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UNIVERSITY OF GHANA

LEGON

College of Humanities

URBANIZATION, ECONOMIC GROWTH AND POVERTY NEXUS IN SELECTED COUNTRIES IN SUB-SAHARAN AFRICA

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DECLARATION

I, SOLOMON AHIMAH-AGYAKWAH, hereby declare that this thesis is the original research undertaken by me under the guidance of my supervisors; and with the exception of references to other people's work which have been duly cited, this thesis has neither in part nor in whole been submitted for another degree elsewhere.

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DEDICATION

To my brother, Paul Kwabena Agyakwa Goldwater

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First, I am grateful to El, even as He continues to awaken me from my slumber.

Second, my heart felt appreciation goes to my supervisors, Prof. Edward Nketiah-Amponsah and Dr. Frank Agyire-Tettey for their valuable direction towards the completion of this work.

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ABSTRACT

Urbanization is recognized as a key driver of rapid economic growth, structural transformation and poverty reduction. The enormous body of both theoretical and empirical knowledge widely supports the idea of a positive relationship between urbanization and economic growth. However, at the core of the existing debate is the causal direction. The first part of the study investigated the causal relationship between urbanization and economic growth in Sub-Saharan Africa (SSA) from the two dominant viewpoints in the literature namely, urbanization as an engine of economic growth and urbanization as a product of economic growth. The second part investigated the poverty reduction effect of urbanization using the Poverty Headcount ratio and Poverty Gap.

The data for the study was sourced from Penn World Tables Version 9.1; the United Nations' "World Population Prospects: The 2018 Revision" and "World Urbanization Prospects 2019"; and the World Bank's World Development Indicators database. The sample is an unbalanced panel data sub-divided into 5-year time intervals over the period 1970-2019 for up to 30 rapidly urbanizing countries selected from all the four sub-regions in SSA.

This dynamic study employed the one-step system generalized methods of moments (SYS-GMM1) to estimate the three elasticities namely urbanization elasticities of growth, growth elasticities of urbanization and urbanization elasticities of poverty reduction. The estimated urbanization elasticities of growth and growth elasticities of urbanization suggest a positive and non-linear relationship between urbanization and economic growth in both the short run and long run. The comparative analyses of the results at both growth rates and levels also showed a strong bi-directional causation between urbanization and economic growth. This two-way causal

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relationship is also confirmed by the findings of the Dumitrescu & Hurlin (2012) test of Granger (1969) non-causality in heterogeneous panel data.

Furthermore, the estimated urbanization elasticities of poverty show that urbanization in SSA has a positive effect on poverty reduction in both the short run and the long run. Also, the comparative analyses showed that consistently the poverty reduction effect of urbanization is stronger for the Poverty Gap relative to the Poverty Headcount ratio in both the short run and the long run.

Notwithstanding, the growth promotion and poverty reduction effects of urbanization are not automatic. They require sound urban planning, policies and enormous investments to achieve. Particularly, for SSA, the expansion of cities has largely been horizontal, resulting in unprecedented and ever-increasing footprint of urbanization that requires enormous investment in urban infrastructure. More so, most infrastructure provisions in cities in SSA have mainly involved retrofitting and this has tremendously increased the associated costs of investment.

Furthermore, urbanization in SSA has largely been seen as an undesirable antecedent of a new urban poverty and governments are ambivalent towards it. This has to change for urbanization to be fully embraced with massive resource investment so as to reap its full benefits of productivity growth and job creation. Legal provision and enforcement of private property rights over land and structures are also required. Managing the urbanization process should be seen as an integral component of nurturing growth and development in SSA.

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ACRONYMS

DIF-GMM	Differenced Generalized Methods of Moments
DPD	Dynamic Panel Data
FE	Fixed Effects
GDP	Gross Domestic Product
GMM	Generalized Methods of Moments
IMF	International Monetary Fund
IV	Instrumental Variable
OLS	Ordinary Least Square
PWT	Penn World Tables
RE	Random Effects
SDG	Sustainable Development Goal
SSA	Sub-Saharan Africa
SYS-GMM	System Generalized Methods of Moments
UN	United Nations
UN-DESA	United Nations Department for Economic and Social Affairs
UN-HABITAT	United Nations Human Settlements Programme
WDI	World Development Indicators

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CHAPTER ONE

INTRODUCTION

1.1 Background

Target 11.3 of the Sustainable Development Goal (SDG) 11 in the 2030 Agenda for Sustainable Development aims to make urbanization sustainable for all countries worldwide (United Nations, 2015). Humanity as a whole became a predominant urban species - homo urbanus in 2009, where for the first time in the history of the world, the level of urbanization crossed the 50% mark (World Bank, 2009). In 2018, the world's urbanization was estimated to be about 55% and this figure is projected to increase to 68% by 2050 (UN-DESA, 2018, 2019a).[1] Historically the proportion of the world's population living in cities has grown steadily with time. From a paltry 3% and 10% in 1800 and 1900 respectively, urbanization rose to 30% in 1950 and to 47% by the end of the twentieth century (Grimm *et al.*, 2008; Haase *et al.*, 2018).

Considerable differences in the levels and rates of urbanization persist at the regional and country levels worldwide. The estimates from the United Nations' "World Urbanization Prospects: The 2018 Revision" indicate the following regional urbanization levels in 2018: Northern America (82%), Latin America and the Caribbean (81%), Europe (74%), Oceania (68%), Asia (50%) and Africa (43%). Thus, Asia and Sub-Saharan Africa (SSA) are the least urbanized regions in the world.[2] These two are also the world's most rapidly urbanizing regions. For instance, the estimated average rates of urbanization for SSA and Asia for the respective periods of 1950–2018

[1]UN-DESA is the abbreviated form of the United Nations Department of Economic and Social Affairs.
[2] To simplify exposition, the study assumes the names Africa and Sub-Saharan Africa (SSA) to be the same.

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(20182050) are 1.7% (1.0%) and 1.5% (0.9%) as compared to 0.5% (0.3%) for the rest of the world (McGranahan & Satterthwaite, 2014; UN-DESA, 2019a).

Generally, SSA and Asia being the world's least urbanized as well as the most rapidly urbanizing regions have also been homes to most of the world's extreme poverty (Christiaensen *et al.*, 2013; McGranahan, 2017; World Bank, 2018). Although, the world achieved a milestone of having the lowest extreme poverty rate in recorded history in 2015 (World Bank, 2018), a closer look at the regional breakdown showed a puzzling phenomenon between SSA and Asia, whereby amidst rapid urbanization, extreme poverty is steadily declining in the latter and increasing in the former as shown by *Figure 1.1*. SSA's relatively poor performance in reducing extreme poverty is largely attributed to its comparatively sluggish economic growth as shown in *Figure 1.2*.

Figure 1.1: Number of Poor by Region: 1990–2030.

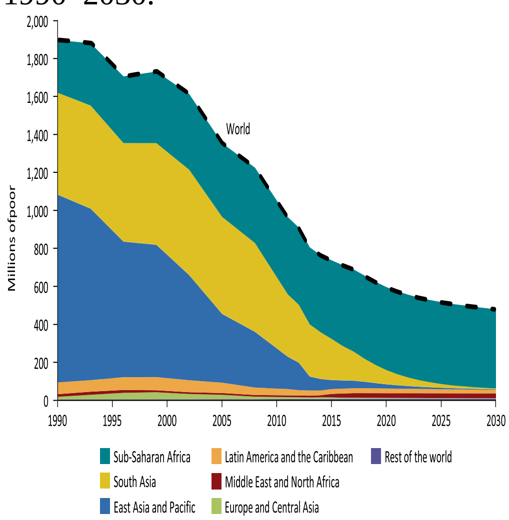
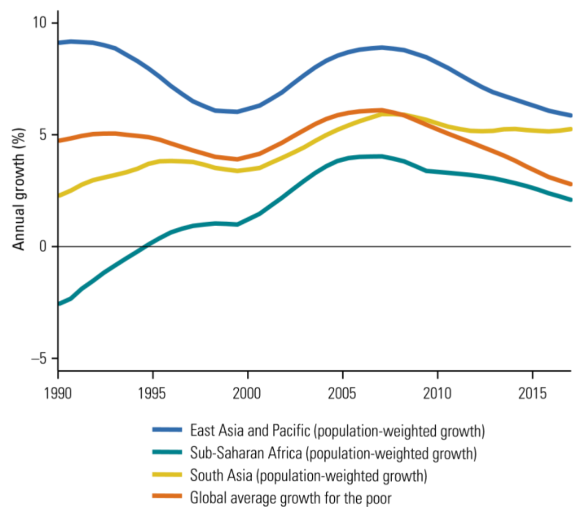


Figure 1.2: Regional GDP per capita Growth Rates: 1990–2017.



Source: World Bank (2018). Piecing Together the Poverty Puzzle. Poverty and Shared Prosperity.

Consequently, in piecing together the poverty puzzle in SSA, the region's urbanization, economic growth and poverty have all attracted considerable and growing worldwide interest from various stakeholders such as the international development agencies, governments, researchers and many

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others. As extreme poverty continues to become increasingly an SSA burden as depicted in *Map C.1* in *Appendix C*, it is rightly recognized that it is in this same region that the battle for reducing worldwide extreme poverty to less than 3% by 2030 will be won or lost (World Bank, 2018, 2019).

In both theoretical and empirical literature, urbanization is widely recognized as a key driver of rapid economic growth, structural transformation and poverty reduction. Urbanization spurs economic growth via its effect on productivity growth in the agriculture, manufacturing and services sectors (UN-HABITAT, 2006; Annez & Buckley, 2009). Also, urbanization contributes to the structural transformation of an economy by increasing the shares of output from manufacturing and services activities (Jedwab, 2013; Gollin *et al.*, 2016; Jedwab *et al.*, 2017). Additionally, the poverty reduction effect of urbanization is evidenced by increasing income/consumption for a large number of both rural and urban inhabitants through the creation of relatively higher productivity and correspondingly higher paying non-farm employment opportunities (World Bank, 2009; Glaeser, 2013; Christiaensen & Weerdt, 2017).

The general historical evidence shows that rapid and sustained urbanization is often associated with rapid and sustained economic growth, thus making urbanization an inherent part of the economic growth process (Grimm *et al.*, 2008; Spence *et al.*, 2009; Collier & Venables, 2017). However, the urbanization dividend is not automatic due to the associated negative effects of over urbanization and/or poor urbanization management (UN-HABITAT, 2016; Collier, 2017; Collier & Venables, 2017). This implies that rapidly urbanizing countries in SSA in their quest to foster economic growth and reduce poverty must make urbanization sustainable so as to reap its full benefits through urban agglomeration economies and scale economies (World Bank, 2009; UN-HABITAT, 2016; Rudd *et al.*, 2018).

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1.2 Problem Statement

First, in both the theoretical and empirical literature, there is a lack of consensus on the relationship between urbanization and economic growth. On one hand, there is enormous body of both theoretical and empirical literature that support the idea of a positive relationship between urbanization and economic growth (Lewis, 1954; Quigley, 2008; Spence et al., 2009; Glaeser, 2013; Gollin et al., 2016). On the other hand, urbanization and economic growth are seen to have no discernable relationship, with urbanization being seen as a purely demographic transition phenomenon (Preston, 1979; Dyson, 2011; Potts, 2012; Lesthaeghe, 2014; Haase *et al.*, 2018).

Furthermore, concerning the literature on the positive relationship between urbanization and economic growth, an area of persistent debate and disagreements is the causal direction between the two. Some studies have found urbanization to cause economic growth. These urbanization-led growth proponents argue that through urban agglomeration economies and economies of scale, cities are the engines of economic growth and development (World Bank, 1999; UN-HABITAT, 2006; Desrochers & Hospers, 2007; World Bank, 2009). Conversely, other studies have also found economic growth to cause urbanization. According to these growth-led urbanization proponents, urbanization is a product of growth by being a spatial transition process that accompanies growth and development (Fay & Opal, 2000; Henderson, 2003a; Polese, 2005). Also, some studies have found a feedback relationship, whereby urbanization causes growth and growth causes urbanization (Liddle & Messinis, 2015; Nguyen & Nguyen, 2018).

From the above exposition, it can be seen that the extant literature on the urbanization-economic growth nexus is both contradictory and divergent. This is a problem and demonstrates the difficulty in generally determining whether there is a unidirectional causal relationship with either urbanization causing economic growth or conversely; or bi-directional causation whereby

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urbanization causes growth and growth also causes urbanization; or whether a causal relationship even exist at all between urbanization and economic growth.

This study contributes to the debate in the literature by investigating urbanization both as a cause and effect of economic growth using the dynamic system generalized methods of moments (SYS-GMM) estimation technique proposed by Arellano & Bover (1995) and Blundell & Bond (1998). The SYS-GMM technique controls for the problems of endogeneity and simultaneity bias, as well as mitigate both the unmeasured and time-invariant individual country heterogeneity effects, so as to obtain consistent and efficient estimates. Also, the heterogenous panel Granger non-causality test developed by Dumitrescu & Hurlin (2012) is adopted as a confirmatory methodology for the findings of the SYS-GMM.

Second, being the least urbanized geographic region in the world with only about 43% of its total population living in urban areas in 2018, SSA is projected to be the World's most rapidly urbanizing region between now and 2050 (UN-DESA, 2019a). However, as compared to the urbanization of Europe, North America and some Asian countries, the urbanization process in SSA is largely seen to be different in both pace and economic structure (Fay & Opal, 2000; Beauchemin & Bocquier, 2004; Potts, 2013; Gollin *et al.*, 2016). In terms of pace, the current rate of urbanization in SSA is the most rapid in history, such that it only takes about 30 years to move from being only 10 to 20% urbanized to full urbanization at about 60 to 85% as compared to the over 100 to 150 years experienced by current developed countries (Henderson, 2010). Such rapid rates of urbanization are associated with enormous economic ramifications which require appropriate policies and tremendous resources to address (Collier, 2017).

In terms of economic structural transformation, SSA's process of urbanization deviates from the stylized facts of urbanization fostering economic growth and development through an industrial

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revolution such as the old urbanizations of Europe and North America or an agricultural green revolution like the new urbanizations of some Asian countries (World Bank, 1999, 2009; Gollin *et al.*, 2016; Henderson & Kriticos, 2017). A readily observable feature of the process of urbanization in SSA is its association with worsening poverty, inequality and poor governance (Collier, 2006; Collier, 2017; Collier & Venables, 2017; Glaeser & Henderson, 2017).

Historically, SSA's urbanization is occurring at a much lower income per capita than it occurred in other geographical regions of the world. For instance, a regional comparison of the average per capita GDP (2005 constant USD) at urbanization levels of 40% showed that Latin America achieved this level in 1950 with $1,860, Middle East and North Africa region in 1968 with $1,800, Asia in 1994 with $3,617, and SSA in 2017 with just $1,000 (Lall *et al.*, 2017). Also, at the country level, the United Kingdom and United States each became one-third urbanized respectively in 1861 and 1890 with per capita GDP of around $5,000 and nearly $6,000, whilst the urbanization levels of France, Germany and the Netherlands only reached 50% when their respective income levels were well over $5000 (Glaeser, 2013).

These observations provide insight into the inability of the new urban economics and the modern economic geography literature which are primarily based on the old urbanization experience of Europe and North America, in explaining the urbanization process and its associated economic effects in SSA (Henderson, 2003a; Jedwab, 2013; Gollin *et al.*, 2016; Castells-Quintana, 2017; Christiaensen & Weerdt, 2017). Thus, the urbanization, economic growth and poverty relationships in SSA have generally been described as a puzzle and highlighted variously as a phenomenon of "urbanization without growth" by Fay & Opal (2000), "urbanization of poverty" by Ravallion *et al.* (2007), "pathological urbanization" by Annez & Buckley (2009), "poor country urbanization" by Glaeser (2013) and "dysfunctional urbanization" by Collier & Venables (2017).

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However, according to Glaeser & Henderson (2017), these various descriptions of the urbanization process in SSA succeeds from the fact that an understanding of the urbanization process in the SSA region is nascent, evidenced by the limited number and areas of prior studies on same. Although, the urbanization process in SSA has continued to receive growing worldwide attention beginning the last two decades, the existing body of empirical knowledge is not overwhelming. This has resulted in a continued limited understanding of the urbanization-poverty nexus in the sub-region. The study seeks to contribute to the knowledge gap in the literature by aiming to establish a new urbanization-poverty relationship in SSA using the SYS-GMM methodology for a long span panel data sub-divided into 5-year time intervals over the period 1970-2019 for up to 30 rapidly urbanizing countries selected from all the four sub-regions in SSA. The findings from this study will be compared and discussed with that of related prior studies.

1.3 Research Questions

The first part of this study investigates the relationship between urbanization and economic growth in SSA from the two dominant standpoints in the literature. Here, the study seeks to answer the following research questions:

i) Does urbanization lead to economic growth or vice versa in SSA?

ii) What is the extent of the effects?

The second part of this study focuses on investigating the role of urbanization in poverty reduction in SSA countries. The proposed main research questions here are:

iii) Does urbanization lead to poverty reduction in SSA?

iv) To what extent does urbanization affect poverty in SSA?

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This study uses the definition of extreme poverty as income/consumption less than the International Poverty Line (IPL) of US$1.90 a day in 2011 purchasing power parity (World Bank, 2018).[3] The Foster-Greer-Thorbecke (1984) class of decomposable poverty measures covering the Poverty Incidence/Headcount ratio (P_0) and the Poverty Gap (P_1) are used to measure respectively the breadth and depth of poverty (Foster *et al.*, 1984).[4]

1.4 Research Objectives

This study has two main research objectives. The first is to investigate the relationship between urbanization and economic growth. The second is to investigate the nexus between urbanization and poverty reduction. The specific objectives are as follows:

a) To find the direction of causation between urbanization and economic growth in SSA.

b) To estimate and discuss the signs, magnitudes and significances of the three main elasticities - urbanization elasticity of growth; growth elasticity of urbanization; and urbanization elasticity of poverty.

1.5 Expected Contributions

The future of the world's population is urban and urbanization is rightly and widely recognized as the primary determinant of the spatial distribution of global population (UN-DESA, 2018, 2019b). This demographic mega-trend which is also closely related to the social, economic and environmental dimensions of sustainable development presents opportunities and challenges

[3] The study by Fosu (2009) used this same IPL.

[4] The poverty headcount ratio also known as the poverty incidence measures the proportion of a country's population that falls below the poverty line. The poverty gap takes into account both the poverty incidence and how far below the poverty line the poor are, hence, it measures the depth of poverty.

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which are both enormous. Also, as identified by Rudd *et al.* (2018), sustainable urbanization (SDG11) is strongly interlinked with 10 other urban critical SDGs, namely, ending poverty (SDG1); promoting health and well-being (SDG3); sustainable management of water and sanitation (SDG6) and energy resources (SDG7); sustainable economic growth (SDG8); building resilient infrastructure (SDG9); reducing inequality within and among countries (SDG10); sustainable consumption and production (SDG12); combating climate change and its impact (SDG13); and building accountable and inclusive institutions (SDG16). Thus, urbanization demands a closer inspection by governments, development institutions, researchers and many other stakeholders due to the pivotal role it plays in sustainable growth and development. In essence, this study has both significant research and practical contributions.

First, there has been an increased research interest on urbanization issues in the developing world and more especially in SSA due to the latter's comparatively rapid urbanizing rates, sluggish economic growth and worsening extreme poverty (World Bank, 2018). However, prior studies on SSA's urbanization and associated economic issues are limited (Burgess & Venables, 2004; Annez & Buckley, 2009; Glaeser & Henderson, 2017). Consequently, this study provides insightful results on the nexus between urbanization, economic growth and poverty reduction in SSA.

Prior studies in this area have tended to focus on the entire developing countries in the world (Bourguignon, 2003; Kalwij & Verschoor, 2007; Ravallion *et al.*, 2007; Fosu, 2009; Glaeser, 2013; Fosu, 2017); entire SSA region (Fay & Opal, 2000; Potts, 2012, 2013), only a sub-region in SSA (Beauchemin & Bocquier, 2004) or a single country in SSA (Christiaensen & Weerdt, 2017). By focusing on up to 30 selected rapidly urbanizing countries from all the four sub-regions in SSA over the period 1970-2019, this study provides country-level evidence that truly represent the SSA region. Such evidence obtained will help provide granular understanding of the urbanization,

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growth and poverty nexus in SSA. Also, in line with the purpose of most empirical studies which is to provide incremental knowledge, this study aimed primarily at building upon prior research, as well as provide avenues for further research in this subject area and geographic region.

Second, it is hoped this study will make practical contribution to policy as it aims to provide an in-depth understanding of how urbanization trends in SSA affect the region's economic growth and poverty reduction performances. It is envisaged that the knowledge generated could serve as a guide towards evidence-based and participatory policy making and planning by various governments in SSA. Additionally, it is believed such information will provide a perspective on the successful implementation of the New Urban Agenda for achieving Sustainable Development Goal 11, which aims at making cities all over the world inclusive and safe for all income groups as well as resilient and sustainable (United Nations, 2015; UN-HABITAT, 2016).

1.6 Organization of the Study

The study is organized into six chapters. This first chapter is the introductory part of the study. Chapter two is the overview and covers the key urbanization concepts, trends and perspectives. It also analyzes the trends in the main variables of the study namely urbanization, GDP per capita, economic structure – agriculture, industry and services; demographic – population growth, fertility and life expectancy; and poverty indices – poverty incidence and poverty gap. Chapter three reviews both the theoretical and empirical literature on urbanization and economic growth and urbanization and poverty. Chapter four presents the data sources, methodology and empirical models of the study. Chapter five presents and discusses the empirical results. Chapter six presents the summary, conclusions and recommendations based on the results of the study. Some limitations of the study are discussed and areas for further research suggested.

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CHAPTER TWO

OVERVIEW

2.1 Introduction

This chapter is divided into two main parts. The first part presents an overview of the key urbanization concepts, trends and perspectives. The second part analyzes the trends in the main variables used for the study namely urbanization, GDP per capita, economic structure, demographic and poverty indices variables.

2.2 Background on Urbanization

Urbanization is a multi-dimensional phenomenon that has and continues to be one of the most important worldwide change processes. It is a multi-faceted concept with diversity of perspective and definition. This has led to some conceptual and empirical confusion about urbanization viz. the definition of urban and urbanization, urbanization trends and perspectives and the implications of urbanization for sustainable development (McGranahan & Satterthwaite, 2014; Haase *et al.*, 2018; Parnell *et al.*, 2018).

2.2.1 What is Urban?

A major source of demographic confusion which has plagued many urban economic studies for decades has bordered on the definition of "urban". This has to do with the fact that there are as many definitions of urban (or city) as there are criteria used in defining them. Some of the single criterion often used in defining/delineating urban (or city) include the population size, population density, administrative boundary, commuting density, built-up area, travel distance, economic

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characteristics or urban employment (the proportion of workers engaged in non-agricultural economic activities), facilities (e.g. higher-level schools), infrastructure (e.g. paved streets, sewerage systems, water supply systems, street lighting) and many others (UN-HABITAT, 2006; UN-DESA, 2019a). In practice, however, most countries in the world use the multiple criteria approaches, whereby two or more criteria are combined to define urban.

Despite the use of these criteria, there is no formal definition that accurately captures the urban phenomenon in all its diversity (Dyson, 2011; Haase *et al.*, 2018), explaining the persistence of cross-country and cross-time definitional variations. Evidently, two reports from the United Nations that are only 12 years apart namely the "*State of the World's Cities Report 2006/7" and* the *"World Urbanization Prospects: The 2018 Revision"* both show the different criteria and the changing number of countries that use them to define "urban" as shown in *Table 2.1*. Comparatively, for the 2018 (2006) report, out of the 233 countries surveyed, 121 (105) used the administrative criteria with 59 (83) using it as the sole criterion in defining urban. Also, 108 (100) used the population size or population density criterion with 37 (57) using this demographic feature as the sole criterion. Used together with other criteria, 38 (25) countries employed the economic characteristics criterion, whereas 69 (18) employed the urban infrastructure criterion. Lastly, 12 (25) countries provided no definition, whilst 12 (6) regarded their entire population or country area as urban (UN-HABITAT, 2006; UN-DESA, 2019a).

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Table 2.1: Number of countries according to the criteria used in defining Urban Areas: 2006 and 2018.

Type of criteria	No. of countries using only this criterion		No. of countries using this with other criteria	
	2006	2018	2006	2018
Administrative	83	59	105	121
Population size/density	57	37	100	108
Economic	-	-	25	38
Urban infrastructure	-	-	18	69
No definition of Urban	-	-	25	12
Entire population Urban	-	-	6	12

Source: Compiled from the "State of the World's Cities Report 2006/7" and "World Urbanization Prospects: The 2018 Revision". United Nations Department of Economic and Social Affairs (UN-DESA), Population Division.

Furthermore, although it is generally agreed that cities are places where large numbers of human population live and work as well as being the hubs of government, commerce and transportation activities, there is no standardized international criteria on how to identify when a settlement is a city or an urban area so as to clearly define it as well as how to determine the boundaries of a an urban area/city (Dumont, 2018; UN-DESA, 2018). In most cases, there exist multiple boundary definitions for the same urban area/city. The choice of how the boundaries of a city are defined has an important consequence in both the determination of the size of a city's population and its growth. This is clearly illustrated in the United Nations' report: *"The World's Cities in 2018 - Data Booklet"* for Toronto, Canada. In this report, the United Nations examined three types of boundary definitions for the city as illustrated in *Map 2.1*. The first was the "city proper" definition which describes a city by the administrative boundary. The second was the "urban agglomeration" definition, which considers the extent of the built-up area to delineate the city's boundaries. The third was the "metropolitan area" definition which delineates the city's boundaries based on the degree of interconnectivity of economic and social activities such as commerce, commuting patterns and many others of nearby areas.

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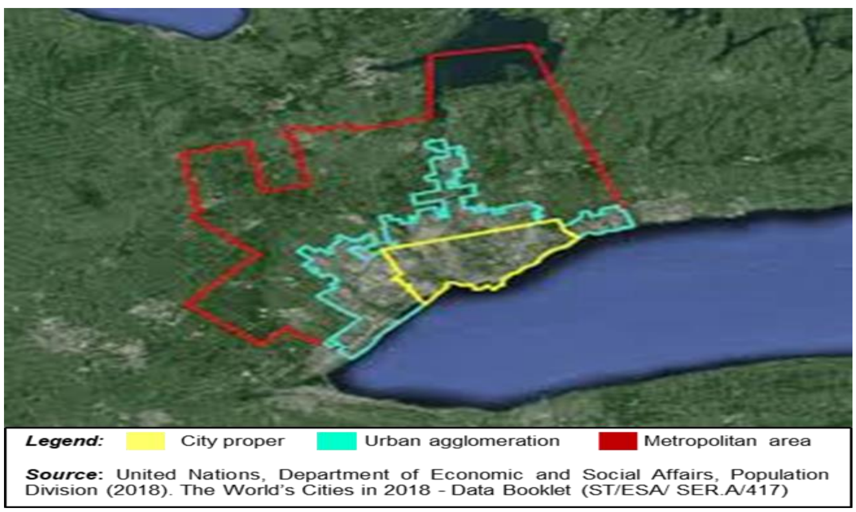
The differences in these three administrative definitions of a city (or urban) might not seem much from a casual observation, however, they generated substantial differences in both the population size and the rate of population growth of Toronto, Canada. According to the UN report, from the 2011 census of Canada, about 2.6 million, 5.1 million and 5.6 million people respectively resided within the "city proper", the "urban agglomeration" and the "metropolitan area". Also, between the 2006 and 2011 Canadian censuses, the growth rates of the "city proper", the "urban agglomeration" and the "metropolitan area" averaged annually at 0.9%, 1.5% and 1.8% respectively. This clearly illustrates the point that the choice of how the boundary of a city is defined has essential consequences for both policy and research.

Map 2.1: Defining Urban using City proper, Urban agglomeration and Metropolitan area boundaries.



Source: United Nations, Department of Economic and Social Affairs, Population Division (2018). The World's Cities in 2018 - Data Booklet (ST/ESA/ SER.A/417)

Again, consider the definition of a city (or urban) using the size of the population as the main criteria. For most countries, the minimum size of the population ranges from 1,000 to 5,000, however, there are extremes ranging from a minimum concentration of 200 to 50,000 inhabitants (UN-HABITAT, 2006). A typical case in point as illustrated by McGranahan & Satterthwaite (2014) is that of Sweden and Mali. In Sweden, an urban area is defined as a built-up area having a minimum of 200 households with maximum gaps of 200 metres between them. In Mali, the

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censuses used a minimum of 5,000, 30,000 and 40,000 people to delineate an urban area in the respective years of 1987, 1998 and 2009. Such differences in urban definitions across countries (and also over time) make cross-country reporting and international comparisons of urban populations difficult and sometimes misleading.

2.2.2 What is Urbanization?

As with the concept "urban", the phenomenon of "urbanization" is not yet amenable to a standard international definition. Such definitional issues associated with urbanization are seen to be originating from some sections of the literature that treat urbanization primarily as a demographic phenomenon, which often results in urbanization being often loosely defined and erroneously assumed to be equivalent to urban population growth (McGranahan & Satterthwaite, 2014). It is argued that the most common definition of urbanization as "the increasing number of people living in urban areas" rather defines urban population growth. Rigorously defined, urbanization refers to the increasing share of a national population that is urban (Dyson, 2011; Potts, 2012; McGranahan & Satterthwaite, 2014; Haase *et al.*, 2018; UN-DESA, 2019a).

On the whole, empirical evidence confirms that at all levels of urbanization (i.e. world, regional, country, city), urbanization rate is always less than urban population growth rate as shown in *Table 2.2*. The *Table* indicates that between 1950–2020, the annual growth rate of the world's population averaged at 1.6%, whilst its urbanization level grew at 0.9% and the urban population growth rate was 2.6%. Thus, less than half of the global urban population growth over this period can be attributed to urbanization while the natural population growth accounted for over 50%.

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Table 2.2: Estimates of World Population, Urbanization and Urban Population growth rates: 1950-2020.

Category	1950-1960	1960-1970	1970-1980	1980-1990	1990-2000	2000-2010	2010-2020	Average
World Population growth rates	1.8	2.0	1.9	1.8	1.4	1.2	1.1	1.6
World Urbanization rates	1.3	0.8	0.7	0.9	0.8	1.0	0.9	0.9
World Urban Population growth rates	3.2	2.8	2.6	2.7	2.3	2.3	2.0	2.6

Source: Compiled from McGranahan & Satterthwaite (2014). The figures are compound annual growth rates.

It is also said that the full process of urbanization for a city, country or a geographic region typically involves the increases in the levels of urbanization from being 10% or less to being 70% or more (Dyson, 2011). However, differences in the definition of full urbanization exist among countries. For instance, fully urbanized means 60-65% urbanized for Austria, Finland and Switzerland; just over 70% for the USA and 80-85% for Argentina, Brazil and Chile (Henderson, 2003a). Overall, urbanization is caused by the expansion of urban boundaries due to natural growth of the existing urban population; formation of new urban centres resulting from the reclassification of previously rural areas that have developed as a result of natural population growth or migration to meet the current national urban criteria (World Bank & IMF); and rural-urban migration, with the latter being its immediate and major cause (Fay & Opal, 2000; McGranahan & Satterthwaite, 2014; McGranahan, 2017).

2.3 Conceptualizations and Patterns of Urbanization

Contrary to the dominant traditional viewpoint about the homogeneity of the pattern of urbanization worldwide, it is now readily recognized that the process of urbanization is a heterogeneous one, differing across time and income groups. A thorough decomposition of worldwide urbanization patterns and trends in modern times show that the underlying factors can be broadly categorized under rural push, urban pull and urban push factors (Harris & Todaro, 1970; Jedwab *et al.*, 2017). The rural push factors focus on the declining employment opportunities in

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the rural areas as a result of the modernization of the agricultural sector and/or rural poverty mainly caused by civil disturbances, wars and droughts and many others. The urban pull factors emphasize the increasing economic opportunities in the urban areas resulting mainly from industrialization, differences in rural-urban wages, urban-biased government policies favouring the development of urban infrastructure and many others. The urban push factors focus on the urban internal mechanisms mainly the changes in the patterns of urban natality and mortality that causes rapid natural increase in the urban population.

First, the traditional and general conceptualization of modern historic pattern of urbanization in the literature follows the classic two-sector models of rural-urban migration which typically involves the structural transformation of the economy from being predominantly agrarian to industry and services and the subsequent transfer of labour from the backward rural agricultural sector to the modern urban manufacturing and services sectors (Lewis, 1954; Rostow, 1959; Harris & Todaro, 1970). This pattern focuses on both the rural push and urban pull factors and views urbanization and industrialization synonymously. It also implicitly assumes that agriculture is exclusively a rural activity whereas manufacturing and services are uniquely urban activities, and that, economic development involves productivity growth in agriculture which results in both the transfer of employment opportunities and the release of rural labour from agriculture to urban manufacturing and tradeable services sectors (Lewis, 1954; Henderson, 2003a; Gollin *et al.*, 2016).

This stylized pattern of urbanization and industrialization as experienced by many developed countries in Europe and North America during the 19th century and subsequently in other countries in Latin America, Caribbean and Asia leads to what is termed "production cities", whereby cities are known to produce tradeable goods (Gollin et al. 2016). Here, urban employment is concentrated in the manufacturing and tradable services sector such as business services, finance,

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insurance and real estate. Subsequently, agricultural share of income falls from about 32% to less than 3% for low to high income countries with a consequent drastic fall in agricultural employment from 66% to 6% for the respective income groups (Fay & Opal, 2000).

Second, more recent works on the conceptualization of urbanization have endogenized the structural transformation of the economy and modelled the urbanization process as being driven by human capital accumulation. Here, it is assumed that the productivity of human capital is only enhanced in the urban areas as compared to the rural areas and therefore people migrate from rural to urban areas as human capital accumulates (Bertinelli & Black, 2004), resulting in a shift from the production of rural goods to that of urban goods (Henderson & Wang, 2005). A variant of this model does not involve a shift in the goods produced per se, rather, it involves the transfer of production away from the sector that mainly uses land and unskilled labour to the sector that produces the same or similar goods but rather uses skilled labour (Lucas, 2004) and in some cases also physical capital (Galor *et al.*, 2009).

