

Growth by Destination: The Role of Trade in Africa's Recent Growth Episode.

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Abstract

Over the period 1990–2009, Africa has experienced a distinct and favourable reversal in its growth fortunes in stark contrast to its performance in the preceding decades, leading to a variety of hypotheses seeking to explain the phenomenon. This paper presents both cross-country and panel-data evidence on the causal factors driving the recent turnaround in Africa’s growth and takes the unique approach of disaggregating the separate growth impacts of Africa’s bilateral trade with: China, Europe and America. The empirical analysis presented in this paper suggests that the primary and most robust causal factors driving Africa’s recent growth turnaround are private sector- and foreign direct investment. Although empirical evidence of the role of bilateral trade openness in Africa’s recent growth emerges within a fixed effect estimation setting, these results are not as robust when endogeneity and other issues are fully accounted for. Among the three major bilateral partners, Africa’s bilateral trade with China has been a relatively important factor spurring growth on the continent and especially so in resource-rich, oil producing and non-landlocked countries. The econometric results are not as supportive of growth-inducing effects of foreign aid. These findings emerge after applying a variety of panel data specifications to the data, including the recent fixed Effects Filtered (FEF) estimator introduced by Pesaran and Zhou (2014) and the dynamic panel Generalized Method of Moments (GMM) estimator, which allows for endogeneity between trade and growth.

Key words: Openness; Growth; Africa; Endogeneity; Fixed-effects; Instruments.

JEL Codes: F14, F43, O19.

1. Introduction

The idea that trade openness is an important causal, contributing factor towards the promotion of economic development and growth has for long been debated by economists and policy makers. Since Ricardo's critique of the Corn Laws in the early 1800s, the debate has not waned. The key argument for free trade, as proposed by Ricardo, and dating at least as far back as Adam Smith, is that nations could improve their incomes and long run growth rates by specializing in the export of goods and services in which they have a comparative advantage. With trade occurring between nations, resources are more efficiently allocated, output is increased and feasible sets of consumption possibilities are expanded, leading to static gains from trade. Modern trade theories, such as those propounded by Helpman and Krugman (1985) and Romer (1986), emphasize the dynamic gains from trade that constantly shift countries' production possibility frontiers outwards. Greater trade openness also encourages private entrepreneurship, attracts foreign investment, fosters learning-by-doing, and encourages acquisition of knowledge and new technologies thus leading to increased productivity and economic growth¹.

Pro-growth trade arguments, however, can be rebutted if it can be established that market and institutional imperfections prevail, which may cause openness to induce: i) the underutilization of human and physical capital and natural resources, ii) the concentration of economic production in extractive economic activities or iii) specialization away from technologically advanced, increasing return sectors. Endogenous growth models presented by Eicher (1999), Grossman and Helpman (1991); Lee (1993) and Young (1991) emphasize these more pessimistic possibilities².

¹ The growth-enhancing effect of trade openness is supported by a large body of literature (e.g. Ben-David, 1993; Bhagwati and Srinivasan, 2002; Dollar, 1992; Dollar and Kraay, 2001; Edwards, 1998; Frankel and Romer, 1999; Sachs and Warner, 1995a; Wacziarg, 2001).

² In Grossman and Helpman (1991) and Matsuyama (1992) a country may specialize in a non-dynamic sector as a result of openness, thus losing out on the long-run benefits of increasing returns. These models generally include imperfections in financial markets or imperfections in contracts which induce individuals to follow a limited notion of static comparative advantage. Sachs and Warner (1995b, 1999) introduce a model where specialization and trade are extractive. Natural resource sectors divert the economy's resources from achieving technological progress - the key to growth in the long-run. In this case, the underlying imperfection is an institutional weakness that encourages natural resource depletion for quick gains, which are subsequently appropriated away by certain groups in society.

East Asia arguably provides an example of how trade can positively affect growth. Outward oriented and export-led growth policies implemented in the 1960s and 1970s have hailed success in many East Asian countries and contributed to their significant progress and development over the past three decades. *Figure 1* confirms the increased level of Asia's openness since 1970, where openness is measured as the total value of trade (imports + exports) normalized by the value of GDP. Through greater exposure to international markets, Asian countries became increasingly competitive and more integrated within the global economy, making a swift move from exports of raw materials to exports involving more dynamic, higher value added and technologically advanced products (Hammouda, 2004).

In contrast, the African experience has been bleak. Following the failure of inward-looking trade policies implemented in the 1960s and early 1970s, many African nations turned to greater external openness (Hammouda, 2004). Unlike their East Asian counterparts however, African countries continued to experience sluggish growth and became increasingly marginalised in the 1980s. Africa, then tagged the "hopeless continent"³, registered negative real GDP per-capita growth rates, averaging 0.8% per annum over the decade beginning in 1980. *Figure 2* shows regional trends in real GDP growth per capita between 1971 and 2010. The figure highlights the relatively sub-par real per capita GDP growth performance of Africa until the 1990's. By this time, as displayed in *Figure 3*, the region was surpassed by Asia in terms of real GDP per capita - a rough but useful proxy of average living standards.

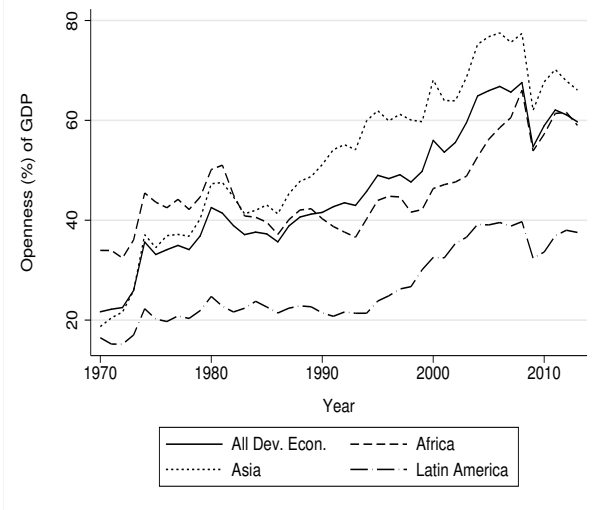
The fact that Africa continued to lag behind other regions despite comprehensive trade reforms and other efforts to emulate export-led growth models prompted some researchers to reconsider the trade-growth relationship. Many studies subsequently highlighted the contingent aspect of the trade-growth link, implying that trade openness would lead to growth only if appropriate

Rodriguez and Rodrik (2001) review the theoretical arguments which could lead trade openness to have a detrimental effect on the economies of developing countries.

³ "The Hopeless Continent" was the title of the published version of the *The Economist*, 13 May 2000.

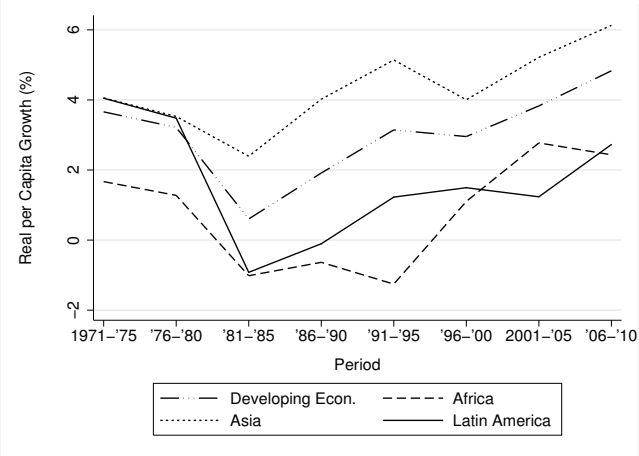
economic, social, institutional and political conditions are in place (Dufrenot et al., 2010). These include factors like governance, economic policies, and the extent of bureaucracy and competition (Dollar and Kraay, 2003; North, 1990) and the growth of inputs such as capital, labour, education and infrastructure (Krugman, 1990).

Figure 1: Regional Openness 1970 -2010



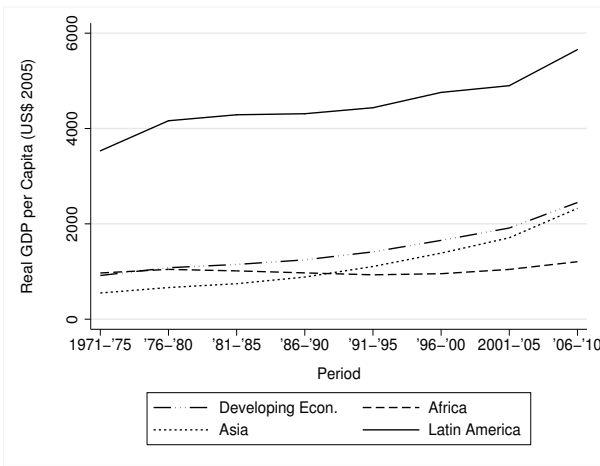
Source:UNCTAD

Figure 2. Trends in Real Growth per Capita by Region (5 year averages)



Source:UNCTAD

Figure 3. Trends in Real GDP per Capita by Region



Source:UNCTAD

The mid-1990s marked the beginning of a positive reversal in Africa’s growth fortunes. In real GDP per capita growth terms, Africa made a noticeable leap from the negative real (per capita) growth in GDP to a more reassuring 2% average rate per annum (see Figure 2). In the first decade

of the 21st century, real GDP growth jumped to 5% per annum on average, proving resilient throughout the turbulent mid-2000s- despite the global financial crisis- outstripping GDP growth in the EU and the US.

The literature on African growth identifies a boom in commodity prices as a key driver spurring the region's recent economic success. This explanation, however, loses its appeal in the face of evidence that many non-resource dependent countries have also made remarkable strides in economic growth over the period (AfDB, 2012); suggesting that growth in Africa stands on a more diversified base, with sectors other than the natural resource sectors gaining importance (McKay, 2013). Researchers also concur that countries across the continent have made significant improvements in macroeconomic management, strengthening of political institutions, investment in physical and human capital and opening up domestic markets to international trade (AfDB, 2012; Rodrik, 2014) as *Figure 1* shows. Baliaoune-Lutz (2011) on the other hand, posits a "growth by destination" hypothesis suggesting that the export destination of Africa's exports, and in particular its growing exports to China, have been instrumental in its recent growth.

This paper contributes to the literature by identifying the main factors driving the recent growth turnaround on the continent using an empirical approach. The role of trade is given added prominence in this study, through the disaggregation of Africa's trade openness, as measured by the normalized value of trade; the total value of imports and exports divided by the value of GDP, with its major regional trading partners: US, EU, China and the rest of the world (ROW). By adopting this approach, the paper provides empirical analysis of the growth by destination hypothesis. The paper is organised as follows: *Section 2* outlines the shifts in Africa's bilateral trade openness over the period 1990 -2009. *Section 3* then provides the contextual setting with regards to key developments concerning bilateral trade arrangements between the EU, USA and China and Africa. *Section 4* then outlines the empirical strategy – specifying an appropriate model along with estimation methods and frameworks. *Section 5* addresses details of the dataset used

within this study after which *Sections 6* and *7* provide estimation results; with the latter section presenting empirical results from robustness tests performed using the empirical model. A discussion of the findings within the context of the empirical literature is provided in *Section 8* after which *Section 9* summarizes the findings and then concludes by making a few policy suggestions based on the empirical findings.

2. Africa's Shift in Trading Partners

Figure 1, also reveals a marked increase in Africa's trade openness since 1990. Beneath the surface of the perceptible buoyancy in Africa's trade flows as shown in the *Figure* however, was a significant shift in the structure of Africa's trade by trading partner. Conclusive evidence of this is provided in *Figure 4*. The first three panels of the figure plot individual African country's trade openness by major trading partner (China, US and the EU) for the two years marking the beginning and end of the review period: 1990 and 2009. African countries maintaining exactly the same trade openness in 1990 as in 2009 with the respective major trading partner will be located on the 45-degree line superimposed onto each graph. Countries within the scatterplot appear closer to the axis denoting the year in which the trade share was of a greater magnitude.

In *panel (a)*, the cluster of points near the x -axis highlights the fact that China's trade penetration in Africa was relatively low in the early 1990's. By the end of the review period, however, there appears to have been a marked increase in China's trade with most African countries, as most countries in the scatterplot lie above the 45-degree reference line. The greatest inroads appear to have been made in natural resource exporters such as Guinea, Togo, Benin, Mozambique, Angola and Gabon. *Panel (b)*, which displays bilateral trade openness between African countries and the US, shows mixed results: the reference line approximately splits the sample into two halves, with most points remaining very close to the reference line. This implies that the value of bilateral trade normalized by GDP remained relatively stable between Africa and US between the years 1990 and 2009.

