**FOREIGN DIRECT INVESTMENT INFLOWS IN SUB-SAHARAN AFRICA: DOES EXCHANGE RATE VOLATILITY MATTER? \***

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**Abstract**

Exchange rate volatility (ERV) adversely affects Foreign Direct Investment (FDI) by increasing the risk of investment, thereby reducing profits. However, most researchers and policymakers tend to overlook the effects of ERV on FDI in Sub-Saharan Africa (SSA). This study examines whether ERV is an important explanation for the observed consistently low FDI flows to SSA, employing the EGARCH model for volatility variable and fixed effects panel estimation model. It is found that ERV adversely affected FDI inflows, though not uniformly so, when the countries are sub-divided into CFA and non-CFA, establishing the weakest effect in the former case.

**Key words**: Foreign direct investment, exchange rate volatility, EGARCH model, sub-Sahara Africa.

**JEL Classification:** F21, F31, O55

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**1. Introduction**

Exchange rate volatility (ERV) is a fundamental issue in the foreign investment decision process because of its direct impact on the choice of a country or region (see, for instance, Goldberg and Kolstad, 1995; Goldberg, 1997; and Razafimahefa and Hamori, 2005). This is because ERV exposes foreign investors to risks emanating from capital loss or gain resulting from large swings in exchange rate movements by increasing the variance of profits. The uncertainty and unpredictability of the investment climate engendered by exchange rate volatility could cause investors to hesitate about committing resources to foreign investment. Thus, exchange rate movement is an important variable in the investment decision process that can either improve or worsen the chances of a country being chosen as a host (Ruiz, 2005). Little wonder, then, that Bénassy-Quéré *et al,* (2001) argued that exchange rate movements could change the decision of investing in a particular location.

It is often argued that the level of exchange rate affects the decision to invest in one country or the other depending on whether the host country’s currency is overvalued or not in comparison with the investing country and/or other countries (Cushman, 1985; Bénassy-Quéré et al, 2001; Froot and Stein, 1991; Goldberg and Klein, 1997). Others have argued that it is not the level but the volatility that matters for FDI flows (Brzozowski, 2003). Much research has been done on the FDI- exchange rate nexus. However, the findings in these studies are inconclusive. More importantly, most of these studies are based on the experiences of developed countries.

As pervasive as the dwindling FDI inflows and simultaneous large volatility in foreign exchange rates of SSA countries are, there are very few studies that seek to ask whether there is any relationship between these phenomena in this region. A few studies that have attempted this enquiry either focused only on levels of exchange rate, public investment or are restricted to a single country analysis (see Bleaney and Greenaway, 2001; Alaba, 2003; Mwega and Ngugi, 2005; and Khan and Bamou, 2005). This study, therefore, seeks to answer some questions that have not been given sufficient attention in the literature: do exchange rates and most especially exchange rate volatility really matter as a determining motive for FDI in SSA? If they do, what is the nature of the relationship and to what extent is the effect important?

Following this introduction, section 2 provides background information on FDI inflows and exchange rate developments in SSA countries with particular focus on the selected countries, especially South Africa. Section 3 presents a theoretical, empirical and methodological literature review on the relationship between both the level and volatility of exchange rate and FDI inflows. Section 4 reports the empirical findings, while section 5 concludes the paper, highlighting some lessons for policy.

**2. Stylized Facts on Foreign Direct Investment Inflows and Exchange Rates in Sub-Saharan Africa**

***The margin between the volume of FDI inflows to SSA and other developing regions is wide and* widening.** SSA remains the region of the world that attracts the least FDI inflows (see Table 1 and Figure 1). The average global FDI inflows during 1970-79 were $2.4 billion. Out of this, Asia, Latin America, and SSA received an average of $1.9 billion, $2.4 billion, and $940 million, respectively. The total average flows to SSA during this period were less than half of what went to each of the other two regions. Although there has been an improvement over the years, the margin between FDI inflows to SSA and other developing regions appear to be diverging and increasingly widening as demonstrated by the 2009 figures.

**Table 1: Distribution of World FDI Inflows by Region, 1970-2005 (Million US$).**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Year/ Region** | **World** | **Africa** | **SSA** | **Asia** | **Latin America and Caribbean** |
| **1970-1979** | 24 365 | 1 124 | 940 | 1 902 | 2 419 |
| **1980-1989** | 93 878 | 2 201 | 1 307 | 11 677 | 6 143 |
| **1990-1999** | 403 802 | 6 864 | 4 585 | 69 062 | 42 050 |
| **2000** | 1 398 183 | 9 670 | 6 655 | 148 396 | 98 267 |
| **2001** | 824 445 | 19 904 | 15 017 | 113 437 | 80 923 |
| **2002** | 625 168 | 14 592 | 11 432 | 98 505 | 57 731 |
| **2003** | 562 056 | 18 719 | 14 806 | 115 148 | 45 885 |
| **2004** | 717 695 | 18 019 | 13 089 | 170 294 | 94 419 |
| **2005** | 958 697 | 29 459 | 19 528 | 210 026 | 76 375 |
| **2006** | 1 411 018 | 45 754 | 26 140 | 272 889 | 92 927 |
| **2007** | 1 833 324 | 52 982 | 33 003 | 319 332 | 126 240 |
| **2008** | 1 770 873 | 72 179 | 50 682 | 372 739 | 183 195 |
| **2009** | 1 114 189 | 58 565 | 43 313 | 301 367 | 116 555 |

*Source*: UNCTAD FDI Database, accessed March 16, 2009.

*Source*: Based on UNCTAD FDI Database.

***The SSA share of global FDI flows is dwindling relative to other developing regions.*** The fact that the volume of FDI inflows to SSA are very low is further corroborated by the average annual share of the region in global FDI inflows that stood at 4.3% during 1970-79 and fell by more than 50% to 1.5% during 1980-89 with a further fall to 1.2% during 1990-99. Thereafter, the average share oscillated between 0.4% and 2.4%, but with the highest peak of 3.9% in 2009. These figures contrast sharply with the situation in Asia and Latin America. Apart from the period 1970-79 when Asia had an average global FDI share of 7.7%, the figures were double digits throughout the period under review. Similarly, the average world shares of Latin America and Asia are in multiples of the figure for SSA, especially between 1980 and 2009 (See Table 2).

**Table 2: Distribution of Global FDI Inflows in Developing Regions, 1970-2005 (% of World)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year/Country** | **Africa** | **SSA** | **Asia** | **Latin America and carribean** |
| **1970-79** | 5.15 | 4.25 | 7.69 | 11.51 |
| **1980-89** | 2.51 | 1.51 | 13.95 | 8.33 |
| **1990-1999** | 1.86 | 1.2 | 19.05 | 9.72 |
| **2000** | 0.69 | 0.47 | 10.61 | 7.03 |
| **2001** | 2.41 | 1.82 | 13.76 | 9.82 |
| **2002** | 2.33 | 1.83 | 15.76 | 9.23 |
| **2003** | 3.34 | 2.64 | 20.52 | 8.18 |
| **2004** | 2.51 | 1.82 | 23.73 | 13.16 |
| **2005** | 3.07 | 2.04 | 21.91 | 7.97 |
| **2006** | 3.24 | 1.85 | 19.34 | 6.59 |
| **2007** | 2.89 | 1.80 | 17.42 | 6.89 |
| **2008** | 4.08 | 2.86 | 21.05 | 10.34 |
| **2009** | 5.26 | 3.89 | 27.05 | 10.46 |

*Source*: UNCTAD FDI Database.

