
Log (Population)	0.169*** (0.0570)	0.263*** (0.0556)
INST	-0.0972** (0.0385)	-0.106*** (0.0313)
Constant	-4.209** (1.641)	-7.643*** (1.777)
Observations	1,897	2,638
R-squared	0.949	0.953

*Standard errors in parentheses*  
\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Appendix II- 4: Estimates result from a dynamic panel threshold to define the level of institutional quality.

VARIABLES	Institutional Threshold
Lag_y_b	0.910*** (0.0316)
ltrade_b	<b>-1.020**</b> (0.454)
cons_d	-7.672*** (1.279)
Lag_y_d	0.0581 (0.0389)
ltrade_d	<b>1.647***</b> (0.297)
R	4.993*** (0.889)
Observations(N)	45
T	35

*Standard errors in parentheses*  
\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

\*Y represents the manufacturing value added share (the dependent variable); Lag y is the lag of manufacturing value added share. Ltrade is the log of trade openness. R represents the level of institutions. The letter b and d represent respectively, the variable below the threshold, and the variable above.

$$Y_{it} = \phi_1 Y_{it-1} + \theta_{11} INST + \theta_{21} ltrade) 1\{q_{it} \leq \gamma\} + \phi_2 Y_{it-1} + \theta_{12} INST + \theta_{22} ltrade+) 1\{q_{it} > \gamma\} + \alpha_i + u_{it}$$

Appendix II- 5: Simple OLS for adjusted predictions by institutional level

VARIABLES	Institutional by level
L.manufacturingvalueadded1	0.967*** (0.00446)
1.Level	-1.221*** (0.424)
Ltrade	0.0641 (0.0972)
1.Level*c.ltrade	0.259** (0.103)
Ldom	-0.0244 (0.0319)
Lpop	0.0700*** (0.0223)
Lfdi	-0.0319 (0.0221)
Constant	-0.861 (0.590)
Observations	2,474
R-squared	0.959

*Standard errors in parentheses*  
 \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Appendix II- 6: List of SSA countries in our sample by level of institutional quality

Year	Code	Country	INST	Level (1 if INST>5, 0 if INST<=5)
1985	AGO	Angola	3.7644444	0
1995	AGO	Angola	3.9030556	0
2005	AGO	Angola	4.7366667	0
2015	AGO	Angola	4.3747222	0
1985	BWA	Botswana	5.4925	1
1995	BWA	Botswana	6.1388889	1
2005	BWA	Botswana	6.5416667	1
2015	BWA	Botswana	6.0966667	1
1985	BFA	Burkina Faso	4.385	0
1995	BFA	Burkina Faso	4.4233333	0
2005	BFA	Burkina Faso	4.9859722	0
2015	BFA	Burkina Faso	4.3791667	0
1985	CMR	Cameroon	4.1941667	0
1995	CMR	Cameroon	4.1666667	0
2005	CMR	Cameroon	4.9583333	0
2015	CMR	Cameroon	4.375	0
1985	COG	Congo	4.657037	0
1995	COG	Congo	4.3541667	0
2005	COG	Congo	4.6808333	0
2015	COG	Congo	4.6981944	0
1985	COD	Congo, DR	2.6525	0
1995	COD	Congo, DR	2.8688889	0
2005	COD	Congo, DR	2.9443056	0
2015	COD	Congo, DR	3.2188889	0
1985	CIV	Cote d'Ivoire	5.3402778	1
1995	CIV	Cote d'Ivoire	5.2291667	1
2005	CIV	Cote d'Ivoire	3.2983333	0
2015	CIV	Cote d'Ivoire	4.1705556	0
1985	GAB	Gabon	5.4236111	1
1995	GAB	Gabon	4.8677778	0
2005	GAB	Gabon	5.1733333	1
2015	GAB	Gabon	4.6636111	0
1985	GMB	Gambia		
1995	GMB	Gambia	4.4225	0
2005	GMB	Gambia	5.7008333	1
2015	GMB	Gambia	4.9002778	0
1985	GIN	Guinea	3.5833333	0
1995	GIN	Guinea	4.0833333	0
2005	GIN	Guinea	4.0909722	0
2015	GIN	Guinea	3.8101389	0
1985	GNB	Guinea-Bissau		
1995	GNB	Guinea-Bissau	3.6666667	0

2005	GNB	Guinea-Bissau	4.6356944	0
2015	GNB	Guinea-Bissau	4.2361111	0
1985	KEN	Kenya	4.8891667	0
1995	KEN	Kenya	5.6458333	1
2005	KEN	Kenya	4.7883333	0
2015	KEN	Kenya	4.7083333	0
1985	LBR	Liberia	2.8194444	0
1995	LBR	Liberia	2.4441667	0
2005	LBR	Liberia	3.8709722	0
2015	LBR	Liberia	4.2402778	0
1985	MDG	Madagascar	4.7425	0
1995	MDG	Madagascar	4.9305556	0
2005	MDG	Madagascar	5.035	1
2015	MDG	Madagascar	4.5594444	0
1985	MWI	Malawi	4.4791667	0
1995	MWI	Malawi	5.3547222	1
2005	MWI	Malawi	4.8263889	0
2015	MWI	Malawi	4.3088889	0
1985	MLI	Mali	3.1041667	0
1995	MLI	Mali	4.6533333	0
2005	MLI	Mali	4.9583333	0
2015	MLI	Mali	4.2816667	0
1985	MOZ	Mozambique	3.7991667	0
1995	MOZ	Mozambique	4.8341667	0
2005	MOZ	Mozambique	5.5041667	1
2015	MOZ	Mozambique	5.3169444	1
1985	NER	Niger	4.5	0
1995	NER	Niger	3.8469444	0
2005	NER	Niger	4.7258333	0
2015	NER	Niger	4.0491667	0
1985	NGA	Nigeria	3.5836111	0
1995	NGA	Nigeria	4.3611111	0
2005	NGA	Nigeria	3.6847222	0
2015	NGA	Nigeria	3.6866667	0
1985	SEN	Senegal	4.875	0
1995	SEN	Senegal	4.7019444	0
2005	SEN	Senegal	4.9202778	0
2015	SEN	Senegal	4.5972222	0
1985	SLE	Sierra Leone	4.0688889	0
1995	SLE	Sierra Leone	2.3744444	0
2005	SLE	Sierra Leone	5.2391667	1
2015	SLE	Sierra Leone	4.5797222	0
1985	ZAF	South Africa	4.5480556	0
1995	ZAF	South Africa	6.2494444	1
2005	ZAF	South Africa	5.8856944	1
2015	ZAF	South Africa	5.3158333	1

<b>1985</b>	TGO	Togo	3.9166667	0
<b>1995</b>	TGO	Togo	4.1675	0
<b>2005</b>	TGO	Togo	4.1491667	0
<b>2015</b>	TGO	Togo	4.3675	0
<b>1985</b>	UGA	Uganda	2.5483333	0
<b>1995</b>	UGA	Uganda	4.4725	0
<b>2005</b>	UGA	Uganda	4.5833333	0
<b>2015</b>	UGA	Uganda	4.3202778	0
<b>1985</b>	ZMB	Zambia	3.7575	0
<b>1995</b>	ZMB	Zambia	5.5005556	1
<b>2005</b>	ZMB	Zambia	5.3366667	1
<b>2015</b>	ZMB	Zambia	5.1980556	1
<b>1985</b>	ZWE	Zimbabwe	3.8883333	0
<b>1995</b>	ZWE	Zimbabwe	5.5969444	1
<b>2005</b>	ZWE	Zimbabwe	3.7402778	0
<b>2015</b>	ZWE	Zimbabwe	3.9208333	0

### CHAPTER III: PREMATURE DEINDUSTRIALIZATION OR DEVELOPMENT WITHOUT FACTORIES. DEMAND FOR SERVICES AS A LEVER FOR DEVELOPMENT IN SUB- SAHARAN AFRICA?

*This chapter has been the subject of an article.*

*To cite: Betty ASSE & Dalila CHENAF-NICET, 2021. "[Note on the role of domestic and external demand on the process of premature deindustrialization](#)," *Region et Développement, LEAD, Université du Sud - Toulon Var*, vol. 54, pages 145-160.*

## I) Introduction

According to Rodrik (2013, 2016) or Subramanian (2014), for developing countries and within the framework of the three-sector hypothesis, structural change must lead first and foremost to a process of industrialization. However, the latter must last long enough to allow modernization of the productive structure, access to advanced technologies and the realization of learning effects, create income and employment growth and enable countries to emerge from underdevelopment (Goh and Olivier, 2002). Industry's share of total value added must therefore grow both over a long period and reach high levels before declining to make way for a more service-oriented economy. The industrialization process thus follows a bell-shaped (or inverted U-shaped) trajectory, with an inflection point that must be reached at high rates of industrialization and as late as possible in the development process before the economy shifts to a service society. Rodrik (2013) gives several examples from the history of the First Industrialized Countries (FICs) of this bell curve phenomenon. First, there is Great Britain, which, starting with the first industrial revolution, underwent a process of industrialization that saw manufacturing employment account for 45% of the employed workforce before the First World War, before declining. This industrialization process lasted some 160 years before the country entered the service era. Next comes the USA, where industrial employment peaked at 27% in the mid-twentieth century before declining. Finally, Germany, where manufacturing employment reached 40% of total employment in the 1970s, before also declining. All these nations have thus become economic powerhouses that have now entered the tertiary and quaternary era. However, Rodrik (2013) notes that for emerging and developing economies, this phenomenon when it occurs would take place over a short period (the turning point occurs in a few decades) and at low rates of industrialization that would offer little opportunity for dynamic long-term growth. He refers to this as "premature" deindustrialization.

For all the countries in the World Bank database and more recent periods (1988, 2000, 2010), Subramanian (2014) shows that the inverted-U curve phenomenon is observed when the level of development (measured by GDP per capita) and the level of industrialization (measured by the share of employment in industry) are put in relation. This relationship is characterized by two trends. Firstly, the curves linking GDP per capita, and industrialization tend to shift downwards over time. This first point can be interpreted as the fact that, for each stage of development, countries tend to specialize less and less in industry over the decades

in take-off phases. Secondly, the curves shift to the left over all three periods, indicating that countries are reaching their peak industrialization ever more rapidly.

