Does monetary integration lead to an increase in FDI flows? An empirical investigation from the West African Monetary Zone (WAMZ)

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Abstract

This paper investigates the relationship between monetary integration, foreign direct investment (FDI) and trade in the West African Monetary Zone (WAMZ) using annual time series for the period 1980−2013. It also examines whether trade and FDI are complement or substitute. Several econometric models are applied including Ordinary Least Squares (OLS) and fully-modified OLS (FMOLS). Our empirical results revealed that FDI flows into the WAMZ is influence positively by monetary integration. The findings also suggest that while real GDP, large population size and greater distance positively influence FDI flows, weak economic freedom index negatively impact FDI flows into the zone. The results support the argument that monetary union positively affect trade. Our empirical finding support the hypothesis that FDI and trade flows are complementary. The results are in line with earlier research findings. Therefore, any policy that promotes trade such as monetary integration enhances FDI inflows as well. The findings offer perspectives and insight for a new policy in WAMZ economies in their drive to attain sustainable economic growth.

1. Introduction

In an integrated region, barriers that formerly confront investors are not only removed but investors have the ease to move around within the zone. These characteristics could lead to an increased inflow of Foreign Direct Investment (FDI). In theory, capital moves from places where it exists in abundance to places where it is limited. Because capital is relatively limited in most West African countries, it is argued that a monetary integration can attract a great amount of capital into the zone.[2] From the host country perspective, FDI inflows are usually regarded as openly beneficial. They finance substantial amount of domestic investment in host countries. FDIs create employment opportunities, boost domestic demand and enhance growth. In addition, they are less volatile than other forms of capital flows, because investors have long-term orientation schedules. They also bring a huge package of managerial and technological know-how that the host country welcomes. The source country could benefit from low cost of production due to lower wage rate in host country. It is well documented that foreign direct investment is an important factor in the economic development of any country particularly least developing nations. It has also been argued that trade has been the energy of economic growth. Studies have shown that integration in the form of monetary integration enhances trade by more than three folds (see Rose & Glick (2001)). It also been argued that trade and FDI to larger

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[2] West Africa Monetary Zone members are Gambia, Ghana, Guinea, Nigeria and Sierra Leone. Liberia and Cape Verde are considered new joiners.

extent exhibits similar characteristic (see Brenton, Di Mauro, and Lucke, 1999).

The motivation for the study is the low and uneven level of economic growth in the economies of the region. In order to overcome this, there is need to formulate policies that will enhance FDI and trade flows into the region. One possible channel to release the benefits of FDI and trade is through more integration. Hence, monetary integration is a possible catalyst to sustainable economic growth. Integration impact on trade flows and FDI will help convince policy makers to consider joining a monetary union.

In this paper, we assess the impact of deepening integration within West Africa paying more attention to the second monetary zone on FDI flows to zone member countries. Consequently, we seek to answer the question: is there an increase in FDI flows to West African Monetary Zone, and how has it been evolving over the years?

In a host country, the following factors positively attract foreign direct investment and trade flows: large market base, income level, population size, low cost of production, political stability, good governance, institutional quality, level of infrastructure, quality of labor force, and common colony. FDIs drive growth positively when the host country is well developed. Foreign direct investment may also be a vehicle for transfer of technological knowledge from source to host country. These influencing factors justify the use of traditional gravity model and Ordinary Least Squares (OLS) methodology in estimating FDI and trade flows. These estimation techniques will help us establish a relationship between FDI and integration, trade and integration and trade and foreign direct investment. The findings will offer policy recommendations.

To the best of our knowledge, this is the first study that clearly considers the impact of monetary integration in the West African region on FDI inflows to the region; and the complementarity or substitutability of trade and FDI flows in the region. This is the first paper to establish a link between FDI and trade via integration channel using West African countries. Although Brenton et al. (1999) looked at Economic Integration and FDI but their study covered the European Union only.

This paper is organized as follows: literature review on FDI flows and regional integration is discussed in Section 2, which is followed by data and methodology for the empirical work in Section 3. Section 4 discusses the empirical findings. Summary and conclusion are discussed in Section 5.

2. Literature review

The initial research carried by Mundell (1961) and McKinnon (1963), the pioneers of Optimum Currency Area (OCA) have triggered further research in the field. these the studies include the suitability of a region as an optimum currency area and its economic impact (see Alesina & Barro, 2002; Alesina, Barro, & Tenreyro, 2002; Alesina, Spolaore, & Wacziarg, 2000; Casella, 1992). Masson and Pattillo (2004a, 2004b) and Devarajan and De Melo (1987) have done substantial work on monetary integration in the African continent. However, prior to the European Monetary Integration, few studies looked into the impact of regional integration on FDI flows. A number of researches have been carried out on monetary integration and its impact on trade flows (see Frankel & Rose, 1998, 2000, 2002; Rose & Glick, 2001; Rose & Van Wincoop, 2001). Since the Euro came into existence, more studies on trade, monetary integration and FDI began to surface. Brenton et al. (1999) study on the impact of European Union (EU) on investment flows revealed that EU single market program led to significant increases in investment by EU firms in other EU countries in the late 1980's. Markusen (2000) also surveyed the literature, and he developed a model that takes into account both vertical and horizontal multinational activity with intra and inter industry trade. In his model, he incorporated economic size as one of the explanatory variables for the level of bilateral FDI. There are two forms of FDIs namely horizontal and vertical FDI. In a horizontal FDI, firms duplicate almost the same activities in different countries. Unlike horizontal FDI, in a vertical FDI different stages of production for a firm are located in different countries. Majority of FDIs are influenced by market rather than low cost of production.

