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ASSESSING THE IMPACT OF TERRORISM IN TRADE DEVELOPMENT IN THE SADC REGION: A GRAVITY MODEL APPROACH

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ABSTRACT

The South African Development Community (SADC) was formed with the objective of achieving development, peace and security, and economic growth but terrorism has been a major obstacle. This paper captured terrorism as a trade cost to bilateral trade in the region. The PPML technique was used for the analyses because of its robustness, consistency and ability to capture zero trades and appropriate fixed effects. Our analyses revealed that, terrorism must have caused an increase in bilateral trade in the region and were dependent on the level of income of trading partners. Trade with low- and medium-income countries were positively influenced by terrorism primarily because their production capacity must have been damaged by terrorism and the only way to augment domestic demand was to depend on international trade. But the region's trade with high-income countries was negatively affected by terrorism. Partly because their capacity to produce for export must have been affected and raising insurance premiums for goods that are shipped to higher-risk nations may also hinder trade. Based on the coefficients, the impacts of terrorism on bilateral trade appear very small but not negligible.

Contribution/ Originality: This study contributes to the existing literature by adopting the gravity model approach to assess the impact of terrorism in trade development in the SADC region. It determined whether such an impact was dependent on the level of income of bilateral trade partners. It found that terrorism could influence trade positively.

1. INTRODUCTION

Terrorism is often considered to be a deliberate use of violence by people or subnational groups to acquire a political or social goal via the terrorizing of a huge group beyond that of the unfortunate victims (Enders and Sandler, 2012). In other words, terrorism implies the use of threat of violence to incite mental dread in people. The sponsors of terrorism are mostly illicit and clandestine political, religious, ideological, revolutionary or nonconformist associations. They attempt to instigate a policy or an economic distortion as a short-term goal and in this manner, accomplish other medium and long-term goals. Political, institutional as well as economic factors play a significant part in the acceleration of terrorism, which causes loss of life, and in addition incites financial and social disturbances (Gassebner and Luechinger, 2011; Krieger and Meierrieks, 2011; Shahbaz *et al.*, 2013). Terrorism

shows the presence of negative influences in the social and moral virtues of society (Ismail and Amjad, 2014) and is hard to clearly define and the various definitions of terrorism highlight the need for a proper and adequate definition (Shahbaz, 2013).

Although terrorism has previously mainly targeted government officials and businesses, it is relatively more focused on private parties nowadays (Brandt and Sandler, 2010). Researchers have had differing opinions on the causes of terrorism.

Nasir *et al.* (2011) found that both economic conditions and political structure were contributory drivers to terror incidences in the South Asian region. Thus, political suppression that denies individuals of their political rights and common liberties supports terrorism, just as income inequality is the fundamental driver of terrorism. On the other hand, Okafor and Piesse (2017) examined the factors that determine terrorism in nations considered inclined to terrorism and categorized under the top fragile states index. They employed panel data of about 38 countries mostly from Sub-Saharan Africa, the Middle East and North Africa, and South Asia. Their result shows a positive and significant effect on terrorism originating from a fragile state with high number of refugees, unemployment of young people, and low military spending. Be that as it may, increase in foreign direct investments, remittances and increased wages could negatively affect terrorism.

Apart from the psychological impact, the economic effect of terrorism is diverse. It can prompt changes in the world's economic methods of production and consumption as it influences tourism, leisure habits, production and sales centers, public transport, and international trade. Terrorism can obstruct economic growth via its impacts on tourism, foreign direct investment (FDI) flow and international trade, which is considered among the most significant economic sectors in the world. This effect on tourism is reflected in the impact on airlines, hotels, transport, and the products and services consumed by tourists.

Abadie and Gardeazabal (2008) and Enders *et al.* (2006) found that terrorism has an adverse effect on FDI flow. The transport of merchandise becomes more expensive by the increase in delivery times and according to Mohamed *et al.* (2019) the passage time for delivery tends to increase. Despite the envisaged hurdles and consequences of terrorism, Nitsch and Schumacher (2004) examined bilateral trade flows data on more than 200 nations and found that terrorism decreases international trade. This was affirmed by Blomberg and Hess (2006) and Mirza and Verdier (2014) which found that terrorism in general tends to depress trade.

