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**HEC MONTRÉAL**

**The Role of International Trade in Explaining China's Growth and  
Poverty Reduction Success and How Such Strategy Could Also Become  
a Leverage for Sub-Saharan Countries' Growth and Poverty  
Reduction**

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## Résumé

Ce mémoire analyse la relation entre les exportations et la réduction de la pauvreté en Afrique subsaharienne à partir d'un panel de 26 pays sur une période de 29 ans. L'objectif est d'analyser la stratégie d'exportations appliquée en Chine pour promouvoir la croissance et réduire la pauvreté et l'applicabilité de ces solutions dans la région de l'Afrique subsaharienne. Sur la base des études de Li, Loungani et Ostry (2018) et Le Goff et Singh (2013), deux équations ont été établies dans le cadre d'une analyse économétrique. La principale conclusion est que l'ouverture des exportations a une influence positive et significative sur la réduction de la pauvreté. De plus, la stabilité politique et l'éducation aident généralement les pays d'Afrique subsaharienne dans leur développement économique. En particulier, un pays relativement ouvert au commerce avec un régime politique stable et une main-d'œuvre qualifiée a de meilleures chances de réaliser la croissance économique et de réduire la pauvreté. Le cas d'un pays africain ayant mis en place avec succès une telle stratégie est également analysé. L'étude conclut que l'Afrique subsaharienne peut tirer des enseignements de la voie suivie par la Chine pour réduire la pauvreté en optimisant sa structure industrielle, en analysant les avantages concurrentiels et en rejoignant la chaîne de valeur mondiale à la faveur de la mondialisation.

**Mots Clés :** Commerce International, Réduction de la Pauvreté, Croissance Économique, ASS, Chine

## **Abstract**

This thesis analyzes the impact of increased exports on economic growth and poverty reduction based on panel data from 26 Sub-Saharan African (SSA) countries across 29 years. The goal is to examine the feasibility of leveraging international trade to achieve economic prosperity and reduce poverty in SSA countries by comparing it to China's export-oriented strategy, economic reforms, and poverty reduction policies. Based on the studies of Li, Loungani and Ostry (2018) and Le Goff and Singh (2013), two equations have been established and analyzed using Two-Stage Least Squares (2SLS) and Generalized Method of Moments (GMM). The main findings are that higher exports have a significant and positive impact on economic growth and poverty reduction in SSA countries. The result also shows that political stability and education generally help SSA countries' economic development and that a relatively trade open country with a stable regime and qualified labour force has a better chance to realize economic growth and poverty reduction. Finally, by discussing a successful country case, SSA can learn from China's path to reduce poverty by optimizing their industrial structure, using their competitive advantages, and joining the global supply chain.

**Keywords:** International Trade, Poverty Reduction, Economic Growth, SSA, China

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## Acronyms

AFCFTA	African Continental Free Trade Area
2SLS	Two-Stage least squares
CNY	Chinese Yuan
CPI	Customer Price Index
EO	Export Openness
EOI	Export-oriented industrializing
EPZ	Export Processing Zone
FDI	Foreign Direct Investment
FE	Fixed-Effects
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
GNI	Gross National Income
GTP	Government Transfer Program
HDI	Human Development Index
HRS	Household Responsibility System
IO	Import Openness
ISIC	International Standard Industrial Classification
IV	Instrumental Variable
LDC	Least Developed Country
LM	Lagrange multiplier
LSMS	Living Standards Measurement Study
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary least Squares
ODA	Official Development Assistance
POLS	Pooled Ordinary Least Squares
PPP	Purchasing Power Parity
RE	Random-Effects
RMB	Renminbi (Chinese Currency)
SEM	Simultaneous Equations Model
SEZ	Special Economic Zone

SOE	State-owned Enterprise
SSA	Sub-Saharan Africa
TFP	Total Factor Productivity
UN	United Nations
USD	United States Dollar
WTO	World Trade Organization



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## Introduction

Over the last 40 years, China has successfully elevated hundreds of millions of people out of poverty. Before the economic reform and opening-up policy that started in 1978, 88.3% of the Chinese population lived below the poverty line<sup>1</sup>. In 2015, this percentage has been reduced to 0.7%. This means that 800 million Chinese have escaped poverty over this period (World Bank, 2017). International trade has boomed during this time, as Chinese exports<sup>2</sup> grew from \$121.6 billion to \$2.66 trillion in real terms (2018 dollars), 22 times the exports from 30 years before. In 2018, Chinese exports represented 19.5% of Chinese GDP and 10.6% of world exports, up from 4.6% and 0.4%, respectively, in 1978.<sup>2</sup>

During the same period, poverty reduction in SSA had been moving at a very slow rate. While the poverty rate declined from 54% in 1990 to 41% in 2015, the population growth rate of 2.6% per year has increased, in absolute terms, of 130 million more poor people in SSA (Beegle, 2019). During this period, SSA trade growth was also limited. In 2011, SSA exports accounted for only 3.5% of world exports, down from 5.3% in 1980. This is low compared to 6.0% for developing Latin American countries and 32% for Asian countries (Le Goff and Singh, 2013).

What role has international trade played in poverty reduction in China, and can China's success in trade growth be replicated in SSA? Could international trade serve as a leverage to increase SSA's economic growth to achieve poverty reduction? The goals of this study are twofold: first, to determine whether increasing SSA international trade can be one of the numerous tools to achieve poverty reduction in SSA, and second, to determine whether

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<sup>1</sup> The World Bank defines extreme poverty as living daily on less than 1.90 int.-\$.  
<https://www.worldbank.org/en/topic/poverty/overview>

<sup>2</sup> Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments. Data are in real term current U.S. dollars using CPI conversion from 1986 to 2018.

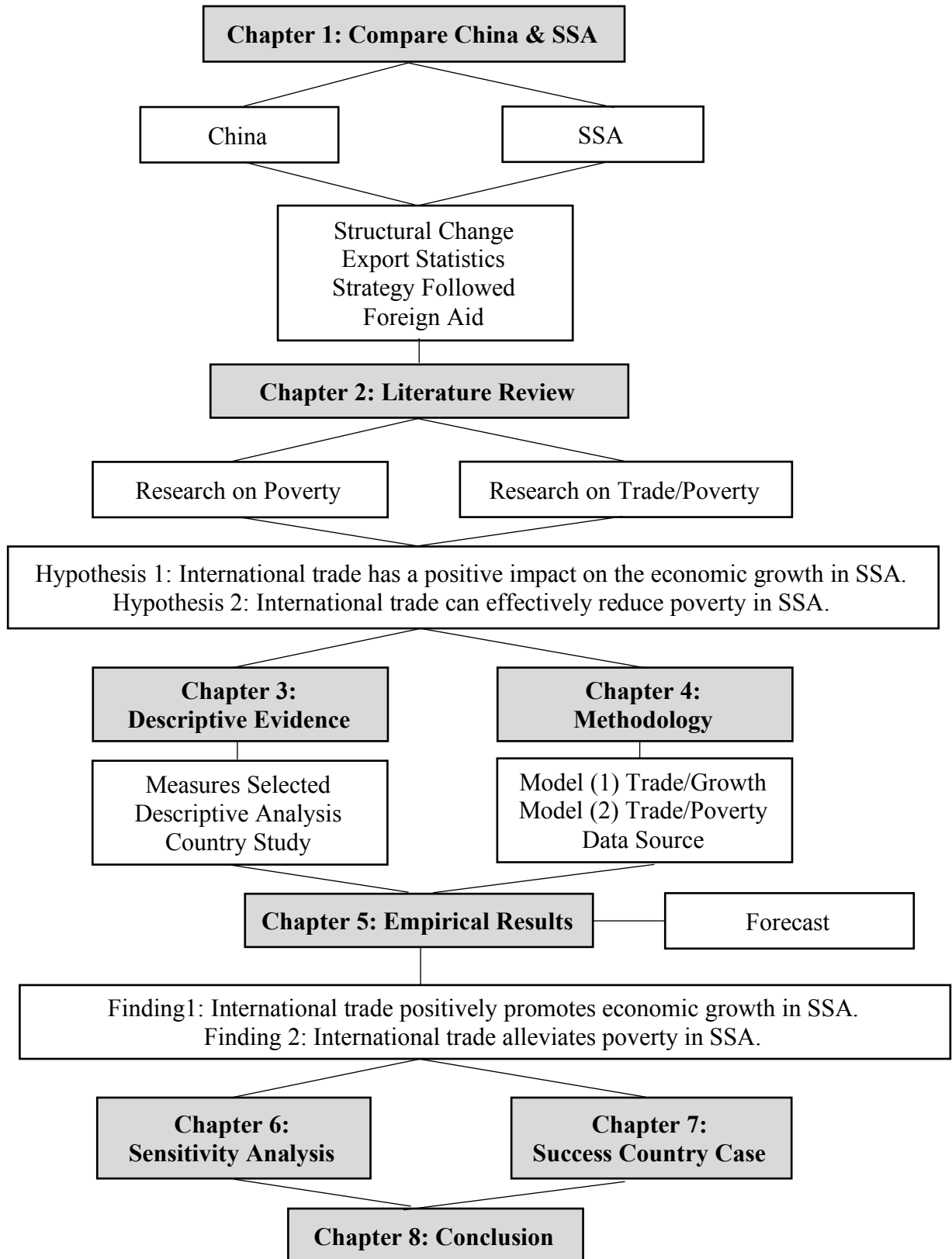
China's export experience can be used by SSA countries to achieve economic growth and poverty reduction.

To fulfill these goals, I adapted an econometric model from Li, Loungani and Ostry (2018) and Le Goff and Singh (2013) using a panel data from 26 SSA economies from 1990 to 2018 to investigate whether changes in the value of exports affect changes in poverty. Three commonly used poverty headcount measures (\$1.90, \$3.20 and \$5.50 at 2011PPP) and two trade openness measures (import and export share in GDP) are evaluated across the three decades in the selected SSA countries. Given that *trade* may be endogenous, instrumental variables will be used. I have also included control variables to assess how political stability, education and human capital have impacted on poverty reduction. Following previous studies, 2SLS and GMM estimation methods will be used and diagnostic and robustness tests will be performed.

The main findings of the study are that higher exports have a significant, positive impact on economic growth and poverty reduction in SSA countries and that political stability and education promote SSA countries' economic development. By analyzing the specific case of Mauritius, I conclude that a relatively trade open country with a stable regime and qualified labour force has a better chance to realize economic growth and poverty reduction. Ultimately, SSA can learn from China's path to reducing poverty by optimizing their industrial structure, using their competitive advantages, and joining the global supply chain.

Figure 1 presents the thesis framework. The study is organized as follows. Chapter 1 presents a comparative overview of China and SSA international trade and poverty reduction between 1970 and 2020. Chapter 2 reviews the literature on theories of trade, economic growth and poverty reduction. Chapter 3 presents descriptive evidence. Chapter 4 describe the econometric methodology and the data. Chapter 5 presents the empirical results and predictions. Chapter 6 conducts robustness checks. Chapter 7 discusses the successful SSA country case of Mauritius in trade development and poverty reduction. Chapter 8 offers concluding remarks and a discussion on the implications of the findings for policies to reduce poverty from an international trade perspective.

**Figure 1: Thesis Framework**





# 1. Comparing China and Africa (1970-2020)

This chapter presents a comparative overview of the structural transformations<sup>3</sup> that have taken place in SSA and China during the period from 1970 to 2020. It emphasizes the role of exports and economic growth on poverty reduction in both regions. Firstly, I present the general view in terms of poverty reduction in China versus SSA by comparing the decline in poverty in the two regions. Secondly, I will describe the two regions' structural changes, export statistics and the strategy implemented, including foreign aid. The goal of this chapter is to show the different trajectories of China and SSA countries and to lay the foundation for later discussions. (See the chapter's structure in Figure 2 below).

**Figure 2: Structure of Chapter 1**



<sup>3</sup> Structural transformation refers to the reallocation of economic activity across the broad sectors agriculture, manufacturing and services (National Bureau of Economic Research, 2013). More details and definitions will be elaborated in Section 1.1.

## 1.1 Poverty Reduction

Before 1970, SSA growth and its composition were indistinguishable from China (Collins, 1996). GDP per capita in SSA was \$109 higher than China (\$222 vs.\$113<sup>4</sup>). Even in 1981, the poverty headcount ratio in SSA was lower than that of China, 49% vs. 88% respectively, using 2011 PPP and \$1.90/day poverty line (World Bank, 2020). However, China's growth trajectory changed in the 1970s. Since 1970, China's GDP per capita has grown by more than 8% annually in real terms (World Bank, 2015), while the economic situations in Africa have deteriorated during the same period. The leadership of many African nations had transitioned into autocracies and dictatorships, and their economies declined (Collier, 1999).

Specifically, the share of China's population in poverty has been declining during the past four decades (decreases of 25% in the 1980s, 39% in the 1990s, 72% in the 2000s, and 96% in the 2010s<sup>5</sup>), compared to an increase of 6% in SSA from 1990 to 2000. China reduced the poverty headcount ratio from 66.2% in 1990 to 0.5% in 2018, while SSA reduced only its poverty headcount ratio from 54.9% to 42.3% during the same period (World Bank, 2020). China's poverty reduction has always been in the double digits, while SSA's poverty reduction was lower, with only a 9% decrease from 2010 to 2020. Until today, SSA's poverty situation is severe, with about 42.3% of the population below the \$1.90 poverty line (see Table 1). Whereas in China, the poverty rate declined from about 88% in 1981 to less than 1% today. Additionally, the poverty gap index<sup>6</sup> in SSA amounts to 16.2%, compared to 0.1% in China (World Bank, 2020). The per capita income in SSA was less than one-fifth of that in China in 2019 (\$1 585 vs \$10 262) (World Bank, 2020).

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<sup>4</sup> \$ is referred to current US\$ in this study unless otherwise specified.

<sup>5</sup> Based on the author's calculation of every ten years' poverty headcount rate of reduction. For example, 25% in the 1980s is calculated from the decrease rate of 88% in 1980 to 66% in 1990. Namely:  $25\% = (88\% - 66\%) / 88\%$

<sup>6</sup> Poverty gap index assesses the depth and severity of poverty, Poverty gap referred here is at \$1.90 a day (2011 PPP) is the mean shortfall in income or consumption from the poverty line \$1.90 a day (counting the nonpoor as having zero shortfall), expressed as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence and will be elaborated in Chapter 3.

## 1.2 Overview of China

This subsection focuses on the structural changes, export development and strategies deployed in China during the past 50 years.

### Structural Change

Structural transformation is defined as the reallocation of economic activity across three broad sectors (agriculture, manufacturing, and services) that accompanies the process of modern economic growth (IMF, 2013). We examine structural changes that have taken place in China during the 50 years. As a result of labour movements, important structural changes have transformed China's economy into the largest manufacturing exporter during the last half-century.

The primary sector had traditionally been the largest contributor to China's economy, contributing 50% of GDP in 1950 (National Bureau of Statistics, 2020). After enormous efforts for more than half a century, the primary sector as a percentage of GDP decreased to 7% in 2018. Meanwhile, the tertiary sectors' percentages of GDP increased from 25% to 54% from 1970 to 2018, contributing to half of China's GDP. The tertiary sector's contribution reached 53.42 trillion Chinese Yuan<sup>7</sup>(CNY) (approximately \$7.63 trillion<sup>8</sup>), followed by the secondary and primary sectors of 38.6 trillion CNY and 7 trillion CNY, respectively (or approximately \$5 trillion and \$1 Trillion, respectively) (National Bureau of Statistics, 2020). The structure of the industries has been significantly optimized as the services sector became a larger part of the national economy (Zhang, 2018). As the services sector is more labour-intensive than manufacturing, job creation through the services sector's exports allowed China to absorb surplus labour in the development process (Salazar, 2013). China's annual GDP growth averaged 9.7% over 37 years from 1978 to 2015 due to the active structural transformation supported by its relative

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<sup>7</sup> Chinese yuan is the unit of account for the Chinese currency.

<sup>8</sup> The exchange is adopted for average 2019. <https://www.exchangerates.org.uk/USD-CNY-exchange-rate-history.html>

advantages (Lin, 2012). China is now an upper-middle-income country<sup>9</sup>, with per capita GNI of \$9,460 in 2018<sup>10</sup> (World Bank, 2018) .

**Table 1: Structural transformations in China and SSA, 1970-2020**

	China						SSA					
<b>Sectoral Composition</b>	1970	1980	1990	2000	2010	2018	1970	1980	1990	2000	2010	2018
<b>Primary (% of GDP)</b>	35%	30%	27%	15%	9%	7%	20%	24%	20%	22%	22%	
<b>Secondary (% of GDP)</b>	40%	48%	41%	46%	46%	39%	21%	20%	17%	13%	14%	
<b>Tertiary (% of GDP)</b>	25%	22%	32%	40%	44%	54%	59%	57%	63%	66%	65%	
<b>Export share (%GDP)</b>	2%	6%	14%	21%	27%	19%	19%	30%	22%	34%	31%	26%
<b>GDP/Capita (current US\$)</b>	113	195	318	959	4550	9976	222	712	668	601	1589	1589
<b>Poverty Reduction (% population)</b>		88	66	40	11	0.5			55	58	47	42

Source: China National Bureau of Statistics (2019) and World Bank (2020)

Note: Poverty reduction is the Poverty headcount ratio at \$1.90 a day (2011 PPP) (% of population). The sector classification varies between China National Bureau of Statistics and the World Bank. For China National Bureau of Statistics, the classification is based on the “Regulations on the Division of the Three Industries” revised by the National Bureau of Statistics of China in 2018<sup>11</sup>. For World Bank, the classification is based on ISIC (International Standard Industrial Classification)<sup>12</sup>.

<sup>9</sup> The world’s Middle-Income Countries (MICs) are a diverse group by size, population, and income level. They are defined as lower-middle-income economies - those with a GNI per capita between \$1,006 and \$3,955; and upper-middle-income economies - those with a GNI per capita between \$3,956 and \$12,235 (2018) Source: <https://www.worldbank.org/en/country/mic/overview#:~:text=They%20are%20defined%20as%20lower,62%25%20of%20the%20world's%20poor.>

<sup>10</sup> Atlas method by the World Bank estimation.

<sup>11</sup> The primary industry refers to agriculture, forestry, animal husbandry, and fishery (excluding agriculture, forestry, animal husbandry, and fishing specialties and auxiliary activities); the secondary industry refers to mining industry (excluding mining professional and auxiliary activities), and manufacturing (Excluding metal products, machinery and equipment repair industry), electricity, heat, gas and water production and supply industry, construction industry; tertiary industry refers to other industries except the first industry and the second industry.

<sup>12</sup> Agriculture corresponds to ISIC divisions 1-5 and includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production. Manufacturing refers to industries belonging to ISIC divisions 15-37. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. Services correspond to ISIC divisions 50-99. They include value added in wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and personal services such as education, health care, and real estate services. I use agriculture, manufacturing and services to represent the three economic sectors with their weighted percentage in GDP.



## Export development

We now examine the development of China's exports, with a focus on the manufacturing sector. Trade has allowed the developing country's firms to access technologies essential for improving their productivity and competitiveness, which has allowed generating growth and employment opportunities and reduce poverty (OECD, 2008).

China over the last half century transformed from a country with an annual trade of barely \$10 billion (current US\$) in 1978, growing 100-fold since then (Pomfret, 2011). Starting in the late 1970s, China's exports grew exponentially, both in terms of volumes and in percentage of GDP. Exports accounted for 36% of GDP at its peak in 2006, contributing more than one-third of GDP. In 2010, China replaced Germany as the world's largest merchandise exporter, accounting for 10% of the world's total merchandise exports. China also became the largest trading country in 2013, overtaking the United States as the world's largest economy as measured by purchasing power parity (PPP)<sup>13</sup> in 2014. Such growth has enabled China, on average, to double its GDP every eight years. In 2018, the total value of exports reached \$2.65 trillion, making China the largest exporter in the world (Observatory of Economic Complexity, 2020). However, in the beginning, exports in China grew rather indiscriminately. As late as 1985, petroleum was China's largest export at 20% of total export earnings. By 1995, all of China's top export commodities were labour-intensive manufactured goods<sup>14</sup> (Naughton, 2007). China's manufacturing sector is now the world's largest in terms of added value.

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<sup>13</sup> PPPs measure the total amount of goods and services that a single unit of a country's currency can buy in another country (World Bank, 2017).

<sup>14</sup> A number of studies have described the shift to labour-intensive manufactures in Chinese exports. According to the International Economic Databank (IEDB) maintained at the Australian National University, the share of labour-intensive products in China's exports increased from 37% in 1984 to 54% in 1994, while the share of agricultural and minerals-intensive products together declined from 49% to 15%. In addition, according to the classification used by the IEDB, capital-intensive exports increased from 14% to 31% of total exports (again 1984–1994).

### Strategy deployed: Main policy reforms

Many studies and researches have analyzed the main drivers behind the economic changes and development of China. One of the remarkable features is that China has managed to transition from a planning economy to a mixed economy, and has not only avoided major economic disruptions but also maintained high economic growth (Yao, 2014). This section will introduce some of the main reforms that were introduced in China during the period, namely the *Household Responsibility System* (HRS), the *Township and Village Enterprises* (TVEs) and the *Special Economic Zone* (SEZ).

The HRS, launched in the early 1980s, was an agriculture production system that allowed households to contract land, machinery, and other facilities from collective organizations. Under this new policy, farmers were motivated to produce for their own private benefit while ensuring that the State could distribute enough agricultural products to the urban sectors at low fixed prices (Lin, 2012). HRS achieved rapid growth in agricultural productivity and poverty reduction. It accounted for half the increase in agricultural output (Lin, 2012) and alleviated a record number of people from poverty in just several years (Derek Headey, 2008). According to China's official estimates, nearly half of the total rural poverty reduction was achieved at the beginning of this reform (International Poverty Reduction Center in China, 2012). With industrial and urbanization funding provided by HRS, *Township and Village Enterprises* (TVEs) were encouraged to absorb extra labour forces freed from the land. This reform is considered as one of the main steps in the transformation of a centrally-planned economy to an open economy. Under this policy, the Communist Party of China publicly allowed privatization and loosened control for most commodities and labour services. With the increase in the role of market regulation, China's resource allocation efficacy improved significantly (Chen, 2008).

Besides HRS and TVEs, China has begun to establish *Special Economic Zones* (SEZ), signifying the economic opening to the world. SEZs are one kind of government-piloted new reforms in geographically contained areas (Preen, 2019). It attracts large foreign direct investment (FDI), absorbs rural labour forces, and improves technologies. In 2002,

China became the world's largest recipient of FDI <sup>15</sup>. In 1979, FDI in China was only \$80,000 but rose to \$42 billion in 2000 and \$156 billion in 2019. From 1978 to the end of 2004, China attracted \$563.8 billion in foreign direct investment, more than 10 times the total FDI that Japan amassed between 1945 and 2000 (Bremmer, 2006). By 2015, SEZs have contributed 22% of China's GDP, 45% of total national foreign direct investment, and 60% of exports (World Bank, 2015). This move significantly separated China from traditional socialist practices and enabled China to gradually open its trade and investment. The intensified mobility of the labour force has allocated resources more efficiently, which has led to increased productivity, inclusive growth, poverty reduction, and improved welfare (Justin Lin, 2008).

With the growth of export and domestic development, the Chinese government had more financial power to reduce poverty. Its poverty reduction program comprised a wide variety of actors, programs and funding channels (World Bank, 2001). The government budget and funding to deprived areas increased. In nominal terms, annual central government poverty reduction funding ranged between \$1 to \$1.5 billion from 1986 to 1996, increased sharply in each year from 1997 to 1999. It totaled more than \$20 billion from 1986 to 1999 (China's Poverty Alleviation Database, 2020)<sup>16</sup>. Besides government financing and transfer, the Chinese government made a strong case for increased investment in health, education and nutrition; farm and community level basic infrastructure; development of agricultural and other technologies and their extension to the poor; and improved access of the poor to microcredit and nonfarm employment (Khan, 2005).

### Foreign Aid

Foreign aid is an important source of fiscal revenue in developing countries (Cruz, 2016), and it has played a vital role also in China's development and poverty reduction. It opened new ideas, methods, knowledge, and experience, and has promoted structural reforms. As we can see from the trial and error reforms and export-oriented strategy, the Chinese

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<sup>15</sup> Foreign direct investment, net inflows (BoP, current US\$)  
<https://data.worldbank.org/indicator/BX.KLT.DINV.CD.WD>

<sup>16</sup> <https://www.jianpincn.com/>

government used trade, foreign investment, and aid to foster economic development. The government has also used the external funding to support Chinese companies to go global and be competitive internationally. According to data compiled by China's National Development and Reform Commission (NDRC), bilateral and multilateral loans to China (including some non-concessional loans that do not qualify for ODA) amounted to \$83 billion between 1979 and 2005. Japan is, to-date, China's largest bilateral donor, with loans and grants totaling \$20 billion and \$6 billion. Japan is also the first country to have provided bilateral aid to China. China's second-largest bilateral donor is Germany with loans and grants between 1985 and 2007 totaling \$4.2 billion and \$3.44 billion, respectively. Other major donors include France, Spain, Italy, the United Kingdom, Switzerland, Australia, the Netherlands, Belgium, Canada, Australia, Sweden, Finland, Denmark, Norway, South Korea, Israel, Saudi Arabia, Kuwait, Russia, Poland, and Luxembourg (NDRC, 2009).

In exchange for accepting this aid, China has been providing profitable opportunities for foreign-funded enterprises (FIEs) and joint ventures, and accepting conditions such as “tied aid”<sup>17</sup> that links foreign aid to trade with donor countries (NDRC, 2009). In the 1980s and early 1990s, more than 50% of bilateral aid to China was “tied aid” (OECD, 2020). Even so, it has benefited China in its early stages of development because that aid went beyond financial support and involves knowledge-transfer and capacity building. For example, the import of complete equipment and turnkey projects provided much-needed funds and advanced technology. China has also learned related professional knowledge, management skills, technologies, and systems (International Poverty Reduction Center in China, 2012). China has established a series of institutional arrangements for managing foreign aid since the early days of reform. The choice of assistance projects by China was based on three major criteria:

- (i) it must conform to China's long-term development plan;
- (ii) it must conform to China's poverty reduction plan;
- (iii) it must be tailored to local conditions.