***FDI flows to SSA are dominated by few countries*** *.* FDI inflows to the region are dominated by a few countries, Angola and South Africa in the Southern, Congo Republic in the Central, Uganda and Tanzania in the Eastern and Nigeria by unparallel margin in the Western (Table 3). The large FDI inflow in Nigeria explains the wide marginal share of the Western Africa in total FDI flows in SSA. Throughout the period examined, Nigeria consistently received the highest FDI inflows, except in 2003 when its total inflow of $2.1 billion was second only to that of Angola which amounted to $3.5 billion. The average annual figure for Nigeria between 1990 and 1999 was $1.5 billion, increasing to a peak of $6.8 billion in 2008 before declining to $5.9 billion in 2009 due to the effects of the global financial crisis. FDI inflows to South Africa, though high, have been volatile. For instance, the total average annual receipts of $92 million between 1970 and 1979 increased to $850 in 1990-1999, with a further rise to $888 million in 2000. In 2001, the South African economy experienced about 800 per cent rise in FDI inflows over the previous period to peak at $6.8 billion. Thereafter, FDI inflows have been fluctuating with a serious reverse inflows standing at $323 million in 2006. The situation gradually improved to a peak of $9 billion in 2008 before the decline to $5.7 billion in 2009. Angola and Equatorial Guinea are the other major recipients of FDI inflows in SSA.

**Table 3: FDI Inflows to sub-Saharan Africa, 1970-2006 (Million US$)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Region/ Country | **1970-1979** | **1980-1989** | **1990-1999** | **2000-2005** | **2006** | **2007** | **2008** | **2009** |
| **Sub-Sahara Africa** | **940** | **1 307** | **4 585** | 11858 | **12 221** |  |  |  |
| **West Africa** | **520** | **705** | **2 086** | **3209** | **6 841** | **9 528** | **11 131** | **10 009** |
| Benin | 3 | 7 | 38 | 47 | 63 | 261 | 174 | 93 |
| Burkina Faso | 2 | 2 | 7 | 20 | 26 | 344 | 137 | 171 |
| Cape Verde | .. | 1 | 14 | 29 | 122 | 190 | 212 | 120 |
| Côte d' Ivoire | 44 | 49 | 203 | 247 | 253 | 427 | 482 | 409 |
| Gambia | 2 | 2 | 18 | 39 | 70 | 76 | 70 | 47 |
| Ghana | 22 | 9 | 102 | 123 | 435 | 855 | 1220 | 1685 |
| Guinea | 0 | 5 | 20 | 54 | 108 | 386 | 382 | 141 |
| Guinea-Bissau | 0 | 1 | 3 | 3 | 42 | 19 | 6 | 14 |
| Liberia | 80 | 171 | 72 | 27 | -82 | 132 | 200 | 378 |
| Mali | 2 | 2 | 24 | 151 | 185 | 65 | 180 | 109 |
| Mauritania | -3 | 8 | 5 | 257 | -3 | 138 | 338 | -38 |
| Niger | 14 | 10 | 10 | 16 | 20 | 129 | 566 | 739 |
| Nigeria | 320 | 434 | 1 494 | 2055 | 5 445 | 6087 | 6814 | 5851 |
| Senegal | 14 | 7 | 57 | 58 | 58 | 273 | 272 | 208 |
| Sierra Leone | 10 | -13 | 3 | 31 | 43 | 97 | 53 | 33 |
| Togo | 13 | 11 | 14 | 55 | 57 | 49 | 24 | 50 |
| **Central Africa** | **176** | **223** | **146** | **552** | **3 786** | **15 698** | **20 859** | **18 682** |
| Burundi | 0 | 3 | 1 | 2 | 290 | 1 | 14 | 10 |
| Cameroon | 20 | 96 | 28 | 294 | 309 | 284 | 270 | 337 |
| Central African Republic | 4 | 5 | 1 | 14 | 24 | 57 | 117 | 42 |
| Chad | 12 | 12 | 22 | 553 | 700 | -69 | 234 | 462 |
| Congo | 27 | 28 | 117 | 233 | 344 | 2275 | 2483 | 2083 |
| Congo, Democratic Republic of | 60 | -4 | 3 | 52 | 180 | 1808 | 1727 | 951 |
| Equatorial Guinea | 0 | 2 | 101 | 458 | 1 656 | 1243 | -794 | 1636 |
| Gabon | 48 | 65 | -132 | 118 | 268 | 269 | 209 | 33 |
| Rwanda | 4 | 17 | 4 | 7 | 15 | 82 | 103 | 119 |
| São Tomé and Principe | .. | 0 | 1 | 1 | 0 | 35 | 33 | 36 |
| **East Africa** | **61** | **62** | **400** | **1157** | **1 789** | **6025** | **5682** | **5028** |
| Comoros | 2 | 4 | 0 | 1 | 1 | 8 | 8 | 9 |
| Djibouti | 0 | 0 | 2 | 14 | 108 | 195 | 234 | 100 |
| Eritrea | .. | .. | 77 | 12 | 4 | 0 | 0 | 0 |
| Ethiopia | 11 | 0 | 69 | 328 | 364 | 222 | 109 | 94 |
| Kenya | 31 | 30 | 21 | 49 | 51 | 729 | 96 | 141 |
| Madagascar | 4 | 4 | 19 | 86 | 230 | 777 | 1180 | 543 |
| Mauritius | 2 | 10 | 28 | 65 | 105 | 339 | 383 | 257 |
| Seychelles | 4 | 14 | 31 | 53 | 146 | 239 | 252 | 243 |
| Somalia | 3 | -4 | 1 | 3 | 96 | 141 | 87 | 108 |
| Uganda | 1 | 1 | 72 | 200 | 307 | 733 | 787 | 799 |
| United Republic of Tanzania | 4 | 5 | 121 | 347 | 377 | 647 | 679 | 645 |
| **Southern Africa** | **183** | **316** | **1 953** | **5162** | **-195** | **7 056** | **10 409** | **6 561** |
| Angola | 3 | 134 | 574 | 879 | - 1 140 | 9796 | 16581 | 13101 |
| Botswana | 26 | 63 | 16 | 264 | 274 | 495 | 521 | 234 |
| Lesotho | 0 | 7 | 23 | 40 | 57 | 97 | 56 | 48 |
| Malawi | 10 | 7 | 13 | 27 | 30 | 92 | 170 | 60 |
| Mozambique | 1 | 2 | 92 | 239 | 154 | 427 | 592 | 881 |
| Namibia | .. | 5 | 88 | 243 | 327 | 733 | 720 | 516 |
| South Africa | 92 | 14 | 850 | 795 | -323 | 5695 | 9006 | 5696 |
| Swaziland | 15 | 28 | 59 | 29 | 36 | 37 | 106 | 66 |
| Zambia | 30 | 52 | 142 | 199 | 350 | 1324 | 939 | 959 |
| Zimbabwe | 18 | 8 | 95 | 28 | 40 | 69 | 52 | 60 |

*Source*: UNCTAD FDI Database.

***FDI inflows into SSA are highly volatile.*** The volatility of FDI inflows in SSA economies is also discouraging. For instance, the average annual FDI inflows between 1970-1979 and 1990-1999 fluctuated between $2.7 million and $38.3 million for Benin; $4.4 million and $0.9 million for Central African Republic (CAR); and $48 million and -$132 million for Gabon. As earlier mentioned, this is the same situation with South Africa. Furthermore, among the list of top 20 economies ranked by inward FDI Performance Index for 1994, 2004 and 2005, Republic of Congo, Democratic Republic of Congo and Angola are the only SSA countries included in the list (UNCTAD, 2006). A greater number of countries in the region were rather classified as underperformers.

***FDI inflows are dominated by resource availability and movements in commodity prices.*** A striking pattern discernible from the nature of FDI inflows to SSA is that they are dominated by two major factors, namely, natural resource availability and sharp upward movement in commodity prices such as aluminium, copper, diamond, and oil which increased by over 400 per cent between 2000 and 2007 (UNCTAD, 2008). On the whole, resource-rich countries in the region accounted for more than 75 per cent of total FDI inflows. However, there are now emerging number of SSA countries that have successfully undertaken several reform programmes aimed at improving the macroeconomic and investment climate. These have further strengthened the confidence of foreign investors in these economies, thus further boosting FDI inflows to the region.

