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Impact of Trade Facilitation Mechanisms on Export Competitiveness in Africa

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Acronyms

AUC	African Union Commission
BRIC	Brazil, Russia, India, China
CMSA	Constant Market Share Analysis
EGLS	Estimated Generalized Least Squares
EU	European Union
FDI	Foreign Direct Investment
ICT	Information and Communication Technology
IMF	International Monetary Fund
ISO	International Organization for Standardization
GCI	Global Competitiveness Index
GDP	Gross Domestic Product
LDC	Least Developed Country
NTB	Non-Tariff Barrier
OECD	Organization for Economic Cooperation and Development
POLS	Pooled Ordinary Least Squares
RCA	Revealed Comparative Advantage
SITC	Standard International Trade Classification
TFP	Total Factor productivity
TTC	Trade Transaction Costs
UNECA	United Nations Economic Commission for Africa
WEF	World Economic Forum
WTO	World Trade Organization

Abstract

Export competitiveness, while seemingly intuitive, remains conceptually and empirically elusive. This paper presents three distinct ways of thinking about export competitiveness and attempts to capture their character empirically for African nations. The first, the 'competitiveness as market share' hypothesis, employs a Constant Market Share Analysis to examine the dynamics of the competitiveness of Africa's exports. The second explores the foundations of export competitiveness through the Global Competitiveness Index and its relationship with Total Factor Productivity. Thirdly, the character of African exports is scrutinized through the application of Hausmann, Hwang and Rodirk's (2007) measure of the income level of exports. The analysis then turns to the impact of trade facilitation on export competitiveness. It shows that trade facilitation, captured by the four indicators created by Portugal-Perez and Wilson (2010), significantly bolsters a key source of competitiveness, total-factor productivity, through a transaction effect but the production effect in which trade facilitation reallocates resources to more productive sectors, proxied by the impact on the income level of exports, is less sensitive. While the quality and quantity of physical infrastructure is robust across specifications, the results suggest that trade facilitation measures are best adopted as part of a holistic trade policy aimed at creating an environment conducive to the diversification of African exports to ensure long run export competitiveness.

1. Introduction

Despite its apparent intuitive appeal, the notion of export competitiveness remains ill-defined, conceptually vague and subject to abuse. Economists accept that firms must be 'competitive' to secure the bottom line, but national competitiveness has been dismissed as a "largely meaningless concept…a dangerous obsession" (Krugman, 1994; p.41). For Krugman, the language of competition contravenes the win-win Ricardian exchange from which international trade derives is *raison d'etre*, and erroneously implies that the wealth of nations is derived from international fortunes alone. Nonetheless, while nations may not be in direct contest, the goods and services they produce do compete for the affections of foreign consumers. To deny that domestic conditions are relevant to exporter's relative success in this regard is in itself a dangerous misgiving: given the development challenges that persist on the continent, Africa can ill-afford the opportunity cost of failing to integrate with an increasingly globalised economy.

It is not hard to see why export competitiveness is so problematic. Firstly, it concerns what a nation is good at, and just how good at it it is: its comparative advantage. Secondly, it concerns the level of demand in the global economy for the product of these comparative advantages, which in turn depends on the prices these goods and services are traded at. Lastly, it concerns how beneficial specialization in comparative advantage activities is for the exporting country. Ricardian comparative advantage implies that exporting those goods in which the opportunity cost of production is at its lowest is welfare enhancing but, as is discussed in Section 5, such specialization can entail substantial long run opportunity costs if it resides in the 'wrong' activities. When one considers that none-of-the-above are static, but rather subject to a myriad of dynamic forces (see Lin, 2010), and in fact frequently in conflict with one another, the conceptual complexity is confounded.

Meanwhile, Africa continues to punch below its weight when it comes to its share of world markets and trade facilitation – broadly understood as the process of making trade easier and less costly – is increasingly viewed as the essential oil for trade's stuttering engine of growth. Countless assessments, reviewed in Section 2, have re-asserted the potential benefits of trade facilitation, although few have attempted to interpret its interaction with a dynamic and multifaceted understanding of the competitiveness of Africa's exports. This paper attempts to bridge this gap. It presents three distinct conceptualizations of export competitiveness and endeavors to capture their character empirically for African economies. The first, outlined in Section 3, equates competitiveness with market share. A Constant Market Share Analysis is applied to the export growth of 37 African nations, revealing massive heterogeneity in the competitiveness of the continent's constituents, at both the product and partner level. Section 4 critiques the competitiveness as market share thesis as potentially detrimental to standards of living if induced by a devalued currency. This critique holds that productivity, and an environment which facilitates productivity growth, determines competitiveness. In Section 5, the analysis turns to export composition.

A measure of export sophistication of Hausmann, Hwang and Rodrik's (2007) creation is employed to identify countries which may need to diversify their exports in order to reach their full potential for growth. Section 6 develops and tests a conceptual framework of the impact of trade facilitation on export competitiveness. Using measures of total factor productivity and export sophistication estimated earlier in the paper as dependent variables, it models the impact of four trade facilitation indicators created by Portugal-Perez and Wilson (2010) covering physical infrastructure, information and communications technology, border and transport efficiency and the business and regulatory environment. Section 7 summarizes the papers main finding that while trade facilitation can bolster productivity, the specificity of inputs to the production process requires a degree of selectivity rather than a blanket approach to facilitating the upgrading of exports required to secure long run competitiveness.

2. Trade Facilitation: A Literature Review

In the context of the growing cannon of research alluding to the growth potential of trade and the East Asian experience of export-led growth, the poor export performance of African nations is increasingly viewed as fertile ground for the pursuit of growth in the continent. The World Bank has developed a thematic group on export competitiveness[1] which advocates a framework based on the following three complementary elements:

1) The incentive framework – resources must be allocated to firms that have the capacity to compete internationally in the long run, and the most productive firms.
2) Reducing trade related costs – this includes physical infrastructure and complementary services related to trade, as well as policies related to the supply of capable workers.
3) Overcoming market and government failures – a holistic approach to mitigate weak capacity through building institutional quality in areas such as export promotion, innovation, and transparency of government procedure.

Of the above, the second – reducing trade related costs – is a crude synonym for trade facilitation. In its narrowest sense, trade facilitation refers to the reduction of the trade costs associated with moving goods across borders. A broader interpretation encompasses all non-tariff barriers (NTBs) to trade, including behind the border costs associated with the institutional and business environment, services in support of trade, and physical infrastructure in transport, energy and information and communication technology (ICT). Portugal-Perez and Wilson (2010; p.2) distinguish further between a "'hard' dimension related to tangible infrastructure such as roads, ports, highways, telecommunications, as well as a 'soft' dimension related to transparency, customs management, the business environment, and other institutional aspects that are intangible. This latter component includes international efforts to make trade easier reflecting,

1 http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/TRADE/EXTEXPCOMNET/0,,contentMDK:21784205~pagePK:64168427~piPK:64168435~theSitePK:2463594,00.html

for example, the WTO's definition of trade facilitation as "the simplification and harmonization of international trade procedures."

Trade Transaction Costs (TTCs)–encompassing both directly incurred costs, such as expenses relating to supplying information and documents to the relevant authority, and indirect costs, such as those arising from procedural delays – typically amount to between 1 and 15 per cent of the value of traded goods (OECD, 2003). Estimates associated with the broader interpretation of trade costs typically reside toward the higher end of the spectrum, as do those facing developing countries (OECD, 2005). Reducing the costs of doing business has a long precedent in economic theory (see Coase, 1937, for example). With respect to trade facilitation, Berkowitz *et al.* (2006) distinguish between a transaction effect, the boost to productivity caused by the reduction in transaction costs incurred by exporting firms, and a production effect, the changes to production structures through the provision of more of the inputs required for the production of more sophisticated, growth-boosting products. Wilson *et al.* (2005) estimate that global trade volumes would see a $377 billion boost, with sub-Saharan African countries exporting almost 10 per cent more (exports benefit more than imports) if countries with below average facilitation indicators were to increase them half way to the average of the 75 countries in their sample.

Institutional factors, a key component of the broader interpretation of trade facilitation introduced above, emerge from the literature as significant determinants of trade costs in developing countries. The premium caused by the insecurity of trade within LDCs is significantly reduced if the legal system is capable of enforcing commercial contracts and formulation and implementation of government economic policy is transparent and impartial, variables which go a long way to explaining South to North exports falling short of those predicted by factor endowments (Anderson and Macoullier, 2002). A poor domestic business environment also affects access to capital, increases risk premiums and encourages holding excessive stock inventories, which conspire to undermine export competitiveness (Balchin and Edwards, 2008). These results are corroborated by Elbadwi *et al.*'s (2006) firm level analysis. Using data from the World Bank's Investment Climate Report they find exports are greater where the rule of law is stronger and there is less corruption. In this case, institutional variables impact the number of exporters in a country (the extensive margin) more than the share of output existing exporters sell abroad (the intensive margin).

Other studies emphasize infrastructure constraints. Information and Communications Technology (ICT) repeatedly features as a barrier to trade. Firms with internet access export around 11 per cent more than those without (Clarke, 2005; although it is of course possible that rather than internet use encouraging exports, exporting may necessitate internet use). Yoshino's (2008) findings imply ICT infrastructure matters more when African countries are trading with global partners, and introduce access to new vintage capital as a further source of export gains. Electricity infrastructure matters too: almost half of African respondents believed electricity to be a major constraint in Balchin and Edwards (2008)

survey. In Kenya, for example, the median firm saw sales reduced by 6 per cent due to power failures, a loss associated with a 6 per cent reduction in total factor productivity (Eifert *et al.*, 2005). A third infrastructure constraint resides in costs arising from transportation. One study showed that raising transport costs by 10 per cent reduced trade volumes by more than 20 per cent, with infrastructure accounting for more than 40 per cent of transport costs (60 per cent for landlocked countries: Limao and Venebles, 2010), while another found a one day increase in inland transit time reduces exports by 7 per cent on average (Freund and Rocha, 2010). Cheaper international transit is also associated with extensive expansion (Dennis and Shepard, 2007; Persson, 2010). The costs of transport are not endogenous of trade volumes, however. Clark *et al.* (2004) show evidence of economies of scale such that an increase in export volume from the level of Cyprus (15th percentile) to that of Indonesia (85th percentile) reduces transport costs by around 20 per cent.

With respect to 'on the border' issues, the aforementioned Clark *et al.* (2004) study, each of the four indicators of port-efficiency had a negative and significant impact on the cost of trading. Djankov *et al.* (2006) show each days exporting delay corresponds to a 1 per cent reduction in trade volumes, with delays in developing countries and time-sensitive goods (such as agricultural perishables) associated with an even greater reduction.

Lastly, trade facilitation often concerns the simplification and synchronization of trading procedures. The complexity of import procedures required that 85 per cent of exporting enterprises using imported inputs in the African firms considered in Clarke's (2005) study employed a clearing agent to assist with the process. Standardization is often touted as a route to eliminating such complexity related costs. Balchin and Edwards (2008) show that the probability of African firms exporting is enhanced by possession of an International Organization for Standardization (ISO) certificate, and Africa's exports are far less restricted by EU standards when they are harmonized with those of the ISO (Czubala, *et al.*, 2007).

The empirical literature unequivocally endorses trade facilitation as a driver of more trade, observed and projected alike. The oft-cited Wilson *et al.* (2005) study is broadly representative in its conclusion that "results suggest that both imports and exports for a country and for the world will increase with improvements in …trade facilitation measures." This tells us little of the mechanics at play, however. Can export growth be attributed merely to lower transaction costs (the transaction effect) or can trade facilitation affect the very structure of production (a production effect)? Does trade facilitation simply expand trade uniformly or can it influence long run dynamics, the underlying competitiveness of exports? Can trade policy in Africa employ trade facilitation mechanisms as part of a holistic policy aimed at growing shares of foreign markets and engendering structural transformation? These questions are addressed in Section 6, but firstly Sections 3-5 attempt to unpack the notion of export competitiveness in the African context.

3. Export Competitiveness as Market Share

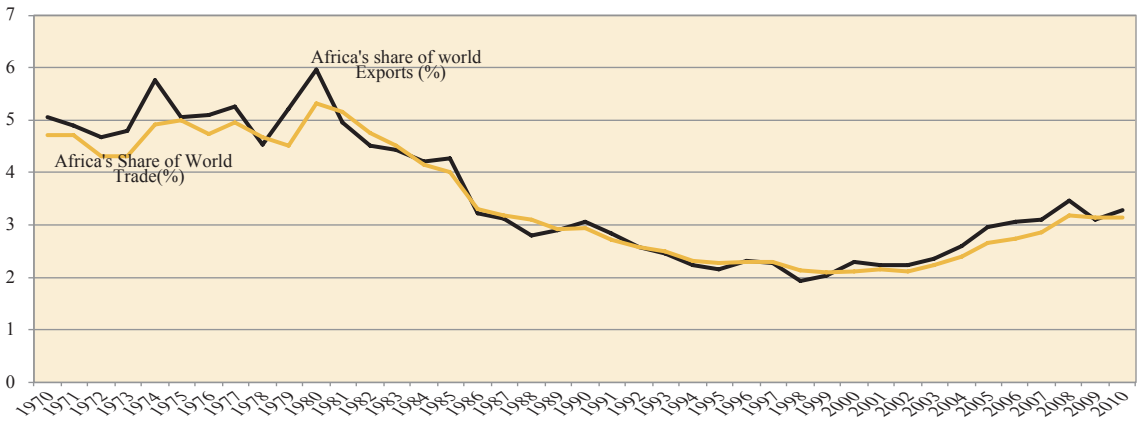
> "The most intuitive definition of *competitiveness* is a country's share of world markets for its products. This makes competitiveness a zero-sum game, because one country's gain comes at the expense of others." (Porter *et al.*, 2008; p.2)

With competitiveness so conceived, countries (or firms in countries) engage in direct competition in a global marketplace to sell their products. If Say's Law is accepted and supply does indeed create its own demand, it is feasible that all nations' exports can continue to grow as they have in the current era of globalization. If one country is to expand its *share* of global markets, however, another's must contract. For every winner, there must be loser. Statesmen often portray international competition as a contest between rivals. President Barack Obama's 2011 State of the Union Address is a case in point:

> "Nations like China and India…realized they could compete in this new world…The competition for jobs is real. But this shouldn't discourage us. It should challenge us… *the future is ours to win*...We know what it takes to compete for the jobs and industries of our time. We need to out-innovate, out-educate, and out-build the rest of the world." (25 January 2011).

