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Journal of Economics and International Finance

Full Length Research

Sectoral Aid for Trade and sectoral export performance in East Africa

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The study set out to evaluate the relationship between sectoral Aid for Trade (AfTS) and sectoral exports within East Africa – represented by the East African Community partner states including Burundi, Kenya, Rwanda, Tanzania and Uganda. The Estimation method used was the Seemingly Unrelated Regression Equation (SURE) model. The SURE estimation results show a positive significant relationship between AfTS and exports from the agriculture, manufacturing and services sectors in the East Africa Region, implying that the initiative has and continues to foster the growth of exports from the region. This relationship however is inelastic, implying that percentage increases in aid disbursed lead to smaller percentage increase in sectoral exports. The results also show a highly significant, positive and elastic relationship between value addition and exports. Other regressors like regulatory quality and corruption control also show a higher impact on exports than AFTS. This shows that while AfTS can contribute to improved export performance, improvements in value addition, the quality of the regulatory environment, and the level of corruption control are equally or even more important in facilitating export growth. From the correlation coefficients between the sectors, all the three sectors are positively correlated. It can also be seen that the greatest correlations exist between the manufacturing sector and the agriculture sector, which could be because the countries in the study – from East Africa are mainly agriculture exporters, with a lot of inputs feeding from the agriculture sectors to the manufacturing sectors.

Key words: Aid for trade, sectoral exports, seemingly unrelated regression model.

INTRODUCTION

The Aid for Trade (AfT) initiative was instituted at the 2005 Hong Kong Ministerial Conference, as a funding mechanism specifically to trade and trade-related activities, to boost trade in developing countries and least developed countries (LDCs). During the WTO Doha round of negotiations that commenced in 2001, of major concern especially to the trade ministers from developing and LDCs was that despite their countries opening up to trade, they were not reaping the expected benefits of such liberal trade initiatives as had been postulated by

the world bank and IMF. According to Stiglitz and Charlton, 2006), the World Bank and Organisation for Economic Co-operation and Development (OECD) published estimates of large welfare gains to be made from liberalizing trade, a large share of which – approximately 70%- would accrue to poor countries. These gains were to the tune of between US$ 200-US$ 500 billion per year; instead, countries were hemorrhaging funds.

UNDP (1997), (cited by Stiglitz and Charlton, 2006) places the estimates of the loss made by sub-Saharan Africa as a result of the Uruguay round at US$ 1.2 billion; Finger and Schuler (2000) estimated that it would cost each developing country US$ 150 million to cover just three implementation costs- Trade Related aspects of Intellectual Property rights (TRIPS), sanitary and phytosanitary measures and customs valuation, while, according to Stiglitz (2005), it was estimated that the 48 LDCs had lost a total of US$ 600 million a year as a result of the Uruguay round. Laird and Messerlin (2003) reported that after the implementation of the Uruguay round, it was estimated that on average, tariffs of the OECD on imports from developing countries were four times higher than those on imports from the OECD.

In addition, many countries, for example in Africa were failing to take up and therefore benefit from market opportunities that had been offered like the Africa Growth and Opportunity Act (AGOA) by the United States of America, that was established in 2000, Everything But Arms (EBA) by the European Union that came into force in march 2001, and other such multilateral trading agreements, because, they lacked the funds needed to implement the agreements and also to invest in order to produce the caliber and quantity of goods that would meet the criterion specified in the trading opportunities.

As a possible solution to these problems, the AfT initiative was introduced at the 2005 Hong Kong Ministerial Conference as a funding mechanism targeting developing countries and LDCs, to enable them deal with the barriers - especially from the supply side that inhibit their being able to transform the resources that they have into exportable products and/or of a higher quality than what was being exported; to boost their productive capacity, thereby increase their participation and integration in the multilateral trading system. Whereas, aid towards trade and trade related activities is not a new phenomenon and has in fact been disbursed since the advent of aid. The initiative dubbed AfT is fairly recent, having been launched in 2005 at Hong Kong WTO Ministerial Conference. The AfT task force, which was instituted to operationalize the AfT fund, took lead in calling for periodic evaluations, and the WTO/OECD produces biannual reviews of the same; six reports have since been produced, that is in 2007, 2009, 2011, 2013, 2015 and 2017, each under a different theme. The taskforce also identified the need to ascertain comparative advantage at the country level as well as

sector level and allocate AfT. The fifth AfT at a glance report (WTO, 2015) noted that not all sectors of the economy are created equal, with some sectors having the potential for significant spillovers, such as technology creation or upgrading of production processes or human skills.

However, empirical research especially at country and regional levels on the performance of the initiative with respect to export performance is limited, with research on the impact of AfT at sectoral level almost nonexistent. Vigil and Wagner (2013), Hühne at el. (2014) and Pickbourn and Ndikumana (2016), noted that the future of research on aid effectiveness in Africa should build on the comparative advantage of country-specific studies in exploring the linkages between aid allocation and development outcomes at the sectoral level. Sectoral analysis has the potential to shed light on the micro-macro paradox in aid impact.

This study therefore sought to establish the impact of sectoral AfT on sectoral exports since the establishment of the AfT initiative. This is driven by the scarcity of systematic empirical research at the cross-country level focusing on the effectiveness of AfT, specifically at sector level on export growth. Three sectors shall be studied; agriculture, manufacturing and services; while the East African Community partner states of Burundi, Kenya, Rwanda, Tanzania and Uganda shall be taken to represent the region of East Africa. The Agriculture sector was selected to represent the impact on AfT on the extractive sector; the manufacturing sector, to represent the impact of AfT on value addition; while services sector, services.

The study set out to address three objectives: First, using data from the OECD Creditor Reporting System (CRS) database, to construct sectoral AfT figures for the agriculture, services and manufacturing sectors of the EAC partner states; second, using the seemingly unrelated regression equation (SURE) model, establish the impact of AfTS on exports from the different sectors in the study; and third, establish the inter-sector correlations between agriculture, manufacturing and services sectors, which could further guide future AfT disbursements.

The findings from the study, including about the level of the inter-sectoral linkages, and the performance of exports vis-à-vis the AfT received shall guide donors and policy makers alike on future allocations of AfT in order to increase on the initiatives impact and/or reach. It is expected that government shall benefit from this study not only from the advice on sectoral allocations of AfT for maximum benefit, but also, the impact of the other regressor variables on exports shall be an indicator to government on other macroeconomic areas where changes need to be made or to be closely monitored like exchange rate, regulatory quality and control of corruption, as these may curtail the outcome on exports from a receipt of AfT.

Table 1. Aid for trade to the agriculture, manufacturing and services sectors in the east African community over the period 2002-2016.