Today, the phenomenon of premature deindustrialization is most widespread in sub-Saharan Africa. For these countries, the industrialization process takes little time. In particular, the bell curve phenomenon (deindustrialization starting from low rates of industrialization) can be observed in Ghana, Kenya, Mauritius, Nigeria, Senegal, South Africa, and Zimbabwe<sup>31</sup>. Several explanations for this phenomenon can be found in the literature, particularly the rise in raw material prices over recent decades, which has led countries to reprimarize. However, two factors are particularly relevant to our analysis. The first concerns the size of these countries' domestic markets, which may be too small to serve as a basis for industrialization. Like the Asian Newly Industrialized Countries (NICs) of the 1960s, sub-Saharan African countries cannot anchor their strategy of structural change on domestic demand for manufactured goods. Consequently, the process of structural change can only be based on external demand. The second factor is that global markets are themselves driven less and less by demand for manufactured goods and more and more by demand for services. This last factor would ultimately prevent countries from developing their industries based on external demand for lack of opportunities. (Rodrik, 2016).

The work of Rodrik (2013, 2016) and Subramanian (2014) support the idea that sustained demand (domestic/foreign) which, while not necessarily driving structural change and the industrialization process, enables the latter to be self-sustaining and sustainable. It is therefore necessary to study the role of these demands in depth, particularly in the case of sub-Saharan African countries, which are often producers of agricultural products and raw materials, and which are struggling to steer their structural change towards modern manufacturing sectors. However, the economic literature on structural change often presents the different determinants of structural change and industrialization, focusing rather on supply-side mechanisms rather than demand-side ones. As Alia (2014) points out, most studies consider productivity growth in the industrial

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<sup>31</sup>Manufacturing output as a percentage of GDP for the period 1960-2011 was, in Ghana, at its highest level of 19% against its lowest level of 8%. These percentages are 13% to 6.5% for Kenya, 25% to 16% for Mauritius, 5.5% to 1.3% for Nigeria, 17% to 14% for Senegal, 24% to 15% for South Africa, and 15% to 7% for Zimbabwe. Data source: UNSD.



sector as the central channel for the reallocation of production factors. Demand factors are then seen more as catalysts of change.

However, as certain theories show, structural change also depends on demand mechanisms. It is in the increase in income due to structural change and growth that the first impacts of demand on structural change can be identified. This well-known mechanism refers to Engel's law (1857), according to which the increase in income brought about by industrialization leads to a change in the structure of demand. Households consume more manufactured goods and services and less agricultural produce. This mechanism then reinforces the structural shift in favor of the industrial sector. Foellmi and Zweimüller (2008), who consider the non-linearity of the Engel curve, then describe how demand evolves with income and emphasize that the structural transformation takes place due to changes in the structure of consumer demand. This point is observed as households move out of poverty and into wealth. In their work, they classify goods into luxury goods with high income elasticities and necessity goods with low-income elasticities. They thus echo Kongsamut *et al.*, (2001)'s conclusion that changes in production structure are caused by differences in the income elasticity of demand for different goods.

Empirical studies of Asian NICs (the Four Dragons<sup>32</sup>) also focus on demand, to characterize their strategy of opening to the outside world. However, domestic, and foreign demand do not play the same role, depending on the size of the country. Thus, according to Kasahara (2004), while it is possible to refer to the "flight of the wild goose" strategy developed by Akamatsu (1962) to qualify the industrial development phenomenon of certain catching-up economies, several versions need to be considered depending on the place and role of different demands. For Kasahara (2004), the first version of this strategy is the one developed by Akamatsu (1962) and applied by Japan in the 1960s and 1970s, but also by a succession of smaller countries such as the Republic of Korea, Taiwan, Singapore, Hong Kong, Malaysia and Indonesia. The economic development model described by Akamatsu (1962) indicates that countries embark on a three-stage process of industrialization and integration into international trade. In the first stage, the country embarks on a process of industrialization, targeting low-tech manufactured products that it first imports. Secondly, it develops its production (learning by doing), relying on domestic demand. Once it has sufficiently mastered production and product quality, it becomes an exporter, this time relying on foreign demand. According to Régnier (2007), this

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<sup>32</sup> South Korea, Taiwan, Singapore and Hong Kong

development model explains the emergence of the Asian region through the transfer of comparative advantages and complementarities from Japan, South Korea and Taiwan via the offshoring of production segments. However, according to this author, the success achieved by South Korea, for example, is not entirely explained by international trade theories, but also by the *intervention of the State*, which was able to implement strategies to enhance the value of exports and substitute for imports. In the case of major emerging countries such as China, it's more a case of a second version of the strategy. Indeed, research shows that while this country initially based its industrialization on external demand, it is now seeking a new lease of life by attempting to conquer its domestic market in order to reduce its dependence on external markets and perpetuate its growth model and structural change (Artus and Xu, 2014).

Our aim is to understand what factors are driving structural change in sub-Saharan African countries, and why the industrial sector is struggling to develop while the service sector already dominates in terms of value added and job creation. However, to do this, we want to focus not on supply factors, as many studies have done before us, but on demand factors. Recent work often highlights the asymmetrical role of international trade in explaining the difficult structural mutations of developing countries (Bourguignon and Verdier, 2005 ; Galor and Mountford, 2008 ; Muendler, 2010 ; Chenaf-Nicet and Rougier, 2011 ; Chenaf-Nicet, 2020), the specialization in mining or oil resources and the development of new activities that appear too risky to entrepreneurs (Hausmann and Rodrik, 2003 ; Xu and Wang, 2006 ; Dasgupta *et al.*, 2008 ; McMillan and Rodrik, 2011). They also highlight the shallowness of the financial sector (Acemoglu and Zilibotti, 1997 ; Estrada *et al.*, 2010), but also the market rigidities, excessive regulation and limited adjustment capacity of developing countries (Hopenhayn and Rogerson, 1993 ; Bertola, 1994 ; Rodríguez and Rodrik, 2001 ; Boeri and Terrell, 2002 ; Dasgupta *et al.*, 2008 ; Freund and Bolaky, 2008 ; Chang *et al.*, 2009 ; Helpman *et al.*, 2010). There are also empirical studies highlighting the mechanisms by which imperfect institutions affect productivity and capital accumulation (Hall and Jones, 1999 ; Acemoglu *et al.*, 2005 ; Chenaf-Nicet, 2020). These points are linked to financial development (La Porta *et al.*, 1997, 1998), comparative advantages in trade (Dollar and Kraay, 2002 ; Costinot, 2009), and export diversification (Bénassy-Quéré *et al.*, 2007) . Some authors also argue that weak protection of property rights can discourage investors (Engerman and Sokoloff, 1994 ; Acemoglu *et al.*, 2003), leading to supply-side constraints in manufacturing sectors.

Demand in all the aforementioned analyses is marginal, and apart from the work of Rodrik (2013, 2016); Subramanian (2014) or Chenaf-Nicet (2020) who establish a correlation between demand and structural change, there is, to our knowledge, no in-depth empirical analysis of the link between deindustrialization and demand. This article aims to fill this gap. With regard to the future of developing countries, this point of analysis remains crucial, as many studies argue that dynamic growth remains strongly associated with the development of the manufacturing sector and not the service sector (Kaldor, 1966 ; Baumol, 1967 ; McMillan and Rodrik, 2011 ; Dercon and Gollin, 2014 ; Gelb *et al.*, 2014 ; Ghani and O’Connell, 2014 ; Timmer *et al.*, 2015 ; United Nations Industrial Development Organization, 2018). For many of these authors, it is industries that enable rapid convergence towards developed countries, as services generate few productivity gains (Baumol, 1967). Similarly, manufactured goods can be standardized and traded easily via international trade, which itself generates growth. Services are little affected by these phenomena, as they are often non-tradable, with low productivity and low technology (McCredie and Bubner, 2010 ; Ghani and O’Connell, 2014). However, there is some controversy on this point since, according to Loungani *et al.*, (2017) or Dihel and Goswami (2016), the service sector is increasingly remunerative for the various providers, not least because today many services are knowledge-intensive (KIS). To paraphrase the title of the work by Loungani *et al.*, (2017), services are the new development path. Our work is therefore part of this controversy.

- Is global demand for services influencing structural change in sub-Saharan African countries to the detriment of industry?
- Does a more service-oriented production structure hinder development in these countries?

In the context of developing countries, and SSA in particular, we will study the respective role of domestic and foreign demand on structural change (industrialization) in a panel of countries. We will test the hypothesis that it is possible to link the deindustrialization of certain countries (in particular, SSA) to the evolution of different demands (world demand for services/domestic demand). In other words, we test the existence, over the last few decades, of an inverse relationship between industrialization in sub-Saharan African countries and demand.

We relate this to the impact of different sectors on growth. We show that not only do Sub-Saharan African countries fail to capitalize on growth drivers due to their high resource

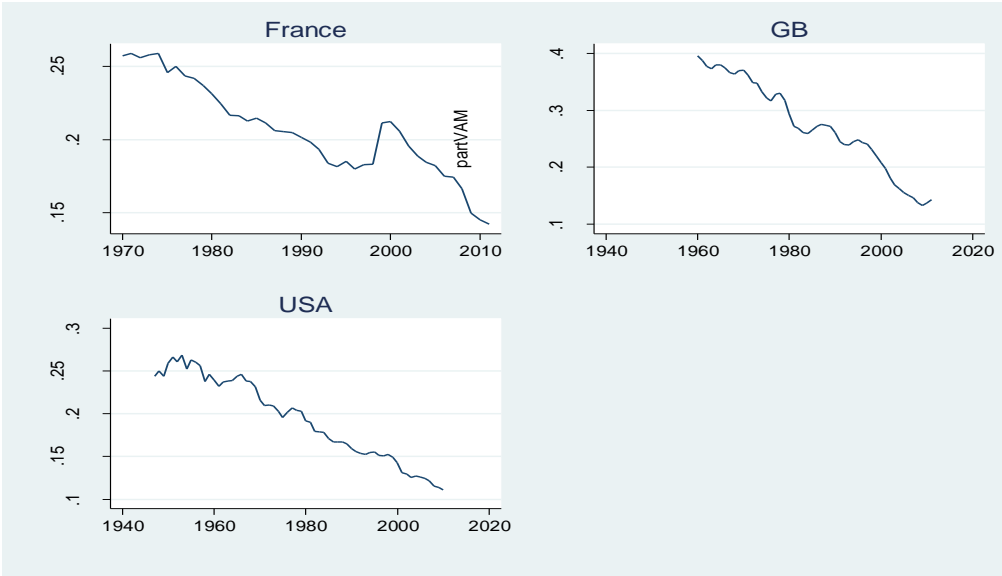
dependence, but also that the services sector is not a growth sector for them. We will use a sample of 57 developing countries (Asia, Sub-Saharan Africa and Latin America) in a panel data model over the period 1984/2017.

