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# Export Performance of Landlocked Countries: with Special Reference to Developing Economies

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EXPORT PERFORMANCE OF LANDLOCKED COUNTRIES:  
WITH SPECIAL REFERENCE TO DEVELOPING ECONOMIES

(TITLE)

BY

KAUSHAL BHATTARAI

**THESIS**

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS  
FOR THE DEGREE OF

KAUSHAL BHATTARAI

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY  
CHARLESTON, ILLINOIS

2019

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## **ABSTRACT**

The present research intends to find whether “landlockedness” has any impact on the exporting capacity of the landlocked countries. To meet that end, I carry out a panel data analysis of 104 countries including 30 landlocked countries. The Hausman test validates the random effect as an appropriate estimation strategy given the structure of the data and research questions in hand. A dummy variable is employed to capture the “landlockedness” and its impact on exporting performance of those countries. The variables openness and foreign direct investments are used to capture the economic health of the countries, other than penalized of being landlocked. Regional dummy for Africa is to assess the impact in the region. The main finding of the present research is the fact that “landlockedness” has a substantially adverse impact on the trading capability of the landlocked countries, as expected. The impact of openness and foreign direct investment do not turn convincing. The incidence of “landlockedness” is slightly higher in Africa among the geographical categories discussed in the research. Therefore, the African landlocked countries should be even more concerned about the economic integration among countries to ensure free transit of their goods to their trading partners.

## **ACKNOWLEDGEMENT**

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## ACRONYMS

FDI	Foreign Direct Investment
LLDCs	Landlocked developing countries
UNCTAD	United Nations Convention on Trade and Development
UN-OHRLLS	The United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States

# **CHAPTER: ONE**

## **INTRODUCTION**

### **1.1 Overview of Landlocked Countries**

There are 44 landlocked countries in the world. Of these, the United Nations lists 32 countries as landlocked developing countries. These countries are home to 440 million people. The two-large concentration of people from landlocked countries lives in Sub-Saharan Africa and Central Asia.

These countries are entirely or almost surrounded entirely by land entailing them no direct access to seas. The obvious disadvantage is that trade is more difficult and costlier because a landlocked country must access most foreign markets through international transport corridors connecting them to ports in neighboring countries called transit countries.

Economists at large have consensus that size of the country, geography, and natural resource endowments may have a significant impact on the prospect of industrialization and economic growth. During the 1960s and 1970s, several empirical studies attempted to determine whether there exists a minimal size below which countries are not economically viable (World Bank, 2003). Aside from the country's size, another geographical factor: distance has an important implication on the composition and direction of the trade. That means, other things remaining constant, countries geographically far from each other are observed to have relatively less 'intense' trade relations. It implies the fact that geographically remote countries like those in central Asia and Southern Africa, may experience relatively difficult to access European and

North American markets. Another important implication is the lack of direct access to the ocean via navigable rivers. This geographical disadvantage has been mostly experienced by Sub-Saharan Africa, the most landlocked region in the world (14 countries), followed by central Africa.

Sachs and Gallup (1989-1999), highlighted 3 main disadvantages of being landlocked. First, cross-border migration of labor is more difficult than internal migration. Second, infrastructure development across national borders is more difficult to arrange than similar investment within the country. Third, coastal economies may have military or economic incentives to impose costs on interior landlocked economies.

Mc Kellar et. al. (2000) conclude that landlocked countries experienced economic growth which was, on average, about 1.5 percent per year slower than non-landlocked countries. According to an estimate of UNO-HRLLS (2017), the average annual real growth rate of Gross Domestic Product (RGDP) for the LLDCs has decreased from 5.5% in 2014 to 3.5% in 2015 and is estimated to have decreased further to 2.6% in 2016.

Landlocked countries are vastly diverse: socially, economically and geographically. Therefore, addressing the problems of these countries is rather challenging.

**Table 1.1: Diversity in landlocked countries**

<b>Feature</b>	<b>Lowest</b>	<b>Highest</b>
Per capita incomes	US\$ 300 (Burundi)	US\$ 7,000 (Kazakhstan)
Population	<1 Million (Bhutan)	90 Million (Ethiopia)
Land Area	0.017 Million km <sup>2</sup> Swaziland	2.7 Million (Mongolia)
Population Density	2 people per km <sup>2</sup>	400 people per km <sup>2</sup>

Source: UNO-HRLLS (2017)

Table 1 shows the vast diversity of landlocked countries. The per capita income of Kazakhstan is 23 times larger than the lowest per capita income of Burundi. The difference in the size of the population is even striking. The population of Ethiopia is almost 90 times the population of Bhutan. Similarly, the difference in land area, as well as population density among landlocked countries, is also vast.

## **1.2 An overview of export performance of the landlocked countries**

Export has been the most important driver of economic growth. The role of export to accelerate the pace of economic growth was highlighted after the East Asian Miracle (EAM). By enhancing their exporting performances, small coastal countries of East Asia attained an unprecedented feat in achieving high growth rate and, most importantly, transformed country's fate from one of the poorest countries to one of the most vibrant export-led economies in the world.

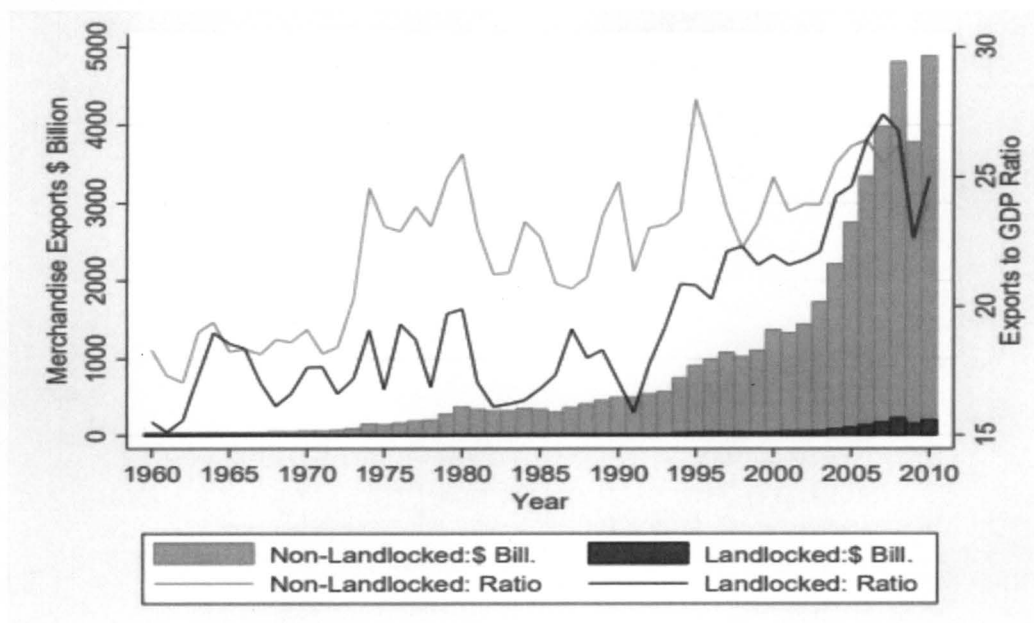
But the majority of the developing countries do not have such a remarkable success story. They implement poor policies, execute through weak governance, undergo poor trade performances. Some are disadvantaged by poor institutions, some are exploited by colonies, some experienced civil wars, while some others experienced epidemics and natural disasters. No matter how serious and chronic these problems are, countries can still dust off the miserable experience of the past with great courage and step forward for a better future. But, the perils of countries geographically disadvantaged as landlocked and aggravated by poor neighborhood are the most pressing one. There's an often-saying dictum that 'the neighbors cannot be replaced'. This is so well manifested in the case of landlocked countries. Country's international trades largely conditioned by the moods of the transit countries. In majority cases, both transit and landlocked countries are developing. Just like landlocked countries, they too have poor infrastructures, sluggish administrative mechanism and, most importantly, have no intensive to improve infrastructures for the convenience of adjacent landlocked countries. Therefore, the "landlockedness" has unique but serious implications on international trade and overall development of the country.