On the contrary, Egger and Gassebner (2015) found that transnational terrorism attacks had essentially no short-run effect on trade. It suggests that on average, the economic effects of terror not only on trade but also on income (and, by that token, on growth) were negligible which was consistent with Gaibulloev *et al.* (2014) who reported no significant effect of terrorism on economic growth. This insignificant finding recommends that the impact of terrorism on trade might be driven by elements other than transaction costs. The absence of a trade effect might be reconciled when one views that terrorism can destroy capital or labor endowments unevenly in focused sectors, consequently, curving the production possibility frontier and affecting the pattern of trade. For instance, Abadie and Gardeazabal (2008) and Bandyopadhyay *et al.* (2014) found that terrorism can decrease capital stocks by decreasing FDI flows. Also, Bandyopadhyay and Sandler (2014) demonstrated that such changes in factor endowments can either increase or reduce trade.

Terrorism can affect international trade in different ways. For example, it can boost the costs of transportation by raising insurance premiums for goods shipped to higher-risk nations. Thus, such higher prices increase costs of imported goods, working effectively as import tariffs decrease trade. Terrorism can prompt the damaging of the productive capacity of specific sectors of an economy, making these sectors increasingly dependent on imports, which have the illogical ramifications, that terrorism may really increase trade (Bandyopadhyay *et al.*, 2017). The later opinion is fully consistent with the school of thought which does not think that terrorism has affected international trade. The partner and structure of bilateral trade may be altered but the overall trade of a country may consistently be increasing.

Existing literature on the subject matter, does not give an analytical inquiry on the impact of terrorism in trade development in the Southern African Development Community (SADC) region. The SADC was formed to achieve development, peace and security, and economic growth but the act of terrorism has been a major concern toward realizing this. Again, Anderson (2015) reasoned that the risk of terror attacks may be reduced when wage elasticity is high, associated with low ratios of predators to prey and high wages, and vice versa. Based on this reasoning, one may begin to wonder if the effect of terrorism on trade would equally be dependent on the respective country's income level. This study examined this scenario with respect to the SADC's trading partners. Using a standard gravity model approach and applying Poisson Pseudo Maximum Likelihood (PPML) technique, we examined how terrorism may affect bilateral trade with SADC's trade partners. It was revealed that terrorism does not significantly reduce trade but may technically enhance the amount of trade flow. The negative effect comes only when the region trades with high income countries.

The latter part of the paper is organized as follows: The first part of this paper deals with the introduction; section two highlights the connection between terror and trade in SADC, the subsequent sections report the methodological note, analyses and discussion. The final section shares the concluding remarks.

2. TERRORISM AND TRADE TREND IN SADC

Making a direct comparison of the development in terrorism in the SADC region and harnessing the trade development in the SADC region, one will notice that over the years, development in the region has witnessed a meaningful increase in terms of GDP of the SADC countries, thanks to various protocols and polices of respective governments. South Africa has remained the biggest economy in the region but overall, there are sensible progresses in terms of economy of the region.

The progress in economic development could be attributed to the service sector which represents over 50 % of the total GDP of SADC countries in the period from 2000 to 2010. Services as the main driver of regional economic growth was attributed to its boost in tourism—the sector often presumed to be negatively affected by acts of terrorism. Peculiar and unique cultures of many nations in the SADC region position it as the focus of tourism attraction. This coupled with the fact that there are some with abundant natural resources encourages trade with the rest of the world.