Countries which registered the most significant increases in trade openness with the US over the sample period were Chad, Equatorial Guinea and Malawi. On the other hand, noticeable declines in trade openness with the US have occurred in Ghana, Angola and Mozambique. It is interesting that, during this same period, China has made inroads into the latter two countries -possibly implying competition for markets between major trading partners and a possible direct pivot away from America toward China in trading ties and allegiances.

Figure 4: African Countries' Trade Openness by Major Trading Partner

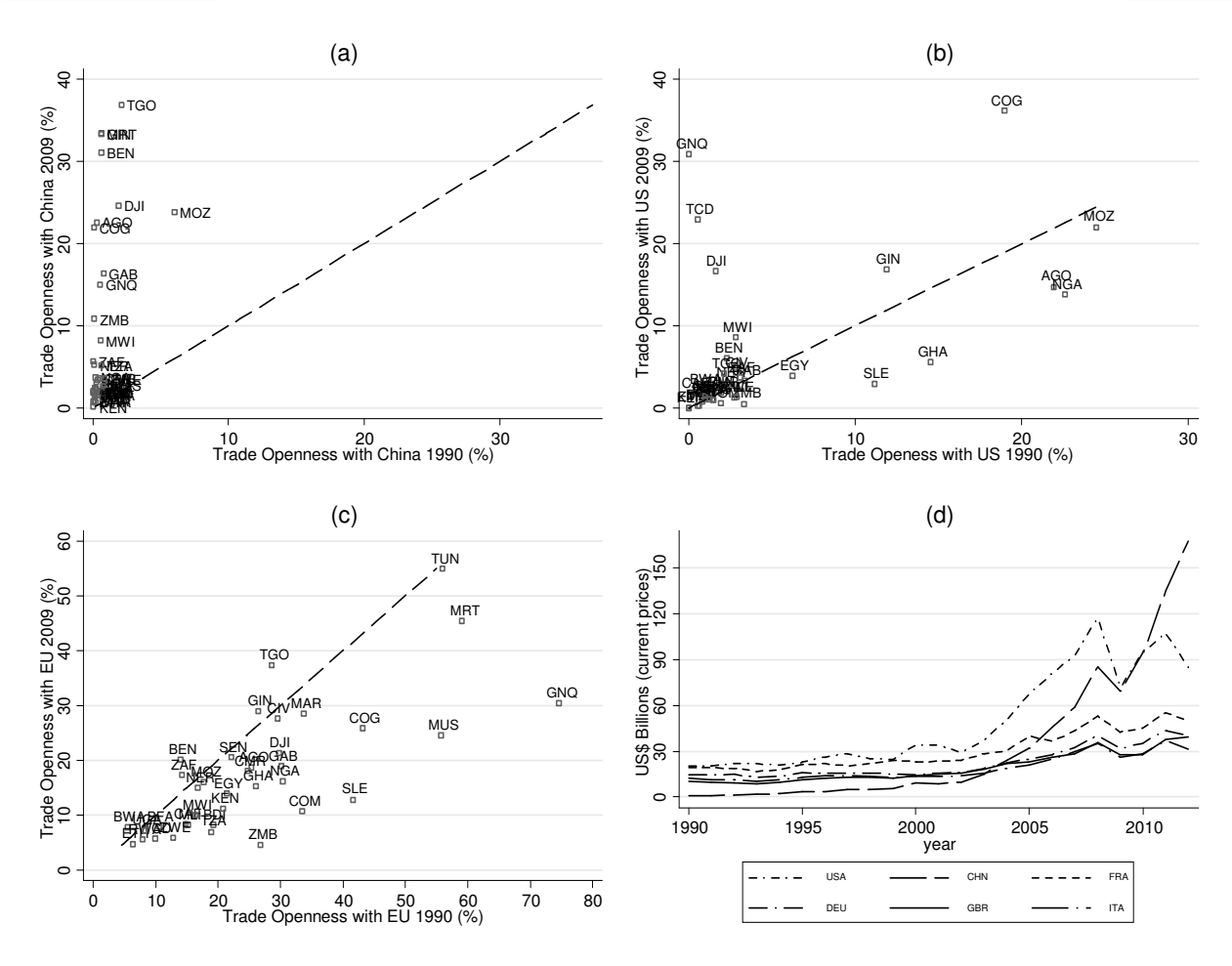


Figure 4: (a) Individual Country Trade Shares with China 1990 and 2009 (b) Individual Country Trade Shares with US 1990 and 2009 (c) Individual Country Trade Shares with EU 1990 and 2009 (d) Value of Bilateral Trade by Major Trading Partner 1990 -2012 . Source: IMF

Panel (c) brings into stark relief the relative decline in Africa’s bilateral trade openness with the EU; especially in countries such as Equatorial Guinea, Mauritius, Republic of the Congo, Sierra

Leone, Chad and Comoros and Zambia. However, despite the apparent decline in trade openness in many countries, there were some countries in which bilateral trade with EU actually increased over the period such as Togo, Guinea, Benin, South Africa, Botswana and Central African Republic between 1990 and 2009. *Panel (d)* depicts times series of the bilateral value of trade in billions of US dollars (at current prices) between Africa's key trading partners over the period 1990 - 2012. The panel confirms Busse et al.'s (2016) observation of significant growth in the value of bilateral trade between Africa and China over the period, with the rate of growth increasing noticeably since the early 2000's, which coincides with China's accession to the World Trade Organisation⁴. The growth continues after a brief, though noticeable, setback during the international financial crisis. Bilateral trade with the US, on the other hand, started off at a relatively higher initial level in 1990 compared to the value of trade with China and thereafter exhibited a trend increase in subsequent years until the financial crisis, during which the value of Africa's bilateral trade with the US registered a sharp and noticeable decline. The post-crisis recovery in bilateral Africa-US trade has however been less impressive than China's, with the value of trade in 2012 eventually settling in 2012 at below pre-crisis levels. The panel also reveals some growth in bilateral trade, albeit less pronounced, between Africa and other major European trading partners such as such as France, Germany, UK and Italy (bilateral trade with Spain and Netherlands and Sweden, though not shown, tend to follow a similar pattern) with the effects of the financial crisis also being observed to varying degrees in these series.

3. The Role of Trade Agreements

The remarkable coincidence of the reversal of Africa's subpar growth outcomes since the mid-1990's with its increased openness to China during that same period has re-ignited the debate regarding the role of bilateral trade and trading agreements in general, in stimulating growth on the continent. Drummond and Liu (2013) directly link Chinese domestic investment which has

⁴ China acceded to the World Trade Organisation (WTO) on 11th December, 2001.

fuelled its demand for minerals, farm products, timber and oil from all over the world including Sub-Saharan Africa (SSA). To fully assess such arguments, the historical context of trading agreements is now explored.

3.1 Africa's Relationship with the European Union

Africa shares a longstanding relationship with the European Union, dating back to 1957 with the Treaty of Rome. The Lomé Convention signed in 1975 and its successive rounds offered African, Caribbean and Pacific countries (ACP) unilateral preferential access to EU markets. Deemed as a breach of the WTO 'most-favoured nation' principle, the convention was replaced by the Cotonou Agreement in 2000, which set the ground for progressive, reciprocal but asymmetric market access, where the EU provided full, duty free market access to ACP countries that ratify Economic Partnership Agreements (EPAs) and commit to progressively open their markets to EU (Ramdoo and Bilal, 2014). Meanwhile, to assist the integration of all least developed countries (LDC's) into the global economy, the EU launched the "Everything but Arms" (EBA) initiative in 2001 as an extension of its Generalised Scheme of Preferences (GSP) scheme to meet the needs of least developed countries (worldwide) and grant full, duty- and quota-free access to the EU for all their exports with the exception of arms and armaments.

EU's non-reciprocal trade preferences aim at (i) increasing export volumes for developing countries thereby boosting their export earnings, and (ii) facilitating export diversification (Persson and Wilhelmsson; 2016). Evidence from previous research, namely Sapir (1981), Oguledo and Macphee (1994), Nilsson (2002), Péridy (2005), Persson and Wilhelmsson (2007), Thelle et al. (2015) among others, point to a general agreement of progress in achieving the first goal. Cirera et al. (2016) also find that unilateral preferences have been effective at increasing exports to the EU both as a result of the direct effect of lower tariffs and positive preference

margin. Similarly, European Commission (2015) find robust positive effects of EU's GSP preferences and EBA program on developing countries' export, with LDCs benefitting the most.

The literature, however, takes a more dissenting view when African countries are singled out. Manchin (2006) notes that despite benefiting from one of the most generous trade preference schemes of the EU providing free access for 95 per cent of their exports, it is widely accepted that ACP countries failed to take advantage of their preferential status and performed poorly in comparison with other developing countries. EU's generous unilateral trade preferences also appear to have an adverse impact on export diversification in the region. Persson and Wilhelmsson (2016) notes that while the Generalised Scheme of Preferences (GSP) increased the ranges of export products for developing countries, African, Caribbean and Pacific (ACP) preferences granted between 1989-2007 (Lomé IV-Cotonou) may have resulted in increased specialization.

Focussing on African LDCs, UNECA (2015) notes that the proportion of manufactured goods exported by these countries to their main partners, including the EU, is extremely small and showed no improvement over 2000–2012. Most exports were concentrated in fuels and to a lesser extent ores and metals, reinforcing the view that trade preferences have failed to promote manufactured exports and export diversification for LDCs in Africa.

Complex and restrictive rules of origin are often identified as a key reason limiting the effectiveness of trade regimes on beneficiary countries (European Commission, 2015). Rules of origin are intended to avoid trade deflection especially in the increasingly globalised business environment with supply chains spanning various countries. Minimum local content requirements and “sufficient processing” are among the most frequently applied criteria. UNECA (2015) underlines the mismatch between African countries' productive capacity and the trade preferences' rules of origin as a potential source of Africa's failure to take advantage of trade preferences. UNECA (2015) further cites the example of EU's GSP requirement of a “double-transformation” process for textile and clothing products for non-LDCs, where woven yarn must

be transformed into fabric and then fabric made into clothing. Countries that rely on imported fabric are thus barred from enjoying preferences under the EU's GSP. The level of restrictiveness of the rules of origin determines the utilisation of preferences (Manchin, 2006).

3.2 Africa's Relationship with the United States

The African Growth and Opportunity Act (AGOA), passed by the US congress in 2000 in a bid further trade relations between USA and Sub-Saharan Africa, lies at the heart of US-African engagement on trade over the past two decades. In addition to the duty free, quota free access for about 5000 product lines under the US Generalised System of preferences, AGOA-eligible countries are granted preferential access to an additional 1800 product lines (Cook and Jones; 2015). Another pivotal provision of AGOA is the 'Apparel provision'. While garments are excluded from the GSP they qualify for AGOA preferences subject to a special apparel visa system and specific rules of origin. These rules of origin emulated the "triple transformation" principle already prevalent in other US preferential trade agreements such as NAFTA and Caribbean Basin Initiative Preferential treatment, and can be applied to apparel assembled in one or more AGOA eligible country from US fabrics, which in turn are made from US yarn. African apparel made from fabric made in another beneficiary African country is acceptable on the condition that it is derived from US yarn and not exceeding an applicable percentage (Portugal-Perez, 2007). AGOA also makes provision for a more relaxed rule of origin for lesser developed countries. Duty-free access was granted to their apparel irrespective of origin of fabric used to produce it, in line with a "single-transformation" requirement

A number of studies have established a positive impact of AGOA on SSA exports. Collier and Venables (2007) and Tadesse and Fayissa (2008) find that AGOA promoted exports of apparel to the US. Moreover, Frazer and Van Biesebroeck (2010) find that AGOA had a large and robust

impact on US imports for apparel and manufactured products and a smaller but significant impact on agricultural products.

In contrast, Nilsson (2007) and Di Rubbo and Canali (2008) did not find significant trade-creating effects for AGOA. The two studies however employed differing levels of aggregation and focussed on different product groups. Nilsson (2007) explored the effects on total exports while Di Rubbo and Canali focussed on agri-products. Similarly, with the use of gravity models Mueller (2008) and Seyoum (2007) find that AGOA has had no significant impact on overall exports from SSA.