A closer look at the economic performance of landlocked developing countries reflects the direct and indirect impact of "landlockedness" on key economic variables. These are one of the poorest countries in the world, with very weak economic growth records and are largely dependent on limited commodities options to export, mainly primary products. Moreover, among 32 landlocked countries, 17 are classified as least developed countries.

In figure 1, the share of export on GDP for landlocked countries is clearly below the ratio of non-landlocked countries. On the other hand, an absolute amount of exports expressed in US\$ (solid black bars compared to grey bars) is ways below the exports of non-landlocked countries.

A vast distance from the major world markets is the main reason behind landlocked countries are struggling compared to their European counterparts. Most of the European landlocked countries are specialized in high valued products and seaborne trades account for a relatively small portion of external trade. In addition, their distance from the seaport is relatively short too.

**Figure: 1.1 Share of Merchandise Exports in GDP: Developing Countries**

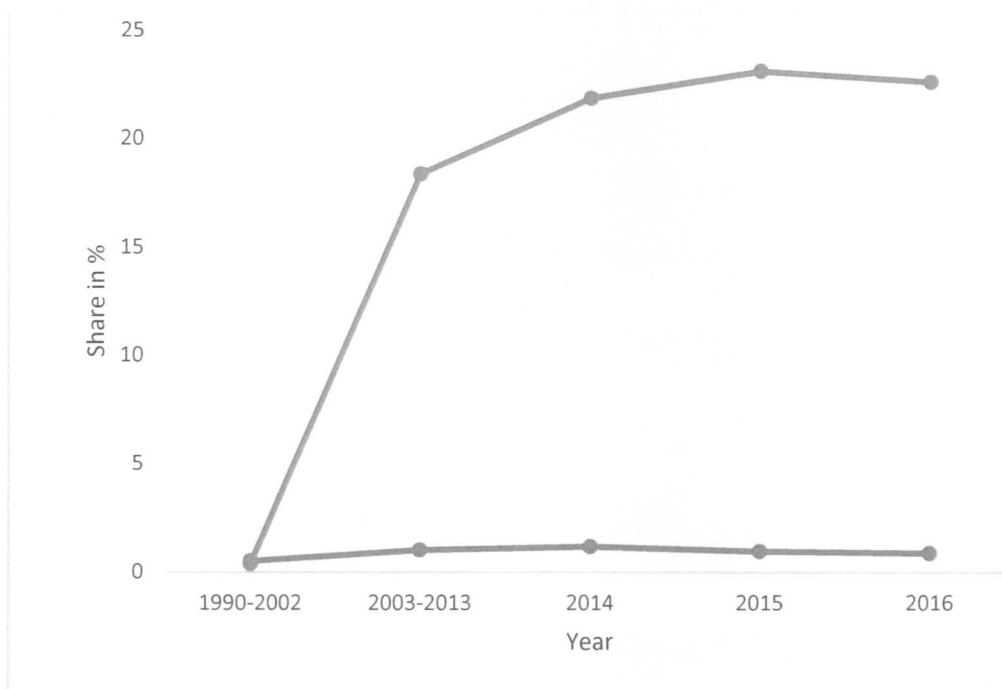


Source: Paudel (2014)

While the distance to the nearest ports in most of the developing landlocked countries is very high. For example, Kazakhstan has the longest distance from the sea (3,750 km). There are more than 5 other landlocked countries having distance from the nearest seaport is more than 5,000 km. This stipulates transit time for goods of landlocked countries very long, mainly because of long-distance to seaports as well as the condition of the roads, geographical complexities and inefficient transit system of the transit countries. In figure 3, the average distance to the deep-water port in Eastern Europe and Central Asian countries is more than 2,5000 kilometers. The standard deviation in the same category is also high implying that some countries are very close to seaports while some are too far. Latin American countries have the shortest distance to seaports. They have low standard deviation too. That means, most of the countries in the region are in the proximity to deep-water seaports. It is also because of the geographical structure of the region. The Latin American region is long stretched from north to south unlike the continents of Asia and Africa.



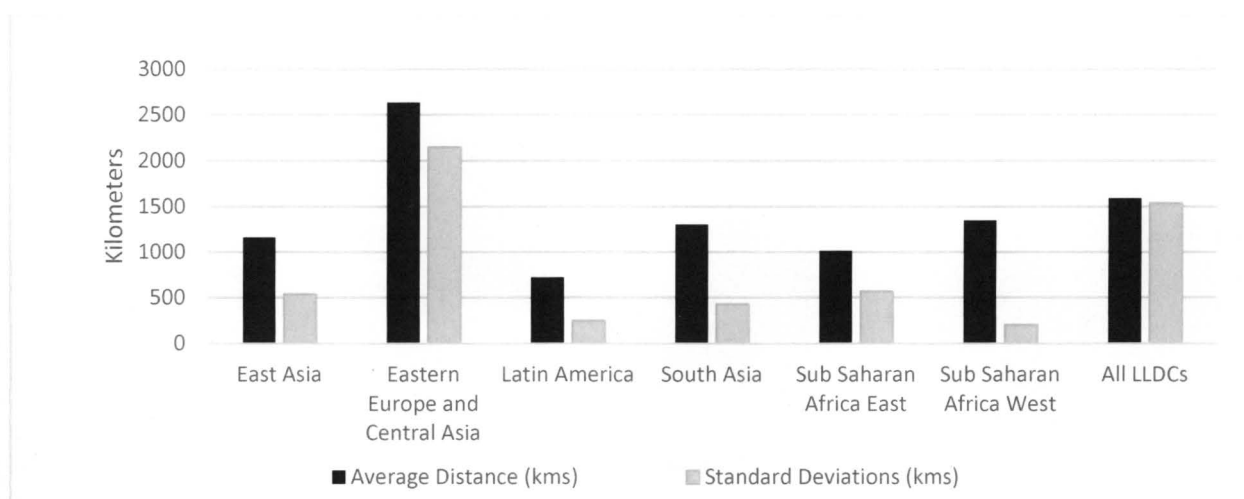
**Figure 1.2: Share of merchandise exports on global trade**



Source: UNCTAD (2016)

According to an estimate of UN-OHRLLS (2017), total merchandise exports from LLDCs declined dramatically in 2015, by 30%, to US\$ 160 billion. On the other hand, total exports concentration ratio for LLDCs was 0.28 in 2015, evidence of greater export product concentration than their transit neighbors and developed countries. In Figure 1, it is evident that until 2002, the share of merchandise exports of both landlocked and transit economies was the same at meager less than a half percentage point. But within a decade, the share of transit countries dramatically reached to whopping 18% while the landlocked countries could hardly surpass 1%. Until 2016, the share of transit countries is around 22% while the share of landlocked countries is struggling to rise above meager 1%.