***South Africa differs from typical SSA countries in FDI attraction. by successfully attracting FDI across diverse sectors.*** South Africa is unique in its leadership role among SSA countries in attracting FDI into diverse sectors other than natural resource activities. The country attracts FDI across a broad range of sectors, implying that the large FDI inflow into the economy is not driven by resource-seeking motive. For instance, Hawkins and Lockwood (2001) found that out of the 165 firms surveyed, 67 are market-seeking, 12 are efficiency-seeking and the remaining ones are motivated by a combination of factors. Hence, the driving force behind FDI inflows in South Africa is the confidence foreign investors have in the economy, given its macroeconomic stability, policy certainty, sufficient fiscal incentives targeted at foreign investors, developed business infrastructure, and large size of the economy (Gelb, 2005). Hence, the country was ranked 18th in the A.T. Kearney’s 2007 FDI Confidence Index, the only African country that featured in the report (A. T. Kearny, 2007). In fact, South Africa came ahead of major FDI destinations such as South Korea and Poland, among others.

***South Africa is a major force in intra-African FDI flows within the Southern Africa region.*** Another interesting feature of FDI in South Africa is the country’s leadership role in south-south FDI in SSA. It is indeed the only country that has consistent data on FDI outflows among the sample countries. The country recorded a mean annual outward FDI amounting to $70.7 million in the 1970s with a significant rise to $221 million in the 1980s. By 1997, the figure had reached about $2.4 billion. In 1999, South Africa accounted for about 49% of the inward FDI stock in Botswana, of which 60% was through De Beers Diamonds subsidiary located in Luxembourg (UNCTAD, 2003). In 2003, 25% of total Southern African Development Community (SADC) FDI was from South Africa (African Development Bank, 2003). In 2004, 7% of total South African FDI was directed at other African countries. While this figure may appear little, the weight of the country’s FDI is more felt within the Southern African region, accounting for 86% and 80% of total FDI inflows to Lesotho and Malawi, respectively (Page and Willem te Velde, 2004).

*Source*: Based on Information Provided in Page and Willem te Velde (2004).

***Exchange rate has been volatile in SSA, possibly accounting for the relatively poor FDI inflows.*** Given the general risk-averse nature of foreign investors, the growing risks in international investment transactions have prompted some of them to employ the services of professional risk assessment and management consultants. For the purpose of this paper, attention is focused only on exchange rate risks.

The breakdown of the Bretton Woods system of fixed exchange rates[[1]](#footnote-2) in 1973 resulted in wide variations in both the nominal and real exchange rates of most economies including those of SSA. The structural adjustment programme (SAP) adopted by several SSA countries during the 1980s further exacerbated this volatility. As revealed in Table 4, the average percentage changes in official nominal exchange rates of selected SSA countries during the 1960s were unchanged followed by relative stability in the 1970s. From 1980s, major spikes began to emerge. For instance, while Kenya had an average annual exchange rate of 0.6 per cent during 1970s, the figure increased to 11 per cent in the 1980s with a further rise to 15 per cent during 1990s. However, this seems to taper off in subsequent years. Democratic Republic of Congo appear to have the largest exchange rate movements among the selected countries presented in Table 4. Even the Francophone countries that maintained a pegged exchange rate arrangement with the French francs experienced wide swings in their exchange rates. Given the risks and uncertainties associated with exchange rate movements, this wide and varying exchange rate is possible the source of dwindling FDI inflows in SSA.

**Table 4: Official Exchange Rate Changes in Selected SSA Countries, 1960-2008 (%)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year/  Country | **Cameroon** | **DR Congo** | **Ghana** | **Kenya** | **Nigeria** | **South Africa** | **Uganda** | **Zambia** |
| 1961-69 | 0.66 | NA | 4.34 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1970-79 | -1.66 | NA | 12.56 | 0.58 | -1.61 | 1.91 | 0.56 | 1.20 |
| 1980-89 | 5.24 | NA | 78.12 | 11.00 | 34.30 | 13.36 | 151.83 | 39.34 |
| 1990-99 | 9.78 | 5608.89 | 26.35 | 15.01 | 45.56 | 9.02 | 24.75 | 75.75 |
| 2000 | 15.64 | 442.97 | 104.36 | 8.32 | 10.14 | 13.59 | 13.04 | 30.27 |
| 2001 | 2.96 | 846.99 | 31.45 | 3.13 | 9.37 | 24.05 | 6.76 | 16.08 |
| 2002 | -4.92 | 67.69 | 10.63 | 0.24 | 8.40 | 22.44 | 2.39 | 21.81 |
| 2003 | -16.61 | 16.93 | 9.38 | -3.57 | 7.17 | -28.23 | 9.24 | 7.61 |
| 2004 | -9.10 | -1.46 | 3.78 | 4.26 | 2.84 | -14.61 | -7.81 | 0.96 |
| 2005 | -0.15 | 18.63 | 0.75 | -4.57 | -1.21 | -1.55 | -1.64 | -6.60 |
| 2006 | -0.87 | -1.19 | 1.12 | -4.57 | -2.00 | 6.48 | 2.85 | -19.28 |
| 2007 | -8.34 | 10.35 | 2.05 | -6.63 | -2.21 | 4.04 | -5.89 | 11.09 |
| 2008 | -6.56 | 8.23 | 13.11 | 2.76 | -5.77 | 17.26 | -0.18 | -6.42 |

*Source*: Own calculations based on the World Bank’s World Development Indicators Database.

**3. Literature Review**

The earlier conclusion in the literature was that exchange rates have no effect on FDI flows (Gray, 1966; and Wallich, 1973). The models of determinants of FDI developed during the 1960s and 1970s treated exchange rate and ERV as exogenous. This view persisted for a long time until the 1970s. Houthakker (1962) was the first to predict a possible positive effect of exchange rate on FDI, albeit this was not based on theory or empirical evidence. This view was also expressed in international business literature by Dufey (1972) who observed that devaluation by the *source* country will make foreign investment less attractive, while devaluation by the *host* country will make the expansion of already existing foreign subsidiaries more profitable. Several studies have explored the impact of exchange rate depreciation and appreciation on FDI with the general conclusion that devaluation attracts FDI while depreciation retards it. Given the orientation of this paper, we shall concentrate only on the literature exploring the relationship between ERV and FDI.

The collapse of the Bretton Woods system of exchange rate which precipitated wide volatility in exchange rates led to several investigations into the relationship between exchange rate and FDI beyond the level of exchange rate. This development engendered research interests about the probable relationship because of the risk associated with volatility. A number of authoritative studies have been conducted to ascertain the extent to which exchange rate volatility affect FDI. It is noteworthy that the theoretical arguments linking volatility and FDI are divided between production flexibility arguments and risk aversion arguments. According to production flexibility arguments, exchange rate volatility increases foreign investment because firms can adjust the use of one of their variable factors following the realization of nominal or real shocks. It is obvious that the production flexibility argument relies on the assumption that firms can adjust variable factors, because the assertion would not hold if factors were fixed. On the other hand, the risk aversion theory is based on the proposition that higher ERV increases the variance of profits, thereby lowering its certainty equivalent since investors are generally risk averse.

One of the oldest tests of the effects of ERV on FDI is contained in Itagaki (1981) who developed a financial flexibility argument for the ERV-FDI nexus. It is affirmed that an increase in exchange rate risk may incite a firm to invest abroad as a way of hedging against a short-term disequilibrium in its balance sheet.