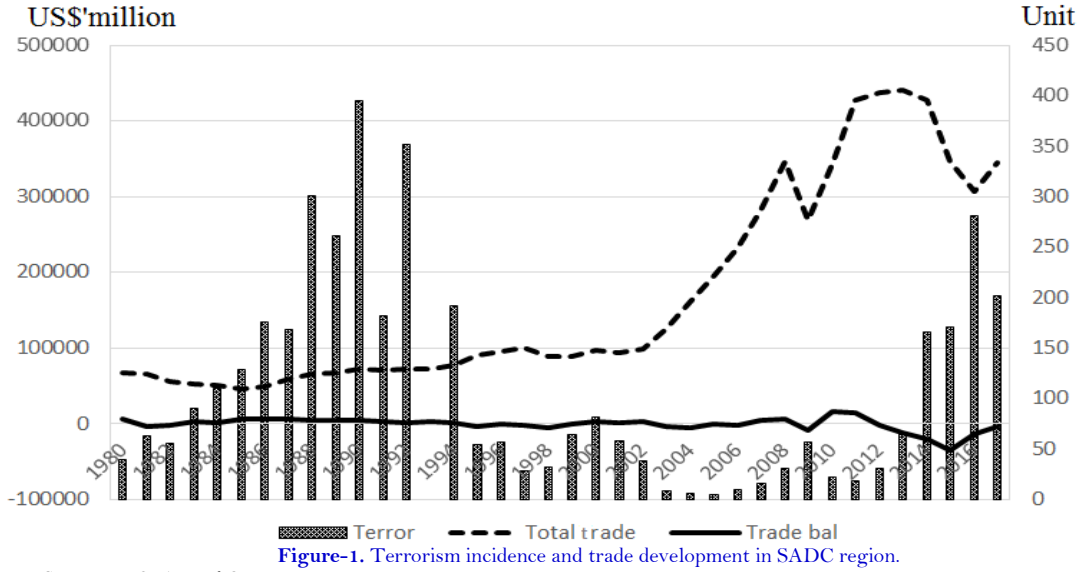

Figure-1. Terrorism incidence and trade development in SADC region.

Data Source: UNCTAD and GTD.

From Figure 1 one could notice that the incidence of terrorism have been peculiar to the region with little wonder at the call for Protocol on the Control of Firearms, Ammunition and Other Materials (2001) which was

followed by the Declaration concerning Firearms, Ammunition and other related materials (2001) which contained the adoption of implementation strategies by the respective Member States. These decisions were taken to curtail the incidence of terrorism in the region and by far reduce the alarming rate of causalities experienced from such incidence.

Before the proclamation, the incidence of terrorism had reached 352 cases in the region in 1992 compared to a total of 39 incidences in 1980. The incidences temporarily reduced to 192 cases in 1994 and further declined to 28 cases in 1997 but after then, the cases of terrorism began to rise again which lead to the protocol and declaration concerning Firearms, Ammunition and other related materials (2001). In the year 2000 there were 81 reported cases of incidences of terrorism in the region. However, in the year of the declaration of the protocol there were 58 reported cases which further declined to 38 cases in 2003. By 2005 there were only 5 cases of terrorism in the region. One would reason that the protocol and its declaration were yielding positive results.

However, right from the period of the global financial meltdown and years after, the incidence of terrorism has begun to appreciate in the region once more. For instance, in 2008, the incidence of terrorism was reported to rise to 30 cases in the region compare to 15 reported cases in 2007. As could be seen from Figure 1, more cases happened in 2009 when it rose to 57 cases in the region. The regional government had called for more tightening and focus in the declaration made in 2001 for the control of arm and ammunitions in the region which further yielded immediate positive results. Of course, it was witnessed that there was a decrease in the number of terror attacks in the region with 2011 reporting 18 incidences in the region.

But that did not last for long time as the incidence of terrorism continue to rise from 31 cases in 2012 to 65 cases in 2013. A further increase was witnessed in 2014 with 165 cases which further increased to 281 cases in 2016 but declined to 201 cases in 2017. With the recent developments in the last decade, the region has been struggling on how to curtail the alarming situation of things with regards to the number of cases of terrorism in the region which have claimed more lives and destroyed a great number of properties with huge economic values. This has been suspected to have impact on the decline in economic growth within this period of time which has decreased from 6.2 % in 2010 to 2.65 % in 2017 but the corresponding impact on bilateral trade in the region is what is due to be tested empirically in this research.

According to the data from UNCTAD, SADC total trade has followed a similar pattern as to the total world trade. The total SADC trade almost quadrupled between 2000 and 2011 from US$91089.52 million in 2000 to US$3536636.4 million in 2011, although there was a sharp decline of more than 25 % in 2009 as a result of the global economic crises.

The main intra SADC trade export items include petroleum oils, agricultural products, electricity and some clothing and textile products. The main export items to the rest of the world consist of predominantly the export of natural resources, resource intensive manufactured goods mainly of the automotive industry, some clothing and textiles, and tobacco. The highest share of total SADC exports over time is to the Asia Pacific market, followed by the EU market. Trade within Africa is the smallest and of this the majority is intra SADC trade. Total intra SADC imports have grown steadily over the past decade, more than tripling in total. As with intra SADC exports, imports also experienced a significant fall in 2009 due to the global recession.

