

## **Export Diversification and Intra-Industry Trade in Africa<sup>1</sup>**

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**Abstract:**

Intra-African trade, which has remained under 12 per cent in the last decade, is low compared to other major regions of the world. In January 2012, the African Union (AU) Summit of African Heads of State and Government endorsed the theme of ‘Boosting Intra-African trade’ and called on Member States, Regional Economic Communities (RECs) and the AU Commission to promote industrial development with a view to diversify economies and moving away from heavy reliance on traditional primary commodities for export. Using disaggregate export and import statistics Harmonized System at the 6-digit level from BACI and COMTRADE data sets between 1998 and 2009, measures of export diversification (using Herfindahl-Hirshman Index) and intra-industry trade (using Grubel-Lloyd Index) are computed for 49 African economies for which data is available. Preliminary results tend to indicate that while both export diversification and intra-industry trade in Africa are generally low, there are exception cases. In addition, a positive correlation between export diversification and intra-industry trade is found for the sample of African countries. This has implication for policy dialogue suggesting that any future trade policy designed to favor export diversification has positive implications for intra-industry trade and vice versa. Other findings from the technical work provide two important contributions to the direction of current trade policy dialogue on boosting Intra-African trade. First, export diversification and intra-industry trade policies should not be treated in isolation. Second, we identify constraints towards export diversification and intra-industry trade in Africa crucial towards better understanding and subsequently developing effective program of actions for boosting Intra-African trade.

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## **(1) Introduction**

In January 2012, the African Union Summit of African Heads of State and Government endorsed the theme of ‘Boosting Intra-African Trade’, paving the way towards fast-tracking a Continental Free Trade area (CFTA) with a tentative timeframe of 2017. The January 2012 decision mandated UNECA, AUC, AfDB and Member States to collaborate closely towards the implementation of relevant action plans at the national, regional and continental levels on boosting intra-African trade and the establishment of the CFTA. In particular, the January 2012 Summit recognized the low level of trade between African countries called upon Member States, Regional Economic Communities (RECs) and the AUC to promote industrial development policy and value addition to diversify African economies and thereby moving away from heavy reliance on traditional primary exports.

It is against this backdrop that this study attempts to contribute to the current trade policy dialogue on boosting intra-African trade in four aspects. First, the study examines patterns of export diversification for African economies. Second, a measure of Intra-Industry trade for African economies is estimated. Intra-industry trade is understood as simultaneous import and export of similar but differentiated goods. Third, the study evaluates potential linkages between export diversification and intra-industry trade in Africa. Informed by the patterns of trade in African economies, constraints towards export diversification and intra-industry trade are discussed and ways to overcoming these constraints are explored.

The paper begins by briefly discussing the theoretical underpinnings behind intra-industry trade and export diversification. Second, it presents the evolution and status of intra-industry trade and export diversification in Africa. Third, it attempts to examine the linkages between intra-industry trade and export diversification as well as exploring potential pathways to enhancing intra-industry trade and/or export diversification in Africa. Fourth, the paper discusses constraints to intra-industry trade and export diversification in Africa. Finally, policy recommendations are formulated to conclude the paper.

## **(2) Theoretical Underpinnings of Export Diversification and Intra-Industry Trade**

### **(i) *Export Diversification***

Export expansion can be either through the extensive margin—new products or new markets—or the intensive margin—more of current products. Export diversification is therefore understood as the expansion of exports due to new products or new markets—extensive margin. Amurgo-Pacheco and Pierola (2008) provide a useful narrower definition by discussing a geographic dimension with export diversification via the extensive margin is the export of new products to existing markets, old products to new markets, and new products to new markets.

Why export diversification is important for Africa? Export diversification—and economic diversification in general—build resilience of poorer countries to external economic shocks. Diversification is more relevant today to Africa as the impact of the global financial crisis affect both rich and poor economies globally. For Africa, with its high dependence on primary commodities and fluctuating world prices on most primary goods, there is therefore a need for Africa to pursue developmental strategies which promote export diversification. In addition, Africa requires high and sustained growth to make progress in combating poverty. Export diversification is widely seen as a positive trade objective in sustaining economic growth (Brenton, Newfarmer and Walkenhorst 2007). Delgado (1995) argued that diversifying the agricultural export base and diversifying the economy across sectors are central to the long-run growth strategies in Africa given the high concentration ratio of agricultural exports (food and beverages typically account for well over half of merchandise exports in non-oil exporting African countries). Moreover, there is convergence in the developmental literature that growth requires structural transformation (primary—manufacturing—services trade), hence African economies must diversify production base into high-value added production in order to sustained economic growth<sup>6</sup>. Diversification is sometimes claimed to be of importance not just for resource-rich countries, but as a pre-requisite for economic growth (Economic Commission for Africa, 2007).

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<sup>6</sup> We are grateful to Patrick Osakwe for bringing these issues to our attention.

Virtually every theory of international trade predicts that a larger economy will export more in absolute terms than a smaller economy. Nevertheless, trade theories differ in predicting how relatively larger economies export more (Hummels and Klenow, 2005). One strand of literature emphasizes on the export expansion through the intensive margin, based on seminal work by Armington (1969). Brenton *et al.* (2007) argued that low income countries focus on greater differentiation of existing products, rather than attempting to diversify directly into new export categories. On the other hand, some have argued for the expansion of export via the extensive margin, based on the influential work of Krugman (1980). However, Hummels and Klenow (2005) argue that neither the intensive margin hypothesis by Armington (1969) nor Krugman's extensive margin hypothesis fully explain international trade patterns in developing countries and provided an empirical framework dividing trade expansion into both intensive and extensive. The authors argued that consumer preferences for variety increases as economic development increases, thereby providing an incentive for export expansion in the extensive margin. Their study found that larger economies export higher volume of each goods (intensive margin), export a higher variety of goods (extensive margin<sup>7</sup>) and export higher quality goods.

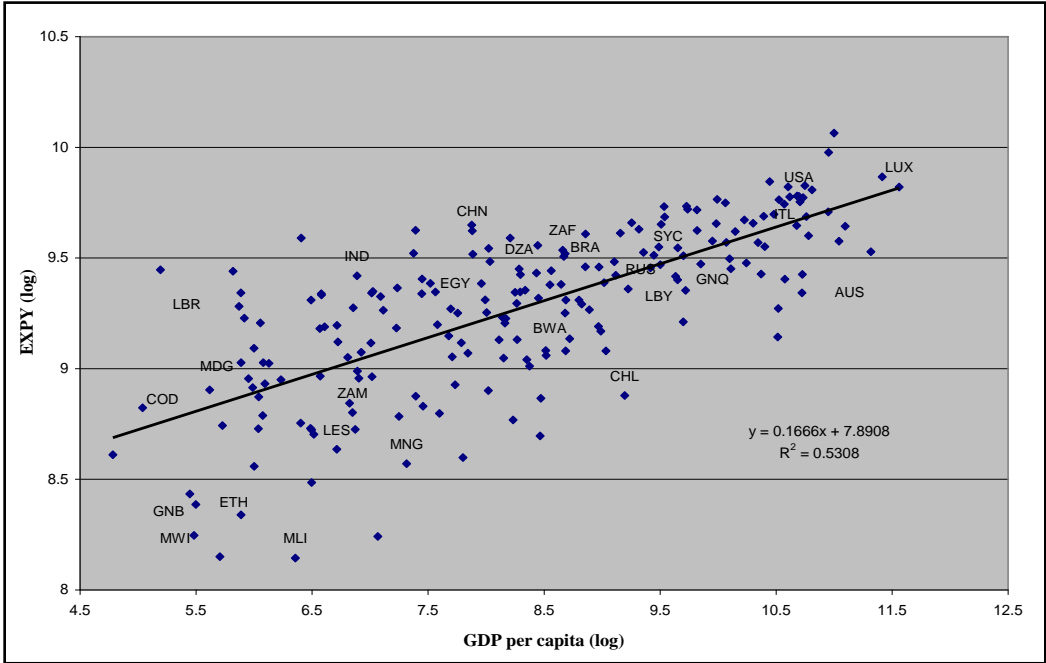
Imbs and Wacziarg (2003) found that the process of diversification follows a two stage process (U-shape relationship), in which growth in early stages of development is accompanied by diversification, until a turning point upon which the trend reverses toward increasing specialization once more. Few African economies are at the level of development associated with the turning point towards specialisation, suggesting that further growth on the continent can lead to greater diversification. This study adopts a measure of GDP per capita, and there is faint evidence of this relationship in Africa, although oil exporting economies with relatively large GDPs but with poorly diversified exports are anomalies inconsistent with the two-stage diversification hypothesis. A recent finding (Spence and Karingi 2011) suggests that many African countries are currently engaged in export activities incommensurate with their level of development and hence associated with significant opportunity costs. An outcome based measure

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<sup>7</sup> The study found that the extensive margin accounts for 62 per cent of the greater exports of larger economies based on data from UNCTAD TRAINS collected from national statistical agencies of 76 importing countries covering all 227 exporting countries in 1995.

of export sophistication<sup>8</sup> (*EXPY*) in which goods are weighted according to the income of the exporting countries is plotted against GDP in Figure 1. The main contribution of the Hausmann, Hwang and Rodrik (2007) study which proposed this measure is that future growth is significantly influenced by current export sophistication. Countries above the line such as Liberia, Madagascar or Egypt can be thought of as exporting products that are ‘richer’ than they are, and as such can expect higher growth in the future. Nations such as Malawi, Ethiopia and Mali, which are below the line and therefore exporting products of lesser sophistication than those having comparable incomes, will grow more slowly unless they can move into exporting more sophisticated goods.

**Figure 1: Income level of Exports (EXPY) vs. GDP per capita, 2007**



**Source:** Karingi and Spence (2011)

Imbs and Wacziarg’s (2003) U-shape relationship was later verified for developing countries by Cadot, Carrere and Strauss-Khan (2008). The later study suggests that growth at the income levels of most African economies should prompt diversification. As developing economies grow, consumption patterns change through Engel effects, that is increased demand

<sup>8</sup> Export sophistication is basically referring to diversification of exports into new products (extensive margin products) and usually with higher value-added.

for a greater variety of goods as income rises. A rising middle class in Africa can be expected to demand a larger variety of goods (AfDB, 2011). UNECA's work on export diversification has reiterated the justifications for diversification with respect to the growth dynamics (UNECA and AUC, 2007, 2011; Karingi and Spence, 2011).

Ben Hammouda *et al.* (2006) offer a richer analysis of the diversification regimes in Africa, found that there is little economic diversification despite prolonged periods of peace and stability, some African economies remain poorly diversified, such as Burkina Faso and Seychelles. Also, some African economies—for instance, Mozambique and Malawi—started the process but have not made any significant breakthrough in diversifying agricultural products and yet to diversify into the higher value activities. Nonetheless, the authors found that some African economies with deepened diversification process are indeed engaging in structural transformation in a sustainable manner. Tunisia's horizontal diversifications into high value activities and Madagascar's capture of vertical value chains in clothing and apparels are exemplarily. However, the study also found other African economies who were backsliding in the diversification process. Typically, African economies which have struggled to move into new sectors is due to rising commodity prices which leads to an ever increasing concentration of exports, enclave economies and Dutch disease effect<sup>9</sup>. Guinea-Bissau and Angola can be categorised by this regime. Lastly, the study found that countries which went through conflicts see their diversification prospects negatively impacted. A category which initially included countries like Liberia, Sierra Leone and the Democratic Republic of Congo, have positive diversification outcomes in more stable years.

Export diversification through product differentiation in Africa has not been subject to extensive economic scrutiny. Brenton *et al.* (2007) articulate a convincing case for low income countries to focus on greater differentiation of existing products, rather than attempting to diversify directly into new export categories. This stems from the observation that export growth at the intensive margin is far more significant for developing countries than that at the extensive margin (i.e. export growth is dominated by intensifying trade in existing products rather, than undertaking new export activities – see Amurgo-Pacheco and Pierola, 2007; Brenton and

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<sup>9</sup>A negative relationship between increased exploitation of natural resources and a decline in manufacturing sector.



Newfarmer, 2009). This may be linked to the fact that the gains from developing new goods for export are socialised through information spillovers, yet the costs are private, leading to a sub-optimal level of innovation (Hausmann and Rodrik, 2003).

Moreover, when developing countries do undertake extensive expansion, the survival rate is very low. With imperfect information firms are *ex ante* unaware of the profitability of entering foreign markets, and evidence suggests that Africa is particularly poor at sustaining export relationships once they are created. Besedes and Prusa (2007) show that African exports would have had a 3 percentage points higher growth rate if it had South Korea's survival compared to a 1.8 percentage points higher growth rate if it had South Korea's deepening (growth of trade in surviving relationships). For Malawi, just 35 percent of export flows survive beyond one year (Brenton *et al.*, 2007). Investing in improving the quality of existing products is further warranted on the grounds that rich countries import more from countries that produce higher quality goods (Hallack, 2006). In the policy framework of 'new structural economics' (Lin, 2010) export diversification is best achieved by focusing on existing comparative advantage, where industries are competitive, leading to the capture of economic rents for reinvestment and subsequent upgrading of endowments structures.

While this is suggestive of a need to prioritize intensive expansion through greater differentiation, Kilnger and Lederman (2006) and Cadot, Carrere and Strauss-Khan (2008) show that the process of diversification (as opposed to export growth) in low income countries is driven by inside the frontier innovation (emulations) and extensive expansion, suggesting that African countries *should* undertake new export activities if it is to succeed in diversifying its exports, but that they should be in industries in which there is already existing expertise. In practice the dichotomy between intensive and extensive expansion is of little prescriptive utility as export growth and diversification requires the upgrading of production of existing exports and the undertaking of new export activities. This implies that African economies need to explore dynamic comparative advantages<sup>10</sup> when promoting diversification. These are potential sectors outside Africa's main comparative advantage sectors of primary commodities and fuel. The role

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<sup>10</sup> We thank Patrick Osakwe for raising this issue to our attention.

of developing the manufacturing sector therefore is of crucial importance. Structural adjustment is of course a costly exercise and therefore indentifying the potential success sectors is essential.

The quality of institutions also matters for diversification. Rauch (2007) presents a model in which institutional reforms is conducive to allowing firms to enter higher value production activities and improve the results of trade liberalization relative to those targeted towards the lower value production. Tybout's (2000) found that differences between manufacturing efficiency in developing country firms relative to developed country counterparts are driven by low incomes in target markets, detrimental macro-policies, high transportation costs, bureaucracy, and poor rule of law. Given the rising incomes and improved macro-stability in many African economies, transportation costs and improved rule of law emerge as policy priorities. Improving intellectual property rights, in particular, can help to privatize some of the positive externalities generated by new exporters which lead to sub-optimal innovation (Hausmann and Rodrick, 2003). Greater adherence to international metrology standards is crucial to ensure that differentiated goods can be assessed on a level playing field. With respect to infrastructure, its negative impact on trade costs is well established (Freund and Rocha, 2010; Limao and Venables, 2001).Cheaper international transit is also associated with extensive expansion (Dennis and Shepard, 2007; Pearson, 2010), while recent evidence from Eastern Europe shows it is also a driver of product quality (Harding, 2009). Karingi and Spence (2011) also found infrastructure to be a significant determinant of both productivity and export sophistication in the African context.

Overall, while the literature on export diversification have argued for the prioritization of intensive or extensive margins respectively or both, we put forward an argument that there is a case for African countries to pursue export expansion through the intensive margin—through product differentiation—and also extensive margin conditional on existing industries competitiveness to compete in foreign markets.

## *(ii) Intra-Industry Trade*

Classical and neo-classical trade theories hypothesize that trade occurs because of differences between economies and the subsequent prospect of gains from specialization. The classical economist, Adam Smith (1776), developed the theory of absolute advantage and was

the first to argue the need for free trade to benefit a country. Two influential theories on international trade have been developed based on Adam Smith's absolute advantage theory. The first was David Ricardo's (1817) comparative advantage theory and later, two Swedish economists, Eli Hecksher and Bertil Ohlin, develop the Heckscher-Ohlin theory (1933) of international trade.