**Figure 1.3: Average distance to a deep-water port from LLDCS from each region**



Source: UN-OHRLLS (2017)

### 1.3 Infrastructures in the landlocked countries

Landlocked countries are disadvantaged in international trade because they have high cost and poor quality of transport and logistics services, regular delays for moving cargo in and out of ports in transit countries and clearing cargos from the ports. Therefore, improving infrastructures in landlocked countries means improving the quality of roads, investing in the corridor approach on a long-term basis. And, above all, road transport is the most dominant mode of transport, as most trade traffic moves by road at some point. As roads provide the main connectivity to landlocked countries, it has been felt to be the most important infrastructures among others. It is so because a huge chunk of exported goods is transported through roadways. Therefore, the cost of export heavily depends on the quality of roads and how long it takes to reach the seaports. According to an estimate by UN-OHRLLS, the average cost to export one container from an LLDC was US\$ 3,444 and US\$4,344 to import. While it was US\$ 1,301 to export and US\$ 1,559

to import. On the other hand, the estimated average time that LLDC take to import goods has decreased from 57 days in 2006 to 49 days in 2014 and to export from 48 to 41 days, that is still almost twice the time taken by transit countries (UN-OHRLLS, 2017).

Continuing the same source, only one-third of roads in LLDCs are paved, with only five countries having greater than 50% of their roads paved. And, access to electricity in LLDCS was 55% of the total population while 9 countries having access rate lower than 20%.

One of the reasons why landlocked developing countries are performing poorly in the trade maybe also because of the poor infrastructural development within the country. Given the low population density and geographical complexities of the LLDCs, it is relatively expensive to develop infrastructures and run service delivery mechanism swiftly and smoothly. Therefore, the relevant infrastructure, given the same population, will cover a larger surface area compared with a neighboring transit country.

Given the inadequacy of growth generating infrastructures, the living standard of people in LLDCs have relatively worsened off than that of living in the transit countries. For instance, coastal developing countries have more than three times the stock of paved roads than that of their landlocked counterparts have.

Apart from physical infrastructures, non-physical infrastructures are also posing problems in landlocked developing countries. Such non-physical infrastructures involve border crossing and customs procedures, documentation requirements, quarantines, and costly bank transactions. The situation is aggravated when the LLDCs imports must cross through multiple cross-national borders. According to one estimate of the World Bank, the cost of customs procedures and transport account for the single greatest cost in external trade and higher than the import tariffs imposed by developed countries on LLDCs goods. Continuing the same estimate, red tape, another important institutional but non-physical infrastructure, accounts for 10 percent of the value of exports in developing countries. Furthermore, unlike the transit developing countries, LLDCs experience an additional 22.9 days for imports and 28.6 additional days for goods to be exported.

Similarly, figure 1.2 shows that the landlocked countries are more dependent on trade than their transit countries. The dependence on the trade of transit countries is the least among all the categories presented in the table below. The case of South Asia is mentioned worthy here. The landlocked countries in this region are highly dependent on imports compared to exports. It implies the fact that the “landlockedness”, in this region, has badly hurt the terms of the trade too. On the other hand, this also implies that how a big transit country having a large economy will have adverse effects on peripheral landlocked countries. India has been the main transit country for most landlocked countries in South Asia. India sets a good example of how institutional, political and cultural factors within transit country have adverse effects on terms of trade of the peripheral landlocked countries.

**Table 1.2: Trade dependences of LLDCs and transit countries**

Region	Import % OF GDP	Export % OF GDP	Trade % OF GDP
East Asia	32	30	61
Eastern Europe & Central Asia	18	19	37
Latin America	29	29	58
South Asia	42	5	47
Sub-Saharan Africa East	26	15	41
Sub-Saharan Africa West	20	10	30
All LLDCs	23	17	40
Transit countries	18	19	37
Global	21	21	42

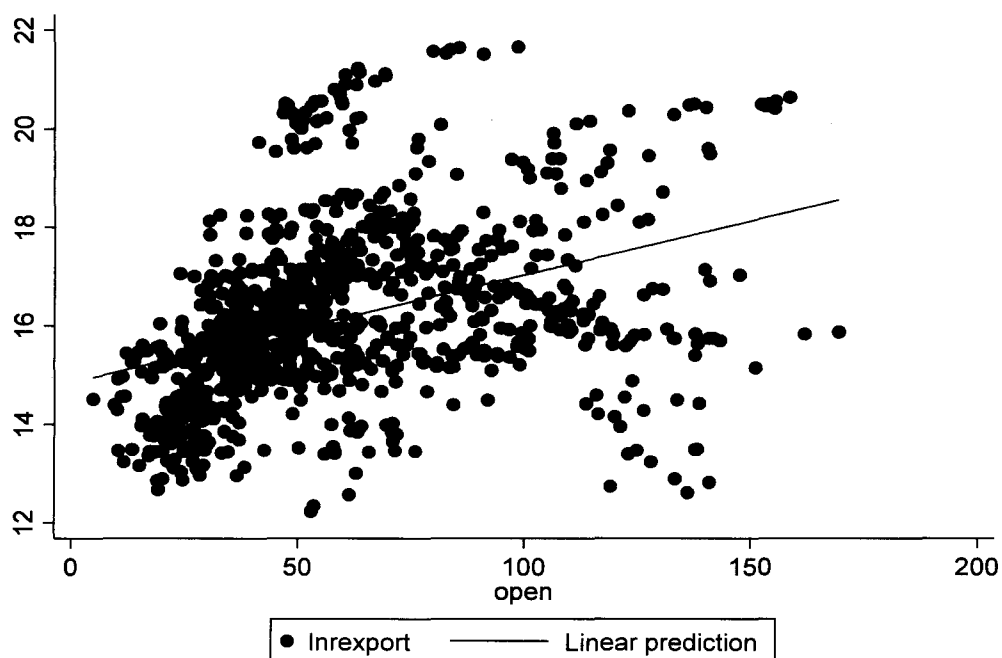
Source: UNO-HRLLS (2017)

#### **1.4 Trade openness and export performance of landlocked countries**

The idea that openness is one of the most important determinants of economic growth is earning coins in among governments of developing countries. A cursory observation shows that more outward-oriented economies with few restrictions on international trades have experienced better economic performance than inward-oriented economies with high tariff walls and strict controls of capital movements. In their theoretical models, Grossman and Helpman (1991) show that trade openness improves the transfer of new technologies, facilitating technological progress and productivity improvement and that these benefits depend on the degree of economic openness. This consensus rests on the assumption that trade creates economic incentives that boost

productivity through two dynamics: in the short-run, trade reduces resource use misallocation; in the long run, it facilitates the transfer of technological development (Zahonogo, 2016).