3. METHODOLOGICAL NOTES

3.1. Augmenting the Gravity Model

The connotation of the original gravity equation signifies that bilateral trade varies directly to both trading partner's income and inversely proportional to the distance between them. Though the model has been empirically successful, it was adjudged to lack micro-theoretical foundation to fully explain its economic meaning. Hence, in a successful attempt to provide hitherto non-existent theoretical underpinning, Anderson (1979) and Anderson and Wincoop (2003;2004) proposed a gravity equation based on the constant elasticity of substitution (CES) function

and differentiating goods based on the country or region of origin. Thus, this study was anchored in this theoretical underpinning.

Iceberg trade cost takes into consideration every factor that either enhances or retards international trade development. In this paper, trade costs were recognized to consist of three components; the geographical variables (G), Terrorism effects (T) and other control variables. The trade cost estimated in the average bilateral trade barriers function is represented by Equation 1:

$$\tau_{ijt} = dist_{ij}\, e^{\beta_1 G_{ij} + \beta_2 T_{it(jt)} + \beta_3 L_{ijt} + \mu_{ijt}} \quad (1)$$

Where $dist_{ij}$ represents distance between pair of trading partners, G_{ij} is a vector that includes geographical variables which includes contiguity, common official language, and colony. These geographical variables are standard gravity variables. $T_{it(jt)}$ stands for a vector that includes terrorism effects on trade. In this study, terrorism was captured unilaterally for exporting and importing countries respectively. Finally, L_{ijt} is a vector that contains every other variable other than in the two above and are assumed to have bilateral effect; these include SADC regional trade agreement and suspension.

It became necessary to ascertain the level of performance of this regional trade agreement on bilateral trade development. Suspension was sometime used as a punishment to any SADC country that did not follow the protocol or adhere to the established rules guiding the operation of government and leadership in respective countries. μ_{ijt} is the white error term assumed to be normally distributed. Since the effect of terrorism on trade could not be linear, adopting an exponential form became necessary.

Equation 1 can be translated into a simple linear form and expanded to accommodate the needed variables as will be used in the analyses. Thus:

$$lnM_{ijt} = \alpha + \gamma_t + \lambda_i + \emptyset_j + \beta_1 lnY_{it} + \beta_2 lnY_{jt} + \beta_3 lnDist_{ij} + \beta_4 Contig_{ij} + \beta_5 CL - off_{ij} + \beta_6 Colony_{ij} + \beta_7 T_{it} + \beta_8 T_{jt} + \beta_9 SRTA_{ijt} + \beta_{10} Susp_{ijt} + \mu_{ijt} \quad (2)$$

Where:

M_{ijt}	Stands for the nominal value of import from country (i) to country (j).
Y_{it}	Represents nominal GDP of the exporting country (i).
Y_{jt}	Represents the importing countries' nominal GDP.
$Dist_{ij}$	Stands for distance between importing country (j) and exporting country (i).
$Contig_{ij}$	Is a dummy variable which took the value of 1 if country i and j shareds a common border and 0 otherwise.
$Comlang\_off_{ij}$	Is a dummy which took the value of 1 if both importing and exporting countries spoke the same official language and 0 otherwise.
$Colony_{ij}$	Is a dummy variable which took the value of 1 if country i was colonized by j or vice versa and 0 otherwise.
T_{it}	Represents the rate of terror incidence from the exporting country.
T_{jt}	Stands for the rate of terror incidence from the importing country.
$SRTA_{ijt}$	Stands for regional trade agreement in SADC region and took the value of 1 if a country became a member and 0 otherwise.
$Susp_{ijt}$	Represents suspension and sanction of member countries. It was captured with a dummy which takes the value of 1 if a country was under sanction or suspension and 0 otherwise.
α	Constant variable.
γ_t	Year fixed effects.
λ_i	Exporter fixed effects.

ϕ_j Importer fixed effects.

μ_{ijt} White noise error term of the general equation.

To complete the gravity model, outward MRT, λ_{it} and inward MRT ϕ_j were included to capture the fixed effects with exporter and importer characteristics respectively. Time fixed effects were captured by γt. Table 1 reports all the variables used for the analysis, with their expected signs of coefficient and sources.

Table-1. Expected sign of coefficient results.