The remainder of this chapter is organized in three stages. In the next section (II), we present some stylized facts on the evolution of Structural Change (SC) in the panel countries, as well as on the evolution of global demand. We then present the variables, data, analysis model and results (III). Finally, we conclude (IV).

II) Structural change and global demand: some stylized facts

Data from the United Nations Statistics Division (UNSD) show that the evolution of the productive structure of the FICs (Former Industrialized Countries) points to a long-standing deindustrialization, dating back mainly to the post-war period. Figure 20, which shows the evolution of the share of manufacturing value added in the total, indicates that the FICs (France, the UK and the USA) have indeed been on the downward slope of the bell curve for several decades.

Figure 20: Share of manufacturing value added as % of GDP - FIC - 1950-2014



Source: UNSD data

If we examine the evolution of the productive structure of certain Asian countries (China, Hong Kong, India, Indonesia, Malaysia, Japan, South Korea), we also observe a bell-shaped evolution, especially for Indonesia, Malaysia and Taiwan, while China and South Korea still appear to be in an ascending phase (Figure 21).

Figure 21: Share of manufacturing value added as % of GDP. Asian countries - 1950-2014



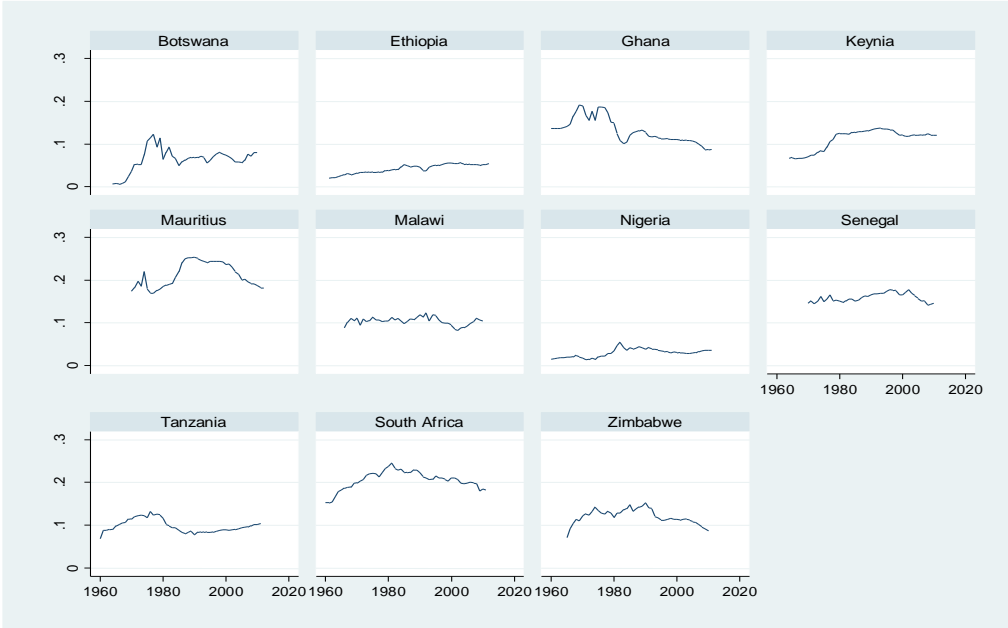
Source: UNSD data

For SSA, while deindustrialization is indeed taking place, the turning point (excluding South Africa) is reached at a relatively low industrialization rate (between 10 and 20%), while the process lasts, for these developing countries, only 10 to 15 years in some cases (Figure 22)<sup>33</sup>.

The phenomenon of deindustrialization therefore seems to be common to many countries, whether developing or not.

<sup>33</sup> For Botswana, the peak was reached in a dozen years, with a turning point in the late 1970s. The phenomenon is identical for Tanzania and Ghana.

Figure 22: Share of manufacturing value added as % of GDP. Sub-Saharan African countries - 1950-2014

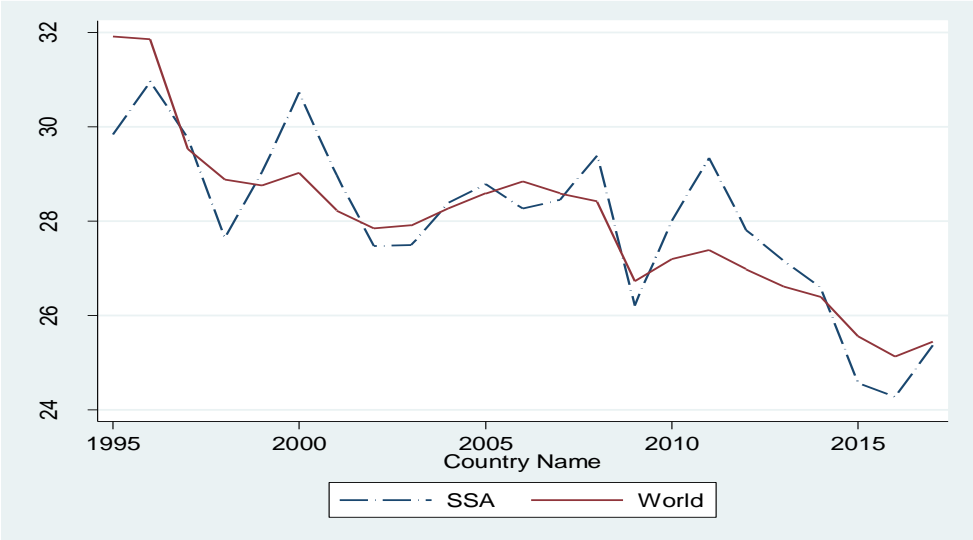


Source: UNSD data

However, in the case of developing countries, deindustrialization can lead to reprimarization or tertiarization, depending on the case. The work of Chenaf-Nicet (2020) shows that over the period 1984-2013, countries such as Angola, Congo, Guinea-Bissau, Liberia and Sierra Leone experienced an episode of reprimarization that can be explained by the rise in commodity prices in the 1990s. Favorable terms of trade for resource-producing countries encouraged them to maintain their primary specializations. However, the same studies show that countries such as Ghana, Mozambique, Nigeria, Senegal, South Africa, Zambia and Zimbabwe have seen growth in the service sector alongside a process of deindustrialization. However, the services concerned create low-skill, low-value-added jobs, such as in the retail sector.

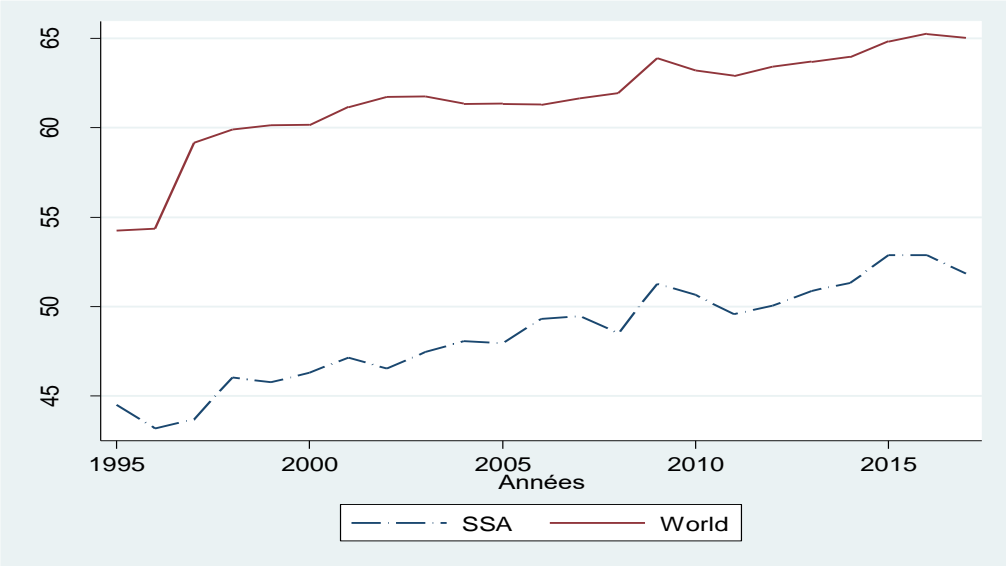
Overall, we can see that the productive structure of SSA countries is indeed evolving in the direction of deindustrialization, and in a manner similar to the global trend. Figure 23 shows that industry's share of value added as a percentage of GDP in this region and worldwide has been steadily declining since the 1990s (Figure 23), while the share of services has been increasing (Figure 24).

Figure 23: Share of industrial value added as % of GDP worldwide and in SSA - 1995-2014



Source: World Bank database

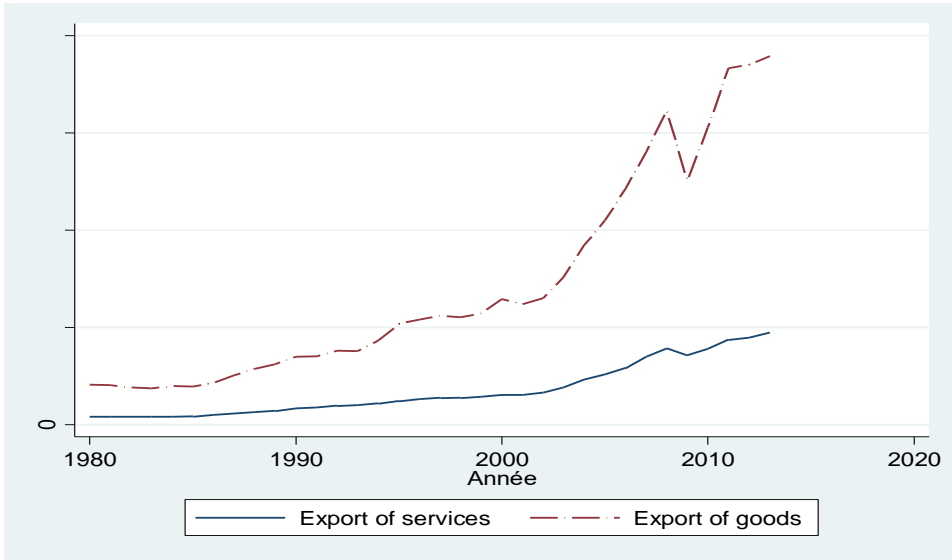
Figure 24: Share of value added in services as % of GDP worldwide and in SSA - 1995-2014



Source: World Bank database

If we look at the evolution of global services exports (figure 25), we can see that growth in services exports is indeed sustained. It rose by 210% between 2000 and 2014, while merchandise exports increased by 193% over the same period (UNCTAD data).

Figure 25: Global exports of services and goods (millions of US dollars) - 1980-2014.



Source: UNCTAD database

So, as Figure 25 shows, even though global merchandise exports were still 4 times higher than services exports in 2014, services accounted for 64% of global value added, while industry accounted for just 26% (Figures 23 and 24).