In a horizontal FDI, there is a trade-off between plant fixed cost and trade cost. In a relatively small host country, the savings from trade cost is much lower than the fixed costs in setting up a production. Therefore, exports will be preferred over FDI. However, when the host country in a relatively large, and the fixed cost of the plant is overcomed by trade costs savings, FDI will be preferred over exports. The implication of this is that a choice between FDI and exports results in a trade-off between trade cost and fixed costs. It implies that in this FDI framework, firms cannot be involved in both exports and FDI.

In practice, however, firms engage in both FDI and exports. A typical setting for a vertical FDI is where home country is much bigger than host country. A vertical FDI framework is like a developed country as the source country and developing countries as the host country. Subsequently, other researchers followed and the empirical research of the bilateral distribution of FDI using the gravity model began to gain much attention. Brainard (1997), Eaton and Tamura (1996) surveyed the literature and employed the gravity model to investigate bilateral FDI flows. Brenton et al. (1999), using simulation models with certain choice of parameter specifications, assessed the impact of deepening integration between the EU and Central and Eastern European Countries (CEECs) on FDI. They addressed the following: the expected long-term level of FDI flows in the CEEC; whether FDI and trade are either complements or substitutes; and whether an increase in integration in the region will lead to a reduction of FDI inflows from the CEEC to other European countries. According to their findings, FDI diverges from the normal pattern in the CEEC, that is, there is no substantial evidence of a surge in FDI inflows in the CEEC. They found trade and FDI are complementary. They also found no evidence that an inflow of FDI going to the CEEC region has a clear negative impact on

the amounts of overseas investment going to other European countries such as Spain and Portugal.

Dabla-Norris, Honda, Lanhreche, and Verdier (2010) examined FDI flows in low-income countries − Global drivers and Growth implications using large sample of middle and low-income countries. They found key drivers to FDI in low-income countries before the crisis was due to lower borrowing costs and positive real side external factors. They also found that strong economic reform and guarantee to macroeconomic discipline are important determinants to benefit in the growth of FDI. Mlachila and Takebe (2011) examined the flow of FDI from the BRICs to low income countries. They found that official data on FDI are seriously underestimated in volumes due to informal operation of most small and medium enterprises (SMEs) but recognized the increased in FDI flow has been significant. They also found FDI flow from BRICs into many non-rich resources in LIC and play a significant role in the growth of these countries. Lumbila (2005) used panel analysis of the effect of FDI on economic growth using 47 African countries from 1980 to 2000. Their results revealed that FDI positively impacts growth. In addition, human capital, conductive investment climate from a well-developed infrastructure and stable macroeconomic environment in the host countries enhance FDIs positive impact on growth.

Farole and Winkler (2014) assessed whether FDI work for Africa. They found exports and FDI are becoming much more interwoven which is an opportunity for developing countries. That is countries should not only limit in attracting FDIs but take advantage of the productivity enhancing potential of FDIs which depends on how integrated FDI is to local economies. Hence, governments need to take note of spillovers and the level of leverage to make it happen. Hence governments need to take the right approach to ripe the benefit of FDI.

3. Data set and methodology

The FDI data set consist of annual observation of stock FDI inflows from eleven (11) OECD countries between 1980 and 2013. These OECD countries were chosen based on the following, they are known as the main source of FDI for these countries, historical connection as the colonial masters and based on their high GDP. However, some high GDP countries such as Canada were omitted as a source country from the research. Data set for the host countries is annual time series spanning from 1980 to 2013. The data was sourced from the World Bank's World Development Index 2015 database. We dropped observations where data was missing. Real Gross Domestic Product and population were also sourced from World Bank's World Development Index 2015 database. Distance was measured as the great circle distance between countries' principal cities. We used kilometers per square as a measurement scale for distance. *The Economic Freedom Index (EFI)* is extracted from the Heritage Institute site (*www.heritage.org*). The trade data set consist of bilateral trade observations consisting of 34 years. We used bilateral trade data covering data from 1980 through 2013. Direction of Trade

(DoT) data set is used from the database developed by the *International Monetary Fund* (IMF). The DoT data set covers bilateral trade between 217 IMF country codes. Bilateral trade on FOB exports and CIF imports are recorded in U.S. dollars. The values of exports and imports in US dollars is used as a bilateral trade measure. We then added a number of other variables that are necessary to estimate the gravity model.

According to Brenton et al. (1999), three main conditions need to exist before a firm can engage in direct investment outside the host country: ownership, location, and internalization advantage.[3] Foreign firms secure an advantage over local rivals in the foreign markets either via the quality of the product or process or as a result of superior management quality. Location advantage permits firms to produce or provide the services. Over the past twenty-five years, foreign direct investment (FDI) flows exhibit features similar to the evolution of trade flows. This paper employ the gravity model which was developed in the 1960s and is the most popular model apply in measuring trade flows. We follow the work of Brainard (1997), Eaton and Tamura (1996). The rationale for using the model is that the evolution of trade and FDI share some common features. We follow Brenton et al. (1999) with little modification of the gravity model by including Economic Freedom Index dummy, which captures instability taking into account that the zone is characterized by wars and coups. The model treats FDI as an increasing function of the countries' income and population and a decreasing function of distance between the two countries. The gravity model is as follows:

$$\ln X_{ij} = \alpha + \beta_1 \ln Y_j + \beta_2 \ln Pop_j + \beta_3 Dist_{ij} + \beta_4 EFI_j$$
$$+ \beta_5 WMU2_j + \beta_6 WNJ_j + \sum \gamma_k D_{kij}$$

where

X_{ij} is any flow of FDI, exports or imports or stock from source country i to host country j per cent of host country's GDP;

Y_j is the income of host country j;

Pop_j is the population of country j;

$Dist_{ij}$ is the distance between source and host countries i and j respectively;

EFI_j represents Economic Freedom Index for host country j;

$WMU2_j$ is a dummy representing the second monetary integration in west Africa;

WNJ_j is a dummy representing countries that are new joiners or observers of the second monetary integration; and

D_{kij} is preferential relationships such as common language, common colonies etc. between country i and j which influence the flow of stock from source to host country.