A third identified path to urbanization which is not driven by structural transformation as in an industrial revolution or a green revolution is globalization. In an open economy, resource rich and poor developing countries are able to urbanize rapidly even in the face of declining agriculture and manufacturing sectors. Such poor countries are able to receive aid from foreign countries whiles resource rich countries are able to concentrate on the extraction of natural resources and subsequently spend the surplus income on urban goods and services that are imported from other countries (Fay & Opal, 2000; Glaeser, 2013; Jedwab, 2013). This usually involves the importation of food and tradable goods to support the growing urban population.

This pattern of urbanization without industrialization as seen in the poor and resource rich developing countries in the Middle-East and Africa gives rise to what is termed "consumption

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cities" with employment opportunities skewed in favour of the non-tradable services sector (Collier *et al.*, 2010; Jedwab, 2013; Gollin *et al.*, 2016). It also focuses on the rural push factors such that the specialization in resource extraction leads to the development of enclave sectors and the subsequent neglect of the agriculture sector such that urban employment is primarily concentrated in local retail and non-tradable personal services.

It is argued that urbanization benefits (agglomeration economies) are generally maximized through industrialization and trade openness and that resource rich countries that urbanize through consumption cities may be unable to reap the full benefits of urbanization if all the accrued resource rents are consumed (Jedwab, 2013; Gollin *et al.*, 2016). Historically, through private and public investments in the productive capacity of the tradables sector, most consumption cities in the United States, Canada and Australia have diversified and industrialized and over time evolved into production cities, whereas only a few consumption cities in resource rich developing countries such as in Chile, Dubai, Indonesia, Mauritius, Malaysia, Mexico and South Africa are in the process of evolving to become production cities (Gollin et al. 2016).

Fourth, the urban push factors pattern of urbanization is caused by natural population increase in the urban areas. High natural increase in the urban population caused by a relatively lower urban mortality as compared to urban natality is seen to be a predominant cause of urbanization in most developing countries (Preston, 1979; Potts, 2012; Jedwab *et al.*, 2017). This explains why developing countries in Asia and Africa with similar rates of migration as in Industrial Europe of about 17-18% are urbanizing far more rapidly (Annez & Buckley, 2009). As compared to most European cities in the 19th century which were often regarded as killer cities whereby the urban growth caused by net migration and urban fertility was offset by high urban mortality rates, most cities in current developing countries of the world are classified as mushroom cities as low urban

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mortality and high urban fertility contribute to rapid natural increase in urban population, which in itself causes urbanization (Preston, 1979; Potts, 2012; Jedwab *et al.*, 2017). For instance, the high natural population increase in London was curtailed when the city experienced squalid years in 1592, 1603, 1625 and 1636 with extremely high mortality rates, higher than in the country-side, whereby about 36% of children died before their 6th birthday, caused mainly by stinking air, vapours and coal smoke (Dumont, 2018).

On the whole, it can be seen that whilst the first two patterns of urbanization follow the stylized facts in the literature that emphasize rural to urban migration resulting from economic growth impetus, the third pattern is a purely demographic phenomenon. The impact of the rapid natural increase in the urban population in many developing countries may be one of the factors that confirm that economic growth is not the only driver of urbanization. Perhaps, this may also help to shed light on the so-called pathological urbanization highlighted by the phenomena of "urbanization without growth" by Fay & Opal, (2000) and "poor country urbanization" by Glaeser (2013) which have both received much traction in the literature.

2.4 Global Urbanization Trends

A historical background of global urbanization showed that the first cities appeared several millennia ago and since then the dynamics of global urbanization have continued to evolve substantially through time and space with people being always the most fundamental ingredient (Alberti *et al.*, 2018). Ancient cities such as Rome which was the world's first megacity have existed for millennia, and more so is Istanbul, which was the capital of four major empires spanning over a period of two millennia and is still in existence today (Haase *et al.*, 2018).

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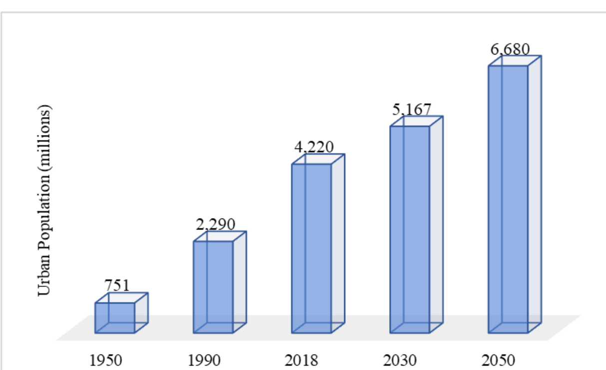
Historically, three main demographic features of the world's cities can be identified, and these have all grown steadily with time, namely, the number of the people living in cities, the proportion of the world's population living in cities and the number of cities. First, the number of people living in cities globally has grown rapidly with time as depicted in *Figure 2.1*. From being only 751 million in 1950, world's urban population has grown substantially to about 4.2 billion in 2018 and this figure is projected to reach about 6.7 billion by 2050 (UN-DESA, 2019a). More so, increasing global population has also resulted in an ever-increasing global volume of urbanization. For instance, whereas it took well over 10,000 years for the world's urban population to reach its first 1 billion figure in 1960, estimates show that the world will add a second billion in just 25 years, and a third billion in only 18 years and a fourth billion in just 15 years (World Bank, 2009).

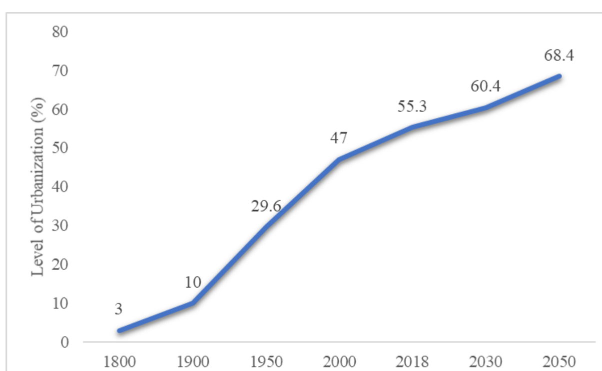
Secondly, from being only 3% and 10% respectively in 1800 and 1900, the proportion of the world's population living in cities rose to about 30% in 1950 and to 47% by the end of the twentieth century (Grimm *et al.*, 2008; Dumont, 2018; Haase *et al.*, 2018). In 2018, the world's urbanization was estimated to be about 55% and this figure is projected to increase to 68% by 2050 as shown in *Figure 2.2* (UN-DESA, 2018, 2019a). *Map C.2* in *Appendix C* gives a pictorial view of the global urbanization levels from 1950 - 2050.

Figure 2.1: World's Urban Population: 1950-2050.



Source: Compiled from the World Urbanization Prospects: The 2018 Revision. UN-DESA.

Figure 2.2: World's Urbanization Levels: 1800-2050.



Source: Compiled from Haase et al. (2018) and World Urbanization Prospects: The 2018 Revision. UN-DESA.

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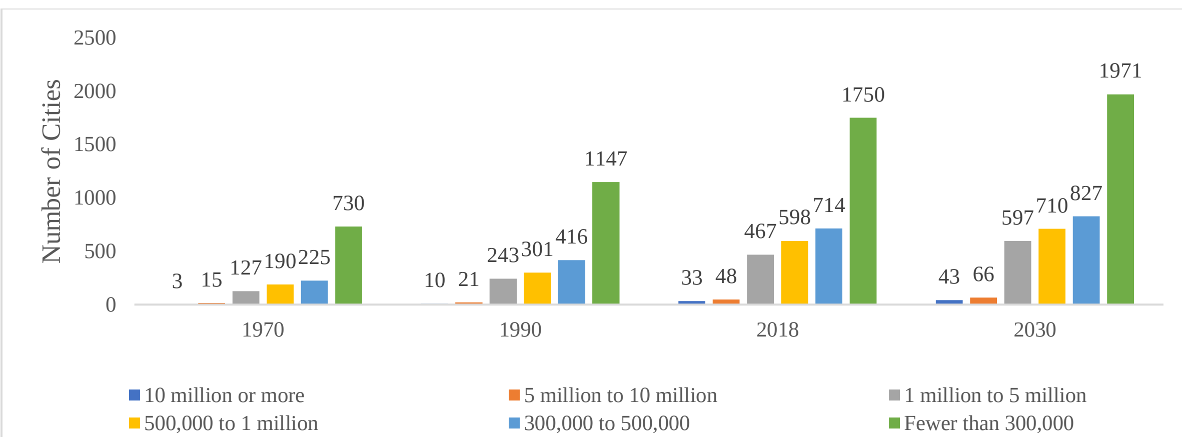
Thirdly, the world's number of cities and the size class of cities have both grown steadily with time. In terms of the number of cities, as depicted in *Figure 2.3*, there were 560 cities with population exceeding 300,000 in 1970, and this figure increased to 1,860 in 2018 and it is further projected to reach 2,243 by 2030 (Haase *et al.*, 2018; UN-DESA, 2018). Furthermore, the size class of cities has also been changing with time. As shown in *Figure 2.3*, the number of megacities (cities with 10 million inhabitants or more) which were only 3 in 1970 increased to 33 in 2018 and are projected to increase to 43 in 2030 (UN-DESA, 2018). *Map C.3* in *Appendix C* gives a pictorial view of the changing size class of cities globally from 1990 - 2018. However, it must be emphasized that today, almost half of the world's urban inhabitants live in relatively small cities of less than 500,000 dwellers while only about 13% live in megacities (UN-DESA, 2018, 2019a).

Figure 2.3: Number of Cities by Urban Size Class.



Source: Compiled from the World Urbanization Prospects: The 2018 Revision. UN DESA.

2.4.1 Urbanization Trends at Regional and Income Levels

Considerable differences in the levels and rates of urbanization as well as the size class of cities persist at both the regional and income levels. Using the administrative boundary definition of urban, the United Nations (2018) estimates indicate the most urbanized regions in the world are Northern America (82%), Latin America and the Caribbean (81%), Europe (74%), and Oceania

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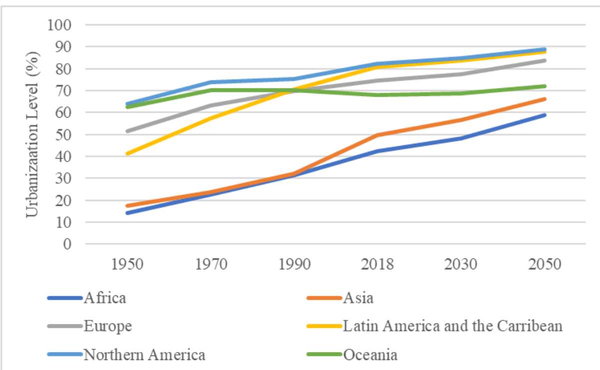
(68%) as shown in *Figure 2.4*. In contrast Asia and Africa with respective urbanization levels of 50% and 43% remain mostly rural with about 90% of global rural population. However, the urbanization levels of these two regions are projected to reach 66% and 59% respectively for Asia and Africa by 2050.

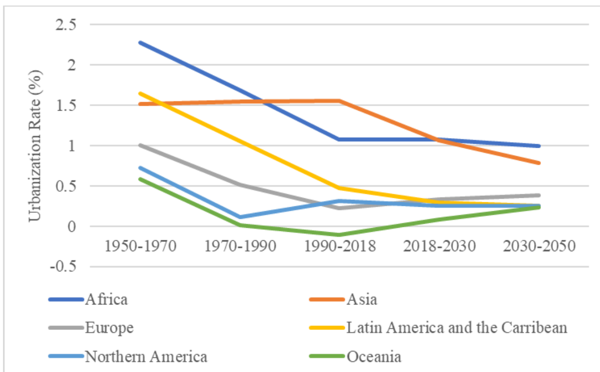
The rates of urbanization also differ markedly across the various regions of the world, with the least urbanized regions of Africa and Asia urbanizing far rapidly than their more urbanized counterparts as shown in *Figure 2.5*. From the Figure, the rates of urbanization have been highest for Africa and Asia since 1950. Also, both the current and future rates of urbanization are highest for Africa as compared to Asia, due to the former's lower level of urbanization.

Figure 2.4: Regional Urbanization Levels: 1950-2050



Source: Compiled from the World Urbanization Prospects: The 2018 Revision. UN-DESA.

Figure 2.5: Regional Rates of Urbanization: 1950-2050



Source: Compiled from the World Urbanization Prospects: The 2018 Revision. UN-DESA.

Furthermore, the distribution of megacities around the world shows considerable regional disparities as depicted in *Figure 2.6* and in *Map C.3*. From the Figure, in 1970, the world had only 3 megacities which were located in Asia (2) and Northern America (1), and this increased to 33 in 2018 and is projected to reach 43 by 2030. Since 2018, there have been megacities located in all the world's regions, except Oceania, which is projected not to have a megacity even by 2030 due

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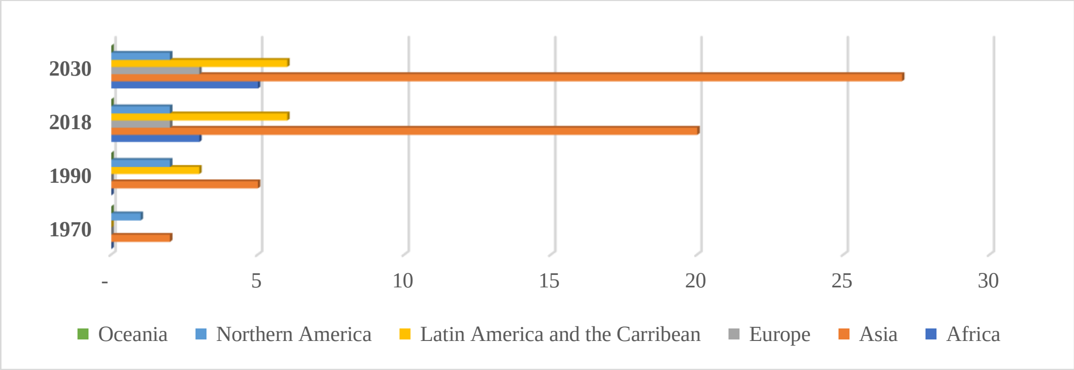
to its relatively lower population (UN-DESA, 2018). *Table D.1* in *Appendix D* gives details of size class distribution of cities at world and regional levels for the periods: 1970, 1990, 2018 and 2030.

Figure 2.6: Number of Mega Cities by Regions.



Source: Compiled from the World Urbanization Prospects: The 2018 Revision. UN-DESA.

As previously mentioned, the levels and the rates of urbanization also differ markedly across the various income groups. Countries such as Australia, Canada, Japan, the United States and most countries in Europe with high levels of income have correspondingly high levels of urbanization and low urbanization growth rates. For several upper-middle income countries such as Brazil, China, Iran and Mexico that are urbanizing rapidly have levels of urbanization close to that of the high-income groups. Conversely, both lower-middle-income countries like India, Indonesia, Ethiopia and Nigeria and many other low-income countries in Africa and Asia have low levels of urbanization and are also urbanizing rapidly as shown in *Figures 2.7 and 2.8.*

From *Figure 2.7*, the level of urbanization in today's high-income countries was about 59% in 1950, which rose to 82% in 2018 and it is projected to reach about 88% by 2050. For today's upper-middle-income countries the level of urbanization in 1950 was about 22%, which grew to about 67% in 2018 and is projected to increase to 83% by 2050. Thus, the gap in the levels of urbanization between high and upper-middle-income countries continues to decline. The levels of urbanization for the lower-middle-income and low-income countries in 2018 are respectively 41%

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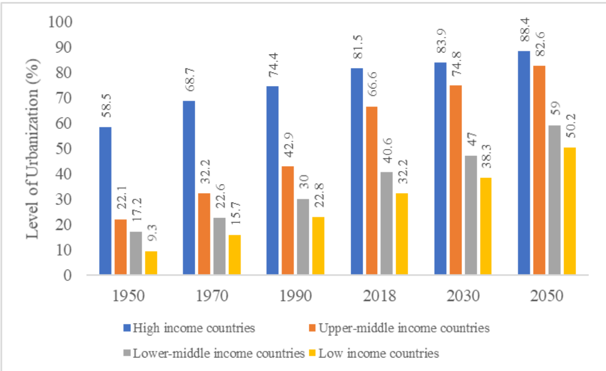
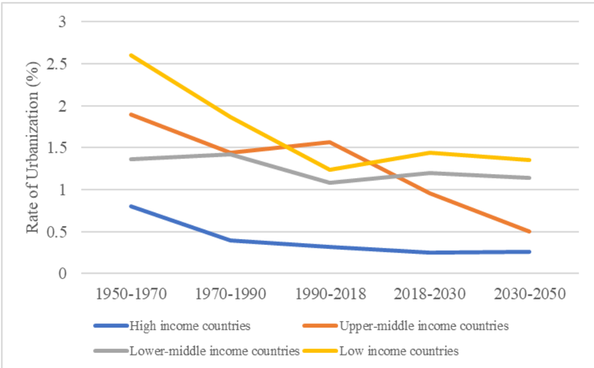
and 32%, and with their faster pace of urbanization, it is estimated that by 2050 their urbanization levels will reach about 59% and over 50% respectively. On the whole, the rates of urbanization for all income groups show a declining trend for the period 1950-2050 as shown in *Figure 2.8*. However, that of both lower-middle-income and low-income countries are projected to increase over the period 2018-2030 and thereafter decline.

Figure 2.7: Level of Urbanization by Income Group:1950-2050.



Source: Compiled from the World Urbanization Prospects: The 2018 Revision. UN-DESA.

Figure 2.8: Rate of Urbanization by Income Group:1950-2050.



Source: Compiled from the World Urbanization Prospects: The 2018 Revision. UN-DESA.

2.4.2 Urbanization Trends at the Country and City Levels

At both the country and city levels, significant differences in urbanization exist and still continue to persist worldwide. *Table 2.3* shows the 10 least urbanized countries or areas in the world for the respective periods 1950, 1990, 2018 and 2050. From the Table, Burundi and Papua New Guinea stand out as the world's least urbanized countries since 1950 and are projected to remain so by 2050. On the whole, countries from SSA (Burundi, Malawi, Niger, Rwanda, South Sudan) and Asia (Nepal, Sri Lanka) with a minimum population of 10 million inhabitants show very low levels of urbanization of less than 20% in 2018.

Not surprisingly, however, most of these least urbanized countries are also the world's most rapidly urbanizing as shown in *Table 2.4*. From the Table, the least urbanized countries from SSA

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(Burundi, Malawi, Niger, Rwanda, South Sudan), Asia (Nepal) and Oceania (Papua New Guinea) are also among the world's projected most rapidly urbanizing countries for the period 2018-2050. Other so projected countries include Ethiopia, Cambodia and Sri Lanka.

Table 2.3: The 10 Least Urbanized Countries or Areas in the World: 1950, 1990, 2018, 2050.

Rank	*Country or area*	*Urbanization level (%) 1950*	*Rank*	*Country or area*	*Urbanization level (%) 1990*	*Rank*	*Country or area*	*Urbanization level (%) 2018*	*Rank*	*Country or area*	*Urbanization level (%) 2050*
1	Papua New Guinea	1.7	1	Rwanda	5.4	1	Burundi	13	1	Samoa	21.5
2	Burundi	1.7	2	Burundi	6.3	2	Papua New Guinea	13.2	2	Papua New Guinea	24
3	Lesotho	1.8	3	Nepal	8.9	3	Niger	16.4	3	Saint Lucia	26.6
4	Bhutan	2.1	4	Uganda	11.1	4	Malawi	16.9	4	Burundi	27.9
5	Rwanda	2.1	5	Malawi	11.6	5	Rwanda	17.2	5	Niger	28.4
6	Eswatini	2.2	6	Ethiopia	12.6	6	Samoa	18.2	6	Rwanda	29.6
7	Nepal	2.7	7	South Sudan	13.3	7	Sri Lanka	18.5	7	Tonga	29.8
8	Botswana	2.7	8	Solomon Islands	13.7	8	Saint Lucia	18.7	8	Antigua and Barbuda	31
9	Uganda	2.8	9	Burkina Faso	13.8	9	South Sudan	19.6	9	Sri Lanka	31.6
10	Mauritania	3.1	10	Lesotho	14	10	Nepal	19.7	10	Malawi	32

Source: World Urbanization Prospects: The 2018 Revision. UN-DESA.

Table 2.4: The 10 Fastest Urbanizing Countries or Areas: 1950-1990, 1990-2018, 2018-2050.

Rank	*Country or area*	*Urbanization rate (%) 1950-1990*	*Rank*	*Country or area*	*Urbanization rate (%) 1990-2018*	*Rank*	*Country or area*	*Urbanization rate (%) 2018-2050*
1	Botswana	6.8	1	Rwanda	4.1	1	Burundi	2.4
2	Mauritania	6.3	2	Bhutan	3.3	2	Nepal	2
3	Eswatini	5.5	3	Lao People's Dem	2.9	3	Malawi	2
4	Papua New Guinea	5.4	4	China	2.9	4	Ethiopia	2
5	Lesotho	5.2	5	Nepal	2.9	5	Uganda	1.9
6	Bhutan	5.1	6	Uganda	2.7	6	South Sudan	1.9
7	Oman	5.1	7	Burkina Faso	2.7	7	Papua New Guinea	1.9
8	Benin	4.8	8	Eritrea	2.7	8	Cambodia	1.8
9	Togo	4.7	9	Burundi	2.6	9	Niger	1.7
10	Gabon	4.5	10	Equatorial Guinea	2.6	10	Rwanda	1.7

Source: World Urbanization Prospects: The 2018 Revision. UN-DESA.

In contrast with the least urbanizing countries, there are countries with urbanization levels exceeding 90% as shown in *Table 2.5*. From the Table, there were only 3 countries in 1950 with urbanization levels exceeding 90% which increased to 12 in 2018 and is further projected to reach 24 by 2050. Among the most urbanized countries with a minimum population of 10 million

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inhabitants in 2018 are in Europe (Belgium, Netherlands), Asia (Japan) and in Latin America (Argentina). By 2050, more countries from all the world's regions will be part of this group.

Table 2.5: Countries or areas with more than 90% of their population residing in Urban areas: 1950, 1990, 2018, 2050.

Rank	*Country or area*	*Urbanization level (%) 1950*	*Rank*	*Country or area*	*Urbanization level (%) 1990*	*Rank*	*Country or area*	*Urbanization level (%) 2018*	*Rank*	*Country or area*	*Urbanization level (%) 2050*
1	Singapore	99.4	1	Singapore	100	1	China, Macao SAR	100	1	Kuwait	100
2	China, Macao SAR	96.9	2	China, Macao SAR	99.8	2	Kuwait	100	2	China, Hong Kong SAR	100
3	Belgium	91.5	3	China, Hong Kong SAR	99.5	3	Singapore	100	3	China, Macao SAR	100
			4	Kuwait	98	4	China, Hong Kong SAR	100	4	Singapore	100
			5	Belgium	98	5	Réunion	99.6	5	Réunion	99.9
			6	Guadeloupe	96.4	6	Qatar	99.1	6	Qatar	99.7
			7	Puerto Rico	96.4	7	Guadeloupe	98.5	7	Guadeloupe	99
			8	Qatar	92.9	8	Belgium	98	8	Belgium	98.9
			9	Guam	92.8	9	United States Virgin Islands	95.7	9	United States Virgin Islands	97.6
			10	Iceland	90.8	10	Uruguay	95.3	10	Uruguay	97.4
			11	Malta	90.8	11	Guam	94.8	11	Guam	96.8
			12	Israel	90.4	12	Malta	94.6	12	Netherlands	96.6
						13	Iceland	93.8	13	Malta	96.6
						14	Puerto Rico	93.6	14	Iceland	95.8
						15	Israel	92.4	15	Puerto Rico	95.7
						16	Argentina	91.9	16	Israel	95.4
						17	Japan	91.6	17	Jordan	95.3
						18	Netherlands	91.5	18	Luxembourg	95.1
						19	Luxembourg	91	19	Argentina	95.1
						20	Jordan	91	20	Gabon	95
									21	Oman	94.9
									22	Japan	94.7
									23	Lebanon	93.4
									24	Sweden	93.2
									25	Bahrain	93.2
									26	Martinique	92.6
									27	Brazil	92.4
									28	United Arab Emirates	92.4
									29	Denmark	92.3
									30	Dominican Republic	92
									31	Curaçao	91.9
									32	Venezuela	91.9
									33	Chile	91.8
									34	New Zealand	91.1
									35	French Guiana	91
									36	Australia	91
									37	Western Sahara	90.7
									38	Saudi Arabia	90.4
									39	Norway	90.2
									40	United Kingdom	90.2
									41	Costa Rica	90.1
									42	Finland	90

Source: World Urbanization Prospects: The 2018 Revision. UN DESA.

At the city level, urban population growth rates also differ substantially across countries and regions as presented in *Table 2.6*. From the Table, it can be seen that 7 out of the top 10 fastest growing cities in the world for the period 1990-2018 were in China, with only 1 each in Nigeria and India. However, for the projected period of 2018-2050, cities in Africa and India dominate the top 10 list. This slowing down in the growth rates of cities in China confirm the generally observable fact that rapidly growing cities are unable to maintain their growth momentum for a long time (UN-HABITAT, 2006; UN-DESA, 2018).

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Table 2.6: Population size and average annual growth rates of the fastest growing Urban agglomerations: 1990 - 2030.

Rank	Country	Region	Urban agglomeration	Population (thousands)			Annual growth rate (%)	
				1990	2018	2030	1990-2018	2018-2030
1	China	Asia	Shenzhen	875	11,908	14,537	9.3	1.7
2	China	Asia	Dongguan	552	7,360	8,279	9.2	1.0
3	Nigeria	Africa	Abuja	330	2,919	5,119	7.8	4.7
4	India	Asia	Malappuram	359	2,950	4,976	7.5	4.7
5	China	Asia	Zhongshan	393	2,872	3,302	7.1	1.2
6	China	Asia	Foshan	1,008	7,196	8,350	7.0	1.2
7	China	Asia	Huai'an	384	2,420	3,430	6.6	2.9
8	China	Asia	Suzhou, Jiangsu	1,067	6,339	9,389	6.4	3.3
9	United Arab Emirates	Asia	Dubai	473	2,785	3,315	6.3	1.5
10	China	Asia	Shantou	724	4,174	5,083	6.3	1.6
11	China	Asia	Xiamen	639	3,585	4,376	6.2	1.7
12	China	Asia	Yantai	422	2,359	3,135	6.1	2.4
13	China	Asia	Putian	311	1,712	2,529	6.1	3.3
14	Angola	Africa	Luanda	1,474	7,774	12,129	5.9	3.7
15	Mozambique	Africa	Matola	319	1,635	2,418	5.8	3.3
16	China	Asia	Ningbo	752	3,815	5,169	5.8	2.5
17	Indonesia	Asia	Bekasi	624	3,159	4,332	5.8	2.6
18	India	Asia	Kollam	346	1,670	2,557	5.6	3.5
19	Burkina Faso	Africa	Ouagadougou	537	2,531	4,426	5.5	4.7
20	Cameroon	Africa	Yaoundé	777	3,656	5,734	5.5	3.8
21	China	Asia	Nanning	790	3,628	4,734	5.4	2.2
22	China	Asia	Nantong	470	2,123	2,828	5.4	2.4
23	India	Asia	Thrissur	615	2,774	4,221	5.4	3.5
24	China	Asia	Shaoxing	525	2,350	3,200	5.4	2.6
25	India	Asia	Surat	1,466	6,564	9,711	5.4	3.3
26	Ghana	Africa	Kumasi	696	3,065	4,681	5.3	3.5
27	China	Asia	Handan	575	2,528	3,423	5.3	2.5
28	China	Asia	Zhengzhou	1,134	4,940	6,669	5.3	2.5
29	China	Asia	Hangzhou Changzhou	1,666	7,236	9,260	5.2	2.1
30	China	Asia	Jiangsu	784	3,372	4,526	5.2	2.5

Source: World Urbanization Prospects: The 2018 Revision. UN DESA.

2.5 Perspectives on Urbanization

Here, the study identifies some of the most common perspectives on urbanization in the urban economics literature and discuss their roles in enhancing understanding of the urban phenomenon and the urbanization processes across time and space.

2.5.1 The Demographic Perspective of Urbanization

This view point see urbanization as an inevitable outcome of the demographic transition and the linkage between the two is evidenced by a systematic trend whereby less developed countries also tend to be less urbanized with higher birth rates (Preston, 1979; Dyson, 2011; Potts, 2012; Lesthaeghe, 2014; Haase *et al.*, 2018). However, as the country develops economically, its urbanization level increases as more of its population tend to reside in urban areas with a

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demographic implication of a fall in intrinsic birth rates (Lesthaeghe, 2014). This perspective asserts that the currently rapidly urbanizing cities in Asia and Africa can be seen as being in the early stages of the demographic transition, whereas cities in North America and Europe can be thought of as reaching the later stages of the demographic transition.

Another demographic perspective of urbanization has to do with de-urbanization or counter-urbanization, which is usually referred to as urban shrinkage, whereby the net growth rates of cities are negative. In general, urban shrinkage is not a new demographic phenomenon as several ancient cities such as Rome, Istanbul and Baghdad have undergone many cycles of growth and shrinkage (Glaeser, 2013; Haase *et al.*, 2018). The United Nations' *"World Urbanization Prospects: The 2018 Revision"* provides details on relatively recent and projected urban shrinkage worldwide. *Figure 2.9* shows the shrinking numbers of urban agglomerations worldwide with a minimum population of 300,000 in 1970-2030. From the Figure, 63 cities mainly located in the United Kingdom, Germany and the United States of America experienced urban shrinkages between 1970-1990, and the figure rose to 95 cities between 1990-2018 for cities mainly located in the Russian Federation, Ukraine and other European countries.

Most of the cities undergoing urban shrinkages, especially since 2000, are in the low-fertility countries of Asia (Japan and the Republic of Korea) and Europe (Poland, Romania, the Russian Federation and Ukraine). Also, around the world, several capital cities such as Bucharest in Romania, Colombo in Sri Lanka, La Habana in Cuba, Riga in Latvia and Yerevan in Armenia have all undergone urban shrinkage. In general, the proportion of cities with a minimum population of 300,000 that are experiencing urban shrinkage have remained steady at about 10% during 1970-2018 period (UN-DESA, 2019a). However, current projections indicate that only about 5% of such cities globally will experience populations decline from 2018-2030 as indicated in *Figure 2.9.* It

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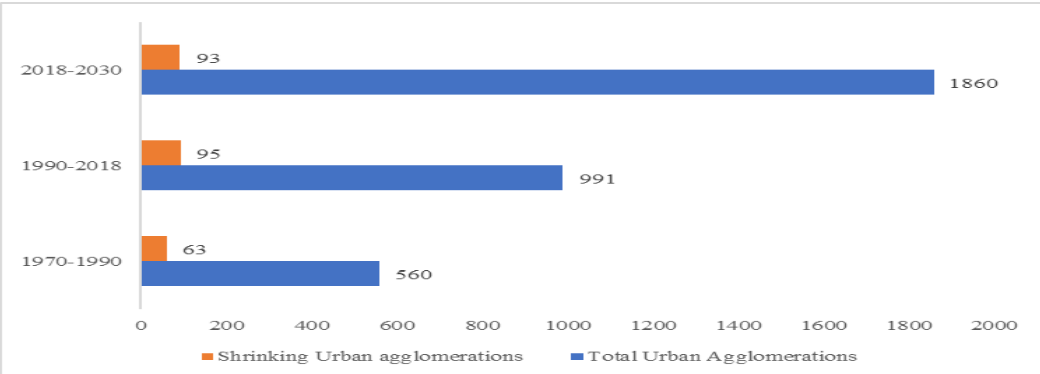
is also estimated that for all city size classes, about 350 to 400 cities worldwide are shrinking (Haase *et al.* 2018). The most readily identifiable factors underlining the demographic decline of cities worldwide include low fertility, economic decline, natural disasters and emigration.

Figure 2.9: Total and Shrinking Urban agglomerations: 1970-2030.



Source: Compiled from the World Urbanization Prospects: The 2018 Revision. UN- DESA.

Another demographic perspective of urbanization is the increasing urban footprint. In many urban areas, the growth of the urban population has usually lagged behind the physical expansion of the urban area leading to declining urban population densities (McGranahan & Satterthwaite, 2014; UN-Habitat, 2016; Bai *et al.*, 2017). Globally, the urban built-up land is estimated to be growing at twice as fast as the urban population with a near tripling in the urban land area predicted between 2000 and 2030 (United Nations, 2019). A related feature of the increasing urban footprint, is the steady decline in the average household size in urban areas (Haase *et al.* 2018).

The occurrences of these two demographic phenomena viz. the increasing urban footprint and the declining average household size in urban areas, have had two different consequences on the urban landscape in the developed world vis-a-vis that of the developing countries. In most developed countries, the increasing per capita living space in the urban areas has significantly influenced the spatial growth of cities. For developing countries, the increased spatial growth of cities has exacerbated an already existing precarious situation of urban housing shortage and has resulted in

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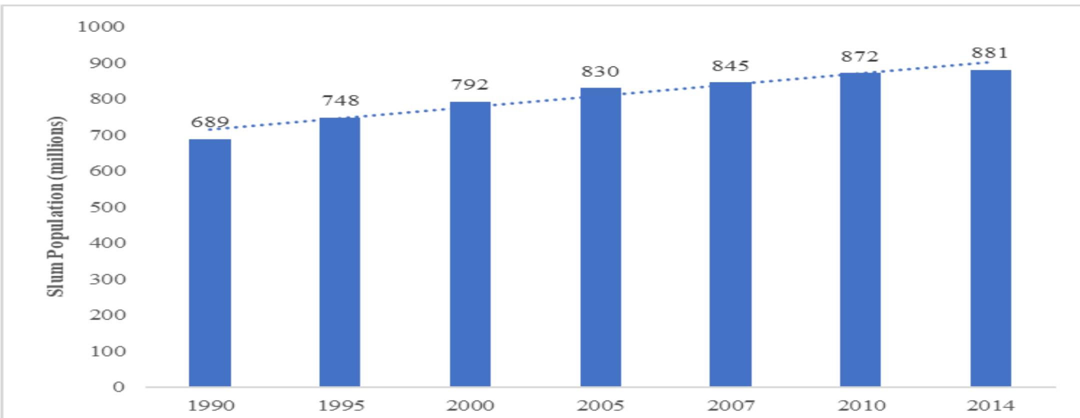
large slum populations. In fact, the predominant global perspective on urbanization in developing countries during the mid-twentieth century was principally defined in terms of a housing crisis, with slum population being its primary symptom (Rudd *et al.*, 2018). Studies show that a growing large number of residents live in slums in the developing world as shown in *Figure 2.10*. As depicted in the Figure, from being 689 million in 1990, slum dwellers increased to 792 million in 2000 and then to over 881 million in 2014.