On these points, SSA countries are also following this trend, since their exports of services increased by 120% over the 2005-2018 period, while those of products rose by just 76%, with services accounting for a greater share of total value added than industry (Figure 24).

The countries of sub-Saharan Africa are therefore seeing their national production structures increasingly oriented towards the service sector, while strong global demand for services is directing a growing share of their exports towards this sector.

The first question concerns the link between the deindustrialization of sub-Saharan African countries and the growth in global demand for services, particularly since the early 2000s: is this link effective and significant? In other words, is an increasingly service-oriented global demand for services hindering the pursuit of a sustainable industrialization process in sub-Saharan African countries?

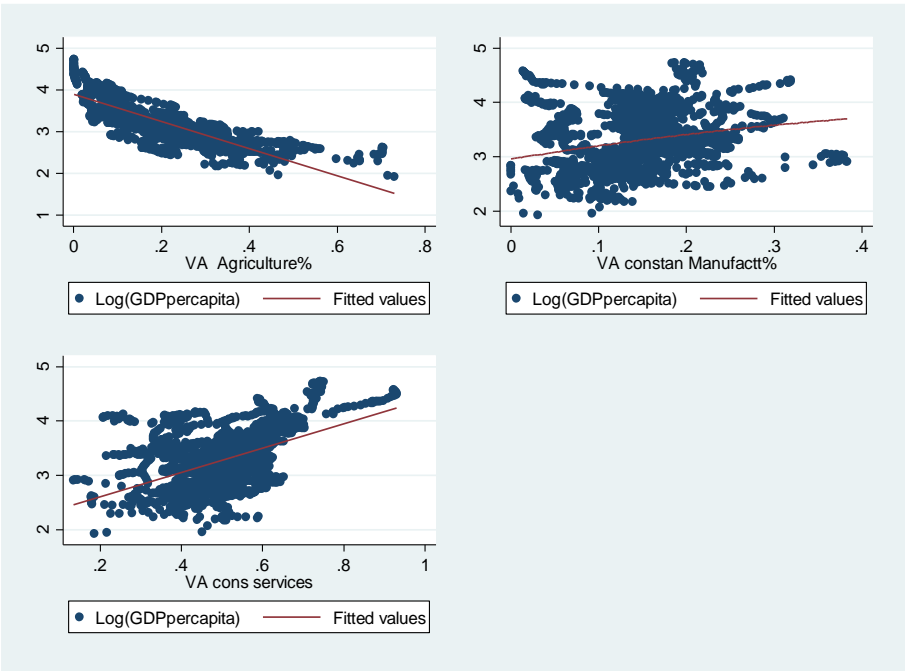
The second question concerns the link between "deindustrialization" and "growth" in sub-Saharan Africa: does deindustrialization hinder long-term growth, so that we can speak of "premature" deindustrialization?

When we examine the relationship between GDP per capita (expressed as a logarithm) and the share of the agricultural sector in total value added for sub-Saharan African countries, we find that there is an inverse relationship (figure 26). This indicates that the process of



development and growth in these countries is accompanied by a decline in primary activities. For other sectors of activity, the direction of the relationship is less clear. However, the adjustment lines suggest the existence of positive relationships between the level of industrialization or tertiarization and growth. This is rather in favor of the analysis of Loungani *et al.*, (2017). Econometric work is needed to establish whether these relationships are indeed significant and whether causality can be established.

Figure 26: Value added of sectors as % of GDP and logarithm of GDP per capita in SSA - 1984-2017



Source: UNSD and World Bank databases

### III) Empirical analysis

This section covers the empirical analysis used to test the two main hypotheses of this chapter. It also serves to highlight the different methodologies used and the main results of these studies.

#### III.a) The relationship between industrialization and demand

To test the impact of (domestic/foreign) demand on industrialization, as well as the impact of global demand for services, we use equation (1), in which the endogenous variable ' SCit ' (structural change variable) for period t and country i is estimated with the following expression:

$$SC_{it} = \phi W_{it} + \pi Z_{it} + \psi X_{it} + \lambda E_t + \sigma IC_{it} + \beta_t + (u_i + \varepsilon_{it}) \quad (1)$$

Where,  $t = 1984, \dots, 2017$  and  $i = 1, \dots, 57$ .

The **variable**  $SC_{it}$  represents the share of value added in each country's manufacturing sector in period  $t$ .

A large number of exogenous variables likely to accelerate or retard structural change and industrialization are included in the vector  $Z_{it}$ . They have been selected based on the literature on structural change and include financial development (*Finance*), trade openness (*Open*) and inward FDI (*FDI*).

In the vector  $W_{it}$  vector, various control variables are introduced. Firstly, GDP per capita (*GDP per capita*) is used to control industrialization as a function of a country's level of economic development. We expect that the higher a country's initial GDP per capita, the more industrialized the country, but this effect may diminish as income rises. GDP per capita also captures market size or the effects of domestic demand on structural change. We also introduce population size (*Population*) as a proxy for market size and domestic demand.

The second control variable is the urbanization rate (*Urban*), which tests the relationship between urban growth and structural change. A positive sign on the coefficient of the *Urban* variable indicates that structural change and urbanization go hand in hand in the context of "production cities". A negative sign can be interpreted as the development of "consumer cities" and possible growth of the service sector rather than manufacturing. Due to the very high correlation between the *Urban* and *GDP per capita* variables, they are introduced separately in the model.

We introduce into the vector  $W_{it}$  the initial share of value added in the manufacturing sector for 1984 (*initial MVA*). In this way, we take into account the differences in industrialization observed at the start of the period.

$X_{it}$  includes a variable reflecting institutional quality. The institutional variable (*investment profile*), which is representative of the business climate, is a proxy for the state of market regulation.

$IC_{it}$  is the vector for measuring access to foreign markets and proximity to industrialized countries. Harris (1954)'s centrality index is used here. It is measured as follows:

$$Centrality = \sum_{i \neq j} \frac{GDP_j}{d_{ij}}$$

GDP stands for GDP and "d" for distance in kilometers. The index is defined for four zones: distance to Europe (Germany's GDP and distance to Germany), distance to North America (USA's GDP and distance to USA) and distance to Asia (Japan's GDP and distance to Japan and China's GDP and distance to China). Centrality is therefore calculated (capital to capital) for each country as its overall degree of distance from these four major markets.

The vector  $E_t$  vector includes world exports of services (*EXP. Services*). Services, like manufactured goods, are assumed to be part of global value chains, since industrial or commercial services such as information technology, factoring, marketing, logistics, assembly and distribution or after-sales service are often outsourced nationally and globally (Ghani and O'Connell, 2016), particularly to developing countries. An increase in service exports can therefore be expected to have a positive impact on the growth of developing countries that are part of these value chains. According to Dihel and Goswami (2016), this can go hand in hand with a dynamic manufacturing sector. Indeed, as services are intermediate inputs in the production of other services as well as other goods, they can help transfer resources from low-productivity activities to high-productivity activities (specially manufacturing). Services thus stimulate productivity growth in industrial sectors through indirect effects. In the case of sub-Saharan Africa, Dihel and Goswami (2016) give an example of these effects in the use of services as intermediate inputs and participation in value chains in the agri-food and textile sectors.

To reflect the strong specialization of certain countries in the primary and raw materials sectors, we also introduce for each country the share of profits from all natural resources (oil, natural gas, coal (anthracite and hard coal), minerals and forests) as a percentage of GDP (rated *resources*). We also introduce a dummy variable indicating whether the country is an oil producer (*Oil*).

All these variables are presented in Appendix III-1 with the signs of the expected coefficients.

The study covers 57 developing countries over the period 1984-2017, including 27 Sub-Saharan African countries and 30 other countries (this group is hereafter referred to as NASS). The list of countries is given in Appendix III-2.

For a Fixed Effects (FE) model,  $u_i$  is an intercept, where individual heterogeneities between country and unobserved variables are allowed to exhibit associations with the explanatory variables. For the Random Effects (RE) model, random individual differences

are included by specifying that the intercept parameters,  $u_i$ , consist of a fixed component representing the population mean,  $\hat{u}$  and random individual differences,  $v_i$  ( $u_i = \hat{u} + v_i$ )<sup>34</sup>.  $v_i$  in the RE model has zero mean and is uncorrelated between countries.  $\varepsilon_{it}$  is the typical random error term. The  $\beta_t$  intercept controls for temporal effects.

To test equation (1), it is possible to use ordinary least squares (OLS), RE or FE models. However, when Hausman tests confirm that it is more efficient to use an FE model (which is the case for many of our estimates), this latter consistent estimator does not allow the introduction of time-invariant variables (*Oil* dummies and *initial VAM*). The same problem arises when using first-difference models. However, when the RE estimator is used, correlation problems remain between certain explanatory variables and the error terms. In this case, Baltagi (2005) recommend using the Hausman-Taylor (H-T) estimator<sup>35</sup>. This instrumental variable (IV) estimator, applied to random effects, helps to overcome inconsistencies caused by correlations between random effects and certain regressors. It is then used to estimate the coefficients of the time-invariant variable. This method, which applies the Generalized Method of Moments (GMM), solves endogeneity problems, and does not require finding external instruments, as the variables are their own instruments. The H-T estimator distinguishes between explanatory variables uncorrelated with  $u_i$  and those potentially correlated with  $u_i$ , as well as between time-varying and time-invariant explanatory variables. The Sargan-Hansen test<sup>36</sup> is used to confirm that all instruments are valid, and canonical correlation is another useful test for comparing different sets of instruments. Baltagi (2008) recommends using instruments with the highest geometric mean of canonical correlations with regressors.

We use the H-T estimator and, to overcome the problems of serial autocorrelation and heteroscedasticity, the proposed estimates are robust (robust standard errors).<sup>37</sup>

The model is first tested for all countries with GDP per capita as the exogenous variable, followed by the urbanization rate (columns 1 and 2). In each column, time-fixed effects are tested, and when we reject the null hypothesis that the coefficients for all years ( $\beta_t$ ) are jointly significantly equal to zero, time-fixed effects are included (Table 14).

Testing the FE models, we find that Fisher's tests confirm that the models have individual/unobserved effects. Hausman (FE/RE) tests indicate that individual effects are

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<sup>34</sup> See Hill *et al.*, (2018).

<sup>35</sup> See Hausman and Taylor (1981) and Baltagi (2005).

<sup>36</sup> See Hansen (1982).