According to Ricardian comparative advantage, countries produce and export commodities in which they have a relative cost advantages and import those commodities in which they have a relative cost disadvantage. The Ricardian model explained that specialization based on differences in labour productivity using different technologies determines a country's comparative advantage. The Heckscher-Ohlin trade model extended the Ricardian model to show that countries specialize and export products that use their abundant and cheap factors of production and import products that use the countries' scarce (and therefore costly) factors. Hence, factor endowments (capital, land and labour) determine a country's comparative advantage.

However, a new trade pattern has emerged in most developed countries—increased intra-industry trade—of which the classical theories of Smith, Ricardo and Hecksher-Ohlin could not fully account for. Moreover, the classical trade theories above emphasised that firms have homogeneous productivity and thus are expected to trade in similar quality goods, which is no longer the case today. Balassa (1966) and Grubel (1967) were among the first to observe tendencies towards trade of similar but differentiated products—intra-industry trade—rather than specialization, in the trading patterns of the European Economic Community. Their work heralded the search for new theories of international trade capable of explaining the phenomenon of intra-industry trade. Of the 'new' trade theories, Krugman (1979; 1980) and Lancaster's (1980) monopolistic competition models are among the best known. They introduce two key assumptions: increasing returns to scale and consumers love for variety. Under the assumption of increasing returns to scale, large firms have a cost advantage over smaller firms and monopolistic competition ensues. Opening up to trade means firms can serve a larger market and hence reduce costs and consumers can benefit from an increased range of varieties. Increased competition may also force prices down but consequently forcing smaller firms out of the market. Brander and Krugman (1983) add that intra-industry trade may take place even in

instances in which goods are homogenous. Domestic monopolists may enter foreign markets at a lower price than that charged for goods at home leading to the prospect of ‘reciprocal dumping’: two-way trade in the same product, even if the goods is identical, the initial prices are equal and trade is costly<sup>11</sup>.

Theories of economic geography add another possible explanation for intra-industry trade. The role of external returns to scale is more explicit here. The argument is that geographical location of firms leads to the development of clusters with technological and pecuniary externalities and external economies of scale. The success of the gravity model of trade flows also underlines that distance matters, and proximity to markets is a significant determinant of trade (gravity models also reflect the Linder hypothesis, which proposes that trade often occurs between similar sized economies – see Linder, 1961). Lastly, geographically fragmented production sees different stages of the value change dispersed across countries according to factor endowments or labor productivity. This can occur within multinational firms or between firms at different levels of the supply chain. Ether (1982) presents a model through which restricted trade in intermediate goods requires final good production to be located near to intermediate goods, explaining the emergence of industrial clusters.

Debaere (2005) shows that new trade theory doesn’t hold for non-OECD countries where many of the key assumptions—namely mature industries capable of realizing economies of scale and trading highly differentiated goods—do not reflect realities of African economies. Somewhat crudely we can say that factor endowments determine North-South trade in line with the Heckscher-Ohlin framework, with new trade theories offering insights into North-North trade. However, intra-industry trade is emerging as vital to our understanding of South-South trade. Indeed, UNCTAD (2011) suggests three alternative analytical frameworks of South-South trade in which intra-industry trade is pivot. Firstly, the flying geese model (Akamatsu, 1962) of regional industrialization allowed East Asian economies to dovetail on the success of regional leaders. Intra-industry trade here is mechanism for learning, as low flying geese import more sophisticated goods from their neighbors at first as a means of acquiring production know-how which allows for their manufacture for reverse export. Secondly, new-centre-periphery patterns

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<sup>11</sup> In other words, Country A exports product “a” to Country B and importing “a bis” from any other country, including potentially but not necessarily Country B.

envisage that African countries may be subject to foreign FDI flows in the shape of large multinational corporations which engage in intra-firm, intra-industry trade, but bring little in terms of diversification or development. Thirdly, the emergence of regional growth poles may lead to external economies of scale and agglomeration economies, allowing for product differentiation and intra-industry trade. We may add a fourth analytical framework in the shape of regional value chains. In a Ricardian perspective of intra-industry trade relatively capital-intensive economies can specialize in the production of finished products, the intermediate inputs for which can be off shored to relatively labor abundant economies thereby generating region value chains (Falvey, 1981; Hirschberger *et al.*, 1994). The importation of raw materials for processing and subsequent re-export is an example of vertical intra-industry trade, that in which the traded goods which differ by quality rather than horizontally differentiated goods, which differ by price (Fontagné and Freudenberg, 1997).

### (3) The Status and Evolution of Export Diversification and Intra-industry Trade in Africa

#### (i) Export Diversification Index for Africa

This section evaluates the evolution and status of African economies export diversification patterns. A Normalised Herfindahl-Hirschman Index (see Hirshman,1964; UNECA and AUC, 2007) is use to estimate export diversification (or concentration), and is given by:

$$H = \frac{\sqrt{\sum_{i=1}^N \left( \frac{x_i}{\sum_{i=1}^N x_i} \right)^2} - \sqrt{\frac{1}{N}}}{1 - \sqrt{\frac{1}{N}}}$$

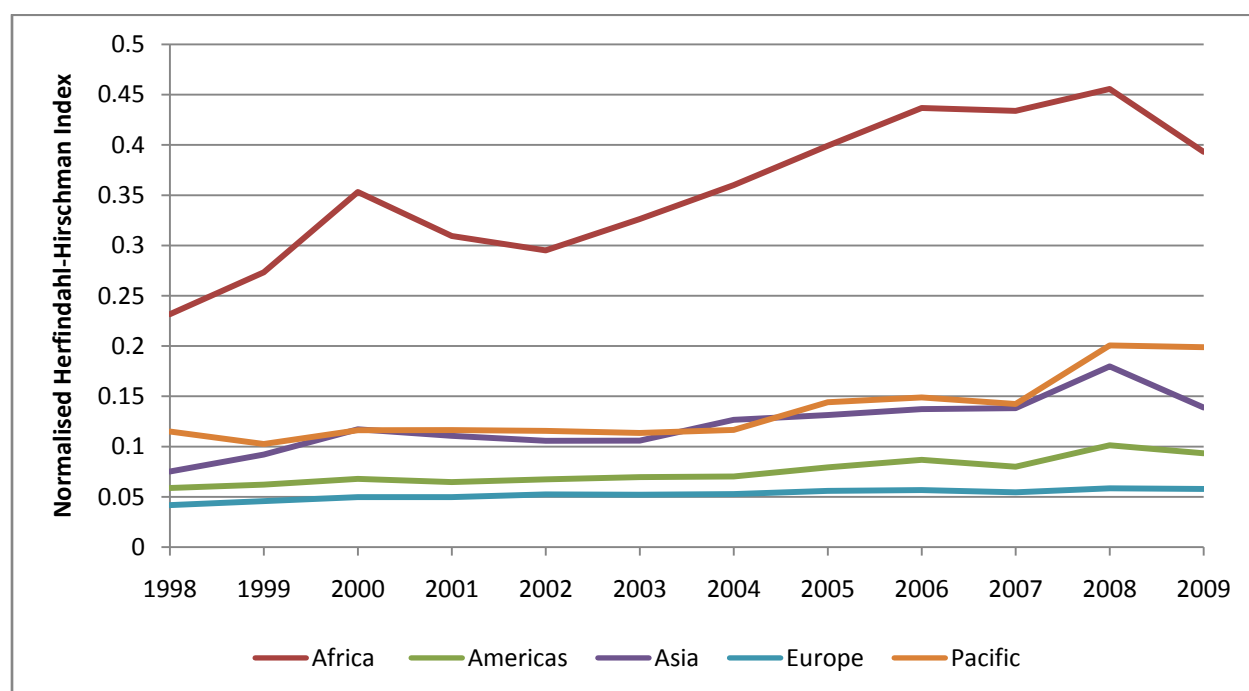
where ‘ $x_i$ ’ is the exports of product ‘ $i$ ’, and ‘ $N$ ’ is the number of products considered. The index ‘ $H$ ’ denotes values  $0 \leq H \leq 1$ ; an index value closer to 1 represents extreme concentration (low export diversification) and value close to 0 attests of high diversification.

The normalised Herfindahl-Hirschman Index is computed using the BACI dataset (Gaulier and Zignago, 2010) created by the *Centre d’Etudes Prospectives et d’Informations Internationales* (CEPII). The BACI dataset reconciles the trade flows reported to UN COMTRADE by exporter and importer at the Harmonized System 6-digit level (HS6), vastly improving the reliability of the data coverage *vis-à-vis* the original dataset. The database covers more than 200 countries and 5,000 products. We use the nomenclature Harmonised System 1996, which covers the years 1998 to 2009. Data is currently available for 51 of the 56 economies in the dataset. Western Sahara and St. Helena are omitted leaving a sample of 49. The Southern African Customs Union (SACU) is reported as one entity in the dataset. Hence, the external trade of its members (Botswana, Lesotho, Namibia, South Africa and Swaziland) is grouped together making it impossible to examine intra-industry trade between members (see

Visser, 2001; Carraneo and Fryer, 2003; TIPS and AusAid, 2006 for analysis of intra-industry between Southern African countries).<sup>12</sup>

Aggregating regional trade flows (see Figure 2), we find that Africa lags behind other regions in terms of export diversification, and is actually moving toward further concentration in the products it exports over the period 1998-2009. Given the prominent role of fuel in Africa's total exports, the rising fuel price over the period is one explanatory factor (a higher oil price increases the value of oil exports relative to non-oil exports and hence the export basket is more concentrated).

**Figure 2: Export Diversification by Regions (1998-2009)**



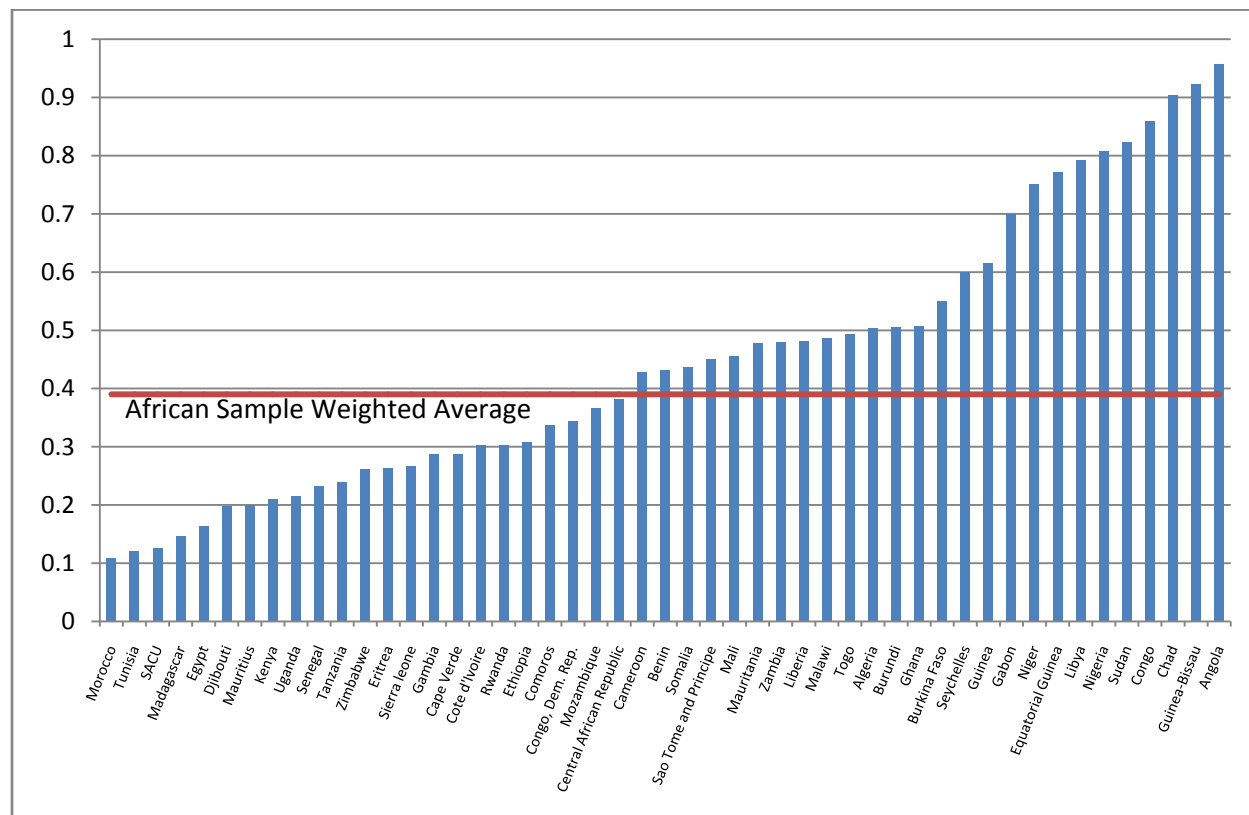
**Source:** Author's estimates using BACI data set.

Figure 3 reports the normalized-Hirschman Index for 49 African economies in 2009, with full results for each year in the period 1998-2009 presented in Appendix 1 Table 6. The most striking observation is the large heterogeneity in the concentration of exports, and a broadly uniform distribution across that concentration. Therefore, while it is true that Africa lags behind other

<sup>12</sup> Trade and Industrial Policy Strategies (TIPS) have also developed a set of analytical templates which includes data on intra-industry trade for SADC countries. They are available online at: [www.tips.org.za](http://www.tips.org.za)

regions with respect to export diversification, to say that African economies are poorly diversified masks the vast range of diversification regimes.

**Figure 3: Normalised Herfindahl-Hirschman Index, 2009**



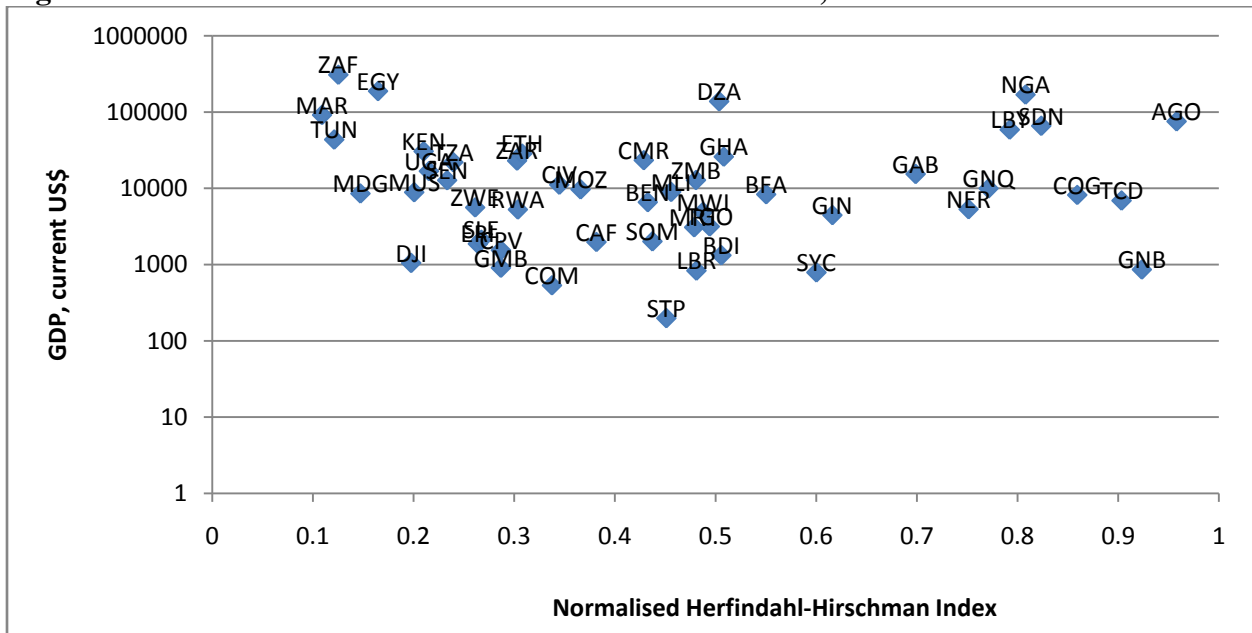
**Source:** Author's estimates using BACI data set.