Figure 2.10: Urban Slum Population in the World's Developing Regions: 1990-2014.



Source: Compiled from World Cities Report 2016. UN-Habitat.

2.5.2 The Spatial Perspective of Urbanization

In-as-much as global urbanization is a demographic phenomenon, it is also a physical one, and in recent times, there has been an increased interest in understanding the spatial patterns of global urbanization at the regional, country and city levels. However, there is limited theoretical knowledge in explaining the spatial configuration of large urban areas, and the few that exist often originate from urban planning and architecture with primary emphasis on intra-urban patterns and shapes (Haase *et al.* 2018). This trend is changing, albeit, slowly as several studies are now beginning to throw more light on the global patterns of the actual urban built-up landscape and how it is changing over time.

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Due to the climatic and geographical differences as well as resource-related opportunities and constraints, urban land is unequally distributed across the globe. Much of the urban spatial expansion over the past three decades have occurred along coastlines and low-lying coastal regions which are below 10 metres elevation and are therefore highly vulnerable to both natural disasters (cyclones, floods, tsunamis, droughts, earthquakes, landslides, volcanic eruptions) and climate change (UN-HABITAT, 2016; UN-DESA, 2019a). For instance, being only 2% of the world's total land area, low-elevation coastal zones contain 13% of the global urban population and a predicted 1 metre rise in sea levels would constitute a great risk to many inhabitants of coastal megacities like Miami, New York, Tokyo, Shanghai, Guangzhou, Bangkok, Rio de Janeiro, Mumbai, Dhaka, Cairo and Lagos (Seto *et al.*, 2011; UN-Habitat, 2016).

Urbanization is largely seen in modern times as the most important spatial transformation phenomenon. Its effect on the natural environment such as land use, land cover, biodiversity and the functioning of the ecosystem at the local, regional and global levels are profound, multifaceted and far reaching (Bai *et al.*, 2017). In general, the transformative effect of urbanization on the natural environment can be seen in two ways, and none is without environmental concerns (McGranahan & Satterthwaite 2014). While demographic urbanization transforms an open and sparsely human populated rural area into a populated urban area, landscape urbanization works by transforming a vegetated rural landscape into a built-up urban area (Seto *et al.*, 2012). Such a recognition of the risks posed by urbanization on the natural environment helps to explain why urbanization has been inextricably linked to sustainable development (Satterthwaite, 2010; United Nations, 2015; Bai *et al.*, 2017; Rudd *et al.*, 2018).

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2.5.3 Urbanization and Sustainable Environment Perspective

Another perspective of global urbanization has to do with the impacts of urbanization on the environment. In our increasingly urbanizing world, cities are known to be the main drivers, bearers and solutions to environmental changes at the local, regional and global levels (Grimm *et al.*, 2008). City dwellers worldwide rely on the productive and absorptive capacities of the environment well beyond the ecological footprints of the city for the goods and services and energy resources used to sustain the human, animal and plant lives in the urban areas. However, the predominant global conception of the environmental impact of urbanization is largely negative.

Historically, excessive environmental resource consumption in ancient cities by the urban elite led to severe degradation of environmental resources and the ultimate collapse of otherwise successful societies such as the salinization in 3rd millennium BCE Mesopotamia (Grimm *et al.* 2008). Also, in this and the past century, large urban agglomerations are known for their excessive per capita consumption of environmental resources. For instance, in 2008, the world's cities accounting for less than half of the world's total population and occupying less than 3% of the earth surface, generated about 78% of global carbon emissions, 60% of residential water use and 76% of wood used for industrial purposes, with the latter being a major cause of deforestation of the world's tropical rainforests (Grimm *et al.* 2008).

The environmental impacts of rapid urbanization have been found to be profound and far reaching and often outpacing the population growth at the respective city, regional and national levels (Bai *et al.* 2017). In general, the literature on the environmental impact of urbanization focuses on six main core aspects, namely, land use, air pollution, water pollution, ecosystems, solid waste management and climate change (Bai *et al.* 2017). Through these core aspects, urbanization has been found to have a negative impact on the environment, with varying patterns and magnitudes

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over time. Suggestive evidence show that the actual environmental impact of urbanization is dependent on the interlinkages between the economic, social, physical and the environmental factors underlying the urbanization processes (Bai *et al.*, 2017).

Albeit, urbanization is generally seen to have negative impacts on the environment, there has been increasingly changing global perception in recent decades towards focusing on the opportunities and solutions that urbanization can offer to the environment. With their enormous financial, technological and cultural capacities, cities are now rightly recognized as having the highest potential to bring about the needed environmental changes so as to empower the planet's transition to sustainability (Grimm *et al.*, 2008; McPhearson *et al.*, 2016; Alberti *et al.*, 2018). Many of the world's cities are now positioned at the fore front of global environmental sustainability issues such as the 2030 Agenda for Sustainable Development, the New Urban Agenda of the UN Habitat and the Paris Climate Change Agreement (Bai *et al.*, 2017). In fact, the inclusion of the SDG 11 in the 2030 Agenda for Sustainable Development is largely seen by urban sustainability stakeholders as a broad international consensus aimed at legitimizing sustainable urban development for all income groups in the world (Rudd *et al.* 2018).

2.5.4 The Ageing Perspective of Urbanization

The ageing of the global population and more especially the urban population is recognized as one of the four demographic mega-trends in the twenty-first century, as it is the fastest growing segment of global population, estimated at about 3.3% per annum (UN-HABITAT, 2016; UN-DESA, 2017, 2019a). The increasing longevity and declining fertility are resulting in ageing (people aged 60 or above) global population and the urban planet. These trends are stronger and readily observable in cities around the world where women are relatively more educated, more

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financially independent, give birth at a much older age and also single-parenting is prevalent (Haase *et al.* 2018). Estimates show that in 1950 only 8% of the world's population was aged, and this increased to 10% in 2000, 13% in 2017 and by 2050 all regions of the world except Africa will have at least a quarter of their population being 60 years and over with most of them living in urban areas (UN-HABITAT, 2016; UN-DESA, 2017).

The differences in the levels and rates of urbanization across time and space are amply reflected in the global distribution of the ageing population. In the world's developing regions (excluding Africa), the aging index (defined as the number of people older than 60 years of age for every 100 children younger than 15 years old) is projected to almost quadruple from 23 in 2017 to 89 by 2050, and that for the developed regions will also increase from 106 to 215 within the same period (Haase *et al.* 2018). Africa stands out as an exception to all the other regions of the world, whereby the proportion of its aged population is forecasted to rise from a very low figure of 5% in 2017 to only about 9% in 2050 (UN-DESA, 2017). Furthermore, regardless of the geographical region and the level of development of the country in which a city is located, it is readily observable worldwide, that older women tend to outnumber older men as women tend to live longer than men.

2.5.5 The Renewed Perspective of Urbanization

As has been pointed out from the onset, there are multiple dimensions to the concept of urbanity, reflecting the diverse conceptual and methodological perspectives on the phenomenon, often under-laid by differences in ideologies and interests (Parnell *et al.*, 2018). The multiplicity and diversity of the urban concept equally attract researchers from multiple and diverse fields of study such as the natural system sciences, the design profession and economics. Such rich diversity in urban studies provides a fertile ground for the introduction and nurturing of new and renewed

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methodologies, conceptualizations and perspectives to amply characterize the dynamics of the urbanization processes (Bai *et al.*, 2017; Haase *et al.*, 2018).

This has led to a growing consensus in the literature that the classical analytical approaches of land-use classifications along rural-urban gradients are insufficient for research and policy planning and analysis (Dyson, 2011; McGranahan & Satterthwaite, 2014). This observed deficiency is prevalent in the nascent areas of urban growth, and more especially in the context of the developing world where urban pockets could be found located within rural landscapes and villages located within cities (Bai *et al.*, 2017). Thus, urbanity should be seen as a continuum to be applied beyond cities boundaries and also extendable to include the dynamic processes that connect people and goods and services from distant and multiple locations (Seto *et al.*, 2012).

Cities are situated in specific geographical location; however, they are described as global entities as their influence reach far beyond their immediate proximity. The concept of global cities which originates from urban studies succeeds from the idea that global urbanization can best be understood as a phenomenon that is mainly created, facilitated and enacted in strategic geographic locations. Therefore, cities that are global key players are seen to be the key nodes in a hierarchical network of global system of finance, transport, trade and communication (Haase *et al.* 2018). Such cities that become global players attract high skilled labour, technology and huge financial inflows to become highly productive, whereas “non-global” cities are usually saddled with declining industries and brain drain (Cohen & Simet, 2018).

Also, there has been a growing concern for the use of an integrated systems perspective in urbanization research and practice. Recent literature shows some considerable improvement in the conceptual understanding of urbanization as people-centered, multi-faceted, dynamic and complex social, environmental and technological processes with multiple actors, structures, functions and

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interlinkages at the city, country, regional and global levels. However, this is not adequate as most of these studies have too narrow, distinct and diverse focus and are disciplinary-rooted (Bai *et al.*, 2017; Parnell *et al.*, 2018). Hence, there is a compelling need to adopt integrated systems and multi-disciplinary approaches to the study of urbanization.

2.5.6 Cities as Complex Systems Perspective

The first human settlements appeared about 10,000 years ago, and ever since, many scholars have tried to understand how cities emerge, function, persist or collapse, however, the formal conceptualizations and the empirical study of cities and urban systems are nascent, being only over the last century (Alberti *et al.*, 2018). In general, cities are complex and highly dynamic and integrated systems that exhibit emergent properties characterized by spatial heterogeneity and multiple feedbacks between the various components (McPhearson *et al.*, 2016). These make cities very difficult to understand and govern, with some writers going as far as referring to cities as "problems of organized complexity" (Desrochers & Hospers, 2007).

There is urgent need to adopt a complex systems approach to understanding the complexities of the urbanization processes and patterns and its key drivers and impacts. Taking a complex systems approach to studying urbanization will involve a paradigm shift from the traditional view of cities as social and technological systems to viewing cities as complex social, ecological and technological systems (SETs), that are linked by the interactions and the joint evolution of the built systems, social systems and living systems (McPhearson *et al.*, 2016; Alberti *et al.*, 2018).

Over the last century, scholars from various disciplines have advanced theories to explain the complexity, dynamics and diversity of the urban phenomenon. Despite being able to describe an array of urban phenomena, they are unable to provide a broad explanation on the evolution, growth,

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persistence and collapse of cities (Alberti *et al.*, 2018). Three reasons account for this. First, such theories have been developed separately in various study domains often without collaborations with other disciplines. Second, the theoretical conceptualizations often preceded the empirical investigations of the urban systems. Third, there was a predominant viewpoint that humans and the natural systems were essentially separate and different from each other.

The recognition and understanding that urbanization is a coupled system of human and ecosystem is nascent and particularly occasioned by the emergence of the new urban ecology, which endeavors to unify the various disciplinary approaches to provide a progressive understanding of cities as intertwined SETs (Grimm *et al.*, 2008; McPhearson *et al.*, 2016; Bai *et al.*, 2017; Alberti *et al.*, 2018). Given the complexity and dynamics of the urban systems, which often present new challenges that require new information, approaches and mechanisms to understand; a multi-disciplinary study can be seen as the required and fundamental systems approach towards a new and better way of achieving complex urban goals such as improved urban resiliency and sustainability (McPhearson *et al.*, 2016). This calls for a new level of collaborations among researchers from all the various urban studies related disciplines such as architecture, economics, ecology, geography, planning, political science, sociology and others, to help develop urban ecological study into the required new urban science (Alberti *et al.*, 2018).

2.6 Overview of the Main Variables under Study

This section presents an overview of the data trends of the main variables under study for the sample of up to 30 SSA countries for the period 1960-2019. The focus is on the level and changes in urbanization, GDP per-capita level and growth, and the poverty indices variables namely poverty headcount ratio (poverty incidence) and poverty gap. Also, the trends in the sectoral

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composition of GDP namely agriculture, industry and services and the selected main demographic variables viz. population growth, fertility and life expectancy are analyzed. Furthermore, in order to situate the discussion in this section in a proper contextual framework, the trends in the variables for the SSA region are compared to the corresponding regional and/or global trends.

2.6.1 Urbanization

The dynamics of urbanization in the sample of SSA countries have continued to evolve substantially over the period 1960-2019. Specifically, the number and proportion of people living in cities have all increased. *Figure 2.11* presents the trends in urbanization level and changes in urbanization (urbanization rate) for the sample of 30 SSA countries.[5] The Figure shows that all the countries in the sample experienced increasing urbanization level over the study period. However, at the regional level, SSA is the world's least urbanized with an estimated urbanization level of 43% as compared to the global average of 55% in 2018 and is home to only about 548 million of the global urban population of 4.2 billion (UN-DESA, 2019b). Although, medium-variant projections show that by the middle of the century, SSA's urban residents will be 1,489 million, representing an increase in the region's share of global urban population from 13% in 2018 to 23% by 2050, SSA will still remain the world's least urbanized region (UN-DESA, 2019b).

Also, from *Figure 2.11*, it can be seen that for most countries in the sample, the rate of urbanization generally experienced a decline over the study period. Nonetheless, for countries such as Lesotho, Mozambique, Rwanda and Uganda, the rate of urbanization initially increased before declining. SSA being the world's least urbanized is conversely, also the world's fastest urbanizing region, with an average annual urbanization rate over the period 1950-2019 of 1.91% as compared to

[5] See Appendix A for the various sources of data for Figures 2.11-15 and Appendices B1 and B2 for the list of selected SSA countries.

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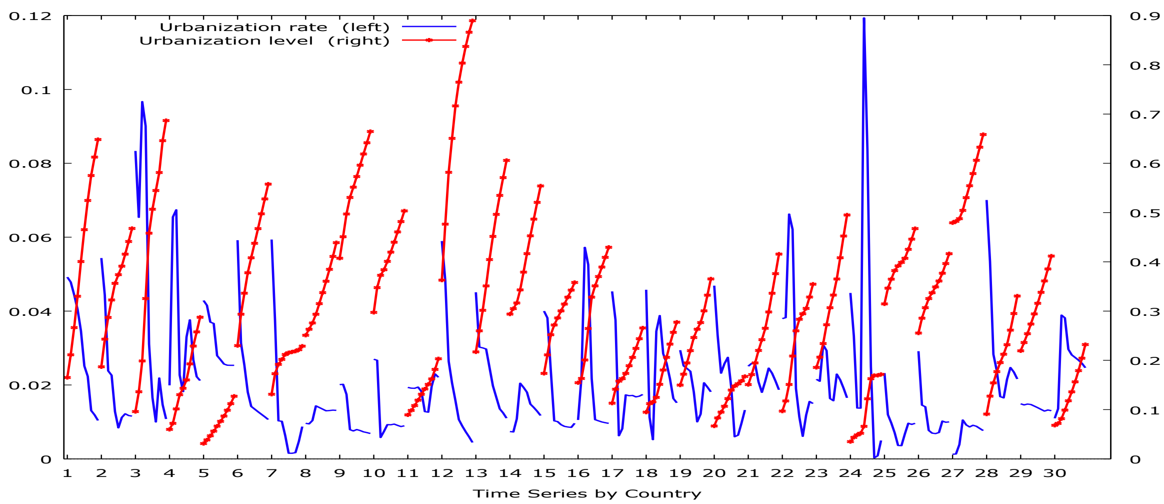
0.91% for the world (McGranahan & Satterthwaite, 2014). More so, projections for 2020-2050 show SSA's annual urbanization rate to be 1.03%, which is markedly higher than the world's average of 0.57% (McGranahan & Satterthwaite, 2014). Also, at the country level, it is estimated (projected) that 6 (7) out of the world's 10 fastest urbanizing countries for the period 1990-2018 (2018-2050) are in SSA and these countries are also among the world's least urbanized (UN-DESA, 2019b).

Figure 2.11: Urbanization trends in the sample of Sub-Saharan African countries: 1970-2019.



2.6.2 GDP per-capita

The time series plot in *Figure 2.12* presents the trends in both the average annual growth rate and level of per-capita GDP in the sample of SSA countries. The Figure shows that considerable variations in the growth rates of GDP per capita existed for all countries in the sample. Nevertheless, the general trend in the per-capita GDP growth in recent years shows an increase for almost all the countries in the sample and this is reflected in a steady increase in the level of per-capita GDP over the same period. However, a comparative analysis of the average annual growth rate of GDP per-capita amongst the world's three poorest regions namely East Asia and Pacific;

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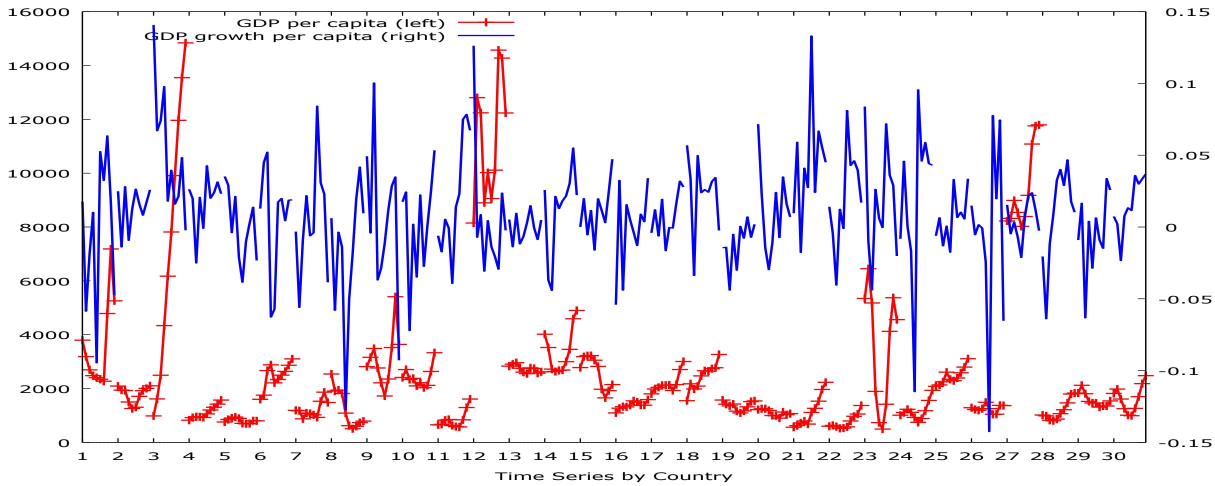
South Asia; and SSA show that the per capita growth rate of GDP for SSA has been the lowest since 1990. For instance, between the period 1990-2015, the growth rate of per-capita GDP for the East Asia and Pacific region was between 5%-10% and that for South Asia was 5%-6% as compared to SSA's figure which rarely exceeded 5% (UN-DESA, 2019c).

Figure 2.12: GDP per-capita level and growth rate in the sample of Sub-Saharan African countries: 1970-2019.



2.6.3 Sectoral Composition of GDP

The sectoral composition of GDP as presented in *Figure 2.13* generally show a declining trend over the study period for the agriculture sector for most countries in the sample. The falling trend in the Agriculture share is in line with the economic structural transformation literature whereby economic growth and development results in structural shifts in the production activities of the economy from agriculture to industry and services (Annez & Buckley, 2009; Spence *et al.*, 2009; Gollin, 2018). However, the trend in both Industry share and Services share do not show a clear pattern consistent with the structural transformation literature.

Notwithstanding, a comparison the two non-agricultural shares show that Services share generally show an upward trend over the study period relative to Industry share. This observation supports

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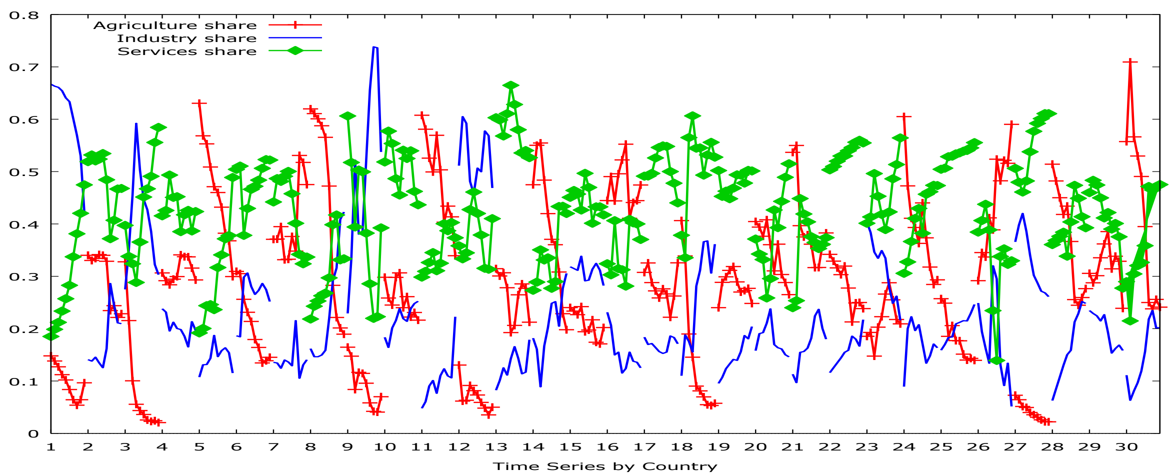
the often-argued viewpoint that most countries in SSA skipped the industrialization phase of the economic development resulting in a relatively under-developed and declining industry sector as compared to the booming services sector (Jedwab, 2013; Gollin *et al.*, 2016).

Figure 2.13: Sectoral GDP shares in the sample of Sub-Saharan African countries: 1970-2019.



2.6.4 Demography

As pointed out in the beginning of this section, there are three demographic variables in the study and their trends over the study period 1960-2019 are presented in *Figure 2.14*. The Figure shows widespread decline in the Fertility rate for all countries. This trend is also observable at the regional level. For instance, SSA's level of fertility declined from 6.3 live births per woman in 1990 to 4.6 in 2019, however, the latter figure was still about 1.8 times higher than the global average of 2.5 in 2019 and the highest in all the 8 SDG regions (UN-DESA, 2019c).[6] Also, notwithstanding the medium-term projections showing a continuous and profound decline in fertility in SSA, it is still expected to be above the world's average well into the next century. For instance, the level of

[6] The 8 geographic/SDG regions according to the United Nation's *"World Population Prospects 2019"* are: Australia/New Zealand, Central and Southern Asia, Europe and Northern America, Latin America and the Caribbean, Northern Africa and Western Asia, Oceania, Eastern and South-Eastern Asia, and Sub-Saharan Africa.

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fertility in SSA (World) is projected to decline to 3.1 (2.2) lives per woman by 2050 and then to 2.1 (1.9) by 2100 (UN-DESA, 2019c).

Conversely, the general trend for Life expectancy at birth is a steady increase for most countries during the study period as shown in *Figure 2.14*. Here again, SSA's life expectancy at birth for both sexes of 61.1years lags clearly behind the global average of 72.6years and the projected increase to 68.5years by 2050 for the sub-region is also significantly below the corresponding world average of 77.1years (UN-DESA, 2019c). The high levels of maternal mortality and child mortality are, *inter alia*, contributory factors to the low life expectancy at birth in SSA.

Among the three demographic variables, Population growth shows the greatest variability over the study period as depicted in *Figure 2.14*. The growth rate of the population in SSA and other developing countries between 2015-2020 is forecasted to be 2.3% per annum, a figure which is 2.5 times higher than that for the rest of the world (UN-DESA, 2019c). In fact, SSA is the only region in the world expected to sustain its population growth momentum into the next century.

Consequently, of the 2 billion people estimated to be added to the global population over the period 2019-2050, SSA is projected to account for 52% of this increase (UN-DESA, 2019c). Particularly, SSA features 4 countries namely Democratic Republic of Congo, Ethiopia, Nigeria and Tanzania out of the 9 countries worldwide that are forecasted to contribute in excess of 50% to the projected global population increase by 2050. Also, SSA is projected to be the world's most populous by 2062, and its population size by 2100 is forecasted to be 3.775 billion, exceeding that of Central and Southern Asia (2.334 billion) and Eastern and South-Eastern Asia (1.967 billion) which are currently the world's first and second most populous regions respectively (UN-DESA, 2019c).

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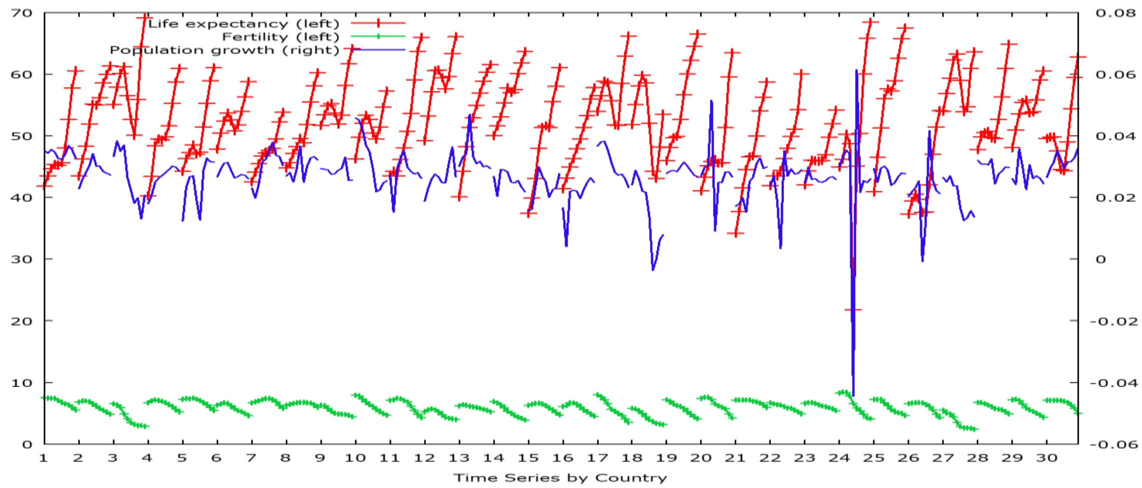
Figure 2.14: Demographic trends in the sample of Sub-Saharan African countries: 1970-2019.



2.6.5 Poverty Indices

Global extreme poverty measured as income/consumption less than the International Poverty Line of US$1.90 a day in 2011 purchasing power parity has been reducing steadily since 1990 such that in 2015 the world achieved a milestone of having the lowest extreme poverty in recorded history. Particularly, the global extreme poverty incidence (headcount) declined from 35.9% (1,895 million) in 1990 to 10% (736 million) in 2015 (World Bank, 2018). However, a comparative analysis of the poverty trends at the world's 6 regions show an uneven progress.[7]

For example, in 1990, SSA was the world's 2nd poorest region in terms of extreme poverty rate (54.3%) and 3rd in the number of people living in extreme poverty (277.5 million) as compared to the 61.6% extreme poverty rate and 987.1 million extremely poor people living in East Asia and Pacific which by then, was the world's poorest region (World Bank, 2018). However, by 2015, East Asia and Pacific's extreme poverty rate (number of extreme poor) declined to 2.3% (47.2 million) as compared to 41.1% (413.3 million) for SSA (World Bank, 2018). Clearly, as compared

[7] The six (6) regions are namely Europe and Central Asia, East Asia and Pacific, Latin America and the Caribbean, Middle East and North Africa, South Asia and Sub-Saharan Africa.

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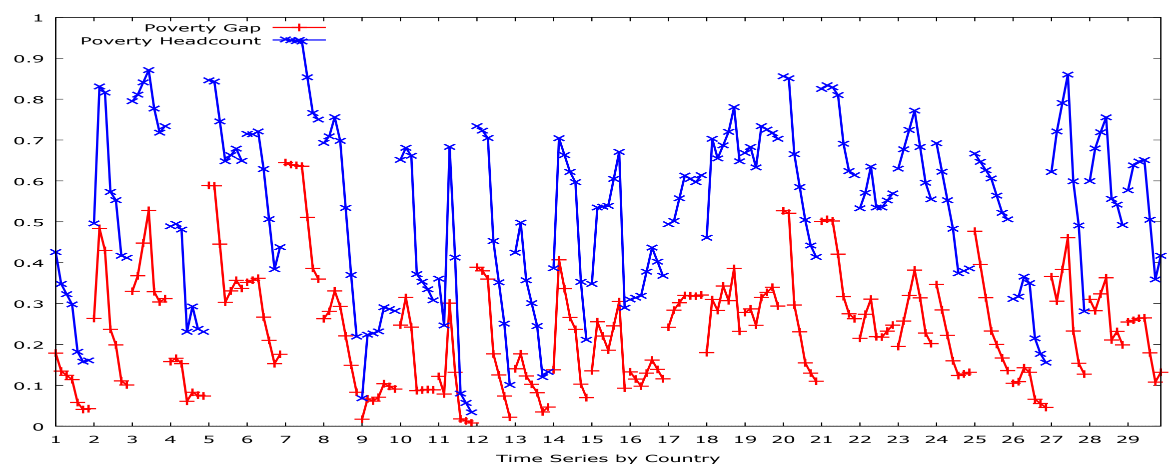
East Asia and Pacific, SSA's poverty reduction performance over the period 1990-2015 has been abysmal. More so, whereas the poverty rate has been declining significantly for all the 6 regions of the world since 1990, the number of people living in extreme poverty in SSA has rather increased substantially by about 49% over the period 1990-2015.

Figure 2.15 depicts the trend in both the Poverty Headcount and the Poverty Gap indices for a sample of 29 SSA countries. The Figure shows a general pattern of declining poverty indices for most countries. However, there are some countries in the sample with notably high poverty indices. According to the World Bank (2018), countries in SSA with relatively high poverty rates include Central African Republic (77.7%), Madagascar (77.5%), Burundi (74.7%), Democratic Republic of Congo (72.3%) and Malawi (69.6%). Similarly, those with comparatively high number of extreme poor include Nigeria (86.5 million), Democratic Republic of Congo (55.1 million), Ethiopia (27 million), Tanzania (21.9 million) and Madagascar (18.8 million).

Figure 2.15: Poverty indices in the sample of Sub-Saharan African countries:1985-2019.



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CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

This chapter generally provides a review of both the theoretical and empirical literature on urbanization and economic growth on one hand and urbanization and poverty on the other hand. The first two sections review the theoretical literature on urbanization as an engine of growth and urbanization as a product of growth. The third section focuses on the theoretical literature on urbanization and poverty. The fourth and fifth sections respectively reviews the empirical literature on urbanization-led growth and growth-led urbanization. The last section of the chapter focuses on the empirical literature on urbanization and poverty.

3.2 Theoretical literature on Urbanization and Economic Growth

The vast body of theoretical knowledge beginning with Adam Smith (1776) widely recognize and support the viewpoint of a positive relationship between urbanization and economic growth and development (Smith, 2007). The stylized facts of urbanization being associated with both rapid economic growth and the structural transformation of the economy is evidenced by the ancient urbanization of Rome, Baghdad and Kaifeng and the old urbanization of Europe and North America in the 19th century (Lewis, 1954; Quigley, 2008; Spence et al., 2009; Glaeser, 2013; Gollin et al., 2016). For a long time, this stylized fact seemed to have made the positive correlation between urbanization and economic growth difficult to challenge, let alone refute. Therefore, in most cases, the source of the debate and the related divergent viewpoints in the literature are rather on the causal direction between urbanization and economic growth.

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Nevertheless, in the 20th century, rapid urbanization rates have and continue to occur in SSA and other developing countries in the Asian and Latin American regions without the envisaged structural transformation and/or rapid economic growth rates with some countries experiencing sluggish and even negative growth rates. These occurrences, which have led to the highlighted phenomena of "urbanization without growth" by Fay & Opal (2000) and "poor country urbanization" by Glaeser (2013) have both received much traction in the literature. This phenomenon has generally been described as a puzzle and consequently regenerated interest among various stakeholders such as multinational organizations, policy makers and researchers largely beginning in the last two decades. The primary objective has been to reappraise both the urbanization-economic growth nexus as well as urbanization's role in growth and development, especially in developing countries (Henderson, 2003a; Polese, 2005; Brülhart & Sbergami, 2009).

The extant theoretical and empirical literature on the urbanization-economic growth nexus can be largely categorized into three key observations. One, the phenomenon of urbanization is seen to cause the growth of national economies. Proponents argue that the growths of cities per se spur economic growth via urban agglomeration economies and scale economies by means of knowledge, technological, information and innovation spillovers and the decline in the cost of transportation all resulting from close proximity combine in various ways to increase productivity of the factors of production, hence, economic growth (Quigley, 1998; Gallup *et al.*, 1999; World Bank, 1999; Fujita *et al.*, 2003; World Bank, 2009).

Two, urbanization is conversely seen as resulting from economic growth and development. Here, adherents regard urbanization as a by-product of economic growth and development as the national economy transition's from the dominance of the agriculture sector to an industrialized and services-based modern economy (Fay & Opal, 2000; Henderson, 2003a; Polese, 2005; Liddle,

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2017). The role played by various government policies, programmes and strategies are known to be critical in this economic structural transformation process. The usual argument here is that economic growth is boosted by sound policies pursued explicitly and consistently by governments that are primarily aimed at promoting the growth and development of their respective national economies through performance improvement in the city economy such as institutional capacities development; infrastructure investment; favoritism of primate cities and urban producers and consumers; and many others (Ades & Glaeser, 1995; World Bank, 1999; Quigley, 2008; Glaeser, 2013; Glaeser & Henderson, 2017; Henderson & Kriticos, 2017). Subsequently, the improved city economic performance results in rapid increases in both internal and external immigrations into the city culminating in urbanization.

Three, another viewpoint in the literature is the assertion that the urbanization-economic growth nexus is largely ambiguous. Proponents maintain that across various times and space, rapid and continuous urbanization has occurred along-side sluggish or negative economic growth performances. Here various factors other than growth, primary among which are demographic factors, globalization and natural resource endowments are seen to cause urbanization, especially in SSA and most countries in the developing world (Preston, 1979; Dyson, 2011; Potts, 2012; Lesthaeghe, 2014; Haase *et al.*, 2018).