In a traditional bilateral trade equation, the volume of flow into a country is positively influenced by its income level and

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population size. Consequently, FDI flows are expected to be positively related to income level of the host country since it has positive influence on the domestic market. The greater the distance between the source country and host, the greater the cost for the source country to form an affiliate in the host country. Therefore, distance could dampen FDI inflows.[4] Intuitively, as the distance between the source and host country widens, the higher the associated cost such as communication costs, language and cultural difference, exchange rate cost, etc.

The empirical measurement for the model will be employed in the following two ways. First, the 'normal pattern' of FDI stock net inflows to the zone coming from major investing organization for Economic Co-operation and Development (OECD) countries[5] is estimated. The normal pattern reflects FDI stock inflows under the conditions where stocks have been fully adjusted to any changes in the explanatory variables that took place in the past. The current actual level of FDI from the source OECD countries to the West African integrated countries can be compared to this 'normal pattern' by using dummy variables for the groups of West African Monetary Union. The first group consist of countries forming a monetary integration (WMU2) and the second group consists of new joiners (WNJ).

Second, the hypothesis that trade and FDI flows are complementary or substitute is tested using the gravity model with exports, imports or exports plus imports as percent of GDP as a measure for trade. We then add the residual from the FDI regression as one of explanatory variable in the trade regression. If the coefficient of the FDI residual is positive, we conclude that trade and FDI are complementary. However, if the coefficient of the FDI residual is negative, we do not reject the hypothesis that FDI and trade substitutes. The empirical results are discussed in the next section.

4. Empirical results

4.1. Actual and expected FDI flows in WAMZ

This section discusses the regression results of FDI net inflows from investing OECD countries to selected countries in West Africa using 1980−2013 data. As discussed, the gravity model is employed to estimate the 'normal pattern' of FDI inflows. Dummy variables are added for the two groups of West African economies − the first monetary integration members and new joiners to test for any divergence from the normal pattern. If the coefficients are significant and negative then WMUs can expect to benefit from further larger FDI inflows from these investing countries as investors adjust their stocks to the new opportunities that come as a result of more economic integration. However, if the coefficients of the dummy are insignificant, then any further increase in FDI

inflows may come via changes in the 'normal' determinants of FDI, particularly GDP growth. The *Economic Freedom Index* (EFI) constructed by the Heritage Foundation is added as an explanatory variable in the regression. The index takes into account factors that influence investors to undertake investment in any particular country. It provides an annual ranking for about 150 countries.[6] As a prior the higher the EFI index, the lower the inflows. We used Augmented Dickey-Fuller unit root test to examine whether the data is stationary (see Appendix A, Tables A1 and A2). On the one hand, population, real GDP, Economic Freedom Index, and trade data series are stationary at level and intercept. On the other hand, distance[7] (which is fixed from source to host country) for all source countries with the exception of Austria, Switzerland, and South Korea are stationary at 90 percent confidence level. The stationary of the data series warrants us to employ Ordinary Least Squares (OLS) method to estimate the gravity model using the first difference for distance. The regression results are in Tables 1−3 with different specifications for the investing OECD countries. Summary statistics of growth of yearly FDI flows from OECD countries to the West African countries considered in the study is presented in Table 4. Although OECD countries exhibits similar growth in FDI flows, France, Germany and United States topped the list. Since one of the problems in applying OLS is the presence of heterskedasticity, we applied white heteroskedasticity test to examine the robustness of standard errors. The robust standard errors are reported in column 9 in Tables 1−3. When three variables such as income, population and distance are included in addition to dummies, most coefficients have the expected signs. The coefficient of real GDP growth has the expected sign and is statistically significant. Host country GDP growth significantly influences Foreign Direct Investment (FDI) flows from OECD countries. The coefficient for population has positive sign. From the results, in West African countries, the higher the population growth the higher FDI flows. All OECD countries show positive and statistically significant relationship between host country's population growth and FDI inflows. The coefficient for distance, three countries (France, Netherland and Switzerland) has a negative sign. However, only Switzerland has a negative sign and statistically significant. All the remaining OECD countries under consideration show a positive relation between distance and FDI inflows. The results are not only positive but statistically significant. Our results to certain extent differ from that of Brenton et al. (1999) where coefficients for population and distance have negative signs for most of the OECD investing countries to CEECs host countries. The coefficient for Economic Freedom Index shows the expected negative sign, with the exception of Finland and Norway which show positive coefficients but

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[4] Theory however suggests that firms will tend to prefer FDI to exports as trade costs rises due to distance.

[5] The source countries we considered are: Austria, Finland, France, Germany, Netherlands, Norway, Switzerland, UK, USA, Japan, and South Korea.

[6] The ten factors that are taken into consideration when ranking a country are: trade policy, taxation, government intervention in the economy, monetary policy, foreign investment, banking, wage and price controls, property rights, regulation and black market activity.

[7] Although, distance is fixed from source country to host country, we performed a unit root test on the variable.

Table 1
Ordinary least squares regression results: determinants of bilateral FDI, major OECD investing country (dependent variable: log of FDI flows), 1980−2013.

