Factor Proportion Theory: Evidence from Kenya

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Abstract: This paper examined empirically if Kenya's pattern of trade with India is consistent with Heckscher-Ohlin theory, using a fixed-effect panel data model and macroeconomic variables for the period 1970 to 2013. The findings indicate a strong trade relation between Kenya and India, with Kenya specializing in the exportation of primary products to India. Overall, the findings indicate that the Kenya–India trade relation is consistent with the factor proportions theory, which spells out the trade relationship between the North – South poles. The paper recommends that Kenyan government should encourage Indian investors to establish subsidiaries of their manufacturing companies in Kenya in order to reduce the cost of importation of capital intensive goods and create jobs in the domestic economy.
Keywords: Kenyan economy, Heckscher-Ohlin theory, Labour force.

INTRODUCTION

In the Heckscher-Ohlin (H-O) model, countries tend to export the commodities that use relatively intensively their abundant factors of production [1, 2]. This framework had been considered by economists as most relevant for predicting the patterns of trade between two countries. Among these economists are Krugman and Obstfeld [3], Lancaster [23], Brander [4], Falvey [5], as well as Richard, Courant and Douglas [6]. Indeed, actual patterns of trade in the Heckscher-Ohlin framework confirm that developing countries should specialize in the production and export of primary goods and labour intensive manufactures whose factors of production are relatively abundant. For most developing countries, this provides an incentive to expand labour-intensive production. In this situation, the Heckscher-Ohlin framework can provide a "vent for surplus" that is a larger market that will permit a country to increase its output and employment.

It has been shown that countries with successful patterns of trade and other prudent economies and developmental policies would wean themselves from heavy reliance on foreign aids and use trade as one of their engines for economic development [7]. Apart from the increasing importance of inter-industry trade theory in predicting the patterns of trade in developing world trade, little or no studies have been conducted to empirically examine whether Kenya's pattern of trade is consistent with trade regime characterized by Heckscher-Ohlin theory. The main thrust of Heckscher-Ohlin framework is to encourage a nation to use their relatively intensive abundant factors of production to satisfy domestic production and international markets for the purpose of achieving and accelerating economic growth and development. One thing is at least very clear; Kenya is endowed, both in natural and human resources. The pool of resources in Kenya is unquantifiable such that given a dynamic leadership and strong institutional framework, economic prosperity would have been achieved [8]. Therefore, the goal of this paper is to bring together the measures of factor abundance and factor intensity in order to determine whether Kenya's pattern of trade is consistent with the Heckscher-Ohlin framework.

Understanding the factor abundance and factor intensity theory of Heckscher-Ohlin is very important in determining the pattern of trade that Kenya should adopt in order to reap the potentials of an economy abundantly endowed with labour and fertile land resources, among others. This study is also significant as it will help the Kenya government to understand the need for an urgent diversification of the economy through expansion of sectors such as agriculture and manufacturing. Overall, the broad objective of this study is to examine empirically if the patterns of trade between Kenya and its trade partners are consistent with the factor proportions framework, using fixed effect methodology. The result will help to predict the attainability of the growth outlooks of 6.6% for 2016 and 7% for 2017 projected by the World Bank for Kenya.

Kenya's Trade Pattern in Retrospect

Because nations are differently endowed in terms of natural resources and human capabilities, trade

has become a popular method of allowing nations to get the products that they are not able to produce. As supported by the Heckscher-Ohlin model, countries tend to export the commodities that they use relatively intensively their abundant factors to produce [1, 2]. The theory assumes trade to exist only between developed and developing countries. In a North – South trade between Kenya and India, Kenya's primary exports are tea, flowers, coffee and legumes, which each make up more than three percent of the country's total exports as of 2014. Out of 20.8% of Kenya's exports, tea is the primary export product. Kenya's imports from India include machinery, transport equipments, motor vehicles, metals, plastics and electrical equipments. In fact, India has remained Kenya's largest import partner for several years. In 2009, India's imports to Kenya accounted for more than 11% of its total import volume [9].

The main trade partners for Kenyan products are Uganda, Tanzania, the Netherlands, the United Kingdom, the United States, Egypt and Pakistan. Among all these countries, the study accesses the trade relationship between Kenya and India. This is because, in 2009, Kenya's exports grossed over US$4.9 billion, and India is the largest export partner of Kenya, accounting for more than 10% of the total export volumes. Table 1 below summarizes Kenya's trade interactions with India over the period 2006 - 2008.