As has already been pointed out, there is a consensus in both the theoretical and empirical literature about the positive relationship between the level of urbanization and economic growth and development. Both economic development and urbanization go hand-in-hand as no country in the history of the world has ever achieved a middle-income status without a substantial level of urbanization (Annez & Buckley, 2009; Henderson, 2010). However, the existence of a positive correlation between urbanization and economic growth and development does not imply causation.

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Hence, at the heart of the debate is the direction of causation, consequently, the study expands on the two dominant strands of thought in the literature.

3.2.1 Theoretical literature on Urbanization as an engine of Growth

Majority of the extant theoretical literature is in support of the traditional viewpoint of a causal relationship between urbanization and economic growth proceeding from urbanization to economic growth. Historically, cities have been known and still continue in the contemporary times to play crucial roles in the social, economic, political and many other facets of development of their corresponding national economies. Accordingly, cities have commonly been described as engines of economic, social and political growth and development. A perusal of the theoretical literature points to the fact that the notion of cities being causes of economic growth originated from Adam Smith following the publication of his Wealth of the Nations in 1776 (Smith, 2007; Brülhart & Sbergami, 2009). However, in the modern times, this proposition is mostly linked to the pioneering work of Jane Jacobs, commencing in 1969 and principally aimed at demonstrating the economic growth promotion effect of cities (Polese, 2005; Desrochers & Hospers, 2007).

Subsequently, this notion of urbanization-led economic growth has frequently been fueled by the new growth theory, new urban economics and the new economic geography literature, showing how the gains from internal and external economies of scale (i.e. agglomeration economies) can impact on growth (Gallup *et al.*, 1999; Polese, 2005; World Bank, 2009). Thus, given that endogenous growth is dependent on education, technological innovation, knowledge spillovers and sharing, and since close spatial proximity plays an important role in spillovers, it implies that much of the agglomeration economies in the form of interaction, mimicry and sharing must occur in cities (Polese, 2005). At the basic level, the economies of agglomeration can be defined to

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encompass both the internal and external efficiency improvements and consumption gains respectively from the spatial cluster of firms and people.

In the academic literature, the notion that cities cause growth and development is deeply rooted and can therefore not be ignored (Baldwin & Martin, 2004; World Bank, 2009). So, the natural and fundamental question to ask is how are cities able to contribute substantially to growth? Asked differently, why do people and economic activities tend to be concentrated in locations that are characterized by cities? The answers to these questions which usually centers on the existence of economies of scale or localized aggregate increasing returns, provide a rationale for the existence of cities (Duranton & Puga, 2004; Quigley, 2008; UN-HABITAT, 2016). Some compensating benefits in the form of both static and dynamic agglomeration economies have been identified to be associated with the geographic concentration of consumers and firms, which further provide impetus for urbanization (Rosenthal & Strange, 2004; Duranton, 2008; Quigley, 2008; Venables, 2008; Annez & Buckley, 2009).

Globally, cities are known to facilitate all types of external and internal economies. An important historical example of external economies is the reduction in transport costs. Historically, the reduction in the costs of transport in delivering both inputs and outputs helps to explain why many large cities of the world developed along waterways and trade routes (Davis & Henderson, 2003; Duranton & Puga, 2004; Quigley, 2008). For instance, out of the 19 largest cities across the globe, 14 are located close to a large water body which connects them to the local, regional and global trade (UN-HABITAT, 2008). As seen from the long perspective of history worldwide, the low cost of transport associated with cities located along the coast, major rivers banks and great lakes have enabled them to continuously dominate their local and regional urban landscape, and it is even said that coastal megacities were vital to the industrial revolution of Western European

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countries and in the United States as well as the development of Asian countries such as Japan and China (Annez & Buckley, 2009; Glaeser & Henderson, 2017).

The internal agglomeration economies are in the form utility gains from a variety of consumption and increased productivity resulting from specializations, large scale productions, reduction in transactions cost, production complementarities and many others (Quigley, 2008; Venables, 2008; Lall *et al.*, 2019). For instance, the high labour productivity in cities can be explained by both the selection effect and rat-race effect whereby on average cities respectively attract high working professionals at all ages with young professionals putting in more hours of work than the more experienced professionals (Annez & Buckley, 2009). In general, urban agglomeration economies for a particular firm could be in the form of large size of the market occasioned by the high population of the urban area; lower costs of infrastructure due to scale and scope economies; reduced costs of information and transactions from more likely face-to-face contacts due to proximity; increased flexible and speedy input relationships resulting from the diversity and closeness of possible input suppliers; lower costs of recruitment and training due to the existence of a labour pool that is large and diversified and many more (Rosenthal & Strange, 2004; Quigley, 2008; World Bank, 2009; UN-HABITAT, 2016).

However, as happened in many cities in Europe and North America during the early years of the industrial revolution and currently in SSA, it is currently argued that urbanization becomes dysfunctional if it is not properly planned and adequately managed and cities are not provided with the required essential public services and infrastructure (UN-HABITAT, 2016; Collier & Venables, 2017; Lall *et al.*, 2019). In general, this is evidenced by increasing existence of external or agglomeration diseconomies such as increased wages, high prices of land and houses, increased transport costs, environmental pollution, congestion, pressure on natural resources, regional

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inequality, increasing policing costs as a result of higher levels of crime and insecurity, squalid living conditions such as poor sanitation leading to the outbreak of diseases and high urban mortality, proliferation of slum population and many others (World Bank, 2009; UN-HABITAT, 2016; Collier & Venables, 2017; Dumont, 2018). Notwithstanding the existence of these and other externalities diseconomies, the effects of agglomeration economies in cities are seen to be far greater and thus the net economic, social and political effects of urbanization are positive, which serves to attract migration of people from the rural areas to the cities hence urbanization (Venables, 2008; Annez & Buckley, 2009; Spence *et al.*, 2009).

In the scholarly literature, the formal conception of agglomeration economies is credited to Alfred Marshal (1890, 1920) who identified three micro-foundations of agglomeration economies. These were knowledge spill-overs in a localized industry allowing workers to learn from each other; labor market pooling which reduces risk and improves matching for workers' skills and employers' needs; and input sharing which allows producers to share the use of inputs which could not be purchased by a single producer (Quigley, 1998; Henderson, 2003a; Duranton & Puga, 2004; Rosenthal & Strange, 2004; Venables, 2008; World Bank, 2009).

Albeit, the work of Adam Smith (1776) on the analysis of the benefits of agglomeration which was subsequently extended by Thünen (1826) can be regarded as being a candidate for the first conceptualization of agglomeration economies, it narrowly focused on division of labour as the only source of agglomeration economies (Duranton & Puga, 2004; World Bank, 2009). Also, works on agglomeration economies were contained in the early writings on the localization of industry and other economic activities by researchers such as Alfred Weber (1909), Edgar Hoover (1948), Walter Isard (1956) and many others (Polese, 2005). Additionally, the existence of

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agglomeration economies was also identified by Robert Lucas (1988) and influenced the development of endogenous growth theories (Henderson, 2003a).

Furthermore, in the literature, many different microeconomic mechanisms have been provided as justification for the existence of cities. This is because, the concept of urban agglomeration economies has been found to be robust to many different micro-foundations (Duranton & Puga, 2004). Subsequently, Duranton & Puga (2004) proposed three different micro-foundations of urban agglomeration economies based on the taxonomies of *sharing* of indivisible facilities such as large-scale infrastructure, wider variety of inputs and risks; *matching* for consumers, firms and products; and *learning* evidenced by knowledge generation, diffusion and accumulation. Thus, in the presence of incomplete information, cities play a crucial matching role by making it easier to find inputs and customers, and a learning role by enabling experimentation to discover new knowledge and possibilities. Also, as identified by Rosenthal & Strange (2004), others micro-foundations of external economies, both positive and negative, have been suggested in recent literature. These include natural advantage, home market effects (concentration of demand), consumption economies (people like the bright lights of cities) and rent-seeking (redistributing of expropriated resources by undemocratic governments to the urban elite).

Some important features of the effects of agglomeration economies are that they extend over at least three different scopes such as geographic, industrial and temporal, with each scope effects having a high tendency of localization and also attenuating with distance (Fujita *et al.*, 2003; Duranton & Puga, 2004; Rosenthal & Strange, 2004; Venables, 2008). The industrial scope, popularly known as localization economies is the most familiar dimension and shows the extent to which agglomeration economies is concentrated within and across industries. The geographic scope of agglomeration, also known as urbanization economies is what provides a rationale for the

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existence of cities and asserts that proximity is advantageous. The temporal scope captures both the static and dynamic agglomeration effects respectively at a point in time and across time.

3.2.2 Theoretical literature on Urbanization as a product of Growth

The proponents of growth-led urbanization argue that, although, the existence of urban agglomeration economies helps to explain the relatively higher productivity in cities worldwide, it does not necessarily explain the growth of national economies (Polese, 2005; Annez & Buckley, 2009). Urbanization is seen primarily as a spatial transition process that is consequential of economic growth and not the cause of it. Thus, urbanization is part and parcel of the fundamental processes of the multidimensional transformations that accompany economic growth and development even as economies transition from low-income status to middle-income and subsequently high-income levels (Fay & Opal, 2000; Annez & Buckley, 2009), and the outcome of economic structural transformation from the predominance of low productivity rural agriculture to a high productivity and urbanized industrial and services production (Henderson, 2003a; Henderson & Wang, 2005; Jedwab, 2013).

This multidimensional structural transformation of the economy due to technological innovations that increases rural agricultural productivity and subsequently releases rural farm labour to the urban industrial and services sectors induces urbanization with both producers and consumers all clustering in cities to exploit the various advantages of internal and external agglomeration economies (Davis & Henderson, 2003; Fujita *et al*., 2003)

A comprehensive summary description of this view point can be presented as follows. As real labour productivity in the urban manufacturing and services sectors increases over and above that of the rural agricultural sector, which is also a necessary concomitant for increases in real wages

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in the urban areas as compared to the rural areas, labour will be pushed out of the relatively low productivity and low wages rural agriculture sector to the high productive and high wage urban manufacturing and services sectors, a stylized fact experienced in Europe and North America during the industrial revolution (Spence et al., 2009; World Bank, 2009).

With rising real wages, increasing labour productivity and its attendant increasing employment opportunities in the urban areas, there will be an ever-declining demand for farm labour which will subsequently lead to a fall in real wages and employment opportunities in the agriculture sector at the countryside. This will ultimately set in motion a rural to urban exodus that will continue in so far as the rural-urban productivity and wage differentials persist (Fay & Opal, 2000; Polese, 2005). Indirectly, the higher levels of income in the urban areas vis-à-vis that in the rural areas can be described both as a result of the existence of agglomeration economies in the urban areas, and a continuing rural to urban migratory adjustment process, with urbanization on-going insofar as the wage-productivity differentials persists (Polese, 2005; Collier & Venables, 2017).

Thus, the movement of labour from rural agriculture to urban industrial and services is a purely economic process of more efficient territorial labour reallocation, a spatial adjustment process in response to opportunities resulting from changes in demand and rewards for labour, and the consequent shift in resources from the less productive to the more productive locations. This movement is not so much different from say labour moving between and across industries. In essence, at any particular level of urbanization, the existing rural-urban wage differentials act as a signaling mechanism that further productivity increases and corresponding wage gains are possible through the reallocation of resources in favour of the urban areas.

Nevertheless, after the allocational gains have been fully exploited, there is no guarantee that additional spatial reallocation of resources will tend to boost economic growth. So, the growth

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promotion effect of urbanization is fundamentally seen as allocational, reflecting a more effective geographical allocation of resources (Polese, 2005). This viewpoint also helps to shed more light on the empirically observable fact that urbanization does not go on forever, it tails off at some point in time when countries become fully urbanized and even stagnates in decline when there are no further geographic allocational gains (Rogers & Williamson, 1982; Davis & Henderson, 2003).

An alternative explanation also in support of the causal relationship between urbanization and economic growth proceeding from the latter is the effect of political factors such as government policies on urbanization. It can be seen from a long perspective view of history, that, the growth of cities are neither random nor entirely organic (Ades & Glaeser, 1995; UN-HABITAT, 2008). Generally, most cities worldwide are built incrementally by a succession of millions of individual households, firms and governments decisions and investments. However, government policies at local, national and regional levels impact greatly on the comparative advantages that often accrue to cities at these respective levels which also combine with other factors in various ways to determine which cities will grow and thrive or decline in size, political and/or economic importance (Ades & Glaeser, 1995; UN-HABITAT, 2008; Collier, 2017). Indeed, available empirical evidence suggest the growth of cities in several countries worldwide was originally propelled by various government policies and investments and then further driven and sustained by other development players (UN-HABITAT, 2008).

First, government strategies, programmes and policies (SPPs) aimed at improving the performance of the city economy at various levels are known to exert profound impact on cities' growth, especially primate and national capital cities. Government infrastructural investments in cities namely roads, railways, education, healthcare and telecommunication networks affect both the pecuniary and non-pecuniary resources dedicated to urban living (Henderson, 2002; Fujita *et al.*,

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2003). It also influences the efficiencies of both production and distribution activities as well as the degree to which the full benefits of knowledge and information spillovers in cities are realized (Henderson, 2002; Davis & Henderson, 2003). Also, government decisions such as the designation of special economic zones or industrial hubs has witnessed a tremendous growth in cities such as in East Asia (UN-HABITAT, 2008). Furthermore, government SPPs on migration, trade policies and others have significant effects on the whole urban system the and internal and external migration patterns that favour urbanization (Davis & Henderson, 2003).

Second, government urban-bias policies that make the urban economy grow and that of the country-side wilt fuel urbanization (Rogers & Williamson, 1982; World Bank, 1999; Collier, 2017). This could be in the form of unfair terms of trade between rural agriculture and the urban industry and services; subsidies for urban producers and consumers such as underpriced gasoline; trade protection policies that favour the urban industrial sector and discriminate against the rural agricultural sector such as agricultural price controls all work together as urban pull and rural push factors to fuel urbanization (Henderson & Wang, 2005; Duranton, 2008; World Bank, 2009; Glaeser & Henderson, 2017; Henderson & Kriticos, 2017).

Third, favouritism of primate and national cities like Bangkok in Thailand, Mexico City in Mexico, Jakarta in Indonesia, Soul in South Korea, Paris in France, Sao Paulo in Brazil and many other cities in the developing countries adversely affects competition across cities and between urban and rural areas (Henderson, 2002; Davis & Henderson, 2003; Duranton, 2008; UN-HABITAT, 2008). This skews the allocation of investment, production and consumption resources in favour of such cities and the clustering of rents to be extracted by the central political powers with little or no competition, hence urbanization (Ades & Glaeser, 1995; Glaeser & Henderson, 2017).

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3.3 Theoretical literature on Urbanization and Poverty

The poor are overwhelmingly and disproportionately located in rural areas (Liddle, 2017; World Bank, 2018; Lall *et al.*, 2019). For instance, the global incidence of poverty in rural areas is 17.2%, which is more than three times the 5.3% figure in the urban areas, and despite the increasing share of poverty in urban areas, caused mainly by the poor being the most rapidly urbanizing segment of the population, it will not be until the middle of the century that the rural and urban shares of poverty will be equal (Ravallion *et al.*, 2007; World Bank & IMF, 2013; McGranahan, 2017).

From the extant literature, urbanization is seen from both the theoretical and empirical perspectives to have a significantly positive impact on poverty via urban agglomeration economies and that no amount of productivity increases in the rural sector will match the immense poverty-reduction impact of the urbanization process (Ravallion *et al.*, 2007; Spence *et al.*, 2009; World Bank & IMF, 2013; Collier & Venables, 2017). Urbanization has been found to contribute to poverty reduction via myriads of channels which are broadly categorized under two-rounds effects. The first-round effects are manifested through improvements in welfare of the poor rural migrants residing in the urban areas which are evidenced by increased income and consumption. The second round-effects involve improvements in the living standards of the poor who remain in the rural areas due to good rural-urban linkages.

The first round-effects are the most obvious and observable channel through which the process of urbanization improves the living standards of the poor rural migrants in urban areas. It has been found that poor people are overly and disturbingly located in rural areas which tend to lack the basic and essential public services and infrastructure such as education, electricity, healthcare, portable water, sanitation, housing, transport, capital and many others (World Bank & IMF, 2013; Liddle, 2017; World Bank, 2018). These and other amenities that help to improve living standards

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tend to be both adequately supplied and at a relatively cheaper cost in urban areas as compared to rural areas. So, as poor people migrate from rural to urban areas, they are able to access most of these facilities and services, which in turn helps to improve their quality of life, hence reducing poverty (World Bank, 2009; Liddle, 2017).

The provision of employment opportunities is generally regarded as the main gateway out of extreme poverty. Consequently, cities are often described as real poverty fighters as they provide diverse and numerous formal and informal employment opportunities which are generated by the large scale production, consumption and service activities in cities (Chen, 2012; UN-HABITAT, 2016). These employment opportunities in cities tend to absorb the usually abundant low and unskilled labour from the rural areas at comparatively higher levels of productivity and remuneration, thus boosting the earnings of the poor rural migrants to help eradicate poverty.

This transformative effect of urbanization on poverty reduction via the provision of massive employment opportunities in both the formal and informal sectors of the urban economy, especially in light manufacturing is clearly observable in East Asia. From being the region with the world's highest incidence of extreme poverty, which was estimated to be about 77% of its population living below the poverty line in the early 1980s, the region has over a few decades, through rapid urbanization accompanied by rapid economic growth, substantially reduced its extreme poverty to just 14% by 2008 (UN-HABITAT, 2016). Of particularly and historically significance here is the impressive achievement of China, which through both rapid urbanization and massive economic growth has been able to reduce extreme poverty from a high of 84% in 1981 to as low as 10% in 2013, and in so doing pulling about 680 million people out of extreme poverty (UN-HABITAT, 2016).

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Furthermore, cities are also places of economic, political, social, cultural and ethnic diversity, and thus, can help reduce the risk of ethnic, political and religious conflicts. Cities provide a safe haven for marginalized minority ethnic, political and religious groups and also women to escape from rural persecutions; and for those displaced by conflicts and disasters cities are best places for the effective delivery of humanitarian services (UN-HABITAT, 2016; McGranahan, 2017).

Additionally, poverty in the rural areas is extremely gendered, with women suffering from various traditional and gender-biased roles and restrictions (Tacoli, 2012; Chant & Datu, 2015). Hence, despite most women in urban areas being disproportionately employed in the low paid informal sectors of the urban economy (Chen & Ravallion, 2007), the resultant increased employment income and the independence that comes from escaping the village restrictions and marginalization help to increase the welfare of women in urban areas as compared to those in the rural areas (McGranahan, 2017).

The second-round effects of urbanization on poverty are myriad and reflects good rural-urban linkages that helps to reduce poverty in both rural and urban areas (World Bank & IMF, 2013; McGranahan, 2017). The existence of a close linkage between rural and urban areas enable cities to obtain food from the rural areas to support it ever growing population as well as raw materials to feed agro-processing industries, and in so doing, providing a source of livelihood to the urban inhabitants (UN-HABITAT, 2016; Christiaensen & Weerdt, 2017; Collier & Venables, 2017). Also, rural areas purchase urban products as well as supply cheap, unskilled and low skilled labour to the urban sector in the form of artisans, factory workers and others which help to boost the urban economy to reduce urban poverty (Christiaensen & Weerdt, 2017).

Generally, in many developing countries of the world, the rural poor are overwhelmingly employed in the agriculture sector (World Bank, 2018).The non-diversified nature of the rural

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economy makes employment opportunities outside the agriculture sector very limited, which forces the sector to absorb the extra labour not required, hence leading to a vicious cycle of low farm land per capita, under employment, low labour productivity, low income and hence poverty (World Bank & IMF, 2013). With urbanization, cities and large towns are able to provide ready and large sources of market for rural agricultural products which helps in the development of non-farm employment opportunities, especially in small and medium towns which are highly favoured by the rural poor (UN-HABITAT, 2016; Christiaensen & Weerdt, 2017). These non-agricultural employment opportunities generate relatively higher productivity and income as compared to rural agriculture, so ordinarily, the exodus of rural labour force from agriculture to non-farm employment improves earnings and helps to reduce rural poverty (World Bank & IMF, 2013).

Subsequently, the out migration of rural labour from the agriculture sector to the non-farm sector and also to urban areas results in a virtuous cycle of increased per capita farm land for existing farmers, thereby increasing agricultural productivity and earnings to reduce poverty (World Bank, 2009; Collier, 2017). Also, remittances from rural migrants living in urban areas to family and friends living in the rural areas have become an important source of rural income which helps to smoothen rural consumption and enable asset accumulation to reduce rural poverty (UN-HABITAT, 2016; Christiaensen & Weerdt, 2017).

Historically, the urbanization of poverty, evidenced by the poor being the fastest growing segment of the urban population in many developing countries has been seen largely as an undesirable antecedent of new urban poverty and has therefore resulted in countries implementing measures to actively resist urbanization such as South Africa's apartheid system and China's hukou (household registration) system; or inactively resisting urbanization through measures of partial exclusion such as Brazil's favelas (Ravallion *et al.*, 2007; McGranahan *et al.*, 2016). Such inactive

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measures of exclusion have mainly been in the form of not providing and/or formally limiting access to basic amenities such as water, sanitation and good educational and health services and proper housing for rural migrants and also in poorer urban areas which are often the primary destination of poor rural migrants (Feler & Henderson, 2011; World Bank, 2011). This has resulted in the so-called "double divide" whereby high inequalities are seen and perpetuated both within and across cities and between urban and rural areas (Henderson, 2010).

These measures of partial exclusions which commonly involve cities only planning for their non-poor residents and excluding the low-income population is typical of many urbanizing developing countries and has resulted in pushing a large proportion of the growing poor rural migrants and the existing urban poor into informality and/or illegality, thus preventing many from pursuing decent urban livelihoods and homes (Chen, 2012; Brown & McGranahan, 2016). In spite of these partial exclusions, the poor rural migrants residing in urban areas generally have higher living standards as compared to their rural counterparts, thus confirming the tremendous poverty-reduction potential of the process of urbanization (Annez & Buckley, 2009; McGranahan *et al.*, 2016).

However, it must be emphasized that the transformative impact of urbanization on poverty reduction is not automatic (Ravallion *et al.*, 2007; Chant & Datu, 2015; UN-HABITAT, 2016; Collier & Venables, 2017). Without good governance, proper urban planning and management, adequate investment in public infrastructure and services and equitable distribution of urbanization benefits, cities will become sinkholes and less habitable areas of poverty, inequality with growing slum population as characterized by the early urbanization experience of Europe and North America and the current urbanization experience of SSA and other developing countries (World Bank, 2009; Rodríguez-Pose & Wilkie, 2015; Lall *et al.*, 2019). Therefore, managing the

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urbanization process should be seen largely as an integral component of nurturing growth and development of national economies.

3.4 Empirical literature on Urbanization and Economic Growth

The economists that support the viewpoint of urbanization-led economic growth tend to be very influential and prevalent. The empirical evidence often adduced to support this strand of thought heavily relies on the economic power of cities (World Bank, 1999, 2009; McKinsey Global Institute, 2011; UN-HABITAT, 2011, 2016). It is argued that the economic power of cities, evidenced by the relatively high economic productivity in cities worldwide, can only be explained by the presence of urban/agglomeration economies in cities (Glaeser, 1994; Ciccone & Hall, 1996; Quigley, 1998; Henderson, 2003b). Indeed, according to the new urban economics and the modern economic geography literature, the existence of a large variety of urban/agglomeration economies is the most important spatial feature of the urban economy.

The enormous economic power of cities clearly demonstrates the positive relationship between urbanization and economic growth and development (Fay & Opal, 2000; Polese, 2005; Spence et al., 2009). Empirically, it is observable that cities make immense and disproportionate contributions to both the economic output of their respective national economies as well as that of the global economy. For instance, about half of the world's population living in cities in 2011 accounted for 80% of the global GDP, and just 600 urban centers with a global population share of only 20% generated 60% of global income and this trend is expected to remain stable through 2025 (McKinsey Global Institute, 2011). Figures 3.1 and 3.2 show the contributions of some selected key cities to the GDP of their respective national economies. Both figures amply depict the enormous power of cities in both the developed and developing regions of the world, whereby,

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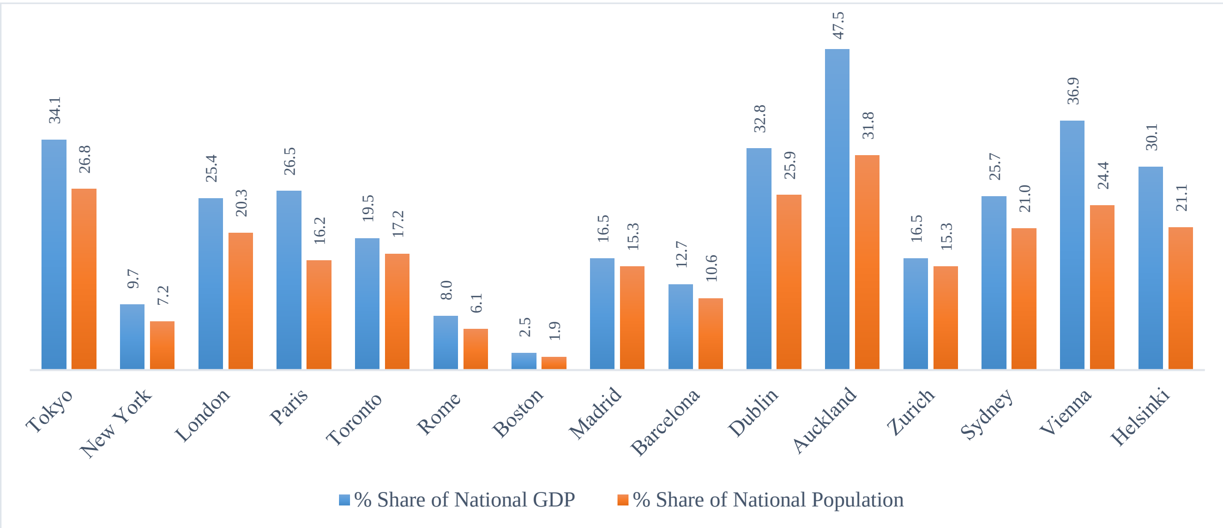
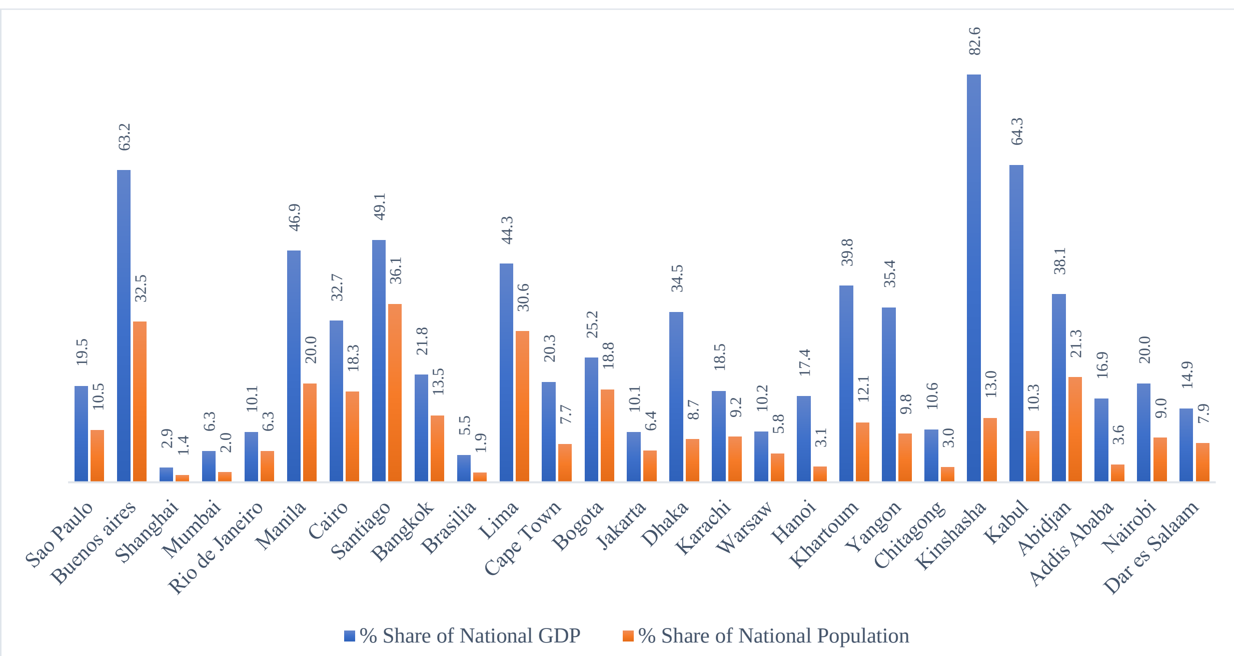
the contributions of cities to their respective national outputs are far in excess of their share of the national population (UN-HABITAT, 2011).

Figure 3.1: National Population and GDP shares in key Cities in Developed Countries – 2008.



Source: UN-HABITAT, 2011.

Figure 3.2: National Population and GDP shares in key Cities in Developing Countries – 2008.



Source: UN-HABITAT, 2011.

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Historically, the presence of agglomeration economies which results in the concentration of people, economic activities and hence economic development is not new and is widely observable worldwide. For example, about 300 years ago China and India alone accounted for about 50% of global population and generated 66% of global output; the European Union (EU), North America and Japan with less than 16% of the world's population in 2000 accounted for about 75% of global output; and in 2009 a paltry 1.5% of the world's land surface generated over 50% of its total output (World Bank, 2009). At the city level, whereas the top 190 cities in North America contributed 20% of global GDP in 2007, the largest 220 cities in developing countries only generated 10%, confirming that urban agglomeration economies are much more spatially localized in North America (McKinsey Global Institute, 2011). Also, between 2014 and 2016, the world's 300 largest metropolitan areas generated nearly 50% of its output as well as 67% and 36% of the global GDP growth and employment growth respectively (Brookings, 2018).

Furthermore, the rapid economic growth and development in East Asia[8] over the past few decades and the clustering of most of the world's high-income countries in small industrial cores in the Northern Hemisphere exemplifies the localization effect of urban agglomeration economies (Hall & Jones, 1999; Fujita *et al.*, 2003). Particularly, within the East Asian region, Japan in 1990, with only 3.5% of the total land area and about 8% of the region's population, accounted for a whopping 72% of the total GDP and 67% of the manufacturing GDP of this region (Fujita et al., 2003). Also, cities and towns in Africa which only accounted for about 30% of the total regional population generated over 50% of its GDP (Becker & Morrison, 1993). Additionally, the coastal provinces in China which accounted for less than 20% of its land area generated more than 50% of its GDP in

[8] Namely Japan, China, Hong Kong, Indonesia, Malaysia, Philippines, Republic of Korea, Singapore, Taiwan and Thailand.

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2005; and in India, less than 33% of the population living in cities and towns generated over 67% of GDP and about 90% of government revenue (World Bank, 2009).

The empirically observable positive relationship between urbanization and development, whereby urbanization goes hand in hand with economic growth such that epochs of sustained rapid growth are accompanied by sustained rapid urbanization, makes the assertion of a direct causal link between urbanization and growth rationally appealing. Historically, no country ever achieved high income status without the accompanying high level of urbanization (Fay & Opal, 2000; Spence *et al.*, 2009; Henderson, 2010). However, the empirical testing of a direct causal link between urbanization and growth remains a challenge due to the widespread existence of potential endogeneity issues among economic variables (Baldwin & Martin, 2004; Polese, 2005). Thus, whereas correlations can easily be estimated, claiming causal relations remains problematic (Henderson *et al.*, 2013).

3.4.1 Empirical literature on Urbanization as an engine of Growth

There are several empirical studies in the literature whose findings support the traditional view point that urbanization promotes economic growth. The mounting evidence from such studies show that urban agglomeration economies are amplified with density and attenuated with distance. The latter implies that economies of scale are principally localized with the most significant spillover effects occurring at a smaller geographical scale and mainly within cities or regions and not between them (Fujita et al., 2003; World Bank, 2009). For instance, the US metropolitan areas account for a whopping 96% of all innovations in the country; in the United Kingdom and France about 75 to 95% industry is localized; and in China the most productive manufacturing firms are from the most concentrated cities (Fujita *et al.*, 2003; World Bank, 2009).

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Some relevant empirical studies showing that urban agglomeration economies amplify with density are reviewed as follows. In investigating how agglomeration economies relates to the large differences in the average labour productivity across US states, Ciccone and Hall (1996) using OLS estimations for the 1988 county level data on output per worker in 47 US states and also controlling for the quality of labour at the county level and differences in public capital investment at the state level, found that doubling economic density at the county level increases the average productivity of labour by 6% with more than 50% of the productivity differentials across states being caused by the differences in the spatial density of economic activities.

Similarly, Ciccone (2002) employed both least squares and instrumental variables approach (2SLS) to estimate agglomeration effects and controlled for endogeneity of the spatial distribution of employment and spatial fixed effects at both the regional and country levels. The study used the non-agricultural private value added per worker data sample beginning in the late 1980s for 628 of the European 'Nomenclature of Territorial Units for Statistics' (NUTS) 3-regions namely Germany, the UK, France, Spain and Italy. The study found that a 100% increase in employment density increases the average productivity of labour by almost 5% for the European region. This result is close to the 6% previously estimated by Ciccone and Hall (1996) for the US states.

In testing for and characterizing the existence of dynamic production externalities in cities, Henderson *et al.* (1995) used data from 224 US Metropolitan Statistical Areas (MSA) covering the period 1970-1987 for five key two-digit traditional manufacturing industries namely instruments, electrical machinery, machinery, primary metals and transportation. The study found a high degree of persistence in the patterns of employment, such that increasing own industry employment concentration by one-standard deviation in the first period will increase the employment level of that industry by 16 to 31% in the later period.

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Again, Henderson *et al.* (2001) in estimating the nature and magnitude of external economies of scale for 23 major manufacturing industries across 50 to 74 Korean cities covering the 1983-1993 period of rapid industrial deconcentration from Soul to other metropolitan areas, found significant localization economies in all industries. Using panel data estimation methods, the results from the study showed that at a given input level, a 10% increase in own industry employment at the local level will generate about 0.6 to 0.8% rise in plant output.