<sup>37</sup> We use a Wooldridge test for autocorrelation and a Wald test for group-level heteroscedasticity.

fixed and non-random, while Hausman (RE/H-T) tests indicate that H-T models are superior to RE models. Finally, Breusch-Pagan Lagrange multiplier tests indicate that random models are more appropriate than simple OLS models. The instruments used are valid in each model (Sargan tests on over-identifying restrictions). The geometric means of the canonical correlations providing information on the associations between variables are high<sup>38</sup>.

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<sup>38</sup> The same approach is used for all tables.

Table 14: H-T estimation for the whole sample (Robust cluster)

Variable: SCit	(1)	(2)
N. Obs: 1938	GDP per capita	Urban
Years :34		
N. Cluster: 57		
GDP per capita	1.04e-06 *** (3.05)	-
Urban	-	.0012*** (6.01)
Population	.00127*** (6.23)	2.17e-10 *** (9.76)
Initial VAM	4.607*** (8.57)	3.652*** (8.41)
FDI	-.00056*** (-3.43)	-.0004*** (-2.56)
Open	.000163*** (4.86)	.00017*** (5.43)
Investment Profile	.0008* (1.74)	.0011*** (2.53)
Finance	4.83e-06 (0.57)	6.37e-06 (0.77)
Oil	.0476 (0.82)	-.0069 (-0.16)
Resources	-.0009*** (-6.76)	-.0008*** (-6.65)
Centrality	.084*** (7.87)	.0614*** (7.33)
EXP. Services	.701*** (3.07)	.624*** (2.83)
Country effects vs Pooled	F=159.94 ***	F= 160.59 ***
Time effects tested	Yes***	Yes***
Hausman test (FE/RE)	$\chi^2 = 269.68$ ***	$\chi^2 = 137.88$ ***
Hausman test (RE/H-T)	$\chi^2 = 119.93$ ***	$\chi^2 = 87.23$ ***
Breusch-Pagan Lagrange multiplier	$\chi^2 = 8421.64$ ***	$\chi^2 = 8123.81$ ***
Sargan test (over-id)	$\chi^2 (6) = 8.412$	$\chi^2 (6) = 4.515$ ***
Canonical correlation	Prob> $\chi^2 = 0.2094$ 0.73	Prob> $\chi^2 = 0.6074$ 0.65

Significance level: 1%: \*\*\* ; 5%: \*\* ; 8%: \*. Values in brackets are t-statistics.

Columns 1 and 2 of Table 14 indicate that the supply-side variable such as business climate (*investment profile*) have the expected positive and significant impacts. The coefficient of the "investment profile" variable (which measures investment risks such as contract viability, profit repatriation possibilities or payment delays) is positive and significant. This variable, which can be described as market- and company-friendly, has an impact on structural changes. This point corroborates the findings of Mauro (1995, 1996), Noland and Pack (2011) and the World Bank (2004, 2009): Supply structure responds to a good business climate.

The coefficients for domestic demand, whether measured by *GDP per capita* (also a proxy for the level of development) or by *population* size, are positive and significant. We therefore find results consistent with the findings of Leukhina and Turnovsky (2016), for whom demand remains central to structural change processes. This last point is also in line with the work of McMillan *et al.*, (2014), who show that countries that manage to eradicate poverty and achieve higher levels of development are also those that manage to diversify their productivity from agriculture to the modern industrial sector. In particular, the authors show that structural change in Africa boosted growth between 2000 and 2005 and attribute this growth to the expansion of the manufacturing sector and the contraction of the agricultural and service sectors. The positive and significant sign of the *Urban* variable validates the hypothesis of cities of production rather than consumption. Labor mobility from rural to urban areas therefore goes hand in hand with industrialization.

Regarding access to international markets, as expected, proximity to major markets (*centrality*) and openness (*openness*) have a positive and significant impact on industrialization. International integration has a positive effect on structural change in the developing countries in the sample as a whole. However, as in other work (Chenaf-Nicet, 2020), the coefficient of the *FDI* variable is negative and significant, highlighting that FDI can be detrimental to countries' industrialization. We find here results consistent with the findings of Alaya *et al.*, (2009). These authors indicate that there are a large number of conditions under which FDI can have a positive impact. They list the body of empirical work that shows that only high absorptive capacities in the host country, measured by the level of education<sup>39</sup> or by the technological gap with FDI source countries<sup>40</sup>; a higher level of financial development<sup>41</sup>; a

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<sup>39</sup> Borensztein *et al.*, (1998); Lipsey (2000).

<sup>40</sup> (Lipsey, 2000; Xu, 2000; Görg and Greenaway, 2004; Li and Liu, 2005).

<sup>41</sup> Hermes and Lensink, 2003; Alfaro *et al.*, 2004.

more open, export-oriented economy<sup>42</sup> ; greater macroeconomic stability<sup>43</sup> and better local infrastructure and institutions<sup>44</sup> enable FDI to increase overall factor productivity. These conditions are rarely met in developing countries. This is also explained by the fact that FDI in the countries in the sample is often in the primary and hydrocarbon sectors, which locks countries into this type of specialization. This point is related to the fact that the variable benefiting from primary resources has a positive but negative coefficient. These results are similar to those of Dabla-Norris *et al.*, (2013) who, in the case of 23 African countries, found that primary resource endowments have strong but negative effects on structural change. We confirm the latter result as well as the findings of McMillan and Rodrik (2011) and Hausmann and Rodrik (2003), who show that structural change can be limited when there is strong specialization in primary resources and the rentier sector captures available resources. They show that it is difficult for countries to take advantage of international integration for resource-producing countries. The "oil" dummy variable has a coefficient which, however, is not significant.

The coefficient of the "financial development" variable is not significant in this estimation, which may be explained by the difficult access to capital markets in some of the countries in the sample.

The coefficient of the "*Initial MVA*" variable is significant and positive, indicating that countries with a low level of industrialization at the start of the period have more difficulty catching up.

Finally, it is worth noting that global demand for services has an impact on the industrialization of the developing countries in the sample or, in other words, that global demand for services does not appear to hinder the industrialization process of the countries in the sample. We find here results consistent with the findings of Ghani and O'Connell (2014), Enache *et al.*, (2016) and Dihel and Goswani (2016), according to which the indirect effects of services stimulate industrialization. Model 1 is tested for the sub-sample of Sub-Saharan African countries and the sub-sample of countries outside Sub-Saharan Africa, denoted NASS (Table 15).

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<sup>42</sup> Balasubramanyam *et al.*, 1996 ; Bende-Nabende, 2000.

<sup>43</sup> Tondl and Prüfer (2007).

<sup>44</sup> Olofsdotter, 1998; Busse and Groizard, 2006; Tondl and Prüfer, 2007.



Table 15: H-T estimation by subsample (Robust cluster)

SCit	ASS	ASS	NASS	NASS
N. Obs: 1938				
Years :34	(1)	(2)	(3)	(4)
Cluster: 57	GDPper capita	Urban	GDP per capita	Urban
GDP per capita	9.09e-07 (0.49)	-	1.00e-06 ** (2.99)	-
Urban	-	.00031 (1.04)	-	.001*** (5.91)
Population	-6.02e-10 **** (-4.39)	-6.74e-10 **** (-4.82)	2.14e-10 *** (11.13)	1.81e-10 *** (9.24)
Initial. VAM	1.033*** (5.37)	1.29*** (5.37)	2.997*** (6.86)	3.41*** (7.28)
FDI	-.00018 (-0.93)	-.0001 (-0.84)	-.0017*** (-5.93)	3.41*** (-4.58)
Open	-.00001 (0.33)	-6.71e-06 (-0.13)	.0003*** (7.57)	.0002*** (6.79)
Investment Profile	.0035*** (2.52)	.0030*** (4.56)	.0012*** (2.37)	.0011*** (2.14)
Finance	-2.97e-06 (-.033)	-2.48e-06 (-0.28)	.0001*** (3.89)	.0001*** (3.19)
Oil	.045 (0.45)	.063 (1.63)	.0597*** (2.08)	.079** (2.01)
Resources	-.0005*** (-3.58)	-.0005*** (-3.52)	-.0020*** (7.39)	-.001*** (-6.29)
Centrality	.0011 (0.31)	.006 (1.45)	.024*** (2.61)	.075*** (6.66)
EXP. Services	-.692*** (-4.46)	-.003*** (-3.10)	.869*** (3.82)	.770*** (3.27)
Country effects vs Pooled	F = 105.87***	F=118.16***	F= 141.39***	F= 144.15 ***
Time effects tested	Yes	Yes	Yes***	Yes***
Hausman test (FE/RE)	$\chi^2 = 7.35$	$\chi^2 = 5.36$ ***	$\chi^2 = 18.73$	$\chi^2 = 75.99$ ***
Hausman test (RE/H-T)	$\chi^2 = 0.99$	$\chi^2 = 1.35$ ***	$\chi^2 = 105$ ***	$\chi^2 = 191$ ***
Breusch-PaganLagrange multiplier	$\chi^2 = 3177.29$ ***	$\chi^2 = 3207.15$ ***	$\chi^2 = 3185.97$ ***	$\chi^2 = 3448.00$ ***
Sargan test(overid)	$\chi^2 (6)=2.866$ *** Prob> $\chi^2 =0.8254$	$\chi^2 (6)=2.10$ *** Prob> $\chi^2 =0.90$	$\chi^2 (6) = 7.269$ Prob> $\chi^2 =0.2967$	$\chi^2 (6) = 2.866$ Prob> $\chi^2 =0.8254$
Canonical correlation	0.62	0.66	0.77	0.70

Significance level: 1% : \*\*\* ; 5% : \*\* ; 8% : \*. Figures in brackets are t-statistics.

For NASS countries (column 3 and column 4) in table 15, the results are similar to those in Table 14, i.e. domestic (GDP per capita; population size) and foreign demand variables have positive influences on industrialization (proximity to major markets, openness rate and global demand for services), as does the business climate variable.

The coefficient of the *FDI* variable remains negative and significant, and we see that primary specialization remains a disadvantage (*Resource*) even though the *Oil* variable now has a significant and positive coefficient. This reflects the fact that the improvement in terms of trade due to higher oil prices over the period may have benefited the industrialization of the countries in this group.

Finally, the financial development variable has a significant and positive coefficient, reflecting the fact that access to capital markets enables the financing of investments for industrialization in countries with generally higher levels of GDP per capita than SSA countries, and therefore higher levels of development. The results are reversed for SSA countries (column 1 and column 2). In fact, this variable has a non-significant coefficient. The lack of impact of the financial sector on industrialization can be explained by the weakness of SSA countries' debt capital markets, which do not allow sufficient financing of investment projects.