**Figure 1.4: Relationship between openness (% share of total trades on GDP) and real export in LLDCs**



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

In figure 1.4, there is a clear positive relationship between openness and real export. The observations are clustered around the level of openness (measured in terms of share of total trade on GDP) is between 30 to 60 percent. Beyond 60%, the observations are somewhat scattered implying two-sided extremes of the economies.

The implication of openness on economic growth in landlocked is not different in the case of landlocked countries as well. Various studies show that openness is equally important for the enhancement of trade in landlocked and coastal economies alike.

Alesina et. al (2005) consider trade openness as a shifting factor of the trade-off between the costs and benefits of size. As international markets become more open, the benefits of size decline relative to the costs of heterogeneity, thus the optimal size of a country declines with trade openness. In other words, as they argue, small and relatively more homogeneous countries can prosper in a world of free trade. With trade restrictions, instead, heterogeneous individuals must share a larger polity to be economically viable. Incidentally, above and beyond the income effect, this may reduce their utility if preference homogeneity is valued in a polity. Poor regions would like to join rich regions to maintain redistributive flows, while richer regions may prefer to be alone.

### **1.5 External trade and neighborhood effect**

The motivation behind writing this section is the response to the most obvious question: If landlocked thwarted the growth potentials of some of the developing countries, then, how could Switzerland prosper? Why is Uganda poor and Switzerland rich? As Collier (2007) argues, it is indeed partly that Switzerland access to the sea depends upon German and Italian infrastructures, whereas Uganda's access to the sea depends upon Kenyan infrastructures. He further argues, if a

country with poor transport links to the coast that are beyond the control, it is very difficult to integrate into global market for many products that require a lot of transport, therefore, these landlocked countries are left with no option other than forget about manufacturing—which to date has been the most reliable driver of rapid economic development.

On the other hand, neighboring countries do not necessarily always serve as a transit country.

They could be the market. But how a poor neighbor poses a problem to this end?

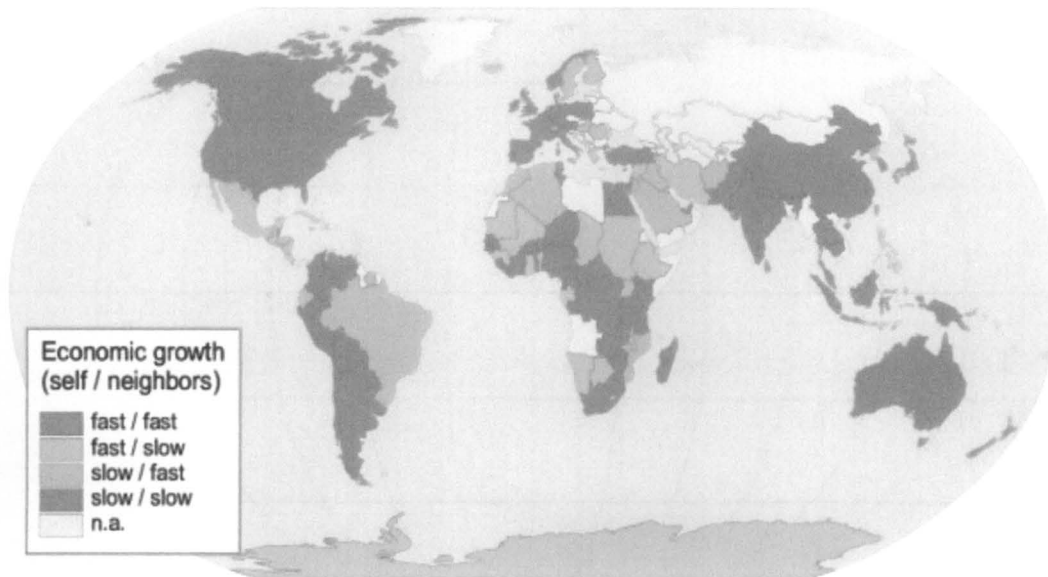
Continuing earlier example, Switzerland has its neighbor as Italy and Germany, one of the most industrialized and prosperous countries in the world. Unfortunately, some neighbors are better as markets than others. Uganda has Kenya, which has been stagnant for nearly three decades, Sudan which has been embroiled in Civil War; Rwanda, which had a genocide; Somalia, which completely collapsed; D. R. Congo, a rather catastrophic history; and finally, Tanzania, which invaded Congo.

To investigate how landlocked economies grow and how their growth is affected by the growth of the neighbor, Collier and O'Connell (2000) found that whether being landlocked mattered at all depended upon what other opportunities were open to the country. According to their research, if the country had a large natural resource surplus, that, rather than whether it was landlocked, became its defining feature. That is why Botswana could benefit enormously from its resources. They further argue as natural resources are usually so valuable that they can be exported despite the higher transport cost associated with being landlocked. Indeed, resource-rich landlocked countries at least have something optimistic to start with in comparison to resource-scarce counterparts. That is what Botswana did. Their study estimated that globally the



landlocked, resource-scarce economies indeed are more dependent than other economies on the growth of their neighbors: from the OLS results, whereas the typical growth spillover of an additional one percentage point on the growth rate of neighbors is 0.4 percentage points, for the landlocked, resource-scarce it is 0.7 percentage points (Collier & O'Connell, 2000). But, this was not the case in Africa because, on their assessment, the region's domestic barriers to trade was substantially high that may include poor trade policy and high transportation cost to benefit from the growth spillover of the neighboring country. The spillover growth for African landlocked countries is 0.2 compared to non-African landlocked countries for 1 percent growth of the neighbor. In Figure 5, which ranges 1990-1995, shows several clusters of countries which shared fast growth relative to the sample mean. Notably, these countries are associated with each other by some formal or informal integration. A closer look at the African region shows that Sub-Saharan Africa has more of a patchwork appearance with notable incidences of fast-growing countries sharing regional trade agreements with slow-growing countries. There is a noteworthy implication of this tendency. It implies a greater propensity of growth rates across Sub-Saharan African countries to be independent of each other than in other major parts of the world or across the group of advanced industrialized as a whole. It implies that Sub-Saharan African countries are characterized by the relative absence of growth spillover because of poor integration and infrastructures.