What can be said of African export competitiveness if it is to be taken simply as its share of world markets? Figure 1 below shows that Africa's share of global merchandise exports falls far short of the 6 per cent it enjoyed 30 years ago. However, substantive gains have been made over the past decade. Indeed, exports from African countries have increased five-fold in the 10 years to 2008 while world exports tripled over the same period, increasing Africa's share of world exports to 3.47 per cent. In short, Africa's exports have been getting more competitive.

Figure 1: Africa's Share of Global Merchandise Trade



Source: UNECA and AUC (2011).

The share of world markets alone reveals little of the dynamics at play, however. The methodology of Constant Market Share Analysis (CMSA) helps to reflect objectively on whether the observed increase in world market share is attributable to favourable export composition (e.g. growing demand for the commodities in which African countries specialize, a commodity composition effect), favourable trading relationships (e.g. growing demand from emerging trading partners like China and India, a market distribution effect), or a shift in underlying competitiveness (a competitiveness effect). First applied to international trade by Tyszynski (1951), the refinements made by Leamer and Stern (1970) disaggregate export growth according to the following identity:

$$\overbrace{\sum_i \left(X_i^2 - X_i^1 \right)}^{export\,growth} \equiv \overbrace{\overbrace{r \sum_i X_i^1}^{world\,effect} + \overbrace{\sum_i \left(r_i - r \right) X_i^1}^{commodity\,composition\,effect} + \overbrace{\sum_i \sum_j \left(r_{ij} - r_i \right) X_{ij}^1}^{market\,distribution\,effect}}^{structural\,effect} + \overbrace{\sum_i \sum_j \left(X_{ij}^2 - X_{ij}^1 - r_{ij} X_{ij}^1 \right)}^{competitive\,effect} \quad (1)$$

Where:

X_i^t = exports of product i in period t

X_{ij}^t = exports of product i to market j in period t

r = percentage change in world exports from t (1) to t (2)

r_i = percentage change in world exports of product i from t (1) to t (2)

r_{ij} = percentage change in the world export of product i to market j from t (1) to (2)

The disaggregation of export growth in this way clearly distinguishes between export growth attributable to the structure of trade (dynamism in products or partners) and that arising from the ability to compete effectively with other sources of supply. The competitiveness effect is positive if, in aggregate, the country in question is able to enlarge its share of foreign markets across product lines. [2]

Using export data from the *UNCTADstat* database this paper undertakes a Constant Market Share Analysis of the growth of African countries exports from 2004 to 2008. A sample of 115 trading partners is used, comprised of the top 100 export destinations for African exports (which accounts for more than 99 per cent of African exports) and the 15 African countries not included in the top 100. The analysis covered 252 products at the 3-digit level of the third revision of the Standard International Trade Classification (petroleum products are excluded owing to price volatility and the ensuing sensitivity of Africa's oil producer's exports to external shocks).

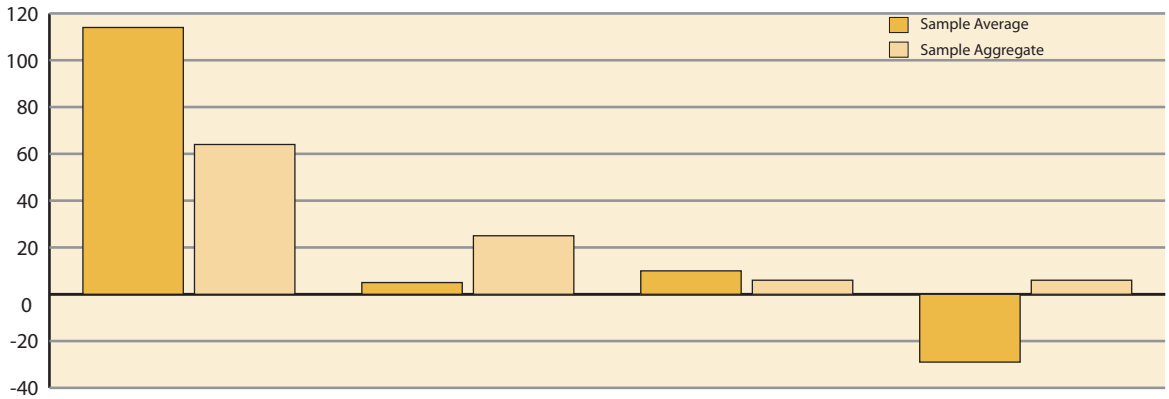
UNCTADStat collates data from national Statistics Offices and International Sources and while the CMSA analysis was undertaken for all 53 African countries, some have been excluded on the grounds of inconsistency of the total exports at this level of disaggregation with what has been reported elsewhere (namely the WTO online database and the IMF Direction of Trade Statistics).[3] Those countries for which *UNCTADstat* reports a decline in exports are also excluded.[4] As exports are denominated in current US dollars the results are of course subject to distortions arising from fluctuations in this currency. It should also be noted that CMSA fails to distinguish between price and non-price competitiveness effects and offers no causal interpretation of the observed changes. - Appendix B shows the results for the 26 non-oil exporting countries (Table B1) and 11 oil exporting countries (Table B2, reporting only their non-oil exports).

2 Combining the commodity composition effect and the market distribution effect with the world effect – the hypothetical growth in exports consistent with the general rise in world exports – gives the structural effect, the changes that arise from the structure of trade rather than underlying competitiveness factors.

3 While the convention is to favor import data as more reliable, particularly for developing countries, our analysis found larger disparities between these sources for import data and as such would require the expulsion of more countries on these grounds.

4 Interpretation of the competitive effect is impaired when a decline is observed. For example, if exports fall by 100, of which 25 is due to competitiveness factors, recording a -25 per cent competitiveness effect is not the same as a negative competitiveness effect when total exports have grown. Appendix A provides a summary table of all the country samples used for each of the empirical analyses undertaken in this paper.

Figure 2: Constant Market Share Analysis, Sample Average and Aggregate



Source: Authors calculations from UNCTADstat data.

Figure 2 shows the sample aggregate and average CMSA results. Consider firstly the world effect. On aggregate African export growth far outstripped the growth in world trade, but for the average African country, export growth fell short of the global rate. Similarly, a positive aggregate competitiveness effect of six per cent shows competitiveness is growing in aggregate, but a negative average competitiveness effect implies some countries have substantial competitiveness deficits too. African competitiveness, that is the ability to expand its share of foreign markets, is driven by a few key economies. Note that even those with large competitiveness residuals have seen shares of some foreign markets fall, however (while the competitiveness effect may be positive in aggregate, it is not universally positive for all *i* to all *j*). This is unsurprising as trade facilitation mechanisms (which essentially address the inputs required for export) are not indiscriminate across products. Better transport infrastructure, for example, may shift the incentive structure in favour of heavier goods previously too costly to export, encourage exports of perishables that would previously waste in transit, or make markets once too distant more accessible.

Of the 37 countries reported in Appendix B, 22 exhibit a positive competitiveness effect, and 15 negative. Egypt shows the largest absolute competitiveness residual, with exports in 2008 $6.2 billion greater than that which would have been observed had it simply maintained a constant share of all partner markets in all product categories since 2004. Burkina Faso enjoys the largest competitiveness effect as a share of export growth, with more than three times the observed export growth attributable to competitiveness factors. This sizeable competitiveness effect is attributable to Burkina Faso's ability to expand its share of partner countries cotton markets, and as the growth in cotton exports actually exceeds the growth in overall exports (i.e. non-cotton exports fell over the period concerned) the competitiveness effect exceeds the aggregated export growth over all product lines. At the other end of the spectrum, South Africa has the largest negative competitiveness effect value ($5.7 billion) and Mauritius is the least competitive

when the residual is considered as a share of export growth (drastic falls in sugar exports to the UK and clothing to the US are the biggest culprits).

No country is uniformly competitive or uncompetitive: in each case there is a range of positive and negative residuals across products and partners. Table B3 shows the percentage of product lines for which the competitiveness effect is positive and negative, and the best products and partners for each country. Egypt and Libya are the best performers with more than 70 per cent of product lines experiencing an increased share of foreign markets. South Africa and Cote d'Ivorie are 'uncompetitive' in 69 per cent and 65 per cent of product lines respectively, the largest in the sample. Closer scrutiny of the most and least competitive products for each country reiterates the dominance of primary commodities and extractive industries to African countries export portfolio. Lesotho and Madagascar's clothing exports, the motor-vehicle exports of South Africa, and intermediate inputs from North Africa are rare instances in which the most competitive industries contain high levels of value added.

One of the features of the 'competitiveness as market share' hypothesis is the idea that nations are in direct competition for that market share, a competition which often results in winners and losers. The CMSA of cocoa exports, for example, shows that Nigeria's share of cocoa markets has been growing while Cote d'Ivoire's has been falling. Nigerian cocoa has displaced Ivorian cocoa – it has beaten its West African opponent in the cocoa contest. Similarly, where Guinea and Angola have lost copper ore exports, Mauritania has gained them. Such observations are doubtless a product of the homogeneity between African export baskets and raises important questions with respect to the costs and benefits of regional competition in areas of traditional comparative advantage. Regional cooperation in pursuit of greater diversification may reduce the degree of direct competition between African nations if it succeeds in moving export portfolios into product lines in which the principal competitors are located out with the region.

With respect to partner countries, China features most frequently as that country for which African exports are displacing other countries', exemplifying China's increasing importance for the continent. This contrast with the UK: for 5 of the sample of 35 countries the UK is that country for which exports experienced the greatest fall in market share. Geography and history are evident in the evolving dynamics of export competitiveness, with neighbors and former colonizers featuring as trading partners of different profiles. France, for example, seems to be buying more of some Francophone countries exports and less of others – Gabon and Madagascar are enjoying an increasing share of French markets while Mauritius and Cote d'Ivoire experience falling shares.

The CMSA reveals that specialization in dynamic products with dynamic partners is a substantially greater component of export growth than 'competitiveness' and as such the production effect of trade facilitation (in which the provision of inputs to production changes production structures in favour of dynamic products) may be more relevant for competitiveness in Africa than the transaction effect (in which reduced transaction costs engender productivity growth).

4. Productivity and the Foundations of Export Competitiveness

> "competitiveness is a poetic way of saying productivity, and has nothing to do with conflict between countries" (Krugman, 1996; p.18)

Despite its intuitive appeal, the conceptualization of export competitiveness as the share of world markets has been subject to some fearsome criticism. Even the authors of the 'most intuitive definition' of competitiveness describe it as 'seriously flawed.' Their concern is that if competitiveness is simply the ability to enjoy a growing share of foreign markets it may originate from a favourable but unsustainable exchange rate position and thereby encourage policies of undervalued exchange rates and artificially low wages. This concern is mirrored in the debates surrounding recent currency wars sparked by such interventionist policies.[5] This feature of export competitiveness is undesirable for three principal reasons. Firstly, a definition of export competitiveness should reflect phenomena in the real economy, rather than merely price effects. Secondly, export competitiveness should be based on a sustainable base, rather than transient conditions. And thirdly, as trade is never an end in itself but rather a means to the end of greater prosperity, export competitiveness should not be in conflict with this end (as it would were it derived from suppressed wages, for example). Recall also Paul Krugman's objections to the characterization of international trade as a zero-sum contest of winners and losers cited in the introduction. A burgeoning domestic economy may actually benefit rivals by providing larger markets for their exports or by selling higher quality goods at lower prices.