On average, for NASS countries, the *Finance* variable represented by "*Domestic credit to the private sector by banks (% of GDP)*" reaches 65%, whereas this amount is only 25% for Sub-Saharan African countries. These percentages indicate that these countries have difficult access to bank financing, and that financial markets remain highly restricted.

In addition to the financial development variable, we observe that trade openness has opposite effects for the two groups of countries. For NSSAs, as in several other studies, trade openness stimulates economic diversification and enables structural change through economic diversification (Imbs and Wacziarg, 2003 ; Javorcik, 2008, 2010 ; Cadot *et al.*, 2011). The NSSA group therefore benefits from the positive effects of international trade. The positive link between structural change and international trade can be attributed to the fact that these countries, which are less specialized in resource-based sectors (although still negatively affected), can more easily direct allocations towards export-oriented industrial sectors and better integrate into global value chains. We obtain the opposite result for sub-Saharan Africa, with trade openness having a negative effect, as does high specialization in the resource sector (the *Resources* variable has a negative coefficient). These results are similar to those of Bourguignon and Verdier (2005) or Muendler (2010), who find that trade openness has an asymmetric effect on a country's well-being depending on its specialization. In particular,

welfare can deteriorate in countries that specialize in low-skilled labor activities (e.g. energy). This result reflects the very negative impact of resource dependency.

The significant coefficients are those of the variable representing initial conditions and endowments. This indicates, for these countries, a strong dependence on growth trajectories. The significant and positive coefficient of the *initial* variable *VAM* shows that favorable initial conditions in terms of industrialization allow industrialization processes to continue.

Similarly, the negative and significant coefficient for the *Resources* variable shows that these countries remain prisoners of their resource dependency. More damaging for these countries is the presence of a significant and negative coefficient for the population variable. On this point, it is possible to refer to work that shows the specificity of SSA in demographic terms. Many SSA countries are undergoing a slow demographic transition. Annual population growth in Africa was 2.6% between 1975 and 2009, higher than in other developing regions (UN data). This strong demographic growth is due, on the one hand, to a high birth rate combined with a high fertility rate and, on the other, to a falling mortality rate. However, as the population of sub-Saharan Africa is predominantly rural, there is a negative sequence (nexus) between high population growth and the need to maintain a large proportion of the workforce in the agricultural sectors to meet nutritional requirements. This phenomenon hinders structural change and prevents people from escaping from poverty. There is therefore a fatal link: population growth, lack of structural change and increasing poverty. Some authors link this process to the increased exploitation of natural resources and environmental degradation (Blaikie and Brookfield, 1987 ; Cleaver and Schreiber, 1994).

For Sub-Saharan African countries, proximity (or distance) to the main markets has no impact on industrialization. Indeed, the centrality variable now has a non-significant coefficient. Low transport costs and easy access to imported industrial products from major markets that compete with domestic products may hinder industrialization in sub-Saharan African countries. However, our model does not take this phenomenon into account.

The most notable result of the analysis is that for SSA countries, the global demand for services variable not only has a significant and negative coefficient, but also the highest value. It is therefore possible here to validate Rodrik (2013, 2016)'s hypothesis that deindustrialization in SSA countries is significantly correlated with global demand for services. This raises the question of whether deindustrialization is premature in the sense of impeding the development of sub-Saharan African countries. In other words, is the weakness of the industrial sector a brake on their growth? As a corollary, can the service sector ensure their long-term growth? It's

probably too early to say. However, it is possible, within the framework of a growth model, to specify the nature of the links between GDP per capita and the respective sectors of activity.

### III.b) The relationship between growth and productive sectors

To test the influence of different sectors on GDP per capita, we use a standard equation (2), in which the endogenous variable GDP per capita for period  $t$  and country  $i$  is estimated from the following expression:

$$GDP_{it} = \mu GDP_{it-1} + \alpha GFCF_{it} + \beta Labor_{it} + \phi Open_{it} + \lambda FDI_{it} + \sigma Finance + \gamma Resources_{it} + \theta Oil + \pi In.profil_{it} + \xi ADS_j + (u_i + \varepsilon_{it}) \quad (2)$$

Where,  $t = 1984, \dots, 2017$  and  $i = 1, \dots, 57$  and  $j=1,2,3$

This equation contains the basic variables for growth models: labor, capital, and GDP per capita lagged one period ( $GDP_{it-1}$ ). Capital is measured by GFCF (Gross Fixed Capital Formation) as a percentage of GDP. The variable (*labor*) is used as an approximation of the labor force, which is represented by the size of each country's population.

According to the literature on growth and trade, international insertion variables are also used (Frankel and Romer, 1999 ; Dollar and Kraay, 2002 ; Costinot, 2009). These are the rate of openness (*Open*) and inward *FDI*.

To reflect the strong specialization of certain countries in the raw materials and primary sectors, we also introduce for each country the share of profits from all natural resources (oil, natural gas, coal (anthracite and hard coal), minerals and forests) as a percentage of GDP (*Resources*). We also introduce a dummy variable indicating whether the country is an oil producer (*Oil*).

According to Acemoglu *et al.*, (2005), institutional quality is a determinant of long-term growth. We therefore include a variable reflecting the quality of institutions (*Investment profile*), which is representative of the business climate. It is a proxy for the state of market regulation (Chenaf-Nicet, 2020).

A financial development variable (*Finance*) is also used, as in many endogenous growth models (Acemoglu and Zilibotti, 1997 ; La Porta *et al.*, 1997, 1998 ; Levine, 1997, 2001 ; Estrada *et al.*, 2010).

We have successively introduced into this equation the share of each sector  $j$  in total value added ( $ADS_j$ , with  $j$ =Agriculture, Manufacturing, Services). The model is tested first for the

total sample (Table 16) and then for the two sub-samples (Table 17).  $\varepsilon_{it}$  is the random error term. The constant  $\beta_t$  controls for time effects. Variables are in logarithmic form.

For the entire sample, there is a positive and significant sign for GDP per capita lagged by one period, reflecting countries' dependence on their growth trajectory. We find investment as a growth factor and trade openness as a growth driver (the coefficient of the variable Openness is significant and positive). As for the weight of sectors, only the primary sector (share of value added in the agricultural sector) has a significant but negative impact.

Table 16: Equation 2 - H-T estimates for the whole sample (Robust cluster)

Variable: GDP			
Obs: 1938	(1)	(2)	(3)
Cluster: 57			
GDP <sub>t-1</sub>	.912*** (15.23)	.918*** (17.71)	.917*** (11.82)
Labor	-.001 (-0.69)	-.007*** (-2.23)	-.006 (-1.68)
GFCF	.012*** (6.84)	.0132*** (6.67)	.013*** (6.92)
FDI	-.00006 (-0.09)	-.00008 (-0.10)	.0002 (0.24)
Open	.010 *** (2.93)	.009*** (2.18)	.009*** (2.30)
Investment profile	.0004 (0.09)	.0014 (0.26)	.0010 (0.19)
Resources	-.0001 (-.13)	.0009 (0.61)	.0012 (0.86)
Finance	-.005*** (-4.35)	-.005*** (-3.74)	-.0051*** (3.54)
Oil	.063 (1.63)	.071* (1.86)	.067 (1.66)
AD. Agri	-.010* (-1.80)	-	-
AD. Indu	-	-.0079 (-1.66)	.-
AD. Serv.	-	-	.0080 (0.23)
Country effects vs Pooled	F= 5.32 ***	F= 5.25***	F= 5.12 ***
Time effects tested:	Yes***	Yes***	Yes***
Hausman test (FE/RE)	$\chi^2 = 41.77***$	$\chi^2 = 140.42****$	$\chi^2 = 162.08***$
Hausman test (RE/H-T)	$\chi^2 = 164.17***$	$\chi^2 = 143.3***$	$\chi^2 = 204.90***$
Breusch-Pagan Lagrange multiplier	$\chi^2 = 70.60***$	$\chi^2 = 65.91***$	$\chi^2 = 60.85***$
Sargan test(overid)	$\chi^2 (3) = 9.164***$ Prob> $\chi = .16$	$\chi^2 (1) = 7.269$ Prob> $\chi^2 = .29$	$\chi^2 (1) = 0.017$ Prob> $\chi^2 = 0.89$
Canonical corr.	0.97	0.78	0.80

Significance level: 1% : \*\*\* ; 5% : \*\* ; 8% : \*. Values in brackets are t-statistics.

The working population variable has a significant but negative coefficient only when the manufacturing sector is considered (column 2). The negative impact of population growth is

found in many growth models (Mankiw et al., 1992; Barro, 1996)<sup>45</sup>. Research shows that population growth has a negative impact on GDP per capita when technical progress is insufficient, and when this growth leads to a dilution of capital and R&D efforts (Aghion and Howitt, 1990 ; Young, 1998). It also has a negative impact when it does not lead to an improvement in human capital.

The coefficient of the "investment profile" variable (which measures investment risks such as contract viability, profit repatriation possibilities or payment delays) is not significant. This variable, which describes elements that may be favorable to the market and to companies, has no impact on growth in our sample.

The Finance variable has a negative and significant coefficient. This result can be explained by the fact that this variable reflects the process of money creation and hence inflation. By modifying price signals, inflation therefore has a negative effect on the development of new and risky activities, on structural change and finally on growth (Robinson, 2009).

The rate of openness (*open*) has a positive and significant impact on growth. International integration has a positive effect on the growth of developing countries in the sample as a whole. However, as in other studies (Chenaf-Nicet, 2020), the coefficient of the *FDI* variable is not significant. These results are consistent with the findings of Alaya *et al.*, (2009). These authors indicate that there are many conditions under which FDI has a positive impact. They list all the empirical studies that show that only high absorptive capacities in the host country, measured by the level of education<sup>46</sup> or by the technological gap with FDI source countries<sup>47</sup>; a higher level of financial development<sup>48</sup>; a more open, export-oriented economy<sup>49</sup>; greater macroeconomic stability<sup>50</sup> and better local infrastructures and institutions<sup>51</sup> enable FDI to boost overall factor productivity and growth. These conditions are rarely met in developing countries. This is also because FDI in the countries in the sample is often in the primary and hydrocarbon sectors, which locks countries into this type of specialization.

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<sup>45</sup> For a full review of the literature, see Blanchet (2001).

<sup>46</sup> Borensztein *et al.*, 1998 ; Lipsey, 2000.

<sup>47</sup> Lipsey, 2000 ; Xu, 2000 ; Görg and Greenaway, 2004 ; Li and Liu, 2005.

<sup>48</sup> Hermes and Lensink, 2003; Alfaro *et al.*, 2004.

<sup>49</sup> Balasubramanyam *et al.*, 1996 ; Bende-Nabende, 2000.

<sup>50</sup> Tondl and Prüfer (2007).