**Figure 1.5: Moran scatterplot map (Economic growth: the average annual logarithmic growth rate of real GDP per capita growth rate, 1990-1995; neighborhood definition: belonging to the same RTA)**



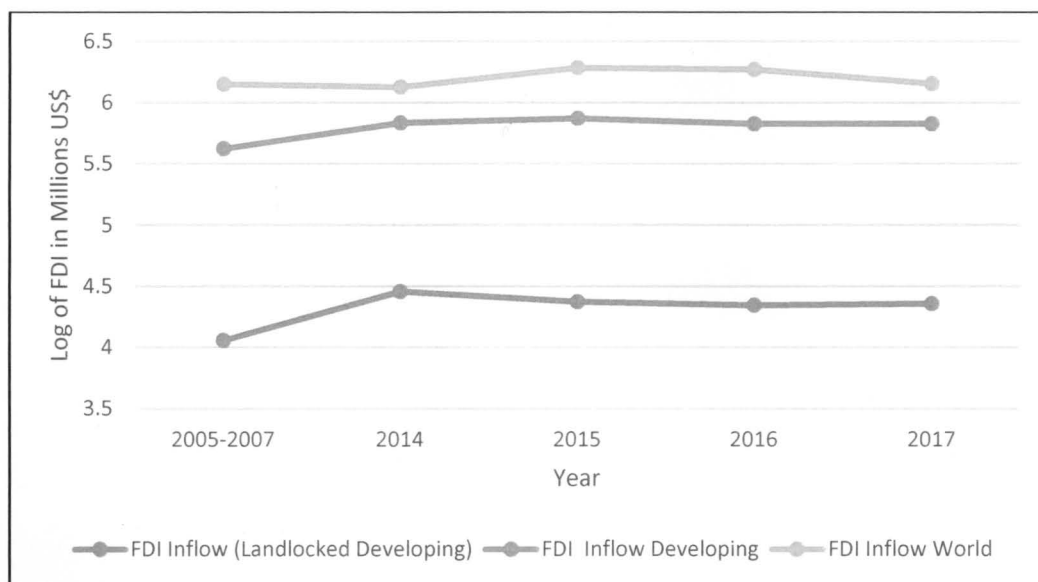
Source: Roberts, M., & Deichmann, U. (2009). *International growth spillovers, geography, and infrastructure*. The World Bank.

### **1.6 Foreign Direct Investment in Landlocked Countries**

Landlocked countries need foreign investments than any other geographical groupings. However, most landlocked developing countries (LLDCs) have failed to attract FDI on a enough scale to offset poor local factor endowment and accelerate economic development with capital imports (UNCTAD, 2009). Various studies have shown that economic stagnation and poverty in most of the landlocked developing countries are a cause of low or negligible inflows of FDI. They include: lack of direct territorial access to the sea is the single most formidable obstacle to FDI inflows. And, it is compounded by the economic, social and institutional realities in these economies. Some LLDCs are small, with a narrow resource base and a small domestic market. In

the absence of critical size, they suffer from diseconomies of scale on both the supply and demand sides. These characteristics make them less attractive for various types of FDI, particularly for FDI that is dependent on trade (UNCTAD,2003).

**Figure 1.6: Inflow of foreign direct investment (in Millions of US\$) between LLDCs and non-LLDCs**



Source: UNCTAD (2018)

There are some others which cannot be ignored include small domestic market, lack of incentives to the investors, shortage of skilled labor, weak institutional capacity for the formulation and implementation of economic policies, and the lack of basic infrastructures.

In figure 1.6, the FDI in the landlocked developing countries is in a declining trend. A closer look at the trend line of landlocked countries as well as developing countries, in general, indicate that investment inflows in both the groupings of the countries have similar trend pattern. The investment surged past 2007 but remained stagnant thereafter.

Provided that “landlockedness” imposes a severe geographical disadvantage. It is still not clear that being landlocked poses a enough condition for deterring FDI. Some of the highest attractors of FDI are landlocked countries (Austria, the Czech Republic, Hungary, Slovakia, and Switzerland). These landlocked countries have successfully overcome the “quagmire of geography” by developing strength in economic activities that are not sensitive to distance from the sea.

## **CHAPTER: TWO**

### **REVIEW OF LITERATURE**

The landlocked aspect of economic growth has long been neglected from the literature of development economics in general and economic growth, in particular. Studies, however, have shown that “landlockedness” has a significant and negative impact on achieving economic growth through trade. Coastal economies flourished in export business and eventually boosted up overall economic growth of the country. Low transportation cost and exempt from trans-border anomalies have been few, among others, conducive to trade, historically.

Landlocked countries, on the other hand, are lagged mainly because of the inadequate trade facilities. The most important has been the access to sea route. And, transit through the third country has always been a cumbersome phenomenon for most of the landlocked developing countries. Non-tariff barriers, bureaucratic anomalies and poor infrastructures at the transits, unnecessary quarantine of the perishable goods, and abrupt enforcement of the new regulations are few among many other barriers for international trade.

Using structural gravity model, Moore (2018) estimates that there is a substantial “landlocked penalty”, with landlocked countries on average exporting 27-41% less than non-landlocked countries over 2005-2014, other things remaining the same. He further demonstrated that the chunk of such penalty was primarily driven by developing countries. It was more than 40% in developing countries.

Most of the literature highlights the fact that landlocked countries are facing significant hindrances in trans-border trades. They have weaker institutions, according to a recent paper by Fabrizio Carmignani of Griffith University, Australia, the flow of the people and ideas that brought innovation to maritime countries largely bypassed landlocked ones. He calculates that Bolivia's GDP would be a fifth higher if it had kept its access to the sea.

In the view of current trends toward reduction in maritime transport costs and the development of more advanced logistics to compensate for the limitations of intercontinental distance, lack of direct sea access presents growing challenges to the global integration and growth prospects of many landlocked developing countries (World Bank, 2010). Their most obvious handicap is in moving goods to and from ports. International treaties promise access to the oceans, but responsibility for implementing them lies with the governments to transit states. They have little incentives to build infrastructure that would mainly help their neighbors.

Faye (2004) finds that landlocked countries not only face the challenge of distance, but also the challenges that result from dependence on passage through a sovereign transit country, one through which trade from a landlocked country must pass to access international shipping markets. The study also finds that the landlocked countries have 9% higher ratio of export and insurance cost to the actual value of the exports compared to its maritime neighbors.

MacKeller (2000) gives a neoclassical approach to the "landlockedness" and its impact on economic growth. The approach considers "landlockedness" causes a rise in the price of imports

and reducing the price of exports, eventually hurting terms of trade resulting reduction on real income.

Gallup, Sachs, and Mellinger (1998) and MacKellar, Wörz and Wörgötter (2000) come up with the conclusion that landlocked countries have lower output growth rates mainly because of the negative effect of “landlockedness” on the volume of international trade. On the other hand, if there are “learning by doing” externalities, leading comparative advantage to be endogenous, the reduction in a trade that results from being landlocked may keep such countries in a “low equilibrium trap”.

Gallup, Sachs, and Mellinger (1998) present an AK type model with transport costs included and developing countries import capital goods and its relative price is a function of transport costs. With this model, the growth rate of the economy is inversely affected by transport costs, and these reduce economic growth by making imported capital goods more expensive. Thus, in their view, the higher transport costs faced by landlocked countries may reduce growth by reducing investment, even if this investment is intended to serve the domestic market.

In this connection, a United Nations report on landlocked countries is informative to understand why the attention of growth economics should be turned towards geographical dimensions rather than some stylized factors such as factors accumulation and technological progress only. If that was the case, then why the developing countries did not import the technologies and became rich thereof? No doubt, geographic and many factors come into play to determine the level of economic growth any country can achieve (UN-OHRLLS, 2013).