Investing country	Real GDP	Log of population	D (log of distance)	Economic freedom index	WMU2	WNJ	Adj. R^2	Robust S.E
Austria	0.03***	0.45***	0.90***	−0.01***	0.07	0.43***	0.21	0.81
Finland	0.02***	0.47***	0.42***	0.00*	−0.02	0.58	0.12	0.66
France	0.01*	0.54***	−0.38	−0.01***	5.15*	5.11*	0.59	0.53
Germany	0.01**	0.57***	1.00***	−0.01***	−0.11*		0.39	0.43
Netherlands	0.01**	0.25***	−1.14	−0.01***	9.88*	10.25*	0.23	0.69
Norway	0.01**	0.52***	0.49***	0.00*	0.02	0.32**	0.11	0.75
Switzerland	0.03***	0.29***	−2.70**	−0.01***	13.95**	14.59**	0.36	0.72
UK	0.01*	0.83***	0.02	−0.00	1.16***	0.66***	0.51	0.71
US	0.01**	0.66***	0.68***	−0.00	0.01	0.58***	0.31	0.48
Japan	0.02**	0.48***	1.15***	−0.01***	−0.05	−0.38***	0.30	0.70
South Korea	0.01**	0.25***	0.86***	−0.00	−0.25***	−0.48***	0.10	0.75

*** 1% significant level, ** 5% significant level and * 10% significant level.

Table 2
Ordinary least squares regression results for bilateral trade, major OECD countries (dependent variable: log of exports), 1980−2013.

Reporting country	Real GDP	Log of population	D (log of distance)	Economic freedom index	WMU2	WNJ	Adj. R^2	Robust S.E
Austria	0.00	0.97***	0.14*	−0.01***	0.19***	0.06	0.51	0.59
Finland	−0.014*	0.89***	−0.25*	−0.01**	0.28**	−0.05	0.23	1.08
France	−0.02***	1.62***	−0.94***	−0.00	0.04	0.43***	0.60	0.72
Germany	0.002	1.07***	0.07*	−0.00**	0.21***	0.87***	0.77	0.31
Netherlands	0.01**	0.72***	0.84***	−0.01***	0.18***	0.38***	0.50	0.42
Norway	−0.01*	1.24***	−0.76***	0.00	0.53***	1.78***	0.50	0.73
Switzerland	−0.01**	1.15***	−0.34***	−0.00	0.06*	0.60***	0.62	0.50
UK	−0.00	0.85***	0.56***	−0.01***	0.64***	0.27***	0.65	0.45
US	0.01**	1.01***	0.23***	−0.00***	0.35***	0.62***	0.69	0.39
Japan	−0.01**	1.21***	−0.54***	0.01***	0.20***	1.10***	0.54	0.61
South Korea	−0.01	1.56***	−1.32***	0.01***	0.31***	1.87***	0.50	0.85

*** 1% significant level, ** 5% significant level and * 10% significant level.

statistically insignificant. The monetary union dummies show positive sign. Out of the eleven (11) OECD countries considered, the WMU2 (second West Africa monetary integration) show positive sign indicating that monetary union positively impact FDI inflows. In addition, with the inclusion of new joiners (Liberia and Cape Verde), the coefficient of WNJ dummy is positive and statistically significant for all OECD source countries.

To investigate the relationship between monetary integration and trade, we estimate the gravity equation for exports and imports for source countries to and from host countries. We follow the same specification with Economic Freedom Index and monetary union dummy. Dummy variable for WMU2 and

WNJ are included to test for any potential divergence from the "normal pattern" of trade between West Africa countries and OECD countries. The expected sign is positive for monetary integration, colonial affiliation and common language between host and source countries. From the OLS regression results in Table 2, the coefficients of the two dummies, WMU2 and WNJ respectively have positive signs and statistically significant. With the exception of Finland, WNJ dummy have positive coefficient for all the OECD countries. Our findings collaborate with earlier research by Anderson and Van Wincoop (2001a, 2001b), and Frankel and Rose (2002) that integration enhances trade flows. It therefore suffices to conclude from the analysis that our results are in line with earlier

Table 3
Ordinary least squares regression results for exports with FDI residual, major OECD countries, 1980−2013.

Investing country	Real GDP	Log of population	D (log of distance)	Economic freedom Index	FDI residual	WMU2	WNJ	Adj. R^2	Robust S.E
Austria	0.00	0.96***	0.18*	−0.01***	0.14*	0.02	0.05	0.50	0.58
Finland	−0.02**	0.93***	−0.25*	−0.01***	−0.44***	0.77***	2.03***	0.26	1.05
France	−0.02***	1.52***	−0.69***	−0.01***	−0.18**	0.53***	0.68***	0.59	0.71
Germany	0.01*	0.79***	0.73***	−0.01***	0.13**	−0.01	0.57***	0.59	0.40
Netherlands	0.01**	0.64***	1.06***	−0.01***	0.03	0.16*	0.26*	0.46	0.43
Norway	−0.01*	0.79***	0.36**	−0.01***	−0.03	0.31*	1.37***	0.27	0.87
Switzerland	−0.01***	0.96***	0.14*	−0.00***	−0.08*	0.05	0.94***	0.59	0.48
UK	−0.00	0.85***	0.66***	−0.01***	0.02	0.16*	0.37**	0.50	0.51
US	0.01***	087***	0.60***	−0.01***	0.10*	0.12*	0.58***	0.62	0.42
Japan	−0.01**	1.2***	−0.51***	0.01***	0.24***	0.19***	1.09***	0.54	0.60
South Korea	−0.01*	1.60***	−1.39***	0.01***	0.49***	0.33***	1.90***	0.53	0.82

*** 1% significant level, ** 5% significant level and * 10% significant level.

Table 4
Descriptive statistics: growth in FDI outflows from selected OECD countries.

	Mean	Std. dev.	Observations
Austria	5.39	0.92	509
Finland	5.07	0.70	510
France	7.23	0.83	510
Germany	7.23	0.83	510
Japan	6.82	0.82	510
South Korea	5.04	0.79	510
Netherlands	6.64	0.79	509
Norway	5.74	0.79	509
Switzerland	6.09	0.90	510
United Kingdom	6.14	1.02	507
United States	7.19	0.57	502

research that economic integration enhances Foreign direct investment flows (see Brenton et al. (1999)).