Country	AfTS_Agric1	AfTS_Agric2	AfTS_Manuf1	AfTS_Manuf2	AfTS_Serv1	AfTS_Serv2
Burundi	184.77	299.99	17.62	122.57	101.18	145.55
Kenya	941.89	2732.93	1349.12	2081.42	1033.55	2246.72
Rwanda	631.17	889.50	202.70	341.53	307.78	441.71
Tanzania	943.54	3150.98	2517.27	2611.70	1432.42	2814.51
Uganda	880.26	1588.54	914.54	991.01	742.53	1061.15

Source: Author compilation from the OECD-CRS database, AFTS_(Sector1): Narrow definition of sectoral aid for trade, AFTS_(Sector2): Broad definition of sectoral Aid for Trad.

Sectoral AfT to the EAC

The data from OECD's CRS database shows that for all the countries, the volume of AfT as a percentage of total bilateral aid has increasingly grown during the period under study. For example, for Burundi, percentage of AfTS in total bilateral sectoral aid disbursements grew from 1.6 percent in 2005 to 14.5 percent in 2015 before dipping in 2016 which can be attributed to the political unrest in the country. At 27.8 percent in 2016, Tanzania recorded the highest percentage of AfTS to total bilateral aid within the region. The growth in volume of disbursements of AfTS recorded by all countries in the study is an affirmation of the belief of donors in role of AfT in boosting trade in the region.

Table 1 drawn from Table A_1 in the appendix summarizes the AfT – categorized as narrow and broad AfTS- that has been disbursed in the EAC to the three sectors under study. The narrow AfTS refers to that aid specifically disbursed to a particular sector, say, for agriculture or towards services, while the broad categorization of AfTS includes all AfTS disbursed say to transportation, that has a cross-cutting effect across all sectors. Table A_2 shows what constitutes those broad and narrow definitions of AfTS in the different sectors.

From Table 1, it can be seen that over the study period, Tanzania received the highest AfTS to all sectors, while Burundi the least.

EMPIRICAL LITERATURE ON AID FOR TRADE AND EXPORTS

Nowak-Lehmann et al. (2013), used the gravity model of trade to investigate the effect of foreign aid on exports of aid recipients and donor countries. The analysis found the net effect of aid on recipient countries' exports to be insignificant, both for the sample of 123 countries and for important regional sub-samples. The analysis' findings were consistent with earlier studies which found small or insignificant macroeconomic impact of aid, suggesting that exporters in recipient countries are not benefiting from improved trade relations with donors.

This result is a 'spanner in the works' on the aid-trade relationship that has been a matter of contention amongst researchers for many decades. The current study however is a consideration of not just general aid, but targeted sectoral aid. Whereas, there exist a great discord on the relationship between general aid and trade; it is generally agreeable that targeted aid such as AfT, tends to yield positive results on exports. This study shall investigate this further.

Cadot and de Melo (2013), noted that at the launch of the AfT initiative, WTO trade ministers called for expansion of AfT to help developing countries, particularly LDCs, to build the supply side capacity and trade-related infrastructure that they need to implement and benefit from the WTO agreements and more broadly to expand trade. Their research therefore was aimed at evaluating the achievements of the initiative. The findings indicated that in terms of an increment of foreign AfT related activities, the initiative has been highly successful with the trade-related share of aid rising from 30% in 2005 to 35% in 2010, translating into a boost in annual commitments from $ 25 billion in 2005 to over $ 45 billion in 2010. However, they also reported that despite the increase in commitments, the aggregate data showed no discernible aggregate effects in spite of rising AfT volumes. This finding is in line with Nowak-Lehmann et al. (2013) above of a minuscule impact of aid on exports of the recipient countries.

Calí and Te Velde (2011) undertook a study in which they examined the extent to which various types of AfT had helped recipient countries' export trade performance. Their findings showed that although AfT has an overall positive and significant impact on exports, and that AfT facilitation reduces the costs of trading, this effect was entirely driven by Aid to Economic Infrastructure (AEI). The other main category of AfT, Aid to Productive Capacity (APC), had no discernible effect on export trade performance. The strong positive association of AEI with exports at the sectoral level was attributed to an allocation of aid that was biased toward already well performing sectors. Basnett et al. (2012) noted that while econometric evidence paints a positive picture on the impact of AfT in economic performance such as exports, GDP or the investment climate, evaluation of the AfT initiative shows mixed results, that its impact varies

considerably stemming from the differences in the type of intervention, the sector to which it is directed, the geographical location of the recipient country and the income level of the recipient country.

Hühne et al. (2014) studied the impact of AfT in helping recipient countries upgrade and diversify their exports, focusing specifically on primary commodities and the manufactures. Using an asymmetric and aggregated gravity model, they found that indeed the AfT initiative has promoted the exports of manufactures, but the impact is insignificant for exports of primary products. In other words, although the AfT initiative successfully promotes trade for both donors and recipients (a doubling of AfT would cause exports from the aid recipients to the donors to increase by 5% while from the donors to the recipients by 3%), the scheme particularly boosts the exports of middle-income countries, such as those in East Asia and Latin America. The AfT scheme is less effective in promoting the exports of sub-Saharan Africa, even though there is more of a need there.

Evidence on the effectiveness of AfT policy and regulations in improving trade-related performance is rather mixed, though generally positive (Busse et al., 2011; Calì and te Velde, 2011; Helble et al., 2009). There is growing empirical evidence that reduced trade costs have led to welfare gains; however, as Vijil and Wagner (2010) wrote, the effectiveness of AfT is subject to the choice of instruments, the sectors targeted and the country context, among other factors. For example, donor investments in trade-related infrastructure have, in aggregate, contributed to reducing trade transport costs.

Ghimire (2013) notes, systematic empirical research at the cross-country level focusing on the effectiveness of AfT on export promotion of developing countries is surprisingly limited. Morrissey et al. (2006), Wagner (2003) and Lloyd et al. (2000) focus on the effects of bilateral foreign-aid on bilateral exports, while Cali and te Velde (2011) in a case study suggest how small and vulnerable Caribbean economies would benefit from AfT by reducing the cost of trading. Pettersson and Johansson (2013) study the impact of aid, and AfT on bilateral exports on a sample of 184 developing countries for the period 1990-2005 and find that for general aid, a positive correlation existed with exports of both donors and the recipients as in their interpretation, the existence of aid helps to reduce the effective cost of distance. This positive relationship between aid and exports was particularly strong for aid to technical assistance. However, for AfT, the aid specifically directed towards trade and trade-related activities, their findings are indicative of a small impact on exports, all of which is attributed to aid to investments in trade-related infrastructure.