What explains this heterogeneity? Given the large number of small economies in Africa one may expect that the ability to export a large spectrum of goods be limited by the size of the economy but there is no apparent correlation between GDP and diversification (Figure 4). Imbs and Wacziarg (2003) found that diversification follows a two stage process, in which growth in early stages of development is accompanied by diversification, until a turning point upon which the trend reverses toward increasing specialization once more in a relationship replicated for exports by Klinger and Lederman (2006), albeit at a slightly higher turning point. Few African economies are at the level of development associated with the turning point toward specialisation, suggesting that further growth can lead to greater diversification. Each study adopts a measure of GDP per capita, and there is faint evidence of this relationship in Africa



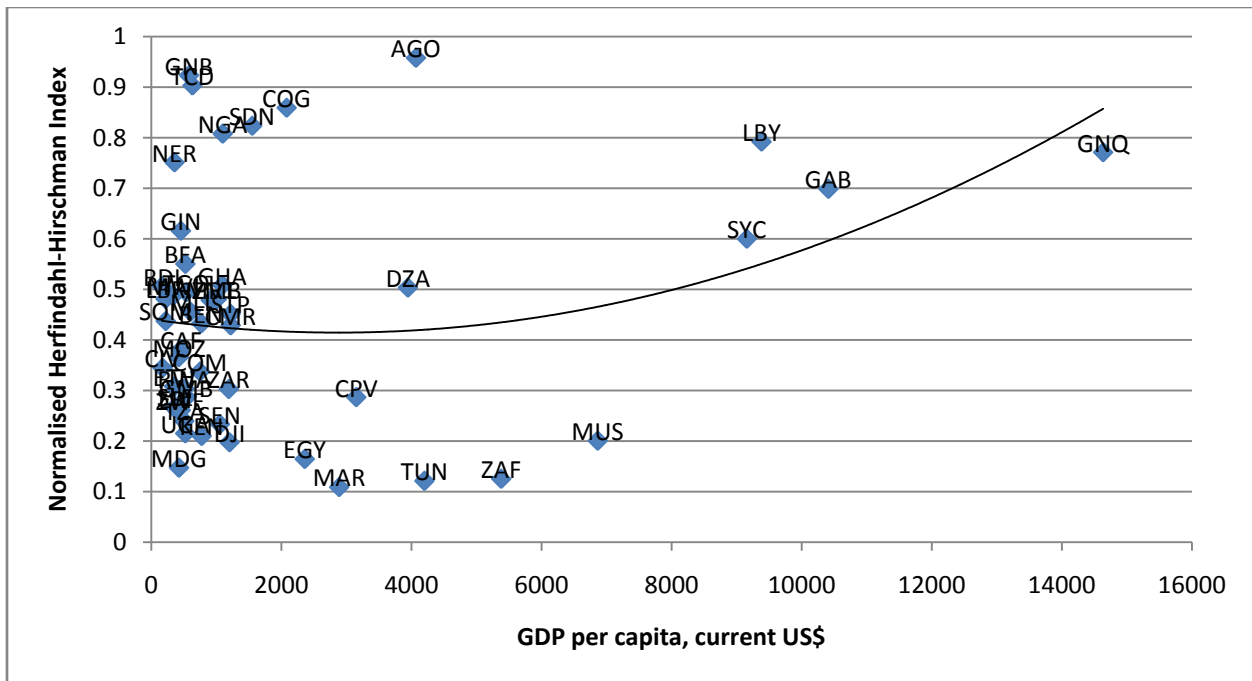
(figure 5), although oil exporting economies with relatively large GDPs poor poorly diversified exports are anomalies inconsistent with the two-stage diversification hypothesis.

**Figure 4: GDP vs. Normalised Herfindahl-Hirschman Index, 2009**



Source: Author's estimates using BACI data set and UNCTADstat.

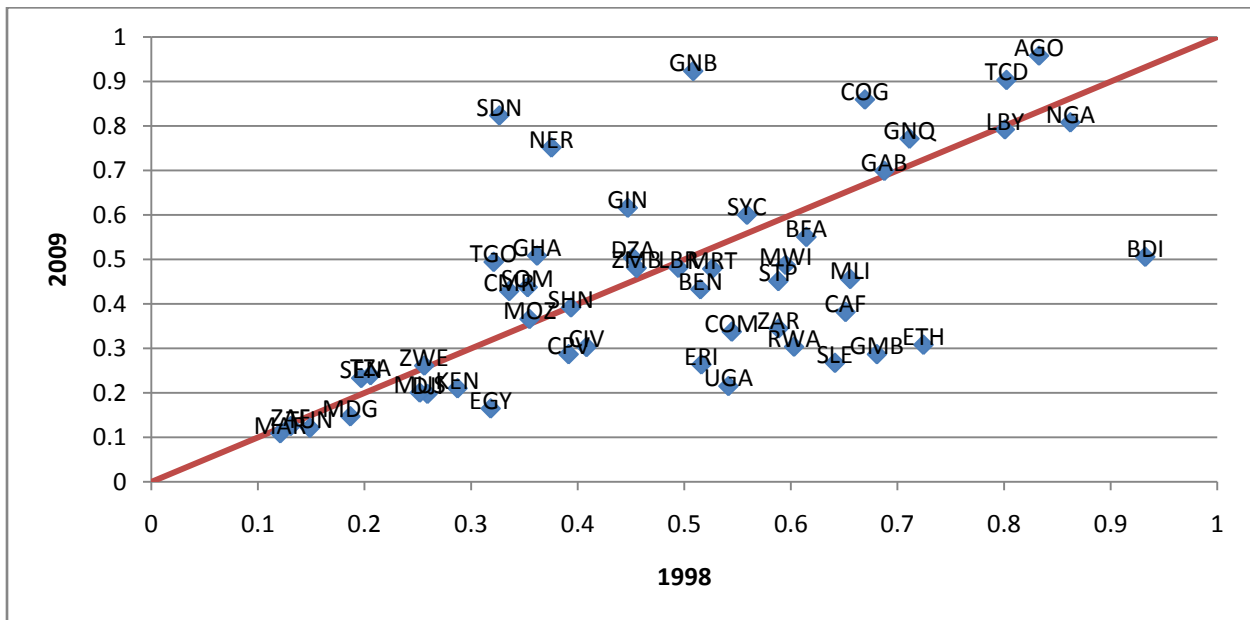
**Figure 5: GDP per capita (current US\$) vs. Normalised Herfindahl-Hirschman Index, 2009**



**Source:** Author's estimates using BACI data set and UNCTADstat.

Turning to diversification trends, Figure 6 plots the normalized-Hirschman Index in 1998 against that in 2009. Those to the right of the right of the line have succeeding diversifying their exports, whereas those to the left have moved towards further concentration, with the distance from the line an indication as the magnitude of the shift. There are a number of phenomenon that can be ascertained from this picture. First, some African economies have managed significantly to diversify exports over the 12 year period. These include Burundi, Central African Republic, Comoros, Democratic Republic of the Congo, Egypt, Eritrea, Ethiopia, Gambia, Mali, Rwanda, Sierra Leone and Uganda. Second, other African economies have witnessed a shift toward concentration of exports when comparing 1998 and 2009. Angola, Cameroon, Chad, Congo, Ghana, Guinea, Guinea-Bissau, Niger Togo and Sudan are in this category. Overall, it appears that those countries which were heavily concentrated in 1998 remain so in 2008 lending support to the 'resource curse' explanation, a feature of which is the emergence of enclave economies which undermine the very process of structural transformation. Similarly, already diversified economies cannot be expected to diversify further (although Kenya and Egypt have succeeded in this endeavor).

**Figure 6: Normalised Herfindahl-Hirschman Index, 2009 vs. 1998**



**Source:** Author's estimates using BACI data set.

**(ii) Intra-Industry Trade**

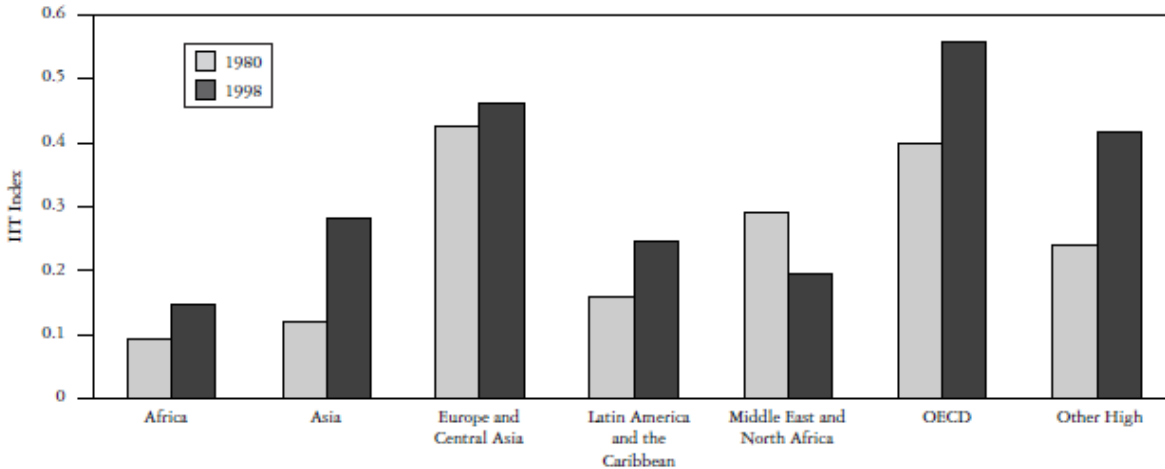
This section unpacks the current status of intra-industry trade in Africa. It employs the Grubel-Lloyd index (Grubel and Lloyd, 1975), an accepted measure of the proportion of total trade which is intra-industry in nature, which is defined as:

$$GLI_j = \frac{\sum_{i=1}^N [(x_i + m_i) - |x_i - m_i|]}{\sum_{i=1}^N (x_i + m_i)} = 1 - \frac{\sum_{i=1}^N |x_i - m_i|}{\sum_{i=1}^N (x_i + m_i)}$$

where  $GLI_j$  is the Grubel-Lloyd Index for country  $j$ , which is scaled between 0 (no intra-industry trade) and 1 (all trade is intra-industry);  $x_i$  and  $m_i$  represent country  $j$ 's exports and imports of product  $i$  respectively; and  $N$  is the total number of product lines.<sup>13</sup>

From existing research we know that intra-industry trade in Africa is low compared to other regions. Figure 7 presents results of a World Bank study, showing that while the proportion of African trade which is intra-industry in nature has increased from 1980 to 1998, the share of IIT in total trade still lags behind all other regions.

**Figure 7: Grubel-Lloyd Index of IIT by Regions, 1980 and 1998**



**Source:** Ferranti *et al.* (2002)

<sup>13</sup> An important criticism of the Grubel-Lloyd index is that it is not independent of the trade balance. The upper bound of the index is negatively related to the size of the trade balance, meaning a larger imbalance is associated with lower reported IIT. Aquino (1978) suggested an adjustment, which has fallen out of favour following a critique by Greenaway and Milner (1986) meaning the issue remains empirically unresolved.

The BACI dataset used to calculate the Normalised Herfindahl-Hirschman Index above can also be utilised to compute the Grubel-Lloyd Index for the 49 African economies identified. The Grubel-Lloyd Index is extremely sensitive to the level of data aggregation, with analysis at the 6 digit level allowing for the narrowest definition of ‘industry’ available – meaning that only simultaneous import and export of goods in the same product line are deemed intra-industry.

Brühlhart's (2009) study, based on bilateral trade flows, defines intra-industry trade as the simultaneous exports and imports of a given product between pairs of countries. Our analysis employs a multilateral approach with trade aggregated across all partners and intra-industry trade is said to be present as long as there is simultaneous exportation and importation of the given product. This approach is preferred for two reasons. Firstly, while there is certainly further scope for diversification in Africa's trading relationships, the imperative to diversify its products as outlined above is more pressing and may well be a precursor to diversification of partners. As such, we define export diversification in terms of products, not partners. Hence, a similar definition of intra-industry trade is appropriate. Secondly, and somewhat more pragmatically, under Brühlhart's (2009) bilateral methodology, no African economy was said to have intra-industry trade greater than 5 per cent of total trade and for numerous other African economies, there was virtually no intra-industry trade. This provides very little scope for further analysis relative to the multilateral approach which by definition returns a larger value of intra-industry trade. Comparative analysis among the world's regions is not undertaken here, but we know from existing surveys (Brühlhart, 2009; World Bank, 2002; UNCTAD, 2011) that intra-industry trade in Africa is low relative to other regions. Lastly, Grubel-Lloyd indices are computed across the seven Broad Economic Categories (BECs) to provide insight into variations in intra-industry trade across product categories.<sup>14</sup>

The Grubel-Lloyd Index for each African country is reported in Table 1. The first observation is that intra-industry trade is generally rather low at around 10 per cent for the average African economy. For 32 of the countries in our sample of 50, however, intra-industry

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<sup>14</sup>The Broad Economic Categories (BEC) were developed in the late 1960s to summarise data on international trade in goods. The classification by BEC are as follows; BEC 1 – Food and Beverages, BEC 2 – Industrial supplies not elsewhere specified, BEC 3 – Fuels and Lubricants, BEC 4 – Capital Goods (except transport equipment), and parts and accessories thereof, BEC 5 – Transport equipment and parts and accessories thereof, BEC 6 – Consumer Goods not elsewhere specified, BEC 7 – Goods not elsewhere specified.

trade is below average, and for 8 economies the level of intra-industry trade is less than 2 per cent. With the average skewed by the strong performance of a handful of countries the median rate of intra-industry trade is a meagre 5 per cent. Turning to the strong performers, there are 8 economies in which intra industry trade exceeds 20 per cent of total trade. The finding that Equatorial Guinea enjoys the largest rate of intra-industry trade in Africa is somewhat surprising given that its external trade is highly concentrated in fuels. Indeed, analysis of intra-industry trade by Broad Economy Category (BEC) reveals that out with Broad Economic Category 3, that pertaining to fuels and lubricants, intra-industry trade is in fact very low. This result can be attributed to the lack of refinery capacity in Equatorial Guinea, requiring the exporting and re-importing of its petroleum products. When BEC 3 is removed from the analysis, Equatorial Guinea falls from the top of the stack to third from the bottom. This pattern is repeated, albeit to a lesser extent, for Cameroon, Niger, Libya and Cote d'Ivoire. For trade flows excluding BEC 3, those countries with the highest Grubel-Lloyd indices are SACU (31 per cent), Tunisia (27 per cent), Uganda (20 per cent), Mauritius (18 per cent) and Egypt (17 per cent).