Paudel (2014) finds that “landlockedness” hampers economic growth, especially among the developing countries. However, the magnitude of the negative impact is sensitive to alternative estimation methods. There is evidence that a good governance system and policy initiation of trade reform can help to lower the negative impact of the constraint imposed by “landlockedness”. However, these countries are still disadvantaged relative to countries with similar policies. Openness is positively associated with economic growth in landlocked countries, suggesting that more openness to foreign trade could enhance the growth prospects of these countries.

Furthermore, the economic development of neighbor countries is one of the major determinants of economic growth in landlocked developing countries. However, the evidence found on the role of physical market access in the economic growth of these landlocked countries is not strong. This suggests that market size in neighbors is a more important issue than that of physical market access (Paudel, 2014).

Even though the impact of trade facilitation on the trade has been sufficiently highlighted by previous authors, very little has been written on the impact of “landlockedness” on the trade. Therefore, the literatures in question are scantily available for comparison. One thing is common among the empirical papers reviewed is the use of the gravity-based methodology to estimate the impact of trade facilities on trade. Wilson, Mann, and Otsuki (2003) using four indicators (port efficiency, custom environment, regulatory environment, and e-business) pioneered to evaluate the impact of trade facilities on bilateral trade flows in the Asia Pacific region. The findings



revealed that intra-Apec trade could rise by 21% if member countries below average improved their performance halfway to an average of all other member countries. Hoekman and Nicita (2011) evaluate the impact of various costs on international trade. A reduction in import cost by 10% could raise the imports by 5 % while exports by almost 5%. The study concludes that trade facilitation would generate a larger payoff. Persson (2013), on the other hand, estimates that if transaction cost reduced by 1 %, the number of differentiated goods would increase by 0.6% and homogeneous goods would rise by 0.3%.

The issue of trade facilitation becomes even crucial for landlocked countries. A study by Stone (2001) estimated that out of 30 landlocked countries, 18 have transport cost higher than import trade value. Similarly, in Africa, 7 countries out of 15 transportation cost exceeding 20%.

Another important finding by Limao and Venebles (1999) estimate that the median landlocked country has transport cost 58% higher than the median coastal economy. These costs can be attributed to non-tariff barriers such as administrative delays, inefficient and corrupted bureaucracy and discriminative regulations.

Raballand (2003), Carrere and Grigoriou (2008), have consensus over the fact that bilateral trade flows are highly affected by the infrastructures of transit country as well as the domestic country. Christ and Ferrantino (2011) argue that inland costs have the largest share of the four categories of costs (inland transportation, port costs, customs, and related costs) for the landlocked countries. Shephard and Wilson (2009) suggest that improving port facilities could expand trade by up to 7.5% which is equivalent to 22 billion dollars in the ASEAN member countries.

Accordingly, Hummels (2001), Djankov, Freund, and Pham (2006) estimate that a 10% cut in such delays can expand exports by about 4%. This effect is magnified in the case of landlocked countries. The estimate of Freund and Nadia (2011) suggests that inland transit delay of one day reduces exports on an average of 7%. Another estimate by Raballand and Macchi (2008a) reckons that transportation cost for most of the landlocked African landlocked countries ranges from 15-20 percent of import costs—threefold that of the developed countries.

Radelet et al. (1998) find a strong relationship between shipping costs and economic growth, after controlling for the ten other variables. The estimated coefficient is highly significant and remains so across alternative specifications. The results imply that doubling shipping costs (e.g., from an 8% to 16% cif band) is associated with slower annual growth of slightly more than one-half of one percentage point. All else being equal, a landlocked country with shipping costs 50% higher than a similar coastal economy could expect slower growth of about 0.3 percentage points per year. Another estimate (Basnet, 2017) reckons that the output of the landlocked countries is reduced by 36% than no-landlocked nations but the distance does not support the level of statistical significance.

The holdup dimension of the trade for the landlocked countries is highlighted by Friberg et al. (2009) as the landlocked country is subject to a holdup problem - after an investment has been made, the transit country will be tempted to extract all the rents it can from the landlocked country. Foreseeing this we are less likely to see technology investments in the landlocked country. Furthermore, the result suggests that physical geography (“landlockedness”) is an

obstacle which is estimated approximately one-third amount for the economic growth and development. It supports the "geography matters completely hypothesis"(Basnet, 2017).

## **CHAPTER: THREE**

### **METHODOLOGY AND DATA**

This chapter develops an empirical model to understand whether “landlockedness” hampers exporting performance of the landlocked developing countries. The method is discussed in a sequence of steps that will be followed in the next chapter which explains the properties of data and to conclude and interpret them accordingly.

#### **3.1 The model**

The rationale behind this study is to examine whether landlocked countries are disadvantaged when it comes to exporting performance only because of “landlockedness” or there are other factors that have an impact on the poor performance of landlocked developing countries. To examine the impact of landlocked on exporting performance, several control variables have been used. They include the level of development, regional dummies such as Africa, and whether the country is oil-exporting and others. The present paper intends to roughly follow Radelet, S., & Sachs, J. D. (1998). They estimate the shipping cost against distance to nearest sea, landlockedness (dummy variable) and GDP on PPP. In another model they estimate the weighted average growth rate of non-primary export of developing economies against openness, institutional performance, shipping cost, prevalence of primary products on total exports and coastal area compared to total area of the country concerned. For this end, they sample 43 developing countries between 1965 and 1990.

I intend to extend this model to include various economic variables, regional dummies, and control variables to capture the heterogeneities among countries. My model intends to assess the total exports of both developing as well as developed economies. I employ a panel data model. It covers 104 countries for the period of 35 years ranging from 1983 to 2017. The econometric model can be presented as:

$$\begin{aligned} \ln(X_{it}) = & \alpha + \gamma_t + \beta_1 Llock + \beta_2 (OPEN_{it}) + \beta_3 \ln(PartGDP_{it}) + \beta_4 \ln(DIS_i) + \beta_5 \ln(DEV_i) \\ & + \beta_6 (FDI_{it}) + \beta_7 (INDVA_{it}) + \beta_8 (AFRICA_i) + \beta_9 (Oil_i) + \varepsilon_{it}. \end{aligned}$$

Where,

$\ln$  denotes to the natural logarithm, subscripts  $i$  and  $t$  refer to the exports in the year  $t$ .

The variables are listed below with their details and the postulated sign of regression coefficient for the explanatory variables in brackets.