The literature above is generally indicative of a positive but albeit small and at times hardly discernable impact of AfT on exports of recipient countries. However, given that the initiative was started only in 2005, one could argue that at the time of carrying out the researches above, the initiative had not been able to record discernable change as, the translation from aid to tangible outputs given the political and macroeconomic environment can take time. This calls for further empirical research on the same in order to provide empirical evidence into the working of the initiative, and in this study's case, from a third world regional country grouping's perspective. The scope of the study is the East Africa Region, which shall be represented by the countries in the East African Community, which are, Burundi, Kenya, Rwanda, Tanzania and Uganda.

THEORETICAL FRAMEWORK

For this study, because of the possibility that sectoral exports can very well be correlated to each other, in place of the ordinary least squares (OLS) estimation method, the SURE model proposed by Arnold Zellner (1962) was used. He postulated that when running a system of equations that has different dependent variables and different regressors, if indeed there exist a correlation within the error terms of the system of equations, the SURE yields more efficient estimators than OLS.

A SURE model is a compilation of two or more regression equations in which the error terms are correlated. The model attempts to explain the variation of not just one dependent variable, as in the univariate multiple regression model, but the variation of a set of m dependent variables. It is a generalization of a linear regression model that consists of several regression equations, each having its own dependent variable and potentially different sets of exogenous explanatory variables or a similar set of explanatory variables but each with different values. Each equation is a valid linear regression on its own and can be estimated separately, which is why the system is called seemingly unrelated, however the error terms for each equation in the system are assumed to be correlated across the equations.

The general approach of multivariate single-equation regression models requires that there is only one dependent variable in each regression, that is:

$$y_i = X_i \beta_i + \varepsilon_i$$

Where; y_i is the a vector of the N observations of the ith dependent variable, X_i is an $N \times k_i$ matrix of the regressors of the ith equation, β_i is the vector of the k_i parameters of the ith equation, k_i is the number of regressors (including potentially a constant) of the ith equation, and ε_i is the vector of error terms of the ith equation, which is assumed to be normally distributed. The OLS estimator assumes that all coefficients in the model are unknown and are estimated from data by $\beta_i^{OLS} = (X_i'X_i)^{-1}X_i'y_i$. However, with a system of equations, if the parameters of each equation are estimated separately by OLS, a potential correlation between the equations is not taken into account. Hence, it is implicitly assumed that the error terms are not contemporaneously correlated, that is, $\mathrm{E}\left(\varepsilon_{it}\varepsilon_{jt}\right) = 0 \; \forall \; i \neq j$, where subscripts $i \; and \; j$ indicate the equation and subscript t denotes the observation.

Zellner (1962) developed the Seeming Unrelated Regression (SUR) estimator for estimating models with n > 1 dependent variables that allow for different regressor-matrices in each equation fro example, $X_i \neq X_j$ and account for contemporaneous correlation, that is, $\mathrm{E}\left(\varepsilon_{it}\varepsilon_{jt}\right) \neq 0$.

The model therefore is specified as follows:

$$Y_1 = \beta_1 X_1 + \varepsilon_1 \tag{i}$$

$$Y_2 = \beta_2 X_2 + \varepsilon_2 \tag{ii}$$

.   .
.
.   .

$$Y_n = \beta_n X_n + \varepsilon_n \tag{n}$$

In order to simplify notation, all equations are stacked as shown:

$$
\begin{bmatrix} Y_1 \\ Y_2 \\ . \\ . \\ Y_n \end{bmatrix} =
\begin{bmatrix} X_1 & 0 & 0 \\ 0 & X_2 & 0 \\ . & . & . \\ . & . & . \\ 0 & 0 & X_n \end{bmatrix}
\begin{bmatrix} \beta_1 \\ \beta_2 \\ \vdots \\ \beta_n \end{bmatrix} +
\begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \vdots \\ \varepsilon_n \end{bmatrix}
$$

Where; $Y_1, Y_2, \ldots, Y_n$ are the stacked dependent variables, the independent variables are represented in a diagonal matrix by $X_1, X_2, \ldots, X_n$, for the corresponding dependent variables

in $Y_1, Y_2, \ldots, Y_n$ respectively, $\beta_1, \beta_2, \ldots, \beta_n$ are the stacked coefficients of all equations, and the error terms for each equation are represented in a column vector by $\varepsilon_1, \varepsilon_2, \ldots, \varepsilon_n$.

The SURE estimator that accounts for interrelations between the single sub-models can be obtained by:

$$\beta^{SURE} = [X'\Omega^{-1}X]^{-1}[X'\Omega^{-1}Y]$$

Where Ω^{-1} is a weighting matrix based on the covariance matrix of the error terms Σ. This covariance matrix $\Sigma = [\sigma_{ij}]$ has the elements $\sigma_{ij} = E[\varepsilon_{in}\varepsilon_{jn}]$, where ε_{in} is the error term of the nth observation of the ith equation. The inverse of the weighting matrix can be calculated by $\Omega = \Sigma \otimes I_N$, where, I_N is an $N \times N$ identity matrix and $\otimes$ denotes the Kronecker product. However, as the true error terms e are unknown, they are often replaced by observed residuals, e.g. obtained from OLS estimates. Thus, a SUR model is an application of the generalized least squares (GLS) approach and the unknown residual covariance matrix is estimated from the data.

MODEL SPECIFICATION AND ESTIMATION

The analysis to capture the impact of sector specific AfT on the sectors exports is executed using the following framework:

$$X_{it}^k = \beta_0 + \beta_1 AfTS_{it}^k + \beta_2 VA_{it}^k + \beta_3 TO_{it} + \beta_4 FD_{it} + \beta_5 REER_{it} + \beta_6 CC_{it} + \beta_7 RQ_{it} + \alpha_i + \varepsilon_{it}^k \tag{1}$$

VA is the sector specific value added, TO is trade openness, FD represents financial development of the exporting country, $REER$ represents the real effective exchange rate. Finally, CC represents control of corruption and RQ represents regulatory quality. The expectation is that the aforementioned variables but $REER$ impact on exports positively, as with the appreciation of the exchange rate, demand for exports falls, which can negatively affect their production and the reverse is true. α_i represents the country

specific effects while ε_{it}^k is the error term.

According to Ghimmer (2013), for any given country, exports in a sector can well be correlated with exports in other sectors and these sectoral exports are also likely to be affected by common macroeconomic shocks.

