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The results indicated that for the studied period (1990-2017), the FDI flows for the aggregate economy by sector are determined by the degree of trade openness in terms of their joint measurement. Furthermore, the magnitude of the degree of the industrial trade openness model is robust one and the government should prioritise this sector with regard to exports. Besides, the government should encourage the manufacturing sector, therefore improving infrastructure and promoting concentration of FDI in the country’s production sectors, in particular those which support the paradigm that Sudan, like many Sub-Saharan African countries, should promote its primary exports to transform from an underdeveloped country to a developed one.

The study recommends that, according to magnitude of industrial sector trade openness degree, government should exert more effort for its diversify in order to identify this sector as a leading sector utilising trade efficiently and hence prioritize it in the export.

Keywords: Foreign Direct Investment; FDI; Trade Openness; Exports Efficiency; Sub-Saharan African Countries; Sudan

JEL Classification: E20; F10; F17

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The study analyzed the relationship between trade openness and FDI inflows in Sudan. The results indicated a positive relationship, suggesting that trade openness is crucial for attracting FDI.

**1. Introduction**

Foreign investment and international trade are of great interest to researchers due to their impact on aggregate economic performance. Sudan, as a developing country, has seen fluctuations in FDI inflows.

Since 1980s, Sudan has experienced a significant increase in FDI inflows, which is often associated with the country's efforts to attract foreign capital. However, the annual average growth of FDI inflows in Sudan was 14.3% during the period from 1996 to 2000.

Since the 1980s, Sudan has been characterised by low and fluctuating growth rates of FDI, with the average annual growth rate of FDI being 6.6% and the total for population being 3.1%.

The efficient use of FDI is crucial for LDCs' economies because it represents the lion share of finance for them. Sudan, like many other developing countries, has seen a significant increase in FDI inflows, which has contributed to the country's economic growth.

**1.1 General Background**

Sudan is characterised by its tremendous endowments regarding natural and human resources. Nevertheless, it has suffered from a general slowdown in FDI and GDP growth rate.

During the 1960-2017 period, Sudan's economy experienced a drastic decline; the per capita income was low and was growing at an average rate of 0.2%. The per capita income fell and the foreign debt increased to USD 43.200 billion (Bank of Sudan, 2014), which placed Sudan among the poorest countries.

Since the 1980s, Sudanese economy has been characterised by low and fluctuating activities in general and a low level of FDI in particular. This is due to a series of economic problems and challenges faced by Sudan.

**1.2 Economic Performance: some macroeconomic indicators**

This section looks into the economic performance of Sudan based on some macroeconomic indicators to provide a complete FDI and trade profile.

Table 1 depicts the economic performance of Sudan based on some macroeconomic indicators to provide a complete FDI and trade profile. The study examines the impact of trade openness on FDI in Sudan through the 1990-2017 period. To achieve this objective, the study analyses the long run relationship between FDI and trade openness for the country's overall economy and its sectors, using the trade orientation index and trade integration as indicators of trade openness to reflect its growth stage of that country. Trade openness always attracts export-oriented FDI, whereas tariff-jumping FDI are attracted under trade restrictions.
through the country, indicating the significant role of rainfall in economic growth and peace period, respectively. Also, the period (2000-2006) experienced high and steady growth in real GDP. Several factors contributed to that trend, including financial stability, the signature and implementation of the Comprehensive Peace Agreement (CPA), oil exports, combat of inflation and increases in domestic and foreign investment. After the 1990-1996 period the implementation of sound fiscal and monetary policies coupled with structural reforms enabling the country to cut down inflation to a single digit rate securing confidence of both domestic and foreign investors in the economy.

The aggregate economic performance in Table 1 shows that Sudan had a continuous budgetary deficit excluding the sub-periods of 2006-2010 and 2011-2017. As a result, the government reduced financial deficit by borrowing from the Central Bank. This led to an increase in money supply and, in turn, to a jump of the inflation rate of 31.1% in the 1980-1985 period, 48.9% in the 1986-1990 period, and 105.5% in the period between 1991 and 1995 respectively. That inflation-induced increase in the money supply and generated further inflation. Accordingly, the figures for the periods of 1980-1985, 1990-1995 and 2011-2017 show a persistent increase in the general price level, which resulted in a reduction in government expenditure, particularly in the 1996-2000 period, when the government fostered expenditure reduction and privatization measures, particularly in 1995.