$\ln(X_{it})$	Natural log of Real exports, the dependent variable of $ith$ country in year $t$ .
$Llock$	Landlocked, binary dummy (-) (Ariekot, 2017)
$OPEN$	Openness measured by share of trade on GDP
$DIS$	Distance between the capital city and the nearest port of the landlocked country (-)
$PRGDP$	GDP of the largest trade exporters and partner (+)
$AFRICA$	If the country is in Africa, binary dummy (-)

<i>DEV</i>	Level of development, binary: 1 if the country is developed; 0 otherwise.
<i>OIL</i>	Oil exporting country; binary dummy variable. (+)
<i>FDI</i>	Foreign direct investment received by the country
<i>INDVA</i>	Industrial value-added % of GDP
$\gamma_t$	Time trend (+)

The last term of the equation is the error term. The error component structure is presented in the equation below:

$$\varepsilon_{it} = \mu_{it} + \theta_t + v_{it}$$

where  $\mu_{it}$  is a fixed effect that might be correlated with explanatory variables in equation (2.2),  $\theta_t$  captures the time-specific effects common to all cross-section units, and  $v_{it}$  is error term uncorrelated across cross-section units and overtime periods.

### **3.2 Explanatory variables**

#### **Real exports**

Nominal exports have been converted into real exports by deflating them with the annual US import price index for the base year of 2000. That means the year 2000 = 100

#### **Distance**

Distance is measured in kilometers and shows the distance between the biggest city of the country concerned to the nearest seaport. This variable is only applied for the subsample of

landlocked countries. I intend to examine whether distance to seaport matters to the landlocked countries.

### **Landlocked**

Landlockedness, on the other hand, is a binary variable. If the country concerned is landlocked, then, 1; otherwise 0. This is the main variable of interest. “Landlockedness” is expected to have a negative impact on exporting performance of the countries.

### **Openness**

Trade reform (OPEN) is measured by the share of trade on GDP as it helps to compare the level of openness of a country in terms of international trade and a positive sign is expected.

Interconnectedness among economies has been commonplace in the present day. Developing countries are often cited as a poor reformer, and not trading friendly. This variable is expected to capture this dimension of the developing countries. The higher the level of openness, the higher will be the export performance.

### **Africa**

Africa has been considered as a special case, therefore, assigned a regional dummy. There are concerns among development economists that Africa is unusual in many respects such as economic growth, climate, economic geography, and trade. Given the various studies, I want to examine in what ways (if any) Africa is different in terms of exporting performance.

### **Level of development**

Different levels of development have different capacity to trade. Developed countries are well-equipped to compete in the international market because they have better policies; better institutions and governance. Therefore, when it comes to examining the relationship between “landlockedness” and exporting performance, it is necessary to control for developed countries. I use a binary dummy for this variable and examine whether the level of development has a significant impact of exporting performance of the landlocked countries given the fact that the country concerned is landlocked in nature.

### **Oil**

The oil-exporting countries are different from other developing countries in the sense that the majority of their exports comprise of oil. On the other hand, the export of oil products depends on geography and does not really explain the role of policies taken by the country and very few countries export oils in developing the category. Therefore, I intend to examine the impact of the level of development and or “landlockedness” for oil-exporting and non-oil exporting countries separately.

### **Foreign direct investment**

The main constraint of the developing countries, landlocked and coastal alike, is the inadequacy of financial resources to propel economic growth. The stylized fact of a vicious circle has been low income-low savings-low investment-low capital formation-low employment opportunities-low income. To break this vicious circle of poverty, foreign direct investment has been boon to many developing countries. But all the developing countries cannot attract foreign investments



alike. And, on the other hand, these investments impact economies differently. I use FDI as a control variable to examine the significance of foreign direct investment in developing countries in general and landlocked developing countries, in particular.

### **Industrial value added**

Exporting capacity also relies on the production capacity of the country. When there is a good environment for production, then, it will make its way to export, provided transit-related hurdles.

### **Time trend**

Most of the economic variables have trends. They increase or decrease over time. Such trends have adverse effects on the estimation and, hence, the results are not reliable. Taking lag on of the most adopted remedies to get rid of such trends. But, when we take a lag, we lose the valuable information underlying the variable. Therefore, in order to, retain the information of the variable and to control for the trend, I introduce the time trend which will capture the trends of the variable.

### **Econometric estimation**

I will be using Pooled Ordinary Least Square (POLS) regression methods followed by Fixed Effect (FE) and Random Effect (RE) models. I will carry out the Hausman Test to check whether Fixed Effect or Random Effect is appropriate for the model. I will carry out several diagnostic tests to qualify for an error-robust model.

## **CHAPTER: FOUR**

### **EMPIRICAL RESULTS AND ANALYSIS**

First, the model is estimated on a global sample. That means, all landlocked, or ones having access to the sea, developed underdeveloped, African and non-African countries are taken into considerations. Then, the regression is estimated on restricting the sample on landlocked countries, African countries, underdeveloped countries respectively. Table A.2 shows the results of the regression model on the global sample. The Hausman test confirms that random effect (RE) can better estimate the result. Therefore, all the regression results are under the random effect model. The regression results are presented in a single table and separated by column in terms of geographical regions.

#### **4.1 Global sample**

As shown on the column 2 of table A2, the estimation result for “landlockedness” is, as expected, negative and significant. That means “landlockedness” has a substantial impact on exporting performance of landlocked countries. The “landlockedness” coefficient on the column 2 is -1.144. That means, access to the sea of the landlocked countries would have increased the exports by around 100%. That means, the exports would have doubled if the landlocked countries had access to the sea, other factors remaining the same. The coefficient for openness does not turn substantial. One percentage point increment in openness (measured in the share of trade on GDP) will increase the exports by 0.6 %.

## **4.2 Landlocked countries sample**

Within the subsample of landlocked countries, who they trade with has an important implication on exporting performance. If the landlocked countries trade with the countries having larger GDP, their exporting performance will be increased. Estimation results on column 3 shows that 1% increment on partner's GDP will increase the real exports of landlocked countries by 0.06%. Similarly, the role of trade openness on real exports among the landlocked countries remain almost the same under the subsample of landlocked countries as well. But the magnitude of the foreign direct investment turned out to be smaller than expected. One percentage increment in FDI contributed only 0.05% increment in real export, other things remaining the same.

## **4.3 African countries sample**

As shown on the column 4 of table A2, the magnitude and the direction of the parameter of interest, "landlockedness", which is -1.14 is highly negative and significant, as expected. The result shows the exports of the landlocked African countries would have been twice the current exports. This implies the fact that economic integration among landlocked African countries is urgent compared to landlocked countries of other regions. Like other categories of the results discussed earlier, the magnitude of the coefficient for the openness does not turn convincing. That means, one percentage point increment in openness, measured in terms of the share of total trades on GDP, will lead to 0.55% increment in exports of the landlocked countries of this region. So is the case of foreign direct investment. The result shows, one percentage increment in FDI results in 0.065% increment in real exports.

#### **4.4 Underdeveloped countries sample**

The findings under underdeveloped countries sample are somewhat like that of African countries sample. One reason for this may be the fact that most of the African countries are underdeveloped. The regression results report that coefficient of main variable of interest “landlockedness” is -1.12. It means, if the country’s exports would have double if the countries were not landlocked. The magnitude of the coefficient for openness is higher than other categories of the results discussed earlier. But this is still not convincing. One percentage point increment in openness will boost the exports of underdeveloped countries under the sample by 0.62%.