**Table 1: Grubel-Lloyd Index by Broad Economic Category, 2009**

Country	Grubel-Lloyd Index		Grubel-Lloyd Index by Broad Economic Category							Grubel-Lloyd Index excluding BEC 3	
	Rank	GL	BEC1	BEC2	BEC3	BEC4	BEC5	BEC6	BEC7	Rank	GL
Equatorial Guinea	1	0.544	0.000	0.002	0.638	0.009	0.017	0.004	0.000	47	0.007
Tunisia	2	0.289	0.117	0.227	0.447	0.413	0.295	0.223	0.022	2	0.267
SACU	3	0.286	0.205	0.231	0.171	0.348	0.570	0.378	0.404	1	0.306
Senegal	4	0.252	0.126	0.205	0.592	0.115	0.146	0.230	0.199	6	0.166
Cote d'Ivoire	5	0.227	0.039	0.148	0.605	0.161	0.231	0.162	0.854	15	0.105
Egypt	6	0.222	0.121	0.190	0.459	0.110	0.122	0.313	0.022	5	0.173
Uganda	7	0.206	0.189	0.196	0.274	0.220	0.227	0.147	0.034	3	0.196
Mozambique	8	0.204	0.201	0.067	0.607	0.151	0.102	0.080	0.010	12	0.112
Cameroon	9	0.196	0.014	0.032	0.613	0.068	0.021	0.058	0.003	28	0.033
Mauritius	10	0.175	0.171	0.185	0.108	0.214	0.101	0.184	0.059	4	0.179
Kenya	11	0.164	0.098	0.167	0.206	0.159	0.158	0.218	0.028	8	0.156
Liberia	12	0.152	0.026	0.004	0.030	0.015	0.175	0.073	0.024	7	0.159
Zambia	13	0.144	0.126	0.149	0.094	0.156	0.174	0.085	0.056	9	0.147
Morocco	14	0.139	0.079	0.121	0.134	0.185	0.174	0.157	0.003	10	0.139
Niger	15	0.130	0.016	0.014	0.764	0.037	0.016	0.010	0.000	39	0.019
Djibouti	16	0.123	0.138	0.080	0.579	0.057	0.215	0.044	0.107	14	0.106
Seychelles	17	0.120	0.202	0.047	0.621	0.122	0.019	0.066	0.000	13	0.110
Zimbabwe	18	0.105	0.086	0.146	0.015	0.086	0.060	0.075	0.016	11	0.113
Tanzania	19	0.099	0.105	0.085	0.113	0.114	0.080	0.136	0.187	17	0.097
Sierra Leone	20	0.098	0.028	0.053	0.051	0.167	0.243	0.113	0.000	16	0.101
Madagascar	21	0.085	0.080	0.059	0.211	0.113	0.105	0.056	0.458	19	0.075
Rwanda	22	0.071	0.036	0.037	0.015	0.072	0.372	0.038	0.004	20	0.075
Malawi	23	0.071	0.040	0.084	0.007	0.071	0.090	0.078	0.002	18	0.075
Libya	24	0.060	0.008	0.016	0.085	0.010	0.005	0.002	0.000	46	0.010
Gambia	25	0.052	0.031	0.080	0.004	0.035	0.062	0.059	0.000	21	0.055

Country	Grubel-Lloyd Index		Grubel-Lloyd Index excluding BEC 3							Grubel-Lloyd Index excluding BEC 3	
	Rank	GL	BEC1	BEC2	BEC3	BEC4	BEC5	BEC6	BEC7	Rank	GL
Burundi	26	0.048	0.047	0.012	0.530	0.058	0.145	0.038	0.000	24	0.043
Sao Tome and Principe	27	0.046	0.006	0.019	0.227	0.044	0.041	0.031	0.000	38	0.022
Togo	28	0.041	0.017	0.090	0.001	0.016	0.004	0.014	0.000	22	0.044
Ethiopia	29	0.036	0.043	0.015	0.000	0.061	0.075	0.043	0.000	25	0.041
Nigeria	30	0.034	0.010	0.048	0.027	0.059	0.040	0.067	0.084	23	0.044
Sudan	31	0.033	0.026	0.007	0.055	0.033	0.022	0.004	0.024	41	0.018
Eritrea	32	0.031	0.007	0.050	0.000	0.047	0.044	0.036	0.000	27	0.034
Algeria	33	0.029	0.041	0.026	0.025	0.018	0.070	0.012	0.000	29	0.033
Ghana	34	0.029	0.025	0.027	0.074	0.027	0.015	0.029	0.000	34	0.026
Somalia	35	0.028	0.036	0.007	0.004	0.010	0.068	0.028	0.148	32	0.029
Mali	36	0.028	0.005	0.032	0.071	0.047	0.006	0.016	0.000	36	0.023
Burkina Faso	37	0.028	0.035	0.023	0.001	0.037	0.051	0.056	0.000	30	0.032
Angola	38	0.022	0.002	0.027	0.019	0.052	0.016	0.007	0.003	33	0.028
Gabon	39	0.022	0.011	0.007	0.014	0.050	0.118	0.036	0.000	31	0.029
Central African Rep.	40	0.021	0.025	0.009	0.000	0.059	0.028	0.010	0.000	37	0.022
Cape Verde	41	0.020	0.020	0.006	0.000	0.034	0.020	0.049	0.030	35	0.023
Congo	42	0.019	0.005	0.008	0.021	0.033	0.029	0.008	0.005	43	0.016
Comoros	43	0.017	0.002	0.009	0.000	0.032	0.040	0.010	0.146	42	0.018
Guinea	44	0.016	0.028	0.009	0.001	0.052	0.021	0.006	0.000	40	0.018
Congo, Dem. Rep.	45	0.015	0.012	0.010	0.014	0.033	0.037	0.018	0.000	44	0.015
Chad	46	0.013	0.081	0.012	0.002	0.044	0.065	0.020	0.000	26	0.038
Guinea-Bissau	47	0.010	0.005	0.026	0.000	0.034	0.012	0.019	0.000	45	0.013
Benin	48	0.007	0.003	0.003	0.031	0.011	0.001	0.013	0.000	49	0.005
Mauritania	49	0.005	0.005	0.002	0.000	0.013	0.018	0.009	0.000	48	0.005
Median	-	0.050	0.030	0.029	0.041	0.055	0.061	0.044	0.002	-	0.039
Weighted Average	-	0.147	0.082	0.139	0.146	0.163	0.201	0.178	0.177	-	0.147

Closer scrutiny of IIT in BEC 3 there are a range of countries exhibiting high intra-industry trade while the majority show relatively low IIT. Some oil exports including Cote d'Ivoire, Egypt and Equatorial Guinea, show large shares of intra-industry trade in fuels indicating re-imports of exported products. However, most African oil exporters such as Algeria, Angola, Chad, Congo, Gabon, Libya, Nigeria, and Sudan have very low intra-industry trade indices. This general pattern reflects the well established comparative advantages of African economies, with the pattern replicated for BEC 7 (good not specified elsewhere) which includes metals.

With the exception of extractive industries (BEC 3 and BEC7) there is relatively little variance in IIT across BECs: countries with low IIT have low IIT and each category, and countries with high IIT have high IIT in each category. Rwanda is a notable exception which has low IIT in all categories except BEC 5 transport equipment and parts and accessories thereof, for which the Grubel-Lloyd index is 37 per cent. It is interesting to note, however, that the two entities with the highest intra-industry trade, SACU and Tunisia, have considerably higher IIT in higher value added activities (BEC 4-6). This is suggestive of a possible threshold effect through which intra-industry trade is relatively constant across product lines until a particular threshold, after which there is little scope for further IIT in low value added activities but IIT continues to grow in higher valued added activities which have more scope for differentiation. Given the low level of IIT in Africa it is not possible to test such a hypothesis, however, and it remains highly speculative.

The reasons for the generally low levels of intra-industry trade are suggested by the theory discussed in Section 2. Firstly, the small size of many African economies is insufficient to generate meaningful economies of scale to overcome trade costs. Indeed, the positive relationship between income and IIT shown in Figure 14 (Appendix 4) implies that larger economies may be able to benefit from economies of scale which in turn leads to deeper intra-industry trade. Note that the positive relationship is slightly undermined, however, by a cluster of high income countries for which there is little intra-industry trade owing to the concentration of oil exports in their trade regimes (these countries include Algeria, Angola, Libya, Nigeria and Sudan). Of course, this primary commodity concentration means that exports structures are similar across countries with a focus on low value-added, poorly differentiated exports. The lack of a mature manufacturing sector in most countries means there is little trade in finished



products, so there are few African varieties of manufactured goods for consumers to choose from. The positive relationship between the share of manufacturing in GDP and IIT (Figure 15, Appendix 5) implies that the greater scope for economies of scale and differentiation in the manufacturing sector can lead to intra-industry trade.

Thirdly, trade costs are prohibitively high, and those African economies which have developed industrial bases are geographically dispersed, making intra-industry trade costly.<sup>15</sup> Fourthly, intellectual property right development is poor,<sup>16</sup> meaning that the incentive to differentiate goods through branding in African economies is not well protected. Not one African brand was featured in the top 100 most valuable global brands in a recent survey (Interbrand, 2011). Similarly, there are very few African multinational firms relative to other regions—many of which are concentrated in extractive industries—implying that intra-firm (intra-industry) trade is virtually non-existent.<sup>17</sup>

Lastly, a bias against domestic goods has been observed in many African countries, with some research indicating a preference for imports from technologically more advanced countries (Agbonifoh and Elimimian, 1999; Okechuku and Onyemah, 1999; Opoku and Akorli, 2009). This preference for goods not “made in Africa” means that differentiated goods that are produced on the continent are less preferred, with origin of the product often more important than its price or other attributes.<sup>18</sup> Figure 16 (Appendix 6) compares intra-African intra-industry trade to that with all trading partners. It shows that the economies with the largest total intra-industry trade, Tunisia (28 percent) and SACU (28 per cent) have relatively low intra-African intra-industry trade implying that their intra-industry trade is dominated by trade with trading partners located outside Africa. This is not consistent with the trend, however, with most African economies undertaking more intra-industry trade with each other than they do with external partners. Geographical proximity is one possible explanation, as is the observation that intra-African trade contains more value added, and hence more differentiated goods, than that with the rest of the world (Githinji, 2011). Members of the East African Community (EAC) in particular enjoy higher intra-African IIT than that with all partners. In addition, we find that Uganda (32 percent),

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<sup>15</sup> See Appendix 2, Figure 12

<sup>16</sup> According to Property Rights Alliance (2011), Africa has the lowest Intellectual Property Right Index of all regions of the world, see Appendix 3, Figure 13.

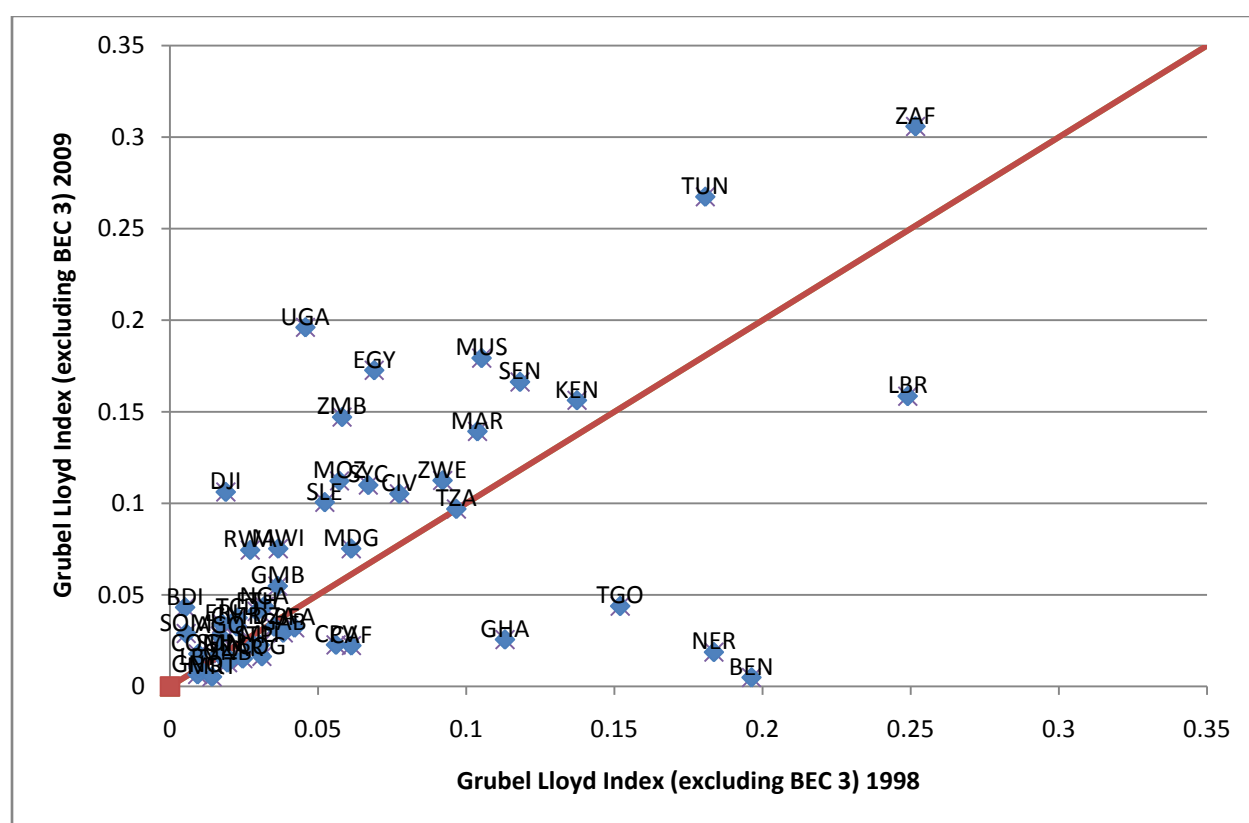
<sup>17</sup> See The Africa Report; available online at <<http://www.theafricareport.com>>

<sup>18</sup> ‘Proudly South African’, Uganda’s ‘Gifted by Nature’ and Nigeria’s ‘Heart of Africa’ are among the initiatives designed to address this problem.

Zambia (20 percent), Tanzania (18 percent), Kenya (18 percent), Mauritius (18 percent), Senegal (17 percent), Sierra Leone (16 percent) and Zimbabwe (15 percent) are among the highest intra-African intra-industry trade economies (excluding BEC 3).

Analysis thus far has been concerned with intra-industry trade in 2009, the most recent year for which data are available. With Africa's share of world trade increasing from 2.1 percent in 1998 to 3.2 percent in 2009 (UNECA and AUC, 2011) it is of interest to identify whether the observed trade growth is intra-industry or inter-industry. Figure 8 compares Grubel-Lloyd indices in 1998 and 2009 revealing that for the vast majority of African economies intra-industry trade is greater in the later year than the former.

**Figure 8: African economies intra-industry trade over time, 1998 versus 2009.**



**Source:** Author's estimates using BACI data set.

Hamilton and Kniest (1991; p.360) uncovered a conceptual problem in comparing Grubel-Lloyd indexes over time periods in this way: "An increase in inter-industry trade flows will show up as an increase in the Grubel-Lloyd index of intra-industry trade when the increase in inter-industry trade acts to reduce the trade imbalance in the sector being measured." A

measure of marginal intra-industry trade has since been developed to capture the proportion of the increase in imports or exports of a particular industry which is matched by an increase of exports or imports of the same industry. As a dynamic indicator, it also provides insights into the process of export diversification that forms the subject of present interest. The favoured measure of Marginal Intra-industry Trade (MIIT) is that first put forth by Brühlhart (1994) and given by:

$$MIIT_{ijt} = 1 - \frac{\sum_{i=1}^N |\Delta_t x_{ij} - \Delta_t m_{ij}|}{\sum_{i=1}^N (|\Delta_t x_{ij}| + |\Delta_t m_{ij}|)}$$

which can be aggregated across industries as follows:

$$MIIT_{jt} = \sum_{i=1}^N w_{ijt} MIIT_{ijt}$$

Where  $w_{ijt}$  is the weight of each industry exports and imports in total trade, given by:

$$w_{ijt} = \frac{|\Delta_t x_{ij}| + |\Delta_t m_{ij}|}{\sum_{i=1}^N (|\Delta_t x_{ij}| + |\Delta_t m_{ij}|)}$$

and  $\Delta_t x_{ij}$  represents the change in exports between two points in time  $t$  for country  $j$  in product  $i$  respectively; and  $N$  is the total number of product lines. Similarly,  $\Delta_t m_{ij}$  represents the change in imports between two points in time  $t$  for country  $j$  in product  $i$ . As with the Grubel-Lloyd Index, a value of 0 shows no marginal intra-industry trade while an index of 1 indicates that all of the observed trade growth is intra industry in nature.