Table 1: KENYA'S Top 10 Export Products to India

Rank	Description	Kenya's Exports to India 2006	Kenya's Exports to India 2007	Kenya's Exports to India 2008	% growth 2007/2006	% growth 2008/2007	% CAGR over 3 year
Total	All products	52.22	86.73	98.87	66.08	14.01	37.60
1	Inorganic chemicals, precious metal compound, isotopes	19.37	38.60	56.65	99.27	46.74	71.00
2	Salt, sulphur, earth, stone, plaster, lime and cement	5.64	6.34	10.48	12.42	65.35	36.34
3	Coffee, tea, mate and spices	5.93	7.25	9.38	22.41	29.34	25.83
4	Raw hides and skins (other than furskins) and leather	5.58	6.03	5.71	8.01	-5.29	1.14
5	Edible fruit, nuts, peel of citrus fruit, melons	1.57	0.86	3.72	-45.21	333.92	54.19
6	Lead and articles thereof	0.15	2.04	2.17	1,278.38	6.18	282.56
7	Wool, animal hair, horsehair yarn and fabric thereof	1.73	2.33	1.88	34.93	-19.25	4.39
8	Vegetable textile fibres nes, paper yarn, woven fabric	0.85	1.58	1.50	85.58	-5.12	32.70
9	Copper and articles thereof	1.45	0.74	1.14	-49.07	53.78	-11.50
10	Pearls, precious stones, metals, coins, etc	1.34	1.43	0.89	6.58	-37.45	-18.35

Source: World Development Indicator

The progress made by Kenya as shown in Table 1 can be attributed to be the dividends of its trade policies over the years. For instance, Kenya adopted a protectionist stance in the manufacturing sector together with an industrialization policy based on import-substitution industrialization strategy to cater for the local market. These policies were underlined by protective trade barriers after the country's independence in 1963. At that time, the preoccupation of the government was on the use of the import substitution strategy to achieve economic independence [9].

Towards the end of the 1970s after gaining economic independence through import-substitution industrialization, Kenya liberalized its trade policy. The government started recognizing the need for an export-oriented industrial strategy as indicated in Kenya National Development Plans of 1974-1978 and 1979-

83. Within this period, the trade policy shifted from import-substitution to export-promotion strategy, with commitment on trade liberalization and outward-looking development strategy [10]. This resulted in the establishment of the Export Compensation Scheme in 1976, leading to the initiation of a number of export promotion programmes. The export promotion programmes were mainly geared towards promoting manufactured exports, mainly labour-intensive manufactures in Kenya.

In the recent times, the number of tariff categories and maximum tariff rates had reduced from 25 to 11 and 170% to 70% respectively [11]. By 1997/98, the simple average tariff rate had been reduced to 16.2% and the trade weighted tariff rate to 12.8%, down from 25.6% [10]. This point to the patterns of trade adopted by Kenya together with regional trade integration measures under the East African

Cooperation that accounted for the dominant share of the increase in Kenya's exports, particularly in manufactured exports.

Kenya's Trade Policy

The 1960s and 1970s saw the introduction of regulatory and protectionist policies in virtually all key sectors of the Kenyan economy. Within this era, Kenya's trade efforts were mainly guided by import substitution strategy. This protection of the domestic market aided the development of industries in Kenya. The Policy was a key influence on the development of trade regime in Kenya over the first decade from independence. The objectives of the strategy were rapid growth of trade; easing balance of payment pressure; increased domestic control of the economy; and generation of employment. In the first decade of independence, the economy achieved an outstanding economic growth, with an average real Gross Domestic Product (GDP) growth rate of 6.6% during the period 1964-73 [9].

Following the external shocks in the 1970s, the first oil crisis (1973) and the collapse of the East African Community (EAC) in 1977, the Structural Adjustment Programmes (SAPs) were introduce in the early 1980s to address the structural rigidities, price instability and macro-economic imbalances that had become embedded in the Kenya economy that led to poor delivery of services by the public sector. The main thrust of the adjustment programme was to have a shift from a highly protected domestic market to a more competitive environment that would facilitate increased use of local resources, and outward oriented policies that would promote employment creation and export expansion. The implementation of the SAPs resulted to, among others, promotion of non-traditional exports, liberalization of market systems and reform of international trade regulations [12].