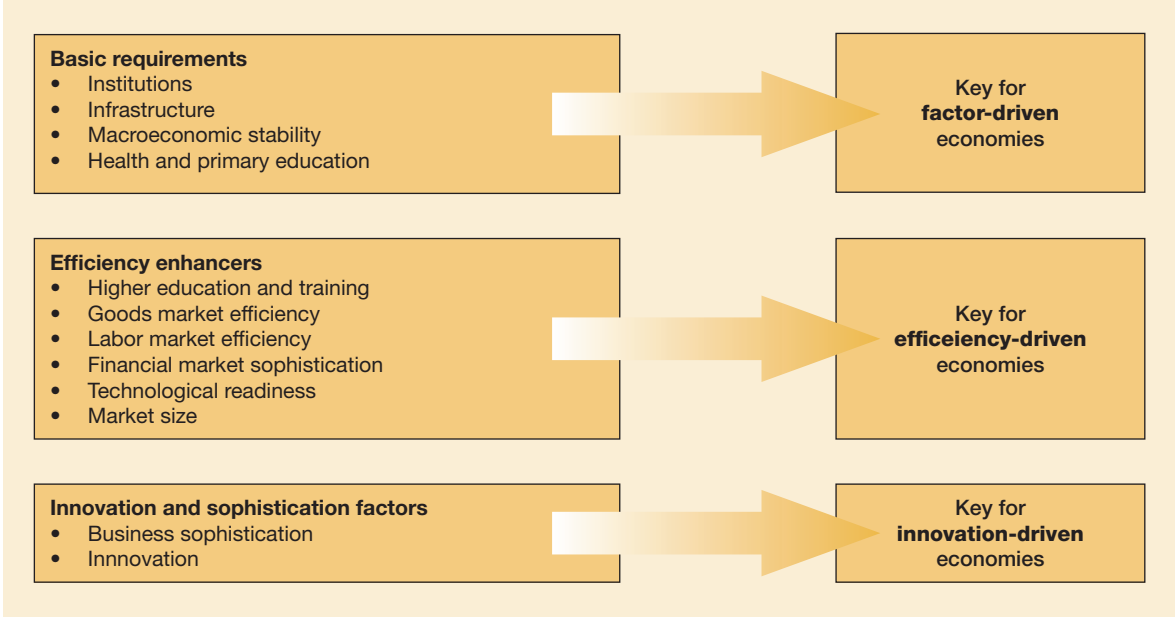
The arguments of Porter and Krugman converge on the conclusion that productivity is a far more meaningful concept than competitiveness. "Competitiveness is the fundamental underpinning of prosperity [and] prosperity is determined by the productivity of an economy…Productivity supports high wages, a strong currency, and attractive returns to capital – and with them a high standard of living. Productivity is the goal, not exports *per se*" (Porter *et al.*, 2008; p.2). Only productivity growth can improve standards of living in the long run and influence the ability to sell goods and services abroad. Export competitiveness is therefore both a driver and the manifestation of improved living standards for the wider economy.

Equating competitiveness with productivity does little to illuminate its character or source, however. Indeed, the emphasis in the competitiveness literature is not so much on productivity, but the microeconomic and macroeconomic foundations of national competitiveness. The World Economic

5 The currency war debate was sparked by comments from Brazil's finance minister, Guido Mantega, who viewed such polices as a threat to competitiveness: "we are in the midst of an international currency war…this threatens us because it takes away our competitiveness" (as quoted by Martin Wolf, FT, 28 September 2010).

Forum defines competitiveness as "the set of institutions, policies and factors that determine the level of productivity of a country" (WEF, 2010; p.4). Competitiveness here concerns the enabling environment, the inputs to the firm which enables it to compete. The WEF captures these inputs through its annually published Global Competitiveness Index (GCI) based on twelve pillars, the relative importance of each weighted according to the level of development (figure 3). A low level of development is equated with a factor driven economy (in which 70 per cent of exports are primary commodities) where competitiveness is derived from certain basic requirements. Thereafter efficiency enhancers dominate before innovation and sophistication factors come to the fore. The implication is that certain requirements precede others as pre-conditions for export competitiveness such that business sophistication, for example, is inconsequential without good institutions, infrastructure, macroeconomic stability, health and primary education. Looking at export competitiveness as the enabling environment projects trade facilitation to the forefront of competitiveness strategies as trade facilitation is by definition the process of improving that enabling environment.

Figure 3: The Twelve Pillars of the Global Competitiveness Index

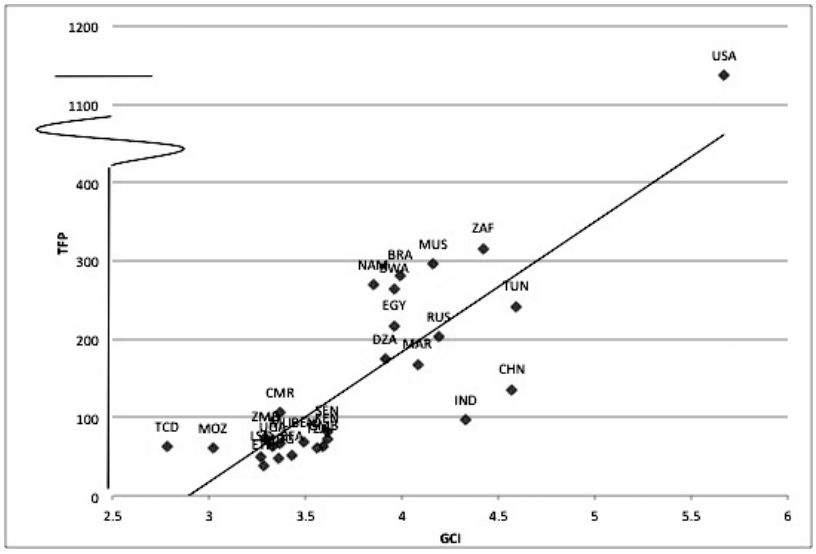


Source: WEF (2010; p.8).

Total Factor Productivity, the change in output unexplained by the change in inputs, is a conventional measure of productivity. A recent growth accounting exercise revealed that growth in Africa is predominantly driven by accumulation of factors of production and that in certain periods, notably the

early 1990s, the contribution of total factor productivity (TFP) was negative (UNECA and AUC, 2007). Appendix C describes the methodology used to estimate TFP for a sample of 34 African countries and 5 comparators (the 4 BRIC countries and the USA) from 2000 to 2007. The range is large across the sample, yet the TFP of countries like Mauritius, Botswana, Namibia and South Africa are comparable to the highest of the BRIC countries (Brazil). Growth in TFP across the continent falls far short of these comparators, however, and as with the UNECA and AUC (2007) findings, TFP is stagnant or declining for several nations (9 of the 34 covered have seen TFP fall between 2000 and 2007).

Figure 4: Total Factor Productivity vs. Global Competitiveness Index, 2007



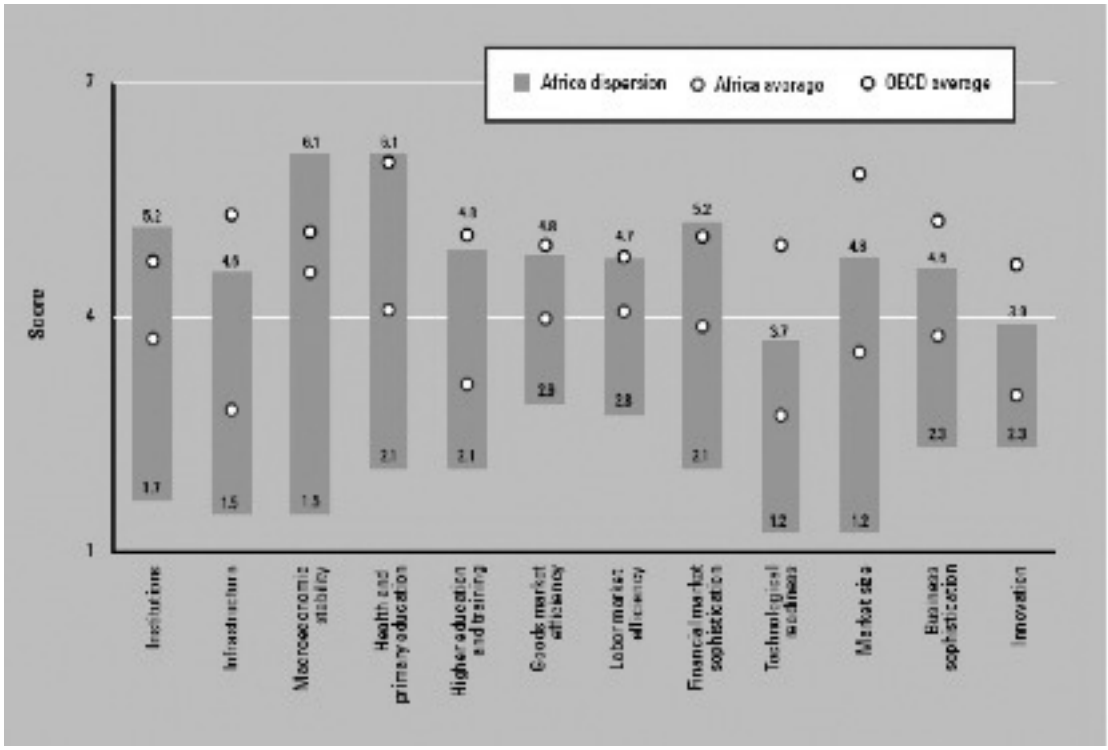
Source: Authors calculations (see Appendix C) and WEF (2008).

Turning to the GCI, figure 4 shows that it is indeed associated with TFP in the African context (again the BRICs and the USA are included to facilitate comparison). Figure 5 unpacks African performance in the GCI further. It reports the score dispersion and an OECD comparison of the 31 African countries covered by the African Competitiveness Report 2009 over the twelve pillars. Firstly, and somewhat predictably, the African average is exceeded by the OECD average in all twelve pillars. Secondly, the range across African countries is again large. The most recent rankings of the composite Global Competitiveness Index (WEF, 2010) reveal Africa's top five as Tunisia (32nd of 139), South Africa (54th), Mauritius (55th), Namibia (74th), and Morocco (75th).[6] Mauritania, Zimbabwe, Burundi, Angola and Chad are not only Africa's least competitive countries; they comprise the bottom five of the sample of 139. Thirdly, of the four

6 Note that South Africa and Mauritius are among the most competitive countries according to the GCI, but were among the least competitive in the CMSA showing that the stock measures of the enabling environment used to estimate the GCI do not always translate to growing shares of foreign markets.

basic requirements, infrastructure is the only pillar in which no African country matches the benchmark of the OECD average and as such represents both a colossal competitiveness deficit, a potential trade facilitation priority and, according to the methodology embodied in the GCI, the most fertile grounds for boosting African competitiveness.

Figure 5: 2008-9 GCI Pillar Score Dispersion among African Countries and OECD Comparison



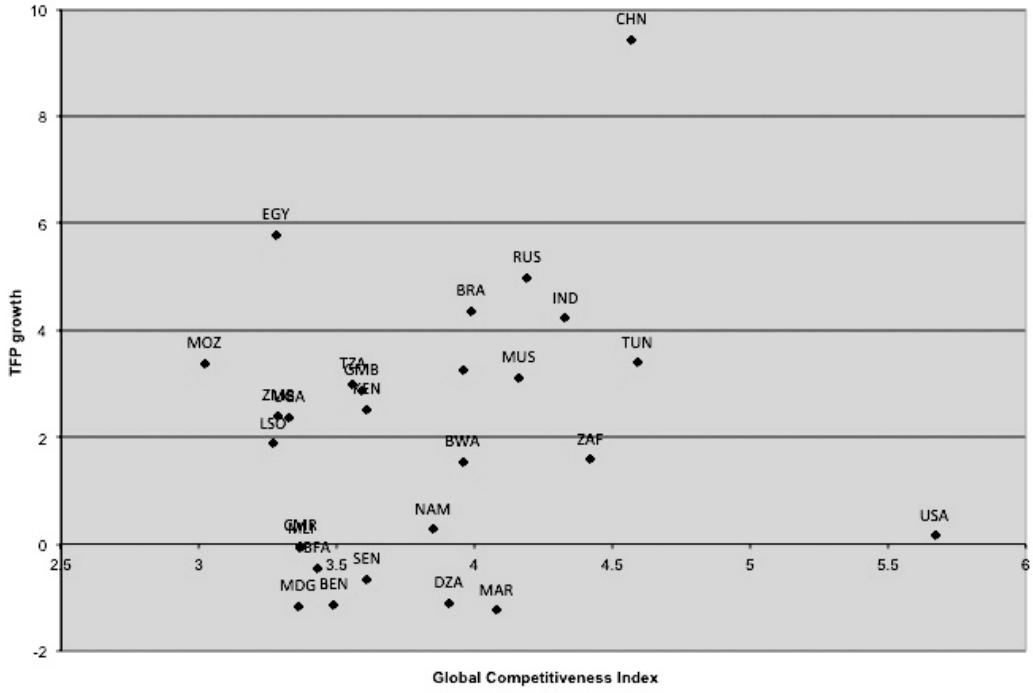
Source: WEF (2009; p.14).

5. (New) Export Competitiveness

> "are these pillars [of the Global Competitiveness Index] sufficient to enhance productivity? Ignoring if any individual pillar is necessary for growth, and assuming there are known levers to improve each of them, if all these levers were pulled is this sufficient to create significant economic growth? An emerging line of research suggests that, for countries where growth requires the emergence of new export activities, the answer might be no." (Klinger, 2010; p3)

While Section 4 showed that the GCI is indeed correlated with total factor productivity, it is clear from figure 6 that the same cannot be said of its relationship to TFP *growth*.

Figure 6: Total Factor Productivity Growth vs. Global Competitiveness Index, 2007



Source: Authors calculations (see Appendix C) and WEF (2008).