On the other hand, there are relevant empirical studies showing that urban agglomeration economies attenuate with distance. For example, in examining the productivity advantages of 356 new manufacturing firms in the metropolitan center of Sao Paulo, Brazil, established between 1977 and 1979, Hansen (1990) found the existence of considerable benefits of agglomeration economies within the metropolis. Using a Cobb-Douglas production function specification, it was estimated that increasing distance away from the city center by 1% will result in a decline in overall productivity by 0.11%.

A study conducted by Sveikauskas *et al.* (1985) based on 1980 data for 356 plants from 10 new manufacturing industries in Brazil using a Cobb-Douglas production functional specification showed a substantial impact of agglomeration economies on plant productivity, whereby average plant productivity decreased by 15% as a result of doubling the traveling time to the city center. Later, a similar work by Henderson (1994) also using a Cobb-Douglas production function and based on 1970 data for 233 firms in the two so-called modern industries namely auto-component and accessories; and agricultural equipment and machinery from 126 cities in southern Brazil also found a decreased impact of agglomeration economies, where by the average profit of firms decreases by 6% when the distance to the regional market center is doubled.

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In testing for the impact of external economies on the geographical pattern of entrepreneurial activity across six industries in the US namely apparel, fabricated metals, food processing, printing and publishing, industrial and commercial machinery, and software, Rosenthal & Strange (2003) assembled a very unique and rich dataset from the Dun & Bradstreet Marketplace database involving over 12 million establishments from the fourth quarters of 1996 and 1997. The results from the study indicated that the effects of localization economies on new plants establishments are very significant for five out of the six industries, but rapidly attenuates for the first five 1-mile concentric rings of employment and there after attenuates much more slowly.

Again, in a similar study in the New York Consolidated Metropolitan Statistical Area, Rosenthal & Strange (2005) using 2001 second quarter data from Dun & Bradstreet Marketplace for four industries namely manufacturing, services, fire and wholesaling found that the effects of agglomeration economies are highly localized and attenuate rapidly within the 1 mile ring as compared to that for the 1 to 5 mile rings. Furthermore, a study conducted by Rice *et al.* (2006) on the spatial determinants of productivity using data from 119 areas in the NUTS3 regions of the UK and covering the period from 1998-2001 found that doubling the spatial concentration of economic activities increases productivity by 3.5%, with the effect highest within 45 minutes of driving time and thereafter, attenuating sharply with little or no effect past 80 minutes.

Other related studies in support of the traditional and dominant view point that urbanization causes growth and development of national economies include a research by Becker & Morrison, (1993). In using both the neoclassical and rent-seeking models of urbanization to study the overall impact of the urban sector on economic development for 24 countries in SSA's post structural adjustments periods of 1970-1980, the study found increased urbanization to have a positive impact on per

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capita income and other measures of economic welfare such as improved healthcare caused by the reduction in natality and mortality as a result of living in urban areas.

Generally, a summary of the various findings from empirical studies supporting the traditional strand of thought is contained in the study conducted by Rosenthal & Strange (2004). In surveying prior literature on urban agglomeration economies and growth, the study observed a general view that across a wide range of city sizes, doubling the size of a given city will increase productivity by about 3 to 8%.

However, findings from other empirical studies have generated mixed results. In investigating geographical determinants on economic growth and development for a worldwide sample of 150 countries with a minimum population of one million in 1995, covering the period 1965-1990, Gallup *et al.* (1999) employed multiple regressions. The study found that urbanization which occurs in coastal areas induces economic growth whereas a similar occurrence in the hinterlands has a negative impact on economic growth. The conclusion from the study was that urban agglomeration economies exist in the coastal urban areas but not inland urban areas.

Similarly, Brülhart & Sbergami (2009) investigated the effect of spatial concentration of economic activities on growth by assembling a very comprehensive data containing two complementary datasets, namely an unbalanced panel of 105 countries worldwide and a cross-sectional data for 16 Western European countries both covering respectively 1960-1996 and 1960-2000. The results from both the cross-sectional pooled OLS and the dynamic panel system-GMM estimations for the two datasets showed that in developing countries urban agglomeration economies boosts economic growth, but in rich countries its growth effect is negative or non-existent. Specifically, for large Western European cities, the growth effect of urbanization becomes negative above an estimated per capita GDP threshold of USD10,000 (in 2006 prices).

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Again, an investigative study by Liddle & Messinis (2015) on the timing of causality between urbanization and growth using evidence from a heterogenous balanced panel involving 100 countries selected worldwide and covering a 50-year period from 1960-2009 generated mixed results. The study categorized all countries into three income panel groups (high, middle and low) and further categorized the non-high-income groups into two geographically based panel groups (Africa, and Latin America and Caribbean). Using system-GMM estimations, urbanization was found to have a positive effect on economic growth in high income countries. However, of particular interest is the results from the Africa and low-income panel groups, whereby, an equilibrium relationship was found, such that initial economic growth led to over urbanization which in-turn stayed additional economic growth.

Another study conducted by Chen *et al.* (2014) on a worldwide geographic scale to analyze both the level and speed of urbanization and their relationship with economic growth spanning a timescale of 30 years from 1960-2011 for 226 countries found the relationship between urbanization and economic growth in general to be complicated and baffling. Using geographic information systems (GIS), cross-sectional and panel estimation methods, the study found in line with the dominant traditional view point, the level of urbanization to be closely correlated with per capita GDP, whereas on the other hand, the speed of urbanization had significantly no relationship with the growth rate of income per capita. The suggestive evidence here is that a given country cannot expect to obtain increased urban agglomeration economies by simply accelerating the speed of urbanization. Perhaps, this result is also a true reflection of the real and complex empirical relationship between changes in urbanization and economic growth.

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3.4.2 Empirical literature on Urbanization as a product of Growth

In investigating the strand of thought that urbanization is a byproduct of growth and development of national economies, some empirical studies have concentrated on investigating the impact of government policies and national public institutions on the rate of urbanization. As a primer study in this regard, Ades & Glaeser (1995) applied urban economic theory to investigate the major determinants of urban primacy by employing a cross-sectional data for a worldwide sample of 85 countries covering the study period 1970-1985. The study also employed five case studies on the historical economic development of selected prominent cities namely Rome in 50 B.C, London in 1650, Edo (now Tokyo) in 1700, Buenos Aires in 1900 and Mexico City in 1990.

The findings from both the cross-sectional and the case studies showed the causal nexus running from political factors to urbanization but not the converse. In all the five case studies, political powers in extracting rents both from the capital and the remote regions of their respective countries and distributing such rents in the form of food and direct cash transfers; protecting capital city dwellers; favouring city trade and manufacturing activities; biased in providing infrastructure and access to city lands all attracted migration from the hinterlands into the capital cities.

These findings are also corroborated by later studies for other primate and national cities such as Bangkok, Jakarta, Sao Paulo, Soul and Paris and specific countries such as China. For example, in their investigation of the determinants of three different aspects of urbanization namely urban primacy, urban percentage and metropolitan concentration, Moomaw & Shatter (1996) assembled an unbalanced panel of 90 countries for the years 1960, 1970 and 1980. By employing both pooled OLS and panel data estimation methods, the study found a significant impact of political forces on urbanization via its effect on urban primacy. Additionally, the study found that both urban

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percentage and metropolitan concentration respond to the economic forces of growth and development, suggesting that urbanization is a product rather than a cause of growth.

Also, Davis & Henderson (2003) examined the impact of the political economy on two major aspects of urban development namely the process of urbanization and urban concentration using an unbalanced panel data of 126 countries covering the period 1960-1995. The study employed pooled OLS and panel GMM estimations and found that public policies directly affect urban concentration and indirectly influence urbanization. The evidence suggested that government policies aimed at evenly distributing public infrastructural investments, deconcentration of manufacturing and other economic activities away from primate to other cities, increasing democratization and fiscal decentralization all have direct effects of reducing urban concentration. Also, bias government policies that make urban areas prosper and rural areas wilt such as price controls on agricultural products and trade protection of the industrial sector indirectly affect urbanization through its influence on income and the sectoral composition of the economy. Consequently, in all, the process of urbanization was found to be driven by structural economic changes that accompanied development.

Furthermore, Chen *et al.* (2017) examined the direct effects of political favouritism of capital markets on city sizes and growth for the top four administrative unit cities in China namely Beijing, Tianjin, Shanghai, and Chongqing, using firm level data covering the period 1998-2007, and found the average price of capital in these cities to be 20 to 40% lower than in other cities in China. In general, the study found a strong evidence that a lower cost of capital leads to a higher growth rate of city size. By employing both OLS and instrumental variables (Kiviet) approaches, it was estimated that over the period 2000-2010, a decreased in the price of capital by one standard deviation increased the growth rate of a city by 4%, with an average growth rate of 5%.

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As has already been discussed, the negative economic growth rates that was experienced alongside rapid rates of urbanization mainly in SSA and Latin America over various periods between 1960-1975, as well as the worsening urban poverty and inequality witnessed over the recent decades have strongly challenged the stylized facts about urbanization and economic growth.[9] These occurrences have largely been described in the literature as a puzzle and subsequently renewed interest among key researchers to reappraise the relationship between urbanization and economic growth with reference to suggestive empirical evidence.

Consequently, in their empirical study on urbanization without growth, Fay & Opal (2000) suggested that economic growths are uncorrelated with urbanization rate thus making the level of urbanization a poor predictor of economic growth. The study which covered the period 1960-1995, showed that for the total of 187 countries worldwide with negative average annual growth rates over a five-year period, a whopping 183 countries from both the developed and developing regions of the world experienced positive urbanization. In particular, the study found that in SSA, whilst the average annual urban growth rate was 5.2% over the period 1970-1995, the per capita GDP was falling at an average annual rate of 0.66%. This evidence suggested no discernable relationship between urbanization and economic growth. More so, traditional factors such as rural-urban income differences and government bias toward cities were unable to explain urbanization in SSA.

Another study with similar findings that urbanization per se and economic growth are unrelated is the Henderson (2003a) extensive study on both urbanization (ratio of total population residing in urban areas) and urban concentration (urban primacy) using an unbalanced cross-country panel dataset of 83 countries worldwide for the period 1960-1995. The study employed an aggregate

[9] See Fay & Opal (2000) for the list of 28 African countries and 39 Non-African countries that rapidly urbanized with negative growth rates.

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Cobb-Douglas production function and estimated results using OLS, instrumental variables (2SLS and 3SLS) and difference GMM. The results shown that as compared to urban primacy, urbanization per se had no significant growth-promoting effect and cited periods of rapid urbanization occurring for decades despite continued negative economic growths. Here, urbanization is primarily seen as a transitory process that terminates when a country becomes fully urbanized and that it results from the interplay of a multiplicity of social, economic and political factors rather than a single major cause.

Additionally, Henderson (2003b) studied both localization (Marshall's scale) economies and urbanization (Jacobs) economies in manufacturing activities using a 30-year panel data from 1963-1992 for 317 metropolitan areas involving 742 counties in US for 6 machinery industries and 4 high-tech industries. By employing both OLS and Fixed effects estimations, the study found little or no evidence in support of urbanization economies both from the scale and diversity of economic activities. Also, in reappraising the urbanization-economic growth nexus, Polese (2005) conducted a panel study on 95 countries covering the period 1960-2002 and using as starting points 1960, 1965 and 1970. Using a simple least square regression, the study observed no significant relationship between the levels of urbanization and the growth rates of real per-capita GDP.

Again, the study conducted by Bloom *et al.* (2008) on the causal relationship between the level of urbanization and the growth rate of per-capita income for 163 countries over the period 1960-2000 using Granger-causality test found no causal connection between the two. Another study conducted by Nguyen & Nguyen (2018) which employed Granger-causality test to investigate the causal relationship between urbanization and economic growth for the ASEAN countries covering the period 1993-2014 generated mixed results. Specifically, for Vietnam, Cambodia and Brunei, the study found a bi-directional causal relationship between urbanization and growth; for Thailand

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and the Philippines, urbanization was found to cause growth, whereas for Malaysia and Indonesia, growth was rather found to cause urbanization. However, another related study by Saliminez & Bahramian (2019) using the Toda-Yamamoto method for data on urbanization and growth for the United States covering the period 1960-2017 conclusively found the direction of Granger-causality to be running from urbanization to growth and not the reverse.

Other studies have also identified demographic factors as the predominant cause of urbanization. For instance, Preston (1979) decomposed the main sources of urban population growth for 29 developing countries over the period 1960-1970 and found that 61% of the urban population growth was caused by the natural increase in the urban population. For the countries with poor economic growth performance, about 67% of all urban growth was attributed to natural increase. Particularly, for some of the large countries in the sample, the estimated proportions were about 74% for South Africa, 68% for India, 64% for Indonesia and 55% for Brazil.

Additionally, the study conducted by Beauchemin & Bocquier (2004) aimed at reconciling the economic and demographic forms of urbanization by re-examining the contribution of migration to urbanization. By using the 1993 Network of Surveys on Migration and Urbanization in West Africa data covering the period 1988-1992, the study revealed that high natality in urban areas which led to high natural population increase accounted for 75% of the growth in urban population. This evidence supports the demographic perspective of urbanization and helps to explain why all the countries that experienced negative economic growth rates continued to urbanize with no signs of urbanization slowing down even during periods of economic recession.

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3.5 Empirical literature on Urbanization and Poverty

The available empirical evidence on the spatial distribution of poverty worldwide shows two main distinctive patterns. The first spatial observation is that poverty is overwhelmingly a rural phenomenon. For instance, almost 75% of the poor people in India lived in rural areas (World Bank, 2011) and this figure increases to about 97% in Vietnam (Nguyen, 2014). In SSA, the proportion of the poor living in rural areas ranges from 68% in Central African Republic to 95% in Malawi (World Bank & IMF, 2013).

The second observable pattern of the spatial distribution of poverty is that within a given country, poverty is heterogeneously distributed across the urban landscape with smaller towns and cities accounting for the largest share of urban poverty relative to their respective share of total urban population (World Bank, 2011). Generally, this empirical evidence is obtained using the poverty city-size gradient analytical technique that uses a combined data from censuses and household surveys. The poverty city-size gradient shows that the incidence of poverty declines steadily from rural areas to smaller towns and cities and to metropolitan areas (World Bank & IMF, 2013).

For example, in 2011, the incidence of poverty in Bangladesh was 43% in rural areas, which declined to 38% as one moved to the towns and smaller cities and then to 26% in the metropolitan areas; in Vietnam, urban poverty in the two megacities (Hanoi and Ho Chi Minh) was only 10% as compared to 55% for smaller towns; and in Brazil and Thailand about 79% and 88% respectively of the urban poor lived in small towns and cities (World Bank & IMF, 2013). In India, smaller towns and cities which accounted for about 70% of the urban population contained about 85% of the urban poor in 2005 (World Bank, 2011).

The findings from many empirical studies support this general observation of an inverse relationship between poverty and city size (i.e. poverty city size gradient). Mention can be made

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of the study conducted by Ferre *et al.* (2012) for 8 developing countries that combined both census and survey data covering the periods 1999-2003. Using the respective national consumption poverty lines and employing simple OLS regression, the study found both the incidence and depth of urban poverty to be highest for smaller towns and cities in all eight countries. The results from the 5 larger and more urbanized countries namely Brazil, Mexico, Thailand, Morocco and Kazakhstan, showed that the incidence of poverty in the smaller cities was about 6 times higher as compared to the metropolitan areas and only slightly lower than that in rural areas. Both the depth and severity of poverty were equally higher in smaller towns and cities in these countries. For the other three countries, existence of these differences was comparatively less pronounced due to their relatively smaller total population (Albania) or large rural population (Kenya and Sri Lanka).

Also, in an extensive study of the urban poverty profile in India covering three National Sample Surveys data in 1983, 1993-94 and 2004-05, the World Bank (2011) observed the existence of poverty city size gradient in India. For the respective survey years, the poverty rates for small towns (large cities) were 49.7% (29%), 43.4% (20.2%) and 30% (14.7%). With the poverty rates in rural areas being 46.5%, 36.8% and 28.1% for the respective survey years, these results showed that poverty rates in rural areas were rather lower than in smaller towns, thus, indicating urbanization of poverty in smaller towns. However, rural poverty rates were higher than the overall urban poverty rates which were 42.3%, 32.8% and 25.8% for the respective survey years, confirming the stylized fact that poverty in India is predominantly rural.

Moreover, the empirical findings from a recent study conducted by Lanjouw & Marra (2018) in Vietnam confirmed the existence of poverty city size gradient in Vietnam. The study combined two data sets namely the 2009 Vietnam Population and Housing Census and the 2010 Vietnam Household Living Standards Survey to create an extensive profile of the poor in the over 700 cities

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in Vietnam. The estimated results showed that poverty in the biggest cities was only 1.4% as compared to 12.2% in the smallest towns, and while the smallest cities only contained 40% of the total urban population, they accounted for over 70% of the total urban poverty.

Generally, findings from available empirical studies point to a consensus that poverty is higher in smaller towns and cities as compared to the larger urban areas due to the former's lack of adequate infrastructure and basic services provision such as portable water, electricity, sanitation, education and many others which are needed for a considerable improvement in urban living standards. Although smaller towns and cities have a much lower population as compared to large cities and metropolitan areas, the available evidence shows that the per capita access to public infrastructure and basic services are far lower in the former. For instance, while 92% of the population in the large metropolitan centers in Brazil had access to waste disposal services, only 76% in the smaller cities did; and in Morocco, whereas 84% of households were connected to portable water supply in the largest urban agglomerations, it was only 73% for those in the smallest cities (Ferre *et al.*, 2012). In Vietnam, 75% of all households had access to portable water in the biggest cities in 2010 as compared to only about 30% in small cities (Lanjouw & Marra, 2018) and in India, whereas, about 77% of the households in the largest cities had access to electricity in 1983, this was only 54% in small towns (World Bank, 2011).

As the available empirical evidence overwhelmingly reveal that the rural poor tend to migrate to nearby smaller towns and cities where the spillover effects of urban agglomeration economies on poverty reduction are relatively smaller as compared to large cities (World Bank & IMF, 2013), it presupposes that smaller towns and cities can play a critical role in addressing the issue of urbanization of poverty if adequate infrastructure and basic services are provided and policies that foster the development of economic activities are implemented.

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However, as compared to many predominantly rural developing countries in Asia and Latin America, the findings from similar countries in SSA were different from the generally observed poverty city gradient. Despite poverty being mainly a rural phenomenon, urban poverty in SSA countries rather exhibit a largest city model, such that the largest city which is often the capital and accounts for a relatively larger proportion of the urban population also contains a disproportionately higher share of the urban poor. For instance, findings from World Bank & IMF (2013) show that the biggest cities in CAR, Gabon and Malawi contain more than 50% of the urban poor in each country; and this share drop to only 40% for countries such as Guinea, Niger, Senegal, Sierra Leone and Swaziland. This reverse poverty city-size gradient observed in many SSA countries can be explained partly by the observation that as compared to similar developing countries elsewhere, many such large cities are confronted with very low per capita provision of basic infrastructure and public services such as water, sanitation, roads, schools and health facilities needed to effectively raise the living standards of the greater majority of the urban poor.

As previously discussed under the theoretical literature on urbanization and poverty, findings from various empirical studies show many pathways through which the process of urbanization alleviates rural poverty, prominent among which is rural to urban migration. For instance, in their study on the urbanization of global poverty using worldwide data from 208 household surveys from 87 developing countries covering the period 1993-2002, Ravallion *et al.* (2007) in general found a positive impact of urbanization on poverty reduction through the two rounds effects in both urban and rural areas. Using an international poverty line of income/consumption below $1 a day (PPP), the study found that of the 5.2% decline in aggregate poverty during the period, urbanization accounted for 20% points.

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Also, despite the study showing evidence of increasing urbanization of poverty globally, whereby the number of poor people living in the urban areas increased by 50 million, that of the rural areas declined by about 150 million, which resulted in a significant reduction in aggregate poverty headcount by 100 million. Besides, it is argued that the evidence on the urbanization of poverty is only an indication that the poor are urbanizing far more rapidly than any other income group. The study also showed considerable differences in both the spatial dimension of poverty and the relationship between urbanization and poverty at the regional level. For instance, Latin America and East Asia had respectively the most and least urbanized poverty situation, whilst both Central Asia and Eastern Europe had a reverse situation of "ruralization" of poverty. However, in SSA, there was little evidence of urbanization reducing aggregate poverty.

Again, a study by Nguyen (2014) using a panel data from the 2006 and 2008 Vietnam Household Living Standard Surveys found a positive effect of urbanization on both the income and consumption expenditure of rural households in Vietnam. The fixed effects regression results showed that a 1% increase in urbanization resulted in a rise in both rural households' per capita income and per capita consumption expenditure by 0.54% and a 0.39% respectively and led to a reduction in rural household poverty rate by 0.17 percentage point.

Another empirical evidence in support of the poverty reduction effect of rural to urban migration comes from a longitudinal study conducted by Christiaensen & Weerdt (2017) on how the nature of urbanization affects income growth and poverty reduction. The study employed both quantitative and qualitative methods and used panel data from the Tanzania's Kagera Health and Development Survey covering 4,323 individuals first interviewed between 1991-1994 and then re-interviewed in 2010. It was found that rural to secondary towns migration was higher and therefore had a greater impact on poverty reduction than migration to cities. Specifically, as compared to

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cities, towns attracted 4 times more migrants and contributed twice as much to aggregate income growth of migrants.

Furthermore, given the relatively minor income differentials at the start of the study by Christiaensen & Weerdt (2017), it was found that over a period of 18 years, the average income of migrants to cities increased by 206% as compared to 36% for non-migrant rural farmers. Also, the income growths for town migrants and those who moved out of agriculture to non-farm rural employment were found to be in-between these two extremes. More so, extreme poverty was found to be virtually non-existent among city migrants, 16% for town migrants, 30% for off-farm migrants and 42% for non-migrant rural farmers. Altogether, these findings exhibit poverty city-size gradient and also provide support for the poverty reduction effects of both rural to urban migration and the movement from agricultural to non-farm employment.

Liddle (2017) studied the effects of urbanization on 7 key urban poverty indicators and rural-urban poverty differential measures namely urban electricity access, rural-urban electricity ratio, urban poverty gap, urban poverty share, rural-urban poverty share ratio and urban slum share and found the existence of a Kuznets' type relationship between urbanization and poverty. Particularly, using World Development Indicators (WDI) data from 2013-2017 for an unbalanced panel of 128 countries classified as non-high income by the World Bank in 2017 and employing both cross-sectional and quantile regressions, the study found an inverted U-shaped non-linear effect of urbanization on both urban poverty measures and the indicators of rural-urban poverty differences.

Essentially, increases in the levels of urbanization below and above a threshold level of 49% respectively improved and worsened the measured indicators. Also, urbanization levels above this threshold exacerbated the rural-urban poverty differentials and led to increased inequality both within urban areas and between rural and urban areas. The suggestive evidence here is that policies

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aimed at promoting rapid urbanization must also encourage equitable access to public services such as health and education both within urban areas and between rural and urban areas so as to reduce both poverty and inequality.

In the extant literature, urbanization is also known to have a positive impact on rural poverty through its effect on rural agricultural productivity. Some studies in this area have investigated how access to the comparatively large urban market due to good rural-urban linkages affects the structural transformation of rural agriculture. For instance, Emran & Shilpi (2012) analyzed the effect of the urban market on rural agricultural product diversification and commercialization using household data from the 1995/96 Nepal Living Standard Survey. Results from the parametric regressions indicated that the size of the urban market had an inverted U-shaped relationship with product diversification and positive linear relationship with agricultural commercialization. Thus, when farmers had virtually no or limited access to urban market initially, village agriculture was highly specialized in a single crop and mostly on subsistence basis with very low diversification and commercialization. As both access to and the size of the urban market increases through increasing urbanization, crop diversification increases up to a certain urban market threshold beyond which the production structure begins to specialize again and diversification falls as the increasing urban market size is now able to support large scale production of a single product.

Although, cities are generally known to have a positive effect on the growth and development of rural areas, rural areas have also been found to have a significant impact on the growth and prosperity of cities. In examining the determinants of city growth in Brazil from 1970-2000, the study by da Mata *et al.* (2015) using a data set consisting of 123 urban agglomerations found that market potential, population and income opportunities of surrounding rural areas had a substantial impact on city size growth. Specifically, results from the GMM estimations indicated that a 1%

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increase each in the market potential and population of surrounding rural areas respectively increased city size by 2.7% and 1.7%; whilst, a 1% decrease in rural income opportunities resulted in rural to urban migration that led to city size growing by 3.7%.

Another channel in the empirical literature through which urbanization alleviates rural poverty is through the development of rural non-farm employment. Typically, rural non-farm employment activities are associated with higher returns to labour and lower incidence of poverty as compared to rural agriculture. For example, a panel study conducted by Foster & Rosenzweig (2004) for rural households in India covering a 30-year period between 1968-1999 found that the poverty reduction impact of agricultural productivity growth is lower than that of the growth in rural non-farm employment activities. Particularly, from 1982-99, wages and salaries in rural factory employment was the fastest growing segment of rural incomes and accounted for twice the share of the overall income growth in rural India during the study period.

However, the location and growth of rural non-farm employment activities are strongly influenced by external urban agglomeration economies. For instance, the work by Fafchamps & Shilpi (2005) using the 1998-99 Nepal Labour Force Survey data found that non-farm wage employment activities and hierarchical workers are mainly concentrated in villages and towns in close proximity to large cities and that this concentration decreases steeply up to 4 hours of travel time from large cities. Again, a study conducted by Deichmann *et al.* (2009) using data from the 2000 Household Income and Expenditure Survey in Bangladesh found urban proximity to have a promotive effect on the development of both rural non-farm employment and hence on rural poverty reduction. The results from the multinomial logit regression of the study showed that high return non-farm rural employment activities were primarily concentrated in close proximity of

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urban agglomerations. This suggests the presence of external urban agglomeration economies and consequently the positive effect of urbanization on poverty in the surrounding rural areas.

Similarly, the study by Cali & Menon (2013) on the effect of urbanization on rural poverty using a large sample data on Indian districts covering the period 1983-1999 found the positive spillovers of urbanization to have a substantial and systematic causal effect on poverty reduction in rural areas in close proximity to cities. The results from the instrumental variable estimations showed that within the same district, urban growth accounted for 13 to 25% rural poverty reduction. The identified channels through which urbanization reduced rural poverty included increased urban demand for rural products, increased rural agricultural land per capita due to rural to urban migration, urban to rural remittances and increased rural non-farm employment.

Furthermore, an extensive study on the effect of economic reforms on pro-poor growth in India conducted by Datt & Ravallion (2009) covering 47 households surveys in India between 1951-2006 found that despite both rural and urban economic growths having significant poverty reduction effects, the poverty reduction impact of urban economic growth were far greater for all three measures of poverty at the national, urban and rural levels. More especially during the post-1991 reform period, all the estimated elasticities of poverty measures to urban economic growth in both urban and rural areas in India were greater as compared to that for rural economic growth. For instance, the elasticities of poverty reduction for urban and rural headcount indices with respect to urban (rural) economic growths were respectively 1.26 (0.08) and 1.26 (0.90). These results suggest the effectiveness of urban economic growth and development in poverty reduction as compared to rural economic growth and development.

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CHAPTER FOUR

METHODOLOGY

4.1 Introduction

This chapter is divided into three main sections. The first section discusses the sources of data and the sampling procedure used in selecting the number of SSA countries included in the study. The second section focuses on the three empirical models used in investigating the urbanization, economic growth and poverty relationships in SSA. The third section discusses the choice of the econometric technique employed in estimating the models.

4.2 The Data

The data used for this study come from three main sources. These are Penn World Tables Version 9.1; "World Population Prospects: The 2018 Revision" and "World Urbanization Prospects 2019" both from the UN-DESA's Population Division; and the World Bank's World Development Indicators database. Also, the sample comprises an unbalanced panel of up to 30 countries in SSA covering the period 1970-2019.

In adhering to the traditional practice of panel regression estimations in the literature, the data for the variables were sub-divided into five-year intervals. The use of the multiple year interval is to purge the variables from short term wide fluctuations and cyclical effects which may bias the estimated results (Fay & Opal, 2000; Henderson, 2000; Brülhart & Sbergami, 2009; Castells-Quintana, 2017; Chauvin *et al.*, 2017; Sulemana *et al.*, 2019). Also, according to Henderson (2003a, 2003b), some data show very small annual variations and the use of the multiple year

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interval captures enough variations.[10] *Appendices A and B* present details of the variable definitions, sources and the list of countries used for this study.

Also, this study was guided by three main criteria in selecting up to 30 out of the World Bank's classification of 48 countries/regions in SSA. First, the study uses the urbanization criterion by following Henderson (2003a) and restricting the sample to only positively urbanizing countries/regions throughout the study period in all the four sub-regions in SSA namely East Africa, Middle Africa, Southern Africa and West Africa. This eliminated 10 countries/regions namely Comoros, Liberia, Mauritania, Mauritius, Niger, Seychelles, South Sudan, Swaziland, Zambia and Zimbabwe with 38 countries/regions remaining.

Second, in line with the general reporting pattern of the United Nations' various reports on world urbanization prospects and Henderson *et al.* (2013), this study uses a population criterion by restricting the sample to only countries/regions with at least 300,000 inhabitants in 1960 and this resulted in 4 more countries namely Cabo Verde, Djibouti, Equatorial Guinea and Sao Tome and Principe being eliminated with 34 countries/regions remaining. This is also in line with the findings of Ferre *et al.* (2012) that as compared to countries with larger population, urban agglomeration effects are far less pronounced in countries with lower population.

The third criterion used was data availability/quality. Here, 2 countries namely Somalia and Eritrea had no data at all on PWT 9.1; 2 more countries namely Central African Republic and Namibia

[10] Although the standard practice in the literature for panel studies is the use of data observations with 5-year period intervals, other studies such as Henderson *et al.*, (2013) and Henderson & Kriticos (2017) have employed 10-year time intervals in line with the about 9-12 years typical census intervals. Also, Chen & Ravallion (2007) use a 3-year time intervals. For other panel studies such as Chen *et al.* (2017) that use annualized data, wide fluctuations in the data is corrected by manually trimming the data to remove outliers. Others studies using annualized data such Christiaensen *et al.* (2013) employ software algorithms such as Stata's "hadimvo" by Hadi (1994) or its alternative "bacon" by Weber (2010) to effectively detect outliers in large multivariable datasets.

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were dropped for having many missing data values, thus reducing the sample size to 30 countries/regions for the urbanization and growth regressions and 29 for urbanization and poverty regressions following the drop of Angola for missing data on the poverty indices.

4.3 The Empirical Model

The study empirically investigates both the short run and long run relationships between urbanization and economic growth from the two principal viewpoints in the literature in the first part and urbanization and poverty in the second part as discussed in Chapter three. As indicated also in Chapter One, investigating relationships from the two dominant and opposing perspectives of urbanization-led growth and growth-led urbanization within the same time period in one study undoubtedly provides broader and clearer insights into such relationships as compared to an investigation based on a single and narrow perspective. It is worth noting that a literature review on the various determinants of economic growth is outside the scope of the study. Hence, only the variables deemed relevant to the respective hypotheses being tested are included in the corresponding regression models.[11]

It is said that the most important characteristic of the spatial economy is the existence of a large variety of agglomeration economies (Fujita *et al.*, 2003). Consequently, in the empirical literature, various variables have been used as proxy measures of agglomeration economies.[12] Some prior studies have used a single variable to measure urban agglomeration economies (Fay & Opal, 2000; Castells-Quintana, 2017; Henderson & Kriticos, 2017; Nguyen & Nguyen, 2018) whereas other studies used multiple variables (Henderson, 2003a; Brülhart & Sbergami, 2009). This study uses

[11] For a comprehensive study on the determinants of economic growth, see Sala-i-Martin *et al.* (2004).
[12] See Rosenthal & Strange (2004) for a summary review of prior empirical literature and Duranton & Puga (2004) for the micro-foundations of urban agglomeration economies.

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a single variable measure of economic agglomeration by equating urbanization with urban agglomeration economies and uses urbanization variable as a proxy for urban agglomeration. Particularly, the proportion of a country's population living in areas described as cities by national statistics (urbanization level) and the changes in urbanization level (urbanization rate) are used exclusively of each other as the proxy measure of urban agglomeration.

In particular, the study formulates three hypotheses and correspondingly models three equations: (i) urbanization is a predictor of economic growth - economic growth is a function of urbanization; (ii) urbanization is a product of growth - urbanization is a function of economic growth and; (iii) urbanization is an engine of poverty reduction - poverty is a function of urbanization. Also, the associated elasticities namely the urbanization elasticity of growth, growth elasticity of urbanization and urbanization elasticity of poverty are estimated and discussed.

First, Brülhart & Sbergami (2009) in investigating the impact of spatial concentration of economic activity on economic growth estimated a dynamic growth equation given as:

$$y_{it} - y_{i,t-1} = \alpha y_{i,t-1} + \beta A_{i,t-1} + \gamma X_{it} + \mu_i + \nu_t + \varepsilon_{it} \quad \text{(A1)}$$

where y is the log of GDP; A is the agglomeration variable; X is set of control variables; α, β and γ are parameters, t denotes 5-year time intervals; μ, ν, and ε are stochastic error terms.

Subsequently, in investigating urbanization as a predictor of growth, the study follows Brülhart & Sbergami (2009) with some changes and specifies a Cobb-Douglas production function:

$$G_{it} = AY_{i0}{}^{\alpha} U_{it}{}^{\beta(1+\ln U)} X_{it}{}^{\theta} \quad (4.1)$$

The hypothesized relationship in Equation (4.1) is that the average annual growth rate (level) of real per-capita GDP of a particular country i over the period t, G_{it}, is given as a function of the

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initial real per capita GDP Y_{i0}, urbanization rate (level) U_{it} and a vector of control variables X_{it}. A positive relationship is expected between G and U as cities are generally regarded as engines of growth (World Bank, 1999; Duranton & Puga, 2004; World Bank, 2009).

One of the most important differences between the models of Equation (4.1) and Equation ($A1$) is that in the former model the growth rate of GDP per capita is endogenously determined and specifically estimated within the model by $y_{it} - y_{i,t-1}$ whereas in the latter model it is an exogenous variable obtained from a data source. Also, since the main focus of the study here is to estimate the urbanization elasticity of growth parameter, the Cobb Douglas functional specification in Equation (4.1) makes it easier to obtain same as compared to Equation (A1).