Variables name	Expected signs	Sources
M_{ijt} (Trade)	Dependent	DOTS IMF
Y_{it}	Positive (+)	UNCTAD
Y_{jt}	Positive (+)	UNCTAD
$Dist_{ij}$	Negative (-)	CEPII
$Contig_{ij}$	Positive (+)	CEPII
$Comlang\_off_{ij}$	Positive (+)	CEPII
$Colony_{ij}$	Positive (+)	CEPII
$Terror_{it}$	Negative (-)	GTD
$Terror_{jt}$	Negative (-)	GTD
$Susp_{ijt}$	Negative (-)	SADC
$SRTA_{ijt}$	Positive (+)	WTO

Note: DOTS IMF signifies direction of trade statistics, International monetary Fund, UNCTAD-United Nation Conference on Trade and Development, CEPII- Centre d'Études Prospectives et d'Informations Internationales, GTD-Global Terrorism Database and WTO-World Trade Organization.

The trade cost that was estimated was based on Equation 2. For better understanding; more clarity and in line with the objective of this research, the trade cost τ_{ijt} was estimated in phases. The first phase considered the general form (full sample), which ascertained the effect of terrorism on SADC bilateral trade with all the 104 countries. Considering all the listed variables, trade cost was given as:

$$\tau_{ijt} = \left\{\beta_3 ln\mathrm{Dist}_{ij} e^{(\beta_4 \mathrm{Contig}_{ij} + \beta_5 \mathrm{CL-Off}_{ij} + \beta_6 \mathrm{Colony}_{ij} + \beta_7 T_{it} + \beta_8 T_{jt} + \beta_9 SRTA_{ijt} + \beta_{10} Susp_{ijt})}\right\} \quad (3)$$

The research also tested to see if the effect of terrorism was dependent on the level of personal income in SADC's trading partners. In this case, per capita income was assumed to be an average income earned by the citizen of each trading partner accounted for in this research. The World Bank segregation of countries based on the level of income was adopted for this purpose. Finally, for a robust check, trade cost was estimated in separate batches of years (five years each).

Thus, trade cost was conditioned for this purpose as follows:

$$\tau_{ijt} = \left\{\beta_3 ln\mathrm{Dist}_{ij} e^{(\beta_4 \mathrm{Contig}_{ij} + \beta_5 \mathrm{CL-Off}_{ij} + \beta_6 \mathrm{Colony}_{ij} + \beta_7 T_{it} + \beta_8 T_{jt} + \beta_9 SRTA_{ijt} + \beta_{10} Susp_{ijt})}\right\}$$

$$if\ M_{ijt} = \{Income\ Level/years\} \quad (4)$$

Equation 3 represents trade cost for the full samples while Equation 4 stands for trade cost which specifically captured income levels and specific years.

3.2. Econometrics and Analytical Method

There have been various estimation techniques that have been employed in the gravity model but these have remained contentious issues among researchers. Many scholars are critical of OLS on fundamental grounds; basically, on its inability to capture zero trade, while truncated OLS, Feasible Generalized Least Square (FGLS),

OLS Censored are said to lack consistency and ability to handle heteroscedasticity (Martin and Pham, 2008; Xiong and Chen, 2012). Recent studies have favored the two-steps Heckman technique and PPML. While both could be leading analytical instruments in this field, Heckman (1979) and Helpman *et al.* (2008) have proved to be too sensitive (Santos and Tenreyro, 2011; Shepherd, 2013). Hence, in this research, the PPML technique was preferred for the analyses because of its robustness, consistency and ability to capture zero trades (Santos and Tenreyro, 2006;2011).

To account for various multilateral resistances, unobserved heterogeneity and correct for possible endogeneity problems, the fixed effects approach was implemented instead of the Anderson and Wincoop (2003) method of using full information to estimate the MRT. It is also important to note that there is also an emerging estimation technique developed by Baier and Bergstrand (2010) using the Taylor series expansion in an OLS setting to generate values for the MRTs and produce consistent estimates for the trade costs parameters. This approach was not factored into this study. Exporter, importer and year fixed effects were used to capture the MRT hence dealing with all unobserved heterogeneity. This was consistent with Anderson and Yoto (2011) and Azu (2019) and this method was recommended by Shepherd (2013) for fixed effects when the focus is on the time invariant estimators of the model.

The coefficient on the logarithm of the continuous variable was simply the elasticity of (the value of trade flows) with respect to the continuous variable (Disdier and Head, 2008; Head and Mayer, 2014) while that of dummy variable was converted to the inverse natural logarithm as $\left((e^{\beta}-1)*100\right)$ (Baier and Bergstrand, 2007).