Table 2 reports the marginal intra-industry trade over the period 1998-2009. Given that intra-industry trade in 2009 remained low for many African economies, it is not surprising that the trade expansion in these economies has been dominated by inter-industry trade. The high MIIT reported by Equatorial Guinea draws attention to the bias caused by fuels. Out-with Broad Economic Category 3, Equatorial Guinea's trade expansion contained virtual no intra-industry trade. Consulting the final column, that which reports MIIT excluding BEC 3, we see that only five African economies can attribute more than 15 per cent of (non-oil) trade growth to IIT: SACU, Tunisia, Uganda, Senegal and Egypt. For SACU and Uganda, MIIT is high in transport equipment (BEC 5), while Tunisia's MIIT has been driven by capital goods (BEC 4) and food and beverages (BEC 1). Thereafter, as was the case for the Grubel-Lloyd Index reported above,

results appear to be broadly uniform across economic categories with high MIIT in transport equipment for Djibouti, Rwanda, Sierra Leone and Ghana clear exceptions.

**Table 2: Marginal Intra-industry Trade by Broad Economic Category, 2009**

Country	MIIT		Marginal Intra-Industry Trade by Broad Economic Category							MIIT excluding BEC3	
	Rank	GL	BEC1	BEC2	BEC3	BEC4	BEC5	BEC6	BEC7	Rank	GL
Equatorial Guinea	1	0.558	0.000	0.002	0.654	0.008	0.018	0.004	0.000	49	0.006
Tunisia	2	0.290	0.099	0.225	0.463	0.392	0.274	0.219	0.021	2	0.261
SACU	3	0.260	0.193	0.212	0.188	0.287	0.508	0.320	0.305	1	0.274
Cote d'Ivoire	4	0.251	0.033	0.153	0.617	0.161	0.178	0.123	0.852	10	0.108
Cameroon	5	0.248	0.013	0.026	0.812	0.078	0.025	0.064	0.003	32	0.032
Senegal	6	0.244	0.151	0.190	0.550	0.101	0.135	0.226	0.010	4	0.166
Uganda	7	0.225	0.208	0.204	0.307	0.237	0.271	0.157	0.029	3	0.213
Egypt	8	0.219	0.114	0.172	0.466	0.135	0.113	0.277	0.002	5	0.163
Mozambique	9	0.207	0.184	0.069	0.603	0.145	0.110	0.078	0.005	11	0.108
Zambia	10	0.141	0.110	0.147	0.091	0.161	0.163	0.067	0.040	6	0.144
Morocco	11	0.140	0.093	0.123	0.124	0.195	0.172	0.134	0.002	7	0.142
Kenya	12	0.133	0.098	0.137	0.093	0.150	0.135	0.187	0.020	8	0.139
Mauritius	13	0.133	0.090	0.141	0.164	0.170	0.097	0.142	0.165	9	0.131
Djibouti	14	0.121	0.137	0.075	0.590	0.052	0.232	0.040	0.107	12	0.103
Seychelles	15	0.112	0.176	0.040	0.866	0.050	0.014	0.082	0.236	16	0.082
Niger	16	0.099	0.033	0.083	0.305	0.035	0.053	0.059	0.000	21	0.060
Zimbabwe	17	0.096	0.062	0.140	0.007	0.070	0.063	0.073	0.001	13	0.103
Sierra Leone	18	0.087	0.007	0.054	0.053	0.150	0.211	0.107	0.000	14	0.090
Tanzania	19	0.087	0.107	0.073	0.099	0.095	0.071	0.108	0.140	15	0.085
Malawi	20	0.072	0.040	0.094	0.000	0.070	0.091	0.060	0.002	17	0.078
Madagascar	21	0.071	0.072	0.042	0.121	0.106	0.116	0.056	0.222	20	0.066
Rwanda	22	0.070	0.031	0.035	0.020	0.071	0.401	0.036	0.004	18	0.072
Liberia	23	0.065	0.027	0.024	0.001	0.015	0.074	0.073	0.000	19	0.067
Libya	24	0.063	0.006	0.014	0.092	0.011	0.004	0.002	0.000	47	0.009
Ghana	25	0.057	0.020	0.022	0.020	0.027	0.394	0.023	0.000	22	0.059

Country	MIIT		Marginal Intra-Industry Trade by Broad Economic Category							MIIT excluding BEC3	
	Rank	GL	BEC1	BEC2	BEC3	BEC4	BEC5	BEC6	BEC7	Rank	GL
Benin	26	0.051	0.007	0.102	0.028	0.015	0.001	0.041	0.000	23	0.053
Burundi	27	0.049	0.081	0.011	0.482	0.055	0.156	0.034	0.000	24	0.047
Sao Tome and Principe	28	0.046	0.014	0.020	0.231	0.036	0.024	0.030	0.000	38	0.022
Gambia	29	0.042	0.023	0.059	0.000	0.037	0.021	0.055	0.000	25	0.044
Ethiopia	30	0.038	0.052	0.014	0.000	0.065	0.090	0.041	0.000	26	0.044
Togo	31	0.036	0.023	0.053	0.002	0.041	0.024	0.024	0.000	29	0.037
Algeria	32	0.033	0.051	0.026	0.028	0.020	0.093	0.015	0.000	28	0.039
Sudan	33	0.033	0.022	0.006	0.055	0.036	0.023	0.004	0.023	43	0.017
Central African Rep.	34	0.031	0.088	0.008	0.000	0.061	0.067	0.017	0.000	31	0.032
Somalia	35	0.030	0.039	0.007	0.005	0.010	0.070	0.031	0.148	33	0.031
Nigeria	36	0.028	0.012	0.047	0.016	0.060	0.041	0.054	0.007	27	0.043
Burkina Faso	37	0.027	0.028	0.022	0.000	0.040	0.042	0.060	0.000	34	0.031
Eritrea	38	0.021	0.020	0.024	0.000	0.022	0.022	0.020	0.000	39	0.022
Angola	39	0.021	0.001	0.030	0.017	0.053	0.017	0.007	0.003	35	0.029
Cape Verde	40	0.020	0.019	0.009	0.000	0.035	0.017	0.047	0.025	37	0.023
Congo, Dem. Rep.	41	0.019	0.012	0.018	0.015	0.033	0.043	0.019	0.000	40	0.020
Gabon	42	0.019	0.011	0.009	0.008	0.040	0.038	0.065	0.016	36	0.024
Congo	43	0.018	0.011	0.010	0.019	0.030	0.031	0.009	0.005	42	0.017
Comoros	44	0.017	0.002	0.010	0.000	0.026	0.045	0.013	0.148	41	0.018
Guinea	45	0.013	0.035	0.004	0.000	0.034	0.023	0.017	0.000	45	0.015
Chad	46	0.012	0.082	0.008	0.001	0.044	0.089	0.025	0.000	30	0.037
Mali	47	0.012	0.008	0.008	0.001	0.047	0.007	0.013	0.000	46	0.012
Guinea-Bissau	48	0.010	0.007	0.019	0.000	0.041	0.012	0.021	0.000	45	0.013
Mauritania	49	0.006	0.005	0.002	0.000	0.021	0.023	0.009	0.000	48	0.007
Median	-	0.054	0.032	0.028	0.024	0.049	0.065	0.044	0.002	-	0.044
Weighted Average	-	0.10	0.057	0.077	0.138	0.092	0.087	0.101	0.427	-	0.083

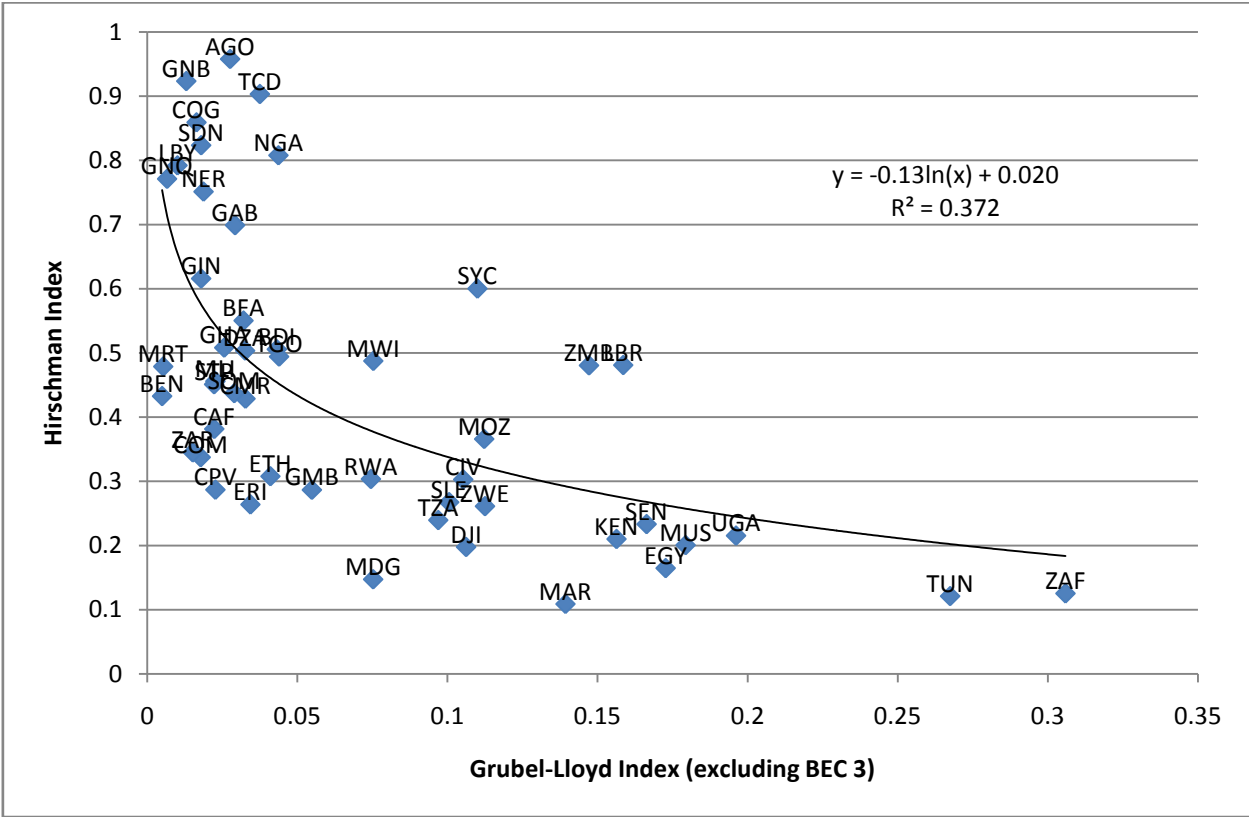
#### **(4) Linking Intra-Industry Trade and Export Diversification in Africa**

To recap, based on the statistics of the status of intra-industry trade and export diversification in Africa, we found that intra-industry trade and export diversification in Africa lagged behind other regions. In addition, while it was found that a few African economies did improve intra-industry trade and export diversification over the period, there is a clear pattern towards sustaining inter-industry trade (which predominantly reflect Africa's high dependence on primary exports) and product concentration. Also, as expected, oil-exporting countries play a crucial role in sustaining product concentration figures for Africa. With these trends in mind, this section sets out to explore the relationship between intra-industry and export diversification in Africa.

Empirical literature on intra-industry trade is suggestive of a strong link with export-diversification. Ferranti *et al.* (2002) find a robust positive relationship between intra-industry trade and export diversification in Latin America, as does Peterson (2005) in South Africa. It is intuitive that export diversification may increase intra-industry trade if the new product lines undertaken allow for mutual exchange with trading partners. In this case, diversification expands intra-industry trade. Diversification may also allow for the movement of capital toward industries in which economies of scale have not yet been realized thereby further expanding the opportunities for intra-industry trade.

Figure 9 below shows a positive correlation between export diversification and intra-industry trade for African economies, after isolating BEC 3. While at this point, we have not established causation, the positive correlation—a formal linkage between the two variables of interest for African economies is established—allows us to explore potential pathways towards strengthening the growth of the two variables of interests.

**Figure 9: Africa’s Export Diversification and Intra Industry Trade, 2009**

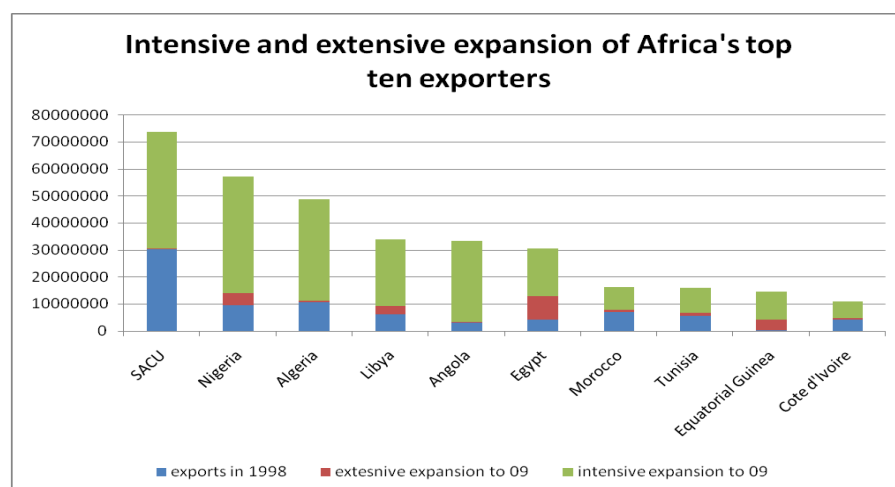


**Source:** Author’s estimates using BACI data set.

A closer examination of the African economies’ sample reveals that, over the 12 years period (1998-2009), the top ten exporters expanded exports through the intensive margin (see Figure 10). Two policy implications are worth mentioning. First, the existing primary product concentration of African exports, coupled with the rising demand for these commodities from developing economies in Asia, has meant that export expansion has occurred in these industries (exporting more volume of existing export products). Second, the gradual increase in prices of oil and other primary commodities in recent times amplify the intensive margin increase as the trade growth is measured in value terms. None-the-less a few African economies have managed to expand exports, over the 10 years period, at the extensive margin namely Egypt, Nigeria, Libya and Equatorial Guinea.



**Figure 10: Export expansion via Intensive and Extensive margins, top 10 African Exporters, 1998-2009.**



**Source:** Author's estimates using BACI data set.

Section 2 emphasized the need for greater product differentiation to engender extensive expansion *and* stimulate intra-industry trade and there is evidence of some success stories with respect to diversification through differentiation. For instance, Mali's fresh mango export volumes increased six fold between 1993 and 2008 (Sangho *et al.*, 2010). Coffee washing began in Rwanda in 2000 and by 2009 washed coffee exports accounted for 23 per cent of coffee exports and 32 per cent of coffee revenue in 2009 (export volumes stayed constant but revenues were up over the period owing to the quality enhancements). In addition, Uganda has recently started exporting washed, roasted and packed coffee as a finished product to the UK and US markets (Easterly and Reshef, 2010). The alcoholic beverage market is one in which greater differentiation is leading to active competition, led by firms including SABMiller South Africa, the Distil Group and Nigerian Brewers. While we find vibrant competition within several African economies, preliminary estimates between alcoholic beverage differentiation and intra-industry trade in Africa was not significant.<sup>19</sup> Early entrance into other African markets in which brands are not well established present a unique opportunity to engender customer relationships and brand loyalties given that consumer spending is expected to almost double to \$1.4 Trillion in 2020 compared to today (McKinsey, 2010).

<sup>19</sup> Although outside the scope of this study, this is an interesting preliminary finding worth exploring in a future research.

As these cases exemplify, the agro-food sector is perhaps the most ripe for product differentiation given its prominence in many African economies and its relevance for Africa's poverty reduction agenda. Indeed, many African economies are currently net food importers, and domestic processing of food products (and possible capturing economies of scale therein) will be imperative to addressing Africa's growing populations food demand. The African Agribusiness and Agro-Industries Development Initiative (3ADI), part of NEPAD's Comprehensive Africa Agriculture Development Programme, aims to have an agriculture sector in Africa which, by the year 2020, is made up of highly productive and profitable agricultural value chains such that by 2020 more than 50 percent of the continent's food products sold in local and national markets will be in processed form. At present there are a number of mechanisms through which agri-food products can be differentiated towards this end. Voluntary sustainability initiatives in forestry, coffee, tea, cocoa and banana industry sectors have been successful at differentiating goods, with subsequent sales increases in excess of that experienced by conventional markets (IISD and IIED, 2010). Of course, the social dimension of schemes including fair trade aims to provide farmers with a surplus for re-investment and possible diversification.