To test the robustness of our results, we apply Fully-modified OLS (FMOLS). The results of the estimates are presented in Appendix A, Table A3. The findings does not change the trust of our results. We performed several diagnostic test to check the validity of our results. Wald tests was performed on the variables in the model. The test revealed that all coefficients are significantly different from zero and that the residual looked well behaved and with a mean around zero as shown in Fig. A1, Appendix B. A serial correlation tests was also performed with two lags, which revealed no presence of serial correlation on the residuals. We performed stability diagnostic test on the estimated coefficient using cumulative sum (CUSUM) developed by Brown, Durbin, and Ewans (1975). The graphical presentation of the test are presented in Fig. A2, Appendix B.

4.2. Trade and FDI relationship: are they complement or substitute?

To examine the relationship between FDI and trade, the residual from FDI regression is added in the gravity model as an independent variable. We follow the approach of Brenton et al. (1999) and test *the null hypothesis that trade and FDI are substitutes*. That is, trade will be lower when FDI increases. From the regression analysis, the coefficient of the FDI residual in the trade (exports, imports, or exports plus imports) should have a negative sign for FDI and trade to be substitute. We follow Brenton et al. (1999) and allow the residuals to vary between the two groups of countries (WMU2 and WNJ). To do this, the products of the FDI residual and the two dummies (WMU2 and WNJ) are added as explanatory variables in the regression.

The results are tabulated in Table 3. The coefficients of FDI residuals for seven out of eleven OECD countries have positive sign in the trade measure regression and of this. Out of the seven OECD countries, the coefficients of FDI residuals for the five countries are statistically significant. However, four countries (Finland, France, Norway and Switzerland) out of eleven FDI source countries have negative coefficient. In addition, the coefficient of the product of the residual FDI and the two dummies are positive for all eleven OECD countries. Thus, it suffices to state that FDI and trade move in the same

direction. Using export as a trade measure and taken into account the OECD countries, we rejected the null hypothesis that trade and FDI flows are substitutes and conclude that trade and FDI inflows are complementary. Our results are in line with earlier findings by Brenton et al. (1999) who found a complementary relation between FDI and trade flows. The intuition of the complementary relation between FDI and trade is that FDI enhances the presence of source country firms in the host country. The presence of these firm leads to transfer of technological know-how from sources to host country through in-house training that enhances human capital, increase employment opportunities, boost demand and increase output.

5. Summary and conclusions

In this study, we examined the relationship between integration and foreign direct investment; integration and trade, and FDI and trade in the West African Monetary Zone. We use annual data from 1980 to 2013, applied the traditional gravity model and OLS methodology. The empirical results showed that monetary integration positively enhance FDI inflows; it also revealed that monetary integration enhance trade; and FDI and trade are complementary. The results are consistent with the study by Rose and Glick (2001) that monetary integration enhances trade flows. The empirical findings are also partially in line with the findings of Brenton et al. (1999) that monetary integration enhance FDI; Foreign direct investment and trade complement each other and weak economic freedom index negatively impact FDI inflows. However, the coefficients for population and distance for most source OECD investing countries are positive, which contradicts the earlier findings by Brenton et al. (1999) where these coefficients were negative. A possible explanation is that higher population in host countries (WAMZ region) attracts FDI flows due to large market size and low cost of production. Therefore, policy makers in the West African countries should adopt policies to ease the free movement of people within the region in order to benefit from these gains. This could be achieved by introducing a common travel document so as to encourage citizens in the region to move and work freely in countries within the zone.

As a general conclusion, it is worth noting that foreign direct investment and trade are catalysts for economic growth in WAMZ region. Consequently, more integration opportunities should be encouraged and FDI inflows should be perceived positively by host countries. Opportunities for trade creation should be encouraged in host countries. The findings could have greater impact by providing recommendations to the governments of WAMZ member countries. The results of the research revealed that integration positively influence FDI and trade flows. This result therefore calls for WAMZ countries to continue to integrate and implement policies to enhance good governance, promote ease of doing business and maintain political stability. One of the shortcomings of this paper is that we could not exhaust all the trade measures due to data limitation. In addition, we could not explicitly include all the variables such as colonial relation, area, etc. which are normally included in the gravity model. However, we thought that some of these

variables are captured in the Economic Freedom Index. Subsequent research in this area could look into all monetary unions in Africa and other parts of the world to assess the relationship between monetary union, FDI and trade flows.

Appendix A.

Table A1
Augmented Dicky-Fuller Unit Root Rest.[a,b,c]

Country/distance	Level	1st Difference	2nd Difference
Austria	0.1385	0.000	Not needed
Finland	0.096	0.000	Not needed
France	0.096	0.000	Not needed
Germany	0.076	0.000	Not needed
Netherlands	0.077	0.000	Not needed
Norway	0.082	0.000	Not needed
Switzerland	0.150	0.000	Not needed
UK	0.062	0.000	Not needed
US	0.017	0.000	Not needed
Japan	0.058	0.000	Not needed
South Korea	0.160	0.000	Not needed
rGDP*, Population*, EFI*, export*			

*Stationary I(0).
[a] All variables are in natural logarithm.
[b] P-values are reported for null hypothesis: Ho: series have unit root.
[c] All tests include intercept and number of lags is based on Schwartz Information Criterion.