Towing a similar line, Cushman (1985) analysed the effects of real ERV and expectations on FDI in the context of a two-period dynamic model for four different cases depending on where inputs were purchased, output produced, financial capital acquired, and output sold. Quantitative evidence showed that an increase in exchange rate volatility brings about a depreciation of the risk adjusted real exchange rate and thus lowers the costs of domestic *vis-à-vis* foreign financing of foreign capital which translates into an increase in FDI. Positive effects of exchange rate volatility on annual bilateral FDI flows from the US to the UK, France, Germany, Canada and Japan for the years 1963 through 1978 were reported. Employing alternative measures of volatility led to a conclusion that the effect of exchange rate volatility is consistently positive for all specifications. However, this effect is insignificant when contemporaneous error correlation is assumed, thus suggesting that Cushman’s results only give a weak support to the hypothesis of a positive link between FDI and exchange rate volatility.

Other theoretical works proposing that exchange rate variations could promote FDI are Goldberg and Kolstad (1995), Cushman (1985) and Cushman (1988). Goldberg and Kolstad (1995) argued that exchange rate volatility unambiguously stimulates the share of FDI. Employing quarterly data, they found positive effects of exchange rate volatility on bilateral investment flows between the U.S., on the one hand, and the U.K., Canada and Japan, on the other, for 1978-1991. They concluded that exchange rate volatility had a positive and statistically significant effect on four of the six bilateral FDI shares; it increased the share of total United Sates investment in Canada and Japan, and expanded the share of Canadian and the UK investment in the US.

Contrary to the studies highlighted above, there are theoretical and empirical models predicting that exchange rate volatility would instead suppress FDI. These arguments are predicated on the assumption that unpredictable fluctuations in the exchange rate introduce added uncertainty into both the production costs and future revenues of foreign operations, thus discouraging potential investors. Dixit and Pindyck (1994) and Pindyck (1998), for instance, opined that currency volatility discourages the entry of MNCs by increasing the “option value” associated with waiting before incurring the sunk costs (a fixed cost paid in advance) necessary to produce overseas. ERV introduces uncertainty about the size of profits, increasing the value of holding on to the option to wait and motivating the firm to postpone investment until a future period. On methodology, two significant studies that have employed a general equilibrium approach in modelling the effects of ERV on FDI are Aizenman (1992) and Devereux and Engel (2001). They examined MNCs within a general equilibrium approach where ERV is endogenous. However, their results are conflicting. Aizenman (1992) employed a production flexibility approach of the option value and found that wider volatility increases diversification as this pushes firms to shift production to the country where it is cheapest. However, by increasing the uncertainty surrounding the return on exercising the Dixit-Pindyck option to invest abroad, this also discourages investment. In this sense, ERV associated with a flexible regime can be construed as deterring FDI.

However, in contrast to the findings of Cushman (1985), Sercu and Vanhulle (1992) showed that increased ERV raises the returns to exports thereby reducing levels of foreign investment. The intuition behind this is that exports and FDI are assumed to be substitutes. In addition, when firms are not faced with a choice between exporting and FDI, the effect of ERV on FDI tend to change. Comparatively, Devereux and Engel (2001) found that when a firm’s price is given in the currency of the local market it is serving (pricing to market), production by all firms, including the affiliates of MNCs is higher under a flexible exchange rate than a fixed exchange rate. Therefore, exchange-rate volatility associated with a flexible regime is loosely linked with increased production by MNCs.

The contention that firms do use certainty equivalent levels in the expected profit functions to make investment decisions was extended by Campa (1993) to include risk-neutral firms by using the argument of future expected profits. The idea here is that investors are concerned about future expected profits and because of exchange rate volatility, firms may temporarily postpone the decision to invest abroad, as they would prefer to invest in a country where expected profits are less volatile due to stable exchange rates. The theoretical results were further established by using data for FDI inflows to the US in the wholesale industries in the 1980s. Using micro-level data, Campa (1993) showed that volatility deters entry by foreign firms contemplating investment in the US. Explaining this further, Campa expressed that in any period when conditions were favorable, “volatility would have no effect on the entry decision” (p.619).

This conclusion was further supported by Zhang (2001), finding a positive and significant relationship between exchange rate volatility and FDI flowing into the European Union (EU) from both inside and outside the EU. Conversely, Bailey and Tavlas (1991) employing the risk-averse model of investment concluded that exchange-rate risk has an ambiguous effect on FDI.

An innovative idea was pursued by Bénassy-Quéré *et al.* (2001) by focusing on the trade-off between exchange rate depreciation and its volatility in terms of their effects on FDI. They tested their theoretical model on a panel of 42 developing countries receiving FDI from 17 investing countries over 1984-1996. The study emphasized the role played by the covariance between the exchange rates of currencies used in two alternative locations of inward FDI. It was affirmed that when a risk-averse firm contemplates relocating in two alternative foreign locations for the purpose of re-exporting, transportation costs influence the sensitivity of FDI to exchange rate volatility. This view stems from the analysis that regardless of the sign of correlation between the two exchange rates movements, an increase in the volatility of any of the two countries’ exchange rate leads to a reduction in FDI. Moreover, lower volatility of exchange rate in a country increases the sensitivity of output in that country to local costs. More precisely, they showed that a one-point increase in exchange rate volatility reduces the FDI stock by 0.63 percent. They concluded that the negative impact of excessive volatility on FDI could erode the apparent attractiveness resulting from currency depreciation.

Another noteworthy development in estimating the relationship between ERV and FDI flows is Kamaly (2001). The author undertook a study of a panel of 151 developing countries between 1990 and 1999. The results revealed systematic evidence demonstrating that ERV has significant adverse effect on FDI flows to developing countries.

Empirical evidence also shows ambiguity in the relationship between ERV and FDI. Examining both the outward US FDI in 12 developed countries and inward investment to the US from these same countries for the period 1983 and 1995, (Gorg and Wakelin (2002), for example, found that exchange rate volatility has no effect on US outward FDI. This finding runs contrary to previous studies, including Cushman’s (1985) model of the choice between FDI and exports under exchange rate volatility and Campa’s (1993) extension of the standard model, where there is no choice between exports and FDI, to include risk- neutral firms.

Regarding FDI inflows to the US, Gorg and Wakelin (2002) found that exchange rate volatility has no statistically significant effect on inward FDI, which is consistent with the finding regarding outward US FDI. The level of exchange rate was shown to negatively affect FDI inflows. This means that FDI inflows increases as the foreign currency appreciates against the dollar. This result is consistent with Froot and Stein (1991) who claimed that FDI increases as the host country’s currency depreciates as relative asset prices in the host country become cheaper. However, the result is not in consonance with Gorg and Wakelin’s (2002) own finding on the effect of exchange rate level on outward FDI, which showed that the US foreign investment decreased as the host country’s currency depreciated against the dollar.

Chakrabarti (2001) was definite about the relationship, reporting a negative relationship for the American FDI to 20 OECD countries. In a similar vein, Galgau and Sekkat (2004) also found that increases in the variance of bilateral exchange rates deter FDI inflows originating outside the EU with a positive link for FDI flows between EU nations. In a study, however, Amuedo-Dorantes and Pozo (2001) reported that there is a positive coefficient associated with volatility of the exchange rate measured as the standard deviation within a rolling window but a negative coefficient emerges when a GARCH construction is used, with both coefficients being significant. This led them to conclude that the effects of exchange rate volatility on FDI may not be robust to the measure of volatility adopted.

This lack of robustness is the focus of Chakrabarti and Scholnick (2002). The paper examined the relationship between exchange rate expectations and FDI flows from the US to twenty OECD countries between 1982 and 1995 based on the mean-reverting expectations. This analysis aimed at determining whether the estimated relationship between exchange rate volatility and FDI are robust across different methodological specifications. To achieve this, OLS, GLS and various panel specifications including both the fixed and random effects specifications were employed. Specifically, the relationship between the mean, standard deviation and skewness of monthly exchange rate devaluations of the currency of the host country during the preceding year and the current US FDI inflows to the country were examined. This was the first study that used skewness to capture the effects of relatively large exchange rate shocks predominantly in one direction on FDI flows. The results seem to corroborate Campa (1993) and Cushman (1988). In three of the four models specified, exchange rate volatility turned out to be insignificant. In the case of the GLS model where it was significant, the sign was negative, suggesting that increases in exchange rate volatility reduced FDI flows.