Adhering to quality standards is a further option. The certification of Mali's mangoes as organic was one factor of success with regard to exporting to the Europe, where organic products are enjoying increased demand. The intuition behind differentiation of this kind is that buyers rely on formal institutions and quality standards to allow them to differentiate between horizontally goods differentiated by quality. Geographic indicators are another means of differentiation, and have been successfully employed in the South African wine market and protected under TRIPS. Differentiation by country of origin through schemes including 'Proudly South African', Uganda's 'Gifted by Nature' and Nigeria's 'Heart of Africa' also has the advantage of a targeting bias toward imported goods from more developed countries.

Thus far analysis has been limited to trade in goods only, but the increasing role of trade in services should offers further opportunities for differentiation, diversification and intra-industry trade. For example, the arts and entertainment industry is a key service sector capable of driving greater diversification. The production of and subsequent trade in films, literature, music and broadcast services relies on a multiplicity of inputs and contains linkages to complementary services and physical inputs, including publishing, technical equipment and financial, legal, advertising and travel services. The film and television industry is exemplary here. Several

studies have applied the value chain concept to film production (Vickery and Hawkins, 2008; Eliashberg et al., 2006; Joffe and Jacklin, 2003, for the SADC region) and South Africa estimates that the economic multiplier of direct film spend is 2.5 (Joffe and Newton, 2008). Nigeria is now ranked second in global film production behind India, benefiting from low cost digital formats, a high share of Nigerian ownership (97 percent of 139 distribution companies are almost entirely Nigerian-owned) and informal distribution networks to the growing African market (UNESCO, 2009). The New York Times estimates the industry is now worth \$500million dollars.<sup>20</sup> This is an excellent example of the value of external economies of scale and agglomeration and simultaneous backward and forward linkages leading to intra-industry trade and diversification. African authors and musicians are now globally recognised and are amongst the most competitive African exports. None-the-less, creative industries face a number of challenges including restrictions on foreign ownership of media (which often impedes the generation of regional markets), lack of multinational indigenous distribution firms and an ongoing preference for imported content (Balancing Act, 2012).

The financial service is a dynamic and growing sector traded globally. It remains a valuable source of revenue for financial and other institutions engaged in various economic activities across the globe. Within the last decade, African countries' financial markets have expanded, with a noted increase in the number of commercial banks operating in countries like Zambia, and measures have also been taken to reduce government ownership or privatize state-owned banks such as in Malawi (World Bank, 2010). Diversification in the financial services depends on the full range of banking and non-banking financial services, i.e. insurance, the stock and bond exchange market, all of which equally depends largely on the full liberalization of the financial industry. UNCTAD (2000) stated that aside from the efforts of the South African financial services sector in boosting intra-industry trade in Africa, Nigerian banks have also been expanding their presence throughout much of Africa, injecting capital into the African economy by introducing new products and new managerial and technological skills, expanding lending and savings mobilization.

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<sup>20</sup> 'A Scorsese in Lagos: The making of Nigeria's Film Industry 23/2/2012'. Available online at: [http://www.nytimes.com/2012/02/26/magazine/nollywood-movies.html?\\_r=1&pagewanted=all](http://www.nytimes.com/2012/02/26/magazine/nollywood-movies.html?_r=1&pagewanted=all)

## **(5) The constraints to Export Diversification and Intra-Industry Trade in Africa**

In addition to the inherent disadvantages—heavy reliance on few primary commodities, infrastructure inadequacy, and Dutch disease dilemma of most African economies discussed in Section 2, there are other factors constraining the development of export diversification and intra-industry trade in Africa. This section attempts to outline those constraints. The section is divided into two parts; first, it discusses tariffs and non-tariffs barriers on trade in goods before considering non-tariff measures on trade in services.

### ***(i) Tariffs and Non-Tariff Barriers on Trade in Goods***

A new study by (UNECA, AfDB & AUC, forthcoming) examined tariff barriers of 53 African economies based on data for 2004 computed from MAcMap-HS6v2 database<sup>21</sup>, using the TASTE software<sup>22</sup>. The analysis shows that African economies face higher tariff rates on their exports within Africa compared to the rest of the world. Table 3 provides a summary of the average protection levels faced by African economies when trading among themselves and when exchanging with the rest of the world.

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<sup>21</sup> The MAcMap-HS6 database offers the option to aggregate protection data using a so called “reference group weight”. In this case, the weight used for aggregation does not strictly reflect the trade for the country considered, but rather that of a group of countries (group of reference) to which a country belongs to according to its income level. As a consequence, the “reference group weight” limits possible endogeneity bias between trade and protection. For example, in the case of a prohibited tariff, imports are discouraged. Thus, if the “trade weight” aggregation method is used, there will be no weight associated to such a tariff line. The “reference group weight”, therefore yields more satisfactory outcomes as it will allow some weight on non-traded tariff lines (UNECA, AfDB& AUC, forthcoming).

<sup>22</sup> Unfortunately, 2004 is the most recent data on market access currently available at such a disaggregated level. However, note that a newer version of the MAcMap-HS6 database including data for the year 2007 is currently being developed. Nevertheless, it is important to note that protection structures did not significantly evolve in Africa between 2004 and 2007; changes have occurred more recently, thanks in particular to the COMESA-EAC-SADC Tripartite initiative.

**Table 3: Africa’s average protection imposed/faced on their imports/exports – In per cent**

	Average imposed protection on imports								Average faced protection on exports							
	TOTAL		Agricultural and food products		Primary products		Other industrial products		TOTAL		Agricultural and food products		Primary products		Other industrial products	
	From Africa	From the Rest of the World	From Africa	From the Rest of the World	From Africa	From the Rest of the World	From Africa	From the Rest of the World	From Africa	From the Rest of the World	To Africa	To the Rest of the World	To Africa	To the Rest of the World	To Africa	To the Rest of the World
AFRICA	8.7	13.6	12.4	19.4	2.3	4.7	9.0	13.1	8.7	2.6	12.4	9.5	2.3	1.1	9.0	2.3

Note: The MACMapHS6v2 database does not provide protection data on trade in services.

Source: (UNECA, AfDB & AUC, forthcoming).

Looking at the columns indicating the protection faced on exports; on average African economies face a 8.7 per cent tariff faced when exporting to their African partners, compared to a 2.6 per cent average tariff faced by African economies when exporting to the rest of the world. This is due to Sub-Saharan Africa benefiting from preferential market access when exporting to foreign markets, thanks to various agreements concluded with the European Union under the ‘Everything but Arms’ (EBA) initiative, with the United States via the African Growth and Opportunity Act (AGOA) from and with certain Developed Countries through the General System of Preferences (GSP). This trend is also consistent by major product groups (agricultural and food products, primary products and other industrial products) providing some support towards the case for a continental free trade to lower trade barriers among African member countries.

In addition, the removal of tariff barriers imposed on imports of intermediate goods - crucial for the development of manufacturing sector across African economies- is key. A study by Laird et al. (2006) indicates applied tariffs<sup>23</sup> by stage of processing (primary, intermediate and final). This information, reproduced in Table 4, indicates that Least Developed Countries—33 of them being from Africa—impose the highest average applied tariffs on their imports of intermediate goods from the rest of the world (18 per cent compared to 9.1 per cent imposed by Developing countries and 3.0 by Developed Countries). However, intermediate goods are vital

<sup>23</sup> Laird et al. (2006) use a trade weight to aggregate the tariffs while the tariff from the UNECA, AUC, AfDB (forthcoming) are weighted by the “reference group” weight (as already explained).

inputs to be used in the production process allowing for production and export of goods of higher value added. Therefore, we can legitimately expect that, if Least Developed Countries in Africa reduce tariffs imposed on their imports of intermediate goods, African countries could significantly enhance their export diversification and intra-industry trade as well as their overall contribution to intra-African trade.

	Primary	Intermediate	Final
Developed Countries	0.4	3.0	3.4
Developing Countries	6.0	9.1	8.0
Least Developing Countries	6.9	18.0	12.0

Source: Laird et al (2001)

An assessment of constraints on African exports by UNECA, AU & AfDB (2010) based on a gravity model highlighted several supply-side constraints. Three are worth mentioning here. First, the study identified the nature of African economies—small, high tariff imposed by African countries, landlocked, high transportation cost, high dependence on primary products, low export diversification, low intra-industry trade—and lack of progress towards regional economic integration as constraints towards Africa boosting intra-African trade. Second, the poor condition of trade-related infrastructure was identified as a major constraint towards trade in Africa. Poor infrastructure (roads and telecommunications) increases transportation time and costs and timely and affordable diffusion of market information is impossible in some parts of Africa due to isolation and lack of effective telecommunications infrastructure. The length of paved roads as per cent of total roads in Africa is about five times less than that of high income OECD countries, whereas telephone coverage (proxied by telephone mainlines per 1,000 people) is generally low (28.4) compared to (574.1) of OECD high-income countries. Telephone coverage is even lower in Sub-Saharan Africa (excluding South Africa) with (8.4). Third, other supply-side constraints include an effective trade export promotion strategy as well as efficient bureaucracies to service exporters are lacking. Customs authorities in many African countries are inefficient with frequent delays when goods cross borders. It is estimated that each day of delay reduces the export volume by about 1 per cent. At this rate, if Uganda reduces its factor-to ship

time from the current level of 58 days to 27 days, its exports would increase by 30 per cent (Njinkeu and Fosso, (2006) in UNECA, AU & AfDB (2010).

Another useful measure of trade constraint is based on pioneering efforts of James Anderson and Peter Neary in the 1990s and further refined by Kee, Nicita and Olarreaga (2009), with the construction of an ‘Overall Trade Restrictiveness Indices - OTRI’. This index tries to estimate the level of constraints on exports of African countries to the world total (including African countries). The OTRI captures the trade policy of a country by calculating the uniform tariff that will keep its overall imports at the current level when the country in fact has different tariffs for different goods.<sup>24</sup> A second indicator used is Market Access-OTRI (MA-OTRI) which provides an aggregate percentage of the level of barriers encountered by each country’s exporters when selling in other countries. The MA-OTRI reflects the effect of trade policies on exporters’ access to markets which is different across trading partners and geographic regions, in part because of trade preferences and also because of composition of trade (World Bank and IMF 2009). It should be noted that OTRI and MA-OTRI do not mirror trade barriers perfectly.<sup>25</sup> Table 5 below outlines African economies with available data on OTRI and MA-OTRI for 2008.

**Table 5: Constraints to Exports for Selected African Economies (2008)**

Country	OTRI			MA-OTRI		
	ALL	AG	MF	ALL	AG	MF
Burundi	10.0%	5.5%	11.0%	15.0%	40.6%	0.9%
Benin	10.9%	12.9%	10.2%	10.3%	8.1%	14.2%
Burkina Faso	13.3%	32.0%	9.6%	21.3%	55.9%	8.9%
Botswana	0.6%	0.2%	0.7%	2.4%	33.9%	1.9%
Central African Republic	..	..	..	3.3%	7.4%	2.8%
Cote d'Ivoire	25.7%	36.5%	21.0%	17.7%	28.4%	4.1%
Cameroon	..	..	..	8.5%	48.6%	1.4%
Comoros	11.3%	3.0%	11.8%	7.0%	13.1%	0.3%
Algeria	36.4%	53.9%	31.6%	1.5%	14.4%	1.4%
Egypt, Arab Rep.	35.0%	46.6%	32.9%	10.0%	20.7%	8.9%

<sup>24</sup>The authors suggested that the OTRI was developed to overcome two measurement problems—aggregation of different forms of trade policies, and the aggregation across goods with different economic importance—which was problematic for the traditional trade restrictiveness index (TRI). The OTRI tackle different constraints (tariff and non-tariff barriers (NTBs) alike) by bringing all types of trade policy instruments into a common metric by estimating ad-valorem<sup>24</sup> equivalents (AVEs) of NTBs for each country at the tariff level.<sup>24</sup> Hence, OTRI provides an aggregate percentage of the extent to which trade constraints (all trade policy instruments) limit imports. The OTRI captures ad valorem tariffs, specific duties, and non tariff measures (NTMS) such as price control measures, quantitative restrictions, monopolistic measures and technical regulations (World Bank and IMF 2009).

<sup>25</sup> See Coughlin (2010) for some discussion on the measurement problems encountering trade restrictiveness.

Ethiopia	12.3%	15.7%	11.6%	19.9%	27.6%	8.3%
Gabon	13.7%	15.6%	13.3%	1.8%	1.6%	1.8%
Ghana	11.7%	26.3%	9.1%	24.7%	38.8%	3.5%
Guinea	..	..	..	6.1%	39.4%	3.5%
Kenya	7.1%	15.8%	5.9%	23.3%	27.9%	15.4%
Morocco	16.8%	57.3%	11.3%	14.1%	33.9%	8.9%
Madagascar	10.0%	9.9%	10.0%	25.4%	19.0%	29.3%
Mali	12.7%	25.0%	10.7%	14.1%	24.6%	11.2%
Mauritius	10.8%	29.4%	5.6%	34.1%	81.4%	16.5%
Malawi	12.9%	24.3%	11.3%	19.9%	21.7%	8.6%
Namibia	1.1%	0.7%	1.3%	4.9%	24.2%	1.8%
Niger	9.2%	11.4%	8.6%	1.7%	18.5%	0.7%
Nigeria	..	..	..	1.8%	35.8%	1.2%
Rwanda	14.2%	7.9%	14.8%	9.0%	27.3%	2.4%
Sudan	27.3%	52.6%	25.9%	1.8%	25.7%	0.5%
Senegal	41.2%	46.4%	39.4%	7.7%	15.1%	4.2%
Togo	11.5%	11.9%	11.4%	34.7%	43.8%	31.2%
Tunisia	..	..	..	11.7%	45.6%	8.9%
Tanzania	52.9%	34.0%	55.4%	13.8%	19.9%	7.7%
Uganda	7.2%	12.9%	5.9%	26.1%	35.6%	2.5%
South Africa	4.3%	11.4%	4.0%	3.8%	24.7%	2.3%
Zambia	5.7%	4.3%	5.9%	8.3%	9.7%	8.1%
Adjusted Simple Average	16%	22%	14%	13%	29%	7%

Note: .. - data not available; Not all African economies are reported to lack of data; ALL – overall aggregated index; MF – aggregated index on Manufacturing Sector; AG- aggregated index on Agricultural Sector; the aggregate percentage reflects applied rates.

Source: Kee HL, Nicita A and Olarreaga M (2009).

We look first at the constraints on home country imports, reflected by OTRI (ALL – column) which proxy the degree of domestic inefficiency of industries due to domestic trade distortionary policies (Kee, Nicita and Olarreaga, 2009). Out of the 32 African economies listed, 5 did not have data. An adjusted simple average<sup>26</sup> shows that for the 27 African economies for which data was available in 2009 the overall trade restrictiveness was 16 per cent. Two interesting observations warrant attention on the OTRI column. First, while majority of African economies in the sample have overall trade restrictiveness below the average of 16 per cent, some African economies have high overall trade restrictiveness indices—Tanzania (52.9 per cent), Senegal (41.2 per cent), Algeria (36.4 per cent), Egypt (35 per cent), Sudan (27.3 per cent)

<sup>26</sup>Average of sum of countries with data available only.



and Côte d'Ivoire (25.7 per cent). Second, some African economies show extremely low overall trade restrictiveness indices—Botswana (0.6 per cent), Namibia (1.1 per cent), South Africa (4.3 per cent), Zambia (5.7 per cent) and Kenya (7.1 per cent)—suggesting that these countries have rather liberal trade regimes.

Looking further to the constraints on the two industry sectors of agriculture and manufacturing for each African economy in the sample, we find that the adjusted simple average OTRI for agriculture sector in our African economies sample is extremely high at 22 per cent reflecting the protectionist trade interest of most African economies on agriculture<sup>27</sup>. On the other hand, we find that the manufacturing sector faces an average of 14 per cent OTRI with the exception of Tanzania which shows a 55.4 per cent OTRI on manufacture.