Second, Fay & Opal (2000) in investigating the role of GDP per-capita on urbanization specified a Cobb-Douglas production function given as:

$$U = E\,Y^{\,a + b\ln Y}(Y_A/Y)(Y_M/Y) \qquad \text{(B1)}$$

The estimated equation was obtained by taking logs on both sides of Equation (B1) to yield:

$$u = e + ay + by^2 + c\,(y_A - y) + d\,(y_M - y) \qquad \text{(B2)}$$

where U is the level of urbanization; a, b, c, d, e are parameters; Y is GDP per-capita and Y_A and Y_M are respectively the contributions of agriculture sector and manufacturing sector to GDP.

In investigating urbanization as a product of growth, the study follows Fay & Opal (2000) with some modifications and specifies a Cobb-Douglas production function model of the form:

$$U_{it} = AY_{it}{}^{\pi(1+\ln Y)}(Y_A)_{it}{}^{\varphi}(Y_{ID})_{it}{}^{\psi}(Y_S)_{it}{}^{\lambda}Q_{it}{}^{\varpi} \qquad (4.2)$$

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The hypothesized relationship in Equation (4.2) is that the rate (level) of urbanization of a particular country *i* over the period t, U_{it}, is given as a function of the growth rate (level) of real GDP per-capita Y_{it}; structural variables of the economy namely the sectoral shares of GDP per-capita of agriculture $(Y_A)_{it}$, industry $(Y_{ID})_{it}$ and services $(Y_S)_{it}$; and a set of control variables Q_{it}. The a priori expectation is that Y_A will be negatively related to U and that both Y_{ID} and Y_S will be related to U positively. U is expected to be small in an under-developed economy predominated by agricultural production, but increases with economic structural transformation involving declining share of output from the agriculture sector with the non-agricultural sector (industry and services) having the lion's share of output (Lewis, 1954; Annez & Buckley, 2009; Glaeser, 2013).

The model in Equation (4.2) defers from that of Equation (B1) in several respects. Equation (4.2) uses the output share of the industry sector rather than manufacturing sector. This is because the manufacturing sector in most countries in SSA is relatively underdeveloped (Jedwab, 2013; Gollin *et al.*, 2016). Therefore, the use of the broader defined industry sector that includes construction, electricity, gas, mining and water activities is preferable as these activities may be associated with the structural changes in the economy pertinent in explaining urbanization in SSA (Henderson & Kriticos, 2017). Also, since the main focus here is to estimate the growth elasticity of urbanization parameter, the Cobb-Douglas functional specification of Fay & Opal (2000) is most appropriate.

Third, Christiaensen *et al.* (2013) analyzed the impact of changes in per capita income on poverty by assuming country fixed effect regression model given as:

$$P_{it} = \alpha + \beta G_{it} + \lambda I_{it} + \mu X_{it} + \rho R_{it} + u_{it} \qquad \text{(C1)}$$

where P_{it} is the poverty headcount; G is the growth rate of per capita GDP, $\alpha, \beta, \lambda, \mu, \rho$ are parameters; I is inequality; X_{it} is a set of control variables namely initial resource rents, initial

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inequality and the resource endowed countries' dummy; R_{it} is the interactions term and involves the interaction of per capita GDP growth rate with each of the three control variables; t denotes annual time intervals; and u is a random error term.

Subsequently, in investigating the effect of urbanization on poverty reduction, this study follows Christiaensen *et al.* (2013) with some modifications and specifies a Cobb-Douglas expenditure function of the form:

$$P_{it} = AU_{it}^{\o(1+\ln U)} K_{it}^{\mu} R_{it}^{\Omega} \quad (4.3)$$

The hypothesized relationship in Equation (4.3) is that the poverty index of country *i* over period t, P_{it} as a function of the urbanization rate (level) U_{it}; a vector of control variables K_{it}; and the set of interaction terms R_{it}.

The regression model in Equation (4.3) is in line with the standard approach in the literature where both initial conditions and interaction effects are considered (Bourguignon, 2003; Kalwij & Verschoor, 2007; Fosu, 2009). The initial levels of per capita GDP and inequality and the changes in per capita GDP and inequality are used as the set of control variables (Dollar & Kraay, 2002; Kanbur, 2005; Dollar *et al.*, 2016; Fosu, 2017). For the interaction terms, the level of urbanization is interacted each with per capita GDP and inequality to investigate the respective effects of per capita GDP growth and changes in inequality on the poverty reduction effect of urbanization. On the whole, urbanization is expected to have a positive effect on poverty, hence *P* and *U* must be negatively related (Ravallion *et al.*, 2007; World Bank, 2011; World Bank & IMF, 2013; UN-HABITAT, 2016; Christiaensen & Weerdt, 2017).

Furthermore, the model in Equation (4.3) defers from that of Equation (C1) in several aspects. As the focus of the study here is on the urbanization elasticity of poverty, the Cobb-Douglas functional

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specification of Equation (4.3) seems appropriate in this regard. Also, t which denotes 5-year time intervals in Equation (4.3) differs from the annual time intervals of Equation (C1).

As discussed previously, the Cobb-Douglas functional specifications of Equations (4.1), (4.2) and (4.3) are to make it easier to log-transform the models to obtain the respective elasticity parameters for estimation. Also, the log-linearization provides additional estimation benefits. First, it transforms these non-linear equations into linear models that enables the parameters to be estimated using linear regression methods for easy interpretation. Second, the log-transformation reduces the skewness in the data which may be caused by outliers that bias the estimated results. Third, it eliminates any possible existence of heteroscedasticity to make the error terms homoscedastic, uncorrelated and normally distributed.

Accordingly, the natural logarithm is taken on both sides of Equations (4.1), (4.2) and (4.3) and rewritten in a dynamic form to yield the respective first order autoregressive-distributed lag [*ARDL* (1)] models to be estimated as follows:

$$g_{it} = \gamma_1 g_{i,t-1} + \alpha y_{i0} + \beta_0 u_{i,t-1} + \beta_1 u_{it} + \beta_2 {u_{it}}^2 + \theta x_{it} + \xi_{it} \quad (4.4)$$

$$u_{it} = \gamma_2 u_{i,t-1} + \pi_0 y_{i,t-1} + \pi_1 y_{it} + \pi_2 {y_{it}}^2 + \varphi(y_A)_{it} + \psi(y_{ID})_{it} + \lambda(y_S)_{it} + \varpi q_{it} + \xi_{it} \quad (4.5)$$

$$p_{it} = \gamma_3 p_{i,t-1} + \varnothing_1 u_{it} + \varnothing_2 {u_{it}}^2 + \mu k_{it} + \Omega r_{it} + \xi_{it} \quad (4.6)$$

where $i = 1, \ldots, N$, $t = 1, \ldots, T$ and $g = \ln G$, $y = \ln Y$, $u = \ln U$, $x = \ln X$, $a = \ln A$, $y_A = \ln Y_A$, $y_{ID} = \ln Y_{ID}$, $y_S = \ln Y_S$, $p = \ln P$, $k = \ln K$, $q = \ln Q$ and $r = \ln R$. The parameters γ_1, γ_2, γ_3, α, β_0, $\beta_1, \beta_2, \theta, \pi_0, \pi_1, \pi_2, \varphi, \psi, \lambda, \varpi, \varnothing_1, \varnothing_2, \mu, \Omega$ are scalars with the subscript *t* denoting 5-year time interval. The squared terms are included to capture any possible non-linear effects.

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The random disturbance term ξ_{it} in the dynamic panel data (DPD) models of Equations (4.4), (4.5) and (4.6) is a one-way error component model of the form:[13]

$$\xi_{it} = \upsilon_i + \varepsilon_{it} \tag{4.7}$$

where υ_i denotes the country specific effects and ε_{it} is the usual stochastic error term. It is assumed that Equation (4.7) is a random model, the error terms $\upsilon_i \sim$IID (0, $\sigma^2\upsilon_i$), $\varepsilon_{it} \sim$IID (0, $\sigma^2\varepsilon_{it}$) and are all independent such that E(υ_i) = 0, E(ε_{it}) = 0 and E($\upsilon_i\ \varepsilon_{it}$) = 0. Also, it is assumed that the explanatory variables (X_{it}^*) in Equations (4.4), (4.5) and (4.6) are all orthogonal to the error terms υ_i and ε_{it} for all *i* and *t* such that E($\upsilon_i X_{it}^*$) = E($\varepsilon_{it} X_{it}^*$) = E($\xi_{it}\ X_{it}^*$) =0.

The first objective of the study, which is to empirically investigate the direction of causation between urbanization and economic growth, is addressed by following Fay & Opal (2000) and including the lagged term of the respective main independent variable namely $u_{i,t-1}$ and $y_{i,t-1}$ respectively in Equations (4.4) and (4.5). If the estimated value of β_0 is found to be significant then this will mean the empirical result leans towards supporting the urbanization causes growth school of thought. Conversely, if the estimated value of π_0 turns out to be significant it will provide empirical support to the strand of thought that urbanization is a product of growth. Moreover, if the estimated values of β_0 and π_0 are both found to be significant, it will imply a bi-directional causal connection between urbanization and economic growth, whereby urbanization causes growth and growth causes urbanization. The general expectation here is that at least β_0 or π_0 should be positive and significant.

[13] A one-way error component model is assumed as opposed to a two-way error component model due to the fact that all the countries in the sample are from the SSA region with generally similar levels of development and thus, it is anticipated that a common external shock to the region may be absorbed similarly across all nations.

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As explained previously, since both the dependent and the main independent variables in Equations (4.4), (4.5) and (4.6) are in natural logarithms, it implies that the coefficients of the respective main independent variables namely β_0 , β_1, π_0 , π_1, ϕ_1 are all elasticities. Particularly, β_0 and β_1 are respectively the lag one (lag1) and contemporaneous urbanization elasticity of growth; π_0 and π_1 the lag1 and contemporaneous growth elasticity of urbanization; and ϕ_1 the contemporaneous urbanization elasticity of poverty. The a priori expected signs are positive for β_0, β_1, π_0, π_1 and negative for ϕ_1. The estimations and discussions of the signs, magnitudes and significances of these parameters addresses the second objective of the study.

4.4 The case for Generalized Methods of Moments (GMM)

According to Baltagi (2005), two sources of persistence characterize the DPD models of Equations (4.4), (4.5) and (4.6). The first is autocorrelation resulting from the inclusion of the lagged dependent variable as separate regressor in the respective equations. The second is the presence of individual country effects which characterize the heterogeneities among individual countries and across time. For instance, there is a problem of endogeneity in Equation (4.4), since g_{it} is a function of υ_i, the implication is that $g_{i,t-1}$ is also related to υ_i. Thus, using $g_{i,t-1}$ as a separate regressor will be correlated with the disturbance term. This same problem of endogeneity exists in Equations (4.5) and (4.6) for u_{it} and p_{it} respectively.

Estimating these dynamic equations with OLS will generate biased, inconsistent and inefficient estimates, even if the ε_{it} are not serially correlated (Bond, 2002; Baltagi, 2005). Also, the Fixed Effects estimator using the Within transformation will only remove the υ_i, leaving ε_{it}, hence the problem of endogeneity will still persist and as such, the FE (Within) estimator will be biased and inconsistent as shown by Judson & Owen (1999) Monte Carlo experiments. Furthermore, the

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Random Effects (GLS) estimator using first difference transformation may yield consistent but inefficient estimates for the DPD models (Bond, 2002; Baltagi, 2005).

Again, two candidate estimation techniques namely the Instrumental Variable (IV) approach and the Two-Stage Least Squares (2SLS) method which are both seen as special cases in the GMM framework can be used to estimate Equations (4.4), (4.5) and (4.6), even when the problem of endogeneity is present (Baum *et al.*, 2003). However, a common limitation with these candidate estimators is that they employ external instruments. Generally, it is difficult to obtain an external instrument which is highly correlated with the explanatory variable and at the same time uncorrelated with the disturbance term. Also, external instruments are known to be weak and rarely satisfy the conditions of validity and relevance required to obtain unbiased estimators. Furthermore, even though in the presence of heteroskedasticity, the IV and the 2SLS estimators are consistent, they are also inefficient resulting in invalid inference (Baum *et al.*, 2003).

To obtain consistent, unbiased and efficient estimates of the DPD models of Equations (4.4), (4.5) and (4.6), the use of the generalized methods of moments (GMM) estimation procedures proposed by Arellano & Bond (1991) and Arellano & Bover (1995), Blundell & Bond (1998), which are respectively the difference GMM (DIF-GMM) and system GMM (SYS-GMM) are recommended. In general, the GMM procedure uses the lagged values of the dependent variable and the regressors in differences (DIF-GMM) or in both differences and levels (SYS-GMM) as instruments. Also, by making use of the orthogonality conditions, GMM estimators are able to obtain efficient and consistent estimates even when heteroskedasticity exists in an arbitrary form (Baum *et al.*, 2003). Furthermore, the dynamic GMM estimators are also known to help mitigate both the unmeasured and time-invariant individual country specific effects which may otherwise correlate with the respective regressors and thus bias the results (Brülhart & Sbergami, 2009).

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Consider the dynamic panel data (DPD) models of Equations (4.4), (4.5) and (4.6) of a general form given as:

$$y_{it}{}^{*} = \alpha' y_{i,t-1}{}^{*} + \beta' x_{it}{}^{*} + + \upsilon_i + \varepsilon_{it} \tag{4.7}$$

where, $y_{it}{}^{*}$ represents each independent variable and $x_{it}{}^{*}$ the respective right-hand variables in Equations (4.4), (4.5) and (4.6). Also, α' and β' are parameters.

The first step in the GMM procedure is to eliminate the unobserved country-specific effects υ_i, by taking the first differences of Equation (4.7) to obtain:

$$y_{it}{}^{*} - y_{i,t-1}{}^{*} = \alpha'(y_{i,t-1}{}^{*} - y_{i,t-2}{}^{*}) + \beta'(x_{it}{}^{*} - x_{i,t-1}{}^{*}) + (\varepsilon_{it} - \varepsilon_{i,t-1}) \tag{4.8}$$

The problem of endogeneity persists in the first differenced Equation (4.8) since the errors ($\varepsilon_{it} - \varepsilon_{i,t-1}$) are now correlated with ($y_{it}{}^{*} - y_{i,t-1}{}^{*}$). The recommended procedure is to use either $y_{i,t-2}{}^{*}$ or ($y_{i,t-2}{}^{*} - y_{i,t-3}{}^{*}$) as instrument for ($y_{it}{}^{*} - y_{i,t-1}{}^{*}$) as the former is correlated with the latter but uncorrelated with the error terms.

It is argued that by using instruments that are sufficiently lagged, even when the problem of endogeneity exist with the explanatory variables, the GMM estimators still remain consistent (Judson & Owen, 1999; Brülhart & Sbergami, 2009). Also, stimulation studies by Judson & Owen (1999) show that the GMM procedure gain efficiency by exploiting additional moment conditions such as using all the available lagged values of both the dependent variables and the exogenous regressors as instruments. However, the consistency of the standard first difference GMM (DIF-GMM1) estimator is contingent on the regressors being weakly exogenous and the error terms being serially uncorrelated (Bowsher, 2002). Thus, there should be no second-order

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autocorrelation for the error terms. The moment conditions of Equation (4.8) for the DIF-GMM1 are given as:

$$E\,[(\,y_{i,t-1}{}^{*}).(\varepsilon_{it}-\varepsilon_{i,t-1})] = 0, \text{ for } t = 3, 4, \ldots\ldots, T \qquad (4.9)$$

$$E\,[(x_{i,t-1}{}^{*}).\,(\varepsilon_{it}-\varepsilon_{i,t-1})] = 0, \text{ for } t = 3, 4, \ldots\ldots, T \qquad (4.10)$$

Nevertheless, there are some inherent shortcomings of the differencing procedure. As can be seen from Equation (4.8), the DIFF-GMM completely eliminates the the country specific and time-invariant effects which may be important determinants of the dependent variable. This may result in incorrect model specification. Second, according to Blundell & Bond (1998), if the co-efficient of the respective lagged dependent variable, α' is persistent and closely follows a random walk, estimating such equation using the DIF-GMM estimator will yield both bias and inefficient estimate in finite samples and this becomes particularly acute when T is short such that N>T. The poor performance of the DIF-GMM estimator in such case which is evidenced by substantial finite sample bias and low precision is attributable to the use of weak instruments. It is proposed that the use of the SYS-GMM estimator will address both issues of biasedness and inconsistency of the DIF-GMM estimator (Blundell & Bond, 1998; Blundell & Bond, 2000; Blundell *et al.*, 2000).

The SYS-GMM estimator addresses the weak instrumentation problem of the DIF-GMM estimator by making use of a system of two equations, namely, the differenced equation of the DIF-GMM and an additional level equation (Blundell & Bond, 1998; Blundell & Bond, 2000; Blundell *et al.*, 2000). The combination of instruments in first differences and levels greatly improves the efficiency of the SYS-GMM estimator (Roodman, 2009a). The level equations make use of the lag differences of the endogenous variables as additional instruments. The appropriateness of these additional moment conditions is based on the assumption of correlation between the country

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specific and time-invariant effects and the explanatory variables on one hand and no correlation between the lagged differences and the country-specific effects. The moment conditions of Equation (4.8) for the one-step SYS-GMM (SYS-GMM1) are given as:

$$E\,[(y_{i,t-1}{}^{*} - y_{i,t-2}{}^{*}).\,(\upsilon_i + \varepsilon_{it})] = 0, \text{ for } t = 3, 4, \ldots\ldots, T \quad (4.11)$$

$$E\,[(x_{i,t-1}{}^{*} - x_{i,t-2}{}^{*}).\,(\upsilon_i + \varepsilon_{it})] = 0, \text{ for } t = 3, 4, \ldots\ldots, T \quad (4.12)$$

4.5 Choosing between the Difference and System GMM estimators

In the literature, two rules of thumb are outlined in choosing between the DIF-GMM and SYS-GMM estimators. The first was proposed by Blundell & Bond (1998) and later a far clearer methodology outlined by (Bond, 2002). As discussed in the previous section, according to Blundell and Bond (1998), if the dependent variable is persistent and follows a random walk, then the SYS-GMM estimator is preferable to the DIFF-GMM estimator.

The second rule of thumb as outlined by Bond (2002) is that the *ARDL*(1) models of Equations (4.4), (4.5) and (4.6) should be initially estimated using both the pooled OLS and Fixed Effects approaches. The estimated value of α' using the pooled OLS and the Fixed Effects should be considered respectively as an upper-bound estimate and lower-bound estimate. The same model is then estimated using DIF-GMM and if the estimated value of α' is lower or close to the Fixed Effects (Within estimate), it implies that the DIF-GMM is biased downward due to weak instrumentation and therefore a SYS-GMM estimation should be the preferred option. This is because, as α' is positively correlated with the error term ξ_{it}, OLS regression biases its estimated value upward whereas the FE estimation biases it downward implying that the estimated value of the true parameter should lie in or close to this range (Bond, 2002; Roodman, 2009b). Thus, even

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if a consistent estimator candidate does not lie within the range of OLS and FE estimates, it is expected not to be significantly above the OLS estimate or significantly below the FE estimate.

In choosing between either the DIF-GMM or SYS-GMM as the main estimation method for each of the Equations (4.4), (4.5) and (4.6), the study follows the Bond (2002) procedure and the estimated results are depicted in *Table 4.1*. From the Table, two variants of Equation (4.4) namely *(4.4a)* and *(4.4b)* with the growth rate and level of real GDP per capita as the respective dependent variables are estimated. Similarly, two variants of Equation (4.5) are also estimated using the rate and level of urbanization as the respective explained variables as presented in *(4.5a)* and *(4.5b)* in *Table 4.1*. For Equation (4.6), two pairs of estimations are conducted each with Poverty Headcount ratio (P_o) and Poverty Gap (P_1) as the respective dependent variables for the rates and levels of urbanization. These are indicated as *(4.6a), (4.6b), (4.6c)* and *(4.6d) in Table 4.1.*

Table 4.1: Alternative estimates for the lagged dependent variables: Equations (4.4), (4.5), (4.6).

	Urbanization causes Growth		**Growth causes Urbanization**		**Urbanization Level and Poverty**		**Urbanization Rate and Poverty**	
	Equation (4.4)		*Equation (4.5)*		*Equation (4.6)*		*Equation (4.6)*	
Estimation	*(4.4a)*	*(4.4b)*	*(4.5a)*	*(4.5b)*	*(4.6a)*	*(4.6b)*	*(4.6c)*	*(4.6d)*
Dependent Variable	ln(GDP growth rate)	ln(per-capita GDP)	ln(Urbanization level)	ln(Urbanization rate)	ln(Poverty Headcount)	ln(Poverty Gap)	ln(Poverty Headcount)	ln(Poverty Gap)
OLS	-0.09	0.875	0.924	0.649	0.768	0.768	0.746	0.702
	(0.455)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
FE (within)	-0.26	0.647	0.763	0.484	0.541	0.541	0.628	0.471
	(0.014)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
DIFF-GMM1	-0.42	0.411	0.692	0.281	0.267	0.267	0.350	0.141
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.017)
Bond (2002) Suggestion	SYS-GMM	SYS-GMM	SYS-GMM	SYS-GMM	SYS-GMM	SYS-GMM	SYS-GMM	SYS-GMM

The results from all the 8 estimations of Equations (4.4), (4.5) and (4.6) as depicted in *Table 4.1* show the coefficients of the respective lagged dependent variables from the DIF-GMM1 estimations to be closer to that of the FE estimations, implying that the DIF-GMM estimator is biased downward and hence the SYS-GMM estimator is preferable in all cases. Also, due to the

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efficiency gains associated with the use of the SYS-GMM estimator over the DIF-GMM estimator as shown in Monte Carlo simulations and various empirical studies such as Blundell & Bond (1998), Blundell & Bond (2000) and Blundell *et al.* (2000), the study opts for the former estimator. Furthermore, according to Bond & Windmeijer (2002), the SYS-GMM estimator still remains consistent in the presence of simultaneous causality bias introduced by the inclusion of both the urbanization term (u_{it}) and per capita GDP term (y_{it}) in Equations (4.4) and (4.5).

Furthermore, according to Bond (2002), the convention for most applied work using GMM estimations involves focusing on the results obtained from the one-step rather than the two-step GMM estimators. This is because various simulation studies such as Arellano and Bond (1991), Blundell and Bond (1998), Blundell *et al.* (2000), Bond and Windmeijer (2002) have shown minimal efficiency gains from using the two-step estimators, even in the presence of significant heteroskedasticity. Moreover, several simulation studies such as Bond & Windmeijer (2002) reveal high inaccuracies associated with inferences based on the two-step GMM estimators. Consequently, this study estimates and interprets the results from the one-step SYS-GMM estimator for the DPD models of Equations (4.4), (4.5) and (4.6).

4.6 GMM Specification Tests

Generally, it is proposed that after estimating a DPD model using GMM estimators, two main standard specification tests namely serial correlation tests and the test on the validity of instruments also known as the test of over-identifying restrictions are performed (Arellano & Bond, 1991). Following the convention in the literature, this study tests for both first order serial correlation [AR (1)] and second order serial correlation [AR (2)] for the *ARDL* (1) models of Equations (4.4), (4.5) and (4.6).

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Additionally, using lagged variables as moment conditions can lead to bias due to the possibility of over-fitting the endogenous regressors (Baltagi, 2005). Consequently, the study follows Bond (2002), Roodman (2009a, 2009b) and use both the Sargan test and the Hansen test as complementary test statistics of instrument validity as well as the structural specifications of the DPD models. The combination of these two standard tests of over-identifying restrictions is informed by the inherent deficiencies in each single test statistic. For instance, Monte Carlo results by Bowsher (2002) shows how the power of the Sargan test in finite samples is weakened by the use of excessive number of moment conditions/instruments. Similarly, under certain contexts, the Hansen test is also known to be weakened by instrument proliferation (Roodman, 2009a). Furthermore, the empirical study by Brülhart & Sbergami (2009) found the Sargan test to be consistently more conservative as compared to the Hansen test. Thus, a combination of the two diagnostic tests is the standard way to go (Roodman, 2009b).

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CHAPTER FIVE

RESULTS AND DISCUSSION

5.1 Introduction

This chapter is divided into three sections. The first part presents the summary statistics and the graphical depiction of the relationships among the main variables under study. The second part presents the empirical results and the standard diagnostic tests of the SYS-GMM1 econometric estimations using the "xtabond2" command of the Stata 15 statistical package. The third part discusses the empirical findings in line with the objectives of the study.

5.2 Descriptive Statistics

Prior to discussing the empirical results from the various estimations of the DPD models of Equations (4.4), (4.5) and (4.6), the study first examines some characteristic features of the data sample of SSA countries including measures of central tendency (mean) and central dispersion (standard deviation). The summary statistics of some selected variables as presented in *Table 5.1* show considerable variations within and among the sample of SSA countries. For instance, the average annual urbanization rate in the sample varied widely from the lowest rate of 0.03% during the period 2005-2010 to the highest rate of about 12% from 1990-1995 both for Rwanda. The lowest urbanization level of about 3% was recorded for Burundi within the period 1970-1975 and the highest level of 89% recorded for Gabon over the period 2015-2019.

The variation in the average annual growth rate of real per-capita GDP is also marked, with Sierra-Leone and Botswana respectively having the least and highest rates of -14% and 14% for the

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respective periods of 1995-2000 and 1970-1975. More so, expenditure-side (output-side) per-capita GDP (in real 2011 PPP-adjusted USD) ranged from a low figure of about USD438 (USD 491) for Nigeria to about USD16,000 (USD14,843) for Botswana for the periods 1995-2000 and 2015-2019 respectively.

Furthermore, immense economic structural variations persist within and across the sample of SSA countries. For instance, whereas the agricultural sector's average annual contribution to GDP was a little over 2% in Botswana for the period 2015-2019, it was as high as 71% for Uganda between 1975-1980. The measure of productivity and hence rural-urban wage differentials was as low as 0.2% for Cameroon during 1970-1980 and as high as 110% for Gambia during the time interval of 2000-2005. Additionally, on poverty indices, substantial variations can be seen across the sample. Noteworthy, Gabon and DR Congo are each on the opposite sides of the poverty indices, with respective poverty headcount ratio and poverty gap being about 3% and 1% for Gabon for the period 2015-2019 and 94% and 65% for DR Congo during the 1985-1995 period. The Gini Index also varied widely across time and space, being 29% for Burundi for the time interval 1985-1990 and 66% for Malawi for the period 1995-2000.

The study also employs graphical tools to provide a pictorial description of how the various relationships being investigated are portrayed in the data sample. However, due to the absence of control mechanisms and various diagnostic tests, not much inference can be made from these graphical results. *Figures 5.1* and *5.2* respectively depict positive relationships between the level of urbanization and GDP per-capita (expenditure-side and output-side) and urbanization rate and GDP per-capita growth rate. These relationships are both in line with the empirical literature.

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Table 5.1: Summary statistics of some selected variables in the sample of SSA countries.

Variable	Mean	Standard Deviation	Minimum	Maximum
Urbanization rate	2.12	1.66	0.03	11.94
Urbanization level	30.66	16.89	3.11	88.95
GDP growth per-capita	0.96	0.04	-14.25	14.08
GDP per-capita (output-side)	2,620.26	2,711.33	490.98	14,842.71
GDP per-capita (expenditure-side)	2,566.36	2,716.19	437.46	16,249.55
Primacy	39.00	15.09	11.05	96.47
Population density	62.44	74.25	1.18	486.00
Government share	19.20	11.59	3.70	66.61
Population growth	2.69	0.83	-4.44	6.14
Life expectancy	52.13	7.07	21.79	69.10
Fertility	5.92	1.17	2.41	8.43
Trade share	32.44	28.03	4.31	203.55
Investment share	16.54	10.17	2.04	65.00
Tertiary education	3.75	4.32	0.06	27.00
Agriculture share	28.95	15.05	2.06	70.93
Industry share	23.74	13.66	4.79	73.83
Services share	42.46	10.00	13.93	66.47
Rural-Urban wage differentials	26.85	20.64	0.23	110.10
Agriculture value-added growth	3.36	3.38	-7.96	18.28
Industry value-added growth	5.77	18.34	-17.06	300.00
Services value-added growth	4.43	3.70	-10.78	19.90
Poverty Gap	23.96	13.87	0.80	64.50
Poverty Headcount	53.58	20.74	3.40	94.60
Gini Index	44.75	7.54	28.50	65.80

Note: Excepting GDP per-capita (both output-side and expenditure-side), Population density, Life expectancy and Fertility, the figures for all variables are in percentages.

Figure 5.1: GDP per-capita and Urbanization level: 1970-2019

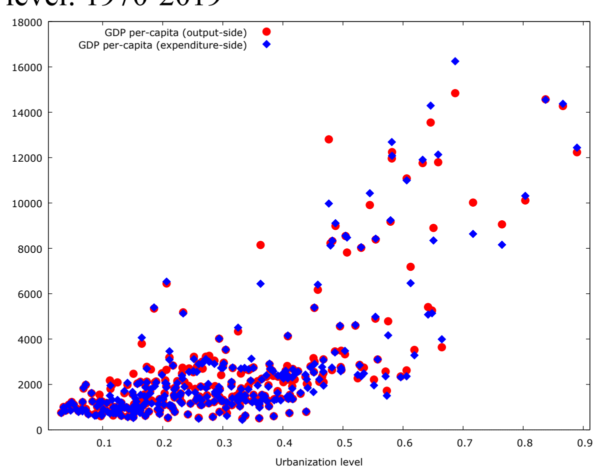
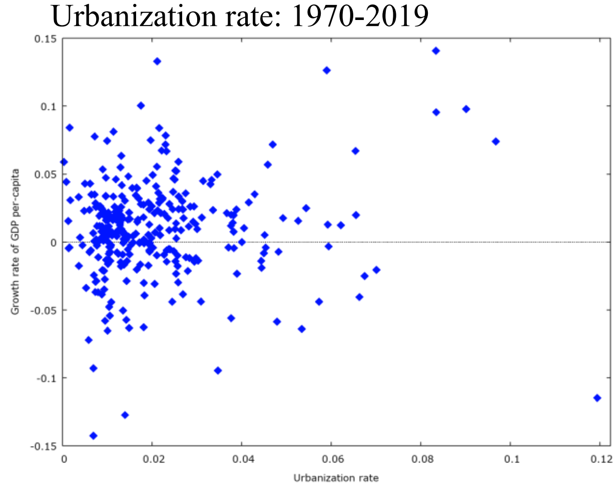


Figure 5.2: GDP per-capita growth and Urbanization rate: 1970-2019



On the variables representing the structure of the economy, the pictorial representation of the sectoral income shares showing negative, positive and positive relationships respectively for agriculture, industry and services sectors with the level of urbanization as depicted in *Figure 5.3*,

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are all in line with the literature. However, as shown in *Figure 5.4*, the relationship between urbanization rate and the sectoral value-added growths are not clearly depicted.

Figure 5.3: Urbanization level and sectoral GDP shares: 1970-2019.

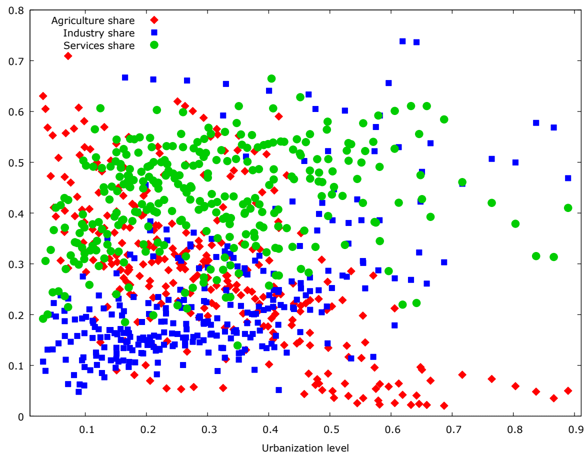
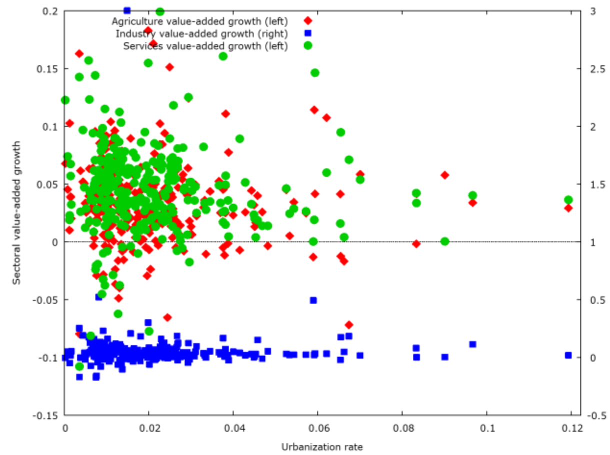


Figure 5.4: Urbanization rate and sectoral value-added growths: 1970-2019.



The graphical representations of the relationships between urbanization (level and rate) and the poverty indices (Headcount ratio and Poverty gap) are also depicted in *Figures 5.5* and *5.6.* The strong negative correlations between the level of urbanization and the poverty indices in *Figure 5.5* attests to the poverty reduction effect of urbanization. However, that between urbanization rate and the poverty indices as depicted in *Figure 5.6* is not clearly observable.