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<sup>17</sup> a kind of aid on the condition that it be used to procure goods or services from the provider of the aid or in exchange for other favours such as tax exemption.

As a result, foreign aid programs and projects have been fully incorporated into China's own development planning and implementation process (NDRC, 2009).

### 1.3 Overview of SSA

Turning now to SSA, this subsection focuses on the structural change, export development and strategy deployed in African economies during the past 50 years.

#### Structural Transformation

Africa experienced small structural changes compared to China, as observed in Table 1. In relative terms, the service and primary sector grew during the last forty years, while the potential of manufacturing remained untapped (see Table 2). The manufacturing sector contributed the least during the four decades and grew at the slowest rate. The services sector grew at a fast rate, but its share of SSA's GDP remained significantly lower than the 2017 global average of 65% (World Bank, 2020). Moreover, the structures are heterogeneous among SSA countries. For example, in 2015, the services sector accounted for more than 70 % of GDP in Cabo Verde, Mauritius, and Sao Tome, but only 33% for Chad and 34% for Sierra Leone (World Bank, 2020).

**Table 2: SSA Structural Transformation (1980-2017)**

Sectoral Composition (% of GDP)	1980	1990	2000	2010	2018	Δ
Primary	20%	24%	20%	22%	22%	2%
Secondary	21%	20%	17%	13%	14%	-7%
Tertiary	59%	57%	63%	66%	65%	5%

Source: World Bank (2020)

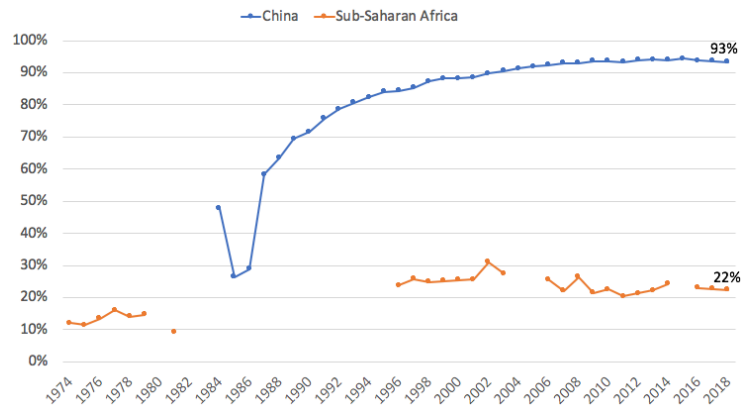
#### Export Development

The total value of exports of goods and services has increased in all selected SSA countries during the period, among which Nigeria, Angola, and Ghana are the top performers. However, the export % GDP dropped from 30% to 22%, unlike 2% to 19% jump in China between 1980 and 2020. An important constraint facing numerous African countries has been the dependence on crude material exports, such as petrol and coal. SSA

depended heavily on natural resources. Between 1960 and 2008, the ratio of natural resource exports to total merchandise exports in SSA only marginally declined from 77% to 65.1%, while the ratio has decreased from 88.1% to 42.8% in Latin America, from 57.9% to 23.7% in South Asia, and from 49.5% to 19.2% in East Asia (Carmignani, 2010). More than half of the exports in the 26 selected SSA countries depend on crude materials, fuels, beverages, tobacco, animal and vegetable oils, etc. For example, crude materials are 86% of exports for the Ivory Coast. Only 3% of exports are manufactured goods, which represents a relatively low capital accumulation as well as low human capital to be able to engage in non-agricultural work. Similarly, in Angola, crude petrol and diamond exports accounted for 92% of the country's total exports (see Table A32 in the appendix) (OEC, 2017). Mozambique and Mauritania's exports comprised over one-half of their respective GDP's. Their exports primarily comprised of fuel, ores, metal, agriculture, and miscellaneous manufactured articles. This reflects the poor industrial infrastructure that the SSA economies commonly shared.

SSA manufacturing exports currently account for only 22% of all goods exports, while China's manufacturing exports make up 97% of goods exports (World Bank, 2020). Manufacturing has been historically immensely important to the prosperity of nations. From a research done by the World Economic Forum, over 70% of the income variations of 128 nations can be explained by differences in manufactured product export data alone (World Economic Forum, 2012). As the demand for manufacturing grows, it spurs job creation, investments, and innovations. Such learning dynamics and spillovers increase the stock of knowledge available for individual firms (Celestin, 2017). Some researches show that most jobs, directly or indirectly, depend on manufacturing. Reviving the manufacturing sector could provide tens of millions of new jobs, eradicating the Great Recession (Rynn, 2011). More than creating jobs, manufacturing also provides more long-term economic benefits than do other activities. It generates economies of scales, sparks industrial and technological upgrading, fosters innovation, and has a larger multiplier effect (Celestin, 2017). For example, workers migrating from farms to factories fueled the economic miracles of Taiwan, Korea, China, Thailand, and Singapore, reducing poverty and raising living standards (Kedia, 2018).

**Figure 3: Manufactures exports as a % of merchandise export: China and SSA**



Source: World Bank (2020)

#### Strategy deployed: Main policy reforms

Witnessing great success with SEZ in Asia, several SSA countries, including Liberia, Mauritius, and Senegal, launched SEZ programs in the early 1970s. However, most African countries did not operationalize their programs until the 1990s or 2000s (Farole, 2017). They faced many challenges, such as low levels of infrastructure, imperfect laws, and political instability. In trying to expand African SEZ schemes, policymakers tend to cause inefficient fragmentation of resources. They often allocated investment to peripheral regions that were poorly positioned to attract investment with or without a zone. Several SSA countries have implemented SEZ programs designed to establish one special zone in each region, province, or state. For instance, in 2009, Tanzania announced plans to establish twenty-five to thirty economic zones, spread out around the country, before its first SEZ was even operational (Farole, 2017). Some governments, such as Mauritius and Kenya, are trying to improve their industry structure and export composition by creating SEZs and attracting FDI, but the results varied. The export-oriented strategy had successfully transformed Mauritius and reduced poverty, with less than 0.2% of people living below the international extreme poverty line. In Kenya, the EPZ initiative was implemented in the 1990s when the country was experiencing its worst economic performance with an annual GDP growth rate averaging about 2% and industrial sectors failing completely to withstand international competition from cheaper imports. Therefore,

EPZ programs failed to maintain the momentum of growth and reverted to growing at a very slow rate (Karimi, 2019). The result of export and poverty reduction strategies in SSA countries is heterogeneous; a successful country case will be further discussed in Chapter 7.

Beside export strategy through establishing SEZs, SSA governments also sought to reduce poverty through government transfer, infrastructure building and international aid. But due to unstable political environment, high corruption and bureaucracies, such efforts did not make a difference in the poor population. Especially since the 1960s, when African countries began to achieve independence, many of them have encountered significant levels of institutional instability, making people's life harder. Corruption is also an important constraint in reducing poverty. According to a report of Transparency international<sup>18</sup>, cameras and videos are required for instance when installing drinking water purifiers for villages because of the corruption concern. In Mozambique, several former government officials and business executives have been indicted over an alleged \$2 billion fraud and money laundering scheme earlier 2019, and it happened frequently. As observed by Mogens and Christian (2014), poor people in Africa are more likely to be victims of corrupt by street-level bureaucrats as the poor often rely heavily on services provided by governments. Therefore, to fight against poverty, SSA countries need to reduce corruption and improve government credibility, besides economic concerns.

### Foreign Aid

Africa is the region that has received the most foreign aid, and its Net Official Development Assistant (ODA) reached \$50 billion in 2016 (OECD, 2018). Ethiopia, Nigeria, and Tanzania rank as the top ODA recipients (see Table A34 in the appendix). Despite this, progresses were slow and official aid in Africa faced many challenges. For instance, the main Millennium Development Goals (MDGs) of reducing the proportion of people living in extreme poverty to half the 1990 level by 2015 was not achieved. Many

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<sup>18</sup> Transparency International is a global movement working in over 100 countries to end the injustice of corruption. It focuses on issues with the greatest impact on people's lives and hold the powerful to account for the common good. They work to expose the systems and networks that enable corruption to thrive, demanding greater transparency and integrity in all areas of public life.



international aid projects faced severe problems, such as corruption and misuse. Numerous articles and reports have analyzed aid effectiveness and even discussed the concept of the curse of aid. This study will include foreign aid and political stability as control variables to test the impacts of aid accumulation and political stability for the selected SSA countries.

## 1.4 Summary

China developed from a basic agriculture and natural resources exporter to a relatively high-skilled spectrum of an industrialized country through a series of policy reforms. HRS, TVEs and SEZs are all household names amongst development specialists. The HRS system fundamentally changed the way households produce, distribute, and manage their harvest, met the needs of the general population, therefore, largely reduced the poverty population. The encouragement of TVEs and the acceleration of SEZs have combined perfectly to access the global market. With foreign development funding and aid, China used the opportunity to learn, grow, and contribute in the world economy. Meanwhile, China also sacrificed and changed many law and regulations<sup>19</sup> to join the global trading network. Creating more value on merchandise and services<sup>20</sup> forms a virtuous circle that alleviated more people from poverty by transferring them from low value-added fieldwork positions to innovative and high value-added production positions. There are also many reforms and events<sup>21</sup> that enabled China to move up the value chain quickly, creating world-class industries in everything from 5G and artificial intelligence to biotechnology and quantum computing (WTO, 2020).

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<sup>19</sup> To enter WTO for example, China lower its tariffs on agricultural products, industrial products and revised 2,300 laws, regulations and departmental rules at central government level, and 190,000 policies and regulations at sub-central government levels, covering trade, investment, IPR protection (WTO, 2020).

<sup>20</sup> as pervious discussed in chapter 1.

<sup>21</sup> Such as dual-track price policy and one child policy. Dual-track price policy refer to the way government control prices. On one track, it continuously provided transitory protection and subsidies to large, capital-intensive state-owned enterprises that violated China's comparative advantage but were essential for national defense and people's basic needs. On the second track, it liberalized the entry of private and foreign firms to China's industries aligned with its comparative advantage (Lin J. , 2017); One child policy refer to the policy starting from 1982 to 2016 officially at country level that only one child per family is allowed, this policy has prevented 400 million births.

During the same period, many countries on the African continent performed poorly, maintaining autocratic political regimes and experiencing low economic growth rates. Since the 1960s, when African countries began to achieve independence, many of them have encountered significant levels of institutional instability. Many exporting zones encountered corruption, misuse of resources and infrastructure constraints. The historical problem of relying on natural resources has further driven SSA countries into poverty. Unbalanced growth and slow structural transformation are holding SSA back.

However, home to the world's largest free trade area<sup>22</sup> and a 1.2 billion-people market, SSA has vast opportunities (World Bank, 2020). In this study, I will discuss the feasibility of SSA export acceleration to economy growth and poverty reduction.

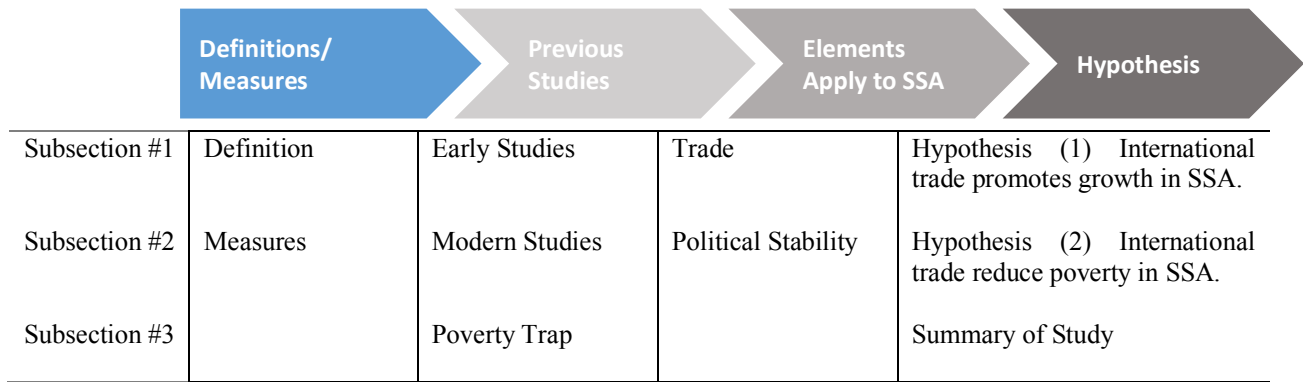
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<sup>22</sup> According to WTO definition: Trade Area refer to the trade within the group is duty free but members set their own tariffs on imports from non-members. The African Continental Free Trade Area (AFCFTA) agreement will create the largest free trade area in the world measured by the number of countries participating. The pact connects 1.3 billion people across 55 countries with a combined gross domestic product (GDP) valued at \$3.4 trillion. It has the potential to lift 30 million people out of extreme poverty, but achieving its full potential will depend on putting in place significant policy reforms and trade facilitation measures. (World Bank, 2020)

## 2. Literature review

This chapter presents a review of the literature on poverty. I will first discuss various definitions and measurements of poverty and then examine empirical studies on the relationship between exports, economic growth and poverty reduction. By comparing the strategies of SSA to those of China (conducted in Chapter 1), I will distinguish the elements applicable to SSA. Two hypotheses regarding the impact of exports on growth and poverty reduction will be proposed (see the chapter's structure in Figure 4 below).

**Figure 4: Structure of Chapter 2**



## **2.1 Definitions and Measurement of Poverty**

### Definitions

Poverty is not an easy concept to define. A range of definitions exist, influenced by various disciplinary approaches and ideologies (Handley et al, 2009). The most commonly used definition is given by the World Bank. The World Bank's 2000 World Development Report defines poverty as pronounced deprivation in well-being (World Bank, 2000). It is an unacceptable deprivation in human well-being that can comprise both physiological and social deprivation (IMF, 2001). It is also a lack of freedom, enslaved by a crushing daily burden, by depression, and by fear of what may happen in the future. The dimensions combine to create and sustain powerlessness and a lack of freedom of choice and action (Deepa, 2000). Poverty is a situation in which inequalities cause some people to lag so far behind the social mainstream that the deprivations they experience push them below what is viewed as basic standards (United Nations, 2017).

A common image of the extreme poor is that they cannot make many real choices (Banerjee and Duflo, 2006). Their resources are so seriously below those commanded by the average individual or family that they are, in effect, excluded from ordinary living patterns, customs, and activities (Townsend, 1979). As we can see from the comparison, poverty could also be viewed as a relative concept, being compared to a certain standard of living and income distribution.

Poverty is also a multidimensional phenomenon with non-monetary dimensions such as deprivations in education and basic infrastructure (i.e. water, sanitation and electricity) (Gerszon, 2018). Multi-dimensional poverty has been studied more intensively in the past few decades because of the acknowledgement that poverty involves much more than just low income (Lugo, 2013). The reason we should care about multi-dimensional poverty is that monetary-based measures do not encompass all aspects of human well-being (United Nations, 2017). For example, vulnerability is a constant companion of material and human deprivation, such as poor people who live and farm on marginal lands with uncertain

rainfall. They live in crowded urban settlements where heavy rains can wipe out their homes. They are at higher risk of diseases such as malaria and tuberculosis. They are at risk of arbitrary arrest and ill-treatment at the hands of local authorities (Wasnik, 2010).

Indeed, poverty impacts all aspects of a human and is closely related to overall social development and economic freedom. Amartya Sen (1999) has described that economic un-freedom, in the form of extreme poverty, can make a person a helpless prey in the violation of other kinds of freedom and that development aims to increase the various forms of freedom: political freedoms (in the form of free speech and elections) promote economic security, social opportunities (in the form of education and health facilities) facilitate economic participation, and economic facilities (in the form of opportunities for participation in trade and production) generate personal abundance and public resources for social facilities (Amartya, 1999).

Poverty has also been used to describe intangible assets, such as time. For example, the notion of “time poverty” is increasingly used to describe groups of people whose disposable incomes may be high enough to keep them out of poverty, but because they work long hours they have little time for personal maintenance, social care, or leisure (United Nations, 2017). Time poverty can be understood as the burden of competing claims on a person's time that constrains their ability to choose how individual time resources are allocated. (Ringhofer, 2015). This, in many cases, leads to an increased workload and trade-offs among various tasks (Aslihan Kes, 2006).

In this study, I will analyze poverty in its economic and financial definition.

### Measurement

Following past practice, poverty is assessed using a household's per capita expenditure or consumption or a household's income per capita as measured from national sample surveys. Income-based poverty measures compare resources available to people to a threshold, below which they are considered poor (Couch, 2010). This threshold is called the poverty line, Abhijit interprets the poverty line as the budget needed to buy a certain

amount of calories, plus some other indispensable purchases (such as housing) (Banerjee and Duflo, 2006).

There are different ways to measure poverty. In general, poverty measurements revolve around absolute poverty and relative poverty measurements. For the absolute poverty measurement, poverty thresholds are calculated according to an annual basket of minimum consumption to ensure a tolerable standard of living. Absolute poverty lines identify those living below an arbitrarily fixed level of wellbeing (Tarp, 2017). Most countries in the world measure their poverty using an absolute threshold, or in other words, a fixed standard of what households should be able to count on in order to meet their basic needs (Feng, 2014). For the relative poverty measurement, poverty is defined in relation to a standard of living and the distribution of income. For example, deep income poverty in Canada is a relative index that measures the number of individuals for whom their family's disposable income is below 75 percent of Canada's Official Poverty Line (Statistics Canada, 2020).

To further analyze absolute measurements among different countries, we use PPPs. PPPs measure the total amount of goods and services that a single unit of a country's currency can buy in another country (World Bank, 2017). PPPs make it possible to compare the output of economies and the welfare of their inhabitants in 'real' terms, thus controlling price level differences across countries. For instance, the international level of extreme poverty is \$1.90 PPP per day, equivalent to approximately \$2,774 per year for a family of four (World Bank, 2020). This number was \$1.25 before 2015 (World Bank, 2015). Like extreme poverty, moderate poverty has been set to less than \$3.20 PPP per day (Lower Middle-Income Class Poverty Line) and \$5.50 PPP per day (Upper Middle-Income Class Poverty Line) (World Bank, 2018). The World Bank also identified a poverty threshold of \$21.70 a day for high-income countries, like the US. All these absolute lines aim at evaluating the poverty status of a country or region (Weller, 2017).

Another absolute poverty measure, the poverty headcount ratio, is the percentage of the population living on less than that certain standard a day. A common measure is the poverty headcount ratio at \$1.90 a day (2011 PPP) (% of the population). It is the

percentage of the population living on less than \$1.90 a day at 2011 international prices (World Bank, 2020). The same logic applies to other standards, such as \$3.20 a day and \$5.50 a day. This measure is easy to understand and simple enough to calculate and has been adopted widely. Another measure is the poverty gap, which is defined as the mean shortfall in income or consumption from the poverty line (counting the non-poor as having zero shortfall), expressed as a percentage of the poverty line (World Bank, 2020). In other words, it aggregates the short-fall of income of all the poor taken together from below the poverty line (Sen Amartya, 1976).

Poverty can also be identified using non-monetary indicators, such as inequality, life expectancy, child mortality, and literacy rate. For instance, the World Bank report of *Comparative Life Expectancy in Africa* found that health outcomes are positively correlated with income (World Bank, 2001). Multidimensional poverty measures that satisfy dimensional breakdown offer an inherent way of exploring the driving factors behind changes in poverty (Suppa, 2017). The Multidimensional Poverty Index (MPI) identifies multiple deprivations at the household and individual level in health, education and standard of living. According to the *United Nations Human Development Report (2019)*, three key dimensions, health, education, and standard of living, comprising 10 indicators<sup>23</sup> are adopted to identify people who are left behind. People who experience deprivation in at least one-third of these weighted indicators fall into the category of multidimensionally poor (UNDP, 2019). To incorporate information on the level of income per person of a country, as well as indicators measuring achievements in health and education (UNDP, 2016), the Human Development Index (HDI) was developed. It is based on the idea that wellbeing is multidimensional and encompasses multiple aspects of human life, including how people interact with each other and with our physical environment. Table 3 summarizes the aforementioned most common poverty measurements.

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<sup>23</sup> The ten indicators include nutrition, child mortality, years of schooling, school attendance, cooking fuel, sanitation, drinking water, electricity, housing and assets. <http://hdr.undp.org/en/2018-MPI>

**Table 3: Main Poverty Measurements**

Monetary indicators	Poverty Line Poverty headcount ratio 2011 PPP and \$1.90/day poverty line 2011 PPP and \$3.20/day poverty line 2011 PPP and \$5.50/day poverty line
	Poverty Gap Index
Nonmonetary indicators	Multidimensional Poverty Index Human Development Index

## **2.2 Studies on Poverty, Economy, and Poverty**

### Early Studies

Having discussed the poverty' definitions and measurements, I will now review some of the main studies, research, and theories on poverty, inequality, and social freedom.

Karl Marx was among the first economists to analyze poverty. The Marxist theory maintains that poverty, like wealth, is an inevitable consequence of a capitalist society. Marxists argue that poverty benefits the ruling class, as it ensures that there is always a workforce willing to accept low wages. Similarly, the existence of unemployment and job insecurity means that there is always a 'reserve army of labour' able and willing (or unable to be unwilling!) to take their place if they are not happy. Capitalism and the bourgeoisie, therefore, benefit from the existence of poverty (Cunningham, 2007). It is not simply that there are rich and poor. It is rather that some are rich because some are poor (Kincaid, 1973). Marx described the crudity of "the fact the vampire will not lose its hold on him so long as there is a muscle, a nerve, a drop of blood to be exploited." (Marx, 1883). As we can see, Marx explained the origin of poverty and inequality through the act of exploitation forced onto the proletariat by capitalists.

After Marx, the liberal school in economics believed that poverty results from the misuse and low efficient allocation of natural or economic resources, due to the lack of production factors or resource misallocation. Liberals hold the view of "capitalism only," that capital scarcity is an obstacle to economic development. They believe that developing countries must industrialize if they want to escape poverty. Industrialization is a fundamental way



for developing countries to eliminate poverty. In the 1950s, Ragnar Nurkse formulated the “vicious circle theory” and argued that developed economies should “push” underdeveloped economies out of the “poverty trap”. The vicious circle theory serves as a foundation of poverty studies. It explains that in poor countries, saving is restricted due to low income, as it must be used for consumption, and low-income results from low labour productivity, which again is a result of deficient capital and low savings. Such situation could also be called a “poverty trap,” as no endogenous forces exist to overcome poverty (Bass, 2008). I will focus on the “poverty trap” theory in a later chapter, which is a set of self-reinforcing mechanisms whereby countries start poor and remain poor, poverty begets poverty so that current poverty is itself a direct cause of poverty in the future (Kraay and McKenzie, 2014). Along with Nurske, Nathan Rosenberg has completed a systematic survey of poverty in developing countries, exploring the causes of poverty in developing countries and ways to get out of poverty in his published article, *Capital Formation in Underdeveloped Countries*. He is a pioneer for the "Big Push" theory of economic development, arguing that government-induced industrialization would break the poverty traps in underdeveloped countries given increasing returns to scale.

Meanwhile, in the early 1960s, Nobel laureate Theodore W. Schultz brought up the human capital concept. He found that the quality of labour could significantly enhance productivity and contribute to the economy overall. He believes that countries are poor fundamentally because they are starved for capital, and that additional capital is truly the key to their more rapid economic growth. However, his emphasis was on one form of capital: human capital (Schultz, 1961). Schultz also believes that the root cause of poverty in developing countries lies not in the shortage of physical capital, but the scarcity of human capital and its excessive neglect of human investment. To get rid of poverty, developing countries must improve the quality of their populations and their knowledge. The improvement of population quality is largely caused by education. The development of education is of considerable significance to the formation of human capital, the transformation of economic structure, and the sustainable development of the economy in developing countries.

More recently, Caselli (2005) concludes that three characteristics differentiate poor countries from rich countries. First, poor countries have much lower labour productivity in agriculture than in rich countries. Second, they also have lower labour productivity than rich countries in manufacturing and services, though the magnitude of these gaps is not as large as those in agriculture. Finally, a larger share of the workforce in poor countries is concentrated in agriculture, which is the least productive sector. His point has been perfectly demonstrated in the research of Justin Lin, previously senior Vice President and Chief Economist of the World Bank. He compared the difference between Burundi and Switzerland, two landlocked countries of roughly the same population, natural resources, and land area, but tremendously different development levels. He paid special attention to the infrastructure change. Burundi's main exports have remained coffee and tea, and its industrial base is limited to light consumer goods such as blankets, shoes, and soap. On the other hand, Switzerland's economy is led by financial services and a manufacturing industry specializing in high technology, knowledge-based production. Well-designed infrastructure facilitates economies of scale, reduces trade cost, and is thus central to specialization, efficient production, and consumption of goods and services. Therefore, he concluded that the infrastructure change is important for an underdeveloped country seeking economic transformation (Lin, 2012).

In summary, many modern scholars have exerted efforts to study and contribute to the poverty issues at both individual and country-level. It is a highly debated topic that continues to evolve and change. Among many classical theories, the poverty trap is a significant and commonly accepted theory with a wide application in the poverty reduction practice. I will discuss it in the following section.

### Poverty Traps

As previously discussed, the most impoverished countries' critical problem is that poverty itself can be a trap (Sachs, 2005). Developing countries are poor because of the lack of resources and the incapability of forming capital. Because of the lack of such foundations, those countries are stuck in the poverty traps. It is a stable low-level balanced growth path to which economies gravitate due to initial adverse conditions or poor equilibrium selection by institutions or weak governance (Elvio, 2011). A dynamic equilibrium below

the poverty line would suggest that eventually all households are expected to be trapped in poverty. Overcoming such a structural poverty trap would require structural changes that provide new economic opportunities for households that raise their equilibrium level of welfare (Nashchold, 2012).

Poverty traps can further be viewed as behavioural poverty traps, geographic poverty traps, saving-based poverty traps, nutritional poverty traps, etc. They represent different types of poverty, but they all share the same concept: the endogenous nature of poverty. It is an equilibrium that poor people can hardly escape. A poor nation is trapped in the sense that it is stuck at its low steady-state and experience no growth in per capita ratios. Take savings-based poverty traps, for example. If countries (or individuals) are too poor to save, they cannot accumulate capital because their incomes can only grow at the rate of total productivity growth. If this productivity growth is low or zero, then incomes will be stagnant (McKenzie, 2014). The same mechanism is shared with nutritional poverty traps. If poor individuals are too malnourished to physically be able to do productive work, thereby not earning enough or producing enough food to alleviate this malnourishment (World Bank, 2014). Yet there must be some people who work as hard as they can, which may not be particularly hard because they are underfed and weak and earn barely enough to cover the basic needs that they always try to fulfil in the least expensive way (Banerjee and Duflo, 2006) and do not have much to change their situations.