In terms of the lesser-studied aspect of export diversification under AGOA, UNECA (2015) and Eicher and Kuenzel (2016), notes that like other preferential schemes, AGOA has not helped Africa to diversify its export products, with energy commodities still constituting the bulk of AGOA eligible countries' exports to the US. On the other hand, Cook and Jones (2015) suggest that AGOA contributed to export diversification, specifically through its apparel provision. Countries that are eligible for the AGOA apparel provision not only export more apparel products, but also export more non-apparel products to the USA.

3.3 Africa's Relationship with China

China's engagement with Africa, initially based on diplomatic and political links, entered a new phase following China's opening up in 1978. At that time, China's share of world GDP was a mere 1.75%⁵ and remained more or less the same until 1990. Over the review period, 1990-2009, China's share of the world economy grew to 8.5%; a remarkable increase. Driven by the growing appetite for resources to fuel its prospering economy, China gradually turned to Africa. Sino-African trade, therefore, rapidly intensified since the start of the new century, growing by an average annual rate of 27% over the period 2001-2014 compared to 17% in the period 1990-2000 (Lakatos et al., 2015). In 2009, China accounted for around 15% of SSA's total trade compared to

⁵ Computations from the World Development Indicator Dataset(World Bank), using current US dollar values.

roughly 5% in 2000 (Pigato and Tang, 2015). This trade relationship is however asymmetric, Africa being of relatively less importance to China as a trading partner. SSA's share in Chinese total trade reached only 3% in 2009. Africa's exports to China are heavily concentrated in oil and non-oil natural resources while its imports are more diversified comprising both consumer and capital goods⁶ (Wang, 2007; Broadman, 2007; Renard 2011; Pigato and Tang, 2015). This provides an interesting contrast to export baskets destined for the EU and US markets in that they also include a significant share of manufactures, in particular textiles and apparel.

The heightened trade between China and Africa has sparked the interest of many scholars, keen to understand its impact on the continent's growth. Using a panel of 43 African countries over 1991-2010, Busse et al. (2016) report that African economies exporting natural resources have benefitted from positive terms of trade effects from Sino-African trade but other economies have experienced displacement effects as a result of bilateral trade with China. Balamoune-Lutz (2011) highlights the "growth by destination hypothesis" distinguishing between the effects of African i) imports from and ii) exports to China, while controlling for export concentration and openness to trade. Balamoune-Lutz (2011) suggests that while exports to China do not affect growth unconditionally, export concentration enhances the growth effects. Exports to developed countries (defined as rest of the world, excluding China and Africa) on the other hand, are linked through an inverted U-shaped relationship while imports from China were found to have growth-enhancing effects.

China first granted preferential market access for 190 products from designated African lesser-developed nations in 2005 and more than doubled the product coverage three years later, offering an average preference margin of 10.4%. Using a simple 'implicit transfer' calculation, Minson

⁶ Consumer goods represent the largest share, particularly textiles and clothing, footwear, and consumer electronics, but capital goods such as machinery, commercial electronics, and transportation equipment are also well represented.

(2008) estimates the economic value of the scheme to be \$10 million per year, spread across 30 countries. Nations exporting primary products and simple manufactures such as sesame seeds, cocoa, beans, leather and cobalt stand to gain from the Chinese trade preference. The benefits of freer access to the Chinese market could nonetheless be offset by potential competition from other Asian LDCs enjoying the same preferences. Non-tariff measures imposed by China to safeguard health, environment and natural security are also likely to undermine preference margins. It is reported that, in general, 6.5% China's tariff lines are subject to such import restrictions and at least two of the 440 items listed for preferential treatment are affected (Minson, 2008). Raw cotton, a major export commodity of many African nations, was also subject to an MFN rate of 40%. This could, however, offer substantial potential for value added processing and diversification provided the required capacities are in place, more so as 49 products on the preference-receiving list including thread, yarn and textiles, were not being actively exported (ibid). Minson (2008) concludes that notwithstanding preferences granted by China were thoughtfully tailored to Africa's exporting capacity, the economic impacts of the scheme are likely to be modest and more of a symbolic importance. This sentiment is echoed by Co and Dimova (2014), who find that the preferential treatment led to some export diversification and moving up the value chain, with effects differing significantly across beneficiary countries. They also note that China's market access arrangement did not enhance export competitiveness of African exports in the Chinese market. These findings are not surprising considering that the additional duty-free products only represent 1.2% of African exports to China; the bulk of African exports (90%), in particular oil and minerals, already entered China duty free before the scheme was implemented (Minson, 2008).

4. Empirical Strategy

4.1 Background

Establishing the empirical relationship between trade openness and growth is fraught with challenges (Chang et al.; 2009). Some papers have found a positive effect which varies in intensity

(Dollar, 1992; Edwards, 1998; Frankel and Romer, 1999; Lee; 2005, Sachs and Warner, 1995a) while others have cast doubt on those results (Harrison, 1996; Loayza et al., 2005; Rodriguez and Rodrik, 2001) on methodological grounds including endogeneity.

There is also a broad literature on other determinants of growth in which many variables have been employed in growth regressions as explanatory variables⁷. In fact, Durlauf et al. (2005), argues that economic theory does not specify the exact mechanism driving growth and identifies over 140 proxies of growth determinants employed in various empirical studies. The neoclassical model due to Solow emphasizes the role of investment in causing growth. Romer's (1986) endogenous growth model argues along similar lines but adding that private investment positively contributes to technological change, ensuring increasing returns to scale and growth in the steady-state. Many empirical studies have featured foreign direct investment emphasizing the role of skills, financial development and bridgeable technology gap (Findlay, 1978; Doucouliagos et al., 2010; Li and Liu, 2005; Gunby et al., 2017; Alfaro et al., 2010; Chang and Mendy, 2012; Cipollina et al., 2012; Görg and Greenaway, 2004; Hanson, 2001).

Foreign aid has also been identified as an important determinant of economic growth (Burnside and Dollar, 2004; Brückner, 2013; Brückner, 2013; Clemens, Radelet, Bhavnani and Bazzi, 2012; Fayissa and El-Kaissy, 1999; Hansen and Tarp, 2000, 2001; Lensink and White, 2000; Stoneman, 1975) while others provide evidence to the contrary (Doucouliagos and Paldam, 2009; Easterly, 2003a; Easterly, 2003b; Easterly, Levine and Roodman, 2004; Kosack, 2003; Rajan and Subramanian, 2008, 2011; Roodman, 2007; Easterly and Williamson, 2011). More recently the literature has emphasized the role of institutions as a major factor influencing economic growth and development with some authors arguing for the primacy of institutions over other deep determinants of growth (Acemoglu et al., 2001; Easterly and Levine, 2003a; Rodrik, 2004; Acemoglu et al., 2005; Rodrik, 2005).

⁷ See Barro (1998), Hall and Jones (1999), Frankel and Romer (1999), Dollar and Kraay (2003) and Chang et al. (2009) among others for a discussion on the different determinants of economic growth.

4.2 Empirical Model

This paper adopts an empirical model of economic growth in Africa, entertaining a model along the lines of Mankiw et al. (1992) written as follows:

$$Growth_{it} = \beta_0 + \beta_1 initGDP_i + \beta_2 TO_CH_{i,t} + \beta_3 TO_EU_{i,t} + \beta_4 TO_US_{i,t} + \beta_5 TO_ROW_{i,t} + \beta_6' CV_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t} \quad (1)$$

In *equation (1)*, the subscripts i and t represent country and time period respectively. The dependent variable *Growth* is the logged difference of real GDP per capita; *initGDP* represents the logged value of 1990 real GDP per capita for each country within the sample. As a consequence of using the logged difference of real GDP per capita as the dependent variable, one observation is dropped for each country leaving 333 observations in the estimation sample. The variables *TO_CH*, *TO_EU*, *TO_US*, and *TO_ROW* measure the logged bilateral trade openness of each African country with major trading partners: China, the EU, US and rest of the world (ROW). Trade openness is measured as the sum total of imports and exports divided by GDP with each bilateral partner (USA, China, EU and ROW) in each country year (Edwards, 1992, 1998; Frankel and Romer, 1999; Ulaşan, 2015, Idris et al. 2016). The normalization of trade values by GDP is a standard treatment reflecting the standard formulation of the neoclassical model of growth stated (in per capita terms) while also acknowledging importance of “size” for economic growth as emphasized by Alesina et al. (2005). Here it is important to note that trade openness variable, as specified, is an outcome variable, measuring is trade value by partner region normalized by GDP and not trade policy *per se*. The chosen measure of trade openness therefore allows us to test whether normalized bilateral trade values from Africa’s major regional partners have contributed to the recent growth turnaround. Although this paper has explored the policy context in *Section 3*, the trade openness measure specified is inherently too crude a measure to make bold statements regarding the effect of policies over the period. On the other hand a major advantage of the

measure used is that: i) it is widely used and therefore allows for comparability with many previous studies ii) it allows us to identify whether bilateral trade outcomes have affected growth.

Alternative measures of trade openness are far from perfect. Various authors have also noted that tariff-based measures of trade openness, for example, would be too narrow and would also limit the sample size⁸ (Busse and Koeniger, 2015; Gervais, 2015).

It is also worth noting that using the definition of bilateral regional trade openness employed within this study does not introduce high pairwise correlations between trade openness proxies at the country-level or within the full sample as will be shown in *Tables 2a* and *2b*. This is due to the normalization of trade values by GDP in each country year which removes implicit linear relationship between the values of bilateral trade openness when these values are summed across bilateral trading partners⁹. Secondly, while it is intuitively appealing to consider that increasing trade openness to one bilateral partner must necessarily decrease trade openness to another due to supply-side constraints (for example, resource and technological constraints), this hypothesis does not hold up to scrutiny. In fact, bilateral trade openness as measured could increase across all trade partners simultaneously. For example, a simple fall in nominal GDP which does not affect the external sector (tradeable goods sector) could achieve this result. Conversely, a favourable change in the terms of trade for a good exported to all trading partners, *ceteris paribus*, could cause openness to all bilateral partners to increase. More generally, therefore, the bilateral trade openness measure simply captures the broad trade policy stance between African countries and their trading partners; thus summarizing a complex mix of policy, demand and supply, and overall economic conditions between each African country and their trading partners within each period¹⁰.

⁸ See Huchet-Bourdon, Le Mouël and Vijil (2011) for a discussion of the varying definitions of trade-openness employed within the economic literature.

⁹ If, on the other hand, the trade values (exports + imports) between country *i* and regional partner *j* were normalized using the total value of trade (instead of GDP) for each country year.

¹⁰ For a recent study using a similar approach see Busse et al. (2016). The bilateral trade openness measure has also been criticized within the literature for its failure to include non-tradeables (Alcalá and Ciconne, 2004), and its endogeneity (which is accounted for within this paper using econometric means). Alternative measures of trade openness have been criticized for inconsistent correlations, introducing biases within estimation. Tariff based

The term *CV* in *equation (1)* represents all other control variables which are included in order control for the effect of trade on growth. A complete list of control variables are found in *Table 1*. The choice of variables for inclusion under *CV* pays due attention to two key considerations: 1) their importance in the theoretical and empirical literature as determinants of economic growth and 2) their potential for affecting the degree of trade openness. The control variables used to estimate *equation (1)* are both time-varying and time-invariant in nature. Key time varying regressors included within our specification are i) *private sector investment to GDP* ratio, (ii) *foreign direct investment (FDI) to GDP* ratio and iii) *AID to GDP* ratio. We also include *inflation* as a simple proxy of financial stability. Following Chang et al. (2009), we calculate *inflation* as the absolute deviation of the inflation rate from 3% in logs. The other time-invariant control variable is *oilprod*- a binary indicator variable which takes a value of 1 for oil- producing African countries.