The model in this study consists of three Equations 2, 3, and 4 below; one for each sector, with the dependent variable $logX_{it}^{sector}$ being the log of the corresponding sectoral exports.

$$
\begin{aligned}
logX_{it}^{Agric} ={}& \beta_0 + \beta_1 logAfTS_{it}^{agric} + \beta_2 logVA_{it}^{agric} + \beta_3 TO_{it} + \beta_4 FD_{it} + \beta_5 REER_{it} + \beta_6 CC_{it} \\
&+ \beta_7 RQ_{it} + \alpha_i + \varepsilon_{it}^{agric}
\end{aligned} \tag{2}
$$

$$
\begin{aligned}
logX_{it}^{Manufacturing} \\
={}& \beta_0 + \beta_1 logAfTS_{it}^{manuf} + \beta_2 logVA_{it}^{manuf} + \beta_3 TO_{it} + \beta_4 FD_{it} + \beta_5 REER_{it} \\
&+ \beta_6 CC_{it} + \beta_7 RQ_{it} + \alpha_i + \varepsilon_{it}^{manuf}
\end{aligned} \tag{3}
$$

$$
\begin{aligned}
logX_{it}^{Services} ={}& \beta_0 + \beta_1 logAfTS_{it}^{services} + \beta_2 logVA_{it}^{services} + \beta_3 TO_{it} + \beta_4 FD_{it} + \beta_5 REER_{it} \\
&+ \beta_6 CC_{it} + \beta_7 RQ_{it} + \alpha_i + \varepsilon_{it}^{services}
\end{aligned} \tag{4}
$$

The main regressors are the log of AFTS and sector-specific value addition (estimated as the log of real per capita value-added by each sector of the exporting country), this according to Ijjo and Shinyekwa (2014) is a measure of industrialization. The aforementioned regressors were used in log form in order to clearly indicate the percentage changes in the dependent variable; the log of sectoral exports when there is a change in a given regressor.

Two measures of sectoral aid are used (AfTS^sector_1 and AfTS^sector_2) indicating their scope and reach. They are derived from the AfTS 3 data on the OECD CRS database. The analysis of the AfTS according to scope was intended to clearly show the impact of AfTS directly targeted to a sector and also the impact from AfTS that is sent to other sectors, but because sector interconnectedness also influences output in related sectors.

Therefore, for each sector, two estimations were carried out, one with the narrow definition of AfTS, and the other with the broad definition of AfTS.

The narrow measure of AfTS is inclusive of the aid that is directed specifically to a particular sector only, while the broad measure includes that AfTS to a particular sector that can also influence on the output and or productivity of another sector. For example, the narrow measure of AfTS to agriculture includes the aid to the sub-sectors under the agriculture sector of agriculture, forestry and fishing, while the broad measure includes both the narrow measure plus the aid to the sectors of transportation, energy, communication, trade policies and the like. The narrow measure to manufacturing includes the aid specifically to industry, construction, transport and storage and energy as illustrated in

Table 2. Output variables and the data sources.

Input variable-output variable (X_t^k) - sectoral export	Measurement	Data source
Agricultural exports	These include crops, fruit, vegetables, meat, fish, dairy and poultry	Trade Map
Manufacturing exports	Exports from the manufacturing sector include Electronics, leather products, machinery, chemicals, transport equipment and textiles	Trade Map
Services exports	Services Exports include such sub-sectors as communication, tourism, insurance and construction	Trade Map

Table A_2 in the appendix for details on other categories of AfTS as used in this study.

The Aid variables are also lagged once; this is because of the possibility that aid can be endogenous since its disbursement at times is influenced by performance, needs or the ability to lobby by recipient countries. Therefore, to deal with this potential problem, many researchers Dalgaard et al. (2004) use a lagged value of aid as opposed to the current value is used to examine the impact of aid on the variable in question.

The other regressor variables as used in the model, their description and source are; AfTS, compiled from the sectoral figures of AfT from OECDs Creditor Reporting System database; sectoral value added (VA), measured as the log of real per capita value-added by a sector in the exporting country and sourced from World Development Indicators; Trade Openness (TO) measured by trade freedom, which incorporates factors such as import quotas, tariffs, voluntary export restraints and customs restrictions, Additionally, the measure also takes into account export subsidies, government monopolies, government industrial policy and other direct government interventions. Hence, it is a measure that measures both import and export openness, and the effect of the existence of NTBs. The data are sourced from Heritage Foundation; FD, measures reports the ratio of bank private credit to a country's GDP: The higher the ratio, the easier access to financial resources for private investment and the converse is true for the lower ratio. Data are sourced from the Global FD database; *REER* of domestic currency vis-à-vis US Dollar, data is from World Development Indicators database; *Control of Corruption (CC),* an index constructed by the World Bank captures the perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption as well as the extent to which the state is "captured" by elites and private interests, data is sourced from World Bank Worldwide Governance Indicators; *Regulatory Quality (RQ*) is defined as an index that "captures the perceptions of the ability of the governments to formulate and implement sound policies and regulations that permit and promote private sectors development" (Kaufmann and Vicente 2011), data is sourced from World Bank Worldwide Governance Indicators. Like CC, RQ is measured on a scale of -2.5 to +2.5, with the higher values indicating less corruption and therefore the higher the quality of the institution and vice versa. Table 2 summarizes the output variables and the data sources

The variables AfTS and the sector-specific value addition, which are principal regressors, differ by sector; however, the other independent variables are the same throughout the system of equations. Aid for Trade, Sectoral exports, and Sectoral Value Added are measured in US dollar (current values) and are reported in their natural log form.

The Breusch-Pagan test for sectoral independence rejects the null of no correlations among sectors with a p-value of 0.000 making the SURE model in order to produce more efficient estimates in addition to estimating the inter sectoral correlations.

Preliminary tests

Fisher-type unit root test

The fisher-type unit root test was carried out to test for the presence of unit roots in the panel. The test showed that the log of sectoral exports and log of service value added were stationary in levels; the other independent variables were stationary in first difference.

Fisher type test was used because of its applicability to an unbalanced panel as it does not require that individual time series have no missing data. Since the independent variables (the sectoral exports) were stationary-in-levels, this showed that they do not trend into the long run, therefore cointegration tests were not carried out.

Granger causality test

To test for and therefore deal with the problem of endogeneity in the model, the Granger causality tests for causality among the variables was carried out. Specific-to-general modeling technique was then used in selecting the optimal lag-length for the independent variables that were found to Granger-cause the dependent variables.

FINDINGS AND DISCUSSION

The study is interested in the relationship between AfTS and sectoral exports from the EAC partner states. The Kao (1999) cointegration test indicates that the dependent and independent variables trend into the long run, so the long run SUR model is run.

The empirical results based on the SURE regression of Equations 2 to 4 are presented in Table A_3 in the appendix.

Sectoral Aid for Trade and sectoral exports

AfTS is the main regressor of the study. Both broad and

Table 3. Sectoral and for trade and sectoral exports.