Furthermore, due to curtailment in donor funding, Kenya's economic performance deteriorated as depicted in its real GDP growth rate that fell from 5% in 1989 to 2.1% and 0.5% in 1991 and 1992, respectively. Following this serious macroeconomic instability, export oriented policies were introduced in the 1990s. These policies provided the framework for the adoption of export promotion strategy centered on creation of an enabling environment for export growth. This was to be achieved through institutional reform, reduction and restructuring of tariffs, abolition of export duties, introduction of export retention schemes, improvement of foreign exchange and insurance regulations and the establishment of the National Export Credit Guarantee Corporation. This strategy proposed incentives that aimed at encouraging industries to produce for exports. Overall, these policies led to improved efficiency, stimulated private investment and increased the economy's foreign exchange earnings [12].

To incorporate the growing trend of trade in services, Kenya in 2004, adopted a long term policy called "Vision 2030 and National Trade Policy". This policy therefore has the potential to make Kenyan economy become a more competitive player in the regional and global trade [13]. According to Nyangito [24], Vision 2030 policy is geared towards making Kenya a globally competitive and prosperous nation with high quality of life. It is obvious therefore that Kenya's wide participation in national and international trade expansion, especially its bilateral trade with India, is geared towards achieving greater economic growth and development.

REVIEW OF RELATED LITERATURE

Patterns of trade deal with what goods and service a country trade, with whom and in what direction. Explaining the patterns of trade is one of the major purposes of trade theory, especially which goods a country exports and which it imports. Different trade theorists explained patterns of trade among which include Heckscher-Ohlin theory. According to Mac-Dougall [14], verification of the Heckscher-Ohlin labour productivity is important in determining the basis for patterns of trade and direction of trade. Myecongjoo, Farhad and Henry (2006) noted that differences in relative endowments of productive factors across countries explain patterns of production and trade. Thus countries would export products using their abundant factors intensively.

Ugbor, David-Wayas and Nwanosike [7] show that Nigeria's pattern of production and trade is inconsistent with the predictions of the Heckscher-Ohlin theory. This is because the Nigerian experience shows that the Heckscher-Ohlin theory is a dynamic model rather than being static. The Nigerian experience on the Heckscher-Ohlin theory is quite a major departure from other countries of the world. As such, the key policy implication from the study is that Nigeria should shift her patterns of production and trade from capital intensive oil production to labour intensive agricultural production as capital is scarce resources in Nigeria. In other words, Nigeria should make intensive use of her relatively abundant labour resources, rich soils and favourable climatic conditions.

On further determinants of trade pattern, Ulasan [15] noted that differences in technology motivate advantageous international trade, thereby determining the pattern of specialization, production and trade. Wang, Eric, and Kathleen (2000) showed that physical and human capital accumulation determines the patterns of trade. Accessing the pattern of trade in Kenya in early 2000, Meredith [16] analyzed the patterns of intra-regional trade and indicated that the trade linkages between the EAC member states are not strong, except possibly for the trade between Kenya and Uganda. In addition, the EAC CET will reduce Kenya's external

tariffs and therefore, lower the price of imports. In these circumstances, one might expect the EAC customs union to have a positive impact on Kenya's trade.

With the current trade liberalization and Vision 2030 policy, Kenya has diversified her trade interaction beyond EAC regions. According to Rachdi and Mbarek [17] and Onuonga [18] Kenya's structure of the import bill shows that the dominance of India as Kenya's import partner has been rising gradually in the last 10 years, while the import trading between Kenya and other East African countries have remained depressed. The trend and pattern of trade between India and Kenya suggest many possible impacts as this study will reveal in its findings. Interestingly, the trade between Kenya and India is a demonstration of North-South trade, which is consistent with the Hechscher- Ohlin framework. In this trade interaction, Kenya primarily exports tea, flowers, coffee and legumes, which contribute almost 25% to the national production as of 2014. On the other hand, Kenya's imports from India include sophisticated capital stock like machinery, infrastructure, communication equipment and manufacture goods like textiles, clothing and footwear, and soap. To what extent is this pattern and interaction between these countries effective considering ' the dependency arguments'. This and more others will be answered through the findings of this study.

