Extensive and Intensive Margins: An Analysis of Kenyan Exports

Tabitha Wanjiku Ngugi
071048

Submitted in partial fulfillment of the requirements for the Degree of Bachelor of Business Science in Financial Economics at Strathmore University

School of Finance and Applied Economics
Strathmore University
Nairobi, Kenya

November, 2015

DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the Research Project contains no material previously published or written by another person except where due reference is made in the Research Project itself.

Tabitha Wanjiku Ngugi ..... [*Name of Candidate*]

..... [*Signature*]

20th November 2015 ..... [*Date*]

This Research Project has been submitted for examination with my approval as the Supervisor.

Mutuoni Ngaruja ..... [*Name of Supervisor*]

..... [*Signature*]

20th November 2015 ..... [*Date*]

School of Finance and Applied Economics

Strathmore University

ABSTRACT

The study analyses Kenyan exports using fifty two commodities obtained from HS92 trade classification[1] exported to 223 export destination countries for the period 2004 to 2013. The research aims at identifying the contribution of the intensive and extensive margins on export growth by decomposing export growth along these margins. The study finds that the intensive margin contributes on average 49.8% towards export growth and the extensive margin contributes 7.2% for the period studied. Additionally, the research aims to establish the factors determining Kenya's geographical diversification. To achieve this, a logistic regression is carried out. The study finds that market size, distance from exporter and previous experience in an export destination market are important in explaining the likelihood of supplying to a particular export destination market. The findings imply that to increase geographical diversification and counteract the effects of reduced export values from its major trading partners, Kenya should lobby for new markets.

Key Words: Export Diversification, Extensive and Intensive Margins, Geographical Diversification

[1] UN COMTRADE codes trade commodities differently based on their classification. HS92 includes data on commodities from the year 1992.

Table of Contents

CHAPTER 1: INTRODUCTION 1
1.1 Background 1
1.2 Problem Statement 5
1.3 Research Objectives 5
1.4 Research Questions 5
1.5 Significance of the study 5
CHAPTER 2: LITERATURE REVIEW 7
2.1 Introduction 7
2.2 Theoretical Literature 7
2.3 Empirical Literature 9
2.3.1 Exports diversification 9
2.3.2 Extensive and Intensive Margins 10
2.4 Summary of Literature 14
CHAPTER 3: METHODOLOGY 16
3.1 Introduction 16
3.2 Research design 16
3.3 Population and sampling 16
3.4 Data collection 16
3.5 Data analysis 16
3.5.1 Decomposing export growth 16
3.5.2 Factors determining geographical diversification 18
CHAPTER 4: RESULTS AND ANALYSIS 22
4.1 Decomposition Results 22
4.2 Logistic Output 24
4.2.1 Tests of Joint Significance 26
CHAPTER 5: CONCLUSION 30
5.1 Summary and Conclusions 30
5.2 Policy Implications and Recommendations 30
5.3 Limitations of the Study and Areas of Further Research 31
REFERENCES 32
Appendix 1: Commodities 34
Appendix 2: Partners 35

List of Tables

Table 1: Kenya's trade balance and current account balance 2
Table 2: Extensive Margin Growth 22
Table 3: Export Growth 22
Table 4: Logistic Output 24
Table 5: Test of Joint Significance for Spillover Effects and Previous Experience 27
Table 6: Test of Joint Significance for Spillover Effects 28
Table 7: Test of Joint Significance for Distance, Border and Language 29

List of Figures

Figure 1: Kenyan Exports by Broad Categories 2

Abbreviations

NP – New Product

ND – New Destination

NNPNND – Not New Product Not New Destination

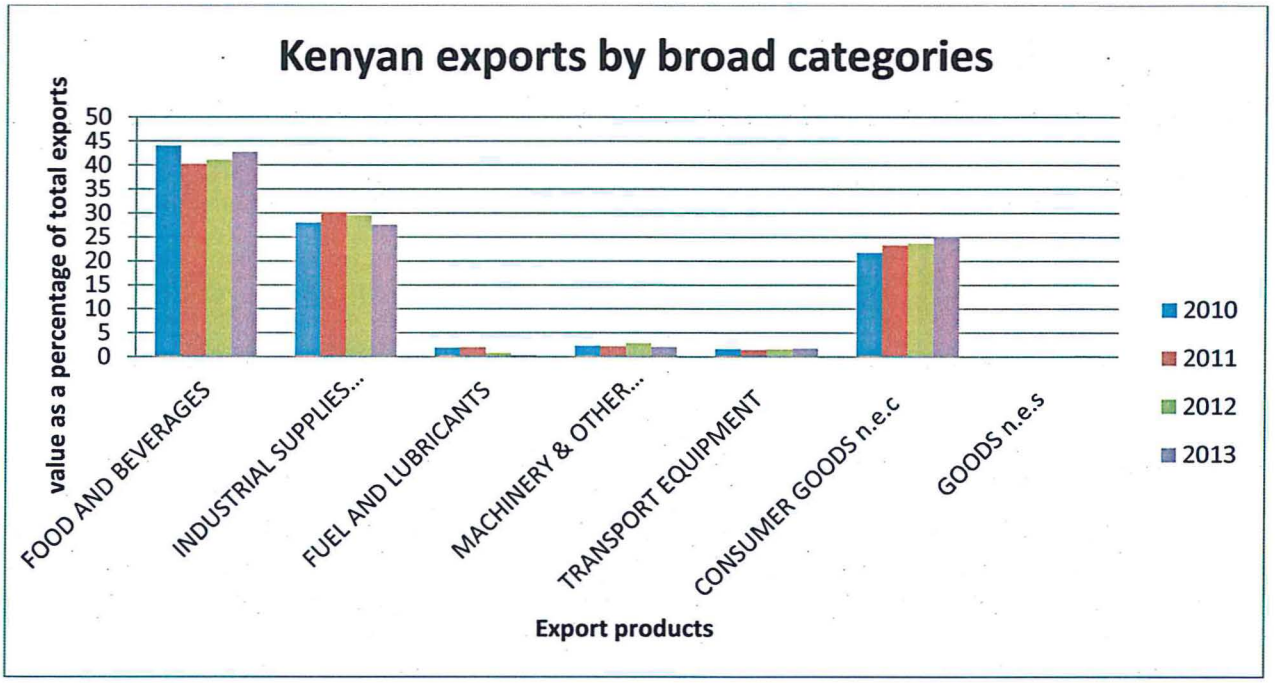
CHAPTER 1: INTRODUCTION

1.1 Background

Gross Domestic Product (GDP) is the measure of all final goods and services produced within an economy. It is the summation of consumption expenditure, government expenditure, investments spending and net exports (exports less imports). In many developing countries, domestic demand for goods is very low which makes exports one of the main channels that could contribute towards higher rates of per capita income growth of a country in the long run (Newfarmer, Shaw, & Walkenhorst, 2009). Furthermore, according to Brenton & Newfarmer (2007) in many developing countries, shifting resources towards exports has a strong impact on growth since export sectors have higher productivity and within sectors exporting firms tend to be more productive than non-exporters. Brenton & Newfarmer (2007) also stated that the 16 fastest growing economies over the 25 year period to 2005 experienced export growth that was considerably more rapid than the average of all developing countries.

Kenya is a developing economy with many opportunities for growth. One avenue for stimulating this growth is through exports. Data obtained from World Bank (2013) showed that Kenya had 169 export trading partners during the 2010-2014 period and 170 import trading partners. From these 169, our top five export partners include Uganda, United Kingdom, Tanzania, Netherlands and the United States. Kenya also exported 3277 products as at year end 2013 and imported 4082 products. Furthermore, data from Kenya National Bureau of Statistics (2014) shows that Kenya has seven broad categories of exports. The graph below shows the value and growth of kenyan exports as a percentage of total exports from 2010 to 2013.

Figure 1: Kenyan Exports by Broad Categories



Source: KNBS (2014)

The figure above shows that Kenya relies a lot on food and beverages as its main export earner. Industrial supplies (Non-food) and consumer goods form the second and third largest group of exports from the economy. The other categories only form a small percentage of Kenya's export products. In addition, Kenya's net exports have been declining moving from negative KES 187,677.3 million in 2010 to negative KES 412,379.4 million in 2014 as shown below.

Table 1: Kenya's trade balance and current account balance

	2010	**2011**	**2012**	**2013**
Trade Balance (Millions)	-537,411.9	-788,145.3	-856,740.0	-911,029.2
Current Account Balance (Millions)	-187,677.3	-340,178.7	-359,676.7	-412,379.4

Source: Kenya Bureau of Statistics (2014)

These observations show that over the years Kenya's imports have been increasing more than its exports. On top of that, Kenya has had a slow demand for its exports and a declining production which has contributed to the deficit trade balances (WorldBank, 2015). Based on these observations, Kenya's export structure needs to be examined to determine how it can be improved.