Imbs and Wacziarg (2003) are at the forefront of the emerging research cited by Klinger (2010) questioning the conventions of the competitiveness theory. They describe a two stage process of diversification 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. UNECA and AUC (2007) explore these results with respect to Africa, showing that the turning point occurs at a level of investment insufficient to engender deep diversification. Klinger and Lederman (2006) shift the focus to exports, finding export growth also corresponds to diversification therein. The most substantive innovation, however, was that by Hausmann, Hwang and Rodrik (2007). Using a specially constructed index of export productivity they show that future growth is stronger for countries exporting more sophisticated goods, adding causality to the thesis that 'what you export matters'. To fully exploit the potential developmental gains from trade, some countries may have to uptake new export activities. The implication is that trade facilitation must be sector specific as the inputs required for more sophisticated goods are necessarily different from those required further down the ladder. For example, competitiveness in the textiles sector is significantly impacted by scale, access to raw materials, and reliable and low-cost electricity. By contrast, moving downstream just one step to the garment sector reveals labour costs, productivity, and trade preferences (market access) among the most important determinants of export competitiveness (Farole *et al.*, 2010).

The 'new' in 'new' export competitiveness refers to the need to diversify into new products rather than any novelty in the idea that certain production activities are better than others. On the contrary, economic theory offers numerous reasons why more sophisticated goods may yield more developmental gains. The fathers of development economics emphasized the greater potential of industrialized production for integration into the wider economy through backward and forward linkages and spillover effects (Hirshman, 1958; Rosenstein-Rodan, 1943). Secondly, the Springer-Prebish (Singer, 1950; Prebish, 1950) hypothesis maintains that primary product exporters will face ever deteriorating terms of trade in the long run given the lesser income elasticity of demand for such commodities relative to manufactures. Thirdly, agricultural activities are subject to Malthusian diminishing returns whereas others have thus far evaded such a fate, and even offer increasing returns to scale (as per the new economic geography of Krugman, 1991), eliminating the possibility of neo-classical convergence. In the fourth instance variety and quality ladder models describe the process of development as one in which firms are required to continuously upgrade their production to more advanced products (Akamatsu, 1962; Grossman and Helpman, 1991). Lastly Acemoglu, Johnson and Robison (2005) have pioneered research showing export expansion in certain industries can redistribute economic and political power and strengthen institutional quality, yielding associated developmental gains.

If export competitiveness is to be properly conceived of as one means to the end of long run productivity growth then our understanding of it must account for the substantial opportunity cost entailed with specialization in certain activities if they bringing fewer benefits than alternatives. The methodology employed by Hausmann, Hwang and Rodrik (2007) is easily replicable to this end. Their measure of

export productivity is outcomes based whereby sophisticated products are defined as those exported by richer countries.

Total exports of country *j* are given by the sum of exports of all goods *l*

$$X_j = \sum_l x_{jl} \tag{2}$$

Denoting per-capita GDP as Y_j, the income or productivity level associated with each product *k*, $PRODY_k$, is given by:

$$PRODY_k = \sum_j \frac{(x_{jk}/X_j)}{\sum_j (x_{jk}/X_j)} Y_j \tag{3}$$

As a measure of revealed comparative advantage the ratio x_{jk}/X_j gives the value share of commodity *k* in the country's overall export basket. The measure *PRODY* therefore weighs GDP per capita according to how prominent the good in question is in the export basket of those countries exporting it. If product *k* comprises a large proportion of poor countries exports and a small proportion of richer countries exports, $PRODY_k$ will be small i.e. it is a relatively poor product. The income or productivity level of country *i*'s export basket, $EXPY_i$, is therefore determined by the weighted average of *PRODY,* where the weights correspond to the value shares of each good in the country's export basket:

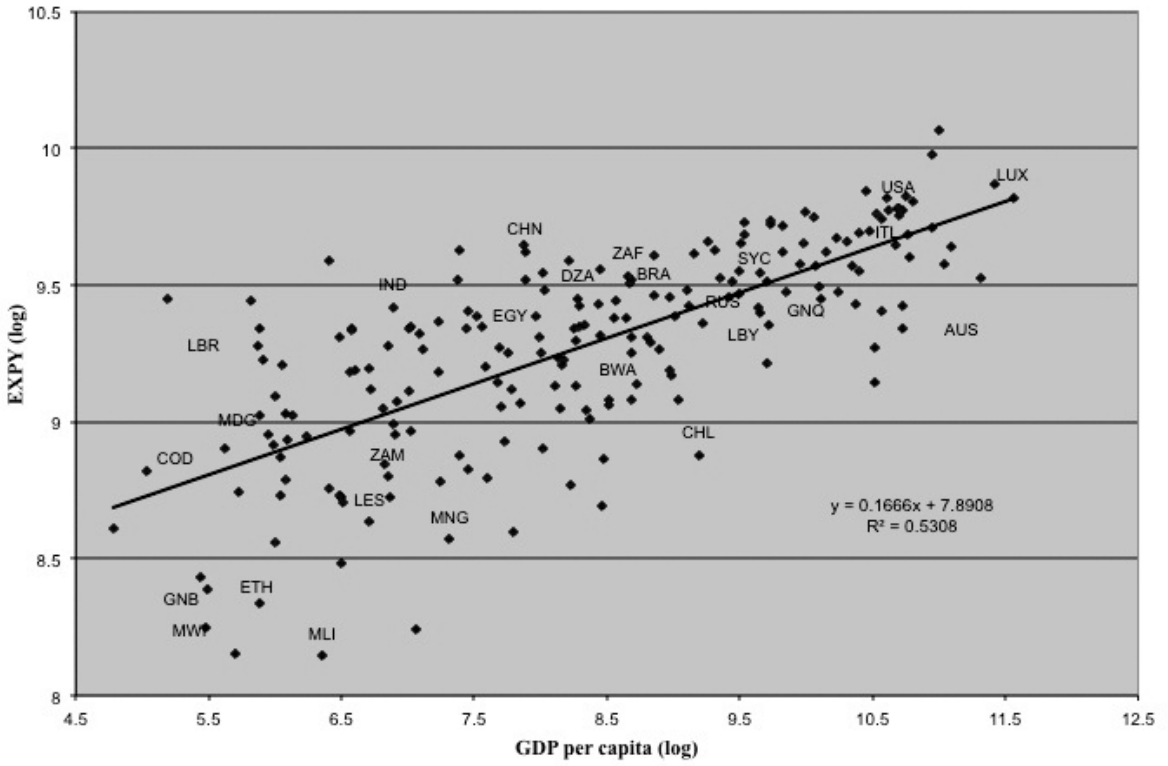
$$EXPY_i = \sum_l \left(\frac{x_{il}}{X_i} \right) PRODY_l \tag{4}$$

Using the same export data as that employed for the CMSA above, this measure of export sophistication was constructed for the same sample of African countries (since the same data is used, the same shortcomings apply and the sample remains restricted to 37 countries). *PRODY* is calculated using export and income data for 203 countries over 259 product lines (the 252 used for the CMSA plus 7 product lines relating to petroleum goods) for the period 2004 to 2008. The average of *PRODY* over these 5 years is used to calculate *EXPY* in each year.

Figure 7 plots this measure of the income level of exports for 2008 against GDP per capita in that year. As mentioned above, the main contribution of the Hausmann, Hwang and Rodrik (2007) was the finding that a higher income level of exports now can lead to higher rates of growth in the future. In short, you become what you export. 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 on similar incomes, will grow more slowly unless they can move into trading goods which are more sophisticated.

Figure 7: Income level of Exports (EXPY) vs. GDP per capita, 2007



Source: Authors calculations from UNCTADstat data.

Table 1: The Income Level of Exports (EXPY): Top 5 (World and Africa) and Bottom 5 (Africa), 2008 (current 2008$)

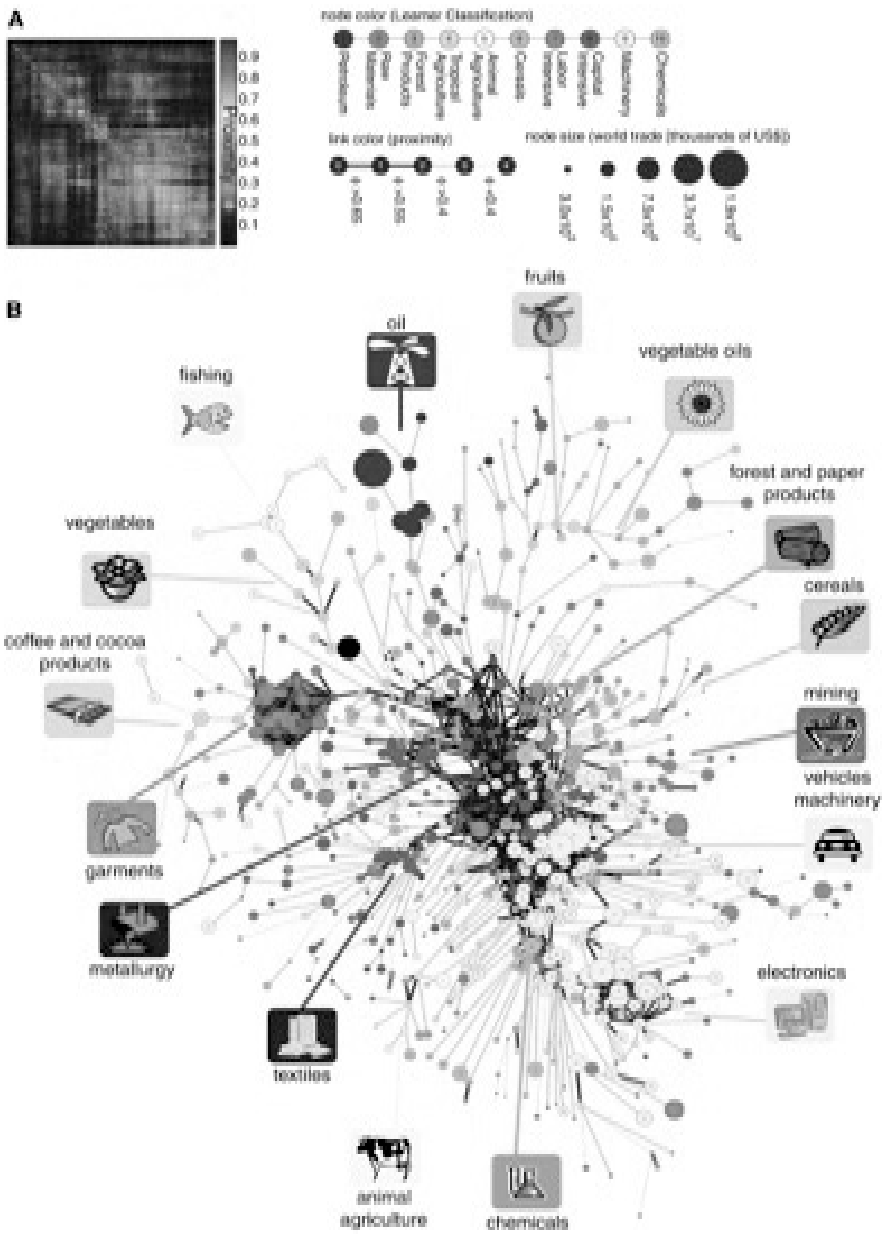
Country	EXPY	Largest export	PRODY of biggest export	% share in export basket
Top 5 Countries by EXPY				
Ireland	23,551	Organo-inorganic, heterocycl. compounds, nucl. acids	39,813	19%
Switzerland	21,473	Medicaments (incl. veterinary medicaments)	26,779	13%
Cayman Islands	20,079	Ships, boats & floating structures	16,787	57%
Japan	18,701	Motor vehicles	21,559	16%
Luxemburg	18,525	Iron & steel bars, rods, angles, shapes & Sections	20,952	21%
Top 5 African countries by EXPY				
Seychelles	13,748	Fish, aqua. invertebrates, prepared, preserved, n.e.s.	13,904	47%
South Africa	13,584	Silver, platinum, other metals of the platinum group	13,645	13%
Algeria	12,836	Petroleum oils, oils from bitumin. materials, crude	11,289	53%
Equatorial Guinea	11,993	Petroleum oils, oils from bitumin. materials, crude	11,289	76%
Egypt	11,990	Petroleum oils or bituminous minerals>70 % oil	12,724	19%
Bottom 5 African Countries by EXPY				
Dem. Rep. of the Congo	5,582	Ores and concentrates of base metals, n.e.s.	1,986	26%
Guinea-Bissau	4,559	Fruits and nuts (excluding oil nuts), fresh or dried	3,918	90%
Mali	3,817	Gold, non-monetary (excluding gold ores and concentrates)	3,220	75%
Ethiopia	3,697	Coffee and coffee substitutes	1,303	35%
Malawi	3,052	Tobacco, unmanufactured	1,460	67%

Source: Authors calculations using UNCTADstat data.

Table 1 displays the top 5 nations in the world by EXPY, and the African countries with the smallest and largest EXPY (full results are reported in Appendix D).The analysis shows that the biggest exports of the best and worst African performers are primary commodities. These largest exports typically make up a larger proportion of total exports than for the world's best performers. The exports of wealthy countries are both more advanced and more diverse than those of African countries.