Sector	AfTS_1	AfTS_2
Agriculture	0.3849***	0.6242***
Manufacturing	0.5506***	0.7383***
Services	0.3586***	0.5653***

Source: Authors own compilation from the SUR regressions results, ***P<0.01.

narrow categorizations of AfTS are considered. The values of AfTS are lagged once, this is following the Granger causality tests and hence, an optimal lag length of one selected. The results in Table A_3 in the appendix show that for all the sectors, there exists a positive and highly significant relationship between AfTS and sectoral exports. This relationship is seen to be larger with the broad definition of AfTS than with the narrow definition (the AfTS disbursed specifically to particular sectors for example AfTS_1 to the agriculture sector is the AfT that was specifically disbursed/targeted to the sub-sectors of fishing, agriculture and forestry). The broad categorization of AfT being defined as that AfT to other sectors or for example to trade policy and regulations (ATPR), which although not directly targeted to a sector, impacts on its exports.

Table 3 is a summary from the results in Table A_3 in the appendix. A number of implications can be drawn from the observed results; first is that generally within the East Africa Region, the relationship between AfTS and export growth in all three sectors is inelastic. That is, a unit percentage change in AfTS leads to a smaller percentage increase in sectoral exports. This could point to the fact that the impact of aid on these exports could be moderated by other factors that inhibit or boost its performance; examples of which are the other regressor variables in the model, like corruption control and regulatory quality. However, the measurement of the extent to which the quality of these two affects the performance of aid is beyond the scope of this study.

Another implication is that a smaller amount of percentage growth is registered with the narrow definition of AfT than with the broader definition of the same. This could either be due to the fact that the volume of AfTS is larger with the broader definition, therefore resulting in a larger effect on exports, but it could also point to the fact that the broader definition of AfT tackles other supply-side impediments that inhibit export growth within the sectors like transport, communication, storage and the like, hence, resulting in a higher growth in exports than the aid specifically targeted to any sector which probably does not have such a wide catchment.

This finding also shows that generally in the East Africa Region, in order to boost exports from any of the sectors under study that is, agriculture, manufacturing and services, AfT should not only be targeted to the sector

itself, but to the other sectors from which the positive externalities of the aid shall help further boost exports. That is, it is important to establish the complementarities between the sectors as this shall help indicate to the donors how one sector interacts with another and therefore probably the extent to which aid disbursed to one sector might impact on the performance of a complementary sector.

This is complementarity between the agriculture, manufacturing and services as indicated by the Breusch-Pagan test for independence in the SUR regression.

Value added and sectoral exports

Table 4 is an extract from the results of Table A_3 in the appendix. The results show that for both the narrow and broad measures of AfTS, a highly significant, highly elastic relationship exists between value addition in the sector and sectoral exports.

It can be seen that once the broad categorization of AfT is used, in all the sectors, a lower percentage growth in exports due to value added is registered. This could be attributed to the fact that once AfTS is targeted directly to a sector, say for agriculture, narrow AfTS is directed specifically to agriculture, fisheries and forestry, which leads to more value added, and hence, a larger percentage growth in exports than the case where AfTS is directed generally to other sectors, that impact on the agriculture sector; for example, transport, communications and the like.

Additionally, the data also shows that generally within the East Africa Region, the relationship between value addition and export growth is of an elastic nature. That is, a percentage increase in investment in value addition leads to a greater percentage increase in sectoral exports with the exception of manufacturing for the broad AfTS which is close to unitary elastic.

The above two findings indicate that in the East Africa Region, a unit increment in value addition, would lead to a more than proportional increment in sectoral exports. This is especially important as it addresses one of the shortcomings of export trade in Africa, that most countries in Africa are faced with unfair terms of trade on the international market because most of their exports are unprocessed agriculture products, and that investing

Table 4. Regression results for the relationship between value addition and sectoral exports.

Sector	VA with AfTS_1	VA with AfTS_2
Agriculture	1.9210*** (0.1086)	1.0819*** (0.2481)
Manufacturing	1.3522*** (0.2789)	0.9314*** (0.2709)
Services	2.1917*** (0.2500)	1.6794***(0.2174)

Source: Authors own compilation from the SUR regressions results; standard errors in parenthesis; ***p<0.01, VA = value addition AfTS_1= narrow measure of AfTS, AfTS_2 = broad measure of AfTS.

in value addition would go a long way in boosting export earnings.

As Condon et al (2015) puts it, other developing countries, particularly African ones' involvement in global value chains has remained typically as producers and exporters of primary goods exports (lower value downstream activities), their participation in activities which involve elements of transformation located in the upper end of value chains has been limited.

Additionally, Wood et al (2001) also notes that Africa's exports are heavily concentrated on unprocessed primary products, in contrast to the exports of East Asia, which consist mainly of manufactures. This implies that in a bid to help developing countries like those in the East Africa Region to boost their exports and therefore their participation in the multilateral community, more AfTS needs to be focused towards sectoral value addition.

Real effective exchange rate and sectoral exports

The results in Table A_3 in the appendix show that for the period under study. REER had a negative and insignificant relationship with exports from all the sectors (with exception of services with the narrow definition of AfTS). This negative sign is as expected a priori, that is, an appreciation in the exchange rate results in a reduction in sectoral exports and vice versa for depreciation in the exchange rate. The finding of an insignificant relationship is in line with Klaassen and Jager (2011) who established that exchange rate has insignificant effect on exports.

Additionally, the relationship between exchange rate and sectoral exports is found to be inelastic for all sectors, and both definitions of AfTS. This finding implies that an increase in demand for exports due to depreciation in the shilling may not be big enough to significantly boost exports. Yussof and Baharumshah (1999) in their study on the effects of the Malaysian currency (the ringgit), real exchange rate on the export demand for Malaysian primary commodities under alternative specification and estimation procedure reported similar findings of an insignificant relationship albeit on balance of trade.

A number of researchers have established a significant impact of exchange rate on export Erdal et al. 2012,

Dincer and Kandil, 2011; Wisdom and Granskog, 2003). For example, Erdal et al. (2012) studied the effect of REER volatility on agricultural exports and agricultural imports in Turkey. Using a GARCH model, and for a study period of twelve years (1995-2007), it was established that indeed a positive long-term relationship existed between the REER and agricultural exports but the same was negative with imports.

Regulatory quality and sectoral exports

The results in Table A_3 in the appendix show that a positive and highly significant relationship exists between exports from the agriculture and manufacturing sectors and regulatory quality. However, at a 5 percent level of significance, the relationship between services exports and regulatory quality is insignificant. This could possibly imply that the level of regulatory quality within the EAC is important to the growth of exports of merchandise trade, but the same policy implication cannot be drawn for services exports. Sila (2016) carried out a study on quality of governance and export performance in the East African Community for the period 1996-2014, and established a positive, significant relationship between regulatory quality and export performance. Iwanow and Kirkpatrick (2007), also find a positive relationship between regulatory quality and export performance that could be equated to that of trade facilitation on export performance.