Generally, a country's export structure could either be concentrated or diversified. A concentrated export structure implies that a country relies on a few commodities whereas a diversified export structure implies that a country relies on a variety of commodities. A lot of research has been done on export concentration and diversification. Hausmann, Hwang, & Rodrik (2007) for example, suggested that specializing in some products would bring higher growth than specializing in others. Furthermore, Hausmann, Hwang, & Rodrik (2007) stated that countries that latch on to a set of goods that are considered sophisticated tend to perform better. However, some authors such as Regolo (2013) have argued against export concentration. Regolo (2013) stated that concentration of exports in many developing countries caused greater volatility and lower growth.

According to Agosin (2008), export diversification has two effects; the portfolio effect and the dynamic effect. With respect to the portfolio effect, the greater the degree of diversification the less volatile the export earnings. Less volatile exports are then accompanied with lower variation in GDP growth. Thus countries that lack access or have imperfect access to world financial markets are able to smooth consumption despite large fluctuations in exports and output. Furthermore, countries with diversified export structures have less volatile real exchange rates. With respect to the dynamic effect, long run growth is associated with learning to produce an expanding range of goods. Growth in this view is seen as being the result of adding new products to the export and production basket (Agosin, 2008).

Ng & Yeats (2005) state that although Kenya was once viewed as being among the African countries with the most favorable growth prospects, it has been deteriorating in the last two decades with respect to many measures of economic performance and social standards. This has resulted in Kenya's share of world trade

being less than one half its average levels in the early 1980s. The authors suggested that the diversification of Kenya's exports away from traditional products such as tea, coffee and cut flowers should be prioritized.

Discussions on export diversification have now broadened to two concepts; diversification along the extensive and intensive margins. Carrère, Strauss-Kahn, & Cadot (2011), showed that low and middle income countries diversify mainly along the extensive margin (diversification of export values by addition of new product lines). This involves growth of new export items which are then marketed at large initial scales. Conversely, high income countries diversify along the intensive margin (diversification of export values among active product lines) and ultimately re-concentrate their exports towards fewer products.

Brenton & Newfarmer (2007) found that Kenya was exploiting less than 4% of the potential bilateral flows for its export products. Thus suggesting the importance of identifying the contribution of the extensive and intensive margins towards Kenya's export growth. Furthermore, Amurgo-Pacheco & Pierola (2008) showed that developing economies favoured geographical diversification to product diversification. Geographical diversification invlves exporting to new destinations whereas product diversification involves export of new products. Brenton & Newfarmer (2007) proposed an index of export market penetration which measures the geographical potential for a country. They found that the log of the index of export market penetration has a positive correlation with the log of GDP per capita. This positive relationship also extended to the log of GDP. Therefore, it is also important to identify factors that contribute to Kenya's geographic diversification.

1.2 Problem Statement

Kenya's trade deficit has been growing over the years (KNBS, 2014). Furthermore, data based on various categories of exports shows that the country over relies on some categories for its export revenue as shown in figure 1. Brenton & Newfarmer (2007) also found that Kenya was exploiting less than 4% of its potential bilateral flows for the products that it exports. Therefore, there is need to examine Kenya's export structure. One of the ways of examining Kenya's exports is by determining the role of the extensive and intensive margins towards export growth.

Amurgo-Pacheco & Pierola (2008) showed that geographic diversification is favoured more as opposed to product diversification and based on the findings of the positive relationship between the index of export market penetration (IEMP) and GDP (Brenton & Newfarmer, 2007), Kenya's exports could be examined based on its geographical diversification to determine the factors that contribute towards it. This could enable gaps in Kenya's export structure to be determined and growth in exports could be achieved by exploiting these gaps. Hence, it is important to identify the role that both the extensive and intensive margins have played in contributing towards export growth and what factors influence Kenya's geographical diversification.

1.3 Research Objectives

1. Identify the contribution of intensive and extensive margins on export growth
2. Identify factor's determining Kenya's geographical diversification.

1.4 Research Questions

1. What is the contribution of the extensive and intensive margins on Kenya's export growth?
2. What are the factors determining Kenya's geographic diversification?

1.5 Significance of the study

The study would be useful to stakeholders in the export market who include the government, producers, firms and individuals. The study will shed light in terms of areas that have not been exploited within the Kenyan export market and direct

policies towards these areas in order to reap greater benefits from exports which will enable the country to obtain more foreign currency. Moreover, firms and individuals who are in the export business could also learn which markets to target.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This section analyses various literature on exports in order to evaluate what various scholars have said with respect to trade and also to see the findings of various authors regarding the extensive an intensive margins. The first section contains theoretical literature on trade, the second section contains empirical literature on export diversification and the extensive and intensive margins and the last section contains a summary of all the literature.

2.2 Theoretical Literature

There are various theories that have been generated with regards to trade. Some of the first theories on trade began with David Ricardo and Adam Smith. Mankiw (2008) explained two terminologies with regards to trade; comparative advantage and absolute advantage. Mankiw (2008) stated that absolute advantage is used when comparing the productivity of a firm, a country or a person to that of another. Comparative advantage, which was introduced by David Ricardo, is then used when describing the opportunity cost of two producers. Mankiw (2008) further stated that the gains from specialization and trade are not based on absolute advantage but rather on comparative advantage. According to Adam Smith, no prudent person should attempt to make at home what it would cost him more to make than to buy (Mankiw, 2008). Moreover, both Adam Smith and David Ricardo argued for free trade. This argument according to Mankiw (2008) is still based on the principle of comparative advantage despite the broadening of the field of economics on issues of trade.

Krugman (1979) developed a simple general equilibrium model of non-comparative advantage trade. Krugman (1979) suggested that one could show that trade and gains from trade would occur even between countries with identical tastes, technology and factor endowments. The model showed that trade is caused by economies of scale rather than differences in factor endowments and or technology. Krugman (1980) also developed a basic model from which he concluded that each country would be a net exporter in the industry for whose goods it had a relatively

large demand. The difference would be in terms of wages. Smaller countries with small markets for its goods would compensate for this in terms of lower wages.

Melitz (2003) developed a dynamic industry model with heterogeneous firms to analyze the intra-industry effects of international trade. The model showed that exposure to trade would induce only the more productive firms to enter the export market while some less productive firms continued to produce only for the domestic market and would simultaneously force the least productive firms to exit. The model also showed that further increases in the industry's exposure to trade would lead to additional inter-firm reallocations towards more productive firms. Furthermore, the aggregate industry productivity growth generated by reallocations contributed to a welfare gain.

The Melitz (2003) model further showed that firms with different productivity levels coexisted in an industry because each firm faced initial uncertainty with regards to its productivity before making an irreversible investment to enter the industry. Moreover, entry into export market was considered to be costly, but the firm's decision to export occurred after it gained knowledge of its productivity. Lastly, the model indicated that policies that hinder the reallocation process or interfere with the flexibility of the factor markets may delay or even prevent a country from reaping the full benefits from trade.

Stokey (1988) developed a dynamic equilibrium model in which goods were valued according to the characteristics they contained, the set of goods produced in any period was endogenously determined and learning by doing was the force behind sustained growth. The model showed that growth comes about from the introduction of new and better products. Stokey (1988) also showed that the set of goods produced changes in a systematic way over time, with goods of higher quality entering each period and those of lower quality dropping out and in the long-run, growth continues without bound. The accumulation of knowledge through economy wide learning by doing was the sole force behind the growth. This learning had to display spillovers among goods otherwise learning would simply reinforce existing

patterns of production, which would work against both the introduction of new goods and the discontinuation of old ones.

Helpman, Melitz, & Rubinstein (2008) developed a simple model of international trade with heterogeneous firms which predicted positive and zero trade flows across pairs of countries and allowed the number of exporting firms to vary across destination countries. The result was that the impact of trade frictions on trade flows could be decomposed into the extensive and intensive margins. Helpman, Melitz, & Rubinstein (2008) defined the intensive margin as trade volume per exporter and the extensive margin as the number of exporters. The decomposition into extensive and intensive margins was important because a big proportion of trade adjustment took place at the extensive margin. Helpman, Melitz, & Rubinstein (2008) showed that the response of trade flow between one pair of countries to a given reduction in distance-related trade frictions such as transport costs could be as much as three times larger than the response of the trade flow between another pair of countries. They showed that these large variations in response to a given trade friction was driven by variation in the extensive margin responses.