Table A2
Augmented Dicky-Fuller Unit Root Rest.[a,b,c]

Country/Exports	Level	1st Difference
Austria	0.000	Not needed
Finland	0.004	Not needed
France	0.000	Not needed
Germany	0.000	Not needed
Netherlands	0.000	Not needed
Norway	0.004	Not needed
Switzerland	0.000	Not needed
UK	0.001	Not needed
US	0.001	Not needed
Japan	0.032	Not needed
South Korea	0.001	Not needed

[a] All variables are in natural logarithm.
[b] P-values are reported for null hypothesis: Ho: series have unit root.
[c] All tests include intercept and number of lags is based on Schwartz Information Criterion.

Table A3
Fully Modified Ordinary Least Squares (FMOLS) regression results: determinants of bilateral FDI, major OECD investing country (dependent variable: log of FDI flows), 1980—2013

Investing country	Real GDP	Log of population	D (log of distance)	Economic freedom Index	WMU2	WNJ	Adj. R2	Robust S.E
Austria	0.042***	0.44**	1.03	−0.01***	0.08	0.48*	0.20	0.82
Finland	0.02**	0.40***	3.24*	0.00	0.01	0.68***	0.12	0.66
France	0.01	0.56***	−0.21	−0.01***	0.99***	−0.07	0.59	0.53
Germany	0.01*	0.60***	1.11	−0.01**	−0.14		0.39	0.43
Netherlands	0.02*	0.24***	−0.75	−0.01***	0.52***	038*	0.23	0.69
Norway	0.01	0.53***	6.25*	0.00	0.08	0.47**	0.13	0.74
Switzerland	0.04***	0.25**	−2.25	−0.01*	0.98***	0.64*	0.35	0.72
UK	0.01	0.83***	2.9	−0.00	1.07***	0.63**	0.52	0.71
US	0.01*	0.88***	3.32***	0.00	0.07	0.57***	0.37	0.45
Japan	0.03**	0.60***	7.48*	−0.01***	−0.12	−0.47**	0.26	0.70
South Korea	0.02	0.26*	2.13	−0.00	0.25*	−0.27	0.10	0.75