For countries trapped in poverty, growth in their economy is the only way to escape the trap. However, due to the constraints facing developing countries, their economy cannot properly grow without outside help of developed countries. Therefore, international assistance is important for them to grow; it can kick-start a virtuous cycle by helping poor countries invest in critical areas and make them more productive. Jeffrey Sachs, a firm believer in such an approach, argued that if developed countries could give developing countries financial aid, this vicious cycle would be interrupted, and poor people could get out of the trap. In his book, *The End of Poverty*, he argued that if the rich world was committing \$195 billion in foreign aid per year between 2005 and 2025, poverty could be eliminated by the end of this period. If all developed countries that have not done so were able to make concrete efforts toward the goal of 0.7 percent of GDP of official

development assistance, aid would reach \$175 billion per year, which would lead to a breakthrough (Sachs, 2005).

On the other side, some believe that there are no such things as poverty traps. They believe in the importance of a well-functioning government and an effective market system. Economists such as William Easterly and Dambisa Moyo believe that foreign aid prevents people from searching for their solutions while corrupting and undermining local institutions and creating a self-perpetuating lobby of aid agencies (Moyo, 2009). Similarly, Albert Otto Hirschman emphasized the need for unbalanced growth, believing that developing countries are short of decision-making skills and the power of governance. He argued that disequilibria should be encouraged to stimulate growth and help mobilize resources. (Hirschman, 1958) Moreover, Simeon, Jose and Marta (2008) argued that aid is ineffective, causing corruption, inequity, and idle bureaucracy in their article, *The Curse of Aid*. Morrison (2012) complemented their studies by purporting causal mechanisms underlying this "curse" and concluded that if the country in which resources are found is well-governed, these resources can have beneficial effects.

Poverty trap is a topic that many scholars and researchers dispute, and we can always analyze it from different perspectives and positions. In summary, as Aart Kraay and David McKenzie concluded, a large amount of foreign aid didn't get Africa out of poverty; but, this does not mean that aid cannot have positive effects on aggregate growth (Kraay and McKenzie, 2014). Microfinance, for example, is a successful financial innovation to help the poor to sort out credit exclusion, which is one of the poverty traps that prevent billions of underserved, especially women, from escaping atavistic misery (Visconti, 2012). Indeed, we may not praise or criticize aid without considering various perspectives, but one thing is clear that aid cannot be present forever. An internal development engine is a core for long-term economic growth and people's welfare. As Rwandan President Paul Kagame said in an interview, "No country can depend on development aid forever. Such dependency dehumanized us and robbed us of our dignity" (Chu, 2009).

### Modern Studies on Exports, Economy and Poverty

Poverty cannot be reduced in isolation from economic growth (Lin, 2012). This section examines the empirical evidence and relationship of export, economic growth, and poverty reduction.

- Relationship between trade and growth

The role of trade in promoting economic growth has always been a concern of economists. As early as the 18th century, Adam Smith argued that trade promotes economic growth by deepening the division of labour system to increase labour productivity. His analytical approach was mainly theoretical and comparative. More recently, econometric research has shown that trade openness has a positive relationship with economic growth (Dollar, 1992; Sachs and Warner, 1995). Frankel and Romer (1999) introduced geographical characteristics as instrumental variables to the standard economic growth model and concluded that open trade benefits economic growth. Dollar and Karry (2004) updated the index of open trade, combined the regression model that Caselli et al. (1996) offered, still showing a positive relationship between trade and economic growth. Lin (2010) believes that trade promotes economic growth by reducing the market's rent-seeking unproductive activities and trigger infrastructure transformation. Table 4 presents a summary of these studies.

**Table 4: Summary of Studies on Trade and Growth**

<b>Authors</b>	<b>Methods</b>	<b>Results</b>
Li, Loungani and Ostry (2018).	GMM, China Urban Households Survey (2002-2009)	An increase in trade share of one percentage point is associated with an increase of 1.8 percent in income per person.
Dollar (1992)	OLS, 95 LDCs (1976-1985)	Trade liberalization could dramatically improve growth performance in LDCs.
Were (2014)	OLS and IV estimates, 85 countries. (1991-2011)	The trade's impact is insignificant for LDCs.
Calderón and Cantú (2019)	GMM-IV, First difference, 173 countries. (1975-2014)	Increased trade openness has a positive causal impact on economic growth.
UNCTAD (2006)	Case study and empirical analysis	In poor countries, settings liberalization often leads to loss of production and jobs in manufacturing (deindustrialization).
Dollar and Kraay (2004)	OLS, IV, Grouped panel data, 101 countries. (1975-1995)	Changes in trade volumes have a strong positive relationship with changes in growth rate.
Frankel and Romer (1999)	OLS and IV estimates, added geography factor, 63 countries. (1976-1985)	Trade raises income and promotes economic growth.
Hay (2001)	FE, GMM, OLS, 500 firms Brazilian. (1986-1994)	Trade liberalization can increase TFP.
OECD (2009)	Case study and empirical evidence.	Trade is central to economic growth.
Huang (2010)	OLS, 138 countries. (1970-1985)	One percent increase in per capita trade raises the equilibrium GDP growth rate by 0.29%.

- Relationship between trade and poverty

Trade can also reduce poverty. Le Goff and Singh (2013) used a panel of African countries over the period 1981-2010 testing for non-linearities in the trade-poverty relationship. They find that trade openness tends to reduce poverty in countries where financial sectors are deep, education levels high and institutions strong. Thelle et al (2015) also found a similar result: a strong export performance can help reduce domestic poverty in developing countries. Most studies supported evidences of the negative relationship between the trade and poverty. However, some scholars using different datasets, models, and estimation methods, found that trade had no significant impact on poverty or that it varied according to country contexts (Mabugu et al, 2014, Hayashikawa, 2008). Table 5 presents a summary of these studies.

**Table 5: Summary of Studies on Trade and Poverty Reduction**

<b>Authors</b>	<b>Method</b>	<b>Result</b>
Le Goff and Singh (2013)	GMM, panel data of 30 African countries. (1981– 2010)	Trade openness tends to reduce poverty in countries where financial sectors are deep, education levels are high and institutions are strong.
Thelle et al (2015)	OLS, FE and GMM estimates, 78 countries. (1996-2010)	A strong export performance can help reduce domestic poverty in developing countries.
Luo (2015)	2SLS, 26 provinces in China (1960-2000)	Trade openness has largely reduced poverty in China.
Mabugu et al (2014)	Computable general equilibrium (CGE) modelling based on national survey data in South Africa (2007-2014)	Trade liberalization has no appreciable impact on poverty in the short run, even if trade-induced TFP increases are allowed.
Hayashikawa (2008)	Case study and empirical analysis	The degree to which trade benefits growth and poverty reduction happens varies considerably across countries.
Dollar and Kraay (2004)	OLS, IV, Grouped panel data, 101 countries. (1975-1995)	Globalization leads to faster growth and poverty reduction in poor countries.

- Relationship between growth and poverty

The relationship between growth and poverty reduction will not be formally tested in this study given that my focus in this thesis concerns more specifically the links trade to growth and trade to poverty. However, a brief review of previous studies on growth and poverty can help understand the mechanisms leading to poverty reduction. Regarding economic growth and reduced poverty, empirically, this relation was observed as being positive. For example, Bruno, Squire and Ravallion (1998), Dollar and Karry (2000) determined a positive relationship between the income of poor groups and the overall population income. Particularly, in the study of Dollar and Karry (2000), they made a first difference study of the income of the poor groups with the average national income. Using 2SLS analysis, they show that economic growth can effectively improve the income level of the poor groups. Lundberg and Squire (2000) and White and Anderson (2001) combined to the model the effects of income distribution and economic growth. They show that open trade mainly impacts poor's income, while the former study showed that

economic growth contributed mainly high-income groups. Ravallion and Chen (1997) leveraged the growth elasticity of poverty to study the impact of economic growth on poverty. They used a 62 countries' panel data and found that a 1% increase in average income is associated with a 3.1% decrease in the poverty rate. Therefore, the growth elasticity of poverty is 3.1. They also concluded that economic growth has a more significant impact on the extreme poor. More studies sought to explain the mechanisms between growth and poverty, such as through government transfers (Chen et al (2017)), structural change (Berthelemy (2018)), employment (Karnani (2018)), institution (Perera and Lee (2013)), infrastructure (Govinda et al. (2020)), wages increase (Gould (2014)) and productivity (Martin and Ivanic (2017)). Some empirical studies have found contradictory results in the relation of growth and poverty. Some discuss causal effects (Frankel & Romer, 1999; Sachs & Warner, 1999). Others argued that the effect of trade is influenced by incorrectly proxied variables (Rodriguez and Rodrik, 2000). Some believe that institutional or policy outcomes could also have an impact on trade (Sachs and Warner 1995; Frankel and Romer 1999; Easterly, Islam and Stiglitz 2001). The studies in this domain is fruitful and varies. As mentioned, I will not test this relationship since it is not the goal of this study.

### **2.3 Elements applicable to SSA**

Based on the review of the literature, I identify possible elements applicable to SSA for their effects on economic growth and poverty reduction. Those elements will be discussed and tested in the econometric analysis section.

First, political stability and inclusive institution are essential (detrimental) for economic development. In China, the ruling party is not concerned with re-elections. It is thus easier to implement reforms when the ruling government enjoys long-term political stability (Guennoun, 2019). Economic concern should always be the priority in the government's agenda. I will add one relevant variable regarding the political stability to test such influence.

Second, increased trade openness and an atmosphere of export promotion can be leveraged for economic growth and poverty reduction. As rapid export expansion has been



witnessed in China and other Asian countries such as Taiwan, Japan and South Korea, I deem that increasing exports would also help SSA economics escape poverty and achieve economic growth. I will elaborate these two hypotheses in the next subsection.

Third, establishing SEZs can promote economic growth and attract FDI. Mauritius, for example, has successfully implemented SEZs to transform its economy and industry structure. This will be discussed in Chapter 7.

## **2.4 Hypothesis**

Based on the literature review, I focus on the transferability of some of the strategies mentioned in Chapter 1. I now formulate two hypotheses to test whether an export-oriented strategy can be leveraged by SSA countries to promote growth and reduce poverty.

**Hypothesis 1: International trade has a positive impact on economic growth in SSA countries.**

This hypothesis is based on the observed China's booming international trade and strong economic growth during the past 30 years. Based on the reviewed previous studies (see Table 4), I will test econometrically whether trade strategy can promote economic growth in SSA regions; and if such relationships are positive, what pre-conditions are required for SSA economic growth and poverty reduction.

**Hypothesis 2: International trade can effectively reduce poverty in SSA countries.**

This hypothesis, based on the reviewed previous studies (see Table 5), seeks to test the relationship between international trade and poverty reduction in SSA. From China's experience, we witnessed that a fast-growing economy accompanies tremendous poverty headcount reduction. I will test econometrically whether an expected positive relationship is observed using different control variables and poverty measures.

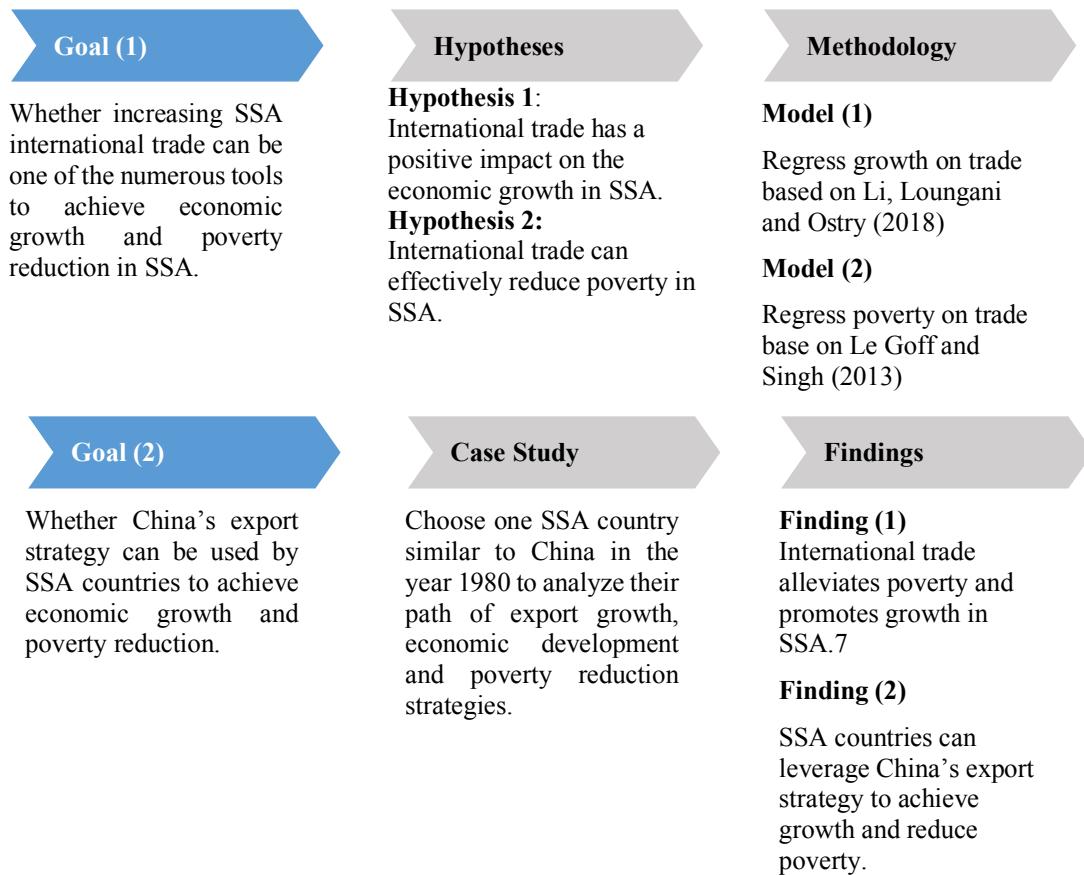
The approaches to testify my two hypotheses and the overall goals are listed below in Figure 5:

**Figure 5: Goals, Hypotheses and Approaches**

**The goals of this study** are twofold:

Goal (1) to determine whether increasing SSA international trade can be one of the numerous tools to achieve economic growth and poverty reduction in SSA;

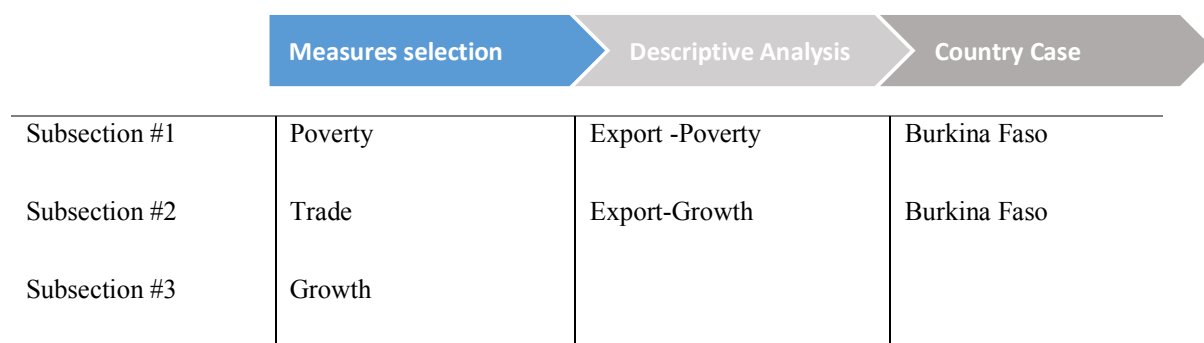
Goal (2) to determine China's export experience can be leveraged by SSA to achieve economic growth and poverty.



### 3. Descriptive Evidence

Before presenting the econometric methodology in Chapter 4, I will conduct a preliminary analysis of the relationship between exports and poverty reduction using a panel of 26 SSA countries during the period 1990-2018. First, I examine and compare various export measures to help choose the variables that will be used in the following econometric models. Second, I analyze the selected variables and their correlation with economic growth and poverty reduction. Finally, I review the descriptive evidence from a specific country perspective – Burkina Faso (see the chapter’s structure in Figure 6 below).

**Figure 6: Structure of Chapter 3**



### 3.1 Selection of Poverty Measures

As discussed previously in the literature review, there are many ways to measure poverty. In general, poverty is measured in absolute terms and relative terms. As one of the most commonly used absolute measures, the poverty line is calculated based on an annual minimum consumption basket to ensure an acceptable standard of living. The international poverty line was first established by the World Bank in its 1990 *World Development Report*. The extreme poverty line is the minimum income threshold necessary to meet basic needs (food, clothing, housing, drinking water, health, education, information and access to services). The international level of extreme poverty amounts to \$ 1.90 per day (in 2011 PPP). Households below this threshold is seen as not being able to meet their basic needs for survival (food deficit, lack of access to health care, drinking and sanitary water, education, housing). As discussed, under a certain poverty line, the poverty headcount ratio is the percentage of the population living below the poverty line. It is among the most popular poverty measurements given its simplicity, consistency and integrity. I adopt the poverty headcount ratio under the different poverty lines to access the size of poverty. Specifically, I will use \$1.90, \$3.20, and \$5.50 in 2011 PPP to examine respectively the extreme poverty level, lower-middle-income poverty level, and upper-middle-income poverty level. I refer to them as: PH1 (\$1.90), PH2 (\$3.20), and PH3 (\$5.50), respectively.

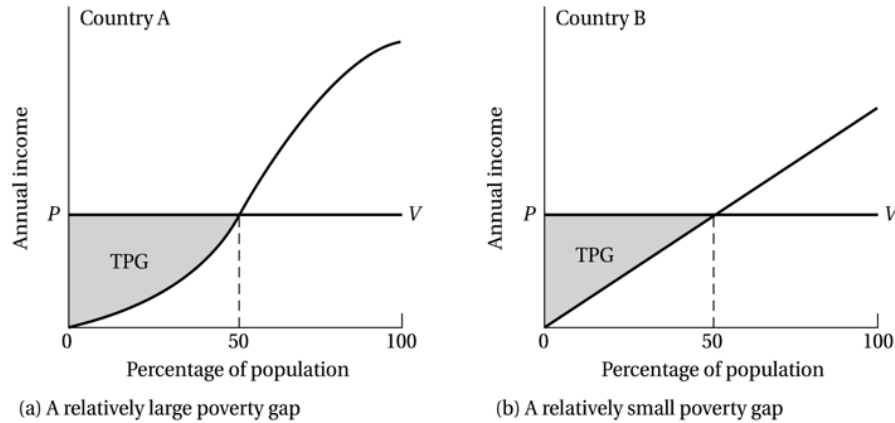
Additionally, two countries with the same headcount index may have quite different poverty levels (See Figure 7). As discussed, the poverty gap<sup>24</sup> (PG), for example, is a good proxy to access the severity of poverty. It is used to aggregates the short-fall of income of all the poor taken together from below the poverty line (Sen Amartya, 1976). It is the amount of income necessary to bring an average poor individual above the poverty line, and calculated as the mean shortfall in income or consumption from the poverty line (counting the nonpoor as having zero shortfalls), expressed as a percentage of the poverty line. Unlike PH measures considering the poor population equally poor, PG measure

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<sup>24</sup> Poverty gap is referred to at the country level instead of the individual level in this thesis.

reflects the depth of poverty. Therefore, I will make use of the PG measures in the robustness tests to assess the severity of poverty in SSA countries.

**Figure 7: Measuring the Poverty Gap**



Source: Todaro and Smith (2006)

Inequality is also closely related to poverty and is often measured by the Lorenz curve<sup>25</sup> and the Gini coefficient<sup>26</sup>. Some researchers also use the income of the bottom 10% or 30% of the population to measure the poverty degree and severity. However, I will not make use of these measures because my study concerns poverty, not inequality. Particularly, trade liberalization tends to increase the opportunities for economic activity; it can very easily widen income inequality while at the same time reduce poverty (Le Goff and Singh, 2013). Therefore, inequality has not been included in my measures of poverty. The selected poverty measures in this study are presented in Table 6.

**Table 6: Selected Poverty Measures**

<sup>25</sup> Lorenz curve is a graphical representation of income inequality or wealth inequality developed (Kenton, Investopedia, 2018). The degree of income inequality is indicated by the deviation of the Lorenz curve from the 45° line. The further the Lorenz curve moves away from the diagonal, the more unequal the distribution of income.

<sup>26</sup> The Gini coefficient is well known as that fraction of the area below the 45° line that lies between the 45° line and the Lorenz curve. (Rogerson, 2013)

<b>Acronyms</b>	<b>Definitions</b>
<b>PH1(\$1.90)</b>	Share of the population that living on less than \$1.90 per day in 2011 PPP.
<b>PH2(\$3.20)</b>	Share of the population that living on less than \$3.20 per day in 2011 PPP.
<b>PH3(\$5.50)</b>	Share of the population that living on less than \$5.50 per day in 2011 PPP.
<b>PG1(\$1.90)</b>	Mean shortfall in income or consumption from the poverty line \$1.90 a day (2011 PPP)
<b>PG2(\$3.20)</b>	Mean shortfall in income or consumption from the poverty line \$3.20 a day (2011 PPP)
<b>PG3(\$5.50)</b>	Mean shortfall in income or consumption from the poverty line \$5.50 a day (2011 PPP)

Source: World Bank (2020) Note: Table A43 in the appendix for a complete description of the various measures.

As observed from the selected poverty measures, I will analyze SSA poverty across two dimensions: the size and the severity. The size is referred to as PH1 (\$1.90), PH2 (\$3.20) and PH3 (\$5.50). They are bounded between 0 and 100%. 0 under extreme poverty refer to zero percent of the population is living on less than \$1.90 a day, and 100% represents the opposites. The severity is referred to as PG1 (\$1.90), PG2 (3.20) and PG3 (\$5.50). They are bounded between 0 and 100%. 0 represents no poverty gap that the average poor is one or above the poverty line, 100% means the opposite. Table 7 and 8 present the levels and changes for the poverty levels and severity for our sample of 26 SSA countries between 1990 and 2015.

**Table 7: Poverty levels in SSA countries– Selected Measures**

Country	Poverty Headcount (PH) Ratio (%)								
	PH1 (\$1.90)			PH2 (\$3.20)			PH3 (\$5.50)		
	1990	2015	Δ	1990	2015	Δ	1990	2015	Δ
<b>Angola</b>	26.5	28.2	1.7	47.4	54.1	6.6	71.1	77.8	6.7
<b>Benin</b>	59.7	49.5	-10.2	84.6	76.2	-8.4	95.3	90.6	-4.7
<b>Botswana</b>	33.6	16.2	-17.4	54.6	38.3	-16.4	74.9	59.8	-15.1
<b>Burkina Faso</b>	84.1	42.8	-41.3	93.2	76.0	-17.2	97.3	92.2	-5.1
<b>Burundi</b>	81.7	74.8	-6.9	95.0	90.6	-4.4	98.9	97.2	-1.7
<b>Cameroon</b>	33.1	22.8	-10.3	64.5	43.4	-21.1	83.6	67.5	-16.0
<b>Central African Republic</b>	81.5	77.7	-3.8	90.6	89.5	-1.1	96.0	95.8	-0.1
<b>Cote d'Ivoire</b>	14.4	28.2	13.8	39.9	57.4	17.5	70.7	82.3	11.5
<b>Ethiopia</b>	65.1	30.9	-34.2	86.6	69.3	-17.3	95.7	90.5	-5.3
<b>Gabon</b>	5.0	4.0	-1.0	19.2	12.9	-6.3	47.5	35.3	-12.3
<b>Ghana</b>	46.4	13.2	-33.2	76.6	32.1	-44.5	93.0	59.6	-33.4
<b>Guinea</b>	91.1	32.8	-58.3	98.2	68.1	-30.2	100.0	91.3	-8.7
<b>Kenya</b>	29.1	37.3	8.2	51.6	66.5	14.9	74.0	86.6	12.6
<b>Madagascar</b>	60.9	77.5	16.6	83.6	90.9	7.3	94.8	97.3	2.5
<b>Malawi</b>	71.6	70.2	-1.4	88.5	89.1	0.6	95.4	96.6	1.1
<b>Mali</b>	86.1	47.7	-38.3	94.0	78.2	-15.7	97.9	94.3	-3.6
<b>Mauritania</b>	41.8	6.2	-35.5	68.8	24.7	-44.1	88.3	59.6	-28.6
<b>Mozambique</b>	87.3	61.6	-25.7	94.3	81.0	-13.4	97.8	91.5	-6.3
<b>Namibia</b>	51.6	13.4	-38.2	65.7	29.8	-35.9	77.5	50.5	-27.0
<b>Niger</b>	71.5	44.2	-27.4	91.7	76.2	-15.5	97.8	93.3	-4.4
<b>Nigeria</b>	54.2	47.0	-7.2	76.2	73.0	-3.1	92.1	89.7	-2.4
<b>Rwanda</b>	70.1	55.2	-14.8	90.6	80.0	-10.6	97.2	91.8	-5.4
<b>Senegal</b>	67.5	33.9	-33.6	84.0	63.3	-20.7	93.5	85.6	-7.9
<b>Tanzania</b>	70.6	40.7	-29.9	90.0	73.9	-16.1	97.9	91.0	-6.9
<b>Uganda</b>	59.2	39.4	-19.8	82.1	68.9	-13.2	93.8	87.4	-6.4
<b>Zambia</b>	53.4	57.5	4.1	68.3	74.3	5.9	83.5	87.2	3.7
<b>Average</b>	57.6	40.5	-17.1	76.1	64.5	-11.6	88.7	82.4	-6.3

Source: World Bank (2020)