METHODOLOGY

The analytical framework of the model was specified on the basis of an individual-specific effect model which is applied to panel data. The individual-specific effect model is based on the presence of an unobserved heterogeneity across the individual units in the panel dataset. The unobserved heterogeneity often denoted as α_i is treated either as a fixed effect or a random effect based on the assumptions made about the unobserved heterogeneity. And treating this unobserved heterogeneity across the individual unit in the panel dataset implied adopting a random effect model.

The treatment of the individual effect as a Random Effect Model is based on the assumption that the unobserved heterogeneity (α_i) is uncorrelated with the observed heterogeneity (X_{it}). However, our choice of treating the unobserved heterogeneity α_i as a random effect model was justified after subjecting the model to Hausman test as suggested by Cameron and Trivedi [19].

Model Specification

The general model is specified in its implicit form as follows:

RGDP$_{it}$ = f(import$_{it}$, export$_{it}$, exchrate$_{it}$, lforce$_{it}$, capital$_{it}$)   (1)

where:
RGDP$_{it}$ = Real Gross Domestic Product across the individual countries and over time;

export$_{it}$ = export trade across the individual countries and over time,
import$_{it}$ = import trade across the individual countries and over time,
exchrate$_{it}$ = Exchange Rate across the individual countries and over time,
lforce$_{it}$ = labour force across the individual countries and over time,
capital$_{it}$ = capital across the individual countries and over time.

The model in (1) is generally specified in its econometric form as follows:
$$RGDP_{it} = \beta_{ot} + \beta_1 imports_{it} + \beta_2 exports_{it} + \beta_3 exchrate_{it} + \beta_4 Lforce_{it} + \beta_5 capital_{it} + \alpha_i + \varepsilon_{it}$$
(2)

where αi is the country specific effect and ε_{it} is the error term. Since $E(\alpha_i, X_{it}) \neq 0$ which will result to estimation bias, the country effect α_i is eliminated by taking the mean difference of equation (2) to obtain:

$$RGDP_{it} = \beta_{ot} + \beta_1 imports_{it} + \beta_2 exports_{it} + \beta_3 exchrate_{it} + \beta_4 Lforce_{it} + \beta_5 capital_{it} + \mu_{it}$$ (3)

Instead of treating β_{0i} as fixed, we assume that it is a random variable with a mean value of β_0 (no subscript *i* here). And the intercept value for an individual country can be expressed as:
$$\beta_{ot} = \beta_o + \varepsilon_i, i = 1, 2, \dots, N$$ (4)

where ε_i is a random error term with a mean value of zero and variance of σ^2_ε . This therefore leads to equation (5) given by:

$$RGDP_{it} = \beta_0 + \beta_1 imports_{it} + \beta_2 exports_{it} + \beta_3 exchrate_{it} + \beta_4 Lforce_{it} + \beta_5 capital_{it} + \omega_{it}$$ (5)

where ω_{it} is the composite error term defined as:
$$\omega_{it} = \varepsilon_{it} + \mu_{it}$$ (6)

The test which was developed by Hausman [20] is carried out by comparing the difference between fixed effect and random effect estimators. Under the null hypothesis, individual effect is fixed. Thus, rejecting the null hypothesis means that the individual effect is random. The study covered the periods from 1970 to 2013. The choice of the period is due to availability of data. The data is obtained from Central Bank of Nigeria Statistical Bulletin and World development indicator. The data is analyzed using Eview 8.0 software.

EMPIRICAL RESULTS AND DISCUSSIONS

The model to be estimated is a panel data model, hence, the Hausman test was carried out in order to test for the presence of fixed effect. The test compared the difference between fixed effect and random effect estimators. Under the null hypothesis,

individual effect is random. The Arellano-Bond test was also conducted to check for correct specification, validity of instruments and autocorrelation in the residuals. The results of the estimated model is therefore presented in Table 2 below.