2.3 Empirical Literature

2.3.1 Exports diversification

Imbs & Wacziarg (2003) studied the evolution of sectoral concentration in relation to the level of per capita income using sectoral data obtained from the International Labor Office (ILO), United Nations Industrial Development Organization (UNIDO) and data on 14 industrial countries from 1960-1993. Imbs & Wacziarg (2003) examined the evolution of several measures of sectoral concentration through time and in relation to the level of development through non-parametric approach. They showed that economies grow through two stages of diversification. At first, sectoral diversification increases, but beyond a certain level of per capita income incentives for concentration starts again. The stages of diversification discovered by Imbs & Wacziarg (2003) showed that the reallocation of resources was driven by the interaction of economic growth and openness to trade. However, there is still the question of which of the two is the most relevant.

2.3.2 Extensive and Intensive Margins

Amurgo-Pacheco & Pierola (2008) investigated the patterns of export diversification along the margins from 24 developed and developing countries from the period 1990 to 2005. By applying an econometric investigation on the gravity equation, they found that export growth along the intensive margin was much more important than along the extensive margin for all groups of countries under investigation. Furthermore, the extensive margin was more important to poorer countries. Within the extensive margin, poorer countries favored geographical diversification. On average, the extensive margin contributed 14% of the overall export growth. For Kenya, their research showed that the intensive margin contributed 34% to export growth and the extensive margin contributed 8.14%.

In addition to that, Amurgo-Pacheco & Pierola (2008) also found that taking part in Free Trade Agreements (FTAs) which reduces trade costs and trading with developed countries had a positive impact on export diversification on developing countries. Amurgo-Pacheco & Pierola (2008), therefore, stated that from a policy perspective, development of a particular industry is not a necessary condition for developing countries to succeed in diversification. Developing economies could exploit their labor capacities in producing parts which could stimulate the achievement of the diversification goal. However, Amurgo-Pacheco & Pierola (2008) stated that there is still need to research on the implications of diversification on employment, spillovers for the economy and growth.

Brenton & Newfarmer (2007) decomposed export growth from 99 developing countries to 102 developed and developing country markets from the period 1995-2004, and found that the intensive margin contributed towards 80 percent of total export growth while the extensive margin contributed only 20 percent for all the 99 countries. They also found that the decline and extinction of existing export products are somewhat more important in sub-saharan Africa, which is the only region where the extensive margin made a larger contribution to export growth than the intensive margin. Moreover, similar to the findings of Amurgo-Pacheco & Pierola (2008), they found that geographic diversification was more important than product diversification within the extensive margin.

Furthermore, Brenton & Newfarmer (2007) also found that countires that did not perform well were able to keep up with the developed countries by intensifying their exports, however, this growth at the intensive margin was slowed by the high death rates of their products. High death rates implies that products stop being exported to the specific destination countries. The high death rates of developing country exports was also found in the research done by Besedes & Prusa (2011). Moreover, Brenton & Newfarmer (2007) found an index of export market penetration (IEMP) which after doing a regression on log of GDP per capita and GDP, they found that there was a positive relationship.

There were, however, a few areas of further research suggested by Brenton & Newfarmer (2007). First, they questioned whether successful countries performed well at the intensive margin because during the maturity stage of a product they invested in raising quality and introducing differentiation which allowed them to exploit the intensive margin. There is also the question of which point during the export cycle do firms choose to look for new export markets; is it when growth in existing markets begins to slow or earlier during the acceleration phase. Finally, the issue of higher death rates of low income countries needs to be examined.

Besedes & Prusa (2011) examined the role of the extensive and intensive margins and export growth on manufacturing exports of 46 countries between 1975- 2003. They identified the contribution of each margin on export growth by performing a series of counterfactual exercises using successful developing economies as benchmarks. They expanded the dimensions of the intensive margin to include survival and deepening. They found that developing economies performed better on the extensive margin and formed more new relationships than developed countries. However, about 7/10 new export relationships of developing countries failed within two years of commencement. Because of this failure of export relationships, they found that almost all the activity at the extensive-margin had only short run impact on exports and little or no impact on a country's long-run export growth. Furthermore, Besedes & Prusa (2011) stated that survival is a necessary condition for deepening and due to the high failure rate, deepening was prevented. However,

better survival would result in higher export growth even in the absence of deepening. Just like Brenton & Newfarmer (2007) , Besedes & Prusa (2011) also do not explain the cause of the high death rates of developing countries' exports. According to Besedes & Prusa (2011) until it is known whether the reason of the high death rate is due to comparative advantage or due to structural reasons such as poor infrastructure, then the issue of survival cannot be improved and the cost of doing this cannot be known.

Evenett & Venables (2003) researched export growth of 23 developing and middle income economies. They decomposed exports for the period 1970-1997 into changes in product lines supplied and changes in export destinations. They employed gravity variables such as market size of the destination country and its distance from the supplier and time varying charactersitics of the exporting nation such as the exchange rate. Evenett & Venables (2003) wanted to examine the factors that contributed towards geographic diversification. They investigated the extent to which export growth is driven by geographic spread of trade and wanted to identify three channels through which exporters learnt about new markets.

Evenett & Venables (2003) found that about 10 percent of export growth of developing economies could be accounted for by the introduction of new products. Moreover, about 60 percent of trade growth was due to exports along the intensive margins. Furthermore, the probability of a previously unsupplied market receiving goods from an exporter in the future depended on the proximity of the unsupplied market to markets that were currently being supplied to by the exporter. They referred to this as proximity to the supply frontier. Evenett & Venables (2003) stated that proximity could take three forms, proximity in terms of distance, use of common language and sharing a common border. Evenett & Venables (2003) found that proximity to the supply frontier occurred about a fifth for all product lines and was the most prevalent learning mechanism. There was, however, the question of whether other factors, other than the three identified by Evenett & Venables (2003) could contribute towards learning about new markets such as similarities in technology between countries that are being supplied to and those that are not.

Zahler (2007) looked at what factors explained world export growth. Zahler (2007) mainly focused on the relevance of new destinations, new products and growth in value. Furthermore, Zahler (2007) wanted to identify whether successful exporters exhibited a different pattern of growth within the three dimensions mentioned, than those that struggle. Zahler (2007) decomposed export growth into the intensive and extensive margins for the period 1984-2000 using 1984 as the base year. Zahler (2007) found that the intensive margin was the main source of export growth. For developing economies, the intensive margin contributed 55.3 percent whereas the extensive margin contributed 44.7percent . Within the extensive margin, new destinations accounted for 37 percent of export growth while new products accounted for only 7 percent of export growth.

Zahler (2007) also found that countries whose exports grew fastest tended to grow faster in every export component including new destinations than countries whose exports grew slower. According to Zahler (2007), even relatively competitive sectors of each country faced difficulties penetrating new destinations and these difficulties were negatively related with population size and GDP per capita. Moreover, Zahler (2007) found that more than a third of new products died which according to Zahler (2007) suggested that experimentation and failure may be a factor in the decision to export to a new destination. Further opportunities for research could be to identify the interaction of differential costs of entering markets, externalities and the rate of failure.

On the other hand, Hummels & Klenow (2005) studied how big economies exported goods along the extensive and intensive margins. Hummels & Klenow (2005) used data on shipments of 126 exporting countries in 5,000 product categories. They decomposed exports into the extensive and intensive margins and further decomposed the intensive margin into price and quantity components. They then performed a regression of these margins on country size (PPP & GDP) and its components; workers and GDP per worker. They compared their findings with various trade models such as Armington model.

Hummels & Klenow (2005) found that the extensive margin accounted for around 60 percent of the greater exports of larger economies. In addition to that, Hummels & Klenow (2005) found that the intensive margins are dominated by higher quantities of each good rather than higher unit prices. They found that rich countries export higher quantities of each good at modestly higher prices as opposed to countries with more workers which exported higher quantities of each good but at lower prices. In their research, Hummels & Klenow (2005) considered only a few models. However, other models might have featured other facts that had not been considered within the models they selected.

Cadot, Carrère, & Strauss-Kahn (2013) conducted a survey on empirical literature concerning export and import diversification and its linkages with growth. They found similar results as Imbs &Wacziarg (2003) on how poor countries have on average undiversified exports and as they grew they diversified and reconcentrated at higher income levels. They concluded that the extensive margin (new products) dominated action in terms of diversification, but the intensive margin (higher volumes) dominated action in terms of export growth. Cadot, Carrère, & Strauss-Kahn (2013) stated that perhaps due to this, the direction of causality between income and diversification is unclear.