**Table 8:Poverty Severity in SSA countries - Selected Measures**

Country	Poverty Gap (PG) Ratio (%)								
	PG1 (\$1.90)			PG2 (\$3.20)			PG3 (\$5.50)		
	1990	2015	Δ	1990	2015	Δ	1990	2015	Δ
Angola	11.4	14.7	3.2	21.6	28.9	7.3	37.5	47.1	9.6
Benin	22.3	22.4	0.1	43.6	39.5	-4.1	63.6	59.2	-4.3
Botswana	12.8	4.4	-8.4	25.9	13.8	-12.1	42.7	29.0	-13.7
Burkina Faso	49.7	10.8	-38.9	65.9	31.8	-34.1	78.4	54.5	-23.8
Burundi	37.4	33.1	-4.3	58.9	54.0	-4.9	75.1	71.1	-4.0
Cameroon	8.9	7.1	-1.8	26.0	18.0	-8.0	46.6	34.1	-12.5
Central African Republic	55.3	41.2	-14.2	68.1	58.1	-10.0	78.9	72.5	-6.4
Cote d'Ivoire	3.8	9.1	5.3	13.3	23.3	10.0	31.8	43.6	11.7
Ethiopia	25.2	8.9	-16.3	46.7	25.9	-20.8	65.9	49.8	-16.1
Gabon	1.1	1.0	-0.2	5.5	3.8	-1.7	17.5	12.2	-5.3
Ghana	15.9	4.3	-11.5	35.2	11.8	-23.4	56.8	26.3	-30.5
Guinea	61.8	9.3	-52.5	75.6	26.7	-48.9	100.0	50.0	-50.0
Kenya	10.7	11.9	1.3	23.0	28.7	5.7	40.2	49.5	9.2
Madagascar	25.2	38.8	13.6	45.2	57.8	12.6	64.2	73.3	9.1
Malawi	31.6	29.7	-1.9	52.2	50.7	-1.5	69.2	68.7	-0.5
Mali	53.6	14.5	-39.1	68.7	35.0	-33.7	80.3	57.3	-23.0
Mauritania	16.1	1.5	-14.6	32.6	7.1	-25.5	52.5	22.5	-30.0
Mozambique	51.7	27.2	-24.5	66.8	45.9	-21.0	78.7	63.3	-15.4
Namibia	27.2	4.5	-22.7	40.5	11.5	-29.0	54.0	23.9	-30.1
Niger	28.7	13.4	-15.4	51.3	33.4	-17.9	69.9	55.8	-14.1
Nigeria	24.6	18.1	-6.5	41.6	35.8	-5.8	60.1	55.6	-4.4
Rwanda	35.9	19.9	-15.9	55.3	40.2	-15.1	71.1	59.9	-11.2
Senegal	35.7	10.7	-25.0	52.5	26.4	-26.1	68.1	47.3	-20.8
Tanzania	29.0	15.6	-13.4	50.4	36.0	-14.4	69.2	57.3	-11.9
Uganda	25.4	12.2	-13.2	44.5	29.9	-14.6	63.3	50.9	-12.4
Zambia	34.2	29.5	-4.7	45.2	44.5	-0.7	58.4	60.0	1.6
Average	28.3	15.9	-12.4	44.5	31.5	-13.0	61.3	49.8	-11.5

Source: World Bank (2020)

As observed in table 7, all three measures of the level of poverty as measured by the headcounts suggest an overall decrease in the PH ratio during the period analyzed. The drop of the PH1 (\$1.90) groups reached 17.1% (from 57.6% to 40.5%) in the sampled economies from 1990 to 2015. The change in PH1 (\$1.90) is the most significant change



compared to the PH2 (\$3.20) and PH3 (\$5.50) groups, which decreased 11.6% and 6.3%. This is a reasonable finding, as PH1 (\$1.90) has the lowest poverty thresholds and includes the extreme poverty population. Logically speaking, it is easier to increase one's income from extreme poor than from PH2 (\$3.20) or PH3 (\$5.5), as the marginal effect is higher for the extreme poor. However, this finding can be overturned under an extremely unequal society where PH2 (\$3.2) and PH3 (\$5.5) groups have the privilege to benefit by a larger degree from the economic growth and government policies. Under the PH1 (\$1.90) measure, Guinea ranks first among our 26 SSA countries in terms of variation in poverty headcount ratio, with a 58% reduction during the past 25 years (from 91% to 33%), followed by Burkina Faso and Mali. Until 2015, Gabon and Mauritania have the lowest poverty headcount ratio and are the only two countries with a poverty headcount ratio under 10%. The higher PH1(\$1.90) indices are found in countries such as Burundi, Madagascar, and the Central African Republic, with rates of extreme poverty of 75%, 77%, and 78%, respectively (a detailed ranking table can be found at Table A37 in the appendix).

Table 8 shows the severity of poverty in SSA. Under PG1 (\$1.90), PG2 (\$3.20) and PG3 (\$5.50) measures, an average SSA country has progressed and experienced less intensity of poverty nationwide; its poverty gaps are closing. From 1990 to 2015, a 12.4% poverty decrease is witnessed in PG1(\$1.90), 13.0% in PG2(\$3.20) and 11.5% in PG3(\$5.50). This finding is in line with headcount ratio drop illustrated in Table 8. As the poverty gap is expressed in the poverty line percentage, a higher poverty gap index reflects a more severe poverty situation. For example, under PG1 (\$1.90) measure, the Central African Republic had the most severe poverty situation among the selected country in 2015 because its poverty gap reached 41.2%. This number indicates that counting the nonpoor (consumption above \$1.90 per day) as having zero shortfall, the average poor population's average is living under \$1.12 (in 2011 PPP) a day<sup>27</sup>. According to the poverty gap definition, higher poverty line standard naturally leads to larger poverty gap. For instance, PG3 (\$5.5) has a wider gap than PG2 (\$3.2), and PG2 (\$3.2) also has gaps larger than

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<sup>27</sup> \$1.12 is calculated according to the *Poverty Gap* =  $\sum_{i=1}^H (Y_p - Y_i) / Y_p$ .  $Y_p$  is the poverty line,  $Y_i$  is the revenue of individual i.  $41.2\% = (1.90 - 1.12) / 1.90$

PG1 (\$1.9) because PG1(\$1.90) has the lowest standard to measure poverty gap. For the PG3 (\$5.50) measure, the poverty gap is 50% for the average selected SSA countries in 2015, indicating that the average poor population lives under \$2.75 (in 2011 PPP) a day<sup>28</sup> if we take out people at \$5.5 or above as nonpoor.

After the description of the measures selected, I will now test the relationships between the selected poverty measures using a correlation matrix. A high correlation among selected poverty measures suggests that choosing either of the selected measures should lead to similar results (see Table 9).

**Table 9: Correlation Matrix-Selected Poverty Measures**

	PH1(\$1.90)	PH2(\$3.20)	PH3(\$5.50)	PG1(\$1.90)	PG2(\$3.20)	PG3(\$5.50)
PH1(\$1.90)	1					
PH2(\$3.20)	0.9534	1				
PH3(\$5.50)	0.8655	0.9694	1			
PG1(\$1.90)	0.9509	0.8342	0.7190	1		
PG2(\$3.20)	0.9948	0.9417	0.8542	0.9699	1	
PG3(\$5.50)	0.9807	0.9843	0.9333	0.9105	0.9810	1

Source: World Bank-PovcalNet (2020)

I observe that the selected measures are closely correlated. For instance, PH1 (\$1.90) and PH2(\$3.20) are strongly correlated with a coefficient of 0.9534. The same pattern is observed between PG1(\$1.90) and PG2 (\$3.20) with 0.9699 coefficient. This finding is reasonable, given the fact that poverty in SSA economies is concentrated and unbalanced. More people living under \$1.90 extreme poverty line can increase PH1(\$1.90) poverty measure ratio and make the rest measures PH2 (3.20) and PH3 (5.50) less indicative. For example, if 99% of the population lives under \$1.90 poverty line, there is less meaning in counting how many people live under \$3.20 and \$5.50 poverty line because they are relatively the same, adding up to 1%. From observation, PH1(1.90) is highly correlated with PH2(\$3.20), PG1(\$1.90), PG2(\$3.20) and PG3(\$5.50) for more than 95% variation. Therefore, to reduce such correlation, I will choose to analyze PH1(\$1.90) and PH3(\$5.50). I select PH1(1.90) because it is the extreme poverty line and the most basic

<sup>28</sup> \$2.75 is calculated under the same logic as footnote 40:  $50\% = (5.50 - 2.75) / 5.50$

measure to assess poverty. I will make use of the other poverty measures in my robustness checks.

### **3.2 Selection of trade measures**

The most straightforward measure of the importance of trade is trade value, defined as the value of all goods and other market services provided to and received from the rest of the world<sup>29</sup>. Another standard measure is trade volume, which measures the quantity of the exported and imported commodity. It can be regarded as one of the important macroeconomic measures of country development (Ebadi, 2015). Both measures can reflect trade growth and development, but in this study, I will adopt neither of them for two reasons. First, absolute quantity measures cannot represent the relative progress of trade growth compared to the overall economy. For example, trade value and volume may increase but at a far slower rate than the overall economy. Lack of this comparison is shortsighted and can lead to biases of the study. Second, from econometric perspectives, trade value cannot be regressed as an independent variable on GDP because it is part of the GDP itself by definition. Doing so would violate the Gauss–Markov assumptions.

Therefore, I needed to find an indicator of trade relative to the overall economy to show how trade grows. Trade openness, as measured by trade as a percentage of GDP, is commonly adopted to reach this goal. It has the advantage of being both clearly defined and well-measured (Golley, 2004). Researchers find it useful in conducting cross-country analyses because data on total trade as a percentage of GDP are available for many countries from standard international databases (Fujii, 2018). In this study, I will also use it to measure trade because it is a good indicator of the progress of the trade relative to the overall economy. However, there are problems using these measurements, too. For example, the relationship between economy and trade may be biased due to endogeneity, or countries whose incomes are high for reasons other than trade may trade more (Frankel and Romer, 1999). I will try to solve the endogeneity issue using instrumental variables (IV) techniques in Chapter 5.

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<sup>29</sup> This study focuses on international trade; therefore, domestic trade measures are not considered.

The descriptive tendency of trade openness in the selected SSA countries is presented in Table 11. A relatively open trade situation among selected SSA economies can be witnessed, and the openness is increasing during the period studied. The export openness (EO) has grown 5.0% and import openness (IO) 7.0%. In 2018, export and import openness reached on average 27.3% and 36.8%. From the country level, Mozambique ranks first at almost 47.8% of the GDP contributed by exports, followed by Mauritania and Botswana at 45.1% and 39.4%. The import openness is higher than the export openness for some countries, reaching 84.2% for Mozambique and 76.2% for Mauritania. The selected trade measures are presented in Table 10.

**Table 10: Selected Trade Measures**

<b>Acronyms</b>	<b>Definitions</b>
<b>EO</b>	Export % GDP
<b>IO</b>	Import % GDP

Source: World Bank (2020) Note: Table A43 in the appendix for a complete description of the various measures.

**Table 11: Trade Openness in Selected SSA economies**

Country	Trade Openness					
	EO (%)			IO (%)		
	1990	2018	Δ	1990	2018	Δ
<b>Angola</b>						
<b>Benin</b>	19.2	35.4	16.2	26.5	44.2	17.7
<b>Botswana</b>	55.1	39.4	-15.7	49.8	37.8	-12.0
<b>Burkina Faso</b>	11.0	30.8	19.8	24.5	37.2	12.8
<b>Burundi</b>	7.9	7.8	-0.1	27.8	30.5	2.7
<b>Cameroon</b>	20.2	19.3	-0.9	17.3	23.7	6.4
<b>Central African Republic</b>	17.1	18.9	1.8	25.9	47.0	21.1
<b>Cote d'Ivoire</b>	31.7	29.8	-1.9	27.1	29.2	2.1
<b>Ethiopia</b>		8.4			22.8	
<b>Gabon</b>	46.0	50.5	4.5	30.9	21.5	-9.3
<b>Ghana</b>	16.9	35.3	18.4	25.9	36.4	10.6
<b>Guinea</b>	31.1	37.6	6.5	33.4	53.0	19.6
<b>Kenya</b>	25.7	13.2	-12.5	31.3	23.0	-8.3
<b>Madagascar</b>	16.6	28.7	12.1	28.0	33.8	5.8
<b>Malawi</b>	23.8	29.2	5.4	33.4	36.2	2.7
<b>Mali</b>	15.7	23.6	7.9	30.9	34.1	3.1
<b>Mauritania</b>	45.6	45.1	-0.5	60.7	76.2	15.5
<b>Mozambique</b>	8.0	47.8	39.8	38.9	84.2	45.3
<b>Namibia</b>	43.6	38.7	-4.9	50.3	44.9	-5.4
<b>Niger</b>	14.8	15.7	0.9	21.6	33.0	11.4
<b>Nigeria</b>	21.0	15.5	-5.5	9.9	17.5	7.6
<b>Rwanda</b>	5.6	17.4	11.8	14.1	34.1	20.1
<b>Senegal</b>	25.4	21.9	-3.6	32.2	36.1	3.9
<b>Tanzania</b>	12.6	15.1	2.5	37.5	17.1	-20.4
<b>Uganda</b>	7.2	19.5	12.3	19.4	28.7	9.3
<b>Zambia</b>	33.0	37.4	4.5	33.7	38.2	4.5
<b>Average</b>	23.1	27.3	5.0	30.5	36.8	7.0

Source: World Bank (2020)

### 3.3 Poverty Reduction and Export

Studies on the relationship between exports and poverty are not new. However, results vary. The opinions are mostly supportive of a positive relationship between export and poverty reduction (Dollar (1992), Calderón and Cantú (2019), Frankel and Romer (1999) and Huang (2010)), with a minority being not supportive (Were (2014) and UNCTAD (2006)). This study aims to assess if a positive relationship between trade/ growth and trade/poverty reduction is present. In the literature, GDP per capita is often viewed as a proxy to poverty reduction, and I will adopt this measurement to verify whether such a relationship is supported econometrically and is significant.

#### Export and Economic Growth

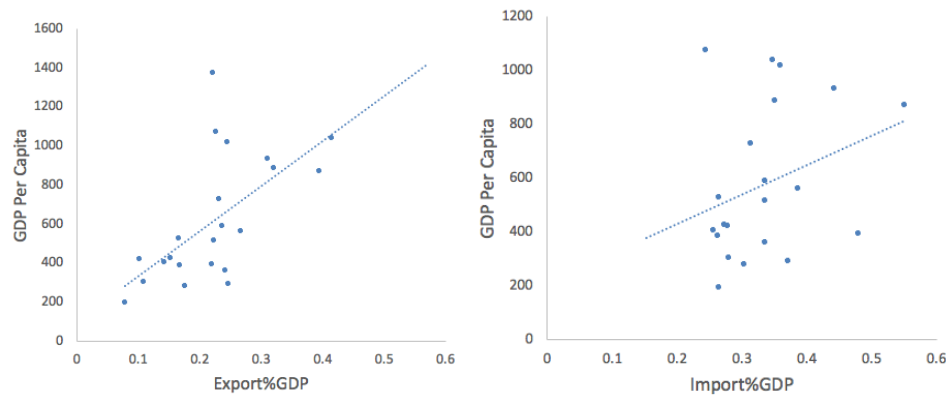
Figure 8 shows the relationship between selected trade measures and economic growth, represented by GDP per capita. We observe a strong positive relationship between these variables as higher the trade openness (both EO and IO) is associated with higher economic growth (GDP per capita). Further comparing the leverage of EO and IO on GDP per capita, the strength of this relationship varies. EO has a steeper slope, representing more substantial leverage on the overall economic growth, and IO has a relatively flat slope, signifying weaker leverage. This difference can be explained by the greater impacts of export regarding trade surplus, foreign exchange earnings and job creation. However, the endogeneity issue exists as a higher growth level also leads to a higher trading level.

This preliminary analysis of the correlation of variables has demonstrated the tendency only, not causality. Therefore, the only way to confirm the result is from multivariate econometrical models. I will test and validate these observations in Chapter 5 and expect the relationship to be positive.

In the literature, the relationship between trade and GDP per capita varies according to the model specification. Depending on the econometrical models, methods and data sources, the relationship can be either positive or negative. For example, in the study of Were (2014), he analyzed the differential effects of trade on economic growth and found

that trade impact is insignificant for LDCs. However, in the study of Dollar (1992), Frankel and Romer (1999) and Huang (2010), they find that trade liberalization could dramatically improve growth performance in LDCs. In this study, all 26 selected SSA countries belong to LDCs and it will be interesting to test this relationship with my sample data.

**Figure 8: Export and Import Openness on GDP per Capita**



Source: World Bank (2020)

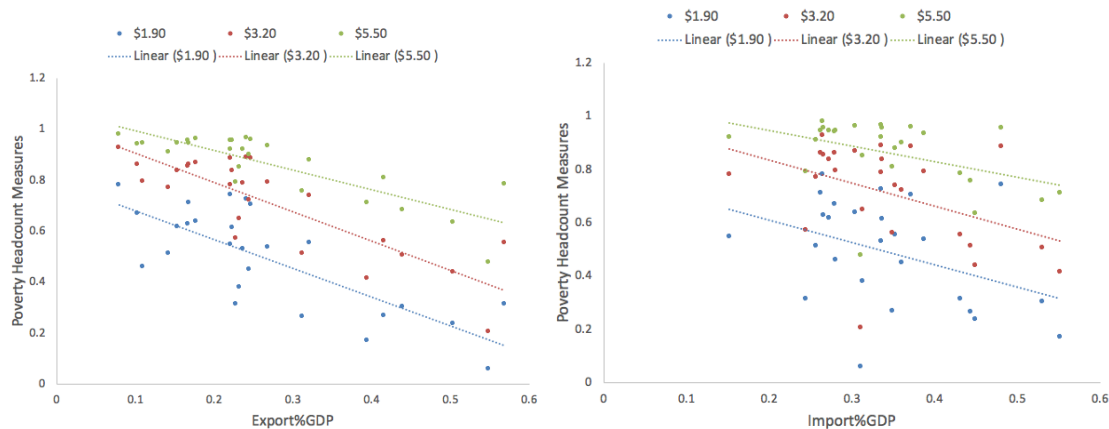
Note: Outliers have been excluded.

### Export/ Import openness and Poverty Reduction

Figure 9 shows the relationship between trade openness and poverty reduction, measured by PH1 (\$1.90), PH2 (\$3.20) and PH3 (\$5.50). The two variables have a negative correlation as more trade openness leads to less poverty headcount ratios. The apparent finding is that higher the export openness and import openness, the lower the poverty headcount ratio at all levels. However, the slopes present a different picture. The slope is a good proxy to review changes in dependent variables (Trade openness) on the changes in independent variables (Poverty measures). We observe in the two figures below that the impact of trade openness has almost the same degree of impacts in reducing poverty at PH1(\$1.90) and PH2(\$3.20) level, but fewer influences on the PH3(\$5.50) level. This can be partially reasoned as economic growth benefit the poorest more easily since they have the lowest threshold to get out of the extreme poverty line. This relationship will be

validated in Chapter 5. Given the preliminary analysis of descriptive tendency, I expect this relationship between trade and poverty to be negative.

**Figure 9: Trade Openness and Poverty Measures**



### 3.3 Country-specific Case

This section analyzes the underlying question of the hypothesis made in chapter 2: if exports can reduce poverty in SSA countries, can China's exports strategies be replicated? Therefore, it is important to examine country-specific cases to see how development trajectories can be varied according to different strategies, institutions and cultures before examining more formally the question using econometric methods in the following chapters.

Based on the World Bank Export % GDP classification, in 2018, 10 selected of our SSA countries' export ratio accounted for more than 30% of their total GDP, and 16 are under 30%. Gabon's export openness reached 50% (see Table 12), meaning that half of the GDP has been contributed by exports. Besides the current export openness level, we can also compare SSA countries' export openness from 1990 to 2018. During the period, countries such as Mozambique and Rwanda's export openness are increasing more than three-fold. Overall, 14 selected SSA economies doubled their export openness. As discussed in Chapter 1, China's export reached 36% of GDP at its peak and is currently 2.64 times the



level of 1990. Therefore, it is useful to compare similar SSA countries with same level of export expansion and development as China to gain insight. For that purpose, I choose Burkina Faso.

**Table 12: Export Openness of Selected SSA Countries and China**

Export Openness in 2018	Country	Export Openness Increased times (compared to 1990)	Country
0-29%	Cote d'Ivoire, Malawi, Angola, Madagascar, Mali, Senegal, Uganda, Cameroon, Central African Republic, Rwanda, Niger, Nigeria, Tanzania, Kenya, Ethiopia, Burundi	<1	Mauritania, Burundi, Cameroon, Cote d'Ivoire, Namibia, Senegal, Nigeria, Botswana, Kenya
30%-49%	<b>(China)</b> <b>Burkina Faso</b> , Mozambique, Mauritania, Botswana, Namibia, Guinea, Zambia, Benin, Ghana	1-2.99	<b>(China)</b> <b>Burkina Faso</b> , Uganda, Ghana, Benin, Madagascar, Mali, Malawi, Guinea, Tanzania, Central African Republic, Gabon, Niger
50% and above	Gabon	>3	Mozambique, Rwanda

Source: World Bank (2020)

Note: Due to data availability, the export openness increased times misses Zambia, Angola and Ethiopia.

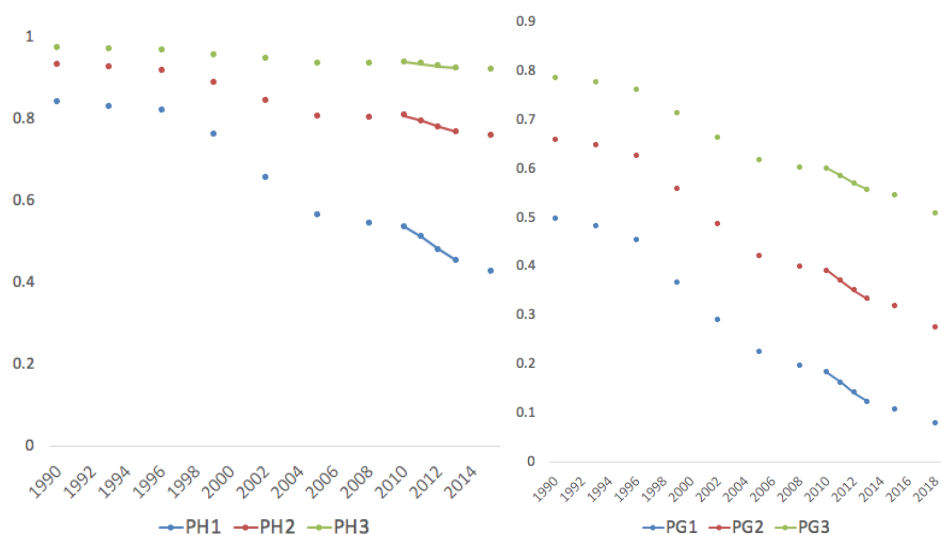
Figure 10 and 11 give us a straightforward demonstration of Burkina Faso experience between 1990 and 2018 in terms of export (EO), economic growth (GDP per Capita) and poverty reduction (PH and PG)

Over the past 29 years in Burkina Faso, poverty headcount ratio has decreased substantially. PH1(\$1.90) dropped from 84% to 43%, PH2(\$3.20) from 93% to 76%, and PH3 (\$5.50) from 97% to 92%. This could be considered as a success compared to many other stagnant countries in SSA. Poverty severity has also dropped substantially. PG1(\$1.90) decreased from 50% to 8%, PG2(\$3.20) from 66% to 27%, and PG3(\$5.50) from 78% to 51%. As observed in Figure 11, the declines in the sizes and severity of poverty were accompanied by continuous increases in export growth. EO has expanded three times from 11% to 28%, and real GDP per capita has grown more than two-fold.

Figure 10 shows that the average poverty level has generally decreased for all the measures, but their levels differ markedly. From their similar definitions, PH1(\$1.90), PH2(\$3.20) and PH3(\$5.50) have shared the same concept but different poverty standards. As the lowest standard of living, PH1(\$1.90) can be easily reduced compared to PH2(3.20) and PH3(\$5.50). However, from poverty intensity of perspective, it is rather difficult to reduce poverty from all three levels: PG1(\$1.90), PG2(\$3.20) and PG3(\$5.50), given the bigger population base at lower poverty levels. As expected, PG measures do not vary much, sharing a similar coefficient.

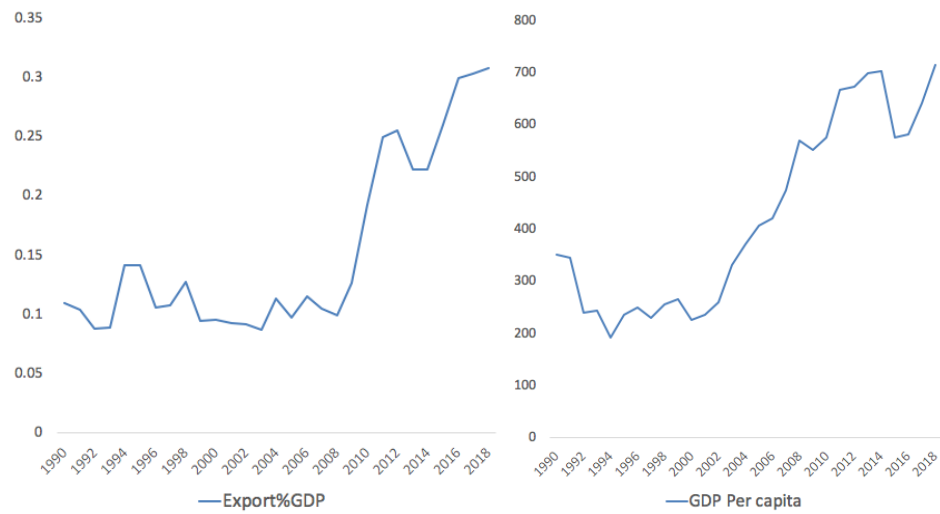
**Figure 10:Poverty Headcount and Poverty Gap measures**

Burkina Faso (1990-2018)



Source: World Bank (2018)

**Figure 11:Export Openness and GDP per Capita**  
Burkina Faso (1990-2018)

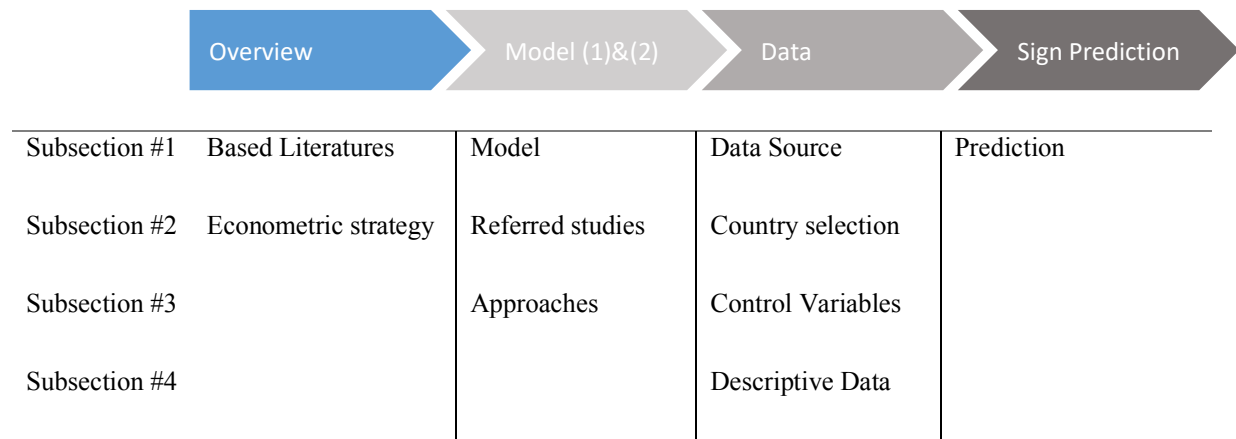


Source: World Bank (2018)

## 4. Methodology and Data

Having presented descriptive statistics and tendencies in trade and poverty in SSA, this chapter will present the econometric methodology used to test whether increasing-global trade can be one of the numerous tools to achieve growth and reduce poverty in SSA. As mentioned, this study aims at determining whether international trade can be one of many means to promote growth and alleviate poverty in SSA and whether an export strategy similar to the one followed by China can be used by SSA countries. The former is analyzed in this chapter, and the latter will be elaborated in Chapter 7 (see the chapter's structure in Figure 12 below).