According to Table 1, the agricultural sector recorded the highest flow of FDI in the period of 1990-2017 (31.3% out of total amount), however this sector always suffered from climate change through the period.

Also, as shown in Table 1, the balance of trade is mostly deficit, reflecting the fact that Sudan’s imports often exceed its exports both through the sub-periods and the whole period between 1990 and 2017. In this regard, Sudan has faced a series of problems such as the a general decline in terms of trade, a general decline in export-oriented production, as well as a high needed for public desirability for capital goods and trade, a general decline in export-oriented production, as well as a general decline in terms of trade.

The FDI grew at 5.5% during the 1990-2017 period. However, its growth rate is averaged at 11.1% for the 1990-1995 period. However, the FDI growth rate improved up to 14.0% during the 1996-2000 period and decreased to around 13.1% for the 2001-2005 period. The investment growth, however, continued its decline (-21.5%) during the period between 2006 and 2010 and took an upward trend in 2011-2017 with a significant rate and political situation along with trade openness in order to attract more FDI.

According to Table 1, the agricultural sector recorded the highest flow of FDI in the period of 1990-2017 (31.3% out of total amount), however this sector always suffered from climate change through the period. Another group of scholars favors outward looking-oriented economic strategies. Also, there are exponents of export promotion, arguing that free trade between nations of the world equally benefits least developed countries (LDCs) by expanding their activities via trade that would be possible from their domestic economies alone. It is also seen as a means of helping them through specialisation and technology transfer and, as a result, increases their citizens’ welfare through the enhancement of their aggregate national income (Adjasi, 2006; Lim, 2001). Trade is crucial to any economy because of differences in technology, proportion of skilled labour and support of research and development. More openness in trade in order to improve FDI (Sahoo, 2006).

Trade openness boosts up export-oriented FDI inflows, while trade restrictions attract FDI tariff-jumping. Consequently, we can say that trade openness of developing economies is positively related to the size of export-oriented capital inflows. Other than trade liberalisation, FDI also depends upon political stability, exchange rate stability and market size of economies. Developing countries must stabilise their exchange rate and political situation along with trade openness in order to attract more FDI (Liarigos & Skandalis, 2010).

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social activities that allows the flow of capital across national boundaries (Igudia, 2004). Thus, it involves the growing economic interdependence of countries worldwide through the increasing volume and varieties of cross-border transactions, international capital flows as well as rapid and widespread technological change.

Moreover, globalisation and technology transfer have changed the world into a global village via the intensification of economic, political, social and cultural relations across national borders (Felipe, 1997; Kokko, Tansini & Zejan, 1996). This is also due to the search for cheaper labour, raw materials and less government intervention.

Abdel Raheem (2011) examined the relationship between FDI inflows and trade openness in South-Asian economies. He examined the relationship of seven countries for the 1986-2010 period based on panel data using random effects estimation. Trade openness was measured by three indicators, in terms of imports, exports and a joint combination of both factors. His results suggested that there is a significant relationship between trade openness and foreign direct investment inflows. Trade openness has a positive and significant impact on FDI inflows in South-Asian countries.

Mohammed Rahman (2011) aims at empirical search to find whether FDI and international trade bolster or hinder growth of each other, or not using data relevant to Bangladesh imports, exports and FDI within the period (1972-2007) by applying a cointegration technique. He found that no cointegration exists among variables.

Ashgar (2016) examined the relationship between FDI inflows and trade openness in Sudan through the period between 1990 and 1997. The study reveals that the trade openness variable was an influential factor affecting the FDI flow in Sudan through the period between 1976 and 1997. Although both the theoretical and empirical applications reviewed above have been incorporated worldwide, there must have been several attempts to analyse the impact of trade openness on FDI in Sudan economy. However, there have been no attempts to address the impact of trade on FDI in Sudan either in general or by sector in particular.