<sup>51</sup> Olofsdotter, 1998; Busse and Groizard, 2006; Tondl and Prüfer, 2007.

Table 17: H-T estimation of equation 2 by sub-sample (Robust cluster)

Variable: GDP Obs : 1938 Years: 34	ASS			NASS		
	(1)	(2)	(3)	(4)	(5)	(6)
GDPper capita <sub>t-1</sub>	.907*** (17.82)	.909*** (18.47)	.913*** (11.72)	.906*** (15.15)	.918*** (14.39)	.923*** (19.69)
Labor	.002 (0.84)	.0004 (0.16)	.00212 (0.55)	-.004** (-2.19)	-.005*** (-2.76)	-.008*** (-3.85)
GFCF	.0087*** (4.88)	.010*** (5.87)	.009*** (3.42)	.0162*** (8.85)	.0157*** (8.40)	.016*** (9.10)
FDI	.0001 (0.25)	.0001 (0.21)	.0002 (0.27)	-.00002 (-0.02)	.0002 (0.25)	.0004 (0.50)
Open	.010*** (2.64)	.009*** (2.47)	.0104** (1.87)	.011*** (3.06)	.011*** (2.97)	.011*** (2.75)
Inv Profile	.001 (0.41)	.0018 (0.60)	-.0004 (0.50)	.0018 (0.25)	.002 (1.02)	.002 (1.17)
Resources	-.0009 (-.40)	-.0007 (-.32)	-.0001 (-.05)	.0003 (.28)	-.0001 (-.14)	-.0001 (0.15)
Finance	-.005*** (-3.53)	-.005*** (-3.50)	-.005*** (-2.83)	-.006*** (-3.12)	-.006*** (-2.83)	-.005*** (-2.53)
Oil	.005 (0.20)	.0014 (0.04)	.0065 (0.52)	-.006 (-0.70)	-.006 (-0.76)	-.007 (-0.99)
AD Agri.	-.019*** (-2.88)	-	-	-.006** (-1.91)	-	-
AD Indu.	-	-.016*** (-4.05)	-	-	.002 (.52)	-
AD Serv.	-	-	.0065 (0.46)	-	-	-.022 (1.65)
Country vs Pooled effects	F= 3.91 ***	F= 4.11***	F= 3.71 ***	F= 3.71 ***	F= 8.52 ***	F=6.33***
Time effects tested	Yes	Yes	Yes	Yes***	Yes***	Yes***
Hausman (FE/RE)	$\chi^2 = 60.05***$	$\chi^2 = 50.17***$	$\chi^2 = 51.71***$	$\chi^2 = 51.71***$	$\chi^2 = 36.46$	$\chi^2 = 141.36$
Hausman (RE/H-T)	$\chi^2 = 45.22***$	$\chi^2 = 1.70***$	$\chi^2 = 47.22***$	$\chi^2 = 47.22***$	$\chi^2 = 72.59***$	$\chi^2 = 336.51***$
Breusch-Pagan LM	$\chi^2 = 9.03***$	$\chi^2 = 9.12***$	$\chi^2 = 9.35***$	$\chi^2 = 201.12***$	$\chi^2 = 230.18***$	$\chi^2 = 222.12***$
Sargan test	$\chi^2 (3) = 9.11***$ Prob>Chi2=0.16	$\chi^2 (6) = 6.250***$ Prob>Chi2=0.395	$\chi^2 (6) = 3.648$ Prob>Chi2=0.724	$\chi^2 (6) = 9.754$ Prob>Chi2=0.135	$\chi^2 (6) = 11.793$ Prob>Chi2=0.107	$\chi^2 (6) = 9.841$ Prob>Chi2=0.131
Canonical correlation	0.92	0.92	0.93	0.97	0.97	0.97

Significance level: 1%: \*\*\*; 5%: \*\*; 8%: \*. Figures in brackets are t-statistics.



Examination of the sub-samples (Table 17) shows that most of the results are like those in Table 16. In particular, the inverse relationship between the agricultural sector and GDP per capita is always observed for each of the country sub-samples. However, two results are worth highlighting. Firstly, it is not possible to identify in our analysis a positive relationship between GDP per capita and the development of the services sector. It is therefore difficult to assert that the service sector is a possible path to development, or at least to growth, within the framework of our model. The second notable fact is that SSA countries are unique in that, in their case, there is an inverse relationship (the coefficient of the variable is significant and negative) between GDP per capita and industrialization. This indicates that this sector may no longer be the path to development for them.

However, some studies (Loungani et al., 2017) indicate that if the services sector can be the new development path for developing countries, they emphasize that it is not through a supply of services oriented towards domestic markets, but rather through a supply oriented towards external markets. Service exports will replace manufactured exports in development strategies and will therefore be the new engines of growth. To test this hypothesis, i.e. international insertion via the services sector as a source of growth, we introduce into equation 2 the last variable, representing countries' openness rate ( $(X+M)/2GDP$ ). However, it is not calculated based on the value of all goods and services, as is traditionally the case, but solely on services (*Open services*). Services, like manufactured goods, are assumed to be part of global value chains, since industrial or commercial services such as information technology, factoring, marketing, logistics, assembly and distribution or after-sales service are often outsourced nationally and globally (Ghani and O'Connell, 2014 and Enache et al., 2016), particularly to developing countries. An increase in service exports can therefore be expected to have a positive impact on the growth of developing countries that are part of these value chains. According to Dihel and Goswami (2016), this can go hand in hand with a dynamic manufacturing sector. Indeed, as services are intermediate inputs in the production not only of other services but also of other goods, they can help transfer resources from low-productivity activities to high-productivity activities (specially manufacturing). Services thus stimulate productivity growth in industrial sectors through indirect effects. In the case of sub-Saharan Africa, Dihel and Goswami (2016) give an example of these effects in the use of services as intermediate inputs and participation in value chains in the agri-food and textile sectors. Due to strong collinearity with the Open variable, the latter is removed from the estimation.

The results in Table 18 indicate that while international integration via the services sector has a positive impact on growth in the countries in the sample, only NASS countries manage to benefit from this opportunity. We find that for NASS countries, the findings of Ghani and O'Connell (2014), Enache et al. (2016), Dihel and Goswami (2016) or Loungani (2017) hold true.

The hypothesis, if validated, appears to be true only for the countries in the NASS sample, many of which are emerging or middle-income countries (Appendix III-2). For these countries, we find results consistent with Dihel and Goswami's (2016) findings that service sector growth can enable higher GDP growth, job creation, poverty reduction and eventually gender parity<sup>52</sup>.

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<sup>52</sup> In other work, the authors show that services play a role in gender parity, as the proportion of female senior managers is higher in African service companies than in manufacturing companies (17% versus 13%, respectively) according to Coste and Dihel (2013).

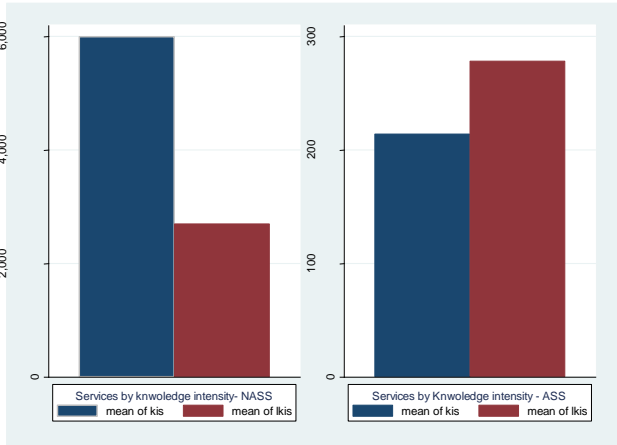
Table 18: H-T estimation of equation 2 by sub-sample (Robust cluster)

Variable: GDP			
N. Obs: 1938		(2)	(3)
Years: 34	(1)	ASS	NASS
N.Cluster : 57			
GDP per capita $t-1$	.921*** (19.18)	.889*** (18.25)	.916*** (11.39)
Labor	-.001 (-0.75)	.008 (1.64)	-.005*** (-2.83)
GFCF	.0134*** (7.79)	.010*** (3.99)	.017*** (8.99)
FDI	.0001 (0.25)	.0003 (0.38)	.0005 (0.58)
Open Services	.005*** (3.37)	.002 (1.10)	.005*** (3.05)
Inv Profile	.0004 (0.09)	-.007 (-0.72)	.001 (0.36)
Resources	.0006 (0.68)	.001 (0.64)	.001 (1.23)
Finance	-.004*** (-4.67)	-.004*** (-3.79)	-.006*** (-2.94)
Oil	-.0002 (-0.03)	-.008 (-0.44)	-.014 (-1.59)
Country effects vs Pooled	F= 6.54 ***	F= 4.71 ***	F=9.28***
Time effects tested	Yes***	Yes	Yes***
Hausman test (FE/RE)	$\chi^2 = 139.18***$	$\chi^2 = 61.89***$	$\chi^2 = 129.46***$
Hausman test (RE/H-T)	$\chi^2 = 164.17***$	$\chi^2 = 10.34$	$\chi^2 = 68.90***$
Breusch-Pagan Lagrange multiplier	$\chi^2 = 133.93***$	$\chi^2 = 26.16***$	$\chi^2 = 246.94***$
Sargan test(overid)	$\chi^2 (5) = 8.591 ***$ Prob>Chi2= 0.126	$\chi^2 (5) = 2.026$ Prob>Chi2=0.845	$\chi^2 (6) = 9.958$ Prob>Chi2= 0.126
Canonical correlation	0.81	0.62	0.97

Significance level: 1% : \*\*\* ; 5% : \*\* ; 8% : \*. Figures in brackets are t-statistics.

This differentiated result is linked to the fact that if we analyze service exports according to knowledge intensity, we find that NASS countries mainly export knowledge-intensive services (KIS), such as financial, telecommunications or air transport services, while SSA countries mainly export low-knowledge-intensive services (LKIS), such as postal or courier services (WTO data).

Figure 27: Services exports by knowledge intensity.



Source: WTO database

Sub-Saharan African countries, some of which are LDCs, are therefore struggling to develop the absorptive capacities needed to build an internationally competitive services sector, which produces the knock-on effects required for long-term growth. As Figure 29 shows, while the majority of service exports from NASS countries are, on average, in the KIS sector, the situation is reversed for SSA countries, which remain specialized in the LKIS sector.

