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Does Exchange Rate Volatility Matter in Foreign Direct Investment? A VECM Analysis on Foreign Direct Investment in Zimbabwe

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Abstract: **Objectives:** The objective of this paper is therefore to determine the impact of exchange rate volatility on foreign direct investment inflows into Zimbabwe. **Prior Work**: Earlier research on the impact of exchange rate volatility on FDI to a large extent failed to agree, were mixed and produced divergent results. The questions to be answered by this research paper are in this paper "to what extent does exchange rate volatility influence FDI?". The other question answered in this study says, "does volatility of the rate of exchange significantly affect the foreign direct investment inflows?" **Approach:** Vector error correction method (VECM) was used for the purposes of this study. Time series data used spans from 1995 to 2022. **Results:** The error correction term is statistically insignificant. This means in the short run, there is no causality in the rate of exchange equation because all variables are statistically insignificant in the rate of exchange equation. **Implications**: Basing on the results of the study we suggest policy recommendations aimed at stabilizing foreign exchange rates for Zimbabwe to attract FDI. **Value:** The conclusion is that stabilization of foreign exchange rates is a critical element of FDI inflows in Zimbabwe.

Keywords: Exchange Rate Volatility; FDI; Vector Error Correction Model; Zimbabwe

JEL Classification: C22; F21; F31; N17

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1. Introduction and Background

The impact of the rate of exchange fluctuation on foreign direct investment (FDI) has been widely studied in both developed and less developed countries (Ben-Obi et al., 2025; Maepa, 2018; Ullah, 2012; Osinubi & Amaghionyeodiwe, 2009). However, the quantum and magnitude of the link between volatility of the rate of exchange and FDI appears to have received little attention especially in Southern African Development Community (SADC) including Zimbabwe. Over the past twenty-five years, Zimbabwe has witness a decline in FDI. On the other hand, its local currency has been fluctuating rapidly against its major trading currencies. It is against this background that this study was carried out.

Foreign direct investment is critical to economic development especially in less developed countries (LDCs) such as Zimbabwe. Most investors make capital investment in countries or economic regions where the Easy to Do Business index is high. These international capitalists bring with them advanced technology and infuse innovative ideas in various sectors of the economy. Capital investment, advanced technology and innovation leads to economic growth which is generally accepted as a proxy for economic development. Masipa (2018) asserted that inflows of foreign direct investment had a long-term favorable impact on most African and Latin American countries. FDI is determined by several variables, one of which is exchange rate volatility.

Since the year 2000, when Zimbabwe embarked on fast track land reform, large tracks of agricultural land was forcibly acquired from white commercial farmers and given to the landless blacks as a way to correct the colonial imbalances. This programme however received criticisms from some local sections of the community and the international community particularly from western countries such as Britain (the former colonial power), USA and the European Union. The combination of economic mismanagement, fast track land reform and political instability resulted in hyperinflationary pressures and rapid depreciation of the Zimbabwean dollar from year 2000 to 2009 when the local currency was demonetized. The rate of exchange became highly volatile, with frequent and significant fluctuations. This volatility eroded the value of the local currency and made it difficult for businesses to plan and operate effectively. This led to a decline in foreign investment as investors were reluctant to commit capital in an environment of uncertainty. The volatility also undermined domestic businesses, making it difficult for them to acquire necessary products and services and prepare for the future. Overall, volatility of the rate of

exchange in Zimbabwe was closely intertwined with the country's economic challenges. More so, the government policies, including the fast land reform, contributed to a decline in economic growth and stability.