Cadot, Carrère, & Strauss-Kahn further suggested that the debate on export diversification could be missing an important factor, that is, factor endowments. They concluded that if countries were unable to master the knowledge to produce sophisticated goods, no industrial policies would make them successful exporters. Nevertheless, Cadot, Carrère, & Strauss-Kahn (2013), did not answer the question of how best to achieve export diversification and how it should rank in the list of government priorities.

2.4 Summary of Literature

Trade is caused by economies of scale rather than differences in factor endowments. Moreover, entry into export markets could be costly but the decision to do so occurs after a firm gains knowledge about its productivity. In addition, the accumulation of knowledge through economy wide learning is the sole force behind growth. Growth

also comes about from introduction of new and better products. Imbs & Wacziarg (2003) showed that economies go through two stages of diversifcation. For poor countries, diversification occurs till they reach a certain level of per capita income when incentives to concentrate take place.

With regards to the intensive and extensive margins, the intensive margin has generally been found to contribute more towards export growth (Amurgo-Pacheco & Pierola, 2008) (Evenett & Venables, 2003). The extensive margin was found to have a contribution towards developing economies' exports. Developing countries were found to favor geographical diversification as opposed to product diversification within the extensive margin (Amurgo-Pacheco & Pierola, 2008). However, the contibution of the extensive margin towards export growth has been diminished by the high death rates of trade relationships. This study will therefore identify the contribution of the margins towards Kenyan export growth and what determines the geographical diversification of Kenyan exports.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter focused on two methodologies. One involved the decomposition of export growth suggested by Zahler (2007) and the second involved modeling revenues and fixed costs so as to find out the factors influencing geographical diversification (Evenett & Venables, 2003).

3.2 Research design

The research was both quantitative and qualitative. The research determined the percentage contribution of the margins towards export growth which entailed quantitative analysis as well as factors that contributed towards geographical diversification. The qualitative aspect came about when interpreting the econometric analysis of factors determining geographic diversification.

3.3 Population and sampling

The research evaluated fifty two commodities obtained from HS92 trade classification which are considered the principle commodities by the KNBS (2014). It also involved 223 export destination countries where these fifty two commodities are exported to. The data was annual data from 2004 to 2013. A cutoff of level of $50,000 was used to determine which products and destinations to use in both the decomposition methodology and the logit estimation.

3.4 Data collection

The research used secondary data. The data on export commodities and their destination countries was obtained from UN COMTRADE database. Data on import values was obtained from World Bank's *World Development Indicators* (2015).

3.5 Data analysis

3.5.1 Decomposing export growth

The decomposition methodology used followed Zahler (2007) because it analyzed the products and destinations together unlike Evenett & Venables (2003) who analyzed them separately. Furthermore, this methodology took into account survival and death rates of products.

Kenya's exports in period t_1 can be thought of as:

$$\sum_{pd \in PDt_1} X_{pd,c,t_1} = \sum_{pd \in PDt_0 \cap PDt_1} X_{pd,c,t_0} \times \left(1 + \Delta\%X_{pd,c,t_1/t_0}\right) + \sum X_{newpd,c,t_1} \quad (1)$$

Where

$$\Delta\%X_{pd,c,t_1/t_0} = \frac{\sum_{pd \in PDt_0 \cap PDt_1} X_{pd,c,t_1} - \sum_{pd \in PDt_0 \cap PDt_1} X_{pd,c,t_0}}{\sum_{pd \in PDt_0 \cap PDt_1} X_{pd,c,t_0}} \quad (2)$$

And

$$\sum X_{newpd,c,t_1} = \sum_{p \in P_{t_0 \cap t_1}, d \in D_{t_0 \cap t_1} pd \notin PD_{t-k} \cap pd \in PD_t} X_{pd,c,t_1} + \sum_{p \notin P_{t_0} \cap P \in P_{t_1}, d \in D_{t_0} \cap d \in D_{t_1}} X_{pd,c,t_1} + \sum_{p \in P_{t_0 \cap t_1}, d \notin D_{t_0} \cap d \in D_{t_1}} X_{pd,c,t_1} + \sum_{p \notin P_{t_0} \cap p \in P_{t_1}, d \notin D_{t_0} \cap d \in D_{t_1}} X_{pd,c,t_1} \quad (3)$$

Equation (1) shows that the sum of the value of each product and destination(pd) exported by Kenya in t_1 is the sum of varieties that had positive values in t_0 and are still exported in t_1 times one plus the growth between t_0 and t_1 and exports of new varieties. Equation (2) shows the growth rate of exports from time t_0 to t_1. Equation (3) shows export of old products to old destinations where they had previously not been exported to, new products to old destinations, old products to new destinations and new products to new destinations.

Next, the exports in t_0 can be decomposed as follows:

$$\sum_{pd \in PD_{t_0}} X_{pd,c.t_0} = \sum_{pd \in PD_{t_0} \cap PD_{t_1}} X_{pd,c,t_0} + \sum_{pd \in PD_{t_0} \cap pd \notin PD_{t_1}} X_{pd,c,t_0} \quad (4)$$

Equation (4) shows varieties that survived from t_0 to t_1 and those that 'died'(were positive in t_0 but not in t_1). Taking together 1 and 4, the percentage change in exports of Kenya between t_0 and t_1 yields;

$$\frac{\sum_{pd \in PD_{t_1}} X_{pd,c,t_1} - \sum_{pd \in PD_{t_0}} X_{pd,c,t_0}}{\sum_{pd \in PD_{t_0}} X_{pd,c,t_0}} = \frac{\sum_{pd \in PD_{t_0} \cap PD_{t_1}} X_{pd,c,t_0} \times \left(1 + \Delta\%X_{pd,c,t_1/t_0}\right)}{\sum_{pd \in PD_{t_0}} X_{pd,c,t_0}} + \frac{\sum X_{newpd,c,t_1} - \left(\sum_{pd \in PD_{t_0} \cap PD_{t_1}} X_{pd,c,t_0} + \sum_{pd \in PD_{t_0} \cap pd \notin PD_{t_1}} X_{pd,c,t_0}\right)}{\sum_{pd \in PD_{t_0}} X_{pd,c,t_0}} = \frac{\sum_{pd \in PD_{t_0} \cap PD_{t_1}} X_{pd,c,t_0} \times \left(\Delta\%X_{pd,c,t_1/t_0}\right) + \sum X_{newpd,c,t_1} - \sum_{pd \in PD_{t_0} \cap pd \notin PD_{t_1}} X_{pd,c,t_0}}{\sum_{pd \in PD_{t_0}} X_{pd,c,t_0}} \quad (5)$$

Equation (5) shows that percentage export growth can be expressed as the growth in the surviving varieties, by new varieties less deaths that occurred between period t_0 and t_1 divided by the exports in the intial period as a point of comparison.

3.5.2 Factors determining geographical diversification

The theoretical considerations in this section were based on the research done by Evenett & Venables (2003). If Kenya exports a particular product to destination market j at time t we denote it by $s_{j,t} = 1$, while $s_{j,t} = 0$ if the export flow is zero or below the cutoff line which was taken to be \$50,000. In a given year the decision to supply an export market depends on the revenue gained from the market and the fixed costs incurred. The revenues earned in market j at time t is denoted as $R_{j,t}$ and the fixed costs incurred as $F_{j,t}$. In log form, they are denoted as $r_{j,t}$, $f_{j,t}$. We therefore have;

$$\mathbf{s_j = \begin{matrix} 1 \text{ if } r_{j,t} \geq f_{j,t}, \\ 0 \text{ otherwise.} \end{matrix}} \qquad (6)$$

These approach made two main assumptions; fixed costs $f_{j,t}$ depended on experience gained in market j and in other markets proximate to market j. Thus in a world with K potential export destinations, it will generally be the case that $f_{j,t} = f_j(s_{1,t-1}, s_{2,t-1}, \dots, s_{j,t-1}, \dots, s_{k,t-1}; u_{j,t})$. These relationships would imply that entry into one market changes the costs to that market and other markets through knowledge spillovers. The other assumption made is that export supply is modelled as a comparison of instantaneous benefits and costs thus ignoring forward looking behavior of exporters. This assumption was made for simplicity purposes.

3.5.2.1 Determinants of net revenues

The assumption made is that net revenue depends on characteristics of the market being potentially supplied including its proximity to the source country. The main market characteristic was size which was denoted by $m_{j,t}$, that is, destinations j's market size in year t. It was also assumed that growth in this market size encourages exports. In the model market size was proxied using the U.S. dollar value of an export destination's total imports. The reason being, such a proxy would capture the export destination's trade policies, its natural opennes and its bilateral exchange rate with the U.S. dollar and also its national income.