*** 1% significant level, ** 5% level significant and * 10% significant level.
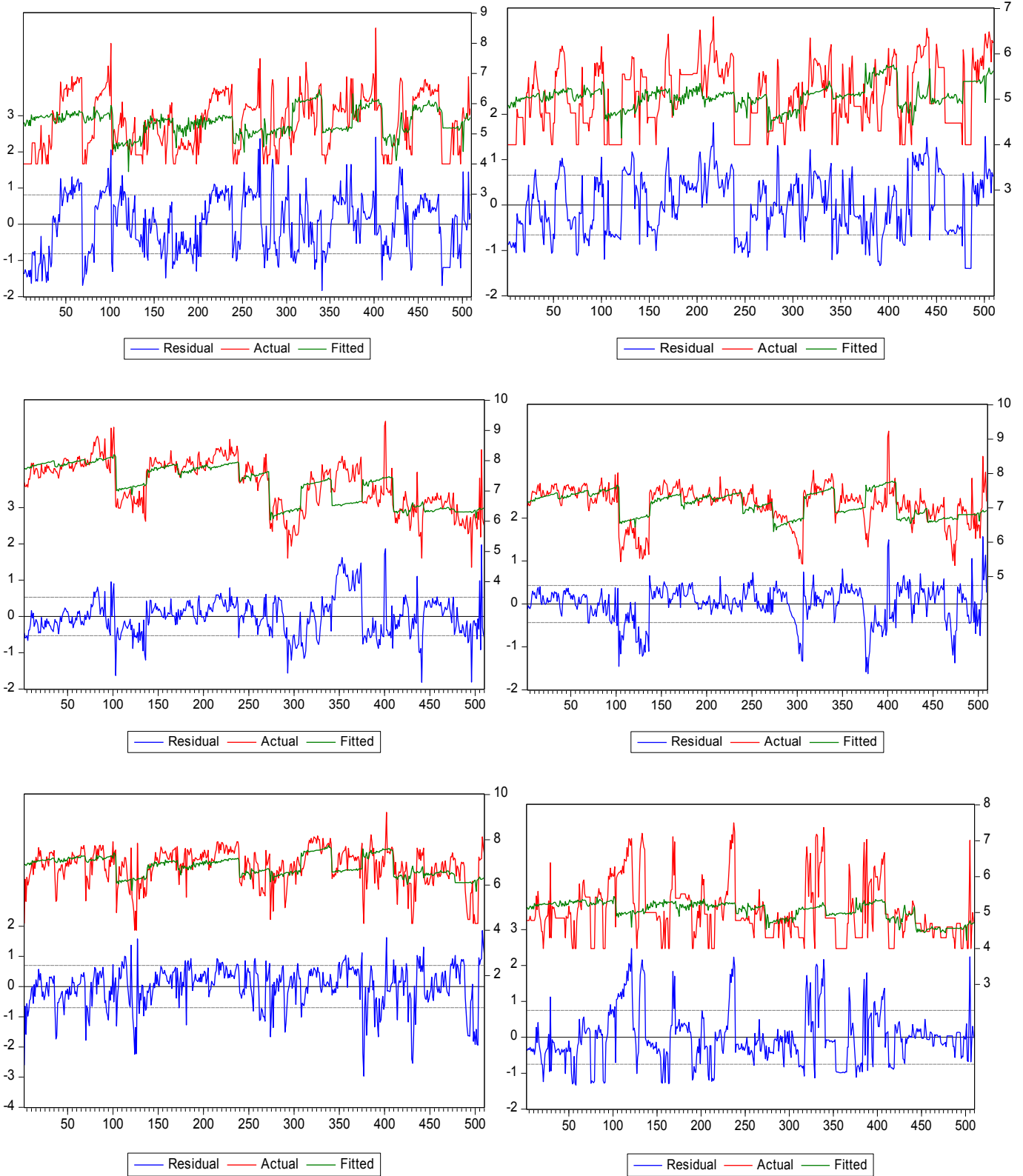
Appendix B.
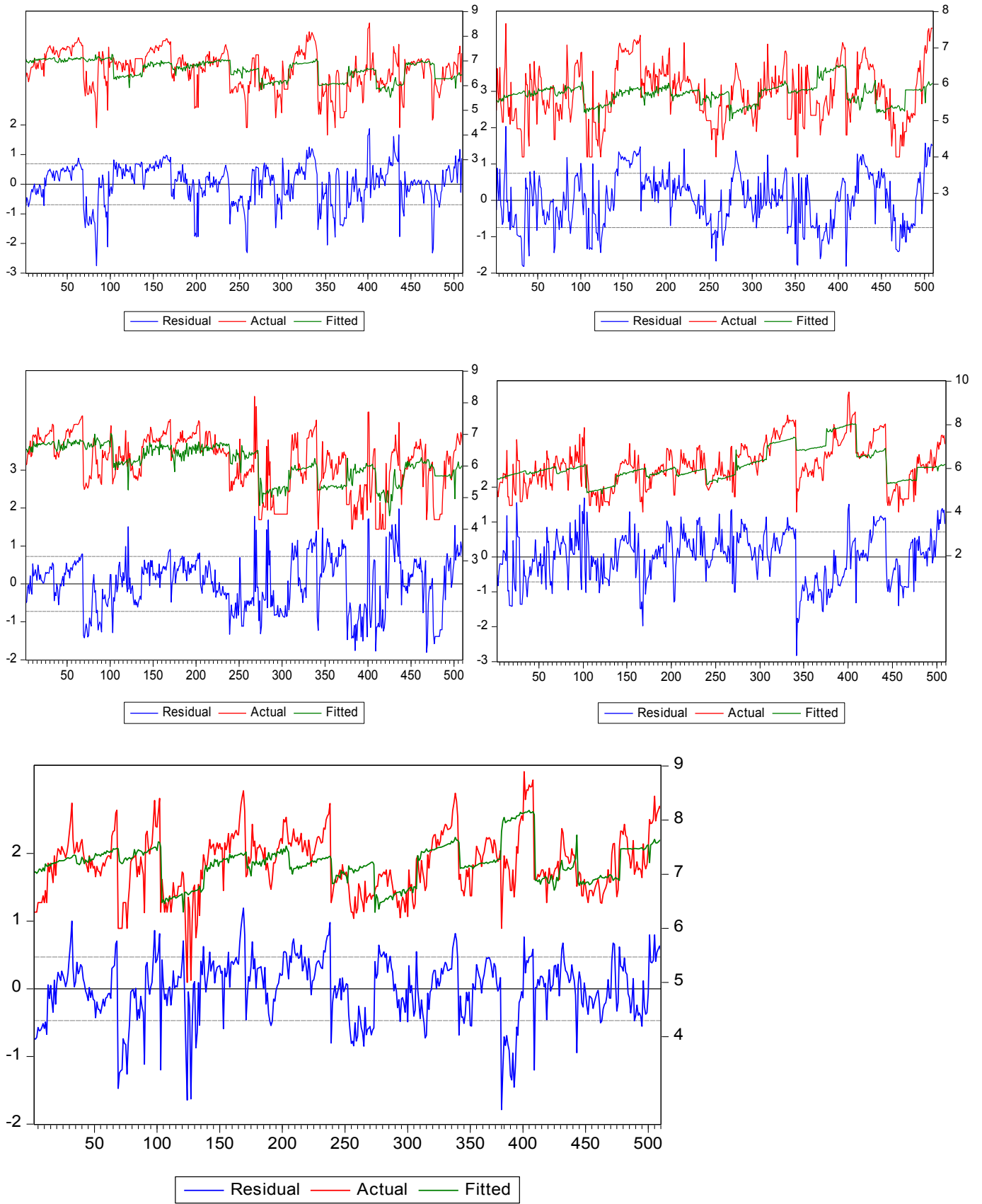