Omran Abbas Yousif Abd Alla, et al. (2015) attempted to investigate some economic determinants of FDI in Sudan in the period between 1990 and 2013. The regression results suggest that the exchange rate, transportation and communication, and oil exploration are the major determinants of FDI in Sudan through the period, while the growth rate of real gross domestic product and openness have an insignificant impact on FDI.

The study attempts to investigate the impact of trade openness and FDI on the Sudanese economy by sector during the 1990-2017 period by using Ros’ (2001) argument.

3. Methodology and Data

This study attempts to investigate the impact of trade openness and FDI on the Sudanese economy by sector during the 1990-2017 period by using Ros’ (2001) argument.

3.1. Model Building

The methodology we followed in the analysis comprises two steps. Firstly, we will specify the models based on a certain measurement for trade openness for the economy and the relevant sectors covering the period between 1990 and 2017 with a focus on the agricultural and the industrial sectors respectively.

Secondly, we will try to employ a cointegration analysis for the whole economy and the main productive sectors, namely the agricultural and the industrial sectors. This is because, in the case of Sudan, we think these sectors would be the drivers of growth for three reasons: 1) the agricultural and the industrial sectors are producing sectors and they should lead economic growth to be one of the main pillars of the poverty reduction strategy; 2) like many Sub-Saharan African countries (we regard Sudan as a part of Sub-Saharan Africa region, nevertheless, it is also regarded as a part of the Northern Africa, for example, by the UN Development Programme), Sudan failed to substitute primary exports with manufacturing exports to transform its economy from an underdeveloped one into a developed one; 3) it is essential to know to what extent these sectors can absorb FDI and hence state the priorities according to the share of each sector with regard to trade openness.

However, trade openness exposes the economy to further adoption of foreign technology and increases the competitive ability of these sectors, which ultimately encourages rapid FDI.

This study employs different proxies for trade openness as relevant to the economy and the sectors under investigation. They are as follows.

- **Trade openness for the whole economy:**
  \[ FDI = F(EOP) \]
  \[ FDI = F(EOP) \]

where, following the literature, we use convenient trade openness which is measured by exports plus imports over the GDP. We use total exports divided by total imports which we call «export efficiency» as a proxy for trade openness or exports index for the whole economy (for further details see, for instance, Ros (2001) and Ashgar (2016)).

- **Trade openness for agriculture:**
  \[ AFDI = F(EOPA) \]

where:

- **AFDI** indicates agricultural foreign direct investment;
- **OPI** stands for agricultural trade openness measured by export efficiency or export index.

Since Sudan heavily depends on exports of primary agricultural products, this study uses primary exports as a ratio of total exports to measure trade openness for agriculture. In this we follow Ros (2001) who, for a particular developing country that depends upon one or a limited number of primary goods, uses the trade orientation index and trade integration as an indicator of trade openness to reflect the growth stage of that country.

- **Trade Openness for Industrial Sector:**
  \[ IFDI = F(OPI) \]
  \[ IFDI = F(OPI) \]

where:

- **IFDI** indicates industrial foreign direct investment;
- **OPI** stands for industrial trade openness measured by export efficiency or export index.

Like many Sub-Saharan African countries, Sudan has failed to promote the primary exports into manufacturing exports to transform its economy from an underdeveloped one to a developed one.
The export of manufacturing products as a ratio of total import is used as a proxy of trade openness in the industrial sector. This is also based on the theoretical view of the integration index. Increases in manufactured exports impose exposition to foreign technology and competition encourages a rapid rate of FDI.

• Trade openness for the whole economy using conventional measurement:

\[ FDI = f(TOP), \]  

(4)

where:

\( FDI \) indicates foreign direct investment;

\( TOP \) indicates trade openness, measured by conventional measurement on term of total export plus import over GDP.

Most of the empirical literature uses trade openness in terms of exports plus total imports divided by GDP.