4. ANALYSES AND DISCUSSION

Summary statistics are displayed in Table 2 and Appendix I reports the correlation coefficients. The correlation coefficient indicated that no variables were correlated which means no exact or linear dependence among the regressors which reduces multicollinearity issues. Table 3 shows the outcome of the regression analyses indicating the effect of terrorism on bilateral trade in the SADC region for the full sample and selected sample based on income groups. Appendix II includes a chronological estimation of the effect of terrorism on bilateral trade development in the SADC region.

Table-2. Summary statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
Trade	116,280	5.18E-05	0.000515	0	0.048314
lnY$_{it}$	115,725	-2.01025	2.185628	-6.50104	5.277585
lnY$_{jt}$	115,725	-2.01025	2.185628	-6.50104	5.277585
lnDist$_{ij}$	160,281	8.68961	0.703223	-0.00487	9.892497
Contig$_{ij}$	163,606	0.027102	0.16238	0	1
Comlang_off$_{ij}$	163,606	0.253622	0.435085	0	1
Colony$_{ij}$	163,606	0.011552	0.106859	0	1
T$_{it}$	116,280	21.53845	124.0987	0	3933
T$_{jt}$	116,280	21.53845	124.0987	0	3933
SRTA$_{ijt}$	163,606	0.028923	0.167591	0	1
Susp$_{ijt}$	163,606	0.000183	0.01354	0	1

From the estimations, there was an indication that overall, terrorism leads to more international trade in the SADC region but that the impact was relatively small. Table 3 reports that the incidence of terrorism from the exporters encouraged bilateral trade with coefficient of 0.000445. Likewise, from the importers with reported coefficient of 0.000589 (see column 2, full sample). Both were statistically significant.

This scenario could be explained with respect to Bandyopadhyay *et al.* (2017) which opined that terrorism, can affect international trade in different ways. In the first instance, it can boost the costs of transportation by raising insurance premiums for goods shipped to higher-risk nations. Thus, such higher prices increase the cost of imported

goods, working effectively as import tariffs decrease trade. On the other hand, terrorism can prompt damage to the country's productive capacity of specific sectors of an economy, making these sectors increasingly dependent on imports, which have the illogical ramifications, that terrorism may really increase trade. The reason for these positive coefficients can be attributed to the later proposition.

Table-3. Analyses of the influence of terrorism on bilateral trade in SADC.

(1)	(2)	(3)	(4)	(5)	(6)
Variables	**INC**	**HIGH**	**UM**	**LM**	**LOW**
lnY_{it}	0.915***	0.828***	0.924***	0.429***	0.719***
	(0.0483)	(0.0511)	(0.0556)	(0.0813)	(0.0503)
lnY_{jt}	0.797***	0.632***	0.778***	0.750***	0.838***
	(0.0462)	(0.0610)	(0.0530)	(0.0873)	(0.0561)
$lnDist_{ij}$	-1.024***	-1.634***	-0.983***	-1.040***	-1.300***
	(0.0948)	(0.220)	(0.104)	(0.103)	(0.101)
$Contig_{ij}$	0.716***		0.487***	0.643***	0.291***
	(0.101)		(0.104)	(0.145)	(0.104)
$Comlang\_off_{ij}$	0.390***	-0.0345	0.495***	0.0468	-0.107*
	(0.0694)	(0.0927)	(0.0939)	(0.107)	(0.0584)
$Colony_{ij}$	1.013***	1.460***	0.985***	8.059***	1.669***
	(0.0738)	(0.0962)	(0.0960)	(0.532)	(0.135)
T_{it}	0.000445***	-0.00110***	0.000521***	0.000436***	0.000323
	(0.000108)	(0.000332)	(0.000127)	(0.000133)	(0.000241)
T_{jt}	0.000589***	-0.000929**	0.000634***	0.000332**	0.000681***
	(0.000132)	(0.000370)	(0.000149)	(0.000147)	(0.000169)
$SRTA_{ijt}$	0.842***		0.763***	0.404***	1.124***
	(0.0679)		(0.0751)	(0.109)	(0.0700)
$Susp_{ijt}$	-0.758		-0.747	-0.706	-2.697***
	(0.480)		(0.491)	(0.456)	(0.726)
Constant	-10.31***	5.784***	-11.22***	-18.35***	-8.066***
	(1.179)	(2.154)	(1.416)	(1.292)	(1.261)
Observations	114,030	29,640	68,830	39,364	62,010
R-squared	0.793	0.790	0.804	0.751	0.662
Country FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1.
General represent trade with all the selected countries-full sample, High is trade with high income countries, UM represent trade with Upper Medium income countries, LM stands for trade with Low Medium income countries and LOW represent trade with Low income countries.