Economic proximity of Kenya to a potential export market j was measured by distance, which is used as a proxy for transportation costs, the presence of a common border and whether businesses in both the exporter and the potential export destination use a common business language, thus facilitating contracting and communication. The languages selected for this part were English, Kiswahili, French, German and Arabic. The reason for selecting French, German and Arabic was because these languages are examined in the Kenya Secondary Certificate of Education (KCSE) which would imply that a reasonable number of Kenyans study them. English and Kiswahili, on the other hand, have been identified by the Central Intelligence Agency (2015) as the official languages in Kenya.

These three effects were denoted by D_j, B_j and L_j respectively. It was also assumed that net revenue depended on the time varying characteristics of Kenya such as its exchange rate denoted by P_t. Revenues were then be expressed as;

$$\mathbf{r_{j,t} = \alpha_0 + \alpha_1 m_{j,t} + \alpha_2 D_j + \alpha_3 B_j + \alpha_4 L_j + \alpha_5 P_t} \quad (7)$$

Where;

$m_{j,t}$ is destination j's market size in year t.

D_j is the distance from exporter.

B_j is a dummy variable that takes a value of 1 if a destination market j shares a common border with the exporter.

L_j is a dummy variable that takes a value of 1 if a destination market j shares a common language with the exporter.

P_t denotes time varying characteristics of the exporter such as exchange rate.

3.5.2.2 *Determinants of fixed costs*

Fixed costs were expressed as;

$$\mathbf{f_{j,t} = \beta_1 s_{j,t-1} + \beta_2 \delta_{j,t-1}[1 - s_{j,t-1}] + \beta_3 \delta_{j,t-1} s_{j,t-1} + u_{j,t}} \quad (8)$$

Equation (8) implies that the fixed cost of supplying market j at t time depends on the knowledge gained about that market. The model assumed that this knowledge came from two sources. The first is from previous experience in market j measured by $s_{j,t-1}$. The second is knowledge spillovers from experience gained from related or

proximate markets denotes as $\delta_{j,t-1}$. The importance of spillovers depended on whether experience was been gained directly in market j. Therefore, if experience was not gained $s_{j,t-1} = 0$, and β_2 measured the value of the spillover. If experience had already been gained directly, that is $s_{j,t-1} = 1$, the probability of obtaining further knowledge from spillovers was reduced. However, the effect of gaining additional knowledge given that Kenya already had previous experience in a certain destination market was included and measured by β_3.

The variable $\delta_{j,t-1}$ which measures knowledge spllovers was referred to as 'proximity to the supply frontier'. This variable used several different measures. The first is the geographical proximity of markets that were supplied in the previous period. Thus $near_{j,t-1} = -\min_k\{dist_{jk}|s_{k,t-1} = 1\}$, where $dist_{jk}$ denotes the distance from market j to market k. In order for this to measure proximity and not distance it had a negative sign. The variable $near_{j,t-1}$ was further broken down to two components; $near1_{j,t-1} = near_{j,t-1}[1 - s_{j,t-1}]$ and $near2_{j,t-1} = near_{j,t-1}[s_{j,t-1}]$. The number 1 captured cases where spillovers were gained directly from market k whereby $s_{j,t-1} = 0$ and the number 2 captured cases where there were both spillovers and $s_{j,t-1} = 1$ respectively.

The second proximity measure was a dummy for whether or not country j had a common border with a country that was supplied in the preceding period. Thus;

$$bord_j = \begin{matrix} 1 \text{ if } \sum_k border_{jk}\, s_{jk,t-1} > 0, \\ 0 \text{ otherwise.} \end{matrix}$$

Interacting with $s_{j,t-1}$ gave two variables, $bord1_{j,t-1}$ and $bord2_{j,t-1}$. The third measure was a dummy for whether or not country *j* had a common business language with a country that was supplied in the preceding period. They were expressed as $lang1_{j,t-1}$ and $lang2_{j,t-1}$. Combining all these equations gave;

$$\mathbf{f_{j,t} = \beta_0 + \beta_1 s_{j,t-1} + \beta_2 near1_{j,t-1} + \beta_3 near2_{j,t-1} + \beta_4 bord1_{j,t-1} + \beta_5 bord2_{j,t-1} + \beta_6 lang1_{j,t-1} + \beta_7 lang2_{j,t-1} + u_{j,t}} \quad (9)$$

Where; $s_{j,t-1}$ is a dummy that takes a value of 1 if there was previous experience in market j.

$near1_{j,t-1}$ is the product of the distance between destination market j and market k and the dummy variable that takes a value of 1 if market j was not supplied to in the previous period but market k was.

$near2_{j,t-1}$ is the product of the distance of destination market j from destination market k with the dummy variable that takes a value of 1 if both market j and market k were supplied to in the previous period.

$bord1_{j,t-1}$ is a dummy that takes a value of 1 if market k and market j share a common border and market k was supplied to in the previous period but market j was not supplied to in the previous period.

$bord2_{j,t-1}$ is a dummy that takes a value of 1 if market k and market j share a common border and there was previous experience in both markets.

$lang1_{j,t-1}$ is a dummy that takes a value of 1 if market j and market k share a common language and market k was supplied to in the previous period but market j was not supplied to in the previous period.

$lang2_{j,t-1}$ ia a dummy that takes a value of 1 if market k and market j share a common language and there was previous experience in both markets.

Combining eqaution (7) and equation (9) gave an estimating equation of the form;

$$\mathbf{Logit}\,(s_j) = \alpha_0 + \alpha_1 m_{j,t} + \alpha_2 D_j + \alpha_3 B_j + \alpha_4 L_j + \alpha_5 t + B_1 s_{j,t-1} + \beta_2 near1_{j,t-1} + \beta_3 near2_{j,t-1} + \beta_4 bord1_{j,t-1} + \beta_5 bord2_{j,t-1} + \beta_6 lang1_{j,t-1} + \beta_7 lang2_{j,t-1} + u_{j,t} \quad (10)$$

CHAPTER 4: RESULTS AND ANALYSIS

4.1 Decomposition Results

	2005	2006	2007	2008	2009	2010	2011	2012	2013
ND Growth	86.7	5.6	12.2	22.7	6.3	9.5	10.0	66.3	74.1
NP Growth	0.0	0.5	0.2	9.2	0.2	0.6	4.4	0.1	-
NNPNND	13.3	93.9	87.6	68.1	93.5	89.9	87.1	33.6	25.9

Table 2: Extensive Margin Growth

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Export Growth	195.1	-1,772	673	1,731	-164	1,839	7.7	784.9	-2,782
Extensive Growth	14.9	1.4	4.7	2.6	3.0	3.0	6.1	1.9	27.3
Intensive Growth	180	-1773	668.2	1728	-167	1835.5	1.7	783	-2809
Deaths	2.3	1.3	4.2	2.3	3.4	1.4	13.3	9.9	3.9

Table 3: Export Growth

The decomposition results suggest that there is no solid pattern to export growth in Kenya for the years under investigation. Export growth for the period 2004 to 2013 has been volatile and this volatility can be attributed to volatility in intensive margin growth. However, the intensive margin still had the biggest influence on export growth contributing on average 49.8% whereas the extensive margin contributed on average 7.2%. These results are comparable to those found by Amurgo-Pacheco & Pierola (2008) whereby the intensive margin contributed 34% towards export growth in Kenya and the extensive margin contributed 8.14%.

The results are also in line with those of Brenton & Newfarmer (2007) and Amurgo-Pacheco & Pierola (2008) who found that geographic diversification was more important than product diversification in sub Saharan Africa. The study shows that new destinations account for 32.6% of extensive margin growth on average while new products contribute only 1.7% towards export growth. However, the contribution of old products exported to old destinations where they were previously not exported to had the biggest impact on extensive margin growth than new products and new destinations. It accounted for 59.29% of extensive margin growth. This new dimension of the extensive margin, seen in Zahler (2007), has not been considered in most studies yet has been found in this study to have the largest contribution towards extensive margin growth.

Of particular importance are the years 2006, 2009, 2011 and 2013. The huge decline in export growth in these years seems to have been driven by a decline in growth at the intensive margin. An analysis of the data shows that in 2006 this decline was driven mainly by a decline in the export value of petroleum products. In DRC for example, export values declined by approximately USD 86.9 million and of these, petroleum products accounted for USD 86.4 million. In addition, there were also declines in export value to some of Kenya's major export partners such as Uganda and Tanzania whose export values declined by USD 408.5 million and USD 62.3 million respectively.