Studies on the relationship between exchange rate and exchange rate volatility, on the one hand, and FDI, on the other, for SSA countries are very sparse. Alaba (2003) is one of the very few authors that have attempted to bridge this gap. He aimed at determining the magnitude and direction of the effects of exchange rate movement and its volatility on FDI flows to agriculture and manufacturing sectors in Nigeria. Employing the GARCH measure of volatility, the error correction methodology was used for the empirical investigation in testing the effects of both the official and parallel market exchange rates on FDI flows to agriculture and manufacturing. While the results show that the official market exchange rate movement significantly reduces FDI inflows to agriculture, the same is, however, insignificant for the manufacturing FDI. For the volatility coefficients, official market exchange rate volatility was not found to be significant for FDI inflows to both manufacturing and agriculture. Conversely, the estimated parallel market exchange rate coefficients suggest that both systematic movement of the exchange rate and its volatility are significant for the flow of FDI to both agriculture and manufacturing in Nigeria with the parallel market rates, yielding both negative and positive signs for exchange rate volatility in the two sectors. The conclusion was that while exchange rate volatility attracted investment in agriculture it deterred FDI in the manufacturing sector, thus suggesting ambiguity regarding the effects of exchange rate movements and its volatility on FDI inflows in SSA.

Mowatt and Zulu (1999) in a study of the South African investment in the Southern and Eastern African region, identified exchange rate as one of the major barriers to FDI in Zimbabwe, Botswana and Mozambique. Similarly, in a survey of the southern African countries, Jenkins and Thomas (2002) found that about 25% of the total firms surveyed identified exchange rate risk as an important determinant of FDI in the sub-region.

This review shows that the literature recognizes the existence of a significant linkage between exchange rate volatility and FDI in both developed and developing countries. However, this relationship differs across countries and seems to be sensitive to the measure of volatility employed. More importantly, the literature on this relationship in SSA is sparse.

**4. The Model, Data and Estimation Procedures**

Estimating the real exchange rate volatility employs a model that combines fundamental determinants of exchange rate and exchange rate regimes. It is noteworthy to mention at this juncture that data constraints and need to preserve a reasonable level of degrees of freedom limit the extent to which all fundamental determinants of real exchange rate can be incorporated. Thus, we concentrate on the most important fundamentals in each country. The Exponential Generalised Autoregressive Conditional Heteroscedasticity (EGARCH) methodology is adopted for this analysis because it allows positive and negative innovations to have asymmetric effect on the conditional variance. This measure of volatility has been adjudged superior to other measures because it takes cognizance of the asymmetric volatility in real exchange rate. The model, therefore, takes this form:

 (2)

Where  is the conditional exchange rate volatility derived from EGARCH (1,1) autoregressive order *q* {AR(q)} specifications. *q* is the lag length chosen on the basis of Akaike Iinformation Criterion,is a vector of exogenous variables, while *i* and *t* are number of variables and time, respectively. The AR(q) is usually denoted as:

 (3)

Where  is the log of real exchange rate () differenced once and  is the residuals used in testing for the presence of ARCH/GARCH effects in the real exchange rate.

The country-specific estimated empirical model is of the form:

 (4)

Here,  is the conditional variance of real exchange rate derived from EGARCH (1,1), D is the dummy variable that characterises exchange rate regime. It assumes the value of 1 during fixed exchange rate regime and zero otherwise. , , , , , and  are the coefficients for estimation, while  represents the standardised residuals  which is *iid* random variables with standard characteristics of zero mean and variance one.

The fundamentals included in modelling real exchange rate for the respective countries are Money supply, foreign exchange reserves, inflation rate, domestic and foreign real interest rate, trade openness, terms of trade and real shocks. For choice of these variables, please see Savvides, 1990; Hau, 2002; and Hviding *et al*, 2004.

The model employedin assessing the relationship between exchange rate volatility and FDIdraws on the work of Goldberg and Kolstad (1995) where changes in FDI flows depend on the level and volatility of exchange rate, among other factors. However, several modifications are made to adapt the model to suit the peculiarities of the SSA countries. A common belief is that FDI decisions take some time to react to exchange rate changes. To check the veracity of this view, one-year lag of the real exchange rate volatility is included as a regressor depending on the suitability of its inclusion based on variable exclusion tests. Real interest rate in the host country is also introduced into the model given the view that this is a major determinant of FDI flows. This is premised on the argument that the decision by an investor to invest abroad is partly influenced by the foreign interest rate *vis-à-vis* the rate at home.

Another common view on FDI flows to SSA is that natural resource abundance in this region is the basic force driving FDI to SSA. Hence, foreign investors are believed not to be sensitive to risk involved in investment in this region. To capture the investors’ attitude towards risk in the region, therefore, the theoretical insights from Itagaki (1981) and Cushman (1985) are employed by including the second moment, that is, the standard deviation of the monthly real exchange rate as an explanatory variable. It has been established empirically that infrastructure is a critical determinant of FDI in SSA (See Bhattacharya *et al*, 1996; Asiedu 2002; and Jenkins and Thomas, 2002). To capture this view, a measure of infrastructure is included as a regressor.

The last but not the least modification made to the model is the consideration accorded capital control in SSA. For many years, different SSA countries adopted different forms of capital control at different period of their existence. While the relaxation of these controls began in the 1980s, different countries experienced different relaxation periods and level with some, especially the CFA countries, still maintaining some control on capital movements. To control for this and the influence it exerts on FDI inflows, a dummy is introduced to reflect this policy stance.

Panel-based empirical model is employed by generating pooled cross-section data from individual country time series data. The model is given as:

 (5)



where  is a common intercept term,  represents the individual-specific effect for each country which accounts for possible cross-country differences in the intercept,  stands for the time-specific aggregate effect that captures possible time-varying behaviour in the cross-section data, tilde (~) symbolises a transformed variable and  is the idiosyncratic disturbance term. Essentially, equation (1) allows for the systematic tendency of  to be higher for some countries than for others (individual effects) and higher for some time periods than for others (time effects).

FDI is the annual FDI inflows to each selected country. This represents total FDI flows from all sources to all sectors of the host economy, and is measured in real term as the ratio of FDI in GDP. Exchange rate level is measured as the real effective exchange rate. This is the most appropriate measure for exchange rate for a study of this nature given its ability to capture and measure the international competitiveness of countries. Moreover, it has been weighted by the level of trade and investment between each country and the rest of the world. This has the advantage of eliminating the bias of the sample towards actual investors when bilateral exchange rates are used and account as much as possible for potential investors in the sense that investors, actual or potential, are more likely to come from countries which are already in trading relationship with these countries. Risk attitude of the investors are measured as the standard deviation of the quarterly real exchange rate (Kiyota and Urata, 2004). This variable captures the foreign investors’ attitude to risk as a determining factor for investing in SSA.

The lag of exchange rate volatility captures the view that FDI flows influence real exchange rate volatility with a lag. Demand volatility captures the market size as well as economic uncertainty in the individual economies as a determining motive for FDI. Real interest rate in the host economy reflects return to investment in the host country. Infrastructure is proxied by the total electricity provision in each country. This variable is measured as the total electricity production less electricity power losses during transmission and distribution. Capital control is a dummy variable which takes the value one for the period of capital control and zero otherwise. *A priori*, bilateral exchange rate, real interest rates, infrastructure, and capital control are expected to have positive signs while risk aversion, volatility and demand volatility are all expected to be negatively signed.