Moving on to the Market Access-OTRI (MA-OTRI)—an aggregate percentage of the level of barriers encountered by each country's exporters when selling in other countries, the overall market access adjusted simple average is 13 per cent. Three observations are worth noting. First, in average, African economies face lower constraints imposed by other countries (MA-OTRI, adjusted simple average of 13 per cent) compared to the constraints imposed by the African economies themselves on their imports from their partners (OTRI adjusted simple average of 16 per cent). This trend is suggestive that barriers to trade imposed by African economies themselves to their own respective industry sectors (particularly agriculture and manufacturing) is extremely high which may have a negative implication through lower efficiency and productivity on export competitiveness. Second, while majority of African economies face less barriers on their exports than the world average (13 per cent), some of them—including Togo (34.7 per cent), Mauritius (34.1 per cent), Uganda (26.1 per cent), Ghana (24.7 per cent), and Kenya (23.3 per cent)—to encounter high constraints when exporting to other countries. Third, African agricultural exports face high protection from other countries; this is especially the case for agricultural exports from Mauritius (81.4 per cent), Burkina Faso (55.9 per cent), Cameroon (48.6 per cent), Tunisia (45.6 per cent), Togo (43.8 per cent) and Burundi (40.6 per cent). On the other hand, African exports of manufacture face fewer constraints with an adjusted simple average of 7 per cent, compared to a 29 per cent average for agriculture exports.

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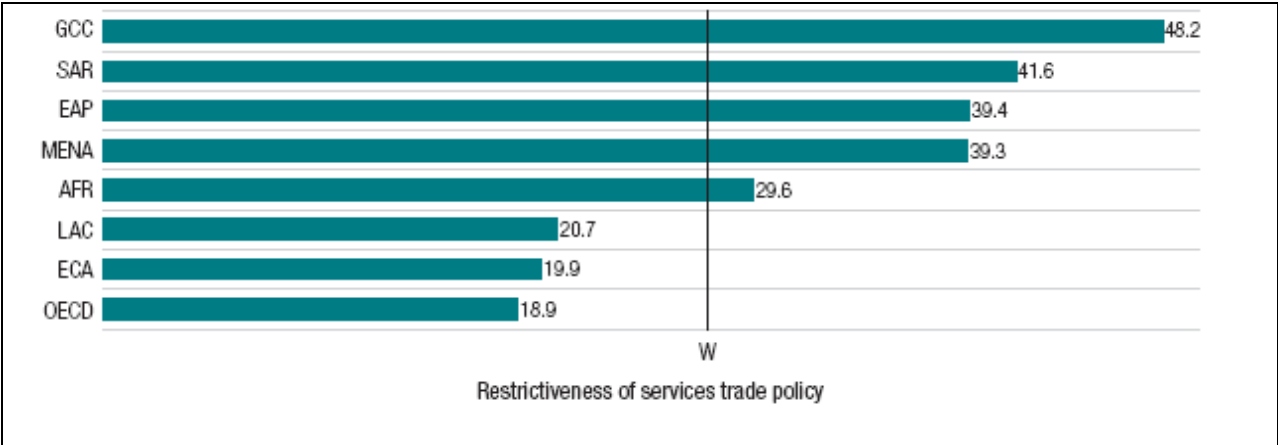
<sup>27</sup>Some African economies show extremely high OTRI—Morocco (57 per cent), Algeria (53.9 per cent) and Sudan (52.6 per cent).

Overall, the agriculture sector for the African sample is highly protected and the data show that African countries have high trade barriers (both tariffs and NTBs) compared to manufacturing. In addition, when comparing barriers from Africa to the rest of the world, African economies faced much higher protection on tariffs for goods exported within African compared to those exported to the rest of the world. Also, while NTBs level varies significantly among African countries, it seems to generally play a major role on hindering exports within Africa and outside.

**(ii) Non-Tariff Barriers on Trade in Services**

Constraints on trade in services in Africa are less pronounced than those on trade in goods. A World Bank survey, assessing applied trade policies in five services sectors—financial services, telecommunications, retails, professional services and maritime transports—of 102 economies including 22 African countries in 2007 and 2008—shows that, on average, the African sample’s countries have relatively liberal services trade policies (see Figure 11). While the African sample is above the world’s average, we find that South Asia, East Asia and the Pacific, and the Middle East and North Africa have more restrictive trade in services policy than the African sample.

**Figure 11: Restrictiveness of Applied Services Trade Policies by Region**



Note: GCC – Gulf Cooperation Council, SAR – South Asia, EAP – East Asia and Pacific, MENA – Middle East and North Africa, AFR – Sub Saharan Africa, LAC – Latin America and Caribbean, ECA – Europe and Central Asia, OECD – Organisation for Economic Cooperation and Development.

Source: Brenton, Dihel, Hinkle and Strychacz (2012).

The survey, however, claims that there is significant variation among African economies—Madagascar and Mauritius are found to have very liberal trade in services policies, while Ethiopia has the highest restrictiveness not only in the African sample but for the whole surveyed sample. Nevertheless, only 22 African economies out of 54 were included in the survey, which is less than half of African countries. In addition, the survey does not provide the list of African countries surveyed. There is very limited data on applied policies governing trade in services in developing countries and this is certainly an area to explore for future research.

To summarize this section, with respect to constraints on trade in goods, we find that agriculture sector is highly protected and the data show that African countries have high trade barriers (both tariffs and NTBs) compared to manufacturing. In addition, when comparing trade barriers in goods within African countries and between Africa and the rest of the world, we find that African economies faced much higher tariff barriers on goods exported to African partners than on goods exported to the rest of the world. Also, while NTBs level varies among African countries, it plays a major role on hindering exports within Africa and outside. Nonetheless, while data on constraints for trade in services is limited for Africa, we find a preliminary study by the World Bank showing less pronounced constraints compared to Asia and Latin America. However, this preliminary survey should be interpreted with some caution as further studies in the country level for all African countries is needed, subject to data availability. The main implication of high barriers to trade within Africa is that it deters the potential for export diversification among African countries. In addition, high tariff on intermediate goods across Africa which is vital for the growth and development of the manufacturing sector further hampers the need to diversify exports from primary commodities to higher value products. The next section concludes the paper with some policy recommendations.

## **(6) Concluding Remarks and Policy Implications**

Based on the computation of Grubel-Lloyd Indices (Intra-Industry Trade) and Herfindahl-Hirschman Indices (Export Diversification) for 49 African countries, there are three findings worthy of attention. First, we found that in general, the African sample have extremely low export diversification and intra-industry trade patterns. However, within the African sample, we find significant heterogeneity in export diversification patterns. Second, over the period 1998-2009, we find that the African sample shows a gradual move towards product concentration (lack of export diversification). Further, Africa is lagging behind other major regions (Asia, Pacific and the Americas) in terms of export diversification. Third, there is a positive correlation between intra-industry trade and percentage of manufacturing in GDP, suggesting that an increase in manufacturing production have positive effect on intra-industry trade and vice versa. In addition, the economies with the largest total intra-industry trade (Tunisia and SACU) have relatively low intra-African intra-industry trade, meaning that for these African economies intra-industry trade mainly takes place with external trading partners located outside the continent.

In terms of the linkages between intra-industry trade and export diversification in the African sample, we found that an increase in export diversification is positively correlated to intra-industry trade and vice versa. The paper identified three key constraints to export diversification and intra-industry trade in Africa. First, while African countries have a comparative advantage on primary commodities (including agricultural products), the average tariff barriers faced by African exports of agricultural are quite high. In addition, African LDCs impose very high tariffs on their imports of intermediate goods which are crucial for the expansion of intra-industry trade and export diversification in Africa. Second, we find that Africa encounters higher average tariff rates on goods traded within the continent than when exported to the rest of the world. Third, constraints in trade in services are less pronounced. These constraints need to be addressed in a systematic manner, ensuring that efforts towards boosting export diversification and intra-industry trade in Africa is undeterred.

In light with these preliminary above findings, three policy implications deserve emphasis. First, the low export diversification and intra-industry trade for most African economies emphasizes the need to facilitate trade in the extensive margin. However, export

expansion through the intensive margin should equally be promoted and supported. Trade facilitation may include hard and soft infrastructure. Greater product differentiation represents one possible pathway to simultaneously increasing intra-industry trade and export diversification. Second, the low export diversification and intra-industry for Africa implies that there are real constraints to trade among African economies which need addressed. The issue of tariff and non-tariff barriers to trade needs to be addressed in order to facilitate trade. In particular, the need to ensure that African exporters have the capacity to meet trade standards necessary to permit their exports within Africa as well as outside Africa. The development of the regional labelling programmes that enhances the environmental profile of African products and improves their market access is a commendable effort by ARSO and UNEP. The CFTA and the regional integration agenda have a critical role to play in that respect. Third, the liberalisation of the financial sector (among other services sectors) is key in ensuring the growth of exports of goods and services in Africa.

This study is best understood as a prolegomena to the assessment of intra-industry trade and export diversification in Africa. Intra-industry trade is not yet a key issue for African economies, but if they sustain their current growth trajectories it will become increasingly relevant. As such, this paper describes some of the pressing issues surrounding IIT, and the policy interventions to better embrace as a pillar of the export diversification paradigm. Future research would be well placed to closer scrutinize bi-lateral intra-industry trade and disaggregate horizontal and vertical intra-industry trade. We also need a better understanding of the role of domestic, regional and international firms (FDI) in intra-industry cross-border trade, and identification at the national level of key sectors in which intra-industry trade is expanding and why. Furthermore, firm level data would allow for greater scrutiny of the implication of so-called 'New-New Trade Theory' (NNTT) and its implications for export diversification and intra-industry trade in Africa. Similarly, more disaggregated data on trade in services presents would allow for deeper understanding of intra-industry trade in service sectors, and its relevance for wider export diversification.

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## (8) Appendices

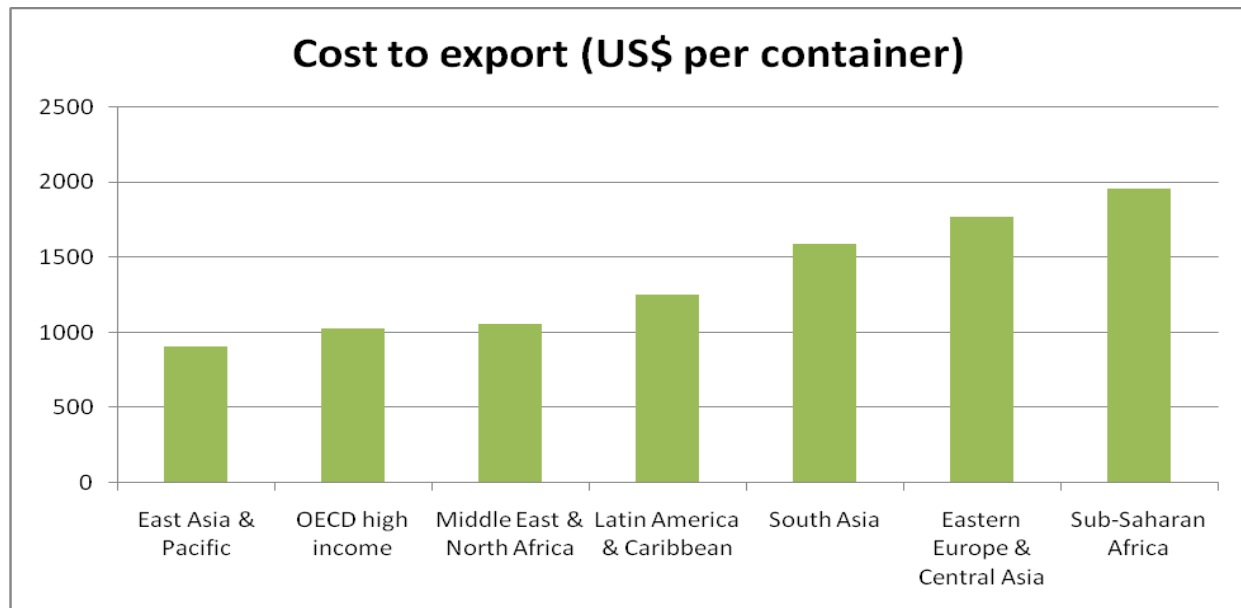
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Algeria	0.5	0.4	0.5	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.5	0.5
Angola	0.8	0.8	0.9	0.9	0.9	0.9	1.0	0.9	1.0	1.0	1.0	1.0
Burundi	0.9	0.8	0.8	0.7	0.5	0.6	0.6	0.6	0.4	0.4	0.4	0.5
Cameroon	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.4
Cape Verde	0.4	0.3	0.4	0.3	0.3	0.2	0.2	0.4	0.4	0.4	0.4	0.3
Central African Republic	0.7	0.7	0.7	0.5	0.6	0.4	0.4	0.5	0.3	0.3	0.3	0.4
Chad	0.8	0.8	0.7	0.8	0.7	0.7	0.8	0.7	0.9	0.9	0.9	0.9
Comoros	0.5	0.4	0.5	0.6	0.5	0.7	0.5	0.4	0.3	0.3	0.3	0.3
Congo	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.8	0.9	0.8	0.8	0.9
Congo, Dem. Rep.	0.6	0.7	0.6	0.6	0.7	0.5	0.5	0.5	0.4	0.4	0.4	0.3
Benin	0.5	0.6	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.4
Equatorial Guinea	0.7	0.7	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8
Ethiopia	0.7	0.6	0.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Eritrea	0.5	0.4	0.2	0.2	0.2	0.1	0.2	0.3	0.2	0.7	0.3	0.3
Djibouti	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.1	0.2	0.4	0.3	0.2
Gabon	0.7	0.7	0.8	0.8	0.8	0.8	0.7	0.8	0.7	0.7	0.7	0.7
Gambia	0.7	0.6	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.3
Ghana	0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.5
Guinea	0.4	0.5	0.4	0.4	0.4	0.5	0.5	0.5	0.4	0.5	0.4	0.6
Cote d'Ivoire	0.4	0.4	0.4	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
Kenya	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Liberia	0.5	0.5	0.4	0.5	0.4	0.6	0.5	0.5	0.4	0.5	0.4	0.5
Libyan Arab Jamahiriya	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.8
Madagascar	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1
Malawi	0.6	0.5	0.5	0.6	0.5	0.5	0.4	0.5	0.5	0.4	0.4	0.5
Mali	0.7	0.6	0.5	0.5	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.5
Mauritania	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.5
Mauritius	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2
Morocco	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1
Mozambique	0.4	0.3	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4
Niger	0.4	0.4	0.5	0.3	0.3	0.4	0.3	0.3	0.4	0.4	0.3	0.8
Nigeria	0.9	0.9	0.9	0.9	0.8	0.9	0.9	0.9	0.9	0.9	0.8	0.8
Guinea-Bissau	0.5	0.6	0.6	0.8	0.6	0.8	0.7	0.9	0.8	0.9	0.9	0.9
Rwanda	0.6	0.7	0.6	0.6	0.5	0.4	0.6	0.4	0.4	0.3	0.4	0.3
Sao Tome and Principe	0.6	0.3	0.3	0.3	0.5	0.6	0.4	0.5	0.4	0.4	0.5	0.5
Senegal	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2



Seychelles	0.6	0.6	0.7	0.6	0.5	0.6	0.5	0.4	0.5	0.5	0.5	0.6
Sierra Leone	0.6	0.4	0.4	0.4	0.3	0.5	0.5	0.6	0.4	0.4	0.3	0.3
Somalia	0.4	0.4	0.5	0.2	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.4
SACU	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Zimbabwe	0.3	0.3	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.3
Sudan	0.3	0.4	0.5	0.6	0.5	0.6	0.6	0.6	0.6	0.9	0.9	0.8
Togo	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.5	0.5
Tunisia	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Uganda	0.5	0.5	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
Egypt	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Tanzania, United Republic of	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2
Burkina Faso	0.6	0.6	0.6	0.5	0.5	0.7	0.7	0.8	0.7	0.7	0.6	0.6
Zambia	0.5	0.3	0.3	0.5	0.5	0.4	0.4	0.5	0.6	0.6	0.5	0.5
<b>Weighted average</b>	<b>0.2</b>	<b>0.3</b>	<b>0.4</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.4</b>	<b>0.4</b>	<b>0.4</b>	<b>0.4</b>	<b>0.5</b>	<b>0.4</b>