Trade policy therefore needs to identify pathways to more sophisticated goods, and trade facilitation should target the inputs required to enable these goods to compete internationally. Hidalgo *et al.* (2007) is instructive in this regard. They develop the concept of proximate goods, in which relative proximity is determined by the likelihood that a country produces one if it produces the other. The intuition is that where goods are proximate the inputs to their production must be similar and so moving into proximate export activities is easier than moving into distant activities. The product space they plot is shown in figure 8. Products for which African countries exhibit a Revealed Comparative Advantage (RCA) typically reside around the periphery, where density is sparse (i.e. there are fewer goods requiring similar inputs) and more sophisticated goods are 'further away' (meaning it is harder to reach them). Nonetheless, targeted trade facilitation should enable African countries to move along the revealed pathways of proximate goods to more sophisticated goods.

Figure 8: The Product Space

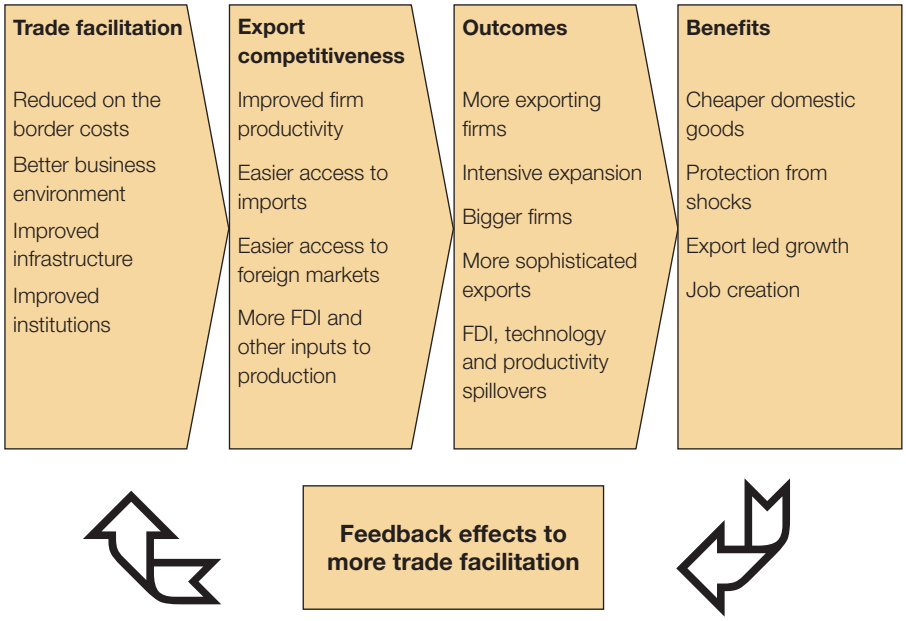


Source: Hidalgo et al. (2007).

6. What Can Trade Facilitation do for African Export Competitiveness?

The above analyses of export competitiveness can now be married with the findings of the empirical literature on trade facilitation to surmise the possible channels through which trade facilitation can improve export competitiveness. Figure 9 provides a schematic representation. The most obvious channel is the direct impact on productivity. Reduced costs permit more output per unit of input, which can allow existing firms to export more and encourage new firms to enter export markets. Indeed, entering the export market significantly increases the probability of exporting in subsequent periods, suggesting trade facilitation can reduce the fixed costs associated with entering export markets (Bigsten *et al.*, 2004). Exporting may also allow firms to grow and capture positive scale effects – the median exporting firm is four times larger than the median firm serving the domestic market only in Balchin and Edwards (2008) sample – available through productivity gains, Smithian and/or Ricardian specialization or the prospect that improved transport infrastructure can allow firms to grow beyond the confines of localized markets. If firms 'learn-by-exporting' too a productivity dividend may arise from exposure to international competition. Mengistae and Pattillo (2004), for example, show that export manufacturers have an average total factor productivity premium of 17 per cent in Ghana, Ethiopia and Kenya, although there is doubtless a process of self selection at play here if only the most productive firms are capable of overcoming the costs associated with entering the export market (see also Tybout, 2001). Lastly, trade facilitation affects not only exports but imports and one can reasonably expect that easier access to imports will result in cheaper intermediate goods, more FDI, and access to better technology vintages, with spillovers into the wider economy. The upshot is lower prices for domestic consumers, job creation from expanding trade, protection from terms of trade shocks and a potential feedback effect as productivity gains, economies of scale, spillover effects and macroeconomic stability conspire to engender further trade facilitation.

Figure 9: Trade Facilitation and Export Competitiveness: A Conceptual Framework



Available measures of trade facilitation are sadly lacking. The World Economic Forum and the World Bank are attempting to redress this issue through the Enabling Trade Index and Logistics Performance Index respectively, but country coverage remains poor (especially for African countries) and as relatively new indices time serious dimensions are lacking. In a recent World Bank paper Portugal-Perez and Wilson (2010) have developed estimates of the following four trade facilitation indicators for 101 developing countries over the period 2004-7 scaled on a range of 0 to 1:

- *INF – Physical infrastructure* measures the level of development and quality of ports, airports, roads, and rail infrastructure.
- *ICT – Information and communications technology* is interpreted as the extent to which an economy uses information and communications technology to improve efficiency and productivity as well as to reduce transaction costs. It contains indicators on the availability, use, absorption, and government prioritization of ICT.
- *BORDER – Border and transport efficiency* aims at quantifying the level of efficiency of customs and domestic transport that is reflected in the time, cost, and number of documents necessary for export and import procedures.

- *BUS – Business and regulatory environment* measures the level of development of regulations and transparency. It is built on indicators of irregular payments, favouritism, government transparency, and measures to combat corruption.

To test the principal assertion of the conceptual framework – that trade facilitation can boost productivity – TFP is regressed on above trade facilitation indicators (all of which are expected to exhibit a positive sign). The model also controls for the following variables:

- *URB – the ratio of urban population to total population* to capture possible agglomeration economies (expected positive sign).
- *MAN – the ratio of manufacturing value added to GDP* to account for productivity gains emanating from a more productive allocation of resources (expected positive sign).
- *XGDP – the ratio of exports to GDP* as an indicator of openness (expected positive sign).
- *GCONCOR – an estimate of control of corruption* from the World Bank's Worldwide Governance Indicators (expected positive sign).
- *DOMCRED – domestic credit to the private sector* (% of GDP) as a measure of financial deepening (expected positive sign).

Portugal-Perez and Wilson's (2010) indicators of trade facilitation are available for 24 African countries from 2004-2007, but missing capital accumulation data for Ghana, Nigeria and Zimbabwe prohibits the calculation of TFP for these countries, reducing the panel to 21 cross-sections over four years. The small panel size impedes the application of unit root tests, although concerns abound in the literature as to the applicability of such tests in instances where both the cross sectional (N) and time series dimension (t) are small (see, for example, Hlouskova and Wagner, 2005).

The correlation coefficients of the explanatory variables are reported in table 2. Variables exhibiting a correlation coefficient in excess of 0.7 with the trade facilitation indicators are dropped from the specification (namely *DOMCRED* in the case of *ICT, GCONCOR* in the case of *BUS*, and *DOMCRED* and *GCONCOR* in the case of *INF)*. The variable *GERSEC* reported in the correlation matrix represents the gross secondary enrollment rate, a measure of human capital frequently cited as a determinant of TFP in the literature. It is excluded from the model estimation here, however, on the grounds of high correlation with the other variables under consideration.

Table 2: Trade Facilitation and TFP: Correlation Matrix

	TFP	GERSEC	URB	MAN	XGDP	GCONCOR	DOMCRED	INF	ICT	BORDER	BUS
TFP	**1.00**										
GERSEC	**0.88**	**1.00**									
URB	0.65	**0.71**	**1.00**								
MAN	0.45	0.33	0.26	**1.00**							
XGDP	0.52	0.50	0.45	0.13	**1.00**						
GCONCOR	**0.80**	0.69	0.51	0.24	0.38	**1.00**					
DOMCRED	**0.77**	**0.70**	0.45	0.57	0.18	0.60	**1.00**				
INF	**0.83**	**0.79**	0.52	0.49	0.34	**0.72**	**0.79**	**1.00**			
ICT	0.65	0.67	0.49	0.42	0.14	0.62	**0.72**	**0.77**	**1.00**		
BORDER	0.49	0.56	0.55	0.34	0.20	0.44	0.39	0.61	0.59	**1.00**	
BUS	0.69	**0.73**	0.57	0.21	0.31	**0.75**	0.58	**0.79**	0.62	0.52	**1.00**

Table 3: Trade Facilitation and TFP: Model Estimates

Dependent Variable: log(TFP). Estimated using EGLS with cross country weights					
	(1)	(2)	(3)	(4)	(5)
Constant	3.458 (0.00)***	2.789 (0.00)***	3.225 (0.00)***	3.224 (0.00)***	3.103 (0.00)***
URB	0.015 (0.00)***	0.018 (0.00)***	0.017 (0.00)***	0.015 (0.00)***	0.018 (0.00)***
MAN	0.015 (0.00)***	0.005 (0.37)	0.025 (0.00)***	0.007 (0.09)*	0.009 (0.00)***
XGDP	0.011 (0.00)***	0.012 (0.00)***	0.012 (0.00)***	0.013 (0.00)***	0.010 (0.00)***
GCONCOR	0.391 (0.00)***		0.441 (0.00)***	0.312 (0.00)***	
DOMCRED	0.005 (0.00)***			0.006 (0.00)***	0.008 (0.00)***
INF		1.990 (0.00)***			
ICT			0.646 (0.00)***		
BORDER				0.362 (0.00)***	
BUS					0.377 (0.02)**
R-squared	0.97	0.93	0.98	0.98	0.93
N	21	21	21	21	21
Number of observations	84	84	84	84	84
White test on POLS estimation	51.3039 (0.00)***	26.1230 (0.02)**	57.0576 (0.00)***	58.4319 (0.00)***	31.57 (0.05)*

Numbers in parenthesis are p-statistics *** denotes significance at the 1 per cent level, ** at the 5 per cent level, and * significance at the 10 per cent level.

The results of the model are reported in table 3. The White test statistics (with p-values in parenthesis) support the rejection of the null hypothesis of no heteroskedasticity and the adoption of panel estimated generalized least squares (EGLS) with cross-section weights to minimize its impact.[7] All coefficients are of the expected sign and are statistically significant in the base specification (1). The trade facilitation variables are all positively significant at the 1 per cent level, with the hard infrastructure variables (*INF* and *ICT*) showing the largest coefficients. At 1.99, the coefficient of *INF* suggests that an increase of 0.01 in the index (which is scaled between 0 and 1) corresponds to a 1.99 per cent increase in *TFP*. If Chad, the country with the lowest *INF*, were to improve the quantity and quality of its infrastructure to the level of Tanzania, roughly representative of the African average, the estimation suggests TFP would be some 50 per cent higher. The average rate of *INF* growth across the sample is approximately 5 per cent, a growth the model associated with substantive productivity gains. Improving the *ICT* of the lowest country (Chad) to that of the average country (Zambia) bolsters *TFP* by approximately 14 per cent. The soft infrastructure variables also exhibit a strong association with total factor productivity: a 0.01 increase in *BORDER* and *BUS* are associated with *TFP* growth of 0.36 and 0.37 per cent respectively. It is also noteworthy that the control of corruption and the measure of openness, the ratio of exports to GDP, are both associated with higher TFP. As governance and trade policy indicators they too are essential ingredients of a holistic trade facilitation programme. To address potential endogeneity the equations were re-estimated using once-lagged values of the independent variables. The findings are essentially unchanged, although the level of significance drops in some cases.

Table 4: Trade Facilitation and TFP: Granger Causality Test*

Pairwise Granger Causality Test. Lags: 2.			
Null Hypothesis	**Observations**	**F-Statistic**	**Prob.**
INF does not Granger Cause TFP	42	6.60698	0.00352
TFP does not Granger Cause INF	42	0.08107	0.92229
ICT does not Granger Cause TFP	42	3.53385	0.03940
TFP does not Granger Cause ICT	42	7.07430	0.00250
BORDER does not Granger Cause TFP	42	0.91202	0.41055
TFP does not Granger Cause BORDER	42	0.07436	0.92847
BUS does not Granger Cause TFP	42	5.49763	0.00812
TFP does not Granger Cause BUS	42	0.60625	0.55072

* If p-value < 0.05, the null hypothesis is rejected. For instance the null hypothesis that infrastructure does not Granger Cause total factor productivity is rejected. This means that there is unidirectional causality from infrastructure to productivity.

7 Given the small cross section size the panel is pooled rather than specified with fixed or random effects.

The regression analysis is supplemented by a Granger Causality Test (Granger, 1969) to identify whether trade facilitation is the driver of total factor productivity, or vice versa. The results, reported in table 4, verify that in the case of *INF* and *BUS* we cannot reject the null hypothesis that causality toward *TFP* is present at the 1 per cent level. The *ICT* indicator exhibits dual causality with *TFP*, indicative of the feedback between export competitiveness hypothesized in the conceptual framework, whereas *BORDER* neither Granger causes, or is Granger caused by, *TFP*.

The above analysis is strongly supportive of the thesis that trade facilitation can bolster productivity for our sample of 21 African countries but new research described in Section 5 raises concerns that there may be an opportunity cost, or limits to the productivity premium, depending on the composition of the export basket of the country in question. Furthermore, the analysis above offers little insight as to whether the transaction effect or the production effect dominates. Regressing *EXPY*, the income level of exports defined in Section 4, on the trade facilitation indicators offers insight as to whether trade facilitation can also shape production, catalysing transition toward more sophisticated exports and greater future growth.