In 2009, the huge drop in intensive margin growth was brought about by a decline in export values of mainly tea and cut flowers. Tea exports to Egypt, for example, declined by USD 67.8 million. Exports of cut flowers to Netherlands, on the other hand, declined by USD 12.2 million. In addition to this, major export markets also had huge declines in export values such as Uganda, United Kingdom and USA. The declines in UK and USA could be attributed to the financial crisis which the two countries were still recovering from. In 2011, the drop in export growth could be attributed to a drop in the value of tea exports. Examples include; Afghanistan where tea values declined by USD 92 million, in Yemen the value dropped by USD 21.3 million and in USA by USD 10.3 million. In this year there was also a decline in export values to major exporting partners such as Uganda where exports dropped by USD 39 million.

Finally in 2013, Kenya experienced the worst drop in export growth. An examination of the data showed that in that year, there was a huge decline in exports of cut flowers to Kenya's major importer, Netherlands. Cut flowers to Netherlands declined in value by USD 71.8 million. There seems to have been a spillover effect because this decline was also experienced in many European countries such as Germany, Norway, Finland, Austria, Switzerland and Sweden. Given that Netherlands is Europe's primary point of entrance for cut flowers (Ministry of Economic Affairs, 2012), a spillover effect is a valid explanation for the declines experienced in other European markets. Other commodities in that year that

contributed to the drop in export growth were fish, beverages and tobacco, tea, coffee and machinery and equipment.

4.2 Logistic Output

A logistic regression on equation (5) gave the following output.

Logistic regression		Number of obs	=	1240
		LR chi2(20)	=	722.18
		Prob > chi2	=	0.0000
Log likelihood = -425.15011		Pseudo R2	=	0.4593

s_j	Coef.	Std. Err.	z	p>|z|	[95% Conf.	Interval]
$m_{j,t}$	.6573032	.0639983	10.27	0.000	.5318689	.7827375
D_j	-1.427311	.2175881	-6.56	0.000	-1.853776	-1.000846
B_j	-1.169499	.616638	-1.90	0.058	- 2.378087	.0390897
L_j	.4112304	.2105795	1.95	0.051	-.0014978	.8239585
$s_{j,t-1}$	2.916146	.950441	3.07	0.002	1.053315	4.778976
$near1_{j,t-1}$	-.0652029	.0483264	-1.35	0.177	-.159921	.0295151
$near2_{j,t-1}$	-.055434	.04578	-1.21	0.226	-.1451611	.034293
$bord1_{j,t-1}$	-.5763915	.3247495	-1.77	0.076	-1.212889	.0601058
$bord2_{j,t-1}$	-.5785117	.3157707	-1.83	0.067	-1.197411	.0403875
$lang1_{j,t-1}$	1.067541	.5551748	1.92	0.054	-.0205817	2.155664
$lang2_{j,t-1}$	.0784438	.7939072	0.10	0.921	-1.477586	1.634473
Year						
2005	1.021846	.3967335	2.58	0.010	.244263	1.79943
2006	.6394006	.3949712	1.62	0.105	-.1347288	1.41353
2007	.1956701	.3885526	0.50	0.615	-.565879	.9572193
2008	-.2900271	.389827	-0.74	0.457	-1.054074	.4740197
2009	.0719776	.3890243	0.19	0.853	-.6904961	.8344513
2010	-.1099047	.3880737	-0.28	0.777	-.8705152	.6507058
2011	-.0504535	.392985	-0.13	0.898	-.8206899	.719783
2012	.1463236	.4079361	0.36	0.720	-.6532165	.9458636
2013	.0758811	.4100858	0.19	0.853	-.7278723	.8796346
_cons	-5.067744	2.036333	-2.49	0.013	-9.058884	-1.076605

Table 4: Logistic Output

This output shows that market size and previous experience in a certain market are positive and strongly statistically significant at the 5% level. These results compare with the results of Evenett & Venables (2003) who found that market size was positive and statistically significant in 95.57 percent of China's 203 product lines while previous experience was positive and statistically significant in all of China's 203 product lines. Distance, a variable used in gravity equations, is found to be

negative and statistically significant at the 5% level. These results further relate to the findings of Evenett & Venables (2003) where this variable was found to be negative and statistically significant in more than half of their estimations.

The results imply that market size and previous experience in a certain export market increases the probability of having supplied to that market. Distance, on the other hand, was found to decrease the probability of exporting to a certain market. This result could be interpreted to imply that the further the export destination country, the less likely it is for Kenya to supply to that market. Distance related frictions such as transport costs are larger the further away a destination market is hence reducing the likelihood of supplying to such a market. Additionally, most of the countries near Kenya are landlocked countries; therefore, they rely on Kenya to acquire shipped commodities. Thus this increases the likelihood of exporting to these countries rather than countries that are further away.

Sharing a common border and language with Kenya were both significant at the 10% level. However, language was found to increase the likelihood of having experience in a certain export market whereas border was found to decrease the probability of having experience in a certain market. Spillovers through sharing a common border with a market previously supplied to by Kenya; $\mathbf{bord1}_{j,t-1}$ and $\mathbf{bord2}_{j,t-1}$ and spillovers from sharing a common business language with markets previously supplied to by Kenya $\mathbf{lang1}_{j,t-1}$ were found to be significant at the 10% level. $\mathbf{bord1}_{j,t-1}$ and $\mathbf{bord2}_{j,t-1}$, however, decreased the likelihood of supplying to an export destination market.

Proximity to markets previously exported to was insignificant. Evenett & Venables (2003) also find this variable to be insignificant in more than half of China's product lines. Within the Kenyan context, this could be explained by a number of reasons. MAFAP's (2013) policy brief on making Kenya's efficient tea markets more inclusive stated that 95% of the tea produced in Kenya is exported and of these 60% go to only three countries; Pakistan, Egypt and the UK. In addition to these, the policy brief also stated that Kenya's tea market is directly affected by a few high volume buyers who dominate the international tea market. Only seven companies control 85% of the tea

consumed worldwide. In the Mombasa Tea Auction, only six companies account for two-thirds of the tea purchased. The same can be seen with regards to cut flowers, with Netherlands accounting for 67% of Kenya's exports. Netherlands is also Europe's principle point of entrance for cut flowers (Ministry of Economic Affairs, 2012). Thus, since Kenya's biggest export commodities are reliant on a few individuals; it is difficult to account for spillovers from proximity to supplied markets.

4.2.1 Tests of Joint Significance

test $\mathbf{near2_{j,t-1}}$ $\mathbf{bord2_{j,t-1}}$ $\mathbf{lang2_{j,t-1}}$

(1) (s_j) $\mathbf{near2_{j,t-1}} = 0$
(2) (s_j) $\mathbf{bord2_{j,t-1}} = 0$
(3) (s_j) $\mathbf{lang2_{j,t-1}} = 0$

chi2(3) = 4.13
Prob > chi2 = 0.2483

Logistic regression				Number of obs =	1240
				LR chi2(20) =	717.85
				Prob > chi2 =	0.0000
Log likelihood = -427.31666				Pseudo R2 =	0.4565

s_j	Coef.	Std. Err.	z	p>|z|	[95% Conf.	Interval]
$\mathbf{m_{j,t}}$	.6339924	.060219	10.53	0.000	.5159654	.7520194
$\mathbf{D_j}$	-1.40871	.2000867	-7.04	0.000	-1.800873	-1.016548
$\mathbf{B_j}$	-1.252538	.6049231	-2.07	0.038	-2.438166	-.066911
$\mathbf{L_j}$	.5639881	.1988221	2.84	0.005	.174304	.9536722
$\mathbf{s_{j,t-1}}$	2.714556	.5704601	4.76	0.000	1.596475	3.832637
$\mathbf{near1_{j,t-1}}$	-.0565517	.0480336	-1.18	0.239	-.1506958	.0375925
$\mathbf{bord1_{j,t-1}}$	-.4519243	.3142743	-1.44	0.150	-1.067891	.164042
$\mathbf{lang1_{j,t-1}}$	.96319	.5471636	1.76	0.078	-.109231	2.035611
Year						
2005	1.045979	.3958605	2.64	0.008	.2701068	1.821851
2006	.6577073	.3938405	1.67	0.095	-.1142058	1.42962
2007	.2447339	.3866138	0.63	0.527	-.5130153	1.002483
2008	-.2666339	.3865783	-0.69	0.490	-1.024313	.4910456
2009	.0740292	.3858074	0.19	0.848	-.6821394	.8301979
2010	-.0670971	.3860451	-0.17	0.862	-.8237316	.6895375
2011	-.0469225	.3907212	-0.12	0.904	-.8127219	.718877
2012	.1764512	.4064066	0.43	0.664	-.6200911	.9729936
2013	.1236053	.4069561	0.30	0.761	-.674014	.9212246