**Figure 12: Structure of Chapter 4**



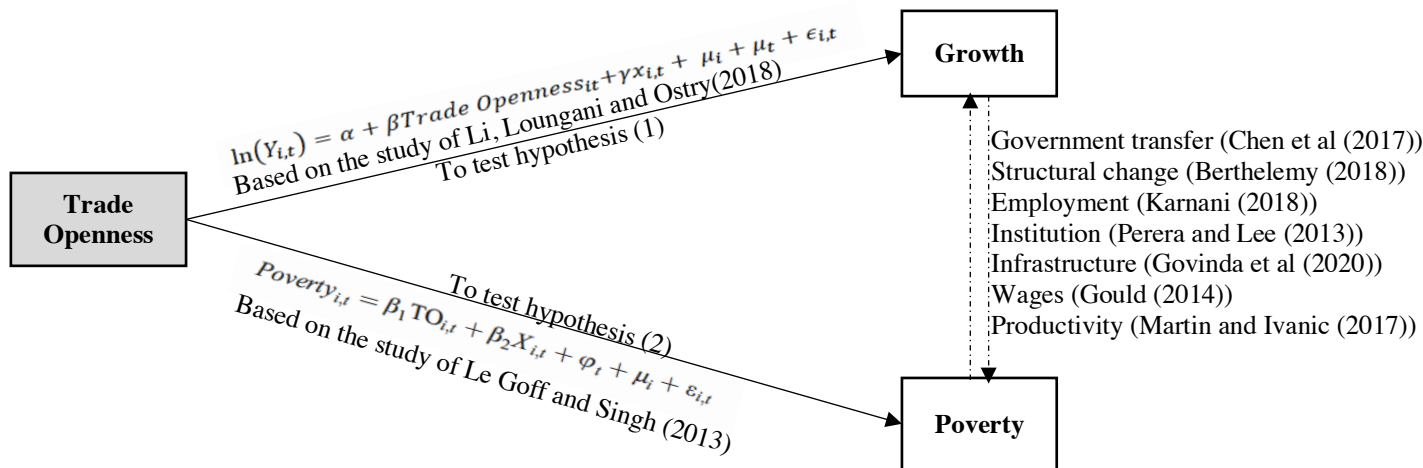
## 4.1 Overview

The Figure 13 below shows the overall structure of my econometric analysis to test my two hypotheses:

- (1) the relationship between international trade and growth;
- (2) the relationship between international trade and poverty.

The two solid lines represent the two relations with the econometric models and related literature. The dash lines show the linkages between growth and poverty, which will not be addresses in the econometric analysis. Remember, the goal of the study is to determine whether increasing SSA international trade can be one of the numerous tools to achieve economic growth and poverty reduction in SSA. Therefore, relations based on the two solid lines will be tested.

**Figure 13: Illustration of Study Subjects and Referred Studies**



Source: Author's demonstration

To test my research hypotheses, I will leverage two classical econometric models from Li, Loungani and Ostry (2018) and Le Goff and Singh (2013) using a panel data of 26 selected SSA economies, aiming to determine whether changes in the exports affect economic growth and poverty reduction. As illustrated in figure 13, I will first seek to analyze how export can improve economic growth based on the study of Li, Loungani and Ostry (2018). Such an investigation can help us understand the impacts of export on

the economy. Then, I will adopt the model of Le Goff and Singh (2013) to analyze the direct impact of export to poverty.

### General econometric strategy

For model (1) of trade on growth, Li, Loungani and Ostry (2018) used the log of each city's average distance to the three closest major ports in China as an instrument for the trade openness, and 2SLS regression to obtain unbiased coefficients. 2SLS is often used when endogeneity problems occurred with OLS. For example, the problem that  $EO_{i,j}$  and  $IO_{i,j}$  are correlated with the error term  $\varepsilon_{i,j}$ .

$$Corr(EO_{i,j}, \varepsilon_{i,j}) \neq 0$$

$$Corr(IO_{i,j}, \varepsilon_{i,j}) \neq 0$$

Simple OLS will produce a biased and inconsistent estimator. This situation occurs when there are unobserved factors influencing both trade openness (EO) and the outcome of interest (GDP per capita). In this case, EO is endogenous. To avoid this problem, I follow the literature and proceed with 2SLS. Meanwhile, OLS, FE and RE will still also be presented as references. To be able to use 2SLS, I need to find good instruments. Unlike the instruments used by Li, Loungani and Ostry (2018), I choose the past value of the variable and examine their correlation with the current value and the residual. If they correlate with the endogenous variable but are uncorrelated with the study subject, they are good instruments. This method has been widely used for its simplicity and efficiency, such as Le Goff and Singh (2013), Thelle et al. (2015) and Luo (2015).

For model (2) of trade on poverty, in order to control for country-specific effects and the possible endogeneity of control variables with poverty, Le Goff and Singh (2013) estimated the coefficients by using the System GMM estimator, and they used lagged values of the explanatory variables as instruments in the poverty regression. Following their strategy, I start with the most basic estimation of OLS and then choose among OLS, fixed and random effects, and system GMM. Several alternative variables will be added to review to what degree they impact on poverty. These variables are selected from previous studies and the literature review. To deal with the issue of endogeneity, I will also use one lagged value of the explanatory variables as instrumental variables (IV) to

elaborated on the real relationship between export and poverty reduction. I will also use Hansen tests of over-identifying restrictions and serial correlation tests. Robustness checks will also be conducted.

## 4.2 Model (1): Trade and Growth

This model aims to test my first hypothesis: International trade has a positive impact on economic growth in SSA. I use this model for comparability purposes with well-known studies and for parsimony. The model based on studies of Li, Loungani and Ostry (2018) is the following:

$$\ln GDP\_PerCapita_{c,t} = \alpha_0 + \alpha_1 EO_{c,t} + \alpha_2 IO_{c,t} + \alpha_3 X_{c,t} + \varepsilon_{c,t} \quad (1)$$

where *lnGDP\_PerCapita* is the log of the GDP per Capita; the index *c* represents the country and the index *t* represents time; *EO* is the log of exports of goods and services in % of GDP; *IO* measures the log of import of goods and services in percent of GDP per Capita; *X* represents a vector of control variables such as labour force, foreign assistance, inflation rate, and political stability;  $\varepsilon$  is the residual.

Li, Loungani and Ostry (2018) studies the impact of trade on growth and inequality using disaggregated data for Chinese cities and urban households for the 2002-2009 period. They found that trade openness and GDP per capita are positively associated and that an increase in the trade has been accompanied by an increase in income inequality. Note that I will not focus on inequality in this study as previously discussed. This is a classical model that has also been used by many researchers such as Romer and Frankel (1999). I adopt their model of trade on growth but following Thelle (2015), I will distinguish in the regression export openness and import openness.<sup>30</sup> The reason to analyze each of the two

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<sup>30</sup> Thelle et al (2015) separate the export openness and import openness from gauging how each variable change impact on poverty reduction. They also included a lagged value of poverty in the model to measure how one period affects the outcome in the next as it is highly likely that poverty is persistent over time.

impacts separately is to specifically measure to what extent export and import influence the poverty reduction.

Some researchers also use tariff data and trade policy to measure openness. However, scholars who focus on the impact of actual globalization on poverty have more often made use of trade openness measures, not indicators of liberalization policies (Le Goff and Singh, 2013). Since my focus is on the effect of trade on poverty, I also use trade openness measures instead of tariff or trade policy. I set the poverty index as the dependent variable and export/import openness as independent variables to conduct the regression. The intention is to estimate poverty reduction elasticities with respect to trade. This is very similar to the poverty elasticities with respect to growth, such as in Chen and Ravallion (2000), Hanmer and Naschold (2000) and Ravallion and Datt (1999).

Li, Loungani and Ostry (2018) used 2SLS methods to estimate the log of each city's average distance to the closest major ports as an instrument for the endogeneity of the trade to GDP ratio. This is a good instrument as the distance to ports is undoubtedly related to the trade while not necessarily impacting GDP per Capita. However, this instrument variable is relatively hard to obtain in 26 SSA countries due to the data limitation. Luckily, lagged explanatory variables are commonly used as IVs to address endogeneity concerns in empirical studies (Bellemare and Wang, 2019). Therefore, I will test the lag value of trade openness to check whether they are good instruments. The overall comparison of my study and the based literature is listed in Table 13.



**Table 13: Comparison of based literature and my study for model (1)**

Comparison	Li, Loungani and Ostry (2018)	My study
<b>Purpose</b>	Studies the impact of trade on growth and income inequality	Hypothesis (1): International trade has a positive impact on growth
<b>Dependent Variable</b>	log of GDP per capita	log of GDP per capita
<b>Independent Variable</b>	Trade openness	Export/Import openness
<b>Data</b>	Chinese urban area data	Selected 26 SSA country data
<b>Method</b>	2SLS	2SLS
<b>IV</b>	Distance	Lagged Value of Variable
<b>Diagnostic Test</b>	/	Sargan, IV test
<b>Main Conclusion</b>	An increase in trade share of one percentage point <u>increases</u> GDP per capita by about 1 percent.	An increase in export share of one percentage point <u>increases</u> GDP per capita by about 4 percent.

### 4.3 Model (2): Trade and Poverty

This model aims to test my second hypothesis: International trade can effectively reduce poverty in SSA. The model, based on Le Goff and Singh (2013), is as follows:

$$Poverty_{c,t} = \delta_1 EO_{c,t} + \delta_2 IO_{c,t} + \delta_3 X_{c,t} + \varphi_t + \mu_c + \varepsilon_{c,t} \quad (2)$$

where c and t present country and time, respectively. Poverty is poverty measures, namely PH1 (\$1.90) and PH1 (\$5.50). This selection was discussed in Chapter 3. EO is a measure of export openness, and IO is a measure of import openness. X is a matrix of control variables.  $\varphi_t$  corresponds to time effects,  $\mu_c$  denotes unobserved country-specific effects, and  $\varepsilon_{c,t}$  the error term.

The model is a classical approach in the general growth literature, where the poverty index is regressed over measures of trade openness and selected control variables to measure the trade impact on poverty reduction. This model is selected because of its wide popularity to estimate the relationship between poverty and trade and will allow to compare my results with those of well-recognized studies. Furthermore, it should be noted

that our concern is poverty, not inequality, as Le Goff and Singh (2013). However, since trade liberalization tends to increase the opportunities for economic activity, it can very easily widen income inequality while at the same time reduce poverty (Le Goff and Singh, 2013). Therefore, we both examine the question from the poverty headcount ratio perspective. Their study also sees economic growth as the key to poverty reduction, and that trade can accelerate growth. As explained in Chapter 3, one of my hypotheses is that trade benefits growth. This is in line with the logic of their study. Based on these analyses, I have chosen to follow their model and econometric considerations.

Following Le Goff and Singh (2013), the model estimates poverty headcount and poverty gap considering the \$1.90 and \$5.50 poverty line over trade, measured by trade openness in percentage of GDP. To control for country-specific effects and possible endogeneity of control variables with poverty, Le Goff and Singh (2013) estimated the model using the System Generalized Method-of-Moment (GMM). In addition, I will use OLS, random and fixed effects as references.

The GMM estimation is considered the best estimation method, and it is performed using alternative lags specifications, of one and two lags. Unlike alternative approaches, GMM requires minimal assumptions about the study subject; this is an advantage given that most errors are not observed. For example, I do not need to specify the distributions of the error terms in my model, and GMM allows it. GMM also allows for the most flexible identification and better than IV estimates. The advantages of GMM over IV are clear: if heteroskedasticity is present, the GMM estimator is more efficient than the simple IV estimator, whereas if Heteroscedasticity is not present, the GMM estimator is no worse asymptotically than the IV estimator (STATA, 2003). As discussed previously, the export variable can be endogenous with the economy: the higher export openness may lead to a faster-growing economy and vice versa. Therefore, in my GMM analysis, I treat this variable as endogenous by using lagged export measure. The overall comparison of my study and the based literature is listed in Table 14.

**Table 14: Comparison of based literature and my study for model (2)**

<b>Comparison</b>	<b>Le Goff and Singh (2013)</b>	<b>My study</b>
<b>Purpose</b>	Explores the empirical link between trade openness and poverty	Hypothesis (2): International trade can effectively reduce poverty.
<b>Dependent Variable</b>	Poverty headcount and the poverty gap considering the \$1.25 poverty line	Poverty headcount considering the \$1.90 poverty line
<b>Independent Variable</b>	Trade openness	Export/Import openness
<b>Data</b>	30 Africa country data	Selected 26 SSA country data
<b>Method</b>	GMM	GMM
<b>IV</b>	lagged values of variable	lagged values of variable
<b>Diagnostic Test</b>	Hansen test, Serial correlation test	Hansen test, Serial correlation test
<b>Main Conclusion</b>	Greater trade is associated with higher levels of poverty, but this could be reserved if financial development grows, education level increases or governance improves.	Greater trade openness leads to lower poverty levels, and many other factors (education, political stability, etc.) also influence the poverty level.

#### 4.4 Data

The panel is composed of 26 SSA countries (see Table 15). The countries were chosen based on data availability and economic performance. I have deliberately excluded economically high performing countries<sup>31</sup> and countries with an incomplete dataset to reflect the true situation in average SAA countries. The panel covers the period from 1990 to 2018, with the selection of this period being mainly dictated by data availability concerning the poverty headcount and gap ratio published in the PovcalNet World Bank. To be consistent across different economies, I use data from the World Bank throughout the analysis.

<sup>31</sup> According to GDP level, high performing countries such as South Africa and Mauritius, where their economic scale are different from the rest of the countries.

**Table 15: Countries included in the Panel Data**

Regions	Countries
Sub Saharan Africa	Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Cote d'Ivoire, Ethiopia, Gabon, Ghana, Guinea, Kenya, Madagascar, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Tanzania, Uganda, Zambia

The analysis is performed using a balanced panel<sup>32</sup>, where the time length is 29 years with yearly data. A balanced panel data provides more information, where an unbalanced dataset misses data, for example, when people refused to respond, or researchers failed to record a certain year (Parent, 2020). Compared to other empirical studies, a sample of 26 countries is relatively small. This choice is made mainly because of the research design and data availability. While SSA has 46 countries, including outliers can make the result biased. For example, the GDP per capita in Mauritius is two times of that in South Africa and 43 times that in Burundi in 2019 (World Bank, 2019). Therefore, I have to exclude certain high-performance countries. In addition to outliers, data integrity is also considered. For countries as Sao Tome and Principe and South Sudan, their poverty headcount ratio is only available after 2010 in the World Bank database. Thus, I exclude those countries. However, this research econometric time period considered is longer than average researches, spanning almost three decades. Previous studies, for example made use of 10 years of longitudinal data such as Dollar (1992) and Frankel and Romer (1999), 16 years in the case of Huang (2010), 20 years in Were (2014) and Dollar and Kraay (2004).

In the following subsections, I include a description of the main variables and controls used in both the model (1) and (2). I will also discuss the expected signs of the relationships between these different variables and the dependent variable, reduction of poverty headcount ratio and the closing of the poverty gap. A summary of these expected

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<sup>32</sup> Balanced panel data refers to the fact that a panel data set where all years (or periods) of data is available for all cross-sectional units. (Wooldridge, 2013)

relationships, as well as a table of the main summary statistics are included in Table 17 and 18 at the end of this Chapter.

#### **4.4.1 Model (1): Trade and Growth**

In this subsection, I include a description of dependent and independent variables, control variables used in model (1): Trade and Growth. This model is composed of trade measures, growth measures and several control variables. The choice of these variables is based on the study of Li, Loungani and Ostry (2018) following the theoretical considerations and empirical evidence from the previous studies in the literature.

The dependent variable is the GPD per Capita from the World Bank database. The main independent variable is export/import openness, measured by the share of export and import in the percentage of GDP. This data is also obtained from the World Bank database for its consistency and integrity. Many scholars such as Frankel and Romer (1999), Le Goff and Singh(2013), Thelle (2015) and Luo (2015) have chosen the openness as their independent variable to study the relationship between trade and economic growth or poverty reduction. Both the dependent and independent variables are measured yearly. Some researches use five-year or ten-year averages to conduct their estimations. I will also do so in the robustness check section. From the previous discussion of descriptive analysis in Chapter 3, I expect the sign of this variable to be negative.

The control variables considered are: infrastructure, political stability, human capital and price level. This choice is based on the relevance of poverty reduction and economic growth literature. For example, Thelle et al. (2015) added controls for education, legal environment, access to financial credit and macroeconomic stability. Le Goff and Singh (2013) included a measure of human capital level (Education), a variable of financial deepening (Private credit/GDP), growth of customer price index (Inflation) and an indicator of institutional quality (Bureaucracy quality). Taken previous studies into consideration, the selected control variables are as follows:

##### Infrastructure

Infrastructure shows great importance in poverty reduction, and it is one of the most used control variables in researches and studies. As mentioned, there would be slow growth

and poverty alleviation without a major improvement in Africa' infrastructure (Estache, 2014). In this study, as a proxy of infrastructure, I will make use of the variables Access to electricity defined as the percentage of the population with access to electricity. Electrification data are collected from industry, national surveys and international sources by World Bank. This variable makes a big difference for a poor household in agriculture productivity, the quality of education, and the quality of life. It also serves as an important factor to gauge the efforts a government is engaged in infrastructure and public affairs. Therefore, access to electricity (as a % of the population) is chosen as a proxy of the overall infrastructure quality. This variable will be tested in the robust check section. I expect this sign to be negative.

#### Political Variable

I choose the Political Stability and Absence of Violence/Terrorism from World Bank Worldwide Government Indicators as the institutional control variable to analyze overall government stability. This indicator measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism. The estimate of governance ranges from -2.5 (weak) to 2.5 (strong) governance performance. It symbolizes social stability, governance power, and institutional control and has been commonly used in the research and previous studies. Table 16 shows the selected SSA countries' political stabilities level. The highest governance performance was witnessed in Botswana in 2018, and the biggest deterioration happened in Mali (drop -2.42 from 0.36 to -2.05). I expect this sign to be negative.

**Table 16: Selected SSA economies Political Stability (1996-2018)**

Country	1996	2018	$\Delta$
Angola	-2.06	-0.32	1.74
Burundi	-2.11	-1.60	0.52
Benin	1.05	-0.13	-1.18
Burkina Faso	-0.30	-1.04	-0.74
Botswana	1.01	0.98	-0.04
Central African Republic	-1.21	-2.28	-1.07
Cameroon	-0.96	-1.38	-0.42
Ethiopia	-1.05	-1.34	-0.29
Gabon	0.12	-0.25	-0.37
Ghana	-0.23	0.03	0.26
Guinea	-1.15	-0.88	0.27
Kenya	-0.65	-1.16	-0.51
Madagascar	0.22	-0.52	-0.74
Mali	0.36	-2.05	-2.42
Mozambique	-0.05	-0.78	-0.73
Mauritania	0.37	-0.67	-1.04
Malawi	-0.45	-0.33	0.13
Namibia	0.85	0.65	-0.20
Niger	0.03	-1.26	-1.29
Nigeria	-1.06	-2.19	-1.14
Rwanda	-1.84	0.12	1.96
Senegal	-0.60	-0.09	0.51
Tanzania	-0.62	-0.56	0.07
Uganda	-1.53	-0.69	0.84
Zambia	-0.16	0.14	0.30

Source: World Bank WGI (2018)

Human Capital Variable

To measure the influence on the export on poverty reduction, I use two human capital variables: the total labour force and secondary school enrollment. Labour force comprises people ages 15 and older who supply labour to produce goods and services during a specified period. It includes people who are currently employed and people who are unemployed but seeking work as well as first-time job-seekers. Not everyone who works

is included, however. Unpaid workers, family workers, and students are often omitted, and some countries do not count members of the armed forces. Labour force size tends to vary during the year as seasonal workers enter and leave. The reason to choose this variable is to measure how the labour supply can reduce poverty and promote economy at a country level. This variable is obtained from the World Bank database, and I expect a negative sign.

School enrollment is one of the main human capital variables to assess the impact of education on poverty reduction. In this study, I will use the school enrollment, secondary (% net), because it completes the provision of basic education that began at the primary level. This education level is expected to offer the labour market and society a moderate human capital force compared to a more advanced university level and the basic primary school level. Secondary education completes the provision of basic education that began at the primary level and aims at laying the foundations for lifelong learning and human development, by offering more subjects or skill-oriented instruction using more specialized teachers. The net enrollment rate is the ratio of children of official school age who are enrolled in school to the population of the corresponding official school age. Many research have shown a significant relationship between education and growth (Hanushek and Woessmann (2012), Friedrich Hayak). Education is the cradle of the human capital, an essential part of production in the economy. Therefore, I will use this control variable to gain insight on education and poverty. I expect his sign to be negative.

#### Price Level Variable

Much of the criticism of trade expansion concerns adjustment costs and price level. The opening trade does force the government to focus its anti-poverty programs on those with the least capacity to cope with adjustment costs. Therefore, it is important to ensure social expenditure levels are reasonable for the poor population in the econometrics model. I choose inflation as it is one of the most widely known indices to show price fluctuations in the market. The inflation level is also important to measure the real purchasing power of people in poverty, as inflation will lead to an increase in the cost of products and



services, whereas deflation signifies a weakening economy. Therefore, I expect this sign to be positive.

#### Foreign Aid

Adding foreign aid to poverty reduction analysis is not new. Burnside & Dollar (2000) and Collier & Dollar (2002) all added this variable into their regression and demonstrated a positive relationship. I will use net official aid to assess this relationship. Net official aid refers to aid flows (net of repayments) from official donors to countries and territories in part II of the DAC list of recipients: more advanced countries of Central and Eastern Europe, the countries of the former Soviet Union, and certain advanced developing countries and territories. This data is obtained from the World Bank database.

#### **4.4.2 Model (2): Trade and Poverty**

The variables included in this second model of the relationship between trade and poverty are similar to the first model. Following Le Goff and Singh (2013), I adopted the poverty ratio from the World Bank database as the dependent variable. As previously mentioned, I chose both poverty headcount ratio (PH) at \$1.90 and \$5.50 poverty level, and I use poverty gap (PG) to assess the poverty intensity in the robust check chapter. The independent variable is the EO and IO, as previously discussed. The other control variables are similar to model (1). Table 17 and 18 present the descriptive statistics and a prediction of signs for selected variables.

**Table 17: Descriptive Statistics**

Variable	Mean	Std. Dev.	Min	Max	Obs
<b>Dependent Variable</b>					
PH1	0.48	0.22	0.04	0.91	324
PH2	0.70	0.20	0.13	0.98	324
PH3	0.86	0.14	0.35	0.99	324
PG1	0.20	0.13	0.01	0.62	338
PG2	0.37	0.16	0.30	0.76	338
PG3	0.55	0.16	0.11	0.99	338
<b>Independent Variable</b>					
EO	0.27	0.14	0.05	0.90	744
IO	0.34	0.12	0.10	0.84	744
GDP per Capita (log)	6.56	1.05	4.72	9.29	782
Labour Force(log)	15.39	1.13	12.48	17.87	729
Inflation(log)	3.40	1.94	-17.62	5.72	679
Foreign Aid(log)	6.24	0.97	2.16	9.34	779
Political Stability	-0.53	0.85	-2.70	1.20	540
Access to Electricity(log)	2.75	1.40	-0.46	4.50	729
School Enrollment(log)	4.43	0.37	3.07	50.30	626

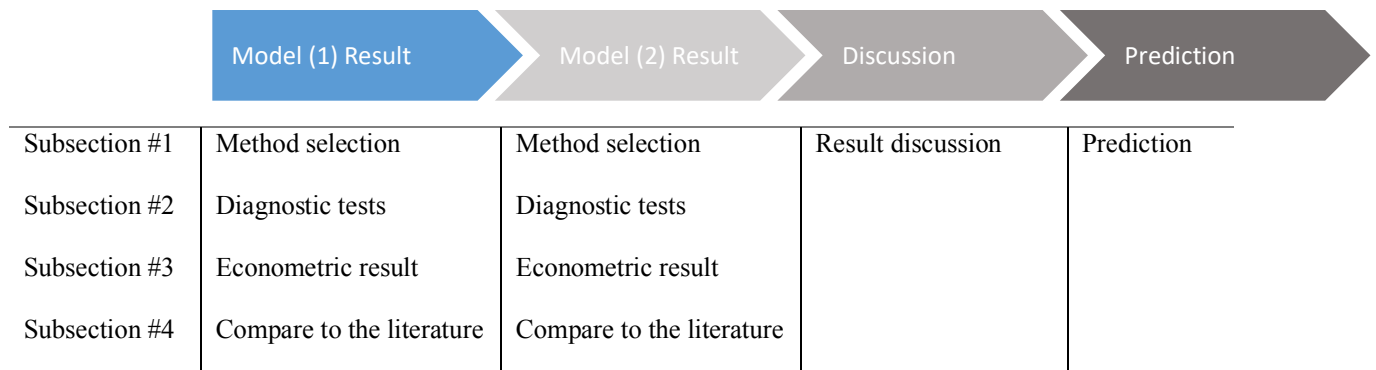
**Table 18: Sign Prediction**

<b>Sign Prediction</b>			
EO	Export Openness	+	Export will lead to growth and poverty reduction.
IO	Import Openness	+/-	Import may increase or decrease growth/poverty since new technology/supplier can contribute to knowledge accumulation and skill learning, while unbalanced import structure makes countries rely on external resources and disturb domestic productions.
Labour Force(log)	Labour Force	+/-	More labour supply promotes growth and reduces poverty, but it also reflects overpopulation.
Foreign Aid(log)	Foreign Aid	+/-	Aid benefits the economy and reduces poverty, but it makes recipients dependable and curb development.
Inflation(log)	Inflation	-	Higher inflation will decrease the purchasing power, therefore negative to growth and poverty reduction.
Political Stability	Institutional Indicator	+/-	Better institution stability leads to faster economic development and lower poverty level, but if the stability is achieved by suppression. Results vary.
Access to Electricity(log)	Infrastructure	-	Better infrastructure will help economy growth and reduce poverty.
School Enrollment(log)	Human Capital	-	Education investment benefits economy and reduces poverty

## 5. Empirical Results

This chapter presents the empirical result of the econometric models proposed in the chapter 4 to assess whether export and other factors significantly affect poverty reduction within our panel of 26 SSA economies. First, I will present the results of diagnostic tests to ensure the integrity and consistency of the results. Tests include tests of instruments, correlation and over-identification. Second, I will compare the estimation methods and select the best method of estimation. Lastly, I will present some predictions based on the results (see the chapter's structure in Figure 14 below).