However, this idea may not be totally true in all cases as regards to trade with various income level countries. While it may be true with trade between SADC and low-income countries and medium-income (upper medium and lower medium) countries, it was not true with high-income countries. From column 3 of Table 3, there was an indication that when the SADC region trades with high income countries, terrorism would bring a negative influence. Both importers' and exporters' coefficient were reportedly negative and statistically significant at one % for the exporters and five % for the importers. The level of development in the high-income countries may not prompt its dependency on import to augment domestic demand rather it would limit its production for export purposes, which is why there was a negative coefficient. It also indicated that high income countries were sensitive to terror incidence which makes them skeptical to trading with countries that have terror incidence. Results from the upper medium income and lower medium income countries were positive and statistically significant for both the exporters' and importers' coefficients. However, in low income countries, the exporters' coefficient was positive but not statistically significant while the importers' coefficient was both positive and statistically significant.

Trade literature is of the opinion that the essence of the establishment of a regional trade agreement is to stimulate bilateral trade between Member States. Overall, the SADC regional trade agreement has a positive influence on trade within the region which is consistent with trade literature. By implication, the regional trade

agreement generally influences bilateral trade in that region by 132 %, all things being equal. No SADC country is a high-income country hence, the variable is omitted when estimating trade with a high-income country.

Trade with upper-medium-income countries yielded a positive coefficient just the same as for the lower-medium-income and low-income countries. The coefficients were all statistically significant at one %. From the robust check in Appendix II, between the year of notification (2004) and enforcement (2000), the effect yielded a negative but non-significant coefficient. The years thereafter resulted in positive coefficients which were statistically significant too. For instance, the period from 2005 to 2009 produced a coefficient of 0.391, the period from 2010 to 2014 had a coefficient of 0.384 and the period from 2015 to 2017 had a coefficient of 0.518 which indicated that the RTA was performing better in the later years.

In general, suspension produced a negative coefficient but was not statistically significant but when trade was with low income countries, it yielded a negative coefficient which was statistically significant. With these countries (low-income) it would cause trade to decrease by 93.25 %, all things being equal, having produced a coefficient of -2.697 and statistically significant at one %. Madagascar's political crises that led to its suspension in 2009 and reinstatement in 2014 was the notable suspension that was captured in the analysis herein. In the period of this suspension, the country did not benefit from the regional trade agreement which ensured its negative coefficient. The negative effect of suspension was notably in trade with low income countries of which the majority of SADC nations are defined as. Estimating the full sample, there was an indication that all the gravity related variables were consistent with trade literature. Both the exporters' and importers' income tended to influence bilateral trade positively while distance created a hindrance to bilateral trade in the region. In the gravity model, distance was used to proxy transportation cost. However, even with the advent of technology and innovation that brought about the largest cargo ship which can carry over 18,000 twenty-foot equivalent units to ease transport cost, the estimation here indicated that distance was still a negative influence on bilateral trade. Contiguity, common official language and colony proved to have a positive influence on international trade. These variables were statistically significant at one % with the full sample.

5. CONCLUSIONS

Rising cases of terrorism have been a major concern to society and the world at large. In this research paper, we analyzed the effect of terrorism on bilateral trade with reference to the SADC region. The paper adopted PPML technique due to its robustness, consistency and ability to capture zero trades and appropriate fixed effects was also used. There were two major revelations in this research paper. Firstly, that in overall, terrorism must have caused an increase in bilateral trade in the SADC region and secondly, that the influence of terrorism on trade was dependent on the level of income. Aside from high-income level countries, every other country seems to be dependent on international trade when terrorism occurred. Practically, this could be the case since their production capacity must have been damaged by terror attack and the only way to augment domestic demand is to depend on international trade. However, trade with high-income countries may be hindered by terrorism since their (high-income countries) capacity to produce for export must have been affected. Again, high income countries may be skeptical to trade when there is terror incidence. Despite mixed effects to international trade, terrorism was generally condemnable due to its negative economic consequences and psychological trauma on casualties. Most developing countries depend largely on developed countries for the bulk of trade, hence the negative effect of terrorism when trading with these high-income countries. Therefore, a collaborative effort in combating terrorism is paramount.

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Appendix-I. Correlation coefficient.