**5. Estimation Results and Discussions**

The EGARCH models are estimated with backcasting and provision for the Bollerslev-Wooldridge heteroscedasticity consistent covariance. The results of the estimates are reported in Table 6. The diagnostic tests reveal that the results are robust based on diagnostic tests on standardised residuals that show absence of ARCH effects and serial correlation. A very important factor taken into consideration in modelling the volatility variable in each country are the major shifts experienced by these countries in their exchange rate arrangements and policies. For instance, all the countries in the CFA zone devalued their currency by 100 per cent in 1994. In addition, most other countries undertook major devaluation in the late 1980s and early 1990s in pursuit of the Structural Adjustment Programme (SAP). These effects are taking into consideration in modelling exchange rate volatility for these countries.

The patterns of exchange rate volatility in the countries are presented in Figures 6.1 to 6.9. They show varying degrees of conditional volatility across the countries and across the exchange rates regimes, with differing reaction to shocks depending on the nature of such shock. The strong impact of the major devaluation of the nominal rates of the CFA franc clearly had a very strong impact on real exchange rate volatility in the CFA countries. Similarly, the impact on volatility of the major devaluation undertaken in Nigeria with the adoption of the SAP in the mid-1980s is also clearly evident. The spikes generated by exchange rate volatility are well pronounced in all the countries except Nigeria. Another important observation about the pattern of volatility is that real effective exchange rate volatility is a persistent feature of all the selected countries throughout the period under review. This, however, became more pronounced from the 1980s onward, when most of these countries moved from the fixed exchange rate system to the flexible one. This is true even for the CFA countries operating pegged exchange rate system.

An important observation about the results is that all the estimated mean equations have very high statistical significance for all the countries. Furthermore, the variance equations reveal that the estimated coefficients for the EGARCH model are statistically significant for all the countries. These suggest that the real effective exchange rates of the selected countries were actually volatile during the period examined. It is also interesting to note that the EGARCH model identifies the presence of asymmetry for all the countries, suggesting that this is an appropriate technique for estimating real exchange rate volatility for these countries.

**Table 5: The Unit Root Test Results for Selected Variables**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **COUNTRY** | **Variable** | **Augmented Dickey-Fuller Statistic** | | **Phillips-Perron** | | **Conclusion** |
| **Level** | **First Difference** | **Level** | **First Difference** |
| **Cameroon** | Volatility | -4.523 | -5.724 | -4.432 | -7.457 | I(0) |
| FDI | -1.762 | -11.307 | -4.757 | -23.417 | I(1) |
| **Central African Republic** | Volatility | -4.381 | -8.984 | -4.209 | -12.645 | I(0) |
| FDI | -2.081 | -6.822 | -2.081 | -7.151 | I(1) |
| **Côte d’Ivoire** | Volatility | -2.812 | -4.102 | -4.769 | -9.328 | I(0) |
| FDI | -1.028 | -6.001 | -1.019 | -6.009 | I(1) |
| **Ghana** | Volatility | 1.652 | -3.999 | -2.482 | -5.490 | I(1) |
| FDI | -2.482 | -5.490 | -2.437 | -5.490 | I(1) |
| **Kenya** | Volatility | -2.764 | -6.038 | -3.684 | -18.649 | I(0) |
| FDI | -5.388 | -8.787 | -5.387 | -9.272 | I(0) |
| **Nigeria** | Volatility | -4.455 | 8.432 | -4.396 | -9.379 | I(0) |
| FDI | -0.016 | 9.289 | -0.479 | -9.431 | I(1) |
| **South Africa** | Volatility | -2.364 | -7.066 | -2.381 | -7.066 | I(1) |
| FDI | 0.228 | -11.979 | -3.729 | -13.448 | I(1) |
| **Tanzania** | Volatility | -4.435 | -7.241 | -4.599 | -10.404 | I(0) |
| FDI | 1.051 | -6.656 | -0.065 | -11.242 | I(1) |
| **Zambia** | Volatility | -3.184 | -6.304 | -3.623 | -12.785 | I(0) |
| FDI | -3.754 | -8.235 | -3.793 | -10.871 | I(0) |

*Source*: Author’s Computation.

Note: The critical values are -3.64, -2.95 and -2.61 at the (1%., 5% and 10% levels, respectively.

**Table 6: The GARCH Model of Exchange Rate Volatility in Selected SSA Countries**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Country** | **Mean Equation** | **Variance Equation** | | | | **Wald Test** | **Normality Test** | | | | | **ARCH/**  **GARCH LM** |
| Constant() |  |  | EGARCH | Mean | Standard Deviation | Skewness | Kurtosis | Jarque-Bera |
| Cameroon | 2.043\*\*\*  [2908.7] | -2.772\*\*\*  [-6.179] | 1.604\*\*\*  [4.763] | 0.284\*\*\*  [2.318] | 0.819\*\*\*  [19.201] | 17.8\*\*\* | 0.393 | 0.922 | -0.831 | 2.713 | 7.059 | 0.120 |
| Central African Republic | 2.0859\*\*\*  [1627.1] | -1.592\*\*\*  [-6.709] | 1.029\*\*\*  [5.474] | 0.1098\*\*\*  [2.204] | 0.889\*\*\*  [25.903] | 10.3\*\*\* | 0.150 | 0.991 | -0.319 | 2.403 | 4.575 | 0.419 |
| Cote d’Ivoire | 2.0229\*\*\*  [1003.2] | -2.220\*\*\*  [-7.083] | 1.329\*\*\*  [10.395] | 0.204\*\*\*  [1.838] | 0.8286\*\*\*  [17.844] | 13.6\*\*\* | 0.139 | 0.994 | -0.014 | 2.663 | 0.687 | 0.116 |
| Ghana | 2.1852\*\*\*  [710.96] | -2.069\*\*\*  [-7.208] | 1.781\*\*\*  [8.006] | 0.149\*  [1.804] | 0.906\*\*\*  [30.824] | 10.3\*\*\* | 0.180 | 0.987 | -0.549 | 1.861 | 5.672 | 0.914 |
| Kenya | 1.9232\*\*\*  [915.31] | -3.298\*\*\*  [-[6.827] | 1.668\*\*\*  [10.028] | 0.143  [1.155] | 0.716\*\*\*  [10.048] | 15.9\*\*\* | 0.218 | 0.979 | -0.425 | 2.034 | 6.114 | 0.476 |
| Nigeria | 2.2216\*\*\*  [2056.7] | -2.498\*\*\*  [-9.318] | 2.094\*\*\*  [11.972] | 0.154\*\*  [2.564] | 0.849\*\*\*  [19.466] | 12.0\*\*\* | -0.01 | 1.003 | -0.014 | 1.578 | 12.145 | 1.154 |
| South Africa | 2.0948\*\*\*  [1546.9] | -3.353\*\*\*  [-4.424] | 1.455\*\*\*  [9.726] | -0.095  [-0.926] | 0.648\*\*\*  [5.223] | 8.1\*\*\* | -0.047 | 1.002 | 0.298 | 3.628 | 4.506 | 0.128 |
| Tanzania | 2.1783\*\*\*  [705.1] | -2.029\*\*\*  [-7.252] | 1.417\*\*\*  [10.938] | -0.021  [-0.318] | 0.829\*\*\*  [14.917] | 9.4\*\*\* | 0.023 | 1.003 | -0.128 | 1.667 | 11.055 | 0.675 |
| Zambia | 2.0353\*\*\*  [1068.5] | 4.745\*\*\*  [-21.709] | 2.438\*\*\*  [13.192] | -0.529\*\*\*  [-3.304] | 0.415\*\*\*  [8.417] | 140.8\*\*\* | -0.150 | 1.039 | 0.202 | 4.495 | 14.399 | 1.341 |

*Note*: The values in square brackets [ ] are the t-statistic, and \*\*\*, \*\* and \* implies statistical significance at the 1 %, 5 %, and 10 %, respectively.