The sample in this instance is restricted to the 18 countries for which data is available for the computation of EXPY and present in Portugal-Perez and Wilson's (2010) published trade facilitation indicators. Replacing the *MAN, DOMCRED* and *GCONCOR* control variables employed above are *POP*, the natural log of total population, *GDPPC*, the natural log of per capita GDP, both positively associated with *EXPY* in Hausmann, Hwang and Rodrik's (2007) initial study. Also included is *TFP*, the natural log of the TFP variable described in Appendix C, which is also expected to exhibit a positive relationship with *EXPY*.

Table 5: Trade Facilitation and EXPY: Correlation Matrix

	EXPY	GDPPC	POP	URB	XGDP	TFP	INF	ICT	BORDER	BUS
EXPY	**1.00**									
GDPPC	0.51	**1.00**								
POP	0.30	-0.24	**1.00**							
URB	**0.70**	0.69	-0.02	**1.00**						
XGDP	0.53	0.68	-0.10	0.68	**1.00**					
TFP	0.69	**0.95**	-0.05	**0.80**	0.68	**1.00**				
INF	0.58	**0.76**	0.00	0.67	0.50	**0.87**	**1.00**			
ICT	0.48	0.55	-0.01	0.53	0.36	0.69	**0.79**	**1.00**		
BORDER	0.46	0.55	-0.08	0.52	0.43	0.59	0.63	0.52	**1.00**	
BUS	0.37	**0.71**	-0.16	0.64	0.44	**0.75**	**0.77**	0.54	0.45	**1.00**

Table 5 describes the correlation matrix, with those variables sharing a correlation coefficient exceeding 0.7 once again omitted, and table 6 presents the estimation results. Again, all coefficients exhibit the expected signs with the exception of *BUS*, which is negative but not statistically significant. Of the trade facilitation variables only *INF* and *BORDER* are significant, at the 1 and 10 per cent levels respectively although, as with the statistically significant coefficient for *TFP*, this may reflect the greater *EXPY* at higher incomes as *GDPPC* is omitted from these estimations. None-the-less, the hypothesis that improved infrastructure and border efficiency make the prospect of moving into more advanced exports more attractive cannot be rejected. The elasticity of *EXPY* with respect to *INF* and *BORDER*, at 0.6 and 0.2 per cent respectively, is less than that observed for *TFP* (1.99 per cent and 0.36 per cent respectively), implying that the production effect of trade facilitation on export competitiveness is of a lesser magnitude than the transaction effect. Openness (*XGDP*) is associated with more sophisticated exports, and the significance of *URB* and *POP* strongly support the hypothesis that scale effects are important for Africa's export competitiveness and re-iterates the potential benefit of regional integration and the development of regional value chains.

Table 6: Trade Facilitation and EXPY: Estimation Results

Dependent Variable: log(EXPY). Estimated using EGLS with cross country weights						
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	3.775 (0.00)***	4.020 (0.00)***	5.901 (0.00)***	3.834 (0.00)***	3.982 (0.00)***	6.377 (0.00)***
GDPPC	0.231 (0.00)***			0.223 (0.00)***	0.194 (0.00)***	
POP	0.196 (0.00)***	0.170 (0.00)***	0.122 (0.00)***	0.194 (0.00)***	0.188 (0.00)***	0.102 (0.00)***
URB	0.001 (0.42)		0.012 (0.00)***	0.001 (0.33)	0.002 (0.15)	0.014 (0.00)***
XGDP	0.010 (0.00)***	0.011 (0.00)***	0.010 (0.00)***	0.010 (0.00)***	0.010 (0.00)***	0.012 (0.00)***
TFP		0.377 (0.00)***				
INF			0.601 (0.00)***			
ICT				0.066 (0.56)		

Dependent Variable: log(EXPY). Estimated using EGLS with cross country weights						
	(1)	(2)	(3)	(4)	(5)	(6)
BORDER					0.202 (0.06)*	
BUS						-0.283 (0.11)
R-squared	0.90	0.89	0.83	0.90	0.90	0.81
N	18	17	18	18	18	18
Number of observations	72	68	72	72	72	72
White test on POLS estimation	42.2102 (0.00)***	15.4930 (0.08)*	44.6754 (0.00)***	44.5012 (0.00)***	49.4410 (0.00)***	18.3649 (0.19)

Numbers in parenthesis are p-statistics *** denotes significance at the 1 per cent level, ** at the 5 per cent level, and * significance at the 10 per cent level

The Granger Causality Test is repeated for the *EXPY* dataset, with F-statistics reported in table 7. Both *TFP* and *ICT*, the hard infrastructure indicators, are shown to Granger cause *EXPY* at the 5 per cent level, and *INF* is a determinant at the 10 per cent level, although again the possibility that both trade facilitation and *EXPY* are driven by income levels cannot be eliminated. It seems intuitive, however, that the availability of improved *ICT* facilitates the production of more advanced, technology intensive goods.

Table 7: Trade Facilitation and EXPY: Granger Causality Test

Pairwise Granger Causality Test. Lags: 1*			
Null Hypothesis	**Observations**	**F-Statistic**	**Prob.**
TFP does not Granger Cause EXPY	51	5.67465	0.02122
EXPY does not Granger Cause TFP	51	0.57543	0.45182
INF does not Granger Cause EXPY	54	3.48068	0.06785
EXPY does not Granger Cause INF	54	0.01830	0.89294
ICT does not Granger Cause EXPY	54	5.40761	0.02406
EXPY does not Granger Cause ICT	54	0.36803	0.54677
BORDER does not Granger Cause EXPY	54	2.74601	0.10364
EXPY does not Granger Cause BORDER	54	1.06218	0.30758
BUS does not Granger Cause EXPY	54	0.53733	0.46690
EXPY does not Granger Cause BUS	54	0.00975	0.92172

* Owing to the small sample size, only one lag is applied in the Granger causality test.

7. Conclusions and Recommendations

The regression analysis emphatically confirms the hypothesis that trade facilitation can bolster productivity levels in Africa. All four trade facilitation indicators are positively associated with total-factor-productivity, with three exhibiting implied causality, suggestive of a pervasive transaction effect. The evidence of the impact of so-called hard infrastructure, that in energy, transport, and ICT, is particularly compelling. The effect of the same indicators regressed on the income level of exports, as a proxy for the production effect (the channel through which trade facilitation encourages a more productive allocation of resources), is less prominent. None-the-less, infrastructure remains a robust contributor to competitiveness across specifications and as such the increasing proportion of Aid for Trade (AfT) commitments to infrastructure is to be welcomed (UNECA and AUC, 2011). The power of openness and market size variables are suggestive of the gains from accelerating regional integration, and as such moves to fast track an African free-trade area, such as that endorsed by African Ministers of Trade in Kigali in November 2010, are also welcomed.

Ultimately, however, the analysis suffers from a number of shortcomings which future research is encouraged to address. Firstly, data limitations inhibit rigorous analysis at both firm and national levels.

The efforts of the World Bank, the World Economic Forum and the African Development Bank to expand coverage of competitiveness and trade facilitation data for African countries is welcomed, and should improve the perspicacity of future research. Secondly, this study has focused explicitly on the volume of trade in manufactured goods, neglecting the quality of manufactures and trade in services, which now accounts for more than 20 per cent of the continent's exports (UNECA and AUC, 2011). Thirdly, little attention is paid to the price component of competitiveness and impact of long run terms-of-trade dynamics, an area ripe for further research. Lastly, greater understanding of how productivity changes are manifest in export markets is required to more fully appreciate the impact of the transaction effect.

As is clear, the analysis undertaken here does not claim to fully capture the complexity of African export competitiveness described in the introduction. Rather, it seeks to frame export competitiveness as something more than a linear function of productivity and national supplied 'competitiveness enhancing' inputs. The grouping of African nations together in the empirical analysis undertaken here yields results of a general nature with an implied replicability. As is clear from both the CMSA and the EXPY analysis, however, competitiveness is by no means uniform, both across and within nations, and as such trade facilitation measures should be sensitive to industry level needs. Trade facilitation can bolster productivity, and while Africa's pervasive infrastructure deficit may dis-incentivise moving into more sophisticated products for export, the limited impact of trade facilitation on what is actually exported implies that structural transformation may require a more holistic trade policy to guarantee long run competitiveness. The CMSA and the estimated income measure of exports (EXPY) undertaken here can allow African nations to shed light on products in which individual nations are competitive, and the compatibility of these products with the goal of sustainable long run growth in standards of living.

8. References

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Appendix A: Country Coverage of Empirical Analyses

Country	CMSA/ EXPY	TFP	GCI 2007	GCI 2010	Trade facilitation indicators	TFP model	EXPY model
Algeria	✓	✓	✓	✓	✓	✓	✓
Angola	✓						
Benin	✓	✓	✓	✓	✓	✓	✓
Botswana	✓	✓	✓	✓	✓	✓	✓
Burkina Faso	✓	✓	✓	✓			
Burundi			✓	✓			
Cameroon		✓	✓	✓	✓	✓	
Cape Verde	✓	✓					
Central African Republic							
Chad		✓	✓	✓	✓	✓	
Comoros		✓					
Congo	✓						
Cote d'Ivoire	✓	✓		✓			
Djibouti	✓	✓					
DRC	✓						
Egypt	✓	✓	✓	✓	✓	✓	✓
Equatorial Guinea	✓						
Eritrea	✓	✓			✓	✓	✓
Ethiopia	✓	✓	✓	✓			
Gabon	✓	✓					
Gambia		✓	✓	✓	✓	✓	
Ghana				✓	✓		
Guinea	✓	✓					
Guinea-Bissau	✓						
Kenya	✓	✓	✓	✓	✓	✓	✓
Lesotho	✓	✓	✓	✓			
Liberia	✓						
Libya	✓		✓	✓			
Madagascar	✓	✓	✓	✓	✓	✓	✓

Country Coverage of Empirical Analyses (cont.)

Country	CMSA/EXPY	TFP	GCI 2007	GCI 2010	Trade facilitation indicators	TFP model	EXPY model
Malawi	✓	✓		✓	✓	✓	✓
Mali	✓	✓	✓	✓	✓	✓	✓
Mauritania	✓		✓	✓			
Mauritius	✓	✓	✓	✓	✓	✓	✓
Morocco	✓	✓	✓	✓	✓	✓	✓
Mozambique	✓	✓			✓	✓	✓
Namibia		✓	✓	✓	✓	✓	
Niger							
Nigeria	✓		✓	✓	✓		✓
Rwanda							
Sao Tome and Principe	✓						
Senegal		✓	✓	✓			
Seychelles	✓						
Sierra Leone							
Somalia							
South Africa	✓	✓	✓	✓	✓	✓	✓
Sudan		✓					
Swaziland		✓					
Tanzania	✓	✓	✓	✓	✓	✓	✓
Togo	✓	✓					
Tunisia	✓	✓	✓	✓	✓	✓	✓
Uganda	✓	✓	✓	✓	✓	✓	✓
Zambia	✓	✓	✓	✓	✓	✓	✓
Zimbabwe			✓	✓	✓		

Appendix B: Constant Market Share Analysis Results

Table B1: Constant Market Share Analysis for Non-Oil Exporting Countries, 2004-2008 (Absolute values are millions of current US dollars)

COUNTRY NAME	2004 exports	2008 exports	export growth	export growth (%)	structural effect (absolute)			comp effect (absolute)	structural effect (%)			comp effect (%)
					W	C	M		W	C	M	
Botswana	3449.02	4815.75	1366.73	40	2079.55	92.42	-1733.34	927.36	152	7	-127	68
Burkina Faso	391.51	467.61	76.10	19	236.06	-146.41	-242.91	229.27	310	-192	-319	301
Cape Verde	14.91	24.59	9.68	65	8.99	-1.86	-1.09	3.68	93	-19	-11	38
Djibouti	35.44	57.48	22.04	62	21.37	9.79	26.24	-35.36	97	44	119	-160
Eritrea	9.44	13.70	4.26	45	5.69	-0.43	14.45	-15.44	134	-10	339	-363
Ethiopia	546.24	1596.26	1050.03	192	329.35	259.38	267.96	194.28	31	25	26	19
Guinea	588.38	1167.58	579.20	98	354.76	199.70	50.99	-25.94	61	34	9	-4
Guinea-Bissau	57.93	117.40	59.47	103	34.93	-0.52	11.41	13.65	59	-1	19	23
Kenya	1923.48	4670.53	2747.05	143	1159.74	92.88	560.18	933.67	42	3	20	34
Lesotho	967.61	1230.89	263.29	27	583.41	-171.09	-198.96	49.93	222	-65	-76	19
Liberia	96.79	178.72	81.93	85	58.36	50.02	-13.08	-13.32	71	61	-16	-16
Madagascar	915.22	1566.99	651.77	71	551.82	-116.68	-76.57	291.14	85	-18	-12	45
Malawi	450.68	854.13	403.45	90	271.73	-10.18	101.02	42.90	67	-3	25	11
Mali	947.12	1884.96	937.85	99	571.05	332.38	1643.65	-1609.78	61	35	175	-172
Mauritania	414.98	1280.03	865.06	208	250.21	414.53	-150.10	361.25	29	48	-17	42
Mauritius	1899.03	2047.21	148.18	8	1145.00	-156.85	-146.29	-690.21	773	-106	-99	-466
Morocco	9372.13	19204.98	9832.85	105	5650.81	1517.43	575.63	2076.79	57	15	6	21