**Figure 14:Structure of Chapter 5**



## 5.1 Results – Model (1): Trade and Growth

Model (1) designated to test on my first hypothesis: International trade has a positive impact on SSA's economic growth. This model (see below) is adapted from Li, Loungani and Ostry (2018).

$$\ln GDP\_PerCapita_{c,t} = \alpha_0 + \alpha_1 EO_{c,t} + \alpha_2 IO_{c,t} + \alpha_3 X_{c,t} + \varepsilon_{c,t}$$

Table 21 report the results from the model (1) for GDP per capital on trade openness. In all the tables, column 1 reports the results estimated by OLS; column 2 presents random effects; column 3 presents fixed effects; and column 4 presents two-stage least squares. As previously mentioned, I will test one lagged value of EO ( $Exp\%GDP_{c,t-1}$ ) and IO ( $Imp\%GDP_{c,t-1}$ ) to ensure the lagged variables can be good instruments. Since it is the lagged variable of trade openness, it is correlated with the potentially endogenous variable.

To test if it correlated with economic growth, I choose to use the Granger causality test<sup>33</sup>, which is a way to investigate causality between two variables (Statistics Howto, 2020). As observed in Table 19, the Granger test shows that lag trade openness and current GDP per capita are not correlated at 5% level of significance. Specifically, the value of 0.667, 0.619, 0.813 and 0.121 does not fall below the typical statistical significance threshold of 0.05; hence, we fail to reject the null hypothesis that lags of export/import do not affect the GDP per Capita. Therefore, the IV is a good measure and will be used for the following analysis.

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<sup>33</sup> Granger causality test has been conducted on random chosen countries time series data.

**Table 19: Granger Causality Test**

Equation	Excluded	chi2	df	Prob>chi2
<b>GDP per Capita</b>	<b>L.EO</b>	0.1846	1	0.667
<b>GDP per Capita</b>	<b>All</b>	0.1846	1	0.667
<b>L.EO</b>	<b>GDP per Capita</b>	0.2466	1	0.619
<b>L.EO</b>	<b>All</b>	0.2466	1	0.619

Equation	Excluded	chi2	df	Prob>chi2
<b>GDP per Capita</b>	<b>L.IO</b>	0.0563	1	0.813
<b>GDP per Capita</b>	<b>All</b>	0.0563	1	0.813
<b>L.IO</b>	<b>GDP per Capita</b>	2.4080	1	0.121
<b>L.IO</b>	<b>All</b>	2.4080	1	0.121

Data Source: World Bank (2020)

After confirming that the instrumental variables are good ones to use, I will make sure my model is just identified. To test an over-identification issue, I conducted a Sargan test. For Sargan test, the null hypothesis is that the overidentifying restrictions are valid. Therefore, a rejection of the null hypothesis indicates that the model may be mis-specified, and failure to reject null hypotheses gives support to the choice of the instruments. Therefore, taking 95% confidence interval, if p-value greater than 0.05, I will accept  $H_0$  and confirm all instruments are valid. The result showed the equation is exactly identified (see Table 20) Therefore, I do not have to be concerned with the over-identification issue.

**Table 20 Sargan Statistic Result**

<b>Sargan statistic</b>	0.000
<b>(overidentification test of all instruments):</b>	equation exactly identified
<b>Instrumented:</b>	EO, IO
<b>Included instruments:</b>	Labour Force(log), Foreign Aid(log), Inflation(log), Political Stability, Infrastructure(log)
<b>Excluded instruments:</b>	L.EO, L.IO

I will then proceed with the 2SLS results. The 2SLS method follows also the one adopted by Li, Loungani and Ostry (2018), However, here I split the export openness and import openness to specify which degree each of the two factors influence growth.

With regard to the estimation methods, OLS estimates are likely to be biased and inconsistent as it requires to meet Gauss-Markov assumptions and does not control for the country-specific variation. Even though the coefficient is significant, I will not use it as our main results. Random effects assume individual unobserved heterogeneity is uncorrelated with the independent variables, which is highly unlikely. Fixed effects estimates, as its name indicates, cannot include other time-constant variables, such as geography and demographics. Those time-invariant country characteristics are therefore contained in the error term. Given the fact that the results under random and fixed effects are insignificant, those two results are for reference only.

As observed in Table 21 column 4, a 1% increase in export openness is associated with an 4.091% increase in GDP per capita. The coefficient is significant at a 1% significance level. This result is consistent with other studies, in particular Sakyi, Villaverde & Maza (2015), Keho (2017), Dollar (1992), Sachs and Warner (1995), Frankel and Romer (1999), Dollar and Karry (2004) Caselli et al. (1996), and Herzer (2013)<sup>34</sup>. These studies found that openness contributes to economic growth by generating more revenues by selling goods and services overseas.

As for imports, a negative relationship emerges (column 4). A 1% increase in import openness is associated with a 0.396% decrease in GDP per capita. This indicates that although imports can help improve economic growth, it can also curb domestic production and reduce national wealth per capita. This tend to be especially true for SSA countries that tend to exhibit export of low value-added primary products and import relatively high value-added products and services. Both EO and IO results are consistent across OLS, RE and FE estimation methods. Regarding the relationship between import openness and GDP per capita, the results of previous studies vary because of different dataset, model

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<sup>34</sup> [Herzer \(2013\)](#)'s finding is slightly different; he found that the impact of trade openness is positive for developed countries and negative for developing ones.

and estimation methods. Broad, Greenfield and Weinstein (2006) found that imports increased productivity and benefited the overall economy. The same conclusion is reached by Idris et al. (2016). They stated that trade openness is good for growth, and import openness contributes to such development since resources are more optimally allocated. However, Uddin (2017) found that import is negatively related to Bangladesh GDP growth. Syzdykova et al. (2019) argue that imports have a negative impact on economic growth in the short term and have a positive effect on the long term.

With regard to control variables, we observe that a 1% increase in the political stability index is associated with a 0.0873% higher GDP per capita in our main 2SLS specification (column 4). This result is statistically significant at 90% confidence interval. A higher political stability index would present a more stable environment for business, people's lives, and fewer costs for unexpected violence or wars, therefore, producing a better economy. Those results are consistent with the prediction. Furthermore, we observe that the infrastructure coefficient is also positive and significant in our main results, indicating that it also promotes the growth of GDP per capita. A 1% increase in access to electricity is associated with an increase in GDP per capita of 0.785%.

We also observe that a 1% increase in the labour force is associated with a decrease in GDP per capita of 0.0609%, but the coefficient is not statistically significant in our main 2SLS specification. Still, RE and FE results are positive and significant at 1% significance level, indicating that human capital could serve as a strong determinant of a country's economic development. This result would support the idea that the accumulation of human capital has closely matched the long-term trend in aggregate productivity and that productivity is the foundation of economic growth (Ljunberg et al, 2008). As for foreign aid, we observe that a 1% increase in foreign aid is associated with an increase in GDP per capita of 0.0532%. This sign direction is supported by the reference model RE and FE at 1% significance level. External assistance can, to some degree, improve national wealth and help build the economy. However, inflation could hurt the economy as a 1% increase in the inflation rate is associated with a 0.012% decrease in GDP growth.

In summary, we observe that exports, political stability and infrastructure are all statistically and economically significant in contributing to the growth of the national well-being per capita while imports tend to contribute to decrease growth in SSA. Furthermore, the labour force and foreign aid are somewhat associated with growth while inflation has a somewhat negative effect. The regression results are consistent with numerous evidences that countries that are more open to international trade have a sound monetary and fiscal policy and have a well-developed infrastructure enjoy higher growth.

**Table 21: Econometric results: Relationship between trade and growth**

Dependent Variable: GDP per Capita				
Estimation Method	(1) OLS	(2) Random Effects	(3) Fixed Effects	(4) 2SLS
EO	3.186*** (0.624)	1.199** (0.563)	1.060** (0.490)	4.091*** (0.855)
IO	-0.265 (0.546)	-1.227 (0.814)	-1.371** (0.628)	-0.396 (0.626)
Labour Force	-0.0921 (0.117)	0.311** (0.143)	1.537*** (0.329)	-0.0609 (0.101)
Foreign Aid	0.0204 (0.0925)	0.168*** (0.0315)	0.166*** (0.0272)	0.0532 (0.0953)
Inflation	-0.00780 (0.00920)	-0.0219** (0.00911)	-0.0188** (0.00832)	-0.0120 (0.00983)
Political Stability	0.0919* (0.0490)	0.0728** (0.0309)	0.0729** (0.0253)	0.0873* (0.0495)
Infrastructure	0.866*** (0.102)	0.791*** (0.171)	0.116 (0.157)	0.785*** (0.105)
Constant	4.721*** (1.553)	-1.041 (2.124)	-16.43*** (4.330)	4.095*** (1.287)
Observations	140	140	140	140
R-squared	0.706		0.746	0.700
Countries		17	17	

Note: the dependent variable is the GDP per capita. 2SLS method is directed to interpret the result, the OLS, RE, FE are fore reference reason only. Instrumental variables are the one period lagged variables of the trade openness. Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



## 5.2 Results –Model (2): Trade and Poverty

We now turn to our estimates of the relationship between trade openness and poverty reduction. The model and variables are described in details in Chapter 4. Our estimated equation, based on Le Goff and Singh (2013), is as follows.

$$Poverty_{c,t} = \delta_1 EO_{c,t} + \delta_2 IO_{c,t} + \delta_3 X_{c,t} + \varphi_t + \mu_c + \varepsilon_{c,t}$$

Table 22 and 23 report the results from the model (2) for HP1 (\$1.90) and HP3 (\$5.50). In all the tables, column 1 reports the results estimated by OLS; column 2 presents random effects; column 3 presents fixed effects; and column 4 and 5 show system-GMM<sup>35</sup> with one and two lags. Indications of the number of instruments used and the outcomes from the Sargan test of overidentifying restrictions and the Arellano-Bond test for autocorrelation are also presented. GMM estimations using 1 and 2 period lags are referred to as GMM (1) and GMM (2).

Two tests are carried out to test the validity of the results from GMM estimation. I use Sargan test for over-identifying restriction and AR (1), AR (2) for autocorrelation of the error term. Sargan test has been discussed in previous session for model (1). For the autocorrelation test, the null hypothesis is that there is no autocorrelation, whereas a rejection of this hypothesis leads to evidence of autocorrelation. Therefore, the value of AR (2) is greater than 0.05 suggests that the original error term is serially uncorrelated and that the moment conditions are correctly specified.

As we can see from Table 22, under GMM (1) method, a 1% in export openness is associated with a 0.213% decrease in poverty headcount reduction at 1 % significance level. Also, a 1% increase in import openness is associated with 0.121% decrease in poverty headcount reduction. We observe the same signs with GMM (2) method but with slightly different slopes. Higher educational level is shown to be also associated with reduced poverty level. A 1% increase in secondary school enrollment can reduce the poverty headcount ratio by 0.0979% (at GMM 1) or 0.153% (at GMM 2), both are at 1%

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<sup>35</sup> The system-GMM used in this study is a one-step GMM without correction of standard error weighting.

significance levels. However, political stability, inflation and foreign aid are associated with increased poverty level. Specifically, a 1% increase in political stability is associated with 0.00379%<sup>36</sup> more poverty headcount using the extreme poverty line (1.90\$); a 1% increase in inflation level with 0.0991% more poverty, and a 1% increase foreign aid with 0.0567% more poverty, all at 1% significance levels. Those results are in line with my predictions (see Table 18). For foreign aid, the relation is not causal but rather an association that poorer countries generally require more aid. For the political stability, the relation is understandable that a stable political environment can be achieved through oppression or through having a political party in a place that does not have to compete to be re-elected (Hussain, 2014). Such a mechanism would also hurt the economy because of the government monopoly and the lack of a dynamic market and confidence in people.

Table 23 shows the result from the PH3 poverty measures (i.e. the 5.50 \$ poverty line). As we can see, export openness is associated with bigger changes for PH3 than for PH1. A 1% increase in export openness is associated with a 0.216% reduction in the number of poor at HP3 level (compared to 0.159% for PH1). This shows inequality in the growth and poverty reduction process and could be interpreted as in line with the Stolper-Samuelson theorem<sup>37</sup>. For the impact of political stability, education, inflation<sup>38</sup> and foreign aid, results are qualitatively similar as those observed for our extreme poverty variable. Those findings are in line with most previous research (Hussain (2014), Cooray (2009), Faria and Carneiro (2001), Economides et al. (2008)). More detailed analysis will be conducted in the discussion section.

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<sup>36</sup> GMM(2) result is interpreted unless otherwise specified.

<sup>37</sup> The theory generally predicts that, given the prevailing pattern of factor endowments, the trade will lead to higher inequality in developed countries by depressing the wages of their unskilled workers while lowering inequality in developing countries by raising the wages of their unskilled workers.

<sup>38</sup> The coefficient on inflation for HP3(\$5.50) is not statistically significant, therefore I kept using the result for the HP1(\$1.90) because it is valid with 1% significance level.

**Table 22:Econometric results: Relationship between international trade and poverty reduction**

Dependent variable: PH1(1.90) Poverty Headcount Ratio at \$1.90 (2011 PPP)					
Estimation Method	(1) OLS	(2) Random Effects	(3) Fixed Effects	(4) GMM(1)	(5) GMM(2)
EO	-0.298*** (0.0801)	-0.0161 (0.0523)	0.0427 (0.0533)	-0.213*** (0.0288)	-0.159*** (0.0315)
IO	-0.154 (0.106)	-0.0451 (0.0527)	-0.0493 (0.0507)	-0.121*** (0.0354)	-0.136*** (0.0387)
Political Stability	0.0558** (0.0228)	-0.0241 (0.0153)	-0.0284* (0.0158)	0.0266*** (0.00925)	0.00379 (0.00906)
Education	-0.0645 (0.0894)	-0.236*** (0.0677)	-0.258*** (0.0746)	-0.0979*** (0.0259)	-0.153*** (0.0270)
Inflation	-0.0124 (0.0710)	-0.0621** (0.0278)	-0.0652** (0.0270)	-0.00298 (0.0248)	0.0991*** (0.0257)
Foreign Aid	0.0600** (0.0281)	-0.0123 (0.0184)	-0.0176 (0.0182)	0.0661*** (0.00871)	0.0567*** (0.00948)
Constant	-0.0117 (0.456)	1.743*** (0.304)	1.975*** (0.321)	0.152 (0.136)	0.0218 (0.139)
Observations	55	55	55	55	55
R-squared	0.532	0.550	0.570		
Countries	17	17	17	17	17
Instruments				28	28
Sargan				0.997	0.991
AR(1)				0.616	0.892
AR(2)				0.634	0.694

Note: Dependent variable is poverty headcount ratio. In the GMM specification, the export openness variable is treated as endogenous, exogenous instruments include all the control variable. AR (1) and AR(2) are p-value from the Arellano-Bond autocorrelation tests for the first and second order; Sargan is the p-value for the Sargan over identification test. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Reported R-squared is used for OLS, and within R-squared for Random and Fixed Effects estimation.

**Table 23: Econometric results: Relationship between international trade and poverty reduction**

Dependent variable: PH3(5.50) Poverty Headcount Ratio at \$5.50 (2011 PPP)					
Estimation Method	(1) OLS	(2) Random Effects	(3) Fixed Effects	(4) GMM(1)	(5) GMM(2)
EO	-0.246*** (0.0492)	-0.00296 (0.0388)	0.0664* (0.0354)	-0.274*** (0.0339)	-0.216*** (0.0288)
IO	-0.0718 (0.0652)	0.00250 (0.0399)	0.00215 (0.0336)	-0.0512 (0.0416)	-0.0430 (0.0354)
Political Stability	0.0378*** (0.0140)	-0.0122 (0.0113)	-0.00750 (0.0105)	0.0300*** (0.0109)	0.0153* (0.00828)
Education	-0.0416 (0.0549)	-0.0618 (0.0493)	-0.0200 (0.0494)	-0.0397 (0.0304)	-0.0629** (0.0247)
Inflation	-0.0513 (0.0436)	-0.0799*** (0.0210)	-0.0888*** (0.0179)	-0.0311 (0.0291)	-0.0195 (0.0235)
Foreign Aid	0.0515*** (0.0173)	-0.0132 (0.0138)	-0.0250** (0.0120)	0.0379*** (0.0102)	0.0470*** (0.00867)
Constant	0.604** (0.280)	1.512*** (0.224)	1.516*** (0.213)	0.566*** (0.160)	0.619*** (0.127)
Observations	55	55	55	55	55
R-squared	0.655		0.630		
Countries	17	17	17	17	17
Instruments				28	28
Sargan				0.840	0.645
AR(1)				0.822	0.985
AR(2)				0.575	0.581

Note: Dependent variable is poverty headcount ratio. In the GMM specification, the export openness variable is treated as endogenous, exogenous instruments include all the control variable. AR (1) and AR(2) are p-value from the Arellano-Bond autocorrelation tests for the first and second order; Sargan is the p-value for the Sargan over identification test. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Reported R-squared is used for OLS, and within R-squared for Random and Fixed Effects estimation.

### 5.3 Discussion

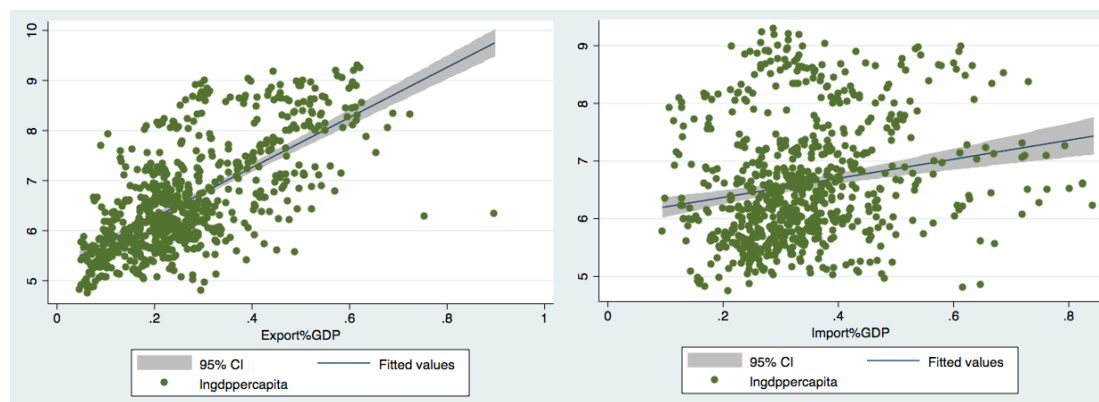
In this subsection, I develop predictions based on the econometric model of trade openness, economic growth and poverty reduction. I will also discuss and summarize the main results statistically significant at least 90%, discussing the main factors driving the growth and poverty reduction.

- Predictions

Based on our econometric models, it is possible to predict the potential impact of various levels of export openness on economic growth and poverty reduction in SSA.

Two-way linear prediction plot (see Figure 15) presents the prediction for the dependent variable from a linear regression on the independent variable and plots the resulting line (STATA, 2020). This method represents the fitted and actual values together in a two-way graph. It shows standard deviations as scattered around the fitted line. It generates the line of best fit through the data with a 95% confidence interval calculated using the standard error for the mean predictions. In Figure 15, the green dots are actual values, the shaded region is the confidence interval, and straight-line comprises fitted values, which are the statistical model's predictions of the mean response values. The direction of such relationships is valid and positive, and the actual values are dispersed around the best fit line.

**Figure 15: Prediction for Trade Openness and GDP per capita in SSA**



Source: Own calculation based on World Bank data (2020)

Table 24 present the predicted values of each export openness level on the poverty reduction. As observed, every 2 percent increase in export openness would reduce PH1(\$1.90) by 0.8 percent, PH2(\$3.20) by 0.5 percent and PH3(\$5.50) by 0.2 percent. Other factors remaining constant, when the average SSA export openness reaches 40 percent, poor population headcount living under \$1.90 would drop by 5.3 percent (calculated the difference from current level 48.2% to the predicted level 42.9%).

**Table 24: Predictions according to different level of export openness in SSA**

	<b>Export %GDP</b>	<b>PH1(\$1.90)</b>	<b>PH2(\$3.20)</b>	<b>PH3(\$5.50)</b>
<i><b>Current Level</b></i>	26.8%	48.2%	70.3%	85.7%
<b>Prediction</b>	30.0%	46.9%	69.3%	85.1%
	32.0%	46.1%	68.9%	84.9%
	34.0%	45.3%	68.4%	84.7%
	36.0%	44.5%	67.9%	84.5%
	38.0%	43.7%	67.4%	84.3%
	40.0%	42.9%	67.0%	84.0%

Source: Own calculation based on World Bank data (2020). Note: Current Level is calculated as the average for the years analyzed, not for a specific year.

- Summary of Result

Table 25 is the summary of the sign from the regression results that the coefficients under 10% significance level are selected.

**Table 25: Sign Summary of the Results**

Dependent Var Independent Var	<b>GDP per capita</b>	<b>PH1(\$1.90)</b>	<b>PH1(\$5.50)</b>
<b>EO</b>	+	-	-
<b>IO</b>		-	
<b>Political Stability</b>	+		+
<b>Education</b>		-	-
<b>Inflation</b>		+	
<b>Foreign Aid</b>		+	+
<b>Infrastructure</b>	+		

First, the results and predictions show that higher export openness benefits economic development and poverty reduction. These results support the hypothesis proposed in Chapter 2. The capacity to export can be a milestone for a country to attain competitive advantages. It requires skills, technology, human capital, factories, management experience, logistics, marketing, finance, and so much more. Numerous countries became prosperous because of exporting, as it creates employment, contributes taxes, accumulates knowledge, enhances international collaboration, is a catalyst for innovation, and fosters industrial development.

Earlier studies have tended to emphasize too heavily exports as a measure for trade openness, ignoring the role of imports (Keho, 2017). In this study, I analyze both export and import openness separately. The impact of both exports and imports are consistent with the predictions. According to the theory of comparative advantage, trade leads to more efficient use of domestic resources through the imports of capital goods and intermediate inputs that otherwise are too costly to produce locally. Trade has a positive effect on productivity when new technologies are imported, and spillover effects from foreign direct investment occur (United Nations, 2013). Specifically, export openness can largely increase economic growth for selected SSA countries, whereas import openness reduces GDP per capita. The reasons for export are multiple, such as earning foreign exchange, creating employment and obtaining learning opportunities. The reason for the opposite effect of imports can be understood as the unbalance import structure, making countries rely on external resources and disturb domestic productions. However, this result is not significant, so I will not elaborate. Table 25 also shows that export/import openness can reduce poverty in selected SSA countries. Especially under the PH1(\$1.90) measure, EO and IO are both statistically significant, demonstrating great leverage in poverty reduction.

The positive effect of infrastructure has been confirmed by many studies, as appropriate public policies can help improve access to services, improve quality of life, and empower resource-poor people without raising incomes (World Bank, 2013). Furthermore, once the basic infrastructure, relationships, and exchanges have been built, domestic firms that connect with foreign firms can access supplier networks, technologies, and knowledge.

Chile, Japan, and Singapore successfully adopted technologies that were available from more advanced countries to launch their industrialization (Lin, 2012). Meanwhile, foreign aid seems to increase poverty, this may due to insufficient fund allocation, corruption and lack of usage supervisor. Finally, government stability usually be understood as positive indicate that promotes growth by providing a good environment for business, reducing unnecessary interruption and conflicts. However, as discussed previously, this stability can be achieved by suppression, corruption and bureaucracy that harm the poor population.