The specification also includes a *conflict* binary indicator, which varies across both country and time and indicates years in which there was a conflict within the African country in question. To capture the degree of institutionalized democracy (autocracy or democracy) within each African country, we use the *polity2* measure. Increases in *polity2* imply an increase in institutionalized democracy over the sample period and varies by country and over time. The terms μ_t and η_i in *equation 1* capture time and country specific fixed effects respectively. Unless otherwise stated, binary year indicator variables are employed in all regressions and robust standard errors are utilized in order to make our statistical inferences and the conclusions drawn from the model robust in the presence of potential heteroscedasticity and autocorrelation.

measured have been criticized for lacking theoretical foundations. Manole and Spatareanu (2010) (Rodriguez and Rodrik; 2001, Harrison and Hanson; 1999)

4.3 Endogeneity

To varying degrees, previous studies have sought to address concerns regarding the problem of endogeneity between explanatory variables, such as trade openness and economic growth in the panel regression framework (Harrison, 1996; Loayza et al., 2005; Rodriguez and Rodrik, 2001 Gervais, 2015). However the endogeneity problem is not confined to bilateral trade variables. León-González and Montolio (2015, Brückner 2013) comment that the endogeneity problem is particularly relevant in empirical studies looking at the impact of foreign aid on growth in developing countries¹¹. Li and Liu (2005) also identify endogeneity between FDI and economic growth over specific periods.

In addition to presenting baseline fixed effect panel data estimations of the model's coefficients a new estimator contributed by Pesaran and Zhou (2014) which specifically enables the estimation of static panel data models with time invariant, exogenous regressors such as the “oil prod” variable is employed. The endogeneity between trade openness and economic growth is directly addressed using two common strategies (i) the panel two-stage least squares estimator is used to provide coefficient estimates which controls for the endogeneity in bilateral trade openness variables and (ii) system GMM estimator which also provides for the endogeneity of other explanatory variables.

Two instrument sets are used for the two-stage least squares estimation: (i) first-differenced bilateral trade openness (ii) trade openness to each African country measured from the perspective of the bilateral, regional partners US, China, EU and the rest of the world. Dollar and Kraay (2004) provide theoretical arguments in order to justify the use of first-differenced bilateral trade openness as an instrument or proxy for bilateral openness. They argue, with some merit, that

¹¹ León González and Montolio (2015) employ the method of Bayesian Modelling Averaging technique in an attempt to overcome issues of endogeneity and model uncertainty in a panel growth regression framework; an increasingly popular approach which attempts to solve the problem of model uncertainty and variable selection. Other approaches have been used with the literature. Wacziarg and Welch (2003) exemplify the use event study methodologies to investigate the relationship between trade liberalization and economic growth.

focussing on the change rather than the level of the trade to GDP ratio controls for initial conditions such that any observed increases in the differenced trade/GDP ratio can therefore be taken to be the result of policies which foster openness¹². It should be noted however that, this theoretical justification remains valid only as long as the *effects* of the initial conditions are assumed to be the same in every period. The bilateral trade-openness to each African country measured from the perspective of the trading partner is slightly *ad-hoc*. It exploits the ambiguity in the definition of the trade openness in the literature and has been employed in earlier papers (Leamer, 1993; Leamer and Levinsohn, 1995). Both instruments satisfy the prerequisite of being highly relevant in a statistical sense as evidenced by examining the results of the first stage regressions. On the other hand, the fact that both instrumental variable specifications are exactly identified precludes the application of tests for appropriateness of the moment conditions within the two-stage least squares framework.

To-step system generalized method of moments (GMM), however, provides a framework which accounts for variable endogeneity while also lending itself to tests for over-identifying restrictions involving the instruments (the instrument appropriateness)¹³. For the dynamic estimation of the model, the standard convention proposed by Roodman (2009a) was followed: for variables predetermined to be not strictly exogenous such as the lagged dependent variable (lagged GDP growth per capita) lags 1 or longer were used, whereas for exogenous variables such as bilateral trade openness and Aid to GDP ratio, lags two or longer were included within the instrument matrix. Not all previous lags were used during estimation.

Using two-step GMM to tackle the problem of endogeneity is not without its pitfalls. One issue of concern is the number of instruments used within the estimation. Including all variables mentioned

¹² A detailed discussion of the use of differenced variables as trade proxies can be found in the Dollar and Kraay (2004) paper.

¹³ The GMM approach naturally provides a framework where tests of over-identifying restrictions can be directly tested using methods pioneered by Sargan (1958) and Hansen (1982).

within the literature as possibly endogenous (along with all the previous lags of these variables) simultaneously during estimation would lead to a proliferation of instruments which can overfit endogenous variables and fail to remove their endogenous components (Roodman 2009a; Roodman 2009b). For this reason the results presented in this paper treat bilateral trade openness and AID to GDP ratio as instruments in all specifications, since the endogeneity of aid is greatly emphasized within the literature. It is worth noting however, that the results remain qualitatively robust to alternative specifications of endogenous variables. The “too many instruments” problem is of particular concern when the empirical model is estimated on a subsample of countries- such as is performed in *Section 7* of the paper. In all cases the instrument count adheres to the ‘rule-of-thumb’ proposed by Roodman (2009a and 2009b) which states that: in every regression the instrument count should be less than the number of countries within the sample (or subsample). When this method proves to be binding for sub-samples that involve relatively few countries the principal components method (Kapetanios and Marcellino 2010; Bai and Ng 2010; Mehrhoff 2009) is used to extract the key components of the instrument matrix to further reduce the instrument count.

5. Data, Measurement and Sources

Real GDP per capita data used for the dependent variable and initial income variable are obtained from Penn World Tables version 8 (with 2005 used as the base year). The bilateral trade and GDP data used to construct the trade openness variable between each African country and the major trading partners EU, China and the US are obtained from the International Monetary Fund’s Direction of Trade Statistics (DOTS) and World Development Indicators (WDI) Database respectively. Private sector investment data are taken from the Penn World Table 8 while foreign direct investment (FDI) and aid (AID) data are both compiled from the WDI dataset. Data used to construct the conflict indicator was obtained from *Version 4-2009* of the Peace Research Institute Oslo (PRIO) dataset.

Table 1: Variable Descriptions, Summary Statistics and List of Countries.

Variable	Source	Unit of Measurement	Mean	Overall standard deviation	Between standard deviation	Within Standard Deviation	Minimum	Maximum	Sample Size
Real GDP per Capita	Penn World Tables 8	Log of GDP PPP US\$(Yr. 2005)	7.3013	0.9043	0.8547	0.3241	5.429	9.4311	370
Initial GDP(1990)	Penn World Tables 8	Log of GDP PPP US\$(Yr. 2005)	7.2313	0.8337	0.8441	0	5.7084	9.011	370
Trade Openness to China	DOT/WDI	Log of Trade Openness	-4.594	1.817	1.359	1.224	-13.195	-0.8498	370
Trade openness to USA	DOT/WDI	Log of Trade Openness	-3.753	1.6514	1.5302	0.665	-11.5129	-0.5815	370
Trade Openness to EU	DOT/WDI	Log of Trade Openness	-1.652	0.6252	0.559	0.2932	-3.3765	-0.1791	370
Trade Openness To ROW	DOT/WDI	Log of Trade Openness	-1.881	0.9565	0.8294	0.4937	-6.908	0.6208	370
Private Sector Investment	Penn World Tables 8.	Share of GDP	0.1348	0.1868	0.1368	0.1289	-1.1898	0.9101	370
Population Growth	WDI	Log of Percent growth	0.7951	0.75001	0.449	0.6049	-4.605	2.037	370
FDI to GDP ratio	WDI	Share of GDP	0.0331	0.07454	0.0516	0.07617	-0.07217	0.8695	370
AID to GDP ratio	WDI	Share of GDP	0.1152	0.112	0.0773	0.0815	0.0012	1	370
oilprod	African Petroleum Producers Organisation	Indicator Variable	0.3784	0.486	0.4917	0	0	1	370
Conflict	UCDP/PRIO Armed Conflict Dataset Codebook	Indicator Variable	0.2892	0.454	0.3733	0.2649	0	1	370
Polity2	PolityIV-	Integer Variable	-0.1622	5.1997	4.273	3.037	-9	10	370
inflation	WDI	Log of absolute deviation from 3	1.533	1.3917	1.006	0.9742	-5.046	7.603	370

Countries:

Oil Producers:

Angola –AGO-RR -Central, Benin –BEN- West, Cote d’Ivoire-CIV-RR- West, Cameroon-CMR-RR -Central, Congo Rep.-COG-RR - Central , Egypt, Arab Rep. –EGY-North, Gabon –GAB-Central, Ghana –GHA-RR- West, Equatorial Guinea –GNQ-RR-Central, Mauritania-MRT-RR -West, Niger –NER-RR-LL -West, Nigeria –NGA-RR -West, Chad –TCD-RR-LL, South Africa –ZAF-South.

Other:

Burundi-BDI-East, , Burkina Faso –BFA-West-LL, Botswana-BWA-LL-South, Central African Republic-CAF-RR-LL-Middle, Comoros –COM-East, Djibouti –DJI-North, , Ethiopia –ETH-LL-East, Guinea –GIN-RR-West ,Kenya –KEN-East, Morocco –MAR-North, Mali –MLI-RR-LL-West, Mozambique –MOZ-RR-South, ,Mauritius-MUS-East, Malawi -MWI-LL-East, Rwanda –RWA-LL-East, Senegal –SEN-West, Sierra Leone –SLE-RR-West, Togo –TGO-RR-West ,Tunisia -TUN-North, Tanzania –TZA-RR-East, Uganda –UGA-RR-LL-East, ,Zambia-ZMB-RR-East, Zimbabwe–ZWE-LL-South.

RR- Resource Rich Countries

LL = Landlocked

Central/West/North/East/South – Geographic Location

Table 2a: Bivariate correlation between growth and determinants

	Growth	Log Initial GDP (1990)	Log Trade openness to China	Log Trade openness to USA	Log Trade openness to EU	Log of Trade openness ROW	Private sector Inv. Share	Pop. Growth Rate	FDI to GDP ratio
Economic Growth	1								
Log Initial GDP(1990)	-0.1691	1							
Log Trade openness to China	0.2578	0.0036	1						
Log Trade openness to USA	0.2046	-0.0936	0.5763	1					
Log Trade Openness to EU	-0.0048	0.2931	0.2522	0.3105	1				
Log Trade Openness ROW	0.0225	0.2592	0.2209	-0.1134	0.2029	1			
Private Investment Share	0.3602	0.2754	0.3522	0.3253	0.2557	0.1722	1		
Pop. Gro. Rate	0.1642	-0.2866	0.0586	0.0192	-0.1705	-0.0511	0.0836	1	
FDI to GDP ratio	0.4349	-0.2130	0.2707	0.3029	0.2365	0.0988	0.2816	0.1175	1
AID to GDP ratio	-0.1765	-0.4718	-0.1020	0.0156	-0.2270	-0.2105	-0.5126	-0.0590	-0.0538

Table 2b: Bivariate correlation between growth and determinants (continued)

	Aid to GDP Ratio	Oilprod	Conflict	Polity2	Inflation	East Africa	West Africa	Middle Africa	North Africa
Economic Growth	-0.1765	0.1853	-0.0660	-0.0170	0.0680	-0.0939	-0.0829	0.1490	0.0135
Log Initial GDP(1990)	-0.4718	0.0333	-0.2519	0.0631	-0.1216	-0.0846	-0.2258	0.0175	0.2975
Log Trade openness to China	-0.1020	0.2152	-0.1662	-0.0023	0.0690	-0.2828	0.1249	0.1523	0.0062
Log Trade openness to USA	0.0156	0.4531	0.0121	-0.0486	0.3013	-0.4605	0.1555	0.2723	-0.0214
Log Trade Openness to EU	-0.2270	0.2505	-0.2270	-0.1598	-0.0379	-0.4199	0.1883	0.1471	0.2694
Log of Trade Openness to ROW	-0.2105	0.0752	-0.1286	-0.0540	-0.0337	0.1430	0.0143	-0.0075	0.1226
Private Sector Investment Share	-0.5126	0.3701	-0.1123	-0.1015	0.1888	-0.2542	-0.2059	0.4412	0.0461
Pop. Gro. Rate	-0.0590	0.2118	-0.0265	0.0835	-0.0284	-0.0861	0.0928	0.1498	-0.1956
FDI to GDP ratio	-0.0538	0.2316	0.0228	-0.1289	0.1783	-0.1419	-0.1035	0.3256	-0.0225
AID to GDP ratio	1	-0.2775	0.1963	0.0278	0.1817	0.2324	0.0251	-0.1942	-0.1946
Oilprod		1	0.0007	-0.1363	0.1239	-0.5075	0.1737	0.4769	-0.0922
Conflict			1	-0.1524	0.1433	0.0983	-0.0826	0.2042	-0.1343
Polity2				1	-0.0556	0.0950	0.1040	-0.2606	-0.3006
Inflation					1	0.1195	-0.1466	0.2066	-0.2527
East Africa						1	-0.4506	-0.3142	-0.2265
West Africa							1	-0.3347	-0.2412
Middle Africa								1	-0.1682
North Africa									1

The *polity2* measure provided by the Polity IV project of the Integrated Network for Social Conflict Research (INSCR) was also used as a regressor. Our regressions also control for inflation by including the absolute deviation of inflation from 3 in logs (see Chang et al. 2009). Before carrying out our computations we calculate non-overlapping 2-year averages for data values for each country on the dataset which spans 1990-2009. The reason for this transformation is that averaging the dataset helps to capture steady state relationships between the variables on the one hand while simultaneously removing, to a certain degree, measurement error and business cycle effects¹⁴. In addition, regional and year dummy variables are included within our regression specification in order to control for both regional and temporal effects within the sample. *Table 1* contains information on all variable definitions, data sources, units of measurements, descriptive statistics and country lists used within this study. All variables excluding “*oilprod*”, the binary indicator capturing whether a particular country is an oil producer or not, and initial GDP (the level of GDP in 1990 for each African country) show within panel variation and all variables show reasonable means and variances.