3.2. Data Testing

A conventional measurement of trade openness alone does not lead to the desired measure of trade and transformations in the economy. The study puts more emphasis on the use of the trade orientation index and trade integration as an indicator of trade openness.

Based on equations (1), (2), (3) and (4), we will apply the Johansson cointegration technique to estimate the impact of FDI on the overall economy and the relevant sectors.

The cointegration concept is a relatively new statistical technique introduced by Engle and Granger (1969). It is used as an explicit statistical model for the analysis of the relationship between integrated series. In particular, it allows individual time series to integrate, and it is suitable for linear combination of the series to be stationary. To qualify this, and to estimate the run-long combination, the Johanssen and Julius (1990) procedures and the Johansen (1988; 1991) methodology of cointegration of a long-run equilibrium relationship are applied. They proposed maximum likelihood estimation that helps researchers to make simultaneous estimation of the model involving two or more variables. This procedure is independent of the choice of the endogenous variables, and it allows researchers to estimate and test the presence of more than one cointegrating vector(s) by imposing linear restrictions in order to determine the long-run behaviour parameters. Once a co-integration has been estimated, the short-run dynamics of this relationship can be depicted by estimating an error correction model.

Based on the above, the error correction mechanism is based on the following vector error correction model (VECM):

\[ \Delta y_t = \sum_1^p \Gamma_i \Delta y_{t-i} + \rho \Delta y_{t-1} + \mu + \varepsilon_t, \]  

(5)

\[ \Gamma = \sum_1^p \Gamma_i, \text{ and } P = \sum_1^p \Gamma_i - I, \]  

(6)

where:

\( Z \) is the \( P \times 1 \) vector time series;

\( \Gamma_i \) is the \( P \times P \) coefficient matrix;

\( P \) is the \( P \times P \) matrix;

\( \mu \) is the \( P \times 1 \) vector deterministic variables;

\( \varepsilon \) is the vector of Gaussian error terms.

The existence of cointegration is based on the rank of \( P \).

• If \( \text{rank}(P) = r = P \) (full rank), the vector time series is stationary and no long-run relationship exists among the variables.

• If \( \text{rank}(P) = r = 0 \), there is no co-integration vector and (VAR) based purely on the first difference of \( Z \) is appropriate.

• If \( \text{rank}(P) = P < P \), then time series are non-stationary and there exist \( P \) cointegration vectors. Under this condition, the matrix \( P \) can be expressed as the product of two \( P \times r \) matrices \( \alpha \) and \( \beta \) both of full column rank:

\[ P = \alpha \beta'. \]  

(7)

With \( \beta' \) being the matrix of cointegration vectors, and \( \alpha \) representing the error correction coefficient (which reflects the speed of adjustment to the long-run equilibrium).

4. Unit Root Tests

Before turning to the test for cointegration, we must determine the order of integration of the variables by using the Augmented Dickey-Fuller (ADF) test. The unit-root hypothesis is tested at the constant and linear trend as well as in the first difference. The lag length in the ADF regression is selected striking a balance between the lag length chosen by the Akaike information criterion (AIC) and the \( t \)-test of the lags. The ADF is a test used for time series properties because any empirical work based on time-series data should first be tested for stationarity before running any estimation in order to avoid the problem of spurious regression and misleading results. The most popular ones are the ADF based on Dickey and Fuller (DF). The ADF test relies on rejecting a null hypothesis of the unit root (testing for the unit root with constant and linear trend) in favour of the alternative hypothesis of stationarity. The ADF consists of the following:

• Testing unit roots (the ADF test with the constant) as follows:

\[ \Delta y_t = \mu + (\beta - 1)y_{t-1} + \sum_{i=1}^k \lambda \Delta y_{t-i} + \varepsilon_t, \]  

(8)

where:

\( \Delta \) indicates the variable under study;

\( \mu \) is the first difference operator;

\( \beta \) is an error term, or indicates stationarity random error;

\( \mu = \text{iid}(0, \sigma^2) \);

\( \varepsilon \) is a white noise disturbance;

\( t \) is a time period;

\( n \) is the number of lags for the dependent variable which is chosen to ensure that the residuals are white-noise.