The estimated results, employing the fixed effects model are reported in Table 6. All the diagnostic tests reveal consistent and reliable estimates. There is neither evidence of serial correlation of the residuals nor differences in residual variance across countries and time. The residuals are also normally distributed.

The results consistently establish negative effects of exchange rate volatility on FDI inflows in all the cases with significant impact at 1% for all the countries and non-CFA countries, and 10% for the CFA countries. The group of non-CFA countries has the highest estimated coefficient and statistical significance. Although both the exchange rate levels and investors’ risk attitude have the expected signs, statistically significant effect is established only in the case of risk attitude for all the countries combined. These results, thus, predict that devaluation increases FDI inflows to SSA while increased risk retards it. This is not surprising given the general risk-averse nature of foreign investors. The stronger effect of exchange rate volatility on FDI in the non-CFA countries relative to their CFA counterpart appears to demonstrate that exchange rate pegging dampens the negative effect of exchange rate volatility on FDI. This should be interpreted with caution, however, given the number of countries involved in the estimated model.

**Table 7: Panel Regression Results on the Effects of Exchange Rate Volatility on FDI in SSA, Fixed Effects Estimation.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Variable** | **All Countries** | | **CFA Countries** | | **Non-CFA Countries** | |
| Coefficient | t-statistic | Coefficient | t-statistic | Coefficient | t-statistic |
| Exchange Rate Volatility | -0.0356\*\*\* | [-3.8256]   |  | | --- | |  | | -0.0129\* | [-1.812] | -0.049\*\*\* | [-4.255] |
| Exchange Rate Movement | 0.032 | [1.338] | 0.017 | [0.404] | 0.038 | [1.329] |
| Risk Attitude | |  | | --- | | -0.016\*\* | | [-2.525] | -0.0151 | [-0.470] | -0.0096 | [-0.631] |
| Infrastructure | |  | | --- | | 0.158\*\*\* | | [5.306] | 0.0655 | [0.809] | 0.1578\*\*\* | [4.937] |
| Real Interest Rate | -0.023 | [-1.181] | -0.0495\* | [-1.697] | -0.0187 | [-0.0726] |
| Income | 0.0008 | [1.108] | -0.0024 | [-0.138] | 0.0061\* | [-1.995] |
| Capital Control | 0.1591\*\*\* | [4.8116] | 0.0211 | [0.261] | 0.2325\*\*\* | [6.1604] |
| Constant | |  | | --- | | -2.35\*\*\* | | |  | | --- | | [-4.0059] | | -0.463 | [-0.402] | -3.115\*\*\* | [-4.293] |
|  |  |  |  |  |  |  |
| Coefficient of Determination | 0.442 | | 0.358 | | 0.5195 | |
| F-test Statistic | 15.732\*\*\* | | 12.1154\*\*\* | | 24.313\*\*\* | |
| Standard Error | 0.235 | | 0.2555 | | 0.2025 | |
| Durbin-Watson Statistic | 1.7254 | | 1.6258 | | 1.8415 | |
| Serial Correlation LM Test (Prob.) | 1.23 | | 0.93 | | 1.01 | |
| Normality of Residuals () | 5.53 | | 4.85 | | 5.32 | |
| Wald-test for group wise heteroscedasticity | (0.00) | | (0.00) | | (0.00) | |

*Notes*: The values in brackets [ ] are the t-statistic, and \*\*\*, \*\* and \* implies statistical significance at the 1 %, 5 %, and 10 %, respectively. Ѱ implies *p*-values are reported. Standard errors are reported in parentheses ( ).

The findings here make sense. Real effective exchange rate is a measure of international competitiveness. Appreciation denotes a rise in domestic prices of inputs relative to countries with unchanged or depreciation in exchange rates. This reduces the chance of such country being chosen by foreign investors. Worse still, volatile real exchange rate inspires uncertainty in the cost of inputs in the host country and thus of profits. Given the general risk-averse nature of foreign investors and irreversibility of capital, this phenomenon retards investment.

The findings that exchange rate depreciation induces FDI inflows compares favourably to earlier studies such as Kohlhagen (1977) and Froot, Stein (1991), Blonigen (1997), Sazanami, *et al* (2003), Kiyota and Urata (2004), and Mwega and Ngugi (2005). Similarly, the negative effect of exchange rate volatility on FDI established in this study is in consonance with Bleaney and Greenaway (2001). This study employed panel data estimation for a sample of 14 SSA countries between 1980 and 1995, and established a significant negative effect of exchange rate volatility on FDI.

**6. Lessons for Policy and Conclusion**

This study examined the effect of exchange rate volatility on FDI inflows in nine SSA countries. Exchange rate volatility is identified as one of the factors responsible for the low, dwindling and volatile FDI inflows in the region. Given the importance of FDI in the region, this has the potential of further retarding the economic growth and development of the region. The “Big Brother” role of South Africa, not just in the SADC region but in the SSA in championing south-south FDI is commendable. This further demonstrates the role of the country as an engine of growth in the region. The instrumental variable estimations reveal that nominal and inflation shocks are the major sources of exchange rate volatility in the region. Thus, these variables should be well managed to mitigate their negative effect on exchange rate volatility. This will help douse the negative effect of exchange rate volatility on FDI inflows in the region with a view to achieving the overall objective of a developed and virile SSA.

Several policy lessons can be drawn from the findings of this study. There is need for policy intervention in terms of exchange rate and monetary policies to lessen the damaging effect of exchange rate volatility on FDI inflows. The exchange rate volatility models revealed that nominal and inflation shocks are prominent sources of exchange rate volatility in the region. This implies that shocks originating from these variables exacerbate exchange rate volatility. There is, therefore, need for sound monetary, exchange rate and macroeconomic policies that will help manage shocks emanating from these variables. Only then can their negative effects on exchange rate volatility be mitigated or possibly removed with a view to improving FDI inflows in the region.

There is also need for policy cohesion and coordination on exchange rate and FDI management. It implies that FDI policies can have very significant effect on the exchange rates. At the same time, exchange rate policies can also stimulate or restrain FDI. Hence, in formulating either policy, the other one must be taken into consideration. This will help improve the policy performance and its ultimate impact on both improving FDI inflows and reducing exchange rate volatility. This calls for joint action and coordination between the different institutions charged with the responsibility of formulating both policies.

**REFERENCES**

African Development Bank. (2003): African Development Report: Oxford University Press, Oxford.

Aizenman, J. (1992): “Exchange Rate Flexibility, Volatility, and Domestic and Foreign Direct Investment”, IMF Staff Papers, 39(l4), pp. 890-992.

Alaba, O. (2003): “Exchange Rate Uncertainty and Foreign Direct Investment in Nigeria”, A Paper Presented at the WIDER Conference on Sharing Global Prosperity, Helsinki, Finland, 6-7, September.

Amuedo-Dorantes, C. and Pozo, S. (2001): “Foreign Exchange Rates and Foreign Direct Investment in the United States”, International Trade Journal,15(3), pp. 323-343.

Asiedu, E. (2002): “On the Determinant of Foreign Direct Investment to Developing Countries: Is Africa Different?” World Development, 30(1), pp. 107-119

Bailey, M. J. and Tavlas, G. S. (1991): “Exchange Rate Variability and Direct Investment”. The Annals, AAPSS,516, pp.106-16.

Bhattacharaya, A, Montiel , P. and Sharma, S. (1996): “Private Capital Flows to Sub-Saharan Africa: An Overview of Trends and Determinants”, Mimeo, Research department, IMF.

Bénassy-Quéré, A., Fontagné, L. and Lahréche-Revil, A. (2001): “Exchange-Rate Strategies in the Competition for Attracting Foreign Direct Investment”, Journal of the Japanese and international Economies, 15(2), pp.178-198.