## **CHAPTER: FIVE**

### **CONCLUSION AND POLICY RECOMMENDATIONS**

The present research intends to find whether “landlockedness” has any impact on the exporting capacity of the landlocked countries. To meet that end, I carry out a panel data analysis of 104 countries including 30 landlocked countries. The Hausman test validates the random effect as an appropriate estimation strategy given the structure of the data and research questions in hand. A dummy variable is employed to capture the “landlockedness” and its impact on exporting performance of those countries. The variables openness and foreign direct investments are used to capture the economic health of the countries, other than penalized of being landlocked. Regional dummy for Africa is to assess the impact in the region.

In nutshell, the main finding of the present research is the fact that “landlockedness” has a substantially adverse impact on the trading capability of the landlocked countries, as expected. The impact of openness and foreign direct investment do not turn convincing. The incidence of “landlockedness” is the highest in Africa among the geographical categories discussed in the research. Therefore, the African landlocked countries should be even more concerned about the economic integration among countries to ensure free transit of their goods to their trading partners.

The major policy inference from this study is that even though landlockedness is a constraint, landlocked developing countries can improve their export level by creating a more export-

friendly environment within the country and active roles of policymakers in economic integration of the landlocked countries.

## Appendix

### A.1: Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
year	3,639	1999.995	10.09835	1983	2017
country	0				
export	0				
index	3,630	105.0158	19.13997	76.175	141.0083
rexport	3,502	5.47e+08	1.53e+09	63257.78	1.84e+10
llocked	3,638	.2886201	.4531832	0	1
lopen	3,392	57.70483	40.24106	4.909436	986.6469
distance	1,052	1348.864	835.7601	78	3209
partgdp	3,597	2.74e+12	4.60e+12	272.7497	1.73e+13
africa	3,639	.2981588	.4575125	0	1
refactend	0				
RegTrAgr	0				
dev	3,638	.1242441	.3299052	0	1
oil	3,639	.4424292	.4967428	0	1
FDI	3,415	6.53e+09	2.81e+10	-2.99e+10	5.09e+11
indva	3,228	29.2275	13.57914	1.882058	213.6904
Country	3,639	52.50921	30.02394	1	104
lnexport	3,502	17.90017	2.326217	11.05497	23.63344
lnopen	3,392	3.899971	.5497523	1.591159	6.894312
lnpartgdp	3,597	19.95782	9.632885	5.608555	30.48202
lnfdi	3,186	19.89295	2.827383	2.302585	26.95588
landdev	3,637	.0096233	.0976388	0	1
dev2	3,638	.1242441	.3299052	0	1
yhat	2,923	17.10389	1.24303	12.18834	19.84198
yhat2	2,923	294.0875	42.12262	148.5556	393.704
yhat3	2,923	5082.327	1077.56	1810.645	7811.866
yhat4	2,923	88261.18	24651.77	22068.76	155002.9
t	3,639	17.99533	10.09835	1	35
lnexport1	3,531	17.90077	2.289213	11.97289	23.59129
_est_fe	3,639	.8032426	.397602	0	1
_est_re	3,639	.8032426	.397602	0	1

## A2: Regression output

(1) Variables	(2) Global	(3) Landlocked	(4) Africa	(5) Underdeveloped
t	0.0501*** (45.67)	0.0489*** (22.16)	0.0443 (20.95)	0.0524*** (43.85)
lnpartgdp	0.00888 (0.98)	0.0635*** (3.77)		-0.00726 (-0.78)
lnopen	0.600*** (22.11)	0.578*** (9.13)	0.550*** (10.20)	0.622*** (21.76)
lnfdi	0.0636*** (11.17)	0.0550*** (5.31)	0.0648*** (6.27)	0.0602*** (9.77)
africa	-1.156*** (-6.20)			
dev	0.982*** (5.18)	3.712*** (4.59)		
llocked	-1.144*** (-6.28)		-1.368*** (-4.39)	-1.268*** (-6.89)
oil	1.350*** (7.52)	0.403 (0.98)	1.500*** (4.43)	1.581*** (8.39)
landdev	2.681** (3.06)			
indva	0.00605*** (5.75)	0.0290*** (9.81)	0.00698** (2.86)	0.00546*** (5.000)
constant	12.92*** (50.54)	9.667*** (21.51)	13.43*** (30.31)	12.66*** (49.34)
<b>R<sup>2</sup></b>	<b>0.63</b>	<b>0.62</b>	<b>0.64</b>	<b>0.54</b>
N	2923	803	919	2597

t statistics in parentheses

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001



### A.3: Hausman test

----- Coefficients -----				
	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
t	.0483978	.0500796	-.0016818	.0006498
lnpartgdp	.1040702	.0088798	.0951904	.0253934
lnopen	.635863	.6001168	.0357462	.
lnfdi	.0523785	.0636108	-.0112323	.
dev	-.1051349	.9818939	-1.087029	.1544607
llocked	.3132211	-1.144286	1.457507	.2959788
indva	.0054778	.0060512	-.0005734	.

b = consistent under Ho and Ha; obtained from  
 xtreg  
 B = inconsistent under Ha, efficient under Ho; obtained from  
 xtreg

Test: Ho: difference in coefficients not systematic

$\chi^2(7) = (b-B)'[(V_b-V_B)^{-1}](b-B)$   
 = 63.75  
 Prob>chi2 = 0.0000  
 (V\_b-V\_B is not positive definite)

## A.4 Correlation matrix

	lnrexp-t	t	lnpart-gdp	lnopen	lnfdi	africa	dev	blocked	oil	landdev	indva
lnrexp-t	1.0000										
t	0.2557	1.0000									
lnpart-gdp	0.2194	-0.0002	1.0000								
lnopen	0.0827	0.2453	0.0657	1.0000							
lnfdi	0.8148	0.4582	0.1685	0.1230	1.0000						
africa	-0.4687	-0.0548	-0.0910	-0.0608	-0.3877	1.0000					
dev	0.4821	0.0385	0.3361	-0.0090	0.3720	-0.2399	1.0000				
blocked	-0.4839	0.0541	-0.3746	0.0717	-0.3646	0.2363	-0.1525	1.0000			
oil	0.4683	-0.0270	0.2196	-0.0148	0.3650	-0.2352	0.1561	-0.3285	1.0000		
landdev	0.1223	0.0136	0.0902	0.0363	0.1112	-0.0654	0.2725	0.1568	-0.0842	1.0000	
indva	0.3697	-0.0093	0.0414	0.2482	0.2389	-0.2109	-0.0544	-0.1703	0.3948	-0.0153	1.0000

## **LIST OF LANDLOCKED DEVELOPING COUNTRIES**

(Africa)

Botswana, Burkina Faso, Burundi, Central African Republic, Chad, Ethiopia, Malawi, Mali, Niger, Rwanda, South Sudan, Swaziland, Uganda, Zambia, Zimbabwe

(Asia)

Afghanistan, Bhutan, Kazakhstan, Kyrgyzstan, Laos, Mongolia, Nepal, Tajikistan, Turkmenistan, Uzbekistan

(Europe)

Armenia, Azerbaijan, Macedonia, Moldova

(Latin America)

Bolivia, Paraguay

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