Control of corruption (CC) and sectoral exports

From Table A_3 in the appendix indicate that for all three sectors, a negative but highly significant relationship exists between the level of corruption control and exports. This result is unlike the expectation a priori of a positive relationship. It was expected that the less the extent to which public power is used for private gain, the more export growth would thrive, but the results tell the reverse. Goel and Korhonen (2011) carried out a study to establish the relationship between various exports (agricultural, mineral, manufacturing and fuel) and corruption, and established that a negative relationship existed between the level of corruption and agricultural

exports because of the decentralized nature of agricultural contracts as opposed to fuel contracts which were in the hands of a few such that the higher the levels of fuel exports, the higher the levels of corruption registered. An insignificant relationship existed between the level of corruption and manufacturing exports. They base their study on a theory by Becker (1968) who theorized that law-breakers engage in corrupt activity when the perceived benefits outweigh the expected costs where the costs could be a fine and or jail time.

Olney (2016) in a study on the impact of corruption on firm-level export decisions found out that corruption decreases the probability that a firm will export directly, and increases the probability of exporting through an intermediary. The effect of this is the possibility of export levels being substantially lower than if the firm were able to personally access the export markets, this then results into a negative relationship between levels of corruption and volume of exports.

Financial development (FD) and sectoral exports

The SURE regression results depicted in Table A_3 in appendix show that for all sectors in the study, there exists a negative relationship between FD and sectoral exports. This relationship is highly significant for the narrow definition of AfTS; however, for the broad definition, it becomes insignificant for both the agriculture and manufacturing sectors, but remains highly significant for services exports. This implies that bank private credit to GDP is not export enhancing in the East Africa Region.

The findings are unlike what was expected a priori, that is, the researcher postulated a positive relationship between FD and export growth as is agreed upon by Kiendrebeogo (2012) who sought to establish whether a country's level of manufacturing trade is affected by its financial sector development. Using pure cross-sectional and panel specifications on a sample of 75 countries over the period 1971-2010, he finds that FD strongly and robustly exerts a positive effect on manufacturing exports, even after controlling for the effect of banking crises.

However, the findings of the inverse financial development-trade nexus are upheld by Yakubu et al (2018), who in their study that sought to establish the effect of FD on international trade also used the ratio of bank private to GDP as a measure of FD. Their findings were indicative of a negative relationship between bank private credit and exports. They therefore drew the conclusion that at low levels, bank private credit to GDP dampens exports. They also found a U-shaped relationship between private credit and trade measures suggesting that financial sector development may be detrimental (helpful) to trade for economies with low (high) level of private credit. Sajo and Li (2017), also find a negative relationship between FD, export growth and economic growth.

According to them, one possible explanation which can be given for the negative relationship between FD and export growth (with FD defined as the ratio of private bank credit to GDP) is that when there are low levels of private credit, the real sector of the economy, most especially the high priority sectors which are also said to be economic growth drivers are not effectively and efficiently serviced by the financial sector.

Mohammed and Sidiropoulos (2006) investigated the effect of FD on export and economic performance in Sudan from 1970 to 2004. The study estimated the short-run and long-run relationship using the autoregressive distributed lag (ARDL) model to co-integration analysis. Their empirical results indicated a weak relationship between FD and export and economic growth in Sudan due to the inefficient allocation of resources by banks, the absence of an appropriate investment climate required to foster significant private investment in order to promote growth in the long run, and the poor quality of bank credit allocation. This is in agreement with the findings of Sajo and Li (2017) who wrote that in the presence of poor credit allocation or in the cases where the real sector is not adequately supplied with credit by the financial sector, growth of both exports and the economy may not be realized.

Trade openness (TO) and sectoral exports

For all sectors under the study, it can be seen from the results as presented in Table A_3 in the appendix, that there exists a negative and significant relationship between exports and the level of trade openness. This is indicative of the fact that for an increase in import tariffs and quotas, voluntary export restraints and or the imposition of NTBs, sectoral exports fall and vice versa for a reduction or removal of the same.

A comparison of the impact of trade openness on trade with the sectoral specific AfT versus the broader categorization of AfT to all sectors doesn't seem to show much difference in impact.

This could be because the Aid for Trade that is sent to sectors is targeted towards such activities as value addition, training and the like and therefore has little or no impact on the indices that constitute the trade openness variable (that is, import tariffs and quotas, voluntary export restraints) implying that the impact of trade openness on exports is likely to be the same regardless of the definition and/or scope of the AfTS disbursed.

Sectoral inter-correlations

The Breusch-Pagan test for independence rejected the hypothesis of no correlation between the sectors under study with a p-value of 0.000 as illustrated in Table A_2 in the Appendix. The inter-sectoral correlations as estimated in the SUR regression are therefore as indicated below.

Correlation indicates the degree of association between two variables. As one variable increases, the other also increases for a positive correlation and the reverse is true for a negative correlation. Therefore from the correlation matrix, for the narrow definition of AfTS, the correlation between agriculture and manufacturing exports of 0.73, indicating that for an intervention/occurrence that results in an increase (decrease) in agriculture exports, there shall be a positive increase (decrease) of 0.73 in manufacturing exports, with the same holding true in the agriculture sector for an intervention/occurrence that results into an increase (decrease) in manufacturing exports. The correlation between agriculture exports and service exports stands at 0.27, while that between services and manufacturing is 0.30; both values are positive, indicating that any interventions/occurrences that would result in an increase (decrease) in agriculture and/or manufacturing exports would result in an increase (decrease) in services exports by 0.27 and 0.30 respectively. The volume of change would occur in the agriculture and/or manufacturing sectors if the intervention led to an increase (decrease) in services exports.

Significantly, larger values of the correlation coefficients are recorded for the broad measure of AfTS. This is particularly between the agriculture and manufacturing sectors and the manufacturing and services sectors. This could be attributed to the fact that the more money is received towards boosting sectoral growth, the larger will be the benefits to other sectors with which they have correlations. This is in line with Amit and Zott (2010), who show that for example, a larger services sector improves value addition in manufacturing as it enables manufacturing firms engaged with the services sector to provide information to producers on market needs.

A number of other authors, Mirajul et al. (2016), Miroudot et al. (2013) and Blyde and Sinyavskaya (2007) have looked at sectoral interdependencies in explaining the complementarity between growth and value addition. Their central argument is that through input and output linkages, integration between two sectors enhances knowledge creation and, therefore, product development and engineering, thereby resulting in value addition, which from the data has an elastic relationship with exports and therefore can greatly result in exponential export growth.