The \( t \)-statistic of \( (\beta - 1) \) is used to test the null hypothesis indicating that this coefficient is equal to zero, i.e. \( \beta = 1 \). To determine the proper lags for each variable, the lag length is chosen according to the Akaike information criterion and the \( t \)-test of lag.

• Testing for unit roots (the ADF with the constant and linear trend) by:

\[ \Delta y_t = \mu + \alpha T + (\beta - 1)y_{t-1} + \sum_{i=1}^k \lambda \Delta y_{t-i} + \varepsilon_t, \]  

(9)

where:

\( \lambda \) indicates trace statistics.

With reference to what has been stated, since there are more than one method of conducting cointegration tests, this study uses Johansen’s cointegration technique (1990; 1992). This technique is preferred to the Engle-Granger (1969) method for the following reasons:

1) It depends on the normalisation of the variables in the cointegrating equation. Thus, it is possible that the arbitrary choice of one variable as a dependent variable and the other as an independent variable may lead to the conclusion that the variables are cointegrated, whereas reversing the choice of dependent and independent variables may indicate no cointegration;

2) It relies on a two step estimator, in which the first step is to generate the residuals from the cointegration regression and the second step is to use the residual generated from step one to test for unit roots; any error introduced in the first step also affects the second step;

3) The Johansen-Jueslius method applies the maximum likelihood procedure to determine the presence of cointegrating vectors in non-stationary time series.

3.3. Sources of Data

Data pertaining to the dependent variables and the explanatory variables were compiled from different sources. Times series on FDI and trade openness were obtained from the Central Bureau of Statistics (CBS), the Ministry of Finance and the Bank of Sudan, while the time series data on
exports and imports were obtained from the Central Bureau of Statistics.

4. Estimation and Finding Results

Before we run the cointegration test we test the stationarity of data using unit root tests, namely the augmented Dickey-Fuller test for each time series variable.

4.1. The Stationarity of Data: Augmented Dickey-Fuller Tests (ADF)

As mentioned before, we test the stationarity of data in order to avoid spurious regression by using the Augmented Dickey-Fuller Test (ADF). As we have outlined in the methodology, the presence of the unit root justifies the estimation of the functions within the cointegration framework. The ADF results are shown in Table 2.

Using the (ADF) test, the unit root test hypothesis tested the variables at their level and the first difference as shown in Table 1. The null hypothesis is the presence of the unit root. The lag length in the ADF regression is selected striking a balance between the lag length chosen by the Akaike information criterion (AIC) and the $t$-test of the lags. All the variables are tested to be stationary in the level and the first differences respectively. According to the obtained results, we conclude that all variables are integrated at order (1).

4.2. Cointegration Results

The presence of unit-root tests in Table 2 justifies the estimation of trade openness and FDI for the economy and its sectors within a co-integration framework.

Since the cointegration test critically depends on the choice of the lag-length, we base the lag selection on the likelihood ratio test of model reduction, moving from two to four lags. In this representation, for estimating the long-run function in equations (1), (2) and (3) we use the Johansen and Jueslius (1990) and Johansen (1988; 1991) methodology of cointegration, as a long-run equilibrium relationship between conventional trade openness and FDI series over the 1990-2017 period. The cointegration test implies that there is a stable relationship between the two series for economy as a whole in the sense that in the long-run they tend to move together rather than wandering away from each other. Table 3 shows the estimation results.