Table B1 (cont.): Constant Market Share Analysis for Non-Oil Exporting Countries, 2004-2008 (Absolute values are millions of current US dollars)

COUNTRY NAME	2004 exports	2008 exports	export growth	export growth (%)	structural effect (absolute)			comp effect (absolute)	structural effect (%)			comp effect (%)
					W	C	M		W	C	M	
Mozambique	1417.35	2434.96	1017.61	72	854.57	152.17	405.18	-400.61	84	15	40	-39
Sao Tome and Principe	3.52	5.48	1.96	56	2.12	-0.08	-0.55	0.60	108	-4	-28	31
Seychelles	255.67	297.16	41.49	16	154.15	-6.47	-18.94	-87.48	372	-16	-46	-211
South Africa	38636.10	70663.95	32027.85	83	23295.18	14808.14	474.22	-5695.15	73	46	1	-18
Tanzania	1432.26	2970.03	1537.78	107	863.56	875.45	770.48	-971.59	56	57	50	-63
Togo	493.57	753.00	259.42	53	297.60	132.21	238.32	-413.20	115	51	92	-159
Tunisia	8430.48	15312.59	6882.11	82	5083.06	674.67	193.85	770.73	74	10	3	11
Uganda	621.21	1660.61	1039.40	167	374.55	130.21	341.38	191.05	36	13	33	18
Zambia	1549.53	5022.67	3473.14	224	934.27	660.83	-285.54	2162.90	27	19	-8	62

Table B2: Constant Market Share Analysis for Oil Exporting Countries, 2004-2008 (Absolute values are millions of current US dollars)

COUNTRY NAME	2004 non-oil exports*	2008 non-oil exports*	Non-oil export growth	export growth (%)	structural effect (absolute)			comp effect (absolute)	structural effect (%)			comp effect (%)
					W	C	M		W	C	M	
Algeria	587.74 (2%)	1450.22 (2%)	862.48	147	354.37	340.71	-61.79	229.19	41	40	-7	27
Angola	225.40 (2%)	1250.64 (2%)	1025.24	455	135.90	-12.16	38.83	862.56	13	-1	4	84
Benin	478.59 (86%)	930.99 (81%)	452.40	95	288.56	-150.63	131.86	190.23	64	-33	29	42
Congo	691.43 (17%)	1139.88 (14%)	448.45	65	416.89	124.70	485.63	-578.27	93	28	108	-129
Côte d'Ivoire	5292.02 (82%)	6056.82 (63%)	764.80	14	3190.76	-29.67	-483.69	-1811.07	417	-4	-63	-237
Dem. Rep. of the Congo	1645.90 (91%)	3673.03 (95%)	2027.14	123	992.37	438.08	520.37	76.28	49	22	26	4
Egypt	4052.12 (63%)	14185.95 (60%)	10133.83	250	2443.18	284.23	1082.18	6274.60	24	3	11	62
Equatorial Guinea	284.36 (6%)	458.20 (3%)	173.84	61	171.45	6.58	81.41	-85.60	99	4	47	-49
Gabon	911.11 (26%)	1977.88 (24%)	1066.77	117	549.34	141.21	509.79	-127.52	51	13	48	-12
Libyan Arab Jamahiriya	1086.34 (5%)	2497.31 (4%)	1410.97	130	655.00	774.17	-282.64	263.44	46	55	-20	19
Nigeria	1330.52 (2%)	3822.10 (3%)	2491.58	187	802.22	155.19	43.06	1468.86	32	6	2	59

*Numbers in parenthesis are the share of non-oil exports in total exports.

Table B3: Most competitive products and partners (Absolute values are millions of current US dollars)

COUNTRY NAME	Share of Product Lines (%) which are:			Most Competitive Product		Least Competitive Product		Partner with largest comp. effect		Partner with smallest comp. effect	
	competitive	competitive un-	exported not	Product	value of comp. effect	Product	value of comp. effect	Country	value of comp. effect	Country	value of comp. effect
Algeria	40	43	17	Hydrocarbons, n.e.s., & halogenated, nitr. derivative	111.59	Fertilizers (other than those of group 272)	-108.31	France	62.92	Morocco	-42.47
Angola	48	34	18	Pearls, precious & semi-precious stones	715.62	Copper ores and concentrates; copper mattes, cemen	-70.74	United Arab Emirates	576.40	Namibia	-71.16
Benin	56	27	16	Non-ferrous base metal waste and scrap, n.e.s.	74.75	Feeding stuff for animals (no unmilled cereals)	-29.32	China	53.86	South Africa	-23.05
Botswana	46	51	2	Nickel ores & concentrates; nickel mattes, etc.	733.93	Road motor vehicles, n.e.s.	-243.75	South Africa	291.54	Canada	-70.68
Burkina Faso	48	27	25	Cotton	111.86	Tobacco, manufactured	-15.04	Singapore	76.82	Côte d'Ivoire	-38.88
Cape Verde	60	24	16	Fish, fresh (live or dead), chilled or frozen	6.30	Footwear	-3.32	Spain	7.36	Portugal	-5.34
Congo	46	29	25	Ferrous waste, scrape; remelting ingots, iron, steel	110.83	Wood in the rough or roughly squared	-297.32	India	239.50	China	-529.36
Côte d'Ivoire	25	65	10	Natural rubber & similar gums, in primary forms	169.01	Cocoa	-428.28	Estonia	143.09	France	-995.75
Dem. Rep. of the Congo	41	47	12	Copper	542.32	Pearls, precious & semi-precious stones	-543.41	China	889.34	Belgium	-629.76
Djibouti	59	25	16	Live animals other than animals of division 03	9.46	Wheat (including spelt) and meslin, unmilled	-14.87	Saudi Arabia	8.96	Ethiopia	-34.76
Egypt	71	27	2	Miscellaneous chemical products, n.e.s.	680.97	Lime, cement, fabrica. constr. mat. (excluding glass, clay)	-420.64	Italy	833.80	Lebanon	-103.27

Table B3 (cont.): Most competitive products and partners (Absolute values are in millions of current US dollars)

COUNTRY NAME	Share of Product Lines (%) which are:			Most Competitive Product		Least Competitive Product		Partner with largest comp. effect		Partner with smallest comp. effect	
	competitive	un-competitive	not exported	Product	value of comp. effect	Product	value of comp. effect	Country	value of comp. effect	Country	value of comp. effect
Equatorial Guinea	25	31	44	Alcohols, phenols, halogenat., sulfonat., nitrat. der.	20.82	Wood in the rough or roughly squared	-98.95	Netherlands	59.74	China	-75.66
Eritrea	29	21	50	Leather	1.49	Sugar, molasses and honey	-10.36	Italy	2.99	Sudan	-13.57
Ethiopia	61	20	19	Vegetables	141.47	Gold, non-monetary (excluding gold ores and concentrates)	-148.41	Netherlands	89.00	Switzerland	-136.50
Gabon	58	30	12	Wood in the rough or roughly squared	138.10	Ores and concentrates of base metals, n.e.s.	-243.16	France	94.63	Ukraine	-163.09
Guinea	47	39	14	Gold, non-monetary (excluding gold ores and concentrates)	135.15	Copper ores and concentrates; copper mattes, cemen	-101.82	Germany	46.51	Korea, Republic of	-79.08
Guinea-Bissau	27	27	46	Fruits and nuts (excluding oil nuts), fresh or dried	16.56	Fish, fresh (live or dead), chilled or frozen	-1.55	India	16.38	Korea, Republic of	-1.30
Kenya	60	37	2	Metallic salts & peroxysalts, of inorganic acids	186.41	Other crude minerals	-96.97	United States	228.29	Pakistan	-29.30
Lesotho	30	56	14	Men's clothing of textile fabrics, not knitted	167.13	Pearls, precious & semi-precious stones	-47.83	United States	234.20	South Africa	-155.88
Liberia	46	28	26	Natural rubber & similar gums, in primary forms	29.67	Ships, boats & floating structures	-47.57	Viet Nam	23.14	Germany	-30.56

COUNTRY NAME	Share of Product Lines (%) which are:			Most Competitive Product		Least Competitive Product		Partner with largest comp. effect		Partner with smallest comp. effect	
	competitive	competitive un-	not exported	Product	value of comp. effect	Product	value of comp. effect	Country	value of comp. effect	Country	value of comp. effect
Libyan Arab Jamahiriya	73	18	9	Hydrocarbons, n.e.s., & halogenated, nitr. derivative	176.49	Gold, non-monetary (excluding gold ores and concentrates)	-108.09	Romania	109.21	Italy	-145.62
Madagascar	48	45	7	Men's clothing of textile fabrics, not knitted	142.86	Spices	-132.99	France	131.07	United States	-28.64

Table B3 (cont.): Most competitive products and partners (Absolute values are in millions of current US dollars)

COUNTRY NAME	Share of Product Lines (%) which are:			Most Competitive Product		Least Competitive Product		Partner with largest comp. effect		Partner with smallest comp. effect	
	competitive	un-competitive	not exported	Product	value of comp. effect	Product	value of comp. effect	Country	value of comp. effect	Country	value of comp. effect
Malawi	45	41	14	Tobacco, unmanufactured; tobacco refuse	264.26	Electric current	-114.45	Belgium	87.92	Mozambique	-111.40
Mali	49	32	19	Fertilizers (other than those of group 272)	18.40	Gold, non-monetary (excluding gold ores and concentrates)	-1441.68	Togo	12.94	Switzerland	-839.09
Mauritania	34	39	27	Copper ores and concentrates; copper mattes, cemen	201.95	Fish, fresh (live or dead), chilled or frozen	-15.58	China	243.99	Germany	-56.08
Mauritius	36	59	5	Fish, aqua. invertebrates, prepared, preserved, n.e.s.	106.54	Articles of apparel, of textile fabrics, n.e.s.	-339.14	South Africa	32.03	France	-276.27
Morocco	58	38	5	Inorganic chemical elements, oxides & halogen salts	879.43	Women's clothing, of textile fabrics	-356.05	Spain	571.26	France	-594.19
Mozambique	54	41	5	Tractors (excluding those of 71414 & 74415)	53.33	Aluminium	-577.62	Malawi	64.36	Netherlands	-358.67
Nigeria	55	43	2	Cocoa	377.74	Ores and concentrates of base metals, n.e.s.	-105.71	Liberia	292.32	United States	-81.74
Sao Tome and Principe	21	11	68	Cocoa	0.72	Tubes, pipes & hollow profiles, fittings, iron, steel	-0.24	Portugal	1.60	Netherlands	-0.78
Seychelles	50	32	18	Fish, dried, salted or in brine; smoked fish	37.73	Fish, aqua. invertebrates, prepared, preserved, n.e.s.	-65.32	Chile	5.83	United Kingdom	-43.37

COUNTRY NAME	Share of Product Lines (%) which are:			Most Competitive Product		Least Competitive Product		Partner with largest comp. effect		Partner with smallest comp. effect	
	competitive	un-competitive	not exported	Product	value of comp. effect	Product	value of comp. effect	Country	value of comp. effect	Country	value of comp. effect
South Africa	31	69	0	Motor vehicles for the transport of persons	1652.65	Silver, platinum, other metals of the platinum group	-2119.03	China	1088.57	United Kingdom	-1935.86
Togo	37	57	7	Cotton fabrics, woven	115.81	Crude fertilizers (excluding those of division 56)	-170.27	Nigeria	71.91	Ghana	-100.95

Table B3 (cont.): Most competitive products and partners (Absolute values are in millions of current US dollars)

COUNTRY NAME	Share of Product Lines (%) which are:			Most Competitive Product		Least Competitive Product		Partner with largest comp. effect		Partner with smallest comp. effect	
	competitive	un-competitive	not exported	Product	value of comp. effect	Product	value of comp. effect	Country	value of comp. effect	Country	value of comp. effect
Tunisia	57	37	6	Apparatus for electrical circuits; board, panels	303.66	Women's clothing, of textile fabrics	-354.48	France	353.67	Spain	-245.04
Uganda	64	30	6	Coffee and coffee substitutes	119.66	Gold, non-monetary (excluding gold ores and concentrates)	-208.22	Sudan	135.01	Switzerland	-114.19
United Republic of Tanzania	62	36	2	Tobacco, unmanufactured; tobacco refuse	75.53	Gold, non-monetary (excluding gold ores and concentrates)	-1161.43	Switzerland	352.57	United Kingdom	-1192.50
Zambia	58	39	3	Copper	1917.56	Manufactures of base metal, n.e.s.	-148.76	Switzerland	1847.05	United Kingdom	-464.58

Appendix C: Total Factor Productivity Estimation – Methodology and Results

The most widely utilized measure of productivity since Solow's (1957) seminal work is that of total factor productivity (TFP), which captures the growth in output not caused by the growth in inputs and is synonymous with technological change. Growth accounting exercises typically adopt a Cobb-Douglas production function for the purposes of estimating TFP. Equation (B1) is a Cobb-Douglas production function with constant returns to scale:

$$Y = AK^{\alpha}L^{1-\alpha} \tag{B1}$$

in which Y is output, A is the total-factor productivity, K is capital stock, L is labour and α is the output elasticity with respect to capital, a constant in the rang $0 < \alpha < 1$. Rearranging equation (1) for TFP gives

$$A = \exp[\log Y - \alpha \log K - (1-\alpha)\log L] \tag{B2}$$

Estimation of capital stock follows the perpetual inventory method in which

$$K_t = K_{t-1}(1-\delta) + I_t \tag{B3}$$

where I_t is investment in year t (gross capital formation in constant 2000 US$ sourced from the World Banks' World Development Indicators) and δ is the rate of depreciation, assumed to be 6 per cent (as in Hall and Jones, 1999, and Tahari *et al.,* 2004). The initial capital stock in the base year (K_{1995}) is calculated following Harberger (1978) in which

$$K_{1995} = \frac{I_{1995}}{(g_{1995-2005} + \delta)} \tag{B4}$$

where $g_{1995\text{-}2005}$ is the average geometric rate of GDP growth from 1995 to 2005.[8] The output elasticity with respect to capital, α, is set at 0.35[9] and values for output (real GDP, Y) and labour force (L) are sourced from the World Development Indicators. Table C1 displays the resulting estimations for the 34 African countries for which relevant data is available, and five comparator nations: the BRIC nations (Brazil, Russia, India and China) and the United States of America.