CONCLUSIONS AND RECOMMENDATIONS

The study set out to evaluate the relationship between AfTS and sectoral exports within the East Africa Region, represented by five of the countries that make up the EAC. The estimation method used was the SURE model because of the existing inter-sectoral correlations between the agriculture, manufacturing and services sectors and also using the SUR, these correlations were established. From the SURE estimation results, there is a positive significant relationship between AfTS and exports from the agriculture, manufacturing and services sectors in the East Africa Region, implying that the initiative has and continues to foster the growth of exports from the region.

This relationship however is inelastic, implying that given percentage increases in the amount of aid disbursed leading to smaller percentage increase in sectoral exports. This could point to the fact that the impact of aid on exports is moderated by other factors/variables in the macro economy, some of which are the regressor variables in the model including the REER, the level of value addition, the level of corruption control (this specifically would affect how much of the aid is actually put to the use for which it was sent and how much of it is diverted and or stolen), among others. Therefore, focusing funds to sectors has shown to be a worthwhile venture, but more focus should also be put on dealing with factors in the macroeconomic environment that can hinder the effectiveness of the aid.

The data also shows that the impact of value addition on exports is a lot greater than the direct impact of AfTS on exports. This impact is greatest for the narrow definition of AfTS than with the broad. This could give policy makers and donors alike a pointer of where might be best to direct the AfTS funds for increased export output. That is focusing on expanding on value addition within the region.

Value addition helps to improve on the quality of exports, and is a direct solution to many African and developing countries in general exporting raw agricultural products. It is therefore a recommendation of this study that great focus of the initiative be put on intensifying on sectoral value addition within the East African Region, as it is shown to have a highly significant and elastic relationship with sectoral exports.

The empirical results are indicative of a greater contribution to export performance of value added, regulatory quality and corruption control than AfTS. The results therefore confirm that while AfTS can contribute to improved export performance, improvements in value addition, the quality of the regulatory environment, and the level of corruption control are equally or even more important in facilitating export growth.

From the correlation coefficients between the sectors, what can be deduced is that all the three sectors are positively correlated, such that a positive intervention like a receipt of AfTS to one sector results in a positive change in another sector as shown by the coefficients, and the converse is true for a negative occurrence in one of the sectors. It can also be seen that the greatest correlations exist between the manufacturing sector and the agriculture sector, which could be because the countries in the study (from East Africa) are mainly agriculture exporters, with a lot of inputs feeding from the agriculture to the manufacturing sectors.

One of the recommendations made by the AfT task force in 2006 was to identify comparative advantages at country level and thereby also inter-sectoral linkages within countries and allocate AfT accordingly to respective sectors. This study partly fulfills this recommendation for the inter-sectoral linkages generally within the East African Region to show that generally the greatest inter-sectoral linkages are between the manufacturing and agriculture sectors in the region. This is especially useful since these countries all have their major export earners or among the top export earners as agriculture products, and therefore Aid for Trade disbursements targeted to the agriculture sector or to a sector like manufacturing would greatly boost production and exports from the sector.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Wood (2001) also notes that Africa's exports are heavily concentrated on unprocessed primary products.

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APPENDIX

Table A₁. Total AfT sectoral distributions to the countries in the study.

Country	Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	TOTAL
Burundi	AfTS_Agric1	0.66	1.26	1.94	1.96	3.08	3.19	6.87	10.44	10.85	15.75	21.35	28.37	22.06	25.86	31.13	184.77
	AfTS_Agric2	1.18	1.34	2.18	4.67	6.79	5.02	11.28	18.26	35.43	32.08	42.07	47.01	35.32	26.00	31.36	299.99
	AFfS_Manuf1	0.18	0.03	0.09	0.02	0.05	0.02	0.61	0.47	7.25	0.64	2.20	5.11	0.51	0.23	0.22	17.62
	AfTS_Manuf2	0.79	0.11	0.29	2.73	3.71	1.87	5.00	8.20	25.68	16.94	21.41	19.12	14.73	1.21	0.76	122.57
	AfTS_Serv1	0.57	0.08	0.19	2.81	5.47	5.69	10.83	6.68	16.82	8.72	19.17	12.36	11.05	0.47	0.26	101.18
	AfTS_Serv2	0.57	0.08	0.25	2.81	5.58	5.70	11.41	12.01	29.90	18.22	23.85	19.93	14.17	0.71	0.37	145.55
Kenya	AfTS_Agric1	16.24	19.83	20.57	19.00	41.86	51.56	66.60	49.55	64.18	82.63	78.84	86.42	101.93	123.20	119.48	941.89
	AfTS_Agric2	26.35	35.41	52.66	53.81	90.32	128.80	145.40	139.74	136.33	192.97	312.26	500.13	306.15	349.11	263.50	2732.93
	AfTS_Manuf1	6.57	6.84	22.37	24.21	22.47	65.82	55.88	55.26	47.43	96.78	179.04	309.69	188.94	156.10	111.73	1349.12
	AfTS_Manuf2	13.00	20.46	38.00	43.41	54.34	84.90	91.56	99.12	98.71	135.43	262.39	455.92	246.45	251.45	186.29	2081.42
	AfTS_Serv1	22.10	17.10	17.87	26.00	38.39	48.35	58.62	67.40	63.16	54.74	115.49	192.00	87.87	133.49	90.95	1033.55
	AfTS_Serv2	15.42	21.13	35.93	43.85	59.53	109.32	105.00	116.61	102.61	148.69	292.30	492.96	259.44	274.32	169.61	2246.72
Rwanda	AfTS_Agric1	3.02	5.62	5.58	8.55	14.24	19.30	23.10	30.50	57.65	56.65	55.14	67.67	48.39	165.70	70.07	631.17
	AfTS_Agric2	3.49	6.95	10.58	11.21	20.87	25.15	38.95	64.79	77.94	83.68	93.41	113.27	74.28	176.42	88.52	889.50
	AfTS_Manuf1	0.84	2.09	4.49	5.17	3.88	4.88	8.76	32.63	17.19	25.60	25.45	27.32	20.32	8.30	15.76	202.70
	AfTS_Manuf2	1.66	2.94	6.60	5.82	4.37	6.35	14.91	38.46	24.91	39.27	36.33	45.35	36.20	45.94	32.43	341.53
	AFTS_Serv1	2.37	2.98	6.47	6.20	3.19	9.82	21.93	41.09	27.64	38.64	34.88	37.10	28.99	22.10	24.36	307.78
	AFTS_Serv2	2.37	2.99	6.56	6.54	9.35	14.27	24.70	45.74	31.34	49.87	54.26	67.78	46.59	42.64	36.69	441.71
Tanzania	AfTS_Agric1	26.14	31.76	30.18	20.42	24.40	31.42	34.47	40.11	55.30	69.92	83.32	112.72	126.90	116.74	139.75	943.54
	AfTS_Agric2	65.00	88.34	72.38	51.49	55.96	100.52	158.08	143.57	291.81	307.89	386.81	541.75	270.79	308.84	307.76	3150.98
	AfTS_Manuf1	41.48	65.85	52.89	42.12	40.63	77.43	133.80	115.89	258.70	256.68	336.39	456.65	175.04	223.42	240.29	2517.27
	AfTS_Manuf2	44.03	67.61	54.36	43.79	44.64	79.65	141.21	122.28	262.33	273.79	341.98	465.14	183.50	234.51	252.88	2611.70
	AfTS_Serv1	28.53	31.41	41.52	36.43	37.06	52.44	115.85	77.46	129.27	115.47	184.09	187.45	85.89	184.06	125.48	1432.42
	AfTS_Serv2	49.48	70.25	56.45	53.31	55.73	92.31	180.80	140.36	281.40	299.59	357.30	482.05	201.18	281.35	212.92	2814.51
Uganda	AfTS_Agric1	11.13	17.71	36.51	37.74	45.15	45.91	33.49	37.49	58.02	57.73	68.94	95.44	111.18	109.36	114.46	880.26
	AfTS_Agric2	26.70	28.91	48.72	42.96	58.41	65.01	87.37	85.26	105.08	115.44	114.06	190.08	221.86	203.45	195.23	1588.54
	AfTS_Manuf1	17.32	17.00	17.98	11.87	22.03	26.06	61.67	57.80	65.71	82.84	59.40	118.86	131.99	116.49	107.53	914.54
	AfTS_Manuf2	20.43	19.30	24.53	13.28	23.96	27.13	62.98	62.48	74.24	95.30	65.74	129.10	140.62	120.53	111.39	991.01
	AfTS_Serv1	10.65	20.05	22.71	15.49	23.69	44.25	54.11	65.01	42.58	52.79	49.09	111.55	74.16	81.19	75.24	742.53
	AfTS_Serv2	22.11	23.89	28.97	17.65	26.19	50.00	62.68	79.83	70.20	89.56	65.76	141.71	134.96	133.51	114.13	1061.15