From the above table, the cointegration results can be summarised as follows:

- The cointegration equation by conventional measurement is:

$$\ln(FDI) = -11.1\ln \text{trend} + 53.3 \ln \text{TOP}. \quad (10)$$

- The cointegration results for aggregate economy based export efficiency are:

$$\ln(FDI) = -20.6\ln \text{trend} + 0.17 \ln \text{EPD}. \quad (11)$$

- The cointegration results for the agricultural sector export efficiency are:

$$\ln(\text{AFDI}) = -0.9 \ln \text{AOP}. \quad (12)$$

- The normalised cointegration results for the industrial sector based on the Ros Index (2000) are:

$$\ln(\text{FDI}) = -0.53 \ln \text{OP}. \quad (13)$$

Consequently, the results of testing the number of cointegrating vectors are reported to have both the null hypothesis and the minimum Eigen value statistics. In the trace test, the null hypothesis is that the number of cointegrating vectors is less than or equal to $r = 0$; while in the maximum Eigen value test, the alternative for $r = 0$ is $r = 1$. For the overall economy, we have found that both of the tests reject the null hypothesis of no cointegrating vector at a 5 percent or less level in favour of one cointegrating vector. The normalised cointegration vector corresponding to the long-run cointegration as shown in Table 3. The results yield the following normalised cointegration equation of the aggregate.

As expected, equations (10), (11), (12) and (13) show that there is a long-run relationship between trade openness in terms of joint measurement in general. The degree of openness was estimated at 0.55 for the aggregate economy using conventional measurement. This value is negative, and it is in line with the share of this factor in other studies, as we have shown in the literature review. The value is negative and is in line with the share of this factor in other studies, for instance by Seim (2009) who explores a negative as well comparable relationship between trade openness and FDI inflows and argues that the result depends on research and needs some careful explanation. As expected, there is a long-run relationship between trade openness measured by the export efficiency or the Ros (2001) index. Equations (11), (12) and (13) show that there is a significant relationship between trade openness and foreign direct investment inflows. These findings are similar to those by Ashgar (2016). His results suggest that there is a relationship between trade openness and foreign direct investment inflows. Trade openness has positive and significance effects on FDI inflows in South Asian countries.

4.3. The error-correction model (ECM) tests

Next, employing the error correction model we look into the short-run dynamics of labour efficiency growth for the economy. In the case at hand, the error correction model is applied for the overall level (using their series data of labour
quality growth) represents the disequilibria from the long-run states. The error term coefficient has negative values. Therefore, the short-run dynamics is modelled by estimating the capital labour quality ratio in the first difference. The model is fitted by applying the ordinary least square method. The error correction model results are given in Table 4.

The estimated coefficient of the error correction model is significant and has a negative value compatible with the theory and consistent with the empirical literature. The $R^2$ values suggest that 89 of the variations in FDI in Sudan is explained by the joint trade openness contribution and measurement.

The vector error correction results in Table 4 show how the economy and its sectors adjust or return back into their equilibrium state and also show the speed of adjustment of the variables to the long-run equilibrium.

5. Conclusions

Trade and FDI have been very important areas of research. Hence, large bodies of literature review have enhanced the knowledge on the impact of trade on FDI inflow.

This paper focuses on long-run relations between trade openness and FDI in Sudan at the national and the sectoral levels.

As noted in this paper, the cointegration technique has never been used in previous studies. The Johansson cointegration was applied to the whole sample period of 1990-2017 for both the Sudanese economy as a whole and its sectors.

The cointegration analysis indicated that FDI for the overall and sectoral level was mainly driven by the degree of trade openness during the 1990-2017 period.

The results indicated that for the period under study, the FDI for the Sudanese economy and its key sectors has been attracted by trade openness measured either in terms of exports plus imports or export efficiency/ the Ros (2001) index. However, the long-run relationship for the Sudanese economy was estimated to be value of 0.53 by using the conventional measurement, which is in agreement with findings by Seim (2009) and Dunning (2003) who argue that the relationship between trade openness and FDI inflows is complex and can be negative, which depends on the features of each case separately, because the impact of trade openness on FDI inflow may change according to the inspiration for appealing FDI activities. The linear combination of FDI and the degree of trade openness measured by using export index indicate positive values of 0.17, 0.9 and 0.55 for the whole economy, the agricultural sector and the industrial sector, respectively. Furthermore, the degree of trade either being negative or positive supports the widely known view that the resources in Sudan are allocated for non-productive projects.