Bleaney, M. and Greenway, D. (2001): “The Impact of Terms of Trade and Real Exchange Rate Volatility on Investment and Growth in Sub-Saharan Africa”, Journal of Development Economics, Vol. 65, pp. 491-500.

Blonigen, B. (1997): “Firm-specific Assets and the Link between Exchange Rates and Foreign Direct Investment”, American Economic Review, 87(3), pp. 447-465.

Brzozowski, M. (2003): “Exchange Rate Variability and Foreign Direct Investment- Consequences of EMU Enlargement”, Studies and Analyses, 258, Center for Social and Economic Research, Warsaw, Poland.

Campa, J. (1993): “Entry by Foreign Firms in the US under Exchange-Rate Uncertainty”, Review of Economics and Statistics, 75(4), pp. 614-622.

Chakrabarti, A. (2001): “The Determinants of Foreign Direct Investment: Sensitivity Analysis of Cross Country Regressions’. Kyklos*,*  54(1), pp. 89–113.

Chakrabarti, R. and Scholnick, B. (2002): “Exchange Rate Expectations and FDI Flows”. Weltwirtschaftliches Archiv – Review of World Economics, 138(1), pp. 1-21.

Cushman, D. (1985) “Real Exchange Rate Risk, Expectations, and the Level of Direct Investment”, The Review of Economics and Statistics, 67(2), pp. 297-308.

Cushman, D.O. (1988) “Exchange Rate Uncertainty and Foreign Direct Investment in the United States”, Weltwirtschaftliches Archiv, 124, pp.322-336.

Devereux, M. B. and Engel, C. (2001): “Endogenous Currency of Pricing in a Dynamic Open Economy Model”. National Bureau of Economic Research, working paper no. 8559.

Dixit, A. K. and Pindyck, R. S. (1994): Investment Under Uncertainty. Princeton, New Jersey: Princeton University Press.

Dufey, G. (1972): “Corporate Finance and Exchange Rate Variations”. Financial Management, Summer, pp. 51-57.

Froot, K. and Stein, J. (1991): “Exchange Rates and Foreign Direct Investment: An Imperfect Capital Markets Approach’, Quarterly Journal of Economics,106(4), pp. 1191-1217.

Galgau, O. and Sekkat, K. (2004): “[Does Economic Integration Affect FDI Inflows to Member Countries Equally? : An empirical Analysis for Europe](http://ideas.repec.org/p/sol/wpaper/04-025.html),” [Working Papers CEB](http://ideas.repec.org/s/sol/wpaper.html) 04-025.RS, Université Libre de Bruxelles, Solvay Business School, Centre Emile Bernheim (CEB).

Gelb, Stephen. 2005. South-South Investment: The Case of Africa. In Africa in the World Economy-The National, Regional and International Challenges. Fondad, The Hague.

Goldberg, L. (1997): “Exchange Rates and Investment Response in Latin America”. in International Trade and Finance: New Frontiers for Research: Festschrift in Honor of Peter B. Kenen,ed . B. J. Cohen,Cambridge: Cambridge University Press.

Goldberg, L. and Kolstad, C. (1995): “Foreign Direct Investment, Exchange Rate Variability and Demand Uncertainty”, International Economic Review*,* 36(4), pp. 855-873.

Gorg, H. and Wakelin, K. (2002): “The Impact of Exchange Rate Volatility on US Direct Investment’. Manchester School, 70, pp. 380-97.

Gray, H. P. (1966): “United States Foreign Investment and the Dollar Exchange Rate”. Economic Internazionale, August, pp. 496-502.

Hau, H. 2002 Real Exchange Rate Volatility and Economic Openness: Theory and Evidence. Journal of Money, Credit and Banking, 34(3), pp. 611-630.

Hawkins, P and Lockwood, K. (2001): “A Strategy for Attracting Foreign Direct Investment in South Africa”, Paper presented at the Economic Society of South Africa Conference, Glenburn Lodge, Johannesburg, South Africa.

Houthakker, H. S. (1962): “Should We Devalue the Dollar?” Challenge, October, pp. 12-12.

Hviding, K., Nowak, M. and Ricci, L. A. (2004): “Can Higher Reserves Help Reduce Exchange Rate Volatility?”, International Monetary Fund Working Paper No.189.

Itagaki, T. (1981): “The theory of the multinational firm under exchange rate Uncertainty”. The Canadian Journal of Economics, 14(2), pp. 276–97.

Jenkins, C. and Lynne Thomas. 2002. “Foreign direct investment in Southern Africa: Determinants, Characteristics and Implications for Economic Growth and Poverty Alleviation”. A Research on Globalisation and Poverty funded by DFID.

Kamaly, A. (2001): “Behind the Surge in FDI to Developing Countries in the 1990s: An Empirical Investigation”, mimeo, University of Maryland, College Park.

Khan, S. and Bamou, L. (2005): “An Analysis of Foreign Direct Investment Flows to Cameroon”. A Report presented at the AERC/IMF Special Workshop on Foreign Direct Investment in Africa.

**Kiyota, Kozo and Shujiro Urata. 2004. “Exchange Rate, Exchange Rate Volatility and Foreign Direct Investment”.** The World Economy, 27(10), pp. 1501-1536.

Kohlhagen, S. (1977): “Exchange Rate Changes, Profitability and Direct Foreign Investment”. Southern Economic Journal, 44, pp. 43-52.

Mowatt, R. and Zulu, T. (1999): “Intra-regional Private Capital Flows in Eastern and Southern Africa: A Study of South African Investment in the Region”. Paper presented at a CREFSA/DFI workshop on Intra-regional Private Capital Flows in Eastern and Southern Africa, Harare.

Mwega, F. M. and Ngugi, R.W. (2005): “Foreign Direct Investment in Kenya”. A Final Report submitted to the African Research Economic Research Consortium, Nairobi, Kenya.

Ogunleye, E. K. (2008): Exchange Rate Volatility and Foreign Direct Investment Inflows in Selected Sub-Sahara African Countries, 1970-2005. PhD Thesis in the Department of Economics, University of Ibadan

Page, S. and Willem te Velde, D. (2004): Foreign Direct Investment by African Countries. Paper prepared for InWent / UNCTAD Meeting on FDI in Africa, 22-24 November, UNECA, Addis Ababa.

Pindyck, R. S. (1998) “Irreversible Investment, Capacity Choice, and the Value of the Firm”. American Economic Review, 78(5), pp. 969-985.

Razafimahefa, I. and Hamori, S. (2005) “An Empirical Analysis of FDI Competitiveness in Sub-Saharan Africa and Developing Countries”. Economics Bulletin,6( 20), pp. 1−8.

Ruiz, I. C. (2005): “Exchange Rate as a Determinant of Foreign Direct Investment: Does it Really Matter? Theoretical Aspects, Literature Review and Applied Proposal”, *Ecos de Economía*, 21. Medellín, pp. 153-171.

Savvides, A. (1990): “Real Exchange Rate Variability and the Choice of Exchange Rate Regime by Developing Countries”. Journal of International Money and Finance, (9), pp. 440-454.

Sercu, P. and Vanhulle, C. (1992): “Exchange Rate Volatility, International Trade and the Value of Exporting Firms”. Journal of Banking and Finance,(16), pp. 55-182.

UNCTAD. 2003. World Investment Report, United Nations, New York and Geneva.

UNCTAD. (2006): World Investment Report, United Nations, New York and Geneva

UNCTAD .(2008): World Investment Directory, Volume X, Africa. United Nations, Geneva.

Wallich, H. C. (1973): “Why Fixed Exchange Rates”. Social Science Quarterly, June, pp. 146- 151.

Zhang, L. H. (2001): “Did European Integration Attract More Foreign Direct Investment Inflows?” Mimeo, Johns Hopkins University.

1. In this paper, Exchange rate is defined as the unit of domestic currency vis-à-vis a unit of the US dollar. [↑](#footnote-ref-2)