_cons	-4.755692	1.965667	-2.42	0.016	-8.608329	-.9030557

lrtest full		
Likelihood-ratio test	LR chi2(3) =	4.33
(Assumption: . nested in full)	Prob > chi2 =	0.2277

Table 5: Test of Joint Significance for Spillover Effects and Previous Experience

A joint significant test of whether having both previous experience in a certain market and knowledge spillovers from markets in close proximity shows that we fail to reject the null which shows that these variables are insignificant in explaining the probability of supplying to a particular market.

test $\mathbf{near1_{j,t-1}}$ $\mathbf{bord1_{j,t-1}}$ $\mathbf{lang1_{j,t-1}}$

(1) (s_j) $\mathbf{near1_{j,t-1}} = 0$
(2) (s_j) $\mathbf{bord1_{j,t-1}} = 0$
(3) (s_j) $\mathbf{lang1_{j,t-1}} = 0$

chi2(3) = 7.42
Prob > chi2 = 0.0597

Logistic regression	Number of obs =	1240
	LR chi2(20) =	714.40
	Prob > chi2 =	0.0000
Log likelihood = -429.04216	Pseudo R2 =	0.4543

s_j	Coef.	Std. Err.	Z	p>|z|	[95% Conf.	Interval]
$m_{j,t}$	.6080614	.0588722	10.33	0.000	.492674	.7234487
D_j	-1.315892	.2003639	-6.57	0.000	-1.708598	-.9231858
B_j	-1.199953	.6067931	-1.98	0.048	-2.389246	-.0106602
L_j	.6419012	.1915425	3.35	0.001	.2664848	1.017318
$s_{j,t-1}$	2.276853	.8527962	2.67	0.008	.6054035	3.948303
$near2_{j,t-1}$	-.0506573	.0451838	-1.12	0.262	-.1392159	.0379014
$bord2_{j,t-1}$	-.3919786	.3019419	-1.30	0.194	-.9837739	.1998167
$lang2_{j,t-1}$	-.1609185	.8238578	-0.20	0.845	-1.77565	1.453813
Year						
2005	.9972021	.3938107	2.53	0.011	.2253472	1.769057
2006	.6142014	.3927093	1.56	0.118	-.1554946	1.383897
2007	.2109729	.3845618	0.55	0.583	-.5427544	.9647002
2008	-.2235744	.3873923	-0.58	0.564	-.9828493	.5357005
2009	.1571229	.3864745	0.41	0.684	-.6003532	.9145991
2010	-.0723147	.3853354	-0.19	0.851	-.8275581	.6829288

2011	.003611	.3888851	0.01	0.993	-.7585898	.7658118
2012	.2317545	.4040731	0.57	0.566	-.5602142	1.023723
2013	.1457962	.4058622	0.36	0.719	-.6496791	.9412714
_cons	-4.254781	1.928033	-2.21	0.027	-8.033656	-.4759051

lrtest full	
Likelihood-ratio test	LR chi2(3) = 7.78
(Assumption: . nested in full)	Prob > chi2 = 0.0507

Table 6: Test of Joint Significance for Spillover Effects

A joint significance for the variables capturing knowledge spillover shows that they are statistically significant at the 10% level. This implies that these variables are important in explaining the likelihood of supplying a market.

test $\mathbf{D_j}$ $\mathbf{B_j}$ $\mathbf{L_j}$	
(1) $(\mathbf{s_j})\ \mathbf{D_j} = 0$	
(2) $(\mathbf{s_j})\ \mathbf{B_j} = 0$	
(3) $(\mathbf{s_j})\ \mathbf{L_j} = 0$	
	chi2(3) = 55.86
	Prob > chi2 = 0.0000

Logistic regression	Number of obs = 1240
	LR chi2(20) = 661.62
	Prob > chi2 = 0.0000
Log likelihood = -455.42954	Pseudo R2 = 0.4207

$\mathbf{s_j}$	Coef.	Std. Err.	z	p>|z|	[95% Conf.	Interval]
$\mathbf{m_{j,t}}$	.5033804	.0557119	9.04	0.000	.3941871	.6125737
$\mathbf{s_{j,t-1}}$	2.915879	.9401458	3.10	0.002	1.073227	4.758531
$\mathbf{near1_{j,t-1}}$	-.1372333	.0444724	-3.09	0.002	-.2243976	-.050069
$\mathbf{near2_{j,t-1}}$	-.1911577	.0415187	-4.60	0.000	-.2725328	-.1097826
$\mathbf{bord1_{j,t-1}}$	-.1841532	.276764	-0.67	0.506	-.7266006	.3582942
$\mathbf{bord2_{j,t-1}}$	-.3011882	.2711438	-1.11	0.267	-.8326203	.230244
$\mathbf{lang1_{j,t-1}}$	.6930668	.5154139	1.34	0.179	-.3171259	1.70326
$\mathbf{lang2_{j,t-1}}$	.1885417	.7902778	0.24	0.811	-1.360374	1.737458
Year						
2005	1.12125	.381159	2.94	0.003	.3741923	1.868308
2006	.6014279	.3744902	1.61	0.108	-.1325594	1.335415
2007	.2290753	.3734432	0.61	0.540	-.50286	.9610106
2008	-.098172	.3690683	-0.27	0.790	-.8215326	.6251887
2009	.3067186	.3708485	0.83	0.408	-.420131	1.033568

2010	.0702428	.3719393	0.19	0.850	-.6587448	.7992305
2011	.170471	.3772713	0.45	0.651	-.5689672	.9099091
2012	.3473275	.3852454	0.90	0.367	-.4077396	1.102395
2013	.1678427	.3901921	0.43	0.667	-.5969198	.9326051
_cons	-13.70481	1.385076	9.89	0.000	-16.41951	-10.99011

lrtest full	
Likelihood-ratio test	LR chi2(3) = 60.56
(Assumption: . nested in full)	Prob > chi2 = 0.0000

Table 7: Test of Joint Significance for Distance, Border and Language

A joint significance test containing distance from Kenya, sharing a common border with Kenya and sharing a common language shows that these three variables are strongly statitically significant at the 5% level. Therefore, these variables are very important in explaining probability of supplying to a particular destination market.

CHAPTER 5: CONCLUSION

5.1 Summary and Conclusions

The purpose of the study was to determine which margin had the biggest contribution towards export growth and the factors contributing towards geographical diversification. The data used in the study was obtained from UN COMTRADE database and World Bank's *World development Indicators.* To determine the contribution of the margins, data was decomposed into the extensive and intensive margins. The research finds that the intensive margin contributed most towards export growth. However, growth in this margin was also very volatile. Within the extensive margin, new destinations had a bigger impact than new products. Nonetheless, the results show that the biggest contributor towards extensive margin growth was old products to old destination where they were previously not exported to.

In determining the factors contributing towards geographical diversification, a logistic regression was used. The study finds that market size, distance from Kenya and previous experience in an export market were the most significant in explaining the probability of supplying a given destination market. However, proximity to markets previously supplied to was insignificant in explaining the probability of supplying to particular export markets. This could be attributed to the fact that the export of Kenya's major commodities such as tea and cut flowers are influenced by very few individuals hence difficult to justify spillovers from proximity to previously supplied markets.

5.2 Policy Implications and Recommendations

Based on the results of the study, it is recommended that Kenya should focus on destinations to grow its exports. This could be done by finding new markets or exporting old products to existing destinations where they were previously not exported to. Kenya should also invest more in innovation so as to come up with new products hence promote product diversification. However, this should also be done prudently taking into consideration the opportunity costs of producing and exporting new products as opposed to importing them. There is also evidence of major export partners buying less such as Uganda, our biggest export partner.

Therefore, the country should strive to strengthen its existing economic relations so as to retain its destination markets.

5.3 Limitations of the Study and Areas of Further Research

The main limitation was lack of data especially for developing countries in Africa. Some of these countries lacking data were big markets such as Nigeria. The study, therefore, used a sample of countries to carry out its evaluation. Moreover, the study only focused on commodities considered principle commodities by the Kenya Bureau of Statistics. Further research can be done by adding other commodities such as tourism which could be considered one of the drivers of Kenya's GDP growth.

REFERENCES

Agency, C. I. (2015). Retrieved November 11, 2015, from The world Factbook: https://www.cia.gov/library/publications/the-world-factbook/fields/2098.html

Agosin, M. R. (2008). *Export diversification and growth in emerging economies.* Cepal Review.

Amurgo-Pacheco, A., & Pierola, M. D. (2008). *Patterns of Export Diversification in Developing Countries: Intensive and Extensive Margins.* Geneva: Economics Section, The Graduate Institute of International Studies.