	Trade	***ln*Y$_{it}$**	***ln*Y$_{jt}$**	***ln*Dist$_{ij}$**	**Contig$_{ij}$**	**Comlang_off$_{ij}$**	**Colony$_{ij}$**	**T$_{it}$**	**T$_{jt}$**	**SRTA$_{ijt}$**	**Susp$_{ijt}$**
Trade	1										
*ln*Y$_{it}$	0.1494	1									
*ln*Y$_{jt}$	0.1361	-0.1144	1								
*ln*Dist$_{ij}$	0.0326	0.2694	0.2694	1							
Contig$_{ij}$	0.0358	-0.0362	-0.0362	-0.4768	1						
Comlang_off$_{ij}$	0.0108	-0.1109	-0.1109	-0.2383	0.1058	1					
Colony$_{ij}$	0.0925	0.0807	0.0807	0.0316	0.0445	0.1499	1				
T$_{it}$	0.0113	0.155	-0.0223	0.0265	-0.0169	-0.0031	0.0117	1			
T$_{jt}$	0.0097	-0.0223	0.155	0.0265	-0.0169	-0.0031	0.0117	-0.0097	1		
SRTA$_{ijt}$	0.0452	-0.0048	-0.0048	-0.3667	0.2599	0.0908	-0.0015	-0.027	-0.027	1	
Susp$_{ijt}$	-0.0016	0.011	0.011	0.0177	-0.003	-0.0104	-0.0018	-0.0009	-0.0009	-0.0034	1

Appendix-II. Chronology on the effect of terrorism on SADC bilateral trade (PPML Technique).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	**1980-1984**	**1985-1989**	**1990-1994**	**1995-1999**	**2000-2004**	**2005-2009**	**2010-2014**	**2015-2017**
lnY_{it}	0.496*	0.124	0.554**	0.628**	0.353	0.640**	0.626***	0.255
	(0.297)	(0.137)	(0.237)	(0.271)	(0.233)	(0.303)	(0.229)	(0.252)
lnY_{jt}	0.390	0.111	0.464	0.133	0.145	0.740**	0.327	0.0624
	(0.237)	(0.168)	(0.283)	(0.289)	(0.221)	(0.319)	(0.288)	(0.484)
$lnDist_{ij}$	-2.421***	-2.120***	-2.148***	-1.453***	-0.973***	-1.029***	-0.930***	-0.678***
	(0.202)	(0.241)	(0.183)	(0.168)	(0.210)	(0.205)	(0.158)	(0.184)
$Contig_{ij}$	-0.355	-0.317	-0.506*	0.0734	0.641***	0.673***	0.897***	0.955***
	(0.319)	(0.293)	(0.277)	(0.231)	(0.208)	(0.208)	(0.176)	(0.215)
$Comlang\_off_{ij}$	0.378***	0.190	-0.0235	0.149	0.413**	0.319**	0.407***	0.476***
	(0.133)	(0.172)	(0.184)	(0.192)	(0.168)	(0.156)	(0.105)	(0.115)
$Colony_{ij}$	1.204***	1.416***	1.519***	1.445***	1.055***	1.027***	0.963***	0.712***
	(0.183)	(0.184)	(0.204)	(0.223)	(0.193)	(0.169)	(0.124)	(0.139)
$\mathbf{T}_{it}$	-0.000612	0.000663	-0.000326	-0.000754	0.00121	0.00138***	-0.000519	-0.000905
	(0.00148)	(0.000962)	(0.000509)	(0.000877)	(0.00161)	(0.000407)	(0.000463)	(0.000781)
$\mathbf{T}_{jt}$	-0.00199**	-0.00107	-0.000101	-8.78e-05	-0.000552	0.000118	0.000550	0.000527
	(0.000931)	(0.000993)	(0.000659)	(0.000974)	(0.00241)	(0.000490)	(0.000354)	(0.000884)
$SRTA_{ijt}$					-0.0554	0.391**	0.382**	0.518***
					(0.179)	(0.164)	(0.160)	(0.189)
$Susp_{ijt}$								-0.189
								(0.440)
Constant	-4.064*	-9.469***	-2.392	-12.97***	-18.38***	-9.645***	-13.44***	-15.24***
	(2.456)	(2.587)	(2.267)	(2.225)	(2.275)	(2.501)	(1.972)	(2.799)
Observations	14,025	13,800	14,655	15,075	15,150	15,120	15,150	9,090
R-squared	0.926	0.846	0.822	0.828	0.789	0.721	0.876	0.836
Country FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
PPML	YES	YES	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.