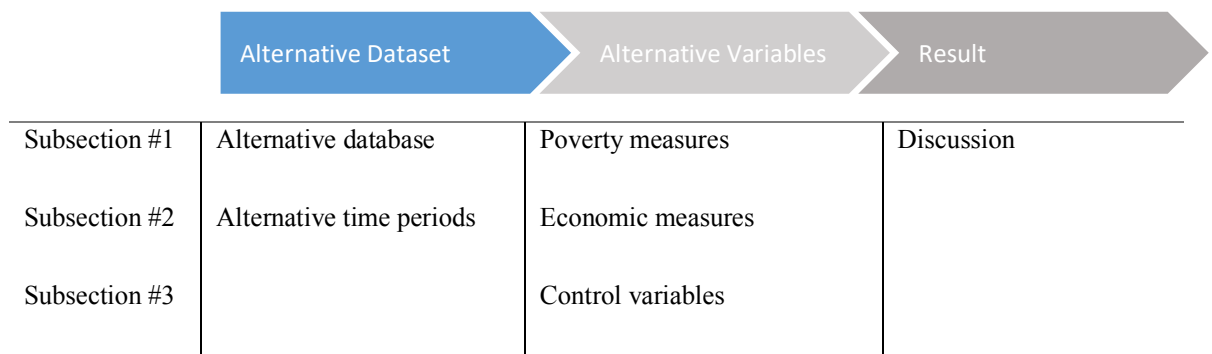
In summary, a more open international trade environment can positively impact the economy and reduce poverty. Result shows that export openness has an elasticity of more than 1 with regard to GDP per capita, meaning that 1% more exports are associated with more than 1% (4.091% to be specific) growth in GDP per capita. This can be understood as the leverage effect: A country can use its competitive advantage to focus on certain products and compete globally. This small effort can enable the country to benefit from enormous profits by exporting. Doing so can create jobs, keep the revenue domestic, and improve the overall economic situation.



## 6. Robustness Tests

In this section, I examine the robustness of our main results by using alternative database and explanatory variables in the regressions in order to re-estimate their association with poverty reduction. The significance of performing several robustness checks is supported by the literature review, which revealed that using different models' specifications leads to a variety of conclusions related to the causality (or noncausality) between variables. Therefore, it is important to test whether my results are consistent (see the chapter's structure in Figure 16 below).

**Figure 16: Structure of Chapter 6**



## 6.1 Alternative Datasets

To validate whether the two main model's results are consistent, I used alternative datasets following a distinction by 1) regional groups, and 2) time periods. The results of this analysis are presented in Tables 35, 36, 37, 38 and 39. For simplicity, not all the results are included.

### Regional Groups

In the study of Frankel and Romer (1999), the geographic characteristics of countries have been considered in their regression of trade and growth. Indeed, geography is a powerful determinant of bilateral trade. For example, New Zealand is far from most other countries and reduces its trade; the fact that Belgium is close to many of the world's most populous countries increases its trade (Frankel and Romer, 1999). In my sensitivity analysis, inland SSA countries and seashores SSA countries are separated into two distinct panels to check if a regional bias could alter the results (see Table 26).

**Table 26: Selected SSA countries' geography**

Coastal Country (15)	Landlocked Country (11)
Tanzania, Nigeria, Mozambique, Kenya, Ghana, Cote d'Ivoire, Senegal, Cameroon, Madagascar, Benin, Guinea, Angola, Mauritania, Namibia, Gabon	Uganda, Zambia, Mali, Malawi, Burkina Faso, Rwanda, Niger, Burundi, Central Africa Republic, Botswana, Ethiopia

After separating the coastal country with landlocked country, I re-estimated model (1) and model (2).

The model (1) regressed growth (GDP per capita) on trade openness (EO and IO). As observed in Table A38 the coefficient of EO remains consistent with both coastal groups and landlocked groups with all the positive signs across the five-year-average measure and ten-year-average measure (This alternative time periods will be discussed later). Most p-values are significant at 10% significance level. Thus, I conclude that the results are robust for EO coefficient regarding the geography difference in model (1). However, the coefficient on IO varies. For coastal countries, more import decrease GDP per capita while

for landlocked areas, import increase such growth for both yearly and ten-year-average measures. One of the reasons is that landlocked countries are relatively less developed and therefore depends more on import for growth; another reason may be the data selection bias. The difference also shows the location of a country is paramount in international trade. For example, a coastal country has access to sea transportation, whereas a landlocked country has to cooperate with seashore neighbours or expensive air transportation to export and is more dependent on imports.

The model (2) regressed poverty on trade openness (EO and IO) for coastal country and landlocked country separately. We observe in Table A40 that the coefficient of EO remains negative using yearly and ten-year averages, but the sign changes to weak positive for landlocked areas with five-year averages. These regional divergences suggest that the results are not robust when controlling for the countries' regional groups. However, the main concern with this approach is the limited number of observations in both panels (i.e. only 11 countries are included in the landlocked geographic groups and 15 countries in the coastal groups). This small sample considerably limits the validity of the results obtained from the GMM. For the coefficient of IO, the result is consistent with both landlocked and coastal groups, showing a negative sign of import openness to poverty reduction, in line with our main results.

#### Alternative Time Periods

Yearly data were used in the analysis so far. Some previous studies have used averaged periods. To test if my study is robust, I will re-estimate model (1) and model (2) using 5-year and 10-year periods averages. This change can further test if alternative time periods can change the result of the analysis, and I can conclude the robustness and sensitivity of the study. Table A38, A39, A40, A41 and A42 include the results of this analysis. For simplification, only the general results are presented.

Altering the time period doesn't change the sign of the coefficient. Trade still showed a positive impact on economic growth and poverty reduction. Over the 5-year period, the

coefficient<sup>39</sup> on the export openness is negative, significant and similar for the original model. Over the 10-year period, the coefficients are still consistent, align with the result obtained from yearly calculation. Therefore, the results of different time periods are consistent and robust.

## **6.2 Alternative Variables**

Besides the alternative database, alternative variables can also alter the result. In this subsection, I will use alternative variables to test the sensitivity of the results.

The first replacement is poverty measures. As previously discussed in Chapter 3, I am interested to including the poverty gap index as a dependent variable in the analysis to see if the results are consistent. If the poverty gap shows the opposite sign as poverty headcount, it represents that although trade may take a part of the population out of the extreme poverty line, it makes those under the line poorer. If it is the opposite, I could conclude that trade reduces both the size of the poor population (represented by poverty headcount) and the intensity of the poverty (represented by poverty gap). Therefore, I will add all the poverty measures, namely PH1(1.90), PH2(3.20), PH3(5.50), PG1(1.90), PG2(3.20) and PG3(5.50) to the model (2) while keeping the independent variables (EO and IO) and control variables the same. The second replacement tested is the economic measure of overall GDP instead of GDP per capita. This change omitted the influence of the population change and focused on the overall economy's status. Especially under a high birth rate scenario, strong economic growth may be underestimated by GDP per capita. Therefore, this measure is useful to assess the overall economic power without taking population into consideration. This change will be made in the model (1). The third replacement is the labour force. I use formal employment levels instead of the total labour force to measure the formal sector employment impact on the economy. In many SSA countries, informal employment is taking a large percent of the labour force in society. Therefore, testing the relationship between formal employment and GDP per capita growth can give us insight into the leverage of the formal sector.

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<sup>39</sup> I will only focus on the GMM estimator for the discussion given the reasons discussed in Chapter 5.

The result (Table A42) shows that regardless of PH measure or PG measure, trade always reduces poverty. We observe negative signs associated with both export at 1% significant levels for PH1, PH2, PH3, PG2 and PG3, and import at 1% significant level for PH1, PG1 and PG2. This consistency with our main results is a strong proof that international trade, especially export, can tremendously reduce a country's poverty level and intensity. Therefore, the study results are consistent. Furthermore, with the replacement of GDP as the dependent variable (instead of GDP per capita) and employment as an independent variable (instead of the labour force), the sign remains the same: the coefficient changed from 4.091 to 4.171 on export and -0.396 to -0.919 on import. They both demonstrated the great leverage the trade has on growth. The coefficient of employment (-0.139) is aligned with the coefficient of labour force (-0.609) within 90% confidence interval.

Therefore, the result is generally consistent based on the alternative dataset (changes in geographic groups and time periods) and alternative variables (changes in dependent variables and independent variables).

## 7. Experience from a successful SSA country

We now highlight the successful experience of an SSA country with special economic zones to test whether China's export strategy can be used by SSA countries to achieve economic growth and poverty reduction. I have chosen to focus on the success of Mauritius. During the past several decades, Mauritius had transformed its industrial structure, increased productivity, promoted growth, reduced poverty and improved people's living conditions. The purpose of this analysis is to let other SSA economics draw reference from the successful country case and perceive that China's export strategy can be and had already been replicated in SSA region.

Forty years ago, Mauritius's industrial structural was almost the same as an average SSA country. It was a mono-crop economy dominated by sugar production. In 1970, sugar and sugar products remained the dominant economic sector, accounting for 97% of exports, 35% of GDP, and 43% employment (Durbarry, 2004). Even by 1983, sugar cane cultivation occupied 87% of total cultivated land or 45% of the island's total land area (World Bank, 1986). The country adopted at that time a new economic strategy based on its relative advantages in textile and agricultural products, such as sugar, and built EPZ to facilitate exports. The governments endeavoured for good policies that led to the success of their economic zones, which contributed significantly to their economic development. Today, Mauritius is almost a high-income country<sup>40</sup>, with GNI per capita in 2018 of \$12,050 (compared with \$1,010 in 1978), exports representing 41% of GDP, and imports 54% of GDP (World Bank, 2018).

Table 27 presents the poverty headcount ratio in Mauritius with poverty lines of \$1.90, \$3.20, and \$5.50 (in 2011 PPP). We can observe during the period a significant decrease in the poor population percentage in Mauritius. By 2018, people living under \$1.90

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<sup>40</sup> The high-income country is 12,375 Gross National Income (GNI) per capita (current US\$) calculated using the Atlas method. <https://blogs.worldbank.org/opendata/new-country-classifications-income-level-2019-2020>

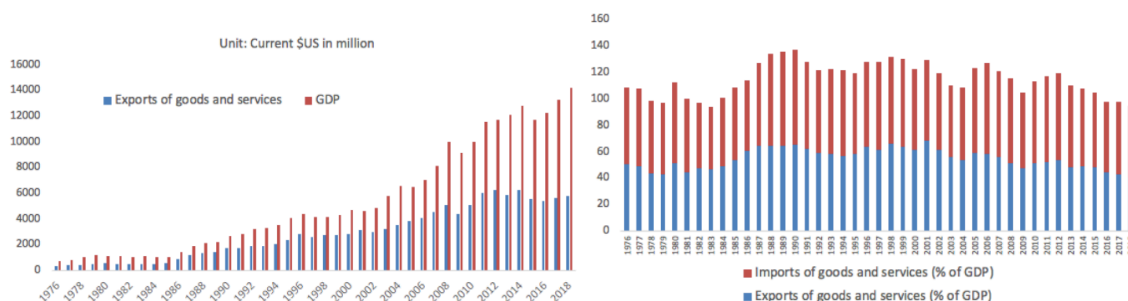
represents less than 0.2% of the total population. Meanwhile, we can observe a “stable push” of exports as a % of GDP during the 1990s (see Figure 17). Trade openness reached 100%<sup>41</sup> of the total economy across almost all observation periods, showing an important trade openness.

**Table 27: Mauritius- Poverty Headcounts (1980-2018)**

Year	1981	1990	2002	2010	2018	Δ
PH1(\$1.90)	19	4	1	0	0	-19
PH2(\$3.20)	55	24	6	3	2	-53
PH3(\$5.50)	84	61	30	18	11	-73

Source: World Bank (2018)

**Figure 17: Mauritius GDP, Export growth and Trade Openness (1976-2018)**



Source: World Bank (2018)

Industrialization began in the 1970s, consisting mainly of textiles and apparel. The country embraced an exporting strategy since the 1960s and established export processing zones in 1971. As a result, the country started to witness remarkable growth across its entire economy. Mauritius was the first African country to establish an EPZ. To facilitate trading, the Mauritius government also enacted the *Export Processing Zone Act* in 1970, which targeted manufacturers that produced exclusively for foreign markets by providing powerful incentives<sup>42</sup> (Karimi, 2019). As China, it started with agriculture exports<sup>43</sup> and then manufacturing production. More recently, the desired and actual share of services

<sup>41</sup> A country's trade openness can be higher than 100% of its GDP because imports are subtracted from GDP calculations. This would be possible if the combined value of a nation's imports and exports exceeds the nation's GDP.

<sup>42</sup> Such as tax exemption.

<sup>43</sup> China started with natural resources and agriculture exports at the early stage of exporting.

has risen, especially tourism, but also financial services and information and computer technology (Frankel, 2010). From the openness of its market, Mauritius has witnessed a significant diversification of its economy: agriculture contributes just 4.3% of GDP, sugar contributes 3%, compensated by a boom in manufacturing in the 1980s and the subsequent development of the services sector (World Bank, 2015).

One focus of the Mauritius government is exports. Mauritius established export-processing zones (EPZ) in 1971 and has seen remarkable growth in the entire economy. This was reflected in the growth in EPZ exports, as EPZ exports share of the country's GDP increased from 25% in 1978 to 65% by 1998. As the zones gained momentum, they were able to increase the proportion of value-added production. By 1999, EPZs accounted for 13% of GDP in the country, over 50% in value addition, and became the leading economic sector in Mauritius in terms of export earnings and employment (Brown, 1997).

The most popular form of SEZs is export-processing zones (EPZ), a legal category of treatment involving freedom of imports and exports rather than a specific set of geographical sites. This enabled companies with SEZ status to locate wherever best suited them in terms of infrastructure and access to labour. Because of the strategy, by 2000, earnings from SEZ firms' exports reached approximately 70 percent of total exports, and by the time of the 2008 financial crisis, SEZ exports exceeded \$1.2 billion, with 413 companies that employed 65,000 workers (Frankel, 2010). The economy of Mauritius has outperformed the rest of the continent with annual GDP growth per capita, averaging 5.4% during the period from 1970 to 2017, while the rest of Africa's growth rate was about 1%. Moreover, in 2010, Mauritius ranked an impressive twentieth in the world in the World Bank Doing Business index. Mauritius appears at the top of the governance rankings for government effectiveness, and the rule of law from the World Governance Indicators place Mauritius first in SSA (2008-2015) (World Bank, 2015).

The increase in Mauritius export growth has been robust and sustainable, especially due to its highly competitive nature and its leading role in ready-made garment markets. As such, it has consistently resulted in export levels that exceed that of other countries. EPZs in Mauritius are considered very successful since they helped the island nation attain the



primary objectives in the generation of employment, increased in exports and diversification of its exports, and attracting investments to the economy.

The lesson learned from Mauritius is to leverage special economic zones for economic growth since concentrating production in a particular geographic area brings major external benefits for firms in that location through knowledge spillovers, labour pooling, and the proximity of specialized suppliers (Marshall, 1890). Developing countries in various parts of the world have already used SEZs as the main instrument to attract foreign direct investment and transform their economies. For example, Thomas Farole (2011) notes that SEZs have allowed the Dominican Republic to create more than 100,000 manufacturing jobs and shift dramatically away from reliance on agriculture (Farole, 2011). Qatar has launched SEZs to diversify its economy from the hydrocarbon-led economy that made it one of the richest in the world, though it was subject to volatile global oil prices, to a knowledge-based economy. Ethiopia has followed the same path, primarily to address its logistics and other infrastructure woes, and experiment with new models of governance that give investors more flexibility to allow them to recruit workers for light manufacturing industries in which the country has a comparative advantage. Those countries' cases further validate that the export strategy can work for SSA countries to grow economy and reduce poverty.

In conclusion, China's export strategy can be replicated in SSA countries, as Mauritius already used SEZs. As a matter of fact, China is not the first country to start such an export-oriented strategy; countries such as Japan, South Korea, Hong Kong and Taiwan are all the beneficiaries of such strategy before China. Therefore, SSA countries have the potential to successfully grow their economy and reduce poverty with the right export leverage.

## 8. Conclusions

The goal of this study was to examine the feasibility of leveraging international trade to achieve economic prosperity and reduce poverty in SSA countries by comparing it to China's export-oriented strategy, economic reforms, and poverty reduction policies.

Trade openness is important to economic growth and poverty reduction. The econometric results of this study based on 26 SSA countries have shown that an increase of 1% export openness can contribute 4.091% to the economic growth rate as measured by GDP per capita and reduce the poverty headcount ratio of extreme poverty by 0.159%. However, there are various reasons why many SSA counties have not implemented an export strategy to reduce poverty. A low level of infrastructure, insufficient education systems, government instability and insufficient foreign aid limit the potential of SSA's growth. Many countries such as Kenya, Mauritius, and Ethiopia have recently implemented SEZs and tax exemptions to attract FDI, but due to many reasons such as weak governing power, lack of electricity, misuse of resources, some have progressed while others stagnated. Particularly, given Africa's unstable political situation and extractive character of institutions (Tadei, 2014), almost every country in Africa remains haunted by historical injustices and oppressive regimes that rose to power during the post-colonial period (Ongayo, 2008). One of the reasons<sup>44</sup> that constrained the ability of the SSA countries to export, growth and reduce poverty is the absence of a stable framework for growth, including the collapse of the state into conflict (Howard White, 2001). On the contrary, China has confirmed that instead of politics, economic development was the best way to benefit its citizens and strengthen national vitality (Peters and Chiang, 2017). In this study, I have found that a 1 percent increase in the 2.5-point scale of political stability can increase GDP per capita by 0.0873 percent. Considering an average \$1,000 per year income, that is a \$87.30 increase in annual income per capita, an amount that may help households pay for rent, food, and electricity for weeks.

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<sup>44</sup> The other reasons for African failed to reduce poverty, according to White (2001) are: poor service delivery and skewed distribution of services, the absence of a poverty reduction strategy, and the inability to target.

The constraints that hinder SSA economies from profiting from increased exports and reducing poverty are various, but they could be removed. For example, improved education can help fill expanding sectors' need for better educated or skilled workers, diversify production into higher value-added products. Education should be made a cornerstone of the government's anti-poor policy and strategy (OECD, 2008). In this study, a 1 percent increase in secondary school enrollment would reduce the poverty headcount ratio by 0.153 percent. This figure could be higher for higher levels of education, such as universities and colleges. Starting building infrastructure can also help tremendously. The 2009 global monitoring report estimates that if SSA infrastructure level reaches that of Mauritius, its annual growth rate would increase by 2.1 percentage points, or 2.7 percentage points if its infrastructure level reaches that of Korea. In my study, a 1 percent increase in the infrastructure (access to electricity) would lead to a 0.785 percent increase in GDP per capita. It is commonly accepted that the construction of public infrastructure can improve the living and production conditions of the poor and allow them to more easily access better education and medical care, reducing poverty.

SSA countries are striving relentlessly to eliminate poverty. Countries such as Ethiopia and Kenya are endeavouring to adopt a similar strategy to that of China. In Ethiopia, the town of Dukem, which is 35 kilometres south of the capital city of Addis Ababa, has earned fame on the world export stage for its "Made in Ethiopia" shoes. The once-farming town began to see a surge in manufacturing in 2010 when Ethiopia's first industrial park was opened. The industrial parks in Ethiopia are one part of the story of how China has built overseas trade and economic cooperation (Xinhua, 2018). It also demonstrates that SSA countries can grab this opportunity to identify their competitive advantages, enhance international connections and boost their economy by exporting.

In addition to an exporting strategy and public service upgrade, governments also need to focus specifically on economic growth and poverty reduction. In that regard, the Chinese government allocated special funds to support social security and public services, especially for society's poorest categories. Those public services covered primary areas such as education, medical care, safe water, transportation and housing (Guennoun, 2019).

In conclusion, SSA countries could use their comparative advantages and refer to the exporting strategies deployed by China, Mauritius, and even Chile<sup>45</sup> to increase growth and reduce poverty. The empirical evidence shows the positive effects of export openness even for the SSA countries that rely heavily on exports of natural resources, and a structural change and export upgrade is necessary for long-term development. Although this study focused on the importance of international trade, it would be wrong to assume that trade liberalization or increasing trade integration, as measured by the trade ratio of national income, is an end in and of itself, rather than one of the means for a country to further its development. All national and international policies need to be rooted in a development-centered approach to trade, rather than a trade-centered approach to development (UNCTAD, 2004).

There are several limitations to this study. With regard to the econometric analysis, the data selection, model specifications and time periods have a significant influence on the results. During my process for data selection, only the most complete dataset at country-level data was kept. This could easily bias the result since the country with a complete dataset is likely to have good political and economic stability for researches to collect those data. Those countries paid attention to keeping records and are open to sharing information, thus having a higher possibility of a robust economy and lower poverty. Moreover, the measure of trade that we used could be developed further to fully reflect trade tendency and development. For example, some researches use a combination of trade measures, including the trade policy, tariff and trading volume, etc. Such approach could become a complement to the current analysis. Another limitation of the study is the lack of mechanism exploring the relation of trade and growth, and trade and poverty. As previously mentioned in the literature review, many factors mediate in the relation of trade and poverty reduction, such as employment creation, government transfer and price level. It would be interesting to further analyze those factors and understand the mechanism behind such relations.

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<sup>45</sup> Chile produced wine for a long time but did not export much before the 1970s. The change from beginning a negligible wine exporter to the world's fifth-largest exporter in the foreign technology to local farms. (Lin, 2012).

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## Appendices

**Table 28: World Share of Exports of goods and services**

<b>Year</b>	<b>SSA</b>	<b>China</b>	<b>Germany</b>	<b>United States</b>
1970	3%	1%	9%	16%
1975	3%	1%	8%	13%
1980	4%	1%	8%	12%
1985	2%	1%	7%	13%
1990	2%	1%	9%	13%
1995	2%	2%	9%	13%
2000	2%	3%	8%	14%
2005	2%	6%	8%	10%
2010	2%	9%	8%	10%
2015	2%	11%	7%	11%
2016	2%	11%	8%	11%
2017	2%	11%	8%	10%
2018	2%	11%	7%	10%

**Source: World Bank (2020)**

**Table 29: Selected Country Poverty Headcount at Different Levels**

Head Ratio	Regional aggregation using 2011 PPP and \$1.9/day poverty line	%	Regional aggregation using 2011 PPP and \$3.2/day poverty line	%	Regional aggregation using 2011 PPP and \$5.5/day poverty line	%
0-29%	Angola, Cote d'Ivoire, Cameroon, Botswana, Namibia, Ghana, Mauritania, Gabon	31%	Gabon, Mauritania	7%		0%
30%-49%	Nigeria, Niger, Burkina Faso, Tanzania, Uganda, Liberia, Kenya, Chad, Senegal, Guinea, Ethiopia	38%	Cameroon, Botswana, Ghana, Namibia	17%	Gabon	3%
50%-100%	Central African Republic, Madagascar, Burundi, Malawi, Mozambique, Zambia, Rwanda, Benin, Mali	31%	Madagascar, Burundi, Central African Republic, Malawi, Mozambique, Rwanda, Mali, Benin, Niger, Burkina Faso, Zambia, Tanzania, Nigeria, Liberia, Ethiopia, Uganda, Guinea, Kenya, Senegal, Chad, Cote d'Ivoire, Angola	76%	Madagascar, Burundi, Malawi, Central African Republic, Mali, Niger, Liberia, Burkina Faso, Rwanda, Mozambique, Guinea, Tanzania, Benin, Ethiopia, Nigeria, Uganda, Zambia, Kenya, Senegal, Chad, Cote d'Ivoire, Angola, Cameroon, Botswana, Mauritania, Ghana, Namibia	97%

Source: World Bank (2015)

**Table 30: SSA Country Export of Goods and Services**

Country	1990	2000	2011	2018	Change
South Africa	27,149	37,034	126,845	110,144	82,996
Nigeria	11,334	25,018	129,735	61,552	50,218
Angola		8,188	67,823	35421*	27,233
Ghana	994	2,432	14,614	23,118	22,124
Cote d'Ivoire	3,421	4,371	13,660	12,815	9,394
Kenya	2,202*	2,743	9,073	11,583	9,380
Zambia	1,205	861	9,494	9,999	8,794
Tanzania	538	1,446	7,498	8,073	7,535
Mozambique	295*	635	4,329	7,029	6,734
Gabon	2,740	3,498	11,229	8,517	5,777
Botswana	2,087	3,000	7,668	7,326	5,239
Cameroon	2,251	2,613	7,608	7,470	5,219
Uganda	312	660	3,837	5,358	5,046
Namibia	1,215	1,598	5,650	5,625	4,409
Burkina Faso	340	251	2,681	4,349	4,009
Chad	234	234	4,726	4,058	3,823
Mali	420	664	2,949	4,051	3,631
Madagascar	512	1,190	2,625	3,973	3,462
Senegal	1,839	1,654	3,788	5,272	3,433
Benin	376	543	1,660	3,664	3,288
Guinea	829	735	2,212	4,102	3,273
Mauritania	465	388	2,900	2,361	1,895
Ethiopia			5,332	7,058	1,726
Rwanda	143	110	896	1,652	1,509
Malawi	447	446	1,663	1838*	1,391
Niger	367	320	1,340	1,462	1,095
Liberia		274	523	849	575
Central African Republic	246	186	320	419	173
Burundi	89	55	197	236	147

Source: Own calculation based on World Bank (2020).

Note: stars mean that the figure is not for the mentioned year, up to 3 years' data is computed here.

**Table 31: SSA Country Export % in GDP**

Country	1990	2000	2011	2018	Change
Mozambique	8%*	11%	30%	48%	40%
Chad	14%	17%	39%	36%	23%
Burkina Faso	11%	10%	25%	31%	20%
Ghana	17%	49%	37%	35%	18%
Benin	19%	21%	21%	35%	16%
Uganda	7.20%	11%	19%	20%	12%
Madagascar	17%	31%	23%	29%	12%
Rwanda	6%	6%	14%	17%	12%
Mali	16%	23%	23%	24%	8%
Guinea	31%	25%	33%	38%	7%
South Africa	23.50%	27%	31%	30%	6%
Malawi	24%	26%	21%	29%*	5%
Gabon	46%	69%	62%	51%	5%
Zambia	33%*	24%	41%	37%	4%
Tanzania	12.60%	11%	22%	15%	3%
Central African Republic	17%	20%	13%	19%	2%
Niger	15%	18%	21%	16%	1%
Burundi	8%	6%	9%	8%	0%
Mauritania	46%	30%	56%	45%	-1%
Cameroon	20%	26%	26%	19%	-1%
Cote d'Ivoire	32%	41%	54%	30%	-2%
Senegal	25%	28%	21%	22%	-4%
Namibia	44%	42%	46%	39%	-5%
Liberia		31%	22%	26%	-5%
Nigeria	21%	36%	32%	16%	-6%
Ethiopia			17%	8%	-8%
Kenya	26%	22%	22%	13%	-13%
Botswana	55%	52%	50%	39%	-16%
Angola		90%	61%	29%*	-51%

Source: Own calculation based on World Bank (2020).

Note: stars mean that the figure is not for the mentioned year, up to 3 years' data is computed here.