Source: Author compilation from the OECD-CRS database, AfTS_ (Sector1): Narrow definition of sectoral aid for trade, AFTS_(Sector2): Broad definition of sectoral aid for trade.

Table A₂. Narrow and broad measures of sectoral aid for trade as used in the study.

Sector	Narrow Measure (AfTS1)	Broad Measure AfTS2
Agriculture	Agriculture Manufacturing Fishing Aid to trade policy and regulations (ATPR)	Agriculture Manufacturing Fishing Aid to trade policy and regulations (ATPR) Transport and storage Communications Energy
Manufacturing	Transport and storage Communications Industry Energy ATPR	Transport and storage Communications Industry Energy ATPR Forestry Mineral Resources
Services	Transport and storage Communications Energy Tourism Banking and other Financial Services Business and other services	Transport and storage Communications Energy Tourism Banking and other Financial Services Business and other services ATPR

Source: Author groupings from TRADEMAP export data.

Table A₃. Regression results: Dependent variables- sectoral exports. Aid type: Disbursements (once-lagged) (Estimation method: SURE Panel (2002-2016)).

Variable	Narrow measure of AfTS			Broad measure of AfTS		
	lgAgr Exp	lgManf Exp	lgServ Exp	lgAgr Exp	lgManf Exp	lgServ Exp
β_0	13.508*** (1.757)	17.2393*** (1.6486)	12.5742*** (1.6294)	13.8387*** (1.4184)	17.4673*** (1.5493)	11.5784*** (1.2785)
Exchange rate	-0.3586 (0.3256)	-0.5966 (0.3766)	-0.7510** (0.2993)	-0.403 (0.2993)	-0.5428 (0.3531)	-0.1680 (0.2564)
Corruption control	-1.5878*** (0.1179)	-0.9543*** (0.1143)	-0.6279*** (0.0914)	-1.2581*** (0.1353)	-0.9107*** (0.1105)	-0.4381*** (0.0865)
Trade openness	-0.0313*** (-0.0061)	-0.0295*** (0.0073)	-0.0141 (0.0075)	-0.0206*** (0.0057)	-0.0295*** (0.0067)	-0.0150*** (0.0058)
Regulatory quality	2.2756*** (0.2373)	1.7254*** (0.2597)	0.0133 (0.2371)	1.9524*** (0.2281)	1.6625*** (0.2444)	0.3810* (0.2069)
Financial dev't	-0.0192** (0.009)	-0.0279** (0.0115)	-0.0259*** (0.0086)	-0.0044 (0.0089)	-0.0113 (0.0113)	-0.0200*** (0.0072)
Agric value added	1.9210*** (0.1806)			1.0819*** (0.2481)		

Table A₃. Cond.

Manf value added		1.3522*** (0.2789)		0.9314*** (0.2709)	
Serv value added			2.1917*** (0.2500)		1.6794*** (0.2174)
AfTS_Agric1	0.3849*** (0.1806)				
AfTS_Manf1		0.5506*** (0.0774)			
AfTS_Serv1			0.3586*** (0.0724)		
AfTS_Agric2			0.6242*** (0.1085)		
AfTS_Manf2				0.7383*** (0.0820)	
AfTS_Serv2					0.5653*** (0.0692)
Observations		57		57	

Standard Errors in parentheses, *p<0.10. **p<0.05, ***p<0.01. AFTS_(sector)1 = Narrow measure of AFTS to a given sector, AFTS_(sector)2= Broad measure of AFTS to a given sector, lgAgr Exp = log of exports from the agriculture sector, lgManf Exp = log of exports from the manufacturing sector, lgServ Exp = log of exports from the Services sector.

Table A₄: Correlation matrix of residuals.

AfTS	Long run SUREG					
	AfTS_1			AfTS_2		
	lgagrexp	lgmanexp	lgserexp	lgagrexp	lgmanexp	lgserexp
lgagr exp	1.000			1.000		
lgman exp	0.7272	1.0000		0.7592	1.0000	
lgser exp	0.2730	0.3036	1.000	0.5531	0.4848	1.000

BP: Breusch-Pagan test of independence.

BP test:	chi2(3) = 39.648	Chi2(3) = 63.694
	p-value = 0.0000	p-value = 0.0000