Table 2: Summary of the Regression Result with RGDP as Dependent Variable

VARIABLES	COEFFICIENTS	T- Value	Prob. Value
IMPORTS	-0.1036526	-1.62	0.113
EXPORTS	0.0501836	0.79	0.433
EXCHANGE	0.107103	2.00	0.052
LABOUR	-0.6154074	-1.83	0.075
CAPITAL	0.0986	2.86	0.006
CONS	95.13531	3.91	0.000
F(1, 43) = 706.57	Prob > F = 0.0000	sigma_u = 68.535806	sigma_e = 3.0832363

Source: Author's computation

From the estimation, the model was considered as fixed effect model. The term "fixed effects" is due to the fact that, although the intercept may differ across individuals (here the two countries), each individual's intercept does not vary over time; that is, it is time invariant. This is in line with Hausman [20] which was carried out to view distance measure between the fixed effects and the random effects estimators (that is, by comparing the difference between fixed effect and random effect estimator). Under the null hypothesis, individual effect is random. Thus, rejecting the null hypothesis means that the individual effect is fixed. This offers model the benefit of being consistent even when the estimators are correlated with the individual effect.

Furthermore, the result from estimation show that trade relationship between Indian and Kenya are unbalance and unfavourable. This is depicted by the coefficients of exports and import between the two countries. Merchandise export earnings of Kenya as a percentage her GDP had for example declined to 5%, thus showing a tremendous deterioration of Kenyan exports within the time in view. See Figure 1 below for additional for further evidence.
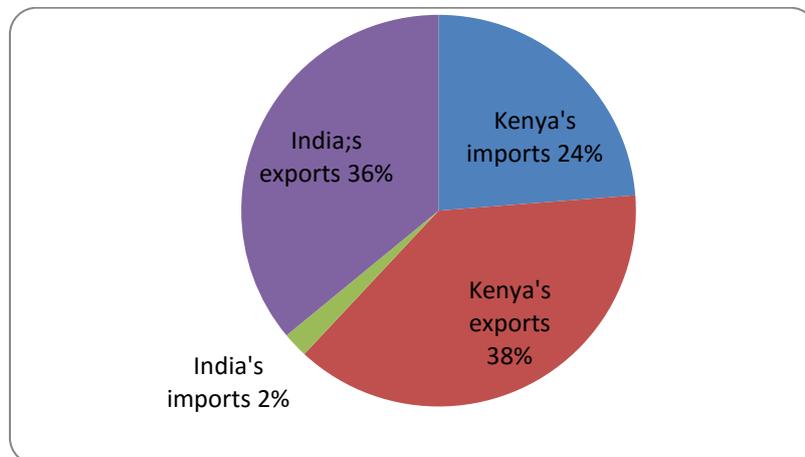

Fig-1: Fraction of Kenya's Trade with India
Source: Authors' Plots

From the Figure 1, the pattern of trade between the two countries show that India exports 36% of the manufactured goods to Kenya and imports only 2% from Kenya. This confirms World Bank [21] findings that Kenya's economy grew by 5.4% in 2014. This implies that the trade pattern between Kenya and India has been unbalanced against Kenya, as the results depicted.

With regards to the patterns of trade between Kenya and its trade partner, the result shows a strong trade relationship between Kenya and India. The study revealed that Kenya specialized in the exportation of primary products like Coffee, tea, mate and spices, Raw hides and skins, leather, Lead, Wool, animal hair, horsehair yarn. On the other hand, Indian exports manufactured products like machinery, infrastructure, communication system and manufacture goods like textiles, clothing and footwear, and soap to Kenya. This is in conformity with the Heckscher-Ohlin theory that spells out trade relationship between North – South poles (that is between advanced countries and developing countries).
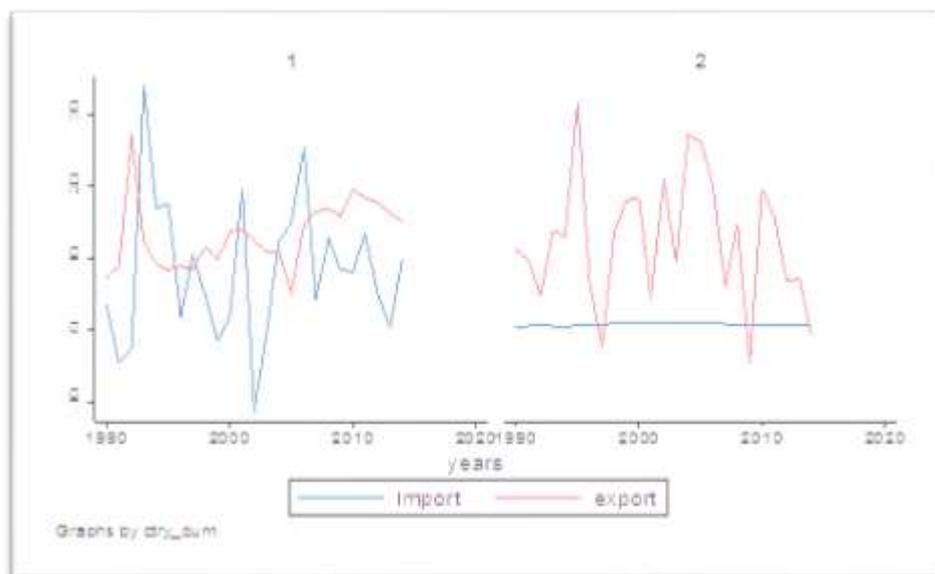
Fig-2: **Patterns of Exports and Imports between Kenya and India**
Source: Authors' computation