Bank, W. (2015). *The World Bank.* Retrieved November 11, 2015, from World Development Indicators: http://data.worldbank.org/data-catalog/world-development-indicators

Besedes, T., & Prusa, T. J. (2011). The role of extensive and intensive margins and export growth. *Journal of Development Economics*, 96(2).

Brenton, P., & Newfarmer, R. (2007). *Watching More Than The Discovery Channel:Export Cycles and Diversification in Development.* The World Bank, International Trade Department.

Cadot, O., Carrère, C., & Strauss-Kahn, V. (2013). Trade Diversification, Income and Growth: What Do We Know? *Journal of Economic Surveys*, 27(4), 790-812.

Carrère, C., Strauss-Kahn, V., & Cadot, O. (2011). Export diversification:Whats' behind the hump? *Review of Economics and Statistics*, 93(2), 590-605.

Evenett, S., & Venables, A. J. (2003). Export growth in developing countries: Market entry and bilateral trade. *working paper.*

Hausmann, R., Hwang, J., & Rodrik, D. (2007). What You Export Matters. *Journal of economic growth*, 12(1), 1-25.

Helpman, E., Melitz, M., & Rubinstein, Y. (2008). Estimating trade flows: trading partners and trading volumes. *Quarterly Journal of Economics*, 441-487.

Hummels, D., & Klenow, P. J. (2005). The Variety and Quality of a Nation's Exports. *American Economic Review*, 704-723.

Imbs, J., & Wacziarg, R. (2003). Stages of diversification. *American Economic Review*, 63-86.

KNBS. (2014). *Kenya Facts and Figures* .

Krugman, P. (1980). Scale economies, product differentiation and the pattern of trade. *The American Economic Review*, 950-959.

Krugman, P. R. (1979). Increasing returns, monopolistic competition and international trade theory. *Journal of International Economics*, 469-479.

MAFAP. (2013). *Making Kenya's efficient tea markets more inclusive.* Food and Agriculture Organization of the United Nations.

Mankiw, N. G. (2008). *Principles of Macroeconomics.* Mason, Ohio: Cengage Learning.

Melitz, M. J. (2003). The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity. *Econometrica*, 1695-1725.

Ministry of Economic Affairs, A. a. (2012). *A Study on the Kenyan-Dutch Horticultural Supply Chain.* Prins Clauslaan 8: The Dutch Ministry of Economic Affairs, Agriculture & Innovation.

Newfarmer, R., Shaw, W., & Walkenhorst, P. (2009). *Breaking Into New Markets:Emerging Lessons for Export Diversification.* Washington DC: The World Bank.

Ng, F., & Yeats, A. (2005). Kenya Export Prospects and Problems. *Working Paper.*

Regolo, J. (2013). Export Diversification:How Much Does the Choice of the Trading Partner Matter? *Journal of International Economics*, 91(2), 329-342.

Stokey, N. L. (1988). Learning by Doing and the Introduction. *Journal of Political Economy*, 701-717.

Worldbank. (2013). *World Integrated Trade Solution.* Retrieved June 25, 2015, from WITS website: http://wits.worldbank.org/CountryProfile/Country/KEN/Year/2010/Summary

WorldBank. (2015, March 5). *The World Bank.* Retrieved June 18, 2015, from The World Bank website: http://www.worldbank.org/en/news/press-release/2015/03/05/kenya-among-the-fastest-growing-economies-in-africa

Zahler, A. (2007). Decomposing world export growth and the relevance of new destinations. *Working Paper.*

Appendix 1: Commodities

Aluminium Sulphate	Maize (corn)
Animal and vegetable oils, fats and waxes	Maize (corn) starch
Avocados, fresh or dried	Meal and flour of wheat and flour of meslin
Beans, shelled or unshelled, fresh or chilled	Meat and preparations
Beverages and tobacco	Metal containers for storage and transport
Birds eggs, in shell, fresh, preserved or cooked	Milk and cream, concentrated or sweetened
Butter and other fats and oils derived from milk	Milk and cream, neither concentrated nor
Carbon dioxide	Non-ferrous base metal waste and scrap, nes
Cashew nuts, shelled dried	Oil seeds and oleaginous fruit
Coffee, not roasted, decaffeinated	and scrap, nes
Coffee, not roasted, not decaffeinated	Paper and paperboard
Cotton	Peas, shelled or unshelled, fresh or chilled
Cut flowers, dried flowers for bouquets, etc,	Petroleum products, refined
Disodium carbonate	Petroleum, petroleum products and related
Feeding stuff for animals	Pineapples, otherwise prepared or preserved
Fish, crustaceans, molluscs, aquatic	Printed matter
Fluorspar, <97% calcium fluoride	Pyrethrum, roots containing rotenone,
Fluorspar, >97% calcium fluoride	Sisal, Agave, raw, processed, not spun, tow
Footwear	Soaps, lubricants, waxes, candles, modelling
Fungicides, packaged for retail sale	Tea
Glassware	Textile yarn, fabrics, made-up articles, nes,
Glues based on starches, or modified starches	Waste and scrap metal of iron or steel
Gold, unwrought, semi-manufactured, powder	Wattle tanning extract
Hides, skins and furskins, raw	Wood and articles of wood, wood charcoal
Leather	Wool, animal hair, horsehair yarn and fabric
Lentils dried, shelled	
Live animals	
Machinery and transport equipment	

Appendix 2: Partners

Afghanistan	Br. Virgin Isds	Rep. of Korea	Greenland
Albania	Brazil	DRC	Grenada
Algeria	Brunei Darussalam	Denmark	Guam
American Samoa	Bulgaria	Djibouti	Guatemala
Andorra	Bunkers	Dominica	Guinea
Angola	Burkina Faso	Dominican Rep.	Guinea-Bissau
Anguilla	Burundi	Ecuador	Guyana
Antigua &Barbuda	CÃ´te d'Ivoire	Egypt	Haiti
Areas, nes	Cabo Verde	El Salvador	Holy See (Vatican
Argentina	Cambodia	Equatorial	Honduras
Armenia	Cameroon	Eritrea	Hungary
Aruba	Canada	Estonia	Iceland
Australia	Cayman Isds	Ethiopia	India
Austria	Central African Rep.	Faeroe Isds	Indonesia
Azerbaijan	Chad	Falkland Isds	Iran
Bahamas	Chile	Fiji	Iraq
Bahrain	China	Finland	Ireland
Bangladesh	China, Hong Kong	Fmr Sudan	Israel
Barbados	China, Macao SAR	France	Italy
Belarus	Cocos Isds	Free Zones	Jamaica
Belgium	Colombia	French	Japan
Belize	Comoros	FS Micronesia	Jordan
Benin	Congo	Gabon	Kazakhstan
Bermuda	Cook Isds	Gambia	Kiribati
Bhutan	Costa Rica	Georgia	Kuwait
Bolivia	Croatia	Germany	Kyrgyzstan
Bosnia	Cuba	Ghana	Lao People's Dem.
Botswana	Cyprus	Gibraltar	Latvia
Br. Indian Ocean	Czech Rep.	Greece	Lebanon
Lesotho	Niger	Serbia	Turkmenistan
Liberia	Nigeria	Serbia and	Turks and Caicos
Libya	Norway	Seychelles	Tuvalu
Lithuania	Oman	Sierra Leone	Uganda
Luxembourg	Other Asia, nes	Singapore	Ukraine
Madagascar	Pakistan	Slovakia	United Arab
Malawi	Palau	Slovenia	United Kingdom
Malaysia	Panama	Solomon Isds	United Rep. of
Maldives	Papua New Guinea	Somalia	Uruguay
Mali	Paraguay	South Africa	US Misc. Pacific
Malta	Peru	Spain	USA
Mauritania	Philippines	Special	Uzbekistan

Mauritius	Poland	Sri Lanka	Vanuatu
Mayotte	Portugal	State of	Venezuela
Mexico	Qatar	Sudan	Viet Nam
Mongolia	Rep. of Korea	Suriname	Wallis and Futuna
Montenegro	Rep. of Moldova	Swaziland	World
Montserrat	Romania	Sweden	Yemen
Morocco	Russian Federation	Switzerland	Zambia
Mozambique	Rwanda	Syria	Zimbabwe
Myanmar	Saint Helena	Tajikistan	
Namibia	Saint Kitts and Nevis	Macedonia	
Nauru	Saint Lucia	Thailand	
Nepal	Saint Vincent and the	Togo	
Neth. Antilles	Samoa	Tokelau	
Netherlands	San Marino	Tonga	
New Caledonia	Sao Tome and	Trinidad and	
New Zealand	Saudi Arabia	Tunisia	
Nicaragua	Senegal	Turkey	