Figure 5.5: Urbanization level and Poverty indices: 1985-2019

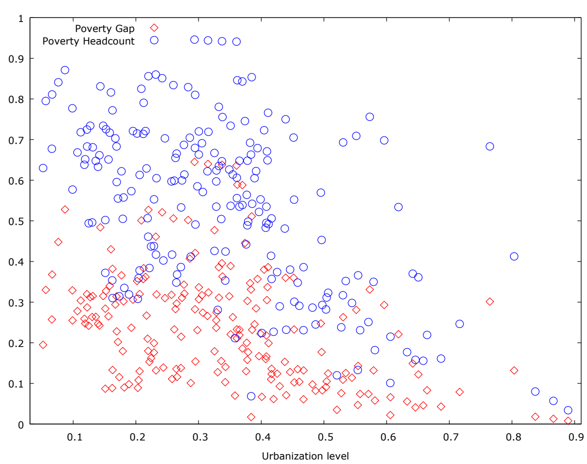
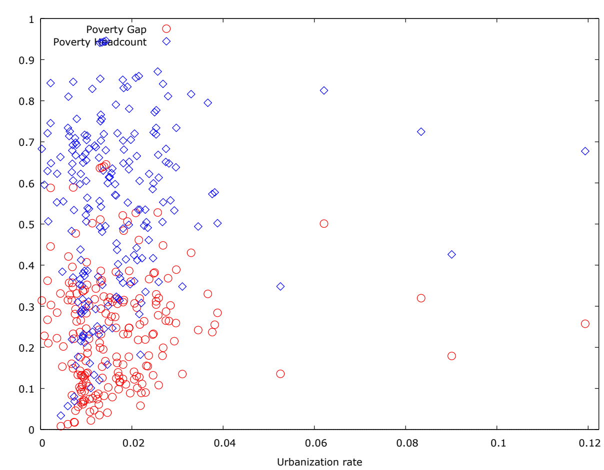


Figure 5.6: Urbanization rate and Poverty indices: 1985-2019



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5.3 Econometric Results

The one-step SYS-GMM estimations of the DPD models of Equations (4.4), (4.5) and (4.6) are presented in *Tables 5.2-5.9*. In particular, the respective results for urbanization as an engine of economic growth [Equation (4.4)] and as a product of economic growth [Equation (4.5)] for the rates and levels of urbanization are divulged in *Tables 5.2, 5.3* and *5.4, 5.5*. Similarly, that for the effect of urbanization (rate and level) on poverty indices, namely the Poverty Headcount ratio (P_0) and Poverty Gap (P_1) of Equation (6) are correspondingly presented in *Tables 5.7* and *5.8*. The (robust) standard errors are reported in parentheses for all estimations. Notably, in all the econometric estimations, the maximum lag length of the variables and instruments are restricted to three (3), which according to the Monte Carlo simulations of Bowsher (2002) maximizes the power of the Sargan test.

It is worthy to note that all the 8 regression estimations of the DPD models of Equations (4.4), (4.5) and (4.6) were conducted at 95% confidence interval. Also, all the standard specification and diagnostic tests are in order. Specifically, a perusal of the results shows that in 7 out of the 8 estimations the respective magnitudes of the AR (1) have the preferred negative signs. Also, the AR (2) is not significant in all the DPD estimations. The respective p-values for the AR (1) and AR (2) ranges from 0.01-0.82 and 0.11-0.65. Most importantly, the AR (2) not being significant in all the dynamic estimations means that the lag terms of the respective dependent variables used as instruments are exogenous and therefore valid instruments, hence, confirming the appropriateness of the DPD models used for this study.

The tests for the structural specifications and moment conditions of the DPD models in the study follows Roodman (2009a, 2009b) and uses the collapsed option to prevent the proliferation of instruments which according to the Monte Carlo studies by Andersen & Sørensen (1996) and

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Bowsher (2002) weakens the Hansen J-test. All the associated p-values for the J-statistics are not significant and ranges from 0.13-0.59. Thus, the J-statistics for all estimations fall within the generally acceptable p-value range of 0.10-0.60 with 50% of the estimations being within the "Goldilocks range" of 0.10-0.25 (Roodman, 2009a). Also, the complimentary Sargan test for instrument validity is not significant at 5% level for all estimations but one, with the p-values ranging from 0.07-0.74. Furthermore, the overall significance of each regression as indicated by the F-test statistic is significant at 1% level for all estimations. Thus, the overall results from these standard diagnostic tests confirm the validity of the structural specifications and moment conditions used in estimating the DPD models in the study.

It is also pertinent to note that in estimating Equations (4.4) and (4.5) where the direction of causation between urbanization and economic growth are respectively being investigated, lag1 elasticities are estimated and compared rather than contemporaneous elasticities due to the collinearity problems caused by the inclusion of the contemporaneous term for the respective main dependent variables. However, for the relationship between urbanization and the poverty indices in Equation (4.6) where causality investigations are absent, contemporaneous elasticities are estimated and compared. Furthermore, including all three sectorial shares and value-added growth rates respectively in a single regression for Equation (4.5) introduced collinearity issues. This study followed the literature and accordingly replaced both Industry share of GDP and Services share of GDP with Non-Agriculture share of GDP and both Industry value-added growth and Services value-added growth with Non-Agriculture value added growth.

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5.4 Discussion of Results

This section discusses the main results of the econometric estimations in two main parts sub-divided into five sections. The first part discusses the results of the urbanization as an engine of growth [Equation (4.4)] and as a product of growth [Equation (4.5)] and additionally compares the urbanization and per capita GDP elasticities respectively for the growth rates regressions (urbanization rate and GDP per capita growth rate) and levels regressions (urbanization level and level of GDP per capita). The second part discuss the results on the poverty reduction effect of urbanization [Equation (4.6)] and compares the urbanization elasticities of poverty at growth rates (urbanization rate and poverty indices) and levels (urbanization level and poverty indices).

5.4.1 Urbanization as an engine of Economic Growth

The results from the dynamic panel one-step SYS-GMM estimation of the traditional and dominant view point of urbanization-led economic growth as modelled in Equation (4.4) are presented in *Tables 5.2* and *5.3.* The results from the Tables show that urbanization has a positive effect on real per-capita GDP in SSA at both growth rates and levels. This is evidently shown by the positive and significant coefficients of the urbanization variables *Lagged[ln(Urbanization rate)] and Lagged[ln(Urbanization level)]* in both the short run and long run. These variables are also the (lag1) urbanization elasticities at growth rates and levels respectively. Also, the magnitude of the urbanization elasticity at growth rates (levels) decreases (increases) from 0.2 (0.27) in the short run to 0.1(0.92) in the long run, suggesting diminishing (increasing) effect of urbanization on per capita GDP growth rate (level) over time.

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Table 5.2: Dynamic Panel one-step SYS-GMM estimation of changes in Urbanization rate as engine of economic growth: 1970-2019.

Estimation	***Urbanization Rate and Economic Growth***	
Dependent Variable: ln(per-capita GDP growth)	One-step SYS-GMM (1)	One-step SYS-GMM (2)
Lagged [ln(per-capita GDP growth)]	-0.60	-0.37
	(0.25)**	(0.10)***
Lagged [ln(Urbanization rate)]	0.02	0.01
	(0.01)**	(0.004)***
Squared (Urbanization rate)	-6.64	-4.16
	(2.81)**	(1.51)***
ln(Initial per-capita GDP)	-0.03	-0.02
	(0.01)***	(0.004)***
ln(Trade share)	0.02	0.01
	(0.01)***	(0.004)***
ln(Investment share)	0.02	0.01
	(0.01)***	(0.004)***
ln(Tertiary education)	0.01	0.01
	(0.01)**	(0.002)***
ln(Government share)	-0.02	-0.01
	(0.01)***	(0.01)***
Lag3(Population growth)	0.09	
	(0.44)	
Lag3(Fertility)	0.01	
	-0.01	
Lag2(Life expectancy)	-0.0003	
	(0.001)	
Population density	0.0001	
	(0.0001)	
ln(Primacy)	-0.02	-0.01
	(0.01)**	(0.01)**
Constant	0.32	
	(0.10)***	
Countries	30	
T	10	
Observations	210	
No. of Instruments	28	
F-test	3.76	
	(0.00)	
AR(1)	-0.23	
	(0.82)	
AR(2)	-1.44	
	(0.15)	
Sargan	19	
	(0.17)	
Hansen	18.96	
	(0.17)	

Notes: * / ** /*** indicate statistically significant levels at respectively 10% / 5% / 1%. The standard errors (robust) of the parameters in parentheses. The p-values of the F, AR (1), AR (2), Sargan and Hansen tests in parentheses. The panel data time span is from 1970 to 2019 and the variables are calculated over 5-year intervals. Also, (1) = short run estimates; (2) = long run estimates.

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Table 5.3: Dynamic Panel one-step SYS-GMM estimation of Urbanization level as an engine of real per-capita income: 1970-2019.

Estimation	***Urbanization Level and per-capita GDP***	
Dependent Variable: ln(per-capita GDP)	One-step SYS-GMM (1)	One-step SYS-GMM (2)
Lagged [ln(per-capita GDP)]	0.70	2.36
	(0.08)***	(0.88)***
Lagged [ln(Urbanization level)]	0.27	0.92
	(0.13)**	(0.42)**
Lagged [ln(Trade share)]	0.31	1.03
	(0.12)***	(0.33)***
Investment share	2.32	7.77
	(0.77)***	(2.63)***
Lag3(Tertiary education)	2.96	-0.57
	(1.71)*	(0.27)**
Lagged [ln(Government share)]	-0.17	-0.57
	(0.07)**	(0.27)**
Lag3(Population growth)	-4.82	-16.16
	(2.58)*	(8.68)*
Lag3(Fertility)	0.13	0.43
	(0.06)**	(0.20)**
Lag3(Life expectancy)	0.006	
	(0.01)	
Population density	0.002	0.01
	(0.001)***	(0.002)***
Primacy	-0.24	
	(0.35)	
Time	-0.06	-0.19
	(0.02)**	(0.06)***
Constant	6.53	
	(2.63)**	
Countries	30	
T	10	
Observations	210	
No. of Instruments	32	
F-test	72.36	
	(0.00)	
AR(1)	-1.99	
	(0.47)	
AR(2)	-1.44	
	(0.15)	
Sargan	28.58	
	(0.07)	
Hansen	24.17	
	(0.19)	

Notes: * / ** /*** indicate statistically significant levels at respectively 10% / 5% / 1%. The standard errors (robust) of the parameters in parentheses. The p-values of the F, AR (1), AR (2), Sargan and Hansen tests in parentheses. The panel data time span is from 1970 to 2019 and the variables are calculated over 5-year intervals. Also, (1) = short run estimates; (2) = long run estimates.

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Also at growth rates in Table 5.2, the *Squared(Urbanization rate)* term is also rightly negative and significant in both the short run and long run, a result in line with the findings of Nguyen & Nguyen (2018) and Liddle (2017) of a non-linear relationship between urbanization rate and economic growth. Additionally, the falling (absolute) magnitude of its coefficient from 6.64 to 4.16 augments the result of diminishing marginal growth effect of urban agglomeration over time.

In simple terms, these results are in line with the findings from the review study of Rosenthal and Strange (2004) and suggest the presence of positive urban agglomeration economies in cities in SSA, thus supporting the traditional viewpoint of urbanization-led economic growth. Specifically, these results are also converse to the findings of Henderson (2003a, 2003b), Polese (2005), Bloom *et al.* (2008) that urbanization per se had no significant growth promoting effects.

Trade share, which measures the degree of openness of an economy to the rest of the world is positive and significant at 1% throughout for both the growth rates and levels regressions. This result is also in line with the findings of Fay & Opal (2000), Jedwab (2013) and Gollin *et al.*(2016) and thus provide support for the openness hypothesis that globalization spurs economic growth and development in current developing countries. Additionally, at both growth rates and levels, two variables which are fundamental to the empirics of the Solow growth model namely Investment share and Tertiary education are each positive and significant in both the short run and the long, thereby reinforcing the findings of Sala-i-Martin *et al.* (2004) and Brülhart & Sbergami (2009). Also, in addition to the elasticity variables, both *Trade share and Investment share* variables exhibit diminishing (increasing) effects at growth rates (levels) over time.

Furthermore, three sets of control variables are used in both regressions. The first set involves two agglomeration variables namely Population density and Primacy. The former (latter) has a significantly negative (positive) effect on per capita GDP at growth rates (levels) in both the short

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run and the long run. The former result is also in line with the findings of Henderson (2002) that suggest the presence of urban agglomeration diseconomies in some primate cities in SSA, resulting from excessive urban concentration. However, the effects of such diseconomies diminish over time, evidenced by the falling magnitude of the *ln(Primacy)* variable from 0.02 in the short run to 0.01 in the long run in Table 5.2, which may imply that SSA countries are gradually improving their management of primate cities as advised by Collier & Venables (2017) and/or developing secondary cities to ease concentration in primate cities as suggested by Christiaensen *et al.* (2013).

The second set of control variables involves Government share whose negative and significant effect at both growth rates and levels is in line with the findings of Brülhart and Sbergami (2009). The third set of controls variables feature the demographic variables namely population growth, fertility and life expectancy. For the growth rates regression, none of these demographic variables have any significant effect on per capita GDP growth as shown in *Table 5.2*. However, at levels regression in *Table 5.3,* both population growth and fertility have respectively negative and positive lag effects on economic growth in both the short run and the long run.

5.4.2 Urbanization as a product of Economic Growth

The results from the one-step SYS-GMM estimation of the DPD model of Equation (4.5) whereby urbanization is seen as a product of economic growth are presented in *Tables 5.4* and *5.5.* Here, the growth rate (level) of real per-capita GDP is seen to have a positive and significant effect on urbanization rate (level). These are indicated by the significance of the variables *Lagged[ln(per-capita GDP growth)] and Lagged[ln(per-capita GDP)]* in both the short run and long run. These variables are also the (lag1) per capita GDP elasticities. Also, at growth rates in Table 5.4, the *Squared(per-capita GDP growth)* variable is significant at 1% level in both the short run and the

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long run, thereby reinforcing the previous findings in *Section 5.4.1* of a non-linear relationship between urbanization and economic growth. In simple terms, these results support the growth-led urbanization viewpoint.

The effects of structural variables of the economy on urbanization are mixed. Agriculture valued added growth which is a measure of the productivity growth in the agriculture sector is negative (positive) and significant in both the short run and the long run at growth rates (levels). These conflicting results are both supported in the literature. For instance, the introduction of potatoes which led to increased agriculture productivity is credited with about a 25% of the population growth and urbanization in the old World between 1700 and 1900 (Nunn & Qian, 2011), and more recently, the green revolution that occurred in East Asia during 1965-1990 raised agricultural productivity which then served as a rural push factor that released surplus rural labour to urban areas to spur urbanization (Gollin *et al.*, 2018). Conversely, the study by Fay & Opal (2000) found that agriculture value-added growth slowed the rate of urbanization.

Furthermore, non-agriculture value-added growth is never significant. Perhaps, this latter result could give credence to the findings of Fay & Opal (2000), Gollin *et al.* (2016) and Jedwab *et al.* (2017) on urbanization occurring without the expected traditional structural transformation in SSA. Also, in consonance with the findings of Fay & Opal (2000), both the magnitude and significance of the variable *Rural-Urban wage differentials* increase with time for both growth rates and levels regressions in *Table 5.4* and 5.*5* respectively, implying that rural-urban wage gap is an important urban pull factor in SSA, albeit, its effect is more pronounced in the long run. Additionally, at growth rates, higher education represented by *Lag3[ln(Tertiary education)]* is positive and significant throughout, a result in accordance with the general findings in the literature that higher education promotes rural to urban migration.

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Table 5.4: Dynamic Panel one-step SYS-GMM estimation of changes in urbanization as product of economic growth: 1970 – 2019.

Estimation	***Economic Growth and Urbanization Rate***	
Dependent Variable: ln(Urbanization rate)	One-step SYS-GMM (1)	One-step SYS-GMM (2)
Lagged [ln(Urbanization rate)]	0.50	1.01
	(0.12)***	(0.48)**
Lagged [ln(per-capita GDP growth]	5.30	10.68
	(2.33)**	(5.20)**
Squared (per-capita GDP growth)	37.17	74.88
	(11.41)***	(22.79)***
Initial Urbanization level	-2.17	-4.38
	(0.70)***	(0.97)***
Lag1 (Agriculture value-added growth)	-4.81	-9.69
	(1.74)***	(3.25)***
Lag3 (Non-Agriculture value-added growth)	0.09	
	(0.30)	
Rural-Urban wage differentials	0.42	0.85
	(0.21)*	(0.39)**
Lag3 [ln(Tertiary education)]	0.17	0.35
	(0.06)***	(0.15)**
Post1980	-0.30	-0.60
	(0.11)**	(0.29)**
Lagged [ln(Population density)]	-0.0004	
	(0.001)	
Lag3 (Primacy)	-0.37	
	(0.24)	
Time	-0.07	-0.15
	(0.03)**	(0.05)***
Constant	4.60	
	(1.84)**	
Countries	30	
T	10	
Observations	210	
No. of Instruments	31	
F-test	89.65	
	(0.00)	
AR(1)	-1.92	
	(0.06)	
AR(2)	-1.61	
	(0.11)	
Sargan	17.28	
	(0.50)	
Hansen	15.93	
	(0.59)	

Notes: * / ** /*** indicate statistically significant levels at respectively 10% / 5% / 1%. The standard errors (robust) of the parameters in parentheses. The p-values of the F, AR (1), AR (2), Sargan and Hansen tests in parentheses. The panel data time span is from 1970 to 2019 and the variables are calculated over 5-year intervals. Also, (1) = short run estimates; (2) = long run estimates.

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Table 5.5: Dynamic Panel one-step SYS-GMM estimation of urbanization level as a product of real per-capita GDP: 1970-2019.

Estimation	***Per-capita GDP and Urbanization Level***	
Dependent Variable: ln(Urbanization level)	One-step SYS-GMM (1)	One-step SYS-GMM (2)
Lagged [ln(Urbanization level)]	0.84	5.44
	(0.05)***	(1.86)***
Lagged [ln(per-capita GDP)]	0.03	0.21
	(0.01)**	(0.09)**
ln(Agriculture share)	-0.003	
	(0.02)	
Lag2[ln (Non-Agriculture share)]	0.11	0.72
	(0.06)*	(0.29)**
ln(Agriculture value-added growth)	0.43	2.76
	(0.21)**	(1.10)**
ln(Non-Agriculture value-added growth)	0.20	
	(0.15)	
Lagged (Rural-Urban wage differentials)	0.09	0.59
	(0.04)**	(0.21)***
Lag3 [ln(Tertiary education)]	0.00	
	(0.01)	
Population density	-0.0002	-0.001
	(0.0001)*	(0.001)***
Lag3[ln(Primacy)]	0.06	
	(0.06)	
Constant	-0.36	
	(0.15)**	
Countries	30	
T	10	
Observations	210	
No. of Instruments	27	
F-test	1391.25	
	(0.00)	
AR(1)	1.29	
	(0.20)	
AR(2)	-1.15	
	(0.25)	
Sargan	17.7	
	(0.54)	
Hansen	20.15	
	(0.39)	

Notes: * / ** /*** indicate statistically significant levels at respectively 10% / 5% / 1%. The standard errors (robust) of the parameters in parentheses. The p-values of the F, AR (1), AR (2), Sargan and Hansen tests in parentheses. The panel data time span is from 1970 to 2019 and the variables are calculated over 5-year intervals. Also, (1) = short run estimates; (2) = long run estimates.

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Furthermore, this study specifically tests the findings of Fay & Opal (2000) that the speed of urbanization in SSA was faster than expected prior to 1980 and slower than expected post 1980. This is done via the inclusion of the *Post1980* binary dummy as a separate regressor in the growth rate estimation and as shown in Table 5.4, its coefficient is negative and significant throughout, and thus supports the previous findings of Fay & Opal (2000). According to Annez & Buckley (2009), one explanation for this result is that just like the China's hukou system, in most SSA countries prior to independence the colonial powers actively restricted rural to urban migration. However, post-independence in the 1960s and 1970s when such restrictions were no more, rapid rural to urban migrations occurred until after the early 1980s when it gradually eased.

5.4.3 Comparing Urbanization and Economic growth elasticities

As discussed earlier, the estimated results for the growth rates presented in *Tables 5.2* and *5.4* show a bi-directional causation between urbanization rate and the growth rate of GDP per capita with the implication that urbanization is respectively an engine and product of growth. Also, at the levels, the same bi-directional causal relationship is observable between the level of urbanization and the level of GDP per capita in *Tables 5.3* and *5.5.*

Given the findings of a bi-directional causal connection between urbanization and economic growth from both the growth rates regressions (urbanization rate and GDP per capita growth rate) and levels regressions (urbanization level and level of GDP per capita), it presupposes that comparative analyses of the magnitudes and significances of the respective elasticities are required to ascertain which effect is stronger in the short-term vis-a vis the long-term or both. *Table 5.6* presents the 8 elasticities estimated from Equations (4.4) and (4.5) with 4 elasticities each for the growth rates and levels regressions.

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The analysis of the elasticities of the growth rates from *Table 5.6* show that at almost the same significance level, the estimated short run and long run urbanization elasticities of growth (growth elasticities of urbanization) are respectively 0.02 (5.30) and 0.01 (10.68). These results show that in both the short run and long run, the magnitudes of the urbanization elasticities of growth are consistently smaller than the magnitudes of the growth elasticities of urbanization. The implies that the effect of urbanization rate on GDP per capita growth is weaker than the converse effect. Consequently, this comparative result provides empirical support for the viewpoint that urbanization is a product of economic growth.

However, the results from the same *Table 5.6* for the levels of urbanization and GDP per capita show converse findings which are also consistent in both the short run and the long run. Particularly, at the same level of significance, the estimated short run and long run urbanization elasticities of growth (growth elasticities of urbanization) are respectively 0.27 (0.03) and 0.92 (0.21). Again, this implies that the effect of urbanization level on the level of GDP per capita is stronger than the reverse effect. Consequently, this result also provides empirical support for the viewpoint that urbanization is an engine of economic growth.

The consistencies in these contrasting results from the comparative analyses of both the growth rates and levels perspectives strongly confirm the existence of a bi-directional causation relationship between urbanization and economic growth in SSA. This result is also in line with the findings of Liddle & Messinis (2015) and Henderson *et al.* (2013) for SSA countries and Nguyen & Nguyen (2018) for ASEAN countries. Most importantly, this result provides empirical support for the main research theme in the new growth theory, modern economic geography and new urban economics literature that emphasize the complementary relationship between spatial

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agglomeration of economic activities and economic growth and development (Martin & Ottaviano, 1999; Fujita *et al.*, 2003; Baldwin & Martin, 2004). [14]

Table 5.6: Comparing the growth rates and levels elasticities of urbanization and per-capita GDP: 1970-2019.

	Growth rates of Urbanization and GDP per capita			**Levels of Urbanization and GDP per capita**		
Estimated Equation	*4.4*	*4.5*		*4.4*	*4.5*	
Table No.	*Table E.2*	*Table E.4*		*Table E.3*	*Table E.5*	
Dependent Variable	ln(GDP growth rate)	ln(Urbanization rate)	*Dominant causality*	ln(GDP per capita)	ln(Urbanization level)	*Dominant causality*
Main Explanatory Variable	Lagged [ln(Urbanization rate)]	Lagged [ln(GDP growth rate)]		Lagged [ln(Urbanization level)]	Lagged ln(per capita GDP)]	
Shortrun elasticity	0.02 (0.01)**	5.30 (2.33)**	*Economic growth*	0.27 (0.13)**	0.03 (0.01)**	*Urbanization*
Longrun elasticity	0.01 (0.004)***	10.68 (5.20)**	*Economic growth*	0.92 (0.42)**	0.21 (0.09)**	*Urbanization*

5.4.4 Urbanization as an engine of Poverty Reduction

Tables 5.7 and *5.8* present the results of the one-step SYS-GMM estimation of the DPD model of Equation (4.6) for urbanization as an engine of poverty reduction correspondingly for the Poverty Headcount (P_0) and Poverty Gap (P_1) indices. Generally, the results from both tables show that urbanization had had a positive effect on poverty in SSA. Some of the clearly observable patterns are discussed as follows. First, the correlation between urbanization and poverty is stronger in both magnitude and significance for the level of urbanization as compared to the rate of urbanization for the same poverty index. For example, for P_1 in *Table 5.8*, the respective estimated short run and long run coefficient of the urbanization level (rate) variable are 0.32 (0.08) and 0.63 (0.13) at corresponding 5% (5%) and 1% (5%) significant levels.

[14]The two-way causal relationship between urbanization and economic growth is additionally confirmed using the econometric methodology proposed by Dumitrescu & Hurlin (2012) to test Granger (1969) non-causality in heterogeneous panel data. Appendix E briefly describes both the Granger (1969) causality test technique and its extension proposed by Dumitrescu & Hurlin (2012). The associated panel unit roots tests and non-causality results for the variables *Urbanization rate* and *GDP per capita growth rate* are also presented and discussed.

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Second, the poverty reduction effect of urban agglomeration is stronger in the long run as compared to the short run for the same poverty index. Again, from *Table 5.8* for P_1, the absolute short run (long run) magnitudes of the agglomeration variables *ln(Urbanization level)* and *ln(Urbanization rate)* are respectively 0.32 (0.63) and 0.08 (0.13). This pattern is also observable for P_0 in *Table 5.7*. Generally, it is observable that the poverty reduction effect of urban agglomeration increases with time as evidenced by the increasing urbanization elasticities of poverty for both the Poverty Headcount ratio and Poverty Gap.

Third, both the growth rate and initial level of per-capita GDP are generally seen to have a significant poverty reduction effect in all 4 estimations of the DPD model of Equation (4.6), a result in line with the literature and specifically in support of the findings of Dollar & Kraay (2002), Fosu (2009), Dollar *et al.* (2016), Fosu (2017) and Bourguignon (2003) that high level of per capita GDP and/or the growth rate of per capita GDP is a boon to poverty reduction. Particularly, it can be observed from *Tables 5.7* and 5.8 that the variables *ln(per-capita GDP growth), Squared(per capita GDP growth)* and *ln(Initial per-capita GDP)* are all negative and generally significant for both P_0 and P_1. The generally significant *Squared(per capita GDP growth)* variable confirm the existence of a non-linear relationship between per-capita GDP growth rate and the poverty indices.

Fourth, the (absolute) magnitude of the growth elasticity of poverty *ln(per-capita GDP growth)* increases throughout with time. It increases respectively from 0.88 (1.32) to 2.07 (2.30) for P_0 (P_1) in the short run and long run for the rates of urbanization as presented in *Table 5.7 (Table 5.8)*. More so, throughout the estimations, the growth elasticity of poverty is positively related to the initial level of per-capita GDP, a result which reinforces the findings of Bourguignon (2003), Kalwij & Verschoor (2007) and Fosu (2017) that low income is a bane to poverty reduction.

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Table 5.7: Dynamic Panel one-step SYS-GMM estimation of urbanization as an engine of poverty reduction (Poverty Headcount): 1985-2019.

Estimation	***Urbanization Rate and Poverty Headcount***		***Urbanization Level and Poverty Headcount***	
Dependent Variable: ln(Poverty Headcount)	One-step SYS-GMM (1)	One-step SYS-GMM (2)	One-step SYS-GMM (1)	One-step SYS-GMM (2)
Lagged [ln(Poverty Headcount)]	0.57	1.34	0.47	0.88
	(0.15)***	(0.80)*	(0.19)**	(0.66)
ln(Urbanization rate)	-0.05	-0.11		
	(0.02)*	(0.06)*		
ln(Urbanization level)			-0.30	-0.57
			(0.11)***	(0.29)**
ln(per-capita GDP growth)	-0.88	-2.07	-0.69	
	(0.39)**	(1.04)**	(0.44)	
Squared (per capita GDP growth)	-8.34	-19.51	-12.82	-24.03
	(3.54)**	(12.06)	(5.49)**	(11.61)**
ln(Inequality growth)	0.49	1.14	0.28	
	(0.17)***	(0.57)**	(0.28)	
Squared (Inequality growth)	0.54		-1.05	-1.97
	(0.42)		(0.46)**	(1.18)*
ln(Initial Inequality)	0.17		0.12	
	(0.14)		(0.19)	
ln(Initial per-capita GDP)	-0.08		-0.14	-0.26
	(0.08)		(0.07)**	(0.13)**
Initial Urbanization level	-0.13	-0.30		
	(0.06)**	(0.13)**		
Urbanization level*Inequality Level	0.87		2.19	4.10
	(0.95)		(0.95)**	(1.69)**
Urbanization level*per-capita GDP	-0.0001	-0.0002	-0.0001	-0.0002
	(0.0001)*	(0.0001)**	(0.0001)**	(0.0001)***
Time	-0.07	-0.16	-0.07	-0.13
	(0.01)***	(0.06)***	(0.03)**	(0.04)***
Constant	0.28		0.51	
	(0.95)		(0.51)	
Countries	29		29	
T	7		7	
Observations	174		145	
No. of Instruments	23		23	
F-test	90.75		76.06	
	(0.00)		(0.00)	
AR(1)	-1.63		-1.23	
	(0.10)		(0.22)	
AR(2)	-0.98		0.46	
	(0.33)		(0.65)	
Sargan	26.94		14.53	
	(0.003)		(0.21)	
Hansen	10.68		11.1	
	(0.38)		(0.44)	

Notes: * / ** /*** indicate statistically significant levels at respectively 10% / 5% / 1%. The standard errors (robust) of the parameters in parentheses. The p-values of the F, AR (1), AR (2), Sargan and Hansen tests in parentheses. The panel data time span is from 1970 to 2019 and the variables are calculated over 5-year intervals. Also, (1) = short run estimates; (2) = long run estimates.

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Table 5.8: Dynamic Panel one-step SYS-GMM estimation of urbanization as an engine of poverty reduction: (Poverty Gap): 1985-2019.

Estimation	***Urbanization Rate and Poverty Gap***		***Urbanization Level and Poverty Gap***	
Dependent Variable: ln(Poverty Gap)	One-step SYS-GMM (1)	One-step SYS-GMM (2)	One-step SYS-GMM (1)	One-step SYS-GMM (2)
Lagged [ln(Poverty Gap)]	0.42	0.74	0.49	0.96
	(0.13)***	(0.38)*	(0.12)***	(0.48)**
ln(Urbanization rate)	-0.08	-0.13		
	(0.04)**	(0.06)**		
ln(Urbanization level)			-0.32	-0.63
			(0.13)**	(0.21)***
ln(per-capita GDP growth)	-1.32	-2.30	-1.08	-2.12
	(0.59)**	(1.11)**	(0.63)*	(1.41)
Squared (per capita GDP growth)	-9.95	-17.28	-12.02	-23.62
	(4.33)**	(9.44)*	(4.47)**	(11.38)**
ln(Inequality growth)	0.76	1.32	0.63	1.25
	(0.28)**	(0.61)**	(0.29)**	(0.72)*
Squared (Inequality growth)	0.69		0.32	
	(0.58)		(0.67)	
Initial Inequality	0.20		0.06	
	(0.24)		(0.21)	
Initial per-capita GDP	-0.20	-0.35	-0.20	-0.38
	(0.09)**	(0.15)**	(0.07)**	(0.15)**
ln(Initial Urbanization level)	-0.28	-0.49		
	(0.11)**	(0.15)***		
Urbanization level*Inequality Level	-0.0001	5.05	3.21	6.30
	(0.0001)**	(1.83)**	(1.45)**	(1.83)***
Urbanization level*per-capita GDP	2.91	-0.0002	-0.0001	-0.0003
	(1.37)**	(0.0001)***	(0.0001)**	(0.0001)***
Time	-0.12	-0.21	-0.09	-0.18
	(0.03)***	(0.04)***	(0.02)***	(0.04)***
Constant	0.17		0.33	
	(0.75)		(0.66)	
Countries	29		29	
T	7		7	
Observations	174		174	
No. of Instruments	29		29	
F-test	117.95		144.20	
	(0.00)		(0.00)	
AR(1)	-2.51		-2.66	
	(0.01)		(0.01)	
AR(2)	-1.45		-1.55	
	(0.15)		(0.12)	
Sargan	12.01		16.82	
	(0.74)		(0.47)	
Hansen	22.57		21.49	
	(0.13)		(0.21)	

Notes: * / ** /*** indicate statistically significant levels at respectively 10% / 5% / 1%. The standard errors (robust) of the parameters in parentheses. The p-values of the F, AR (1), AR (2), Sargan and Hansen tests in parentheses. The panel data time span is from 1970 to 2019 and the variables are calculated over 5-year intervals. Also, (1) = short run estimates; (2) = long run estimates.

Fifth, the results on the effect of income inequality on poverty reduction are mixed. The variable *ln(Inequality growth)* generally has a significant and negative effect on poverty reduction for both P_0 and P_1 which is line with the literature. However, the results for the initial level of inequality, although with the right positive coefficients, are never significant. The former result support the

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findings of Fosu (2009, 2017) and Kalwij & Verschoor (2007) that initial and/or growing inequality hurt poverty reduction efforts. Interestingly, these results also contrast the findings of Dollar & Kraay (2002) and Dollar *et al.* (2016) that growth in income of the poor are uncorrelated with both the initial and growth in income distribution. Furthermore, the variable *Squared (Inequality growth)* was just significant for only the urbanization level estimations for P_0 in *Table 5.7*, suggesting a weak non-linear relationship between urbanization and income inequality.

Sixth, the generally significant negative and positive coefficients respectively for the interaction effect variables (*Urbanization level*per-capita GDP)* and (*Urbanization level*Inequality Level*) show that the poverty reduction effect of urbanization is amplified by economic growth and attenuated by inequality growth. The former results confirm the synergistic complementary relationship between the spatial agglomeration of economic activities and economic growth as discussed in the previous *Section 5.4.3.* Seventh, the control variable *Time* has significant and increasingly positive effect on both poverty indices, a result that corroborates with the generally observable increasing poverty reduction effects of the significant variables in the long run.

5.4.5 Comparing Urbanization elasticities of Poverty Indices

Table 5.9 presents the 8 urbanization elasticities of poverty estimated from Equation (4.6) with 4 elasticities each for the Poverty Headcount (P_0) and the Poverty Gap (P_1) indices. The results from the Table show that the absolute magnitude of the estimated short run and long run urbanization rate elasticities of poverty for P_0 (P_1) are respectively 0.05 (0.08) and 0.11 (0.13) at corresponding significant levels of 10% (5%). Clearly, the poverty reduction effect of changes in urbanization on P_1 is stronger than that for $P_{0.}$

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Similarly, at the same significant level, the estimated short run and long run coefficients of the urbanization level elasticities of poverty for P_0 (P_1) are respectively 0.30 (0.32) and 0.57 (0.63). Again, the poverty reduction effect of urbanization level for P_1 is stronger than for P_0. Generally, these results suggest that the effect of urban agglomeration economies is stronger in both the short run and the long run for the Poverty Gap as compared to the Poverty Headcount ratio.

Table 5.9: Comparing the growth rates and levels of urbanization elasticities of poverty: 1985-2019.