From the figure above, the trade pattern shows strong export patterns and weak import patterns between the two countries. This finding is at variance with the finding of Ugbor, David-Wayas, and Nwanosike [7], which revealed that Nigeria's pattern of production and trade are inconsistent with the prediction of Heckscher-Ohlin theory.

Furthermore, the result unveils inverse relationship between labour force and output productivity between the two countries. Economic expectations suggest that increase in labour force implies increase in productivity. That is, one would expect that abundant labour force would consequently enhance productivity. The reverse seems to be the case. The unexpected sign of the variable could be explained by the mismatch between labour demand and supply. The demand for labour is derived from production and distribution activities in the goods and services sectors. Labour market in Kenya indicates that the demand for labour has been volatile. In the case of India, the unexpected sign shows a paradigm shift from labour intensive to capital and technologically intensive production in India and other advanced nations. This is just similar to Umoru and Omolara [22], which revealed a mismatch between the supply of skilled labour and the absorptive capacity of the labour market in Nigeria. Such a mismatch according to the study culminated into brain drain, increase in social vices and crimes, high dependency ratio, and decline in national output and/or fall in productivity.

Another essential finding in the study lies in the statistical significance of capital as a factor of production. This indicates that a 1% increase in capital as a factor of production leads to approximately 9.86%

increase in real GDP, *ceteris paribus*. However, it is the presence and sustainability of this capital in India and lack of it in Kenya that gives room for the north-South trade between these countries as postulated by the Heckscher-Ohlin theory. In other words, continuous acquisition of capital (technology) will result to long-term growth in the volume of production or trade between these trade partners.

CONCLUDING REMARKS
Based on the findings of this paper, the following policy measures are in order for a better pattern of trade between Kenya and its trade associates, as well as long term sustenance of output growth in the economy.

➢ From the findings, Kenya is still a traditional agricultural producer and exporter of tea and coffee. Although there have been efforts towards diversification of the export sector, Kenya's exports are still dominated by primary agricultural products. There is an urgent need for the government to intensify its efforts towards diversifying its export sector. This will in turn reposition the country for greater competitive advantage.

➢ Kenya government should urge their trade partners to establish subsidiaries of their manufacturing companies in Kenya. This will directly reduce the rate and cost of importation of capital intensive goods as well as resulting in employment generation in the country. Apart from reduction in importation of goods, the employment generation will however, address the mismatch between labour demand and supply as identified in the study, which

will have multiplier effect on productivity in the economy.

➢ Kenya's trade policy should be subsumed into the country's vision 2030 programme that aims at making the country a globally competitive and prosperous nation, with high quality of life and sustainable growth. Government should ensure that Kenya's wider participation in the global economy for national and international trade expansion should impact positively on Kenya's economic growth.

➢ Government should set out to identify viable trade strategy and macroeconomic policy characterized by technological acquisition and export. This can be done by giving of subsidies to manufacturing companies. This will help to elucidate trade relationships among other sovereign states other than India.

➢ The Kenya government should consider the development of transport network which will smoothen the movement of goods and services across the borders.

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