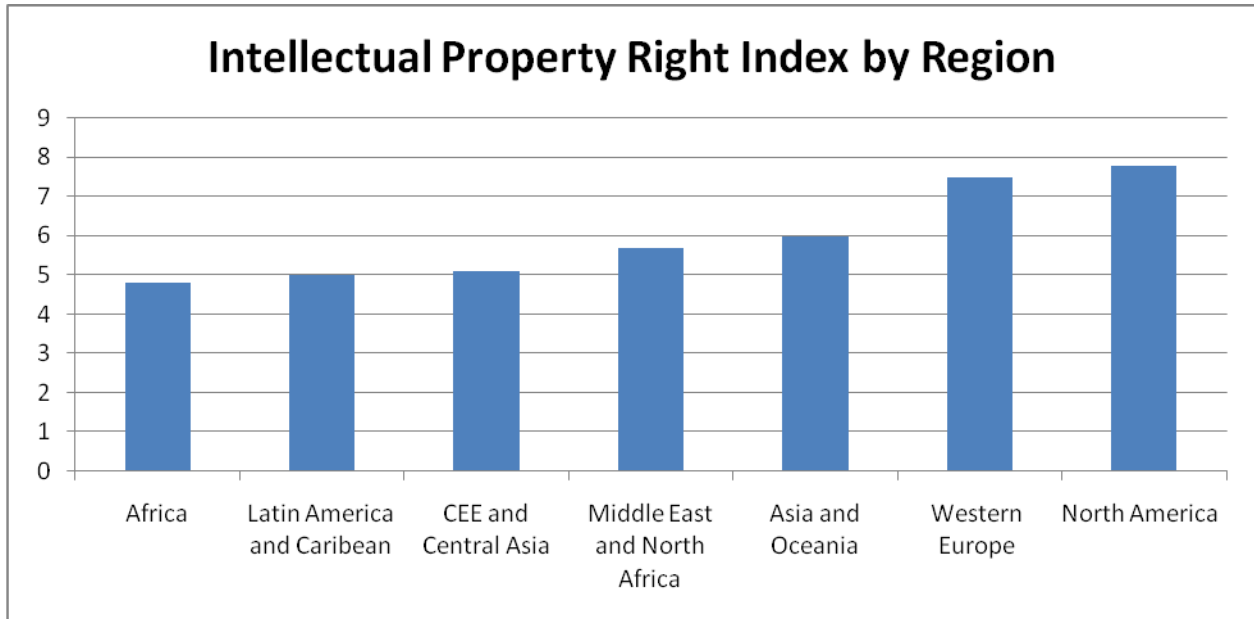
Source: Author's estimations based on BACI Data Set and COMTRADE, 2012.

Appendix 2, Figure 12



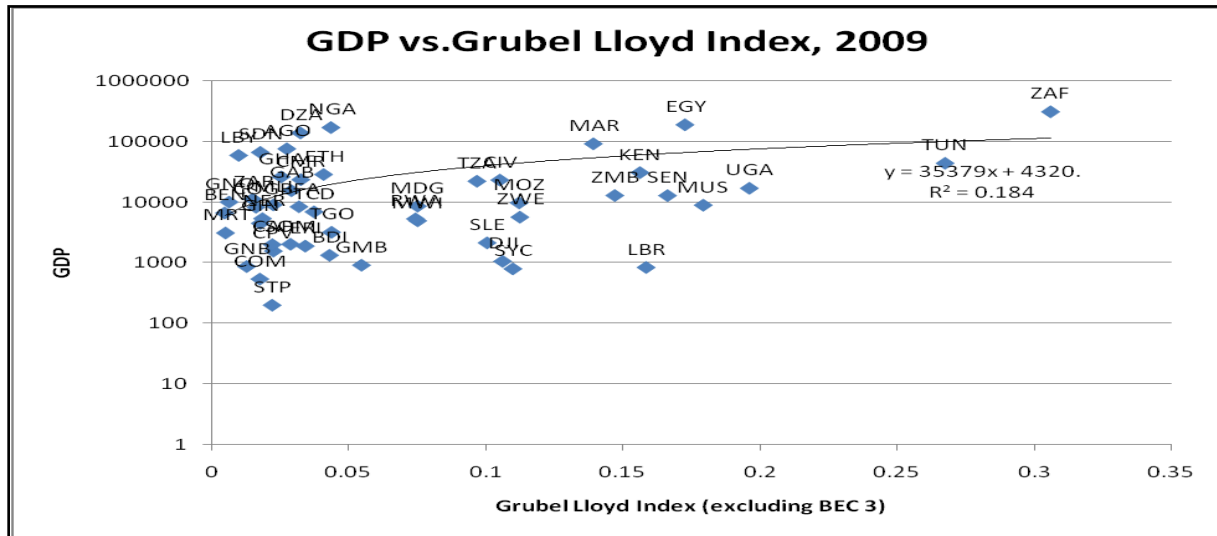
Source: World Bank (2011)

Appendix 3, Figure 13: Intellectual Property Right Index by Region (2011)



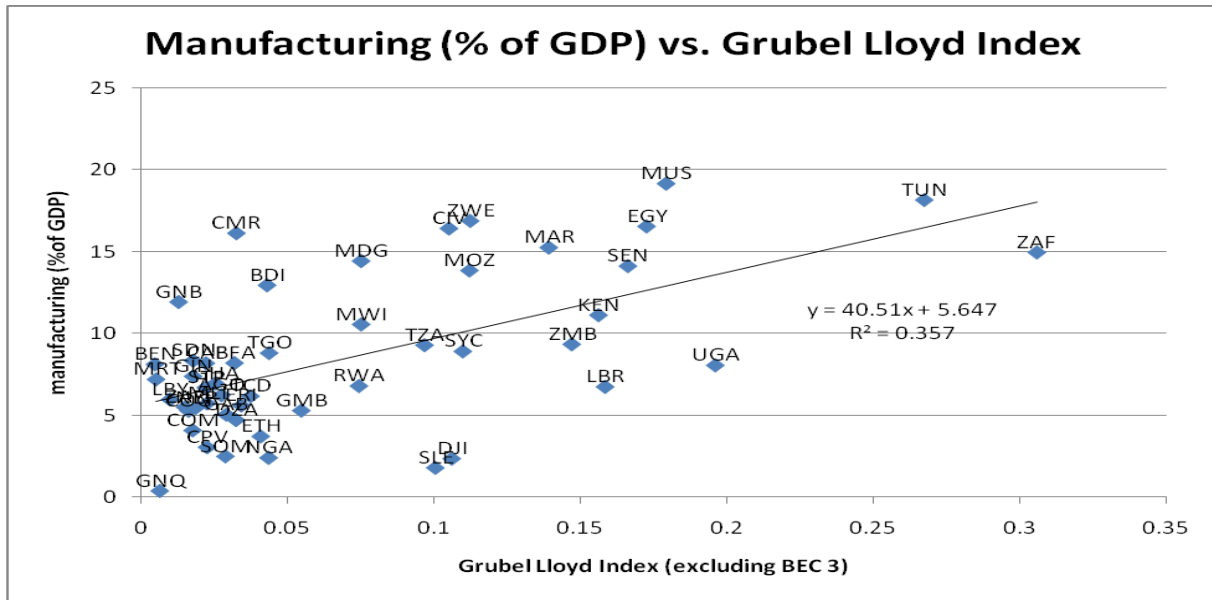
Source: Property Rights Alliance (2011)

Appendix 4, Figure 14: GDP vs. Grubel Lloyd Index, 2009.



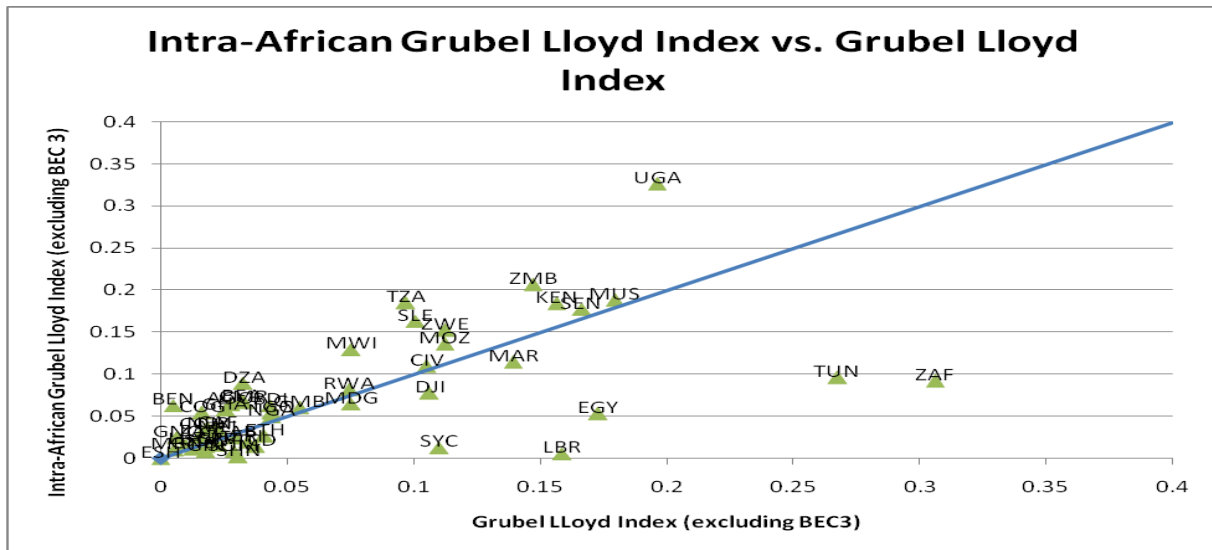
Source: Author's estimations.

**Appendix 5, Figure 15: Africa's Manufacturing Sector's contribution to GDP versus Intra-Industry Trade Index, 2009.**



Source: Author's estimations.

**Appendix 6, Figure 16: Africa's Intra-industry trade versus Intra-Industry trade to all Partners, 2009.**

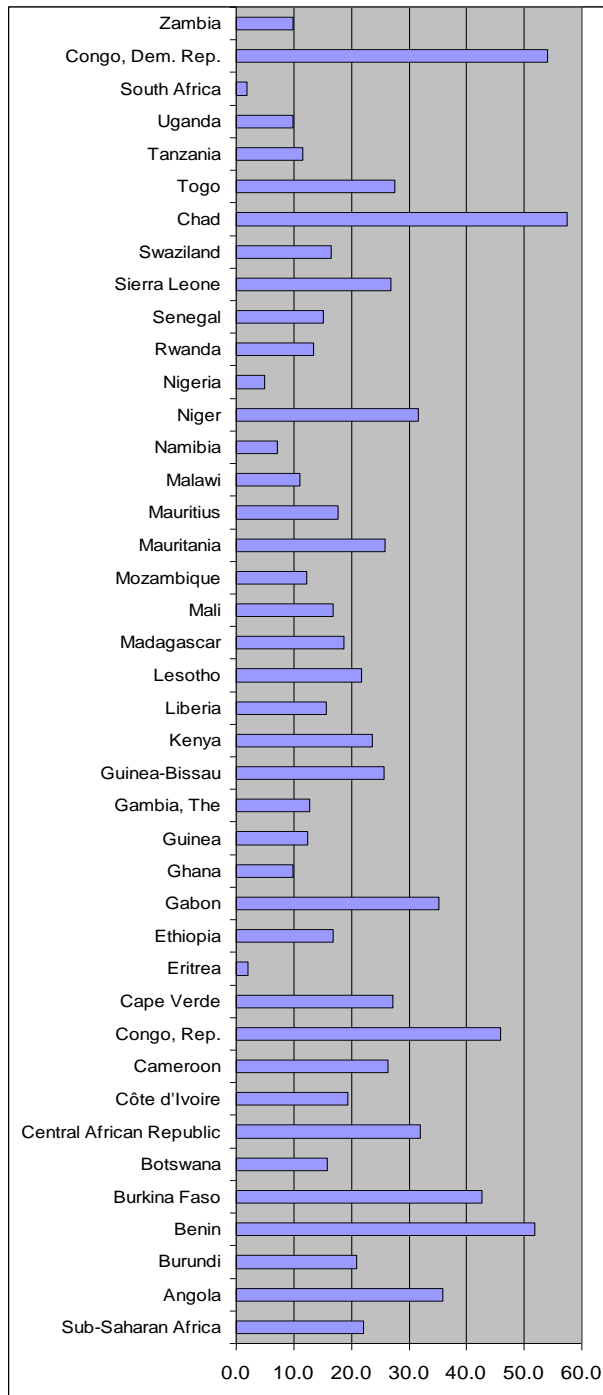
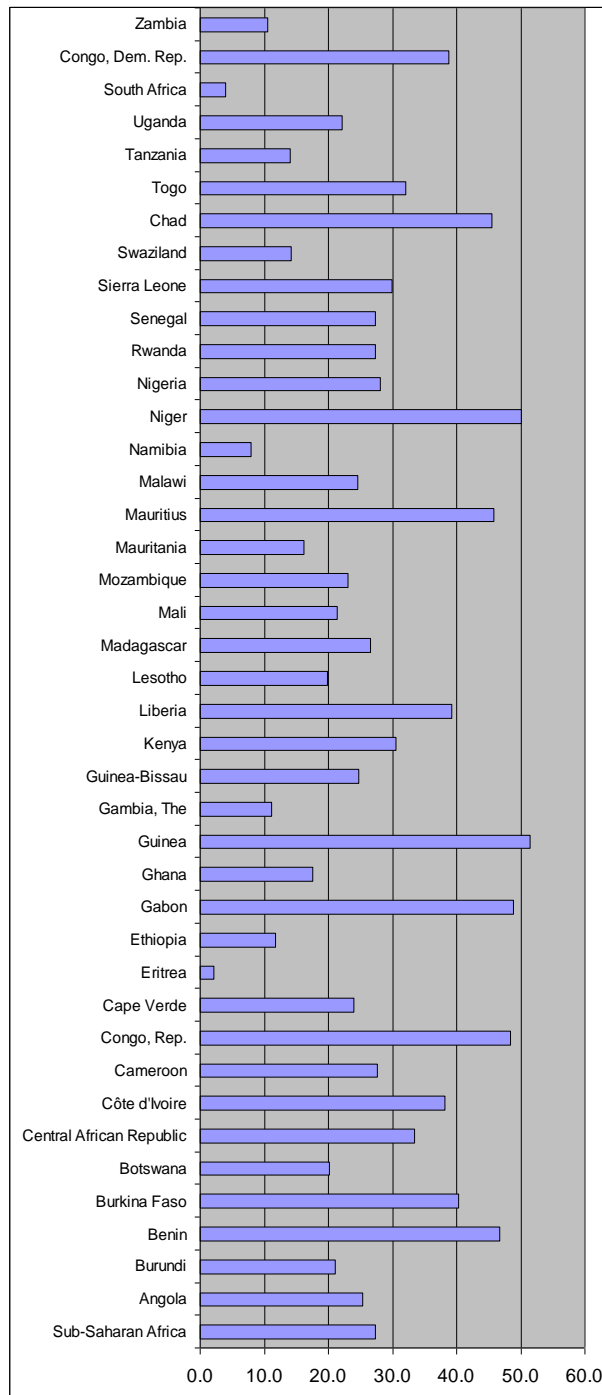


Source: Author's estimations.

### Appendix 7, Figure 17: Constraints to Manufacturing Sectors in Africa

Percent of firms identifying transportation as a major constraint

Percent of firms identifying customs and trade regulations as a major constraint



Source: Adapted from Enterprise Surveys (<http://www.enterprisesurveys.org>), The World Bank, 2012.