In addition, *Tables 2a and 2b* provide the correlation coefficients for all variable pairs within the dataset. A preliminary analysis of the pairwise correlations suggests that they are, in general, acceptable and generally intuitive. These results, though preliminary, do not highlight any difficulties with our method of estimation. Among the bilateral trade openness variables we observe a 0.57 correlation between trade with China and trade with US and could be reflective of close interrelationships between trading relationships between both regional partners. The correlation may well reflect the interconnected nature of these economies through the existence of global value chains since China’s exports comprise value added from the rest of the world, especially other Asian nations and the US. In fact according to the OECD(2015) and Antràs

¹⁴ It is standard practice in the literature to use 5- or 10-year averages. Chang et al. (2009) exemplify this approach. The idea is that this will alleviate business-cycle effects and measurement error. Attanasio et al. (2000), for example, argue that using 5- or 10- year averages in such studies is undesirable since it “throws away” too much information. However such studies relying on 5-year averages tend to utilize annual data since 1960, while in this sample we use only 1990-2009 data.

(2016), changes in the structure and pattern of trade have occurred over the last two decades such that three quarters of international trade comprised firms buying and selling inputs and investment goods and services that contribute to the production process and not directly trading in final products *per se*. The trends in and prevalence of these global value chains implies that the origin of trade may well, in fact, be less relevant as firms strategically decide on where to locate specific production tasks.

6. Results

Table 3 below contains ordinary least squares (OLS) coefficient estimates for *equation 1*. The results of a variety of specifications of the model are displayed in *columns (i) to (v)* of the table. *Column (i)* of the table presents estimates of the baseline regression - a simple linear regression model without year and country fixed effects. *Columns (ii) and (iii)* of *Table 3* depict coefficient estimates incorporating: year effects and country fixed effects, respectively. In *column (iv)*, coefficient estimates for the model estimated with both year and country specific fixed effects modelled explicitly using indicator variables are displayed. Finally, *column (v)* of *Table 3* presents coefficient estimates of the fixed effects filtered (FEF) estimator of Pesaran and Zhou (2014) providing consistent estimates of time invariant regressors.

In general, the coefficient estimates on the log of initial GDP are negative across all columns of the table, implying that countries with lower real GDP per capita in 1990 grew relatively faster between 1990 and 2009. The coefficient is significant in *columns (i) and (ii)* of *Table 3*. Within the set of variables measuring bilateral trade openness, the results in *Table 3* reveal that only bilateral trade openness variables with China and the EU produce statistically significant coefficients across multiple specifications. The positive and statistically significant coefficient on bilateral trade openness to China holds in *columns (iii), (iv) and (v)* of the table; thus proving fairly robust. The coefficient on bilateral trade openness with the EU however has the opposite

sign across all specifications and is robustly statistically significant. Africa-US trade appears, from our results, to have no statistically significant effect on real output growth. These findings suggests heterogeneity in the proximate effect of bilateral trade openness of on GDP per capita

Table 3: Pooled Ordinary Least Squares Estimates: Static Model

Dependent Variable: Logged Difference of Real GDP per Capita					
Estimation Methods	OLS(robust) (i)	OLS (robust) with year indicator variables only (ii)	OLS(robust) with country indicator variables only (iii)	OLS (robust) with both year and country indicator variables (iv)	Fixed Effect-Filtered (Pesaran and Zhou, 2014) (v)
Control Variables					
Log Initial GDP(1990)	-0.0391*** (0.0109)	-0.0392*** (0.01)	-0.0196 (0.0462)	-0.0122 (0.0506)	-0.0137 (0.0317)
Log Trade openness to China	0.0088 (0.0055)	0.0113 (0.0069)	0.0162* (0.0082)	0.0377*** (0.0131)	0.0377*** (0.119)
Log Trade openness to USA	-0.0003 (0.0054)	-0.0024 (0.006)	0.0001 (0.0107)	-0.0084 (0.0115)	-0.0084 (0.0103)
Log Trade Openness to EU	-0.0398*** (0.0102)	-0.0416*** (0.0108)	-0.0564 (0.0306)	-0.0757** (0.036)	-0.0757** (0.0324)
Log of Trade Openness to ROW	-0.0051 (0.0066)	-0.007 (0.007)	-0.0038 (0.0149)	-0.007 (0.0158)	-0.0068 (0.0140)
Private Sector Investment	0.2406*** (0.0567)	0.2299*** (0.0503)	0.2531 (0.1084)	0.2581** (0.1061)	0.2581*** (0.0956)
Log of Pop. Growth	-0.0016 (0.0133)	-0.0014 (0.0126)	0.0125 (0.0189)	0.01181 (0.01738)	0.0118 (0.0157)
FDI to GDP ratio	0.6796** (0.2697)	0.6933*** (0.6933)	0.6005* (0.3607)	0.6279** (0.28)	0.6279** (0.2523)
AID to GDP ratio	-0.1909 (0.1184)	-0.222* (0.1226)	-0.1731 (0.2129)	-0.215 (0.246)	-0.2150 (-0.0074)
Oilprod	0.0045 (0.0213)	0.0057 (0.0222)	-0.1326* (0.0764)	-0.1205 (0.0833)	-0.0074 (0.0281)
Conflict	-0.0291* (0.0164)	-0.02871* (0.0166)	-0.0008 (0.0289)	-0.0074 (0.031)	0.0031 (0.0055)
Polity2	0.0009 (0.0019)	0.0011 (0.0019)	0.0008 (0.006)	0.0031 (0.0061)	-0.0030 (0.0068)
Inflation	-0.0053 (0.0061)	-0.0045 (0.0062)	-0.0026 (0.0077)	-0.003 (0.0076)	-0.0030 (0.0068)
Constant	0.2531*** (0.0872)	0.2245 (0.08)	0.1431 (0.068)	0.0182 (0.0182)	-
R^2	0.3281	0.364	0.3973		-
Observations	333	333	333	333	333

Notes: *** means significant at the 1% level

** means significant at the 5% level

* means significant at the 10% level

growth by trading partner, corroborating earlier findings by Busse et al. (2016). This result reflects the fact that, through the channel of expanding bilateral trade, China's rapid rise over the review period has positively impacted Africa's growth performance over the period. It is interesting to note from *Table 3* however, that although bilateral trade was significant in affecting growth outcomes that across all columns of *Table 3*, the largest marginal contributor to real economic growth in Africa, over the sample period was the foreign direct investment ratio. The positive coefficient on the FDI to GDP variable implies that between 1990 – 2009, African countries which experienced greater FDI flows experienced significantly higher real GDP growth. In addition to the coefficient on the variable being of a higher order of magnitude than other regressors, the variable is also highly statistically significant. On the basis of these preliminary results, it would appear that FDI to Africa has produced a relatively greater effect on economic growth across Africa than regional trade openness.

Perusing the coefficient estimates in *Table 3* reveals that private sector investment to GDP ratio is also a key factor positively and significantly affecting real GDP growth on the continent over the sample period. The coefficient on private sector investment is highly statistically significant across most specifications. On the other hand, increases in the AID to GDP ratio appear to have a statistically significant, negative impact on per capita economic growth supporting previous economic research reporting a negative effect of aid on real GDP per capita growth (Rajan and Subramanian, 2011; Easterly and Williamson, 2011). The ineffectiveness of the policies of aid granting institutions, institutional weaknesses on the part of recipient countries and adverse real exchange rate effects of aid flows are all possible explanations for this phenomenon provided within the literature. It is also noteworthy that some specifications of the model in *Table 3*, appear

to provide some evidence to support the intuition that conflict is bad for growth; confirming *a priori* expectations.

Table 4: Two Stage Least Squares and GMM Estimates: Dynamic Model

Estimation Method	Two Stage Least Square Estimator (Using symmetric Trade openness variables as excluded instruments (i))	Two Stage Least Square Estimator (Using differenced Trade openness variables as excluded instruments (ii))	SYS-GMM Dynamic Estimation (one step) (iii)	SYS- GMM Dynamic Estimation (two step) (iv)
Lagged Dependent Variable	-	-	0.9307*** (0.1382)	0.9887*** (0.09075)
Log Initial GDP(1990)	-	-	0.2434 (0.1724)	0.1149 (0.1623)
Log Trade openness to China	0.0384*** (0.0121)	0.0294 (0.0297)	0.0587* (0.0346)	0.0465** (0.02)
Log Trade openness to USA	-0.0063 (0.0151)	0.0061 (0.0332)	0.0285 (0.0668)	-0.002 (0.0416)
Log Trade Openness to EU	-0.0579 (0.0406)	-0.1521** (0.0641)- 0.0282	-0.1982** (0.0785)	-0.1207** (0.0541)
Log of Trade Openness to ROW	0.0018 (0.0197)	-0.0282 (0.0226)	-0.0322 (0.0424)	-0.0301 (0.053)
Private Sector Investment	0.256*** (0.0906)	0.2472** (0.1151)	0.0618 (0.3816)	0.0800 (0.2587)
Log of Pop. Growth	0.0132 (0.0126)	0.0072 (0.0136)	0.02994** (0.0142)	-0.0317 (0.0347)
FDI to GDP ratio	0.6082*** (0.1376)	0.6881*** (0.1542)	2.292*** (0.7369)	1.8212*** (0.434)
AID to GDP ratio	-0.2343* (0.1421)	-0.1762 (0.1496)	0.2893 (0.3264)	0.2884 (0.1952)
Conflict	-0.0071 (0.0281)	-0.0101 (0.02905)	0.0119 (0.0318)	0.0024 (0.0327)
Polity2	0.0031 (0.0031)	0.0033 (0.0032)	-0.0013 (0.0061)	-0.0013 (0.006)
inflation	-0.0036 (0.0083)	-0.0013 (0.0086)	-0.0224** (0.0109)	-0.0193* (0.0103)
Constant	-0.0257	-0.2429 (0.2354)	-1.281* (0.718)	-0.866 (0.83)
R²	0.2586	0.2335	-	-
Chi-squared	-	-	-	-
Observations	333	333	333	333
AR(1) Arellano Bond test: P value:	-	-	0.047	0.027
AR(2) Arellano Bond test: P Value:	-	-	0.221	0.159
Hansen Test	-	-	0.128	0.131
No of Instruments	20	20	26	26

*For one step GMM the robust estimator of the parameter estimates are calculated and reported

* For two step GMM the robust standard errors are computed having applied Windmeijer's (2005) finite sample correction.