Source: Compiled by the authors

The Appendix 1: Sudan population size, Trade Openness and FDI structure in USD thousands, 1990-2017

| Year | Population size by (000) | Trade openness | Aggregate FDI | Agricultural FDI | Industrial FDI |
|------|--------------------------|----------------|---------------|-----------------|---------------|
| 1990 | 26,066,123               | 7.5            | 6943.0        | 1223.0          | 4000.0        |
| 1991 | 26,656,061               | 9.3            | 7482.5        | 1142.5          | 4500.0        |
| 1992 | 27,307,051               | 9.9            | 12750.4       | 9077.6          | 4500.5        |
| 1993 | 27,970,525               | 31.1           | 1820.0        | 10380.0         | 2821.7        |
| 1994 | 28,656,671               | 35.8           | 43733.4       | 4761.9          | 30101.9       |
| 1995 | 29,352,022               | 36.0           | 69397.8       | 8796.6          | 47611.8       |
| 1996 | 30,058,483               | 29.6           | 76938.8       | 36823.3         | 29279.7       |
| 1997 | 30,777,679               | 23.1           | 115141.0      | 61861.8         | 36453.8       |
| 1998 | 31,499,341               | 27.2           | 149412.5      | 49222.7         | 70416.1       |
| 1999 | 32,210,341               | 20.9           | 130822.1      | 31114.3         | 64526.3       |
| 2000 | 32,920,415               | 25.6           | 1676795.0     | 103126.0        | 74539.7       |
| 2001 | 33,568,336               | 25.7           | 104122.5      | 32988.0         | 42528.2       |
| 2002 | 34,213,147               | 24.1           | 150540.0      | 59634.0         | 56564.4       |
| 2003 | 34,855,802               | 24.7           | 3529087.0     | 399090.7        | 726677.0      |
| 2004 | 35,522,988               | 28.6           | 1912117.5     | 35104.0         | 118592.0      |
| 2005 | 36,409,188               | 31.2           | 3137703.8     | 90784.0         | 207725.0      |
| 2006 | 37,318,188               | 28.0           | 48010.0       | 166895.4        | 114710.0      |
| 2007 | 38,280,987               | 31.8           | 221761.2      | 30368.4         | 160250.0      |
| 2008 | 38,998,903               | 35.9           | 49557.49      | 82885.6         | 395182.0      |
| 2009 | 39,708,789               | 35.9           | 52571.9       | 85290.0         | 191584.0      |
| 2010 | 39,221,210               | 33.8           | 303992.5      | 45796.0         | 248348.0      |
| 2011 | 36,997,100               | 27.3           | 4511190.1     | 19471.0         | 421101.0      |
| 2012 | 37,656,789               | 19.5           | 214642.5      | 76211.0         | 119640.0      |
| 2013 | 34,250,213               | 20.4           | 176277.2      | 80028.8         | 88787.5       |
| 2014 | 35,450,340               | 16.4           | 179552.1      | 43190.0         | 117502.1      |
| 2015 | 36,780,789               | 48.7           | 160719.7      | 48749.5         | 127771.0      |
| 2016 | 36,765,216               | 26.3           | 170619.8      | 38588.9         | 113531.6      |
| 2017 | 33,554,575               | 26.3           | 170619.8      | 38588.9         | 113531.6      |

Source: (1) was obtained from Central Bank of Sudan; (2), (3), (4) and (5) were obtained from Ministry of Finance and Central Bureau of Statistics, respectively.

The Appendix 2: Growth rate of GDP, FDI structure and inflation rate, 1990-2017, %
Appendix 3: Imports, exports, manufacturing exports, FDI, agricultural exports (%); manufacturing exports efficiency, agricultural exports efficiency and manufacturing exports efficiency, 1990-2017

Since the study found that, there is a long-run equilibrium relationship between trade (joint measurement) and FDI for the economy and its sectors, government policies should focus not only on promoting the level of trade openness in the economy but also on the magnitude of the degree of openness in the agricultural and the industrial sectors. Besides, the industrial sector should be prioritised in order to promote its export efficiency, taking into consideration that it should also attract finance to key productive sectors as well as the fact that investment in the industrial sector will improve the country’s infrastructure.

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