8 Harberger (1978) suggested that this average be taken over three years, but the 10 year average is now the norm in the literature (see, for example, Hall and Jones, 1999).

9 This value has precedence in the literature. See, for example, Hall and Jones (1999) and Bosworth and Collins (2003), and is consistent with measurements in Africa (UNECA and AUC, 2007; Ben Hammouda *et al.*, 2010).

Table C1: Total Factor Productivity and Year-on-Year TFP Growth, 2000-2007

Country	2000	2001	2002	2003	2004	2005	2006	2007
Algeria	172.96	170.54	171.63	176.61	178.17	179.76	175.82	173.88
	-1.40%	-1.40%	0.64%	2.90%	0.88%	0.89%	-2.19%	-1.10%
Benin	76.41	75.57	74.79	73.24	71.58	69.70	68.38	67.60
	-0.51%	-1.10%	-1.03%	-2.06%	-2.27%	-2.63%	-1.89%	-1.13%
Botswana	243.88	240.64	251.01	255.79	259.16	255.82	260.61	264.60
	0.18%	-1.33%	4.31%	1.91%	1.32%	-1.29%	1.87%	1.53%
Burkina Faso	45.40	46.77	47.22	48.79	49.27	49.98	50.71	50.48
	-1.53%	3.02%	0.96%	3.32%	1.00%	1.42%	1.48%	-0.46%
Cameroon	108.31	108.18	107.96	108.02	107.76	106.08	105.61	105.56
	0.15%	-0.11%	-0.21%	0.05%	-0.24%	-1.56%	-0.44%	-0.04%
Cape Verde	138.39	139.81	141.87	146.48	141.04	152.67	162.46	169.40
	3.86%	1.03%	1.47%	3.25%	-3.72%	8.25%	6.41%	4.27%
Chad	45.72	46.00	43.82	45.56	58.15	65.93	64.16	62.68
	-7.43%	0.59%	-4.74%	3.97%	27.64%	13.38%	-2.67%	-2.32%
Comoros	57.83	58.85	60.30	60.79	59.80	61.53	61.33	60.21
	-0.71%	1.77%	2.46%	0.81%	-1.63%	2.91%	-0.34%	-1.83%
Cote d'Ivoire	95.81	94.24	91.65	89.22	89.66	89.69	88.88	89.00
	-5.58%	-1.64%	-2.75%	-2.64%	0.49%	0.04%	-0.91%	0.14%
Djibouti	122.17	121.75	121.44	120.60	118.42	116.59	114.08	110.47
	-2.41%	-0.34%	-0.25%	-0.70%	-1.80%	-1.55%	-2.15%	-3.16%
Egypt	202.55	202.29	199.82	199.85	201.41	203.90	209.97	216.77
	1.27%	-0.13%	-1.22%	0.01%	0.78%	1.24%	2.98%	3.24%
Eritrea	38.51	40.04	39.24	36.58	35.72	35.21	33.70	33.12
	-17.52%	3.98%	-1.99%	-6.77%	-2.37%	-1.42%	-4.28%	-1.72%
Ethiopia	31.48	32.60	31.58	29.67	32.16	34.39	36.43	38.54
	1.66%	3.56%	-3.12%	-6.05%	8.40%	6.91%	5.95%	5.78%
Gabon	243.95	243.74	237.85	238.78	235.37	236.41	232.84	239.27
	-3.98%	-0.09%	-2.42%	0.39%	-1.43%	0.44%	-1.51%	2.76%
Gambia, The	58.33	59.61	55.55	57.35	59.21	59.85	61.23	62.99
	1.90%	2.19%	-6.81%	3.23%	3.24%	1.08%	2.31%	2.87%

Country	2000	2001	2002	2003	2004	2005	2006	2007
Guinea	55.36	56.16	57.55	60.16	60.90	62.01	62.89	63.12
	-0.25%	1.45%	2.47%	4.54%	1.23%	1.82%	1.42%	0.37%
Kenya	68.89	68.64	66.88	66.65	67.80	69.35	70.79	72.57
	-3.27%	-0.36%	-2.57%	-0.33%	1.72%	2.28%	2.08%	2.52%
Lesotho	42.22	43.48	43.61	45.18	46.11	46.44	49.31	50.23
	4.01%	2.98%	0.29%	3.60%	2.07%	0.72%	6.16%	1.87%
Madagascar	53.90	54.56	46.24	49.00	48.90	48.43	48.05	47.49
	0.58%	1.22%	-15.26%	5.97%	-0.19%	-0.96%	-0.80%	-1.16%
Malawi	35.91	33.38	30.76	31.46	31.59	30.61	31.33	31.82
	-0.67%	-7.03%	-7.86%	2.29%	0.40%	-3.10%	2.37%	1.56%

Table C1 (cont.): Total Factor Productivity and Year-on-Year TFP Growth, 2000-2007

Country	2000	2001	2002	2003	2004	2005	2006	2007
Mali	62.63	66.09	66.06	66.96	65.56	66.54	67.06	67.01
	-1.07%	5.53%	-0.05%	1.37%	-2.10%	1.49%	0.79%	-0.08%
Mauritius	270.25	271.16	272.72	277.32	287.61	283.52	286.52	295.40
	5.92%	0.34%	0.58%	1.69%	3.71%	-1.42%	1.06%	3.10%
Morocco	150.24	159.84	160.66	162.59	163.11	163.20	170.12	168.01
	-0.55%	6.39%	0.51%	1.20%	0.32%	0.05%	4.24%	-1.24%
Mozambique	45.65	49.02	50.63	51.38	53.43	55.75	58.40	60.37
	-5.33%	7.38%	3.27%	1.50%	3.99%	4.34%	4.75%	3.37%
Namibia	248.35	239.92	242.45	244.19	265.17	262.08	268.42	269.17
	-0.32%	-3.39%	1.05%	0.72%	8.59%	-1.16%	2.42%	0.28%
Senegal	85.33	85.02	82.22	83.18	83.94	84.58	82.39	81.84
	-1.99%	-0.36%	-3.29%	1.17%	0.91%	0.75%	-2.59%	-0.66%
South Africa	292.43	291.21	293.64	293.62	298.25	304.41	310.53	315.44
	0.70%	-0.42%	0.83%	-0.01%	1.58%	2.07%	2.01%	1.58%
Sudan	102.32	101.86	100.44	101.12	99.36	98.90	103.01	106.58
	0.63%	-0.45%	-1.39%	0.67%	-1.73%	-0.47%	4.15%	3.47%
Swaziland	138.57	137.88	139.02	143.41	146.04	147.85	150.26	153.49
	8.78%	-0.50%	0.82%	3.16%	1.83%	1.24%	1.63%	2.15%
Tanzania	49.89	51.22	52.84	53.73	55.25	57.11	58.68	60.44
	1.60%	2.66%	3.16%	1.70%	2.83%	3.36%	2.76%	2.99%
Togo	52.55	50.46	50.61	50.05	49.65	48.34	48.30	47.32
	-4.87%	-3.97%	0.29%	-1.10%	-0.79%	-2.64%	-0.08%	-2.04%
Tunisia	212.10	214.62	211.49	217.15	223.89	227.41	233.34	241.25
	1.05%	1.19%	-1.46%	2.68%	3.10%	1.57%	2.61%	3.39%
Uganda	52.46	53.05	55.36	56.44	57.55	58.34	61.27	62.72
	-0.93%	1.12%	4.37%	1.94%	1.98%	1.36%	5.03%	2.37%
Zambia	65.93	66.73	66.22	67.71	69.30	70.59	72.50	74.24
	0.14%	1.21%	-0.77%	2.25%	2.35%	1.87%	2.71%	2.39%
Brazil	257.99	256.68	256.97	255.70	264.05	266.10	269.82	281.57
	2.16%	-0.51%	0.11%	-0.49%	3.27%	0.78%	1.40%	4.35%

Country	2000	2001	2002	2003	2004	2005	2006	2007
Russia	146.19	151.45	156.81	166.22	175.71	183.40	193.37	202.99
	8.45%	3.60%	3.54%	6.00%	5.71%	4.38%	5.43%	4.98%
India	76.61	78.03	78.35	81.89	85.12	88.89	92.65	96.56
	0.81%	1.85%	0.40%	4.52%	3.95%	4.42%	4.22%	4.22%
China	86.99	90.92	95.61	101.11	106.89	114.21	123.42	135.05
	4.84%	4.51%	5.16%	5.75%	5.71%	6.85%	8.07%	9.42%
USA	1104.88	1095.54	1095.45	1104.55	1122.36	1131.40	1134.45	1136.23
	1.20%	-0.85%	-0.01%	0.83%	1.61%	0.81%	0.27%	0.16%

Appendix D: Income Level of Exports (EXPY), 2008 (current 2008 dollars)

Country	EXPY	Largest Export	PRODY of largest export	% share in export basket
Algeria	12,836	Petroleum oils, oils from bitumin. materials, crude	11,289	53%
Angola	11,335	Petroleum oils, oils from bitumin. materials, crude	11,289	97%
Benin	6,255	Cotton	1,091	34%
Botswana	9,553	Pearls, precious & semi-precious stones	8,592	65%
Burkina Faso	6,274	Cotton	1,091	40%
Cape Verde	11,212	Petroleum oils or bituminous minerals > 70 % oil	12,724	28%
Congo	10,721	Petroleum oils, oils from bitumin. materials, crude	11,289	74%
Côte d'Ivoire	7,921	Cocoa	1,253	27%
Dem. Rep. of the Congo	5,582	Ores and concentrates of base metals, n.e.s.	3,040	26%
Djibouti	8,344	Sugar, molasses and honey	6,403	6%
Egypt	11,990	Petroleum oils or bituminous minerals > 70 % oil	12,724	19%
Equatorial Guinea	11,993	Petroleum oils, oils from bitumin. materials, crude	11,289	76%
Eritrea	7,748	Leather	5,289	16%
Ethiopia	3,697	Coffee and coffee substitutes	1,303	35%
Gabon	9,830	Petroleum oils, oils from bitumin. materials, crude	11,289	75%
Guinea	5,954	Aluminium ores and concentrates (incl. alumina)	4,224	57%
Guinea-Bissau	4,559	Fruits and nuts (excluding oil nuts), fresh or dried	3,918	90%
Kenya	7,833	Tea and mate	1,081	19%
Lesotho	5,614	Men's clothing of textile fabrics, not knitted	4,359	43%

Country	EXPY	Largest Export	PRODY of largest export	% share in export basket
Liberia	10,932	Ships, boats & floating structures	16,787	42%
Libyan Arab Jamahiriya	11,591	Petroleum oils, oils from bitumin. materials, crude	11,289	86%
Madagascar	7,898	Articles of apparel, of textile fabrics, n.e.s.	5,415	18%
Malawi	3,052	Tobacco, unmanufactured; tobacco refuse	1,460	67%
Mali	3,817	Gold, non-monetary (excluding gold ores and concentrates)	3,220	75%
Mauritania	8,031	Iron ore and concentrates	7,488	46%
Mauritius	9,002	Articles of apparel, of textile fabrics, n.e.s.	5,415	22%
Morocco	8,609	Inorganic chemical elements, oxides & halogen salts	8,837	15%
Mozambique	11,833	Aluminium	14,422	55%
Nigeria	11,573	Petroleum oils, oils from bitumin. materials, crude	11,289	84%
Sao Tome and Principe	7,476	Cocoa	1,253	47%
Seychelles	13,748	Fish, aqua. invertebrates, prepared, preserved, n.e.s.	13,904	47%
South Africa	13,584	Silver, platinum, other metals of the platinum group	13,646	13%
Togo	6,471	Cotton fabrics, woven	5,719	23%
Tunisia	10,255	Petroleum oils, oils from bitumin. materials, crude	11,289	14%
Uganda	7,519	Coffee and coffee substitutes	1,303	23%
United Rep. of Tanzania	6,845	Gold, non-monetary (excluding gold ores and concentrates)	3,220	25%
Zambia	6,452	Copper	5,803	65%