*Year dummies are included in all specifications

Notes: *** means significant at the 1% level

** means significant at the 5% level

* means significant at the 10% level

Recall that across all specifications presented in *Table 3* it is assumed that the regressors are strictly exogenous. However, as discussed earlier, this is not always guaranteed to be the case, and there may in fact be endogeneity within the model in which case an estimation framework is needed which can provide consistent estimates of the coefficients under such circumstances. In light of the possible existence of endogeneity, *Table 4*, presents both two-stage least square and two-step system GMM estimates of the coefficients. In particular, the two stage least squares estimator (utilizing external instruments) and system GMM estimators (utilizing internal instruments) are employed and are presented in columns (i) to (iv) of the table. Columns (i) and (ii) of *Table 4* depict the coefficient estimates from the two-stage least squares estimation.

In column (i), the variables capturing bilateral trade are instrumented by trade openness to each country within the dataset measured from the perspective of the regional trading partner. More concretely, the instruments of bilateral openness in this specification are derived by dividing the sum total of the value of trade flows by the major partner's (US, China, EU) GDP for each country year. Reiterating briefly, the rationale for this specification is that we expect this variable to be correlated to bilateral trade openness; however there is no clear and established, direct theoretical or empirical link between, regional partners' trade-openness and GDP growth in a particular country. This is especially the case for regions such as the EU, US and China since, in each case, bilateral trade with each African country represents but a small proportion of the total trade for these large economies. Coefficient estimates depicted in Column (ii) result from a two-stage least squares estimation procedure using alternative instruments. In particular, the specification employs differenced values of bilateral trade openness as an instrument for the respective bilateral trade variables.

Both instruments are highly relevant as evidenced from first stage regression formulations of the exactly identified models. Remarkably, the coefficient estimates in *columns (i) and (ii)* reveal a

general agreement in the signs and magnitudes of the coefficients across both specifications. More specifically, both formulations produce highly similar, statistical significant and positive coefficient estimates for private sector investment and FDI to GDP confirming earlier results from the fixed effect panel estimates in *Table 3*. Bilateral trade openness to China is positive and highly significant in the model presented in column (i) of *Table 4* whereas the negative and statistically highly significant coefficient can be observed on the bilateral trade openness variable for Europe in column (ii).

As a final robustness check, we explore the relationship between bilateral trade openness and real per capita GDP growth using the system GMM method. This method also controls for endogeneity and feedback effects between bilateral trade openness and real GDP growth per capita. One key feature of this method is that it allows for instruments to be selected from within the model. In addition, the validity of the moment conditions can be inferred using statistical tests due to Sargan (1958) and Hansen (1982). The latter option is not feasible in the two-stage least squares framework given that, in this case, the two stage least squares formulations are exactly identified. *Columns (iii) and (iv) of Table 4* depict coefficient estimates for one and two stage system GMM models respectively. In these models the both the bilateral trade openness and AID to GDP ratio are treated as endogenous variables while the lagged dependent variable is treated as predetermined. Note that an extra observation for each country is lost due to the inclusion of the lagged dependent variable.

Both system GMM estimations confirm the positive effect on Africa's bilateral trade with China on GDP growth per capita. The signs and significance of the coefficient estimates on the bilateral trade openness variables concur with the earlier specifications. The model also confirms that FDI flows into Africa was the major contributing factor to the growth episode observed over the review period. The GMM estimates show - consistent with growth theory and the earlier specifications - that private sector investment share had a positive and significant effect on

economic growth. On the other hand bilateral trade with the EU had a statistically significant, negative effect on real per capita GDP growth. In general therefore the findings appear robust across both static and dynamic formulations of the model.

Evidence across various specifications in our analysis suggests that over the 1990-2009 sample period examined, the turnaround observed in the growth fortunes of African economies can be traced to a combination of factors namely: an increase in FDI, private investment and openness to trade. It is also important to note that while the estimation results reveal that FDI and private investment played the most significant role in Africa's growth turnaround bilateral trade also played, albeit a smaller, but also significant contributory role. In particular, the results reflect the fact that significant increase in bilateral trade with China coinciding with China's economic expansion over the period, had positive real growth effects on Africa.

The negative coefficient on bilateral trade openness with the EU which emerges across fixed effects, and both static and dynamic instrumental variables specifications is possibly supportive of prior research that point to the inability of African nations to fully take advantage of special trade relations due to productive capacity mismatch supply constraints and weak administrative structures. Kohnert (2008) remarks that certain EU trade preferences with restrictive rules of origin have not delivered the intended tangible impacts on growth, especially where such domestic bottlenecks prevail. Moreover, despite decades of preferential treatment granted by the EU, African exports are locked in oil and minerals, suggesting a lack of diversification which in turn hampers growth. Xenellis (2009), for example, reports that in 2008, 62% of Africa's total export value to the EU was in 'Mineral fuels' whereas 'Manufactured goods' and 'Food and live animals' exports amounted to only 9% and 8% respectively.

However it is also important to re-emphasize that the measure of bilateral trade openness employed within this paper – derived by normalizing trade values by GDP- are not a precise measure of trade policy *per se*, but instead represent an outcome variable representing an amalgam

of microeconomic, macroeconomic and policy factors influencing trade flows. In light of this, appropriate caveats apply.

7. Robustness Checks

Additional estimation results from robustness checks performed on the data using the empirical model are presented in Tables 5a and 5b below. Table 5a presents panel fixed effect regression results performed on sub - samples of interest which test the robustness and validity of earlier findings. Table 5b presents two-step System GMM results using the key sub-samples. For example, Column (i) of Table 5a depicts results of the model estimated on a subsample of resource-rich countries. The International Monetary Fund (IMF) defines a country to be 'resource-rich', when exports of non-renewable natural resources such as oil, minerals and metals account for more than 25% of the value of the country's total exports (Lundgren et al., 2013).

The list of resource-rich countries within the dataset is annotated in Table 1 and coincides closely with the list provided by Lundgren et al. (2013) for Africa. Column (i) of Table 5a reveals a negative coefficient on the initial GDP per capita variable from which it can be inferred that countries resource rich countries with relatively higher initial GDP in 1990 tended to grown relatively more slowly than resource-rich countries which, in 1990, had low GDP per capita at that time. Interestingly, bilateral trade with China appears to have positively impacted real economic growth per capita for resource rich countries confirming earlier results from both static and dynamic estimations on the full sample.

Another observation from this column is the negative sign on the coefficient on the bilateral trade with EU variable. Again, this result corroborates earlier findings from the estimations carried out on the full sample displayed in Tables 3 and 4 above. Also consistent with earlier results, we find that the coefficient on FDI has a positive sign and is highly statistically significant. This result, once aagain, underlines the important role played by FDI on economic growth, not only when the

Table 5a: Robustness Checks: Fixed Effects

Estimation Method	Fixed Effects Res.- Rich (i)	Fixed Effects Non –Res. Rich (ii)	Fixed Effects Landlocked (iii)	Fixed Effects Not Landlocked (iv)	Fixed Effects Sub- Saharan (v)	Fixed Effects Non–Oil Prod. (vi)	Fixed Effects Oil Prod. (vii)
Log Initial GDP(1990)	-0.1321** (0.061)	0.0046 (0.042)	-0.0862** (0.0413)	0.0322 (0.0726)	-0.0753 (0.0633)	-0.102*** (0.0333)	-0.1748** (0.0721)
Log Trade openness to China	0.0534** (0.0216)	0.0169 (0.0103)	0.0317** (0.0140)	0.0542*** (0.0187)	0.0367*** (0.0122)	0.0246** (0.0116)	0.0679** (0.0258)
Log Trade openness to USA	-0.006 (0.025)	0.0025 (0.0121)	-0.0014 (0.0165)	0.0025 (0.0222)	-0.0117 (0.0142)	-0.0005 (0.0129)	-0.0036 (0.0303)
Log Trade Openness to EU	-0.0133*** (0.045)	-0.0337 (0.0293)	-0.0015 (0.3911)	-0.1176*** (0.0379)	-0.0789*** (0.02842)	-0.0319 (0.025)	-0.1529** (0.0704)
Log of Trade Openness to ROW	-0.0243 (0.02)	0.0591** (0.0293)	0.03912 (0.0414)	-0.0186 (0.0173)	-0.0084 (0.0126)	0.01467 (0.0142)	-0.0086 (0.0352)
Private Sector Investment	0.1978 (0.161)	0.3787*** (0.1107)	0.3366** (0.1368)	0.1809 (0.1163)	0.2842*** (0.092)	0.3269*** (0.105)	0.1996 (0.1808)
Log of Pop. Growth	-0.0246 (0.022)	0.0258** (0.0118)	0.0102 (0.0160)	-0.0065 (0.0188)	0.0082 (0.1259)	0.0154* (0.009)	0.1142 (0.1537)
FDI to GDP ratio	0.612*** (0.1703)	0.207 (0.3648)	0.3549 (0.2982)	0.6551*** (0.1543)	0.6325*** (0.1352)	0.3476 (0.3787)	0.5736*** (0.1843)
AID to GDP ratio	0.2096 (0.2852)	-0.5456*** (0.1171)	-1.095*** (0.2428)	0.0751 (0.0751)	-0.1608 (0.1424)	-0.6182*** (0.129)	0.3076 (0.3229)
inflation	-0.0116 (0.0128)	0.0061 (0.0083)	0.1316 (0.0104)	-0.0063 (0.0113)	-0.004 (0.0085)	-0.0003 (0.0081)	-0.0038 (0.01571)
Conflict	-0.0182 (0.0406)	-0.0146 (0.0336)	-0.0218 (0.0402)	-0.0122 (0.0378)	-0.00617 (0.0286)	-0.0296 (0.0265)	0.01385 (0.06)
Polity2	0.0082 (0.0049)	0.0003 (0.0032)	-0.0044 (0.0048)	0.0046 (0.0041)	0.0029 (0.0032)	-0.0032 (0.003)	0.0146** (0.0064)
Constant	0.8083 (0.4503)	0.122 (0.2776)	0.8972 (0.385)	-0.4103 (0.5283)	0.351 (0.4667)	1.024*** (0.2742)	0.9831* (0.531)
R²	0.5049	0.5402	0.5739	0.4843	0.4563	0.46	0.5473
Observations	180	153	99	234	306	207	126

Notes: *** means significant at the 1% level
 ** means significant at the 5% level
 * means significant at the 10% level

full sample is considered, but also when the model is estimated on the sub-sample of resource-rich countries in Africa over the period 1990 – 2009.

The coefficient results and statistical significance of the coefficients in *column (ii)* imply a contrast in the economic characteristics and outcomes of resource rich and non-resource rich African countries. For the latter group, initial GDP per capita and bilateral trade with the EU, USA and China appear to have been less importance in influencing real growth per capita outcomes. By way of contrast, FDI appears to have been the major positive contributor to economic growth for

this country group while the coefficient on the variable capturing bilateral trade with the rest of the world is positive and statistically significant. On the other hand, the coefficient on foreign aid is negative and statistically significant implying that AID in resource-poor countries may not be growth inducing. The differences in the sign and significance of the coefficient estimates when the empirical model is applied to the subsamples of resource-rich and non-resource-rich African countries highlights the heterogeneity in economic endowments, interactions and outcomes within the sample of African countries.

Fixed effect results of coefficient estimates for the sub-sample of landlocked African countries and those countries which are not landlocked are presented in *columns (iii) and (iv) of Table 5a*. The result shows that across both subsamples the increase in bilateral trade with China, as measured by trade openness had a positive and statistically significant effect on growth in real GDP per capita over the period. Despite similarities in this regard, the results again reveal differences across country groups, with FDI to GDP ratio representing a positive factor affecting economic growth for countries not within the landlocked category. Moreover, the negative and statistically significant coefficient on the variable capturing bilateral trade with the EU is also evident for non-landlocked countries. The coefficient expressing the relationship between foreign aid receipts and real economic growth per capita is also negative and significant for non-landlocked countries with the negative sign on the initial GDP per capita variable for this country subsample implying a general pattern of convergence of the years 1990 to 2009. Results for landlocked countries in *Table 5a* show that initial GDP growth was negatively related to economic growth over the period and savings was a positive contributor to real GDP growth per capita within the subsample.

Column (v) of Table 5a reveals coefficient estimates for countries classified as Sub-Saharan African countries. It should be noted that the estimation sample used for this paper contains only three North African countries – namely: Mauritania, Egypt and Tunisia. The historic, cultural, economic and demographic distinctions between North African and Sub-Saharan African

countries are well known. The estimated coefficient signs and levels of significance for the Sub-Saharan subsample prove to be relatively robust in light of findings on the wider sample. The estimated coefficients on bilateral trade openness with China, private savings as a percentage of GDP along with the FDI to GDP ratio all suggest that these variables are positive and statistically significant factors affecting growth. On the other hand bilateral trade with the European Union appears to have the opposite effect on real GDP growth.