	Growth rates of Urbanization and Poverty Indices			**Levels of Urbanization and Poverty Indices**		
Estimated Equation	*4.6*	*4.6*		*4.6*	*4.6*	
Table No.	*Table E.6*	*Table E.7*		*Table E.6*	*Table E.7*	
Dependent Variable	ln(Poverty Headcount)	ln(Poverty Gap)		ln(Poverty Headcount)	ln(Poverty Gap)	
Main Explanatory Variable	Lagged [ln(Urbanization rate)]	Lagged [ln(Urbanization rate)]	*Dominant effect*	Lagged [ln(Urbanization level)]	Lagged [ln(Urbanization level)]	*Dominant effect*
Shortrun elasticity	-0.05 (0.02)*	-0.08 (0.04)**	*Poverty Gap*	-0.30 (0.11)***	-0.32 (0.13)**	*Poverty Gap*
Longrun elasticity	-0.11 (0.06)*	-0.13 (0.06)**	*Poverty Gap*	-0.57 (0.29)**	-0.63 (0.21)***	*Poverty Gap*

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CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter is divided into three sub-sections. The first part presents the summary and conclusions from the results of the study. The next section makes recommendations based on the results of the study for policy considerations. The last section presents some limitations of the study and suggests areas for further research study on this subject matter.

6.2 Summary and Conclusions

The world achieved a milestone in 2009 by having more than half of its human population living in cities for the first time in recorded history (World Bank, 2009). Historically, the number and proportion of the world's population living in cities; and the number and size class of cities have and continue to increase steadily with time (UN-DESA, 2018, 2019a). However, considerable differences in the levels and rates of urbanization and the size class of cities persist at the regional and country levels worldwide, with SSA being both the world's least and most rapidly urbanizing region (McGranahan & Satterthwaite, 2014; UN-DESA, 2019a), although, medium variants projections indicate that SSA's urban population will increase from the 2018 figure of 548 million to 1,489 million by 2050 (UN-DESA, 2019a).

The region is also home to most of the world's extreme poor due to its comparatively sluggish economic growth since 1992 (World Bank, 2018, 2019). Consequently, in piecing together the poverty puzzle in SSA, the region's urbanization, economic growth and poverty reduction

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relationships have all attracted considerable worldwide interest from various stakeholders such as the international development agencies, governments, researchers and many others.

Both theoretical and empirical literature widely support the idea of a positive relationship between urbanization and economic growth (Spence *et al.*, 2009; World Bank, 2009; UN-HABITAT, 2016; Glaeser & Henderson, 2017). At the core of the existing debate is the causal direction. The dominant viewpoint is that urbanization is an engine of economic growth, with urbanization-led growth proponents arguing that the growth of cities causes economic growth through urban agglomeration economies and scale economies (Quigley, 1998; Gallup *et al.*, 1999; World Bank, 1999; Fujita *et al.*, 2003; World Bank, 2009). Another strand of thought in the literature is that urbanization is a by-product of economic growth. Proponents of growth-led urbanization see urbanization as a consequence of economic growth and development as a national economy transition's from predominantly agricultural to a modern manufacturing and service-based economy (Fay & Opal, 2000; Henderson, 2003a; Polese, 2005; Liddle, 2017). Other viewpoints have also stressed the importance of non-economic factors such as government policy (Ades & Glaeser, 1995; World Bank, 1999; Quigley, 2008; Glaeser, 2013; Glaeser & Henderson, 2017; Henderson & Kriticos, 2017) or demographic factors (Preston, 1979; Dyson, 2011; Potts, 2012; Lesthaeghe, 2014; Haase *et al.*, 2018) in explaining urbanization.

The study investigated the causal relationship between urbanization and economic growth on one hand and the poverty reduction effect of urbanization on the other for a panel of up to 30 selected countries in SSA over the period 1961-2019. The study specified and estimated three Cobb-Douglas functional form equations by following Brülhart & Sbergami (2009), Fay & Opal (2000) and Christiaensen *et al.* (2013). The one-step system generalized methods of moments (SYS-GMM1) estimations method proposed by Arellano & Bover (1995) and Blundell & Bond (1998)

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is employed to estimate the three main elasticities namely urbanization elasticity of growth, growth elasticity of urbanization and urbanization elasticity of poverty.

The rule of thumb outlined by Bond (2002) was used in choosing the dynamic SYS-GMM estimation method over the difference generalized methods of moments (DIF-GMM) and the estimation procedure of Roodman (2009a, 2009b) was adopted for instrument containment. This dynamic study used the SYS-GMM1 estimation method which combines two sets of instruments at differences and levels to help control for the problems of endogeneity and simultaneity, as well as mitigate both the unmeasured and time-invariant individual country heterogeneity effects, so as to obtain consistent and efficient elasticities estimates. Additionally, the Dumitrescu & Hurlin (2012) procedure for Granger (1969) non-causality test for heterogeneous panel data was used as a confirmatory methodology for the findings of the SYS-GMM1.

The signs of the estimated urbanization elasticities of growth and growth elasticities of urbanization were all positive in both the short run and the long run, suggesting a positive connection between urbanization and growth. Also, the comparative analyses of the results based on the magnitudes of the two elasticities show the predominant causation running from economic growth to urbanization at growth rates (per capita GDP growth and urbanization rate) and from urbanization to economic growth at levels (urbanization level and per capita GDP). The consistency of these results shows a strong bi-directional causation between urbanization and economic growth in the selected countries in SSA. More so, the findings of a bi-directional causal relationship between urbanization and economic growth is also confirmed by the Dumitrescu & Hurlin (2012) test for Granger non-causality. Additionally, the results also show a two-way non-linear relationship between the two variables. These results satisfy the main objective in the first part of the study and specific objectives (a) and (b).

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Furthermore, urbanization is found to have a positive impact on poverty reduction in the selected SSA countries, evidenced by the throughout negative signs of the urbanization elasticities of poverty for the Poverty Headcount ratio and the Poverty Gap. Additionally, the comparative analyses of the effect of urbanization on poverty at both growth rates and levels consistently showed that the poverty reduction effect of urbanization is stronger for the Poverty Gap as compared to the Poverty Headcount ratio in both the short run and the long run. Again, these results satisfy the second main objective and also the specific objective (b) of the study.

In absolute terms, the study's findings on urbanization having a positive effect on both economic growth and poverty reduction in SSA in both the short run and long run generally contrast with the so-called urbanization puzzle in SSA, often highlighted in the extant literature as a phenomenon of "urbanization without growth" by Fay & Opal (2000), "urbanization of poverty" by Ravallion *et al.* (2007), "pathological urbanization" by Annez & Buckley (2009), "poor country urbanization" by Glaeser (2013) and "dysfunctional urbanization" by Collier & Venables (2017). However, a regional comparison of the economic growth and poverty reduction performances of SSA with East and South Asia gives credence to these descriptions.

6.3 Policy Recommendations

First, as already discussed, urbanization in SSA has largely been seen as economically dysfunctional as cities have not generated the required productivity growth, jobs and livability (Collier, 2006; Collier, 2017; Collier & Venables, 2017). As explained in Section 3.3, historically, urbanization in SSA and many other developing countries has been seen largely as an undesirable antecedent of new urban poverty and has resulted in many countries implementing partial exclusion measures to inactively resist it such as not providing and/or formally limiting access to

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basic amenities. In order to reap the full urbanization benefits of productivity growth and job creation in SSA, the ambivalence of governments towards it must change. Urbanization must be fully embraced with long-term urban planning and policies aimed at fully managing the process.

Second, the expansion of cities in SSA has largely been horizontal as compared to the mostly vertical expansion witnessed in the developed world. This has led to unprecedented and ever-increasing footprint of urbanization in SSA. Also, most cities in SSA first developed without the required planning and infrastructural investment, with the later provision of infrastructure being mostly retrofitted. The combination of these two factors has tremendously increased the costs associated with providing infrastructure in cities in SSA. This calls for enormous investment in urban infrastructure provision such as roads, railways, water, sanitation, electricity, telecommunications and health facilities. Legal provision and enforcement of private property rights over land and structures that make up the urban built environment are also required for a successful urbanization in SSA.

6.4 Limitations of the Study and Areas for Further Research

The results from the study addressed its objectives, nonetheless, there are some limitations. First, the study did not investigate the effects of other important urban agglomeration variables such as the degree of urban concentration usually proxied by Primacy. According to Henderson (2002), urbanization in SSA tend to be excessively concentrated in primate cities, resulting in urban agglomeration diseconomies that dampen the growth promoting effect of urbanization. Further research is needed to ascertain the optimal threshold beyond which Primacy lessens the growth promoting effect of urbanization and the cost of excessive primacy in SSA countries.

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Second, a fundamental research theme in the “new urban economics” and the “new economic geography” literature is how the spatial concentration of people and economic activities promote growth and hence poverty reduction via both internal and external agglomeration and scale economies (Gallup *et al.*, 1999; Duranton & Puga, 2004; Quigley, 2008; World Bank, 2009; UN-HABITAT, 2016). However, the question as to how the nature of this concentration affects economic growth and poverty reduction remains relatively under researched in SSA (Christiaensen & Weerdt, 2017). Therefore, further research is needed to ascertain whether urbanization concentrated in few large cities in a country has a greater growth and poverty reduction effect as compared to urbanization spread spatially across many cities in a country.

Third, as discussed in Section 3.3, the spatial distribution of poverty worldwide shows two main distinctive patterns namely, poverty is overwhelmingly a rural phenomenon and; the existence of a poverty city-size gradient whereby the incidence of poverty declines steadily as one moves from rural areas to smaller towns and cities and to metropolitan areas (World Bank, 2011; World Bank & IMF, 2013). However, urban poverty in SSA countries rather exhibit a largest city model, such that the largest cities contain disproportionately higher share of the urban poor (World Bank & IMF, 2013). Further research is needed to understand why the poverty situations in SSA countries defer from the stylized facts of the poverty city-size gradient.

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Appendix A: Data Sources and Definitions

A1: Urban agglomeration variables

- Urbanization rate: average annual growth rate of urban population. Source: UN DESA, Population Division. World Urbanization Prospects: The 2018 Revision, Online Edition.
- Urbanization level: percentage of total population living in areas described as cities by national statistics. Source: UN DESA, Population Division. World Urbanization Prospects: The 2018 Revision, Online Edition.

A2: Dependent Variables

- GDP growth rate: annual percentage growth of real GDP per-capita (constant 2011 national prices). Source: Calculated from Penn World Tables 9.1.
- Expenditure GDP per capita: expenditure-side real GDP per capita at chained PPPs (in million 2011USD). Source: Penn World Tables 9.1.
- Output GDP per capita: output-side real GDP per capita at chained PPPs (in million 2011USD). Source: Penn World Tables 9.1.
- Poverty Headcount (P_0): percentage of population with income/consumption below the poverty line of $1.90 a day (2011 PPPs). Source: World Bank, World Development Indicators (2019).
- Poverty Gap (P_1): mean shortfall in income/consumption from the poverty line $1.90 a day (2011 PPPs). Source: World Bank, World Development Indicators (2019).

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A3: Structural variables

- Agriculture share: agriculture value added as a percentage of GDP. Source: World Bank, World Development Indicators (2019).
- Industry share: industry value added as a percentage of GDP. Source: World Bank, World Development Indicators (2019).
- Services share: services value added as a percentage of GDP. Source: World Bank, World Development Indicators (2019).
- Non-Agriculture share: calculated as the average of the sum of Industry share and Services share. Source: Author's calculation.
- Agriculture value-added growth: agricultural sector annual value-added growth rate (constant 2010 local currency). Source: World Bank, World Development Indicators (2019).
- Industry value-added growth: industrial sector annual value-added growth rate (constant 2010 local currency). Source: World Bank, World Development Indicators (2019).
- Services value-added growth: services sector annual value-added growth rate (constant 2010 local currency). Source: World Bank, World Development Indicators (2019).
- Non-Agriculture value-added growth: calculated as the average of the sum of Industry value-added growth and Services value-added growth. Source: Author's calculation.
- Agriculture value-added per worker: labour productivity in the Agriculture sector (constant 2010 USD). Source: World Bank, World Development Indicators (2019).
- Services value-added per worker: labour productivity in the Services sector (constant 2010 USD). Source: World Bank, World Development Indicators (2019).

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- Rural-Urban wage differentials: the ratio of Agriculture value-added per worker to Services value-added per worker. Source: Author's calculation.

A4: Demographic variables

- Population growth: annual population growth as a share of total population. Source: UN, DESA, Population Division. World Population Prospects 2019, Online Edition. Rev. 1.
- Life expectancy: life expectancy at birth in total years for both sexes. Source: UN, DESA, Population Division. World Population Prospects 2019, Online Edition. Rev. 1.
- Fertility rate: total live births per woman. Source: UN, DESA, Population Division. World Population Prospects 2019, Online Edition. Rev. 1.

A5: Control variables

- Population density: number of people per square km. Source: UN, DESA, Population Division. World Population Prospects 2019, Online Edition. Rev. 1.
- Primacy: population in the largest city as a percentage of total urban population. Source: World Bank, World Development Indicators (2019).
- Government share: government share of real GDP per capita (current PPPs). Source: Penn World Tables 9.1.
- Investment share: investment share of real GDP per capita (current PPPs). Source: Penn World Tables 9.1.
- Trade share: sum of merchandise exports and merchandise imports as a percentage of GDP (current PPPs). Source: Calculated from Penn World Tables 9.1.

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- Gini index: a measure of income distribution among individuals or households within an economy. Source: World Bank, World Development Indicators (2019).
- Tertiary education: tertiary school enrolment as a percentage of total enrolment. Source: World Bank, World Development Indicators (2019).

Appendix B: List of selected countries in Sub-Saharan Africa

The data used for this study is made up of two sample sets of countries which were selected based on data availability/quality. The set comprises 30 countries selected for the urbanization and economic regressions of Equations (4.4) and (4.5). The second set consists of 29 countries selected for the urbanization and poverty indices regressions of Equations (4.6).

B1: Urbanization and Economic growth sample

Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Chad, Democratic Republic of Congo, Côte d'Ivoire, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea Bissau, Kenya, Lesotho, Madagascar, Malawi, Mali, Mozambique, Nigeria, Republic of Congo, Rwanda, Senegal, Sierra Leone, South Africa, Tanzania, Togo, Uganda.

B2: Urbanization and Poverty Indices sample

Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Democratic Republic of Congo, Côte d'Ivoire, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea Bissau, Kenya, Lesotho, Madagascar, Malawi, Mali, Mozambique, Nigeria, Republic of Congo, Rwanda, Senegal, Sierra Leone, South Africa, Tanzania, Togo, Uganda.

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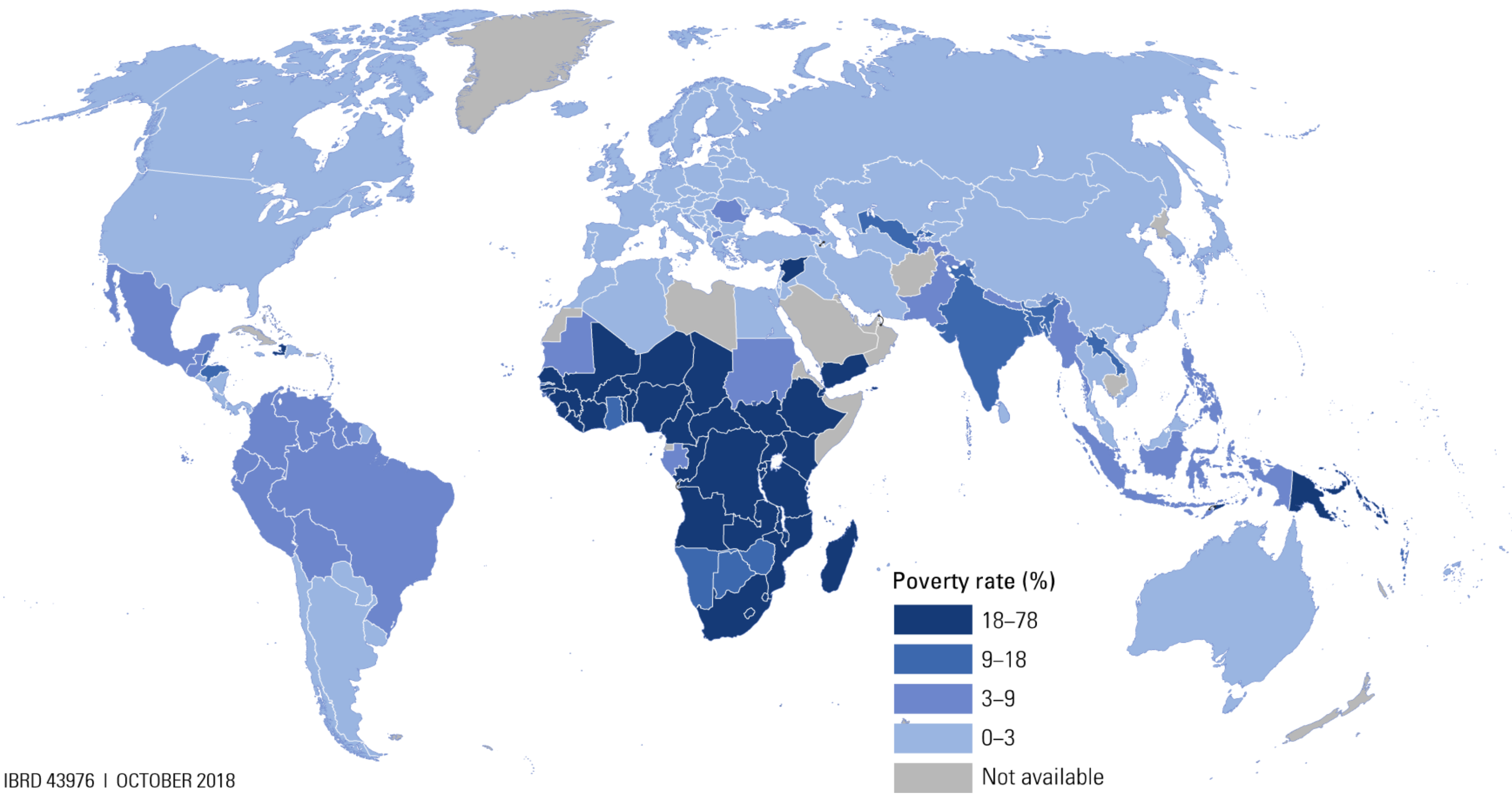
Appendix C: Maps

Map C. 1: Poverty Rate by Country, 2015



Source: World Bank (2018). Piecing Together the Poverty Puzzle. Poverty and Shared Prosperity.

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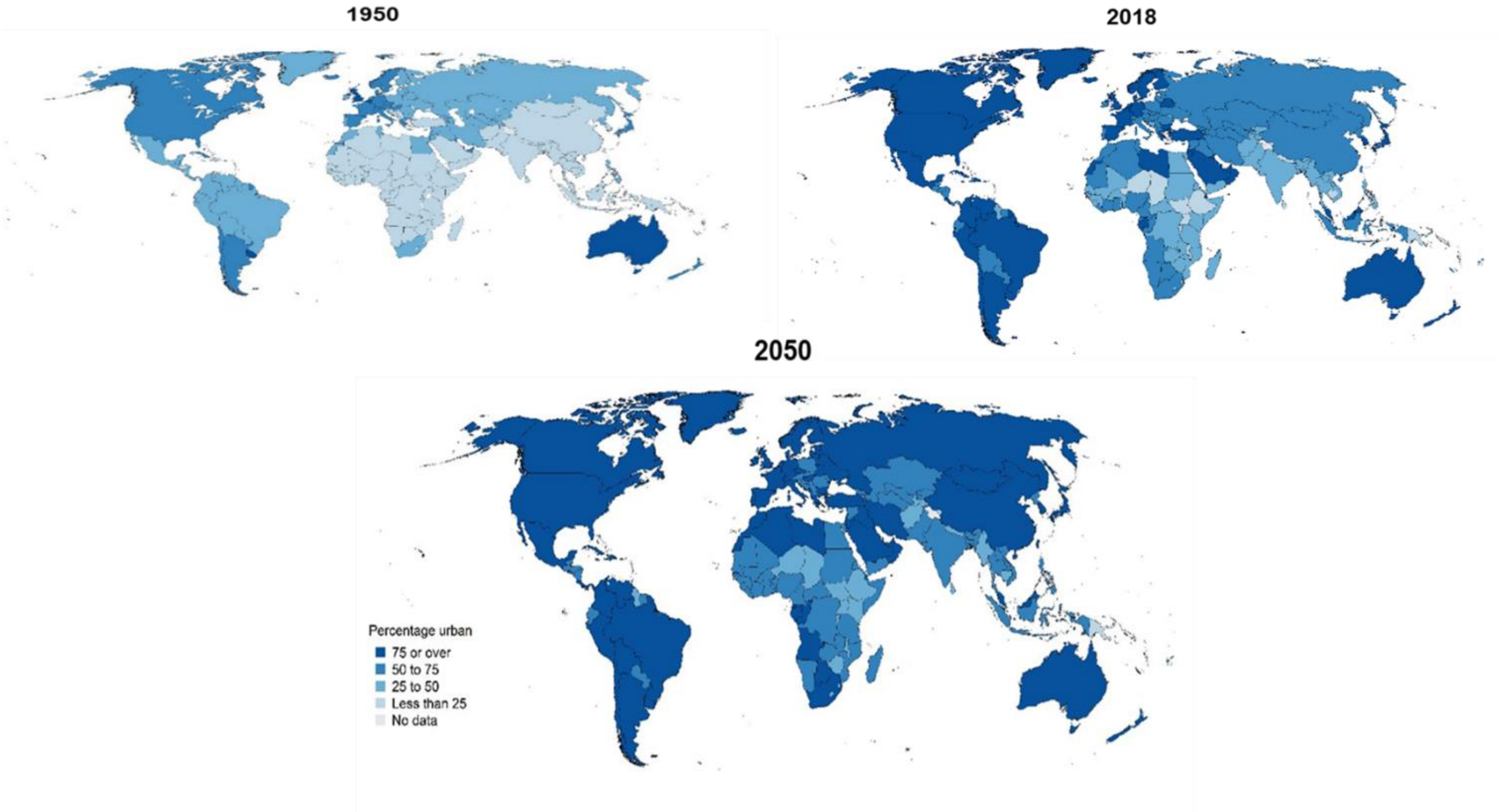
Map C.2: Percentage of population residing in urban areas, 1950, 2018 and 2050.



Source: World Urbanization Prospects: The 2018 Revision. UN DESA.

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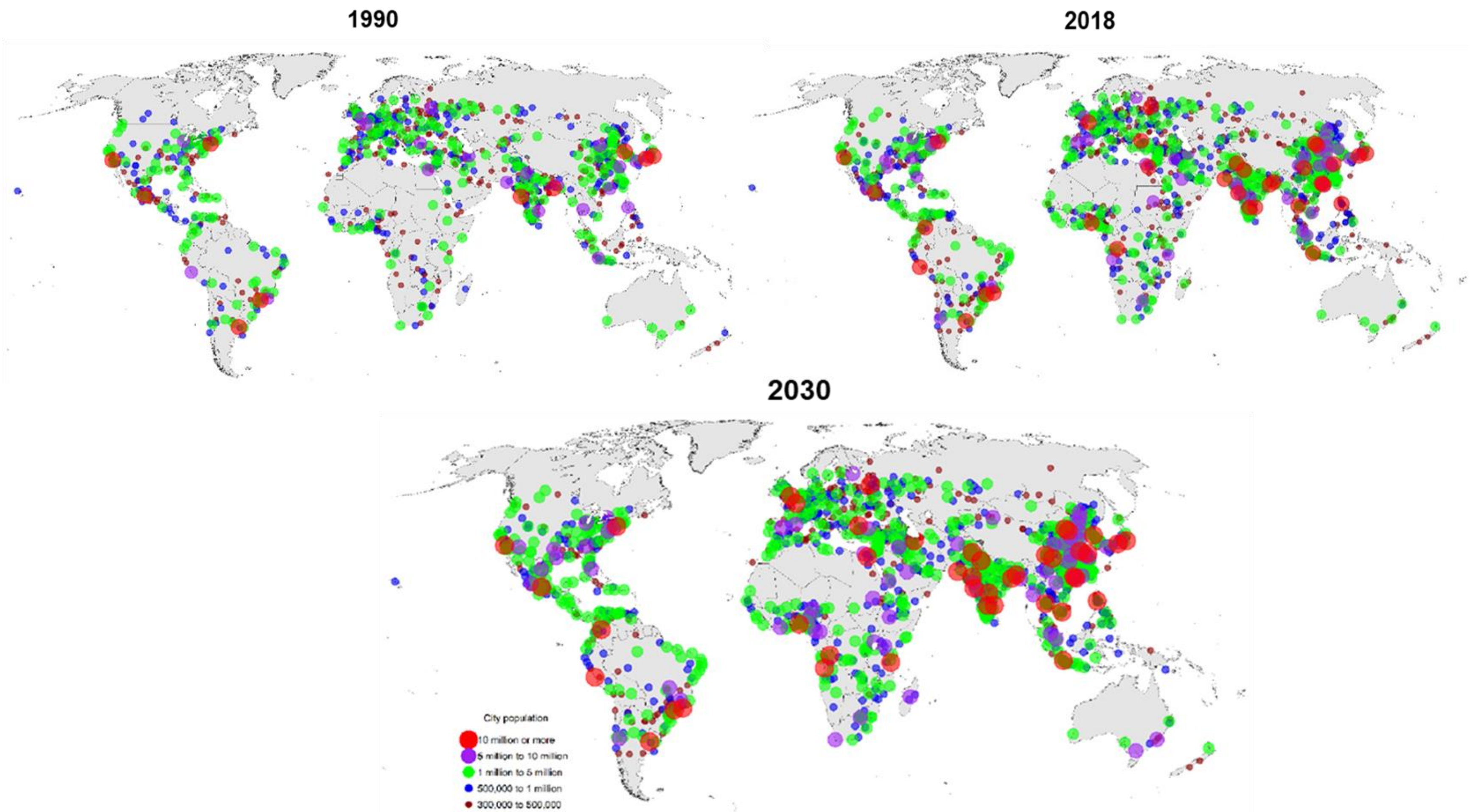
Map C.3: Cities by size class of urban settlement, 1990, 2018 and 2030.



Source: World Urbanization Prospects: The 2018 Revision. UN DESA.

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Appendix D: Tables

Table D.1: Size class distribution of cities at World and Regional Levels: 1970, 1990, 2018, 2030.

Region	Size class of urban settlement	Number of Urban agglomerations 1970	1990	2018	2030
World	10 million or more	3	10	33	43
	5 million to 10 million	15	21	48	66
	1 million to 5 million	127	243	467	597
	500,000 to 1 million	190	301	598	710
	300,000 to 500,000	225	416	714	827
Africa	10 million or more	—	—	3	5
	5 million to 10 million	1	1	5	13
	1 million to 5 million	7	24	55	81
	500,000 to 1 million	12	29	71	111
	300,000 to 500,000	17	43	87	117
Asia	10 million or more	2	5	20	27
	5 million to 10 million	5	14	28	34
	1 million to 5 million	47	99	250	330
	500,000 to 1 million	62	121	333	387
	300,000 to 500,000	77	178	362	429
Europe	10 million or more	—	—	2	3
	5 million to 10 million	3	3	4	3
	1 million to 5 million	33	46	52	55
	500,000 to 1 million	67	78	88	94
	300,000 to 500,000	87	116	114	115
Latin America and the Caribbean	10 million or more	—	3	6	6
	5 million to 10 million	4	2	3	5
	1 million to 5 million	13	36	63	77
	500,000 to 1 million	20	41	57	60
	300,000 to 500,000	21	44	81	101
Northern America	10 million or more	1	2	2	2
	5 million to 10 million	2	1	8	9
	1 million to 5 million	25	33	41	50
	500,000 to 1 million	25	31	48	55
	300,000 to 500,000	23	32	62	59
Oceania	10 million or more	—	—	—	—
	5 million to 10 million	—	—	—	2
	1 million to 5 million	2	5	6	4
	500,000 to 1 million	4	1	1	3
	300,000 to 500,000	—	3	8	6

Source: World Urbanization Prospects: The 2018 Revision. UN DESA.

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Appendix E: A Granger Non-Causality Test in Heterogeneous Panel Data

The basic definition of Granger causality in the literature is based on two precepts, namely the cause precedes the effect and that the causal series contain information concerning the effect that is not contained in any other series according to the conditional distributions (Granger, 2003). For example, if the past values of the series x_t are important predictors of the current value of the series y_t even when the past values of y_t are considered, then x_t is said to be causing y_t (Granger, 1969). The implication is that the causal series x_t is able to provide superior forecast of the effect y_t.

The Granger (1969) model for analyzing the causal relationship between x_t and y_t is given as:

$$y_t = \alpha + \sum_{k=1}^{K} \gamma_k \, y_{t-k} + \sum_{k=1}^{K} \beta_k \, x_{t-k} + \varepsilon_t \qquad \text{with t = 1, …, T} \qquad \text{(D1)}$$

where x_t and y_t are two stationary variables, α, β and γ are parameters, K is the optimal lag order and ε_t the error term. From Equation (D1), causality can be investigated using an F-test under the null hypothesis:

H_0: $\beta_1 = \cdot \cdot \cdot = \beta_K = 0$

If H_0 is rejected, it means that *x* Granger causes *y*. Also, *x* and *y* can be interchanged in Equation (D1) to test for causality running from y to *x* (Lopez & Weber, 2017).

Dumitrescu and Hurlin (2012) developed a methodology that extends the Granger (1969) non causality test to panel data and also accounts for the heterogeneity in panel data. The model for the Dumitrescu & Hurlin (DH) test is given as:

$$y_{it} = \alpha_i + \sum_{k=1}^{K} \gamma_{ik} \, y_{i,t-k} + \sum_{k=1}^{K} \beta_{ik} \, x_{i,t-k} + \varepsilon_{it} \qquad \text{with } i = 1, …, \text{N and t} = 1, …, \text{T} \qquad \text{(D2)}$$

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where x_{it} and y_{it} are two stationary variables for cross-section i in period t. The parameters α, β and γ are time invariant but differ among cross-section units. Also, the lag order K is identical for all cross-section units and a requirement is for the panel to be balanced. In determining causality running from x_{it} to y_{it}, the methodology follows Granger, (1969) and tests for the significance of the effects of past values of x_{it} on the current value of y_{it}. The DH test procedure assumes the absence of causation relationships for the cross-section units of the panel under the null hypothesis of Homogeneous Non-Causality (HNC) defined as:

H_0: $\beta_{i1} = \cdot\cdot\cdot = \beta_{iK} = 0$ for all $i = 1, \ldots, N$

against the alternative hypothesis of causation relationship from x_{it} to y_{it} for only a subgroup of the individual cross-sections under the Heterogeneous Non-Causality (HENC) defined as:

H_1: $\beta_{i1} = \cdot\cdot\cdot = \beta_{iK} = 0$ for all $i = 1, \ldots, N_1$

$\beta_{i1} \neq 0$ or . . . or $\beta_{iK} \neq 0$ for all $i = N_1 + 1, \ldots, N$

where $N_1 < N$. If $N_1 = N$, there is no causality for any of the individual cross-sections in the panel and as such H_1 reduces to H_0. If $N_1 = 0$, it implies causality for all the cross-sections in the panel. Also, rejecting the null hypothesis of HNC does not rule out non-causality for some cross-sections. Furthermore, as compared to the traditional Granger causality tests, Monte-Carlo studies by Dumitrescu & Hurlin (2012) show that the DH test gives more reliable and robust results, more so, in finite panel samples.[15]

In empirically investigating panel causality between changes in urbanization (urbanization rate) and economic growth (GDP per capita growth rate) using the DH test, the first requirement is to

[15] Specifically, finite panel samples here represent samples with both very small time series such as T=10 and few cross-section units such as N=5.

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ensure that all panels are balanced and the second requirement is that all variables must be stationary (Lopez & Weber, 2017). The study tests the stationarity of the variables *Urbanization rate* and *GDP per capita growth rate* using the Im-Pesaran-Shin (IPS) unit-root test for heterogeneous panel as outlined in Im *et al.* (2003). The results of the IPS test as presented in Table E.1 rejects the H_0 that all panels contain unit roots as indicated by the statistically significant Z-bar tilde statistic at 1% level for each variable. Therefore, the variables are stationary at levels and thus integrated of order 0, i.e. I (0).

Table E.1: Im-Pesaran-Shin (IPS) unit-root test for heterogeneous panel

Variable	Z-bar tilde statistic	Probability
Urbanization rate	-3.579***	0.000
GDP growth per capita	-23.937***	0.000
Number of Panels	30	30
Number of Periods	57	57
H0: All panels contain unit roots		
H1: Some panels are stationary		

Note: /***/ indicates rejection of the null hypothesis at statistically significant level of 1%.

A third critical empirical issue to address in heterogeneous panel data is the existence of cross-sectional dependence. For the IPS test for unit root the inclusion of the *demean* option mitigates the impact of cross-sectional dependence in the panel data (Im *et al.*, 2003). Similarly, for the DH test for Granger non-causality, Dumitrescu & Hurlin (2012) proposed a blocked bootstrap procedure to calculate bootstrapped critical values for the Z-bar tilde statistic instead of the traditional asymptotic critical values to address the issue of cross dependence.

A fourth empirical issue concerns the specification of the optimal lag structure K for which the methodology outlined by Dumitrescu & Hurlin, (2012) does not address. Subsequently, Lopez & Weber (2017) propose the use of an information criterion in the selection of the number of lags to

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be included in the DH test. The results for the DH test following the estimation procedure of Lopez & Weber (2017) is presented in Table E.2.

Table E.2: Dumitrescu-Hurlin (DH) Granger non-causality tests for heterogeneous panel

Null Hypothesis:	Z-bar tilde statistic	Probability	Bootstrap replications	Optimal lag length (K)
Urbanization rate does not homogenously cause per capita GDP growth	1.917**	0.042	500	17
GDP growth per capita does not homogenously cause Urbanization rate	4.159***	0.006	500	17

Notes: /***/**/ indicate rejection of the null hypothesis at significant levels of 1% and 5% respectively. Also, the optimal lag length is selected based on Akaike Information Criterion (AIC).

The results from the Table show a feedback causality whereby *Urbanization rate* Granger causes *per capita GDP growth* and conversely *per capita GDP growth* Granger causes *Urbanization rate*. These findings of a two-way causation also confirm the previous results of a bi-directional causal relationship between urbanization and economic growth in Section 5.5.3. The optimal lag length selected in each case using the Akaike Information Criterion (AIC) was 17. Also, in line with the length of the time series data used, bootstrap replications of 500 was used for each estimation.