#### IV) Conclusion

Sub-Saharan African countries suffer from premature deindustrialization. Narrow domestic markets and strong global demand for services leave few growth opportunities for sub-Saharan Africa's manufacturing sectors. Moreover, their high degree of resource specialization prevents them from benefiting from the positive effects of international integration. However, our work shows that the service sector, which is developing in this region, generates few spillover effects on the income of sub-Saharan African countries, which remain highly specialized in low-knowledge-intensive services. The opposite result is observed for NASS countries. It is not possible within the scope of this study to validate the hypothesis that the service sector is the key to sustained growth in SSA countries.

It would be desirable for sub-Saharan African countries to focus first and foremost on the production of goods for which they have comparative advantages. On the other hand, it would be desirable for governments (through state intervention) to steer economic diversification by encouraging the development of certain sectors, putting in place infrastructures and institutions that foster this structural change, and providing or encouraging openness to access the financial support needed to develop these sectors.

However, given openness, integration or advancement, it would be unlikely to advise a change of strategy (import substitution or export orientation). Countries could benefit from producing finished products instead of concentrating on exporting raw materials, which would increase the added value of these sectors and subsequently contribute to economic growth in these countries.

## Appendices chapter III

### Appendix III- 1: List of variables

Variables	Definitions	Expected signs	Information sources	
GDP <sub>it</sub>	GDP per capita for period t and country i		WB	
Finance <sub>it</sub>	Financial development Domestic credit to the private sector by banks (% of GDP)	+	WB	
Open <sub>it</sub>	Open rate	+	UNCTAD	
IDE <sub>it</sub>	Incoming IDE	+/-	UNCTAD	
GDP <sub>it-1</sub>	Lagged GDP per capita	+/-	WB	
GFCF <sub>it</sub>	Gross fixed capital formation as a percentage of GDP	+	UNCTAD	
Work <sub>it</sub>	Workforce	+/-	WB	
ADS <sub>jt</sub>	Share of each sector j in total value added (ADS <sub>j</sub> , where j=Agriculture, Manufacturing	AD. Agri ; AD.indust ; AD.Services	- + -	UNSD
Resources <sub>it</sub>	Share of profits from all natural resources as a percentage of GDP	+/-	WB	
Oil	Dummy variable for oil producer (1 if yes and 0 if no)	-	Trade economics	
Investment profiles <sub>it</sub>	Institutional variable (investment profile)	+	PRS Group (ICRG)	
Open services	Country opening rates (for service only) Author calculation	+	UNCTAD	

### Appendix III- 2: List of countries - GDP per capita (constant US\$ 2010) - Manufacturing value added (% of total) in 2017.

Country	GDP per capita	Share of manufacturing sector	Country	GDP per capita	Share of manufacturing sector	Country	GDP per capita	Share of manufacturing sector
South Africa	7525.5	13,5	Ghana	2323.7	13.8	Nigeria	2412.4	9.1
Angola	3333.2	5,8	Guatemala	3124.1	18.4	Uganda	625.5	9.1
Argentina	10468.2	17.3	Guinea (Bissau)	603.5	11.7	Pakistan	1201.6	13.4
Bolivia	2522.8	13.1	Guinea (Equatorial)	806.5	9.6	Paraguay	4045.2	12.9
Botswana	7523.2	6.9	Honduras	2210.5	15.9	Philippines	2891.3	22.8
Brazil	10862.2	11.9	Hong Kong	38067.5	1.4	Peru	6172.6	14.2
Burkina Faso	685.7	8.1	India	1954.0	18.7	Sierra Leone	462.6	2.0
Cameroon	1511.8	15.8	Indonesia	4130.6	22	Singapore	54300.6	19.7
Chile	15059.5	10.6	Kenya	1169.3	10.4	Sri Lanka	3954.01	17.2
China	7207.3	23.7	Liberia	403.2	5.7	Senegal	1454.9	18.5
Colombia	7600.7	11.9	Madagascar	480.0	7.9	Tanzania	889.2	7.1
Congo, R	2520.1	6.1	Malaysia	11528.3	23.3	Thailand	6126.2	27.3
Congo, DR	409.1	15.1	Mali	996.3	13.1	Togo	652.3	11.2
South Korea	26152.0	31.8	Morocco	3541.1	16.8	Tunisia	4249.7	16.5
Ivory Coast	1625.4	13.4	Mexico	9947.9	16.2	Uruguay	14362.5	12.8
Egypt	2731.0	15.9	Mozambique	519.0	9.1	Vietnam	1834.6	19.6
Ecuador	5269.6	12.4	Namibia	5854.8	10.6	Venezuela	8892.9	11.1
Gabon	442.0	5.7	Nicaragua	2016.3	16.9	Zambia	1637.3	8.5
Gambia	801.3	4.1	Niger	395.9	6.9	Zimbabwe	923.4	8.8

Authors' calculations (UNSD and World Bank databases)

## General conclusion

The aim of our work was to study the relationship between the quality of institutions and the dynamics of structural change, and to see whether there are institutional thresholds that favor structural change. However, we were determined to highlight several other important determinants in the process of structural change, such as demand (domestic and foreign) and international integration. Admittedly, these factors do not allow for an exhaustive approach to all phenomena. However, in our empirical analyses, other important variables of structural change were tested.

This thesis has been presented in four chapters. The Introductory Chapter gives an in-depth presentation of the concept of structural change.

In Chapter 1, the non-linear relationship between structural change and institutional quality is studied on a base of 103 countries. Data analysis techniques have enabled us to define clusters of countries with good and poor institutional quality. These classifications were made using the ICRG institutional database. The particularity of this chapter also lies in the fact that it presents a specific classification of the institutions that matter for the process of structural change. Using a threshold effect model, we conclude that institutions are important for the process of structural change. When we use the average of the twelve institutional indicators (INST), we were unable to find a significant threshold, but the threshold of the composite index based on the PCA is significant. Basically, this work shows us that institutions will play an asymmetrical role in this relationship but depending on the threshold level. Countries that are generally below the threshold show a negative relationship, while those above the threshold show the opposite. When it comes to classify legal, political and economic institutions, we see that they all play an important role. However, the direction of these relationships depends on the country's position in the classification, i.e., below or above the threshold.

And in the chapter 2, the idea is to highlight international integration on structural change but linking it to institutional quality. This study confirms the idea of the institutional threshold. We find that trade has a net positive effect on structural change, but only above a certain threshold. Regarding the concept of institutional similarity, a comparison of institutional levels was made between the countries in the sample and those of countries such as China, the United States and the European Union. This study showed that countries whose institutional levels are

far to those of the United States, the European Union and China have a negative impact on the process of structural change.

In chapter 3, we looked at the early deindustrialization of certain countries, including SSA. It should be remembered that deindustrialization is a normal process if it occurs at the end of the development process. This is not the case for SSA countries. To explain this deindustrialization, we make the link between the various levels of demands (domestic and global) and globalization. We formulate the hypothesis that China has been able to rely on world demand for manufactured products to ensure its industrialization process by following this pattern. However, to date, the countries of SSA have been unable to base their structural on the industrial (manufacturing) sector, because global demand is oriented towards services. Given this trend, we wonder whether these service-oriented countries could develop thanks to this sector. Our empirical analysis is based on a database of 57 countries, including some in Sub-Saharan Africa. When we consider domestic demand as a function of population size or GDP per capita, we find a positive relationship with structural change and demand in the whole sample. However, when we split the sample into SSA and NSSA countries, the results remain identical only for NSSA. The domestic demand becomes non-significant for SSA. Regarding the impact of international demand, we note that the centrality indicator, linked to proximity to international markets, has no significant impact on the manufacturing sector in Sub-Saharan Africa, while the openness rate and the level of services exports have a significant negative impact. For NSSA countries, the results are different.

As for our second hypothesis, this relationship (between services sector and growth) could not be demonstrated for the whole sample. Our study confirms the negative impact of agricultural sector in the growth process for both categories of countries. But when we split the data, a negative relation between the industrial process and growth is only found in the case of SSA countries.

However, when we consider the openness through services, it shows a positive and significant outcome for NSSA countries. However, we could not confirm this relationship in the case of SSA countries. This result could relate to the fact that services offered by these SSA countries are not high value-added services, i.e. those with a high level of knowledge. This could be seen as another research perspective.

In general, our study further confirms the importance of institutional quality in the dynamics of structural change. This is an appeal to country authorities to improve the quality of their



institutions, as this gives investors the confidence to come and invest in their countries. With better institutions and appropriate reforms, the State can support the sectors that can bring about structural change. FDI can then be channeled into key sectors. In this way, countries avoid being locked into low value-added sectoral production that is oriented towards primary sectors.

In terms of concrete recommendations for improving institutions, we could consider as it already seen in previous studies:

- Promoting political stability, as it enables governments to declare their program and stay in place; also, this ensures continuity in policy implementation.
- Strengthening the judicial system and guaranteeing the rule of law. This will give investors confidence, since it will ensure the viability of contracts, protect against expropriation, and facilitate the repatriation of profits and the managements of late payments. This, in turn, will reduce the costs of investing in the country since the risks will be reduced.
- Implementing anti-corruption measures. As corruption could represent a threat to foreign direct investment; in that it can make it difficult to do business effectively and can subsequently lead to the withdrawal or retention of investments. In addition, encouraging transparency in government transaction and public services.

Moreover, given the role played by institutions in a country's economic performance, it is beneficial for countries to improve the quality of their institutions. However, it is important to remember that the quality of institutions alone does not fulfill all their functions. There are other elements to consider – we would say it is a whole ecosystem that needs to be put in place to bring about this structural change in countries, so that they emerge as beneficiaries.

SSA countries should work harder to reduce the various uncertainties that slow down investment in their countries or make such investment unprofitable or fragile. They should also do more to reduce the costs associated with these investments, which would benefit the industrial sector, especially manufacturing sector. If all the conditions are met to foster a good business climate and stable macroeconomic conditions, could SSA be emerging area's replacement in terms of relocation?

This thesis shows that institutional quality is important determinant in the study of structural change. But the measurement of institutional variables remains a main challenge for us in this work. If we compare results in each chapter or even in other studies in the literature, the

coefficients of institutional variables are not stable depending on the measure used or the method used to consider the global institutional environment. It could also impact other variables signs. The other challenge also relates to the measurement of structural change, which is widely discussed in the literature (Introductory chapter). In terms of perspective, for future research, studies could pay more attention to *define objective measures* for institutional quality. In addition, using the *average measure* to show the impact of institutions on structural change, because using annual data could pose the problem of capturing long-term phenomena. In this thesis, we did not consider the informal sector, which is an important element notably for SSA countries. Future work could focus on the *role of informal sector* in the process of structural change and how good institutional quality could address the problem of the informal sector. Lastly not the least, studies in *structural change in micro level* could give more specific and powerful explanations of lack of industrialization in developing countries.

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