The final two columns of *Table 5a* show estimation results on subsamples for oil producing and non-oil producing African countries. The results reveal that, for both groups, initial GDP per capita is statistically significant and positively related to real GDP per capita growth rates; implying divergence in growth outcomes within each groups over the sample period. Secondly we observe a statistically significant effect of bilateral trade with China on real economic growth across both sub-samples. Notably the coefficient is higher in the case of oil-producing countries indicating a relatively larger positive effect in the oil-rich countries. This mirrors earlier findings for the resource-rich subsample of countries, in that, the coefficient on the bilateral trade openness with China variable was also relatively higher to the base category for this subgroup. These findings imply that bilateral trade with China has tended to benefit oil exporters and resource-rich countries in terms of real growth in GDP per capita. Interestingly, a statistically significant, negative coefficient is returned on bilateral trade with EU variable for oil-producing countries mirroring the effects found in the sub-sample of resource rich countries. The importance of FDI to GDP ratio and private savings ratio to real per capita economic growth is underlined by positive and statistically significant coefficients in both the oil-producing and non-oil-producing sample of countries.

Oil-producing countries which have strong political institutions have grown faster on average over the sample period. On the other hand, countries not producing oil which are recipients of

Table 5b: Robustness Checks: Two-Step System GMM

Estimation Method	System GMM (i) Dynamic Estimation (Two-Step) Res.- Rich (i)	System GMM (ii) Dynamic Estimation (Two-Step) Non -Res. Rich (ii)	System GMM (iii) Dynamic Estimation (Two-Step) Landlocked (iii)	System GMM (v) Dynamic Estimation (Two-Step) Non-Northern (iv)	System GMM (vi) Dynamic Estimation (Two-Step) Non -Oil Prod. (v)	System GMM (vii) Dynamic Estimation (Two-Step) Oil Prod. (vi)
Lagged Dependent Variable	0.8809*** (0.3733)	0.9029*** (0.201)	0.9510*** (0.0622)	0.919*** (0.0683)	0.9123*** (0.239)	0.7428*** (0.0947)
Log Initial GDP(1990)	0.131 (0.1701)	0.1376 (0.2157)	-0.045 (0.0571)	0.054 (0.0673)	0.0345 (0.1244)	0.1946 (0.1369)
Log Trade openness to China	-0.0025 (0.0578)	0.0029 (0.0253)	-0.001 (0.0137)	0.0287 (0.0231)	0.0385** (0.0176)	0.2232 (0.377)
Log Trade openness to USA	0.022 (0.1246)	0.0619** (0.0237)	-0.041 (0.0363)	-0.0374 (0.028)	0.1041 (0.1145)	-0.1446 (0.168)
Log Trade Openness to EU	-0.1464 (0.1953)	0.0003 (0.1266)	0.0314 (0.0824)	-0.0719 (0.0872)	0.1429 (0.2446)	0.1929 (0.3017)
Log of Trade Openness to ROW	-0.092 (0.0783)	0.0202 (0.0746)	0.0045 (0.009)	-0.0351 (0.0302)	0.0033 (0.0708)	-0.792 (1.328)
Private Sector Investment	0.8656** (0.4565)	-0.0251 (0.1589)	0.5446*** (0.1883)	0.4896** (0.21)	0.2811 (0.6041)	1.227** (0.519)
Log of Pop. Growth	-0.0386 (0.0358)	0.0797** (0.0394)	-0.0256 (0.019)	0.0006 (0.0351)	0.0525*** (0.0183)	-0.4453 (0.6753)
FDI to GDP ratio	1.082** (0.4627)	-0.2037 (0.797)	0.6416** (0.246)	1.0213*** (0.2025)	1.6019 (2.669)	1.0974*** (0.3191)
AID to GDP ratio	0.4499 (0.9886)	-0.0437 (0.1521)	-0.1065 (0.299)	0.1608 (0.3391)	-0.4049 (0.9378)	1.102 (1.729)
inflation	-0.1203 (0.0195)	0.0143 (0.0236)	-0.0077 (0.0091)	-0.0077 (0.0066)	0.0102 (0.0122)	-0.0186 (0.0297)
Conflict	-0.0027 (0.0994)	-0.0187 (0.1324)	-0.0315 (0.0228)	-0.0178 (0.0244)	0.0621 (0.1156)	-0.099 (0.0891)
Polity2	0.0019 (0.0127)	-0.0051 (0.0068)	0.0057 (0.0046)	0.00002 (0.0033)	0.00003 (0.0037)	-0.0016 (0.0102)
Constant	-0.5981 (2.1351)	-	0.587 (0.4632)	-0.068 (0.382)	1.285 (2.252)	-
Chi-squared	10.27	5.65	14.05	9.95	3.96	2.05
Observations	180	153	234	238	207	126
AR(1) Arellano Bond test: P value:	0.162	0.059	0.081	0.040	0.108	0.494
AR(2) Arellano Bond test: P Value:	0.315	0.814	0.332	0.238	0.919	0.496
Hansen Test	0.114	0.227	0.230	0.354	0.27	0.152
No of Instruments	20	17	25	33	17	14
Countries	20	17	26	34	23	14

*For one step GMM the robust estimator of the the parameter estimates are calculated and reported

* For two step GMM the robust standard errors are computed having applied Windmeijer's (2005) finite sample correction.

*Year dummies are included in all specifications

Notes: *** means significant at the 1% level

** means significant at the 5% level

* means significant at the 10% level

significant aid tend to experience relatively inferior economic outcomes than other countries within that sub-sample.

Table 5b depicts two-step System GMM coefficient estimates of the model on the respective sub-samples when endogeneity of the trade variables are taken into account. It is noteworthy that across alternative similar results were obtained. The columns of the *Table 5b* correspond directly to the subsamples. The lagged dependent variable is significant across all specifications which suggests the autoregressive nature of growth outcomes in all subsamples over the sample period.

The second observation from *Table 5b*, is that both private savings and FDI as a percentage of GDP are the two most important variables driving real per capita growth across all specifications. These variables are correctly signed across all specifications and in most cases statistically significant across the subsamples considered; corroborating earlier findings. Bilateral trade openness variable however is only statistically significant at the 5% level in the non-oil producing countries subsample. This result indicates that in smaller subsamples, when endogeneity is taken into account the effect of bilateral trade – though evident is less robust than within the full sample. Population growth has also has a positive and statistically significant effect across countries which are not resource rich and are not oil producers.

Table 5c depicts fixed effect and two- step System GMM results for the model estimated for the subsamples of the data before 2001 and post 2001. The sub-samples were chosen to take into account into account the date of China's accession to the WTO; the 11th of December 2001. Although coefficient signs are fairly robust across all estimations, the statistical significance of the coefficient estimates differs across both subsamples. For example, before China's accession to the WTO, both fixed effect and dynamic GMM estimates suggest that private sector investment played a major role in real per capita growth in Africa. On the other hand, negative and

Table 5c: Robustness Checks: Two-Step System GMM

Estimation Method	Fixed Effects Before WTO Accession (i)	Fixed Effects After WTO Accession (ii)	System GMM Dynamic Estimation (Two-Step) Before WTO Accession (iii)	System GMM Dynamic Estimation (Two-Step) After WTO Accession (iv)
Lagged Dependent Variable	-	-	0.6443** (0.246)	0.7035*** (0.1863)
Log Initial GDP(1990)	-0.3623*** (0.0823)	-0.0397 (0.117)	0.3269 (0.2433)	0.2165 (0.1841)
Log Trade openness to China	0.01560 (0.0169)	0.0934*** (0.0284)	0.016 (0.018)	0.0405 (0.0528)
Log Trade openness to USA	0.0242 (0.0264)	-0.01728 (0.0215)	-0.0082 (0.0187)	-0.0405 (0.0528)
Log Trade Openness to EU	-0.01047** (0.049)	-0.0224 (0.0579)	-0.0175 (0.0397)	-0.0402 (0.0458)
Log of Trade Openness to ROW	0.0248 (0.0275)	-0.006 (0.0245)	-0.0213 (0.063)	-0.0698 (0.0817)
Private Sector Investment	0.5474*** (0.15519)	0.4683** (0.196)	0.685*** (0.196)	0.6288 (0.5188)
Log of Pop. Growth	-0.0046 (0.0156)	0.0672 (0.0867)	-0.0297 (0.0212)	-0.081 (0.1414)
FDI to GDP ratio	0.2673 (0.2352)	0.6384** (0.2465)	1.0546*** (0.254)	1.117** (0.4997)
AID to GDP ratio	-0.426** (0.1863)	0.2513 (0.3687)	0.1678 (0.1414)	-1.5404* (0.8673)
inflation	-0.004 (0.0012)	0.0059 (0.0134)	-0.021* (0.0113)	-0.01404 (0.0310)
Conflict	0.0367 (0.0488)	-0.0328 (0.0399)	-0.07* (0.0348)	0.0377 (0.639)
Polity2	0.0002 (0.0046)	0.002 (0.01)	-0.0003 (0.0032)	-0.0005 (0.0076)
Constant	2.447 (0.5872)	0.1645 (0.8487)	0.1433 (0.2646)	0.186 (1.5203)
R²	0.5427	0.5688	-	-
Chi-squared	-	-	1.73	1.82
Observations	185	148	185	111
AR(1) Arellano Bond test: P value:	-	-	0.124	0.155
AR(2) Arellano Bond test: P Value:	-	-	0.369	0.178
Hansen Test	-	-	0.421	0.178
No of Instruments	-	-	16	15
Countries	37	37	37	37

*For one step GMM the robust estimator of the parameter estimates are calculated and reported

* For two step GMM the robust standard errors are computed having applied Windmeijer's (2005) finite sample correction.

*Year dummies are included in all specifications

Note s: *** means significant at the 1% level

** means significant at the 5% level

* means significant at the 10% level

statistically significant coefficients are observed on the the aid to GDP ratio for the “Before” fixed effect estimate in column (i) and in the “after” dynamic estimate in column (iv), indicating that the finding is not as robust. In a similar vein, column (ii) of *Table 5c* reveals that Africa’s bilateral trade with China has played a positive and statistically significant effect on real GDP per capita growth in the fixed-effect specification. A positive and statistically significant coefficient is not returned in any other specification, implying that the finding is also not a robust one.

Overall the two-step system GMM results provide robust support for the positive effect of savings and foreign direct investment (as a percentage of GDP) on real growth outcomes. It can also be inferred from the dynamic estimates that conflict and inflation impacted real GDP growth per capita negatively, especially pre-2001.

In general, therefore, when both fixed effect and dynamic system GMM estimation are applied to subsamples of the dataset corresponding to the date of China’s accession to the WTO the results confirm the key role played by savings and foreign direct investment in Africa’s positive growth outcomes over the review period. This finding suggests that it was primarily internal factors, rather than the external influence of increased bilateral trade, that was the critical driver of the growth realized on the continent. Foreign direct investment also appears to have played a key role. Bilateral trade with regional partners does not appear to have played such a significant role. Where the estimation results, suggest a statistical significant role via the effects of bilateral regional trade, the bilateral partner with whom trade appears to have affected growth is China, but the results are not robust across specifications and all sub-samples when subsamples are chosen taking into account the date of China’s accession to the WTO.

8. Discussion

It is useful to compare our findings with existing studies from the literature examining the impact of trade on growth in Africa. A certain degree of caution and scepticism should be exercised in

establishing direct comparisons between earlier research papers and the results we present here. In particular, differences in i) the sample period analysed, ii) the actual countries included within the estimation sample, iv) the variables (or information) included within the empirical model and the measurement of such variables, v) the frequency of the variables employed to carry out the analysis and vi) the estimation methods and model specification are only a few reasons why direct comparison between empirical results cannot be made.