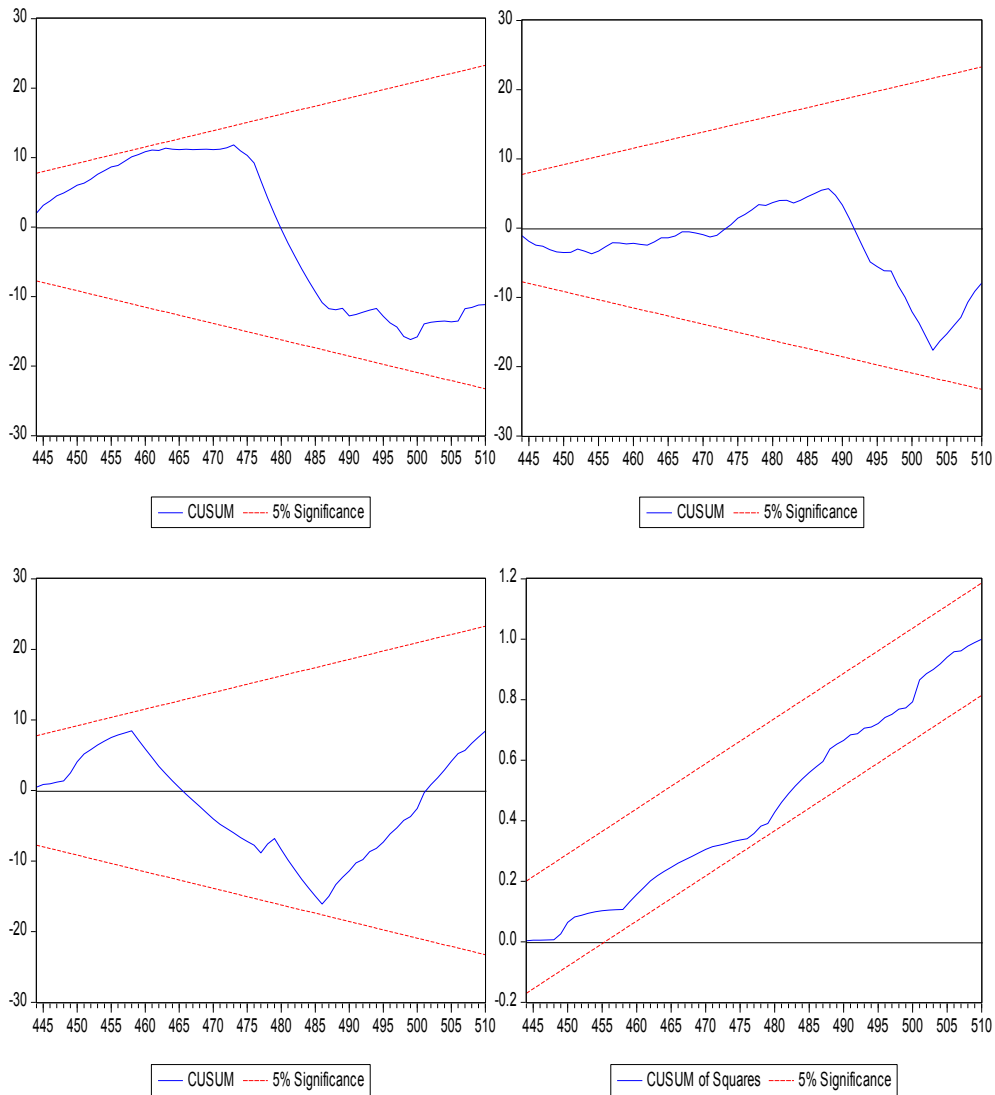Fig. A1. OLS regressions residuals and fitted values.

Fig. A1. (*Continued*).
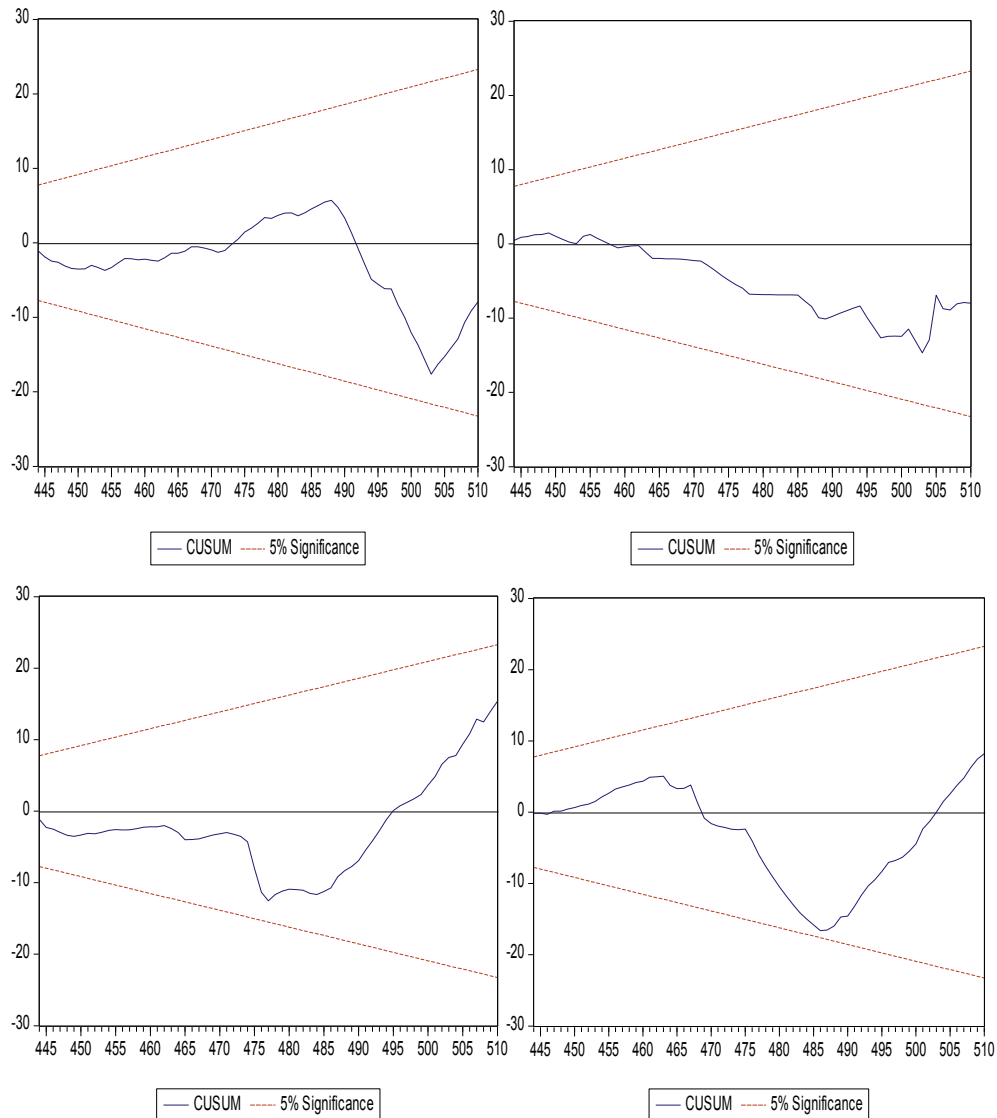
Fig. A2. Stability diagnostic − Cumulative sum (CUSUM).

Fig. A2. (*Continued*)

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