**Table 32: SSA Country Export Component (Unit: Current USD)**

	Animal and vegetables oils, fats and waxes		Beverages and tobacco		Chemicals and related products		Commodities and transactions		Crude materials, inedible, except fuels	
Central African Republic	14,216,850	6%	3,476,960	1%	6,770,689	3%	72,468,096	30%	20,107,669	8%
Liberia	25,262,924	4%	913,062	0%	11,395,837	2%	10,073,558	2%	71,116,633	12%
Senegal	16,507,215	2%	4,084,900	1%	178,524,115	23%	55,424,575	7%	51,112,492	7%
Ethiopia	5,816,885	1%	9,890,110	0%	173,881,999	22%	8,653,129	1%	116,936,161	15%
Mali	26,204,488	3%	3,700,637	1%	37,782,213	4%	228,637,980	24%	42,889,277	5%
Cameroon	17,191,522	2%	8598705	1%	98,935,538	10%	9,113,787	1%	364,190,177	36%
Benin	26,459,728	3%	22,414,592	2%	65,864,758	6%	47,261,920	5%	29,489,901	3%
Gabon	30,204,252	3%	6,662,099	1%	6,128,385	1%	12,467,078	1%	79,088,426	7%
Rwanda	29,261,888	3%	3336056	0%	51,209,367	4%	56,429,786	5%	106,301,583	9%
Burundi	16,379,147	1%	28,778,916	2%	103,356,214	7%	7,450,543	1%	101,505,322	7%
Kenya	16,921,086	1%	27,378,308	2%	147,471,261	10%	25,548,574	2%	227,134,921	15%
Guinea	71,170,800	5%	800565580	51%	38,220,041	2%	161,985,121	10%	78,720,590	5%
Burkina Faso	126,744,398	8%	2,630,653	0%	305,459,870	19%	11,942,820	1%	184,030,658	11%
Niger	16,063,367	1%	65,805,442	4%	23,502,902	1%	4,060,007	0%	125,553,795	7%
Mauritania	7,447,387	0%	3,372,391	0%	538,305,715	30%	8,309,528	0%	125,433,987	7%
Mozambique	18,100,352	1%	6,039,665	0%	39,229,644	2%	28,705,451	1%	305,175,733	14%
Madagascar	59,062,746	2%	11,489,888	0%	48,730,035	2%	7,693,621	0%	1,694,476,767	67%
Nigeria	108,083,358	4%	110,100,277	4%	207,490,774	7%	9,795,820	0%	69,191,445	2%
Angola	129,337,230	4%	31,622,764	1%	159,508,692	5%	12,928,730	0%	1,553,005,844	52%
Malawi	155,932,088	96	13,136,794	0%	170,314,531	5%	23,311,171	1%	1,821,800,557	58%
Cote d'Ivoire	22,906,666	1%	25739309	1%	26,714,403	1%	13,843,825	0%	3,437,843,021	86%
Ghana	464,728,002	4%	9,620,474,039	82%	388,073,688	3%	30,260,856	0%	685,848,335	6%
Grand Total	1,404,002,379	3%	10,810,211,149	23%	2,826,870,672	6%	846,365,975	2%	11,290,953,295	24%



(Follows Table A32)

	Food and live animals		Machinery and transport equipment		Manufactured goods		Mineral fuels, lubricants and related materials		Miscellaneous manufactured articles	
Central African	6,051,414	2%	27,193,646	11%	6,384,531	3%	28,039,859	11%	59,669,670	24%
Liberia	3,459,224	1%	15,708,874	3%	23,493,291	4%	48,808,677	8%	367,058,538	64%
Senegal	23,561,291	3%	53,058,175	7%	20,608,496	3%	170,924,596	22%	188,999,725	25%
Ethiopia	28,993,168	4%	57,332,111	7%	38,381,719	5%	252382720	32%	107,874,243	13%
Mali	9,887,431	1%	149,563,224	16%	45,894,318	5%	285,847,021	30%	116,039,157	12%
Cameroon	62,508,767	6%	168,816,539	17%	72,134,888	7%	53,817,252	5%	151,876,374	15%
Benin	504,358	0%	90,197,913	9%	92,700,018	9%	238791618	23%	409,748,137	40%
Gabon	12,477,825	1%	658,288,191	59%	17,739,411	2%	52,001,239	5%	235,243,444	21%
Rwanda	435,873	0%	135,973,338	12%	165,526,578	15%	35,958,291	3%	556,194,261	49%
Burundi	17,606,359	1%	191,774,963	14%	4,494,222	0%	804,666,317	57%	129,027,167	9%
Kenya	233,763,450	16%	45,773,533	3%	211,426,026	14%	250914046	17%	317,574,982	21%
Guinea	7,394,634	0%	51,203,504	3%	108,961,368	7%	61,296,895	4%	191,246,850	12%
Burkina Faso	2,487,372	0%	554,304,894	34%	13,761,322	1%	202658445	12%	221,668,183	14%
Niger	14,363,369	1%	72,575,941	4%	129,003,652	7%	50,479,132	3%	1,270,259,995	72%
Mauritania	225,183,693	12%	118,803,019	7%	22,156,190	1%	64,181,464	4%	693,893,624	38%
Mozambique	441,835,904	20%	74,323,642	3%	90,671,943	4%	82,023,095	4%	1,069,730,671	50%
Madagascar	22,713,897	1%	169,613,803	7%	153,681,022	6%	66,227,827	3%	289,503,413	11%
Nigeria	14,008,968	0%	228,621,080	8%	31,633,935	1%	71,159,753	2%	2,083,883,867	71%
Angola	7,396,548	0%	118,544,807	4%	14,494,140	0%	575,237,001.00	19%	359,319,295	12%
Malawi	22,870,212	1%	491,521,246	16%	56,263,738	2%	164,072,399	5%	227,064,318	7%
Cote d'Ivoire	1,661,584	0%	85,467,524	2%	52,117,920	1%	144,012,212	4%	181,965,777	5%
Ghana	175,501,295	1%	145,822,746	1%	106,406,057	1%	24,298,158	0%	109,988,029	1%
Grand Total	1,334,666,636	3%	3,704,482,711	8%	1,477,934,785	3%	3,727,798,016	8%	9,337,829,719	20%

Source: Own calculation based on World Bank(2020).

**Table 33: SSA Country Fuel, Ores and Metals Exports**

Country	1990	2000	2010	2018	Change within available data set
Mozambique		38%	74%	79%	41%
Ghana	27%	27%	12%	52%	25%
South Africa	17%	21%	39%	38%	21%
Burkina Faso		3%	2%	19%	19%
Niger		42%	61%		19%
Cote d'Ivoire		21%	24%	18%	18%
Namibia		13%	29%	31%	18%
Burundi		1%	8%	13%	13%
Madagascar	8%	6%	16%	21%	13%
Senegal	22%	19%	27%	27%	6%
Central African Republic		8%	59%	4%	4%
Zambia		75%	86%	78%	3%
Mauritania		46%	57%	49%	3%
Tanzania		1%	36%	2%	2%
Botswana		7%	15%	1%	1%
Mali	0%	0%	1%	1%	1%
Malawi	0%	0%	11%	0%	0%
Rwanda		25%	36%		0%
Angola	100%		99%	99%	-1%
Nigeria	97%	100%	88%	94%	-2%
Uganda		11%	3%	7%	-4%
Kenya	12%	22%	3%	6%	-6%
Cameroon	57%	60%	53%	47%	-9%
Benin	15%	0%	1%	0%	-14%
Guinea		63%		11%	-52%
Ethiopia		1%	1%		
Gabon		85%	86%		
<b>Average</b>	<b>13%</b>	<b>26%</b>	<b>34%</b>	<b>26%</b>	<b>4%</b>

Source: Own calculation based on World Bank (2020).

**Table 34: ODA Recipient**

	Net ODA USD million
Africa	49954
Asia	43516
America	11284
Europe	8222
Oceania	1680
Aid unspecified by region	43059
All ODA recipients	157704

1	Ethiopia	4074	8%
2	Nigeria	2501	5%
3	Tanzania	2318	5%
4	Kenya	2189	4%
5	Egypt	2130	4%
6	Democratic Republic of the Congo	2107	4%
7	Morocco	1992	4%
8	Uganda	1757	4%
9	South Sudan	1590	3%
10	Mozambique	1531	3%
	Other recipients	27764	56%

Source: OECD (2018)

**Table 35: Variable Correlation**

**Matrix of correlations (log form)**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) PH1(1.90)	1.000									
(2) GDP per capita	-	1.000								
	0.758									
(3) EO	-	0.781	1.000							
	0.707									
(4) IO	-	0.470	0.521	1.000						
	0.518									
(5) Labor Force	0.441	-	-	-	1.000					
		0.442	0.661	0.318						
(6) Foreign Aid	0.363	-	-	-	0.874	1.000				
		0.418	0.606	0.180						
(7) Inflation	0.293	-	-	0.046	0.392	0.332	1.000			
		0.232	0.208							
(8) Political	-	0.353	0.487	0.400	-	-	-	1.000		
	0.215				0.666	0.608	0.162			
(9) Infrastructure	-	0.783	0.574	0.392	-	-	-	0.185	1.000	
	0.836				0.200	0.179	0.324			
(10) Education	-	0.484	0.331	0.197	-	-	-	0.116	0.497	1.000
	0.326				0.152	0.078	0.009			

**Matrix of correlations (log form)**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) PG1(1.90)	1.000									
(2) GDP per capita	-	1.000								
	0.656									
(3) EO	-	0.828	1.000							
	0.607									
(4) IO	-	0.530	0.521	1.000						
	0.500									
(5) Labor Force	0.488	-	-	-	1.000					
		0.605	0.695	0.305						
(6) Foreign Aid	0.365	-	-	-	0.877	1.000				
		0.508	0.613	0.164						
(7) Inflation	0.299	-	-	0.040	0.419	0.343	1.000			
		0.241	0.214							
(8) Political	-	0.502	0.507	0.387	-	-	-	1.000		
	0.258				0.628	0.589	0.181			
(9) Infrastructure	-	0.761	0.613	0.450	-	-	-	0.322	1.000	
	0.799				0.343	0.256	0.343			
(10) Education	-	0.510	0.331	0.197	-	-	-	0.120	0.525	1.000
	0.375				0.160	0.079	0.011			

**Table 36: China Export and Import (Unit: Million USD)**

<b>Year</b>	<b>Export</b>	<b>Export% in GDP</b>	<b>Import</b>	<b>Import% in GDP</b>	<b>Net Export</b>	<b>GDP</b>
<b>1978</b>	6,813	5%	7,618	5%	- 805	149,541
<b>1979</b>	9,204	5%	10,561	6%	- 1,357	178,281
<b>1980</b>	11,300	6%	12,450	7%	- 1,150	191,149
<b>1981</b>	14,587	7%	14,591	7%	- 4	195,866
<b>1982</b>	22,600	11%	17,788	9%	4,812	205,090
<b>1983</b>	21,956	10%	19,385	8%	2,571	230,687
<b>1984</b>	24,764	10%	24,710	10%	54	259,947
<b>1985</b>	25,801	8%	38,302	12%	- 12,501	309,488
<b>1986</b>	26,203	9%	33,593	11%	- 7,390	300,758
<b>1987</b>	34,073	12%	33,782	12%	291	272,973
<b>1988</b>	44,924	14%	48,985	16%	- 4,061	312,354
<b>1989</b>	41,191	12%	46,119	13%	- 4,928	347,768
<b>1990</b>	49,130	14%	38,462	11%	10,668	360,858
<b>1991</b>	55,543	14%	43,942	11%	11,601	383,373
<b>1992</b>	66,847	16%	61,849	14%	4,998	426,916
<b>1993</b>	74,280	17%	86,072	19%	- 11,792	444,731
<b>1994</b>	104,607	19%	97,250	17%	7,357	564,325
<b>1995</b>	131,859	18%	119,901	16%	11,958	734,548
<b>1996</b>	154,812	18%	137,262	16%	17,550	863,747
<b>1997</b>	187,447	19%	144,624	15%	42,823	961,604
<b>1998</b>	188,750	18%	144,914	14%	43,837	1,029,043
<b>1999</b>	198,699	18%	168,058	15%	30,641	1,093,997
<b>2000</b>	253,092	21%	224,306	19%	28,786	1,211,347
<b>2001</b>	272,060	20%	243,974	18%	28,086	1,339,396
<b>2002</b>	333,002	23%	295,620	20%	37,383	1,470,550
<b>2003</b>	447,958	27%	412,137	25%	35,821	1,660,288
<b>2004</b>	607,357	31%	556,183	28%	51,174	1,955,347
<b>2005</b>	773,339	34%	648,712	28%	124,627	2,285,966
<b>2006</b>	991,731	36%	782,812	28%	208,919	2,752,132
<b>2007</b>	1,258,057	35%	950,021	27%	308,036	3,550,342
<b>2008</b>	1,497,869	33%	1,149,036	25%	348,833	4,594,307
<b>2009</b>	1,262,664	25%	1,042,534	20%	220,130	5,101,702
<b>2010</b>	1,654,816	27%	1,432,416	24%	222,400	6,087,165

<b>2011</b>	2,006,297	27%	1,825,403	24%	180,894	7,551,500
<b>2012</b>	2,175,081	25%	1,943,215	23%	231,865	8,532,231
<b>2013</b>	2,354,249	25%	2,119,378	22%	234,871	9,570,406
<b>2014</b>	2,462,839	24%	2,241,289	21%	221,551	10,438,529
<b>2015</b>	2,362,093	21%	2,003,257	18%	358,836	11,015,542
<b>2016</b>	2,199,968	20%	1,944,484	17%	255,483	11,137,946
<b>2017</b>	2,424,200	20%	2,208,504	18%	215,696	12,143,491
<b>2018</b>	2,655,609	20%	2,548,986	19%	106,623	13,608,152

**Table 37: Poverty Headcount Ratio at PH1(\$1.90) (2011 PPP)**

Country	1990	1993	1996	1999	2002	2005	2008	2010	2011	2012	2013	2015	Improvement from 1990 to 2015
<b>Guinea</b>	91%	64%	53%	58%	62%	61%	55%	55%	46%	35%	34%	33%	58%
<b>Burkina Faso</b>	84%	83%	82%	76%	66%	57%	54%	54%	51%	48%	45%	43%	41%
<b>Mali</b>	86%	85%	82%	70%	58%	52%	51%	50%	50%	52%	52%	48%	38%
<b>Namibia</b>	52%	51%	51%	38%	36%	29%	24%	21%	19%	17%	16%	13%	38%
<b>Mauritania</b>	42%	41%	20%	19%	19%	13%	11%	10%	9%	8%	7%	6%	36%
<b>Chad</b>	68%	74%	72%	72%	68%	40%	42%	37%	38%	36%	35%	34%	34%
<b>Senegal</b>	68%	61%	56%	50%	48%	38%	36%	37%	38%	37%	38%	34%	34%
<b>Ethiopia</b>	65%	73%	66%	64%	52%	37%	35%	34%	33%	33%	32%	31%	34%
<b>Ghana</b>	46%	46%	41%	35%	31%	26%	21%	19%	15%	13%	12%	13%	33%
<b>Tanzania</b>	71%	75%	80%	84%	80%	67%	58%	54%	51%	49%	46%	41%	30%
<b>Niger</b>	72%	79%	80%	78%	77%	75%	66%	55%	50%	46%	46%	44%	27%
<b>Mozambique</b>	87%	88%	83%	82%	81%	77%	70%	67%	66%	64%	63%	62%	26%
<b>Uganda</b>	59%	64%	62%	66%	65%	58%	47%	43%	38%	37%	37%	39%	20%
<b>Botswana</b>	34%	35%	33%	29%	30%	25%	17%	18%	17%	17%	15%	16%	17%
<b>Rwanda</b>	70%	69%	80%	79%	73%	70%	66%	63%	62%	60%	58%	55%	15%
<b>Benin</b>	60%	58%	57%	54%	49%	50%	50%	52%	53%	52%	51%	50%	10%
<b>Liberia</b>	49%	92%	96%	66%	52%	74%	65%	59%	52%	44%	40%	39%	10%
<b>Cameroon</b>	33%	49%	48%	30%	24%	27%	29%	30%	29%	28%	26%	23%	10%
<b>South Africa</b>	29%	32%	37%	36%	34%	26%	17%	17%	17%	17%	18%	19%	10%
<b>Burundi</b>	82%	82%	84%	84%	81%	80%	77%	75%	75%	74%	72%	75%	7%
<b>Nigeria</b>	54%	59%	64%	65%	58%	54%	54%	53%	52%	51%	49%	47%	7%
<b>Central African Republic</b>	82%	83%	78%	70%	64%	65%	66%	65%	64%	63%	79%	78%	4%
<b>Malawi</b>	72%	68%	64%	65%	73%	73%	73%	72%	71%	73%	71%	70%	1%
<b>Gabon</b>	5%	5%	5%	6%	7%	8%	8%	7%	6%	6%	5%	4%	1%
<b>Angola</b>	26%	43%	35%	32%	33%	34%	29%	30%	30%	28%	27%	28%	-2%
<b>Zambia</b>	53%	55%	42%	44%	49%	58%	63%	64%	63%	60%	59%	57%	-4%
<b>Kenya</b>	29%	37%	31%	35%	42%	44%	42%	41%	40%	39%	39%	37%	-8%
<b>Cote d'Ivoire</b>	14%	23%	21%	25%	23%	27%	29%	32%	36%	34%	32%	28%	-14%
<b>Madagascar</b>	61%	70%	69%	64%	76%	72%	72%	78%	78%	78%	78%	77%	-17%

Source: World Bank

Note: Regional aggregation using 2011 PPP and \$1.9/day poverty line

**Table 38: Robust Check \_Coefficient on Export (Model 1)**

		Coefficient on export	Standard Error	p- value	Obs	Method
Five-year Average	<u>Standard Analysis</u>					
	Whole Sample	9.685	3.081	0.003	52	2SLS
	<u>Geographic Groups</u>					
	Costal	41.338	91.629	0.656	30	2SLS
	Landlocked	0.760	4.159	0.858	22	2SLS
Ten-year Average	<u>Standard Analysis</u>					
	Whole Sample	15.377	8.199	0.078	25	2SLS
	<u>Geographic Groups</u>					
	Costal	-22.121	253.902	0.933	15	2SLS
	Landlocked	-3.924	15.318	0.822	10	2SLS
Yearly	<u>Standard Analysis</u>					
	Whole Sample	4.091	0.855	0.000	140	2SLS
	<u>Geographic Groups</u>					
	Costal	3.831	1.351	0.006	77	2SLS
	Landlocked	2.782	1.120	0.016	63	2SLS

Note: Dependent variable is GDP per capita and independent variables: EO and control variables.



**Table 39: Robust Check \_Coefficient on Import (Model 1)**

		Coefficient on import	Standard Error	p- value	Obs	Method
Five-year Average	<u>Standard Analysis</u>					
	Whole Sample	0.485	1.862	0.796	52	2SLS
	<u>Geographic Groups</u>					
	Costal	16.470	47.794	0.734	30	2SLS
	Landlocked	7.381	8.179	0.382	22	2SLS
Ten-year Average	<u>Standard Analysis</u>					
	Whole Sample	1.585	6.282	0.804	25	2SLS
	<u>Geographic Groups</u>					
	Costal	-33.121	253.902	0.933	15	2SLS
	Landlocked	11.512	17.892	0.586	10	2SLS
Yearly	<u>Standard Analysis</u>					
	Whole Sample	-0.396	0.626	0.528	140	2SLS
	<u>Geographic Groups</u>					
	Costal	-0.428	1.030	0.679	77	2SLS
	Landlocked	1.148	1.105	0.303	63	2SLS

Note: Dependent variable is GDP per capita and independent variables: IO and control variables.

**Table 40: Robust Check \_Coefficient on Export (Model 2)**

		Coefficient on Export	Standard Error	Countries	p-value	Obs	Method
Five-year Average	<u>Standard Analysis</u>						
	Whole Sample	-0.253	0.065	18	0.000	49	GMM(1)
	Whole Sample	-0.243	0.102	18	0.021	49	GMM(2)
	<u>Geographic Groups</u>						
	Costal	-0.320	0.108	11	0.007	29	GMM(1)
	Costal	-0.378	0.149	11	0.764	29	GMM(2)
	Landlocked	0.121	0.105	7	0.271	20	GMM(1)
	Landlocked	0.118	0.107	7	0.289	20	GMM(2)
Ten-year Average	<u>Standard Analysis</u>						
	Whole Sample	-0.208	0.166	18	0.220	36	GMM(1)
	Whole Sample	-0.212	0.749	18	0.779	36	GMM(2)
	<u>Geographic Groups</u>						
	Costal	-0.184	0.390	11	0.470	22	GMM(1)
	Costal	-0.162	0.828	11	0.848	22	GMM(2)
	Landlocked						GMM(1)
	Landlocked						GMM(2)
Yearly	<u>Standard Analysis</u>						
	Whole Sample	-0.213	0.029	17	0.000	55	GMM(1)
	Whole Sample	-0.159	0.032	17	0.000	55	GMM(2)
	<u>Geographic Groups</u>						
	Costal	-0.286	0.095	10	0.006	33	GMM(1)
	Costal	-0.390	0.097	10	0.000	33	GMM(2)
	Landlocked	-0.003		7	.	22	GMM(1)
	Landlocked	-0.033		7		22	GMM(2)

Note: Dependent variable is PH1(\$1.90), independent variables: EO and control variables.

**Table 41: Robust Check \_Coefficient on Import (Model 2)**

		Coefficient on Import	Standard Error	Countries	p-value	Obs	Method
Five-year Average	<u>Standard Analysis</u>						
	Whole Sample	-0.224	0.097	18	0.026	49	GMM(1)
	Whole Sample	-0.311	0.154	18	0.049	49	GMM(2)
	<u>Geographic Groups</u>						
	Costal	-0.060	0.115	11	0.609	29	GMM(1)
	Costal	-0.045	0.148	11	0.764	29	GMM(2)
	Landlocked	-0.419	0.245	7	0.111	20	GMM(1)
	Landlocked	-0.481	0.260	7	0.087	20	GMM(2)
Ten-year Average	<u>Standard Analysis</u>						
	Whole Sample	-0.138	0.160	18	0.396	36	GMM(1)
	Whole Sample	-0.425	1.255	18	0.737	36	GMM(2)
	<u>Geographic Groups</u>						
	Costal	-0.082	0.260	11	0.757	22	GMM(1)
	Costal	-0.733	1.046	11	0.494	22	GMM(2)
	Landlocked						GMM(1)
Yearly	<u>Standard Analysis</u>						
	Whole Sample	-0.121	0.035	17	0.001	55	GMM(1)
	Whole Sample	-0.136	0.039	17	0.001	55	GMM(2)
	<u>Geographic Groups</u>						
	Costal	-0.111	0.109	10	0.316	33	GMM(1)
	Costal	0.003	0.110	10	0.977	33	GMM(2)
	Landlocked	-0.392		7		22	GMM(1)
	Landlocked	-0.719		7		22	GMM(2)

Note: Dependent variable is PH1(\$1.90), independent variables: IO and control variables.

**Table 42: Robust Check \_Coefficient on Export and Import (Model 1 and 2)**

Alternative independent variables specifications	Dependent Variable	Coefficient on export	Standard Error	p-value	Obs	Method
	GDP per Capita	4.091	0.855	0.000	140	2SLS
	GDP	4.171	0.815	0.000	140	2SLS
	Dependent Variable	Coefficient on import	Standard Error	p-value	Obs	Method
	GDP per Capita	-0.396	0.626	0.528	140	2SLS
	GDP	-0.919	0.596	0.125	140	2SLS
	Dependent Variable	Coefficient on Employment	Standard Error	p-value	Obs	Method
	GDP per Capita	-0.139	0.099	0.164	140	2SLS
	Dependent Variable	Coefficient on Labour Force	Standard Error	p-value	Obs	Method
	GDP per Capita	-0.609	0.101	0.549	140	2SLS

Note: Model (1): Dependent variable is GDP per Capita and GDP, independent variables EO, IO and alternative control variables (employment Vs. Labour Force).

Alternative dependent variables specifications	Dependent Variable	Coefficient on export	Standard Error	Countries	p-value	Obs	Method
	PH1(1.90)	-0.213	0.029	17	0.000	55	GMM
	PH2(3.20)	-0.329	0.039	17	0.000	55	GMM
	PH3(5.50)	-0.274	0.034	17	0.000	55	GMM
	PG1(1.90)	0.009	0.011	16	0.435	53	GMM
	PG2(3.20)	-0.090	0.017	16	0.000	53	GMM
	PG3(5.50)	-0.163	0.023	16	0.000	53	GMM
	Dependent Variable	Coefficient on import	Standard Error	Countries	p-value	Obs	Method
	PH1(1.90)	-0.121	0.035	17	0.001	55	GMM
	PH2(3.20)	-0.077	0.048	17	0.112	55	GMM
	PH3(5.50)	-0.051	0.042	17	0.224	55	GMM
	PG1(1.90)	-0.074	0.013	16	0.000	53	GMM
	PG2(3.20)	-0.078	0.019	16	0.000	53	GMM
	PG3(5.50)	-0.065	0.027	16	0.019	53	GMM

Note: Model (2): Dependent variable is PH1, PH2, PH3, PG1, PG2 and PG3, independent variables EO, IO and control variables.

**Table 43: Variables Description and Source**

Variable	Description	Source
<b>Dependent Variable</b>		
Poverty Headcount("PH")	Percentage of the population living on less than a certain threshold a day	World Bank
Poverty Gap ("PG")	Mean shortfall in income or consumption from the poverty line (counting the nonpoor as having zero shortfall)	World Bank
<b>Independent Variable</b>		
Export%GDP ("EO")	The value of all goods and other market services provided to the rest of the world, compared to its GDP.	World Bank
Import%GDP ("IO")	The value of all goods and other market services received from the rest of the world, compared to its GDP.	World Bank
Foreign Aid	Net official development assistance (ODA)	World Bank
Political Stability	The likelihood of political instability and/or politically-motivated violence, including terrorism.	World Bank
Infrastructure_electricity	Access to electricity is the percentage of population with access to electricity.	World Bank
Labor force, total	Labor force comprises people ages 15 and older who supply labor for the production of goods and services during a specified period.	World Bank
Inflation	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services	World Bank
School Enrollment	Gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown.	World Bank