Of the recent research papers on trade and growth in Africa, the review period analysed and the methodological approach of Busse et al. (2016) is similar to the approach of this paper. The significance of trade in affecting the growth outcomes of African countries is a finding common to both papers. This is especially the case for countries which are natural resource exporters – a finding corroborated by the fixed effect estimates produced in Section 5. Busse et al. (2016) that the growth effects differ depending in whether import or export flows are considered. Busse et al. (2016) conclude that FDI and AID play a less significant role in Africa's growth than is robustly confirmed in this paper. The literature has pointed to, *inter alia*, institutional weakness on the part of recipient countries and sub-optimal donor practices as factors inimical to the effectiveness of aid. These authors also find very little evidence in support of the hypothesis that rest of the world trade with China has had a positive effect on real economic growth in Africa over the period, again consistent with our findings.

Brückner and Lederman (2012) employ a two-stage least squares strategy using an unbalanced panel containing annual data for a similar sample of 40 Sub-Saharan African countries over the period 1980-2009 to test the hypothesis that trade causes growth in Sub-Saharan Africa and find strong, positive evidence of both long and short run effects. Chang and Mendy (2012) use a panel fixed effect estimation strategy on sample of 36 African countries over the period 1980-2009 and also conclude that openness and FDI both positively and significantly influence economic growth in Africa. This result concurs with our findings. Finding mixed results on signs of aid and

investment, however, the authors conclude that these variables positively affect growth conditional on whether there are complementary growth-inducing policies in place within the specific countries or region of Africa being examined. Balamoune-Lutz (2011) also investigate the hypothesis that “where you export matters” using 1995-2008 data from a smaller subset of African countries and suggests an inverted “U-shape” function relating exports to developed countries and economic growth in Africa. The study concludes, like this paper, that trade diversification across partners may be beneficial for growth. In general therefore, while the finding that China’s trade with Africa appears to be a significant driver of economic growth is robust across the majority of studies; there appears still to be disagreement regarding the channels through which the effects are expressed. The results provided in this paper highlights the fact that openness to China had stronger growth effects for resource-rich and oil exporting African countries, corroborating an earlier findings by Busse et al. (2016) and Drummond and Liu (2013),.

The fairly robust empirical finding that EU trade with Africa has negative growth effects must be examined within the context the economic literature. Using a structural gravity model Cipollina, Debucquet and Salvatici (2017) find a “minor impact of EU preferential trade policies trade flows”, although the authors admit that certain complex interactions are not captured by their model. Similar results were also found by Gradeva and Martínez-Zarzoso (2016) Davies and Nilsson (2013) who specifically considered the everything-but arms (EBA) agreement and find that EBA- eligible countries realize relatively lower exports.

The growth deterring effect of EU-Africa trade corroborates conclusions from the literature that EU preferential schemes were not as successful in fostering trade between EU and Africa. Strict rules of origin of EU schemes appear to have a negative effect on both utilisation rates and total aggregated trade flows. While the objective PTAs is to facilitate trade, the costs of complying with rules of origin often act as a trade barrier and can even outweigh the benefits of the tariff reduction (Naumann, 2013). The weight of evidence also suggests the stifling of export diversification by

EU preferential trading arrangements. A highly concentrated export structure can be growth reducing as it carries a number of risks namely, high exposure to external economic shocks, increased volatility in market prices resulting in export instability and lower investments by risk-averse firms and inability to forge new linkages in the domestic economy via network effects between sectors (Hesse, 2008¹⁵; EC, 2015;).

Compared to EU's GSP schemes (including EBA), AGOA has more liberal rules of origins. Most studies have found a positive effect of this agreement in enhancing trade between USA and Africa, yet our results show that trade with US did not have growth enhancing effects. As suggested by Brenton and Hoppe (2006) while US AGOA preferences might have increased trade the more significant constraints on trade relate to domestic supply side constraints, poor infrastructure, and weak policy environments (see also Frankel 2010, Hoekman and Ozden 2006, and Edwards and Lawrence 2010). Moreover, Ozden and Rienhardt (2004) argue that GSP schemes can discourage countries from undertaking domestic liberalisation, and that the uncertainty regarding the duration of GSP regimes can discourage investment. They find that countries' export performance improved once they were no longer part of the US' GSP scheme.

Trading with an economic giant such as China could be detrimental to growth of smaller economies in many respects. Many African nations, being heavily dependent on resource exports are susceptible to the Dutch disease due to a rise in demand from China, rendering other export activities less competitive (Zafar, 2007). With an influx of cheaper Chinese manufactures, many African firms could be displaced from the domestic market (Broadman, 2007) as well as third markets (Giovannetti and Sanfilippo, 2009). Our results however point to a pro-growth effect of the Sino-African trade, suggesting that these negative effects are countered by other beneficial transmission channels identified in the literature. Zafar (2007) notes that China's demand for

¹⁵ See Hesse (2008) for a review of the export diversification led growth.

natural resources to fuel its growth contributed to an upward swing in prices and gave a boost to SSA's real GDP. He further observes that consumers in Africa could benefit from imports of low-cost manufactured goods from China, allowing them to increase the variety of consumer goods available to them. Additionally, producers can incorporate more affordable capital goods from China into their production processes (He, 2013; Anderson et al., 2015). Broadman (2007) links the imports of machinery and equipment to the heavy presence of Chinese investment in African countries, which not only propelled African trade into cutting edge multinational networks but also contributed to a rise in GDP. As noted by Anderson et al. (2015), relocation of Chinese exporters to Africa in the context of rising labour costs in China has the potential to significantly boost economic activities in Africa and improve linkages with the global economy. The findings of the current paper, therefore, appear to be consistent with previous results from the economic literature.

The fairly robust empirical results of this paper appear to support the hypothesis that foreign aid can be negative for economic growth, is supported by Young and Sheehan (2014) who provide recent evidence using a 166 country dataset that aid can undermine institutions essential for economic growth and development. Dreher et al. (2016) also report that aid tied to geopolitical rather than purely developmental motives can have insignificant or even negative implications for growth.

9. Conclusion

This paper investigates the main factors driving the recent growth episode in Africa over the period 1990-2009. This study extends the literature in two main ways. Firstly, it clarifies the effect of trade outcomes on Africa's growth by disaggregating the trade openness variable to account separately for Africa's openness with its four main trading partners: China, USA, the EU and the rest of the world (ROW). This method allows us to observe and highlight the changing dynamics in bilateral trade flow values normalized by GDP between Africa and three major economic

players in the world economy. Secondly, while normalized trade flow values are a crude measure of trade policy and is inherently a measure of trade outcomes, the measure still allows us to identify, the relative strength and importance of bilateral trade outcomes, among other regressors identified within the empirical growth literature, in contributing to Africa's growth turnaround over the review period.

Notwithstanding the careful modelling of trade openness by disaggregating trade flows to each African country by major bilateral trading regions, the empirical results identify private sector investment and foreign direct investment as the chief drivers of economic growth in Africa over the review period 1990 – 2009; confirming the results of earlier empirical studies (Sala and Trivín, 2014; Adams, 2009). The finding that private investment and foreign direct investment were the primary drivers of real economic growth in Africa over the review period remain robust across a variety of fixed effect, dynamic system GMM estimations. Furthermore, this result also robustly holds across sub-samples of resource-rich, landlocked, Sub-Saharan and oil-producing countries. Relatively weaker, but nonetheless, statistically significant effects related to bilateral trade with major trading partners are also evident across some specifications. Among the three major trading partners modelled, positive coefficients and statistical significance of the coefficient are most often associated with Africa's bilateral trade with China than is the case for the coefficient on bilateral trade variables capturing bilateral trade with America and Europe after controlling for a variety of institutional and other economic factors.

The statistically significant, positive effect of bilateral trade openness with China on real economic growth in Africa holds in sub-samples of resource-rich, landlocked and non-landlocked, oil and non-oil producing African countries within a fixed effect estimation framework but is not as robust in specifications accounting for endogeneity. It is important to note here, however, that the trade openness measure employed in this paper is an outcome variable and not a measure of trade policy *per se*, since the sum of imports and exports normalized by GDP captures the effect of

policy but also a mix of complex demand and supply side factors affecting trade. In sum, therefore the empirical results reflect that China's rise as an engine of growth for the global economy, including its significantly expanded, resource-driven, bilateral trade with Africa has impacted economic growth. It is important to emphasize however that, for the most part, the growth story in Africa was primarily driven induced by investment supported by a mix of institutional reforms that attracted FDI and increased private sector investment. In fact, the combination of foreign and domestic investment could have served as a driver for trade as stated by Wacziarg and Welch (2003) which raises the question as to whether the growth effects on African economies from bilateral trade with China could be a transitional phenomenon resulting for China's recent increased integration within the global economy. One could also argue that with the expansion of production networks around the globe, the "country origin" of trade has become more blurred. Moreover, China not only hosts a number of multinational firms but is also the 'final link' in the global production chain, engaging in significant trade in intermediate goods. Africa's traditional trade partners may therefore exert an indirect effect on its growth through China.

Another key dimension highlighted by the empirical analysis is that nature of the Africa's bilateral trade. Recalling that a significant proportion of Africa's exports to China are of an extractive nature, it is perhaps not too surprising that most countries in Africa appear to have benefitted in one way or another from high commodity demand from the rising giant, a wider variety of cheap consumer goods sourced from China and more affordable capital goods that could be embedded in their domestic production processes. Higher imports of capital goods are also closely linked to considerable investments by Chinese multinationals in a number of African countries. Will Africa's bilateral trade with China produce sustainable and long run growth on the continent? This is a salient question which is not directly addressed within this paper. Bresnahan et al. (2016)

however use firm level data for Africa to suggest that the effect of trade on productivity growth and thereby long run growth in Africa may well differ by sector and by country.

The negative marginal effect of bilateral trade openness to the EU on real per capita GDP growth in Africa is somewhat puzzling, against the background of the system of preferential access granted the African economies over the review period. The result appears to slightly contradict earlier findings by Cicera et al. (2016), European Commission (2015) and Manchin (2006) which indicate that EU trade preferences have led to induced increased developing country exports to the EU and that even when ACP trade shares to the EU fall, the decline would have been even bigger in the absence of trade preferences. On the other hand, none of these studies consider a full sample of African countries only. Moreover, studies by Cipollina, Debucquet and Salvatici (2017) Gradeva and Martínez-Zarzoso (2016) and Davies and Nilsson (2013) provide results which seem to directly corroborate the empirical results found within this paper. Strict rules of origin and other compliance costs may have hampered both export expansion and diversification.

US-African trade preferences, characterised by softer rules of origin, have been linked to higher African exports to the US. However, the possibility that domestic constraints such as weak institutional and policy framework, may have prevented the beneficial impacts to be fully transmitted to the wider economy. The economic literature has identified supply side constraints and poor policy environments on the continent (Frankel 2010) as possible factors leading to this result. It is also important to note that the measure of trade openness used in this paper: normalized values of the value of trade (imports plus exports) divided by exports is still a rather crude measure, despite its widespread use in empirical analyses of this nature. It this cannot be interpreted as a policy variable per se since it is an outcome variable representing a confluence of factors (including trade policy factors) which could influence real growth.

In addition, our results imply that, *ceteris paribus*, Africa has been gaining even more through growth through foreign direct investment and savings than through its trade policy. This implies

that implementing further policies which encourage increased FDI and domestic savings and strengthening institutions which facilitate the efficient allocation of these resources to productive enterprises throughout the economy should be growth inducing for Africa.

Finally, it is important to note that while recent growth outcomes have been positive and encouraging for the continent it must be borne in mind that, by implication, African economies are highly susceptible to any reversal in recent trends in their bilateral trade with China. Furthermore the interrelationships between bilateral trade outcomes and economic growth may uniquely hold over the specific review period. More importantly, on the basis of our results, a potential slowdown which adversely affects savings and foreign direct investments could negatively impact growth prospects on the continent. The specific circumstances of each African country should be carefully and judiciously regarded for policy formulation; including the prospects for industries and business to participate in the global value chain, to take advantage of opportunities created by the new patterns and structures of international trade. Policy-makers, therefore, need to ensure that foreign direct investment and domestic savings are available to be directed to sectors within African economies that can help to diversify their exposure to shocks in the global economy to which oil and other resource sectors are so susceptible. A failure to harness domestic and foreign investments and to diversify in the product and partner space poses some risk of a return to the poor growth outcomes of prior decades. Finally, given that this paper primarily adopts an empirical approach, there is still scope for the application of theoretical modelling techniques to underpin the analysis. Testing for the “growth by destination” hypothesis using a theoretical approach, therefore still remains fertile grounds for possible future research.

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