Since November 2017, when then the President Mugabe was forced out of office by the military backed by the civilians, the new regime adopted an open door policy to investors across the globe. The new regime then embarked on re-engagement and engagement to lure FDI from both the eastern and western countries. During the mid-2000s most western countries such as the USA, Canada and the European Union imposed travel and trade restrictions to selected top ruling party officials and senior management of some public entities in response to the chaotic fast track land reform and disputed general and presidential elections of 2000 and 2002 respectively. Zimbabwe was also suspended from the British Commonwealth and then opted to quit the organization. By quitting the Commonwealth Zimbabwe forfeited the cultural and economic benefits associated with club members. Some of the big companies that relocated from Zimbabwe or shut down include Unilever, David Whitehead, BP, Dunlop and Pelhams. The Zimbabwe Stock Exchange which used to be second only after the Johannesburg Stock Exchange in the Sub-Saharan Africa witnessed unprecedented capital fight. The Zimbabwean dollar continued to rapidly depreciate against major currencies. Annual inflation stood at 228% March in 2003 became uncontrollable and was galloping such that by July 2008 it had reached 231 million per cent. From 2009 to 2018, Zimbabwe was operating a multi-currency regime led by the United States dollar.

The questions to be answered by this research paper are in this paper "to what extent does exchange rate volatility influence FDI'? The other question answered in this study says, "Does volatility of the rate of exchange significantly affect the foreign direct investment inflows"? The objective of this paper is therefore to determine the impact of currency rate volatility on foreign direct investment inflows into Zimbabwe from 1995 to 2022. Basing on the results of the study we suggest policy recommendations as to how Zimbabwe can attract FDI and stabilize the exchange rate.

2. Literature Review

There are various theoretical arguments that link volatility of the rate of exchange to foreign direct investment inflows. The theories that link these two variables include

production flexibility theory, risk aversion theory, portfolio theory, Mundell-Flemming model, and Dornbusch overshooting model.

Several empirical studies have been conducted to study the link between fluctuations in exchange rates and FDI in different countries and regions. It is worth noting that the findings of empirical studies vary depending on the methodology, data, and specific country context. Nevertheless, these studies provide gainful knowledge into the relationship between rate of exchange volatility and FDI.

Safet Kurtović et al. (2025) examined the impact of exchange rate volatility (ERV) and the production capacity index (PCI) on mergers and acquisitions (M&A) and greenfield FDI in 14 selected emerging economies. Nonlinear ARDL model and annual data from 2000 to 2023 were used and found a significant asymmetric impact of the ERV on M&A in China, Czechia, Romania, and Russia, as well as on greenfield FDI in Bulgaria, China, Hungary, and India. The PCI also significantly impacts M&A in Argentina, Brazil, Bulgaria, China, Czechia, India, Malaysia, and Russia, as well as greenfield FDI in Brazil, Egypt, Hungary, India, Poland, and Russia. Nguyen, Ha et al. (2018) utilized a panel of 80 developing and developed countries for the period 1990-2015 to analyse the relationship between exchange rate volatility and FDI inflows. The findings of their study show a negative relationship between exchange rate volatility and FDI.

Using African countries in the empirical study, Asiedu and Lien (2018) investigated the influence of currency volatility on FDI inflows to 45 African nations, including Zimbabwe. Results of their study show that volatility in the currency rate had a detrimental impact on FDI inflows implying that rate of exchange stability is crucial for attracting FDI. In the same vein, another study by Mlambo and Bonga (2019) using panel data examined the relationship between exchange rate movements and FDI inflows for selected SADC countries. The outcome of their study indicated that higher volatility of the rate of exchange has a detrimental effect on FDI inflows in SADC countries, including Zimbabwe. Zerihum and Adem (2021) also analyzed the impact of exchange rate volatility on FDI inflows in 38 African countries including Zimbabwe. Their findings indicated that volatility of the rate of exchange negatively affects FDI inflows clearly demonstrating importance of maintaining rate of exchange stability to attract and sustain FDI.

A study by Ncube and Ndlovu (2020) on the effect of movements in rate of exchange on FDI inflows in Zimbabwe, found a negative relationship. The study employed an autoregressive distributed lag (ARDL) approach and recommended the need for rate

of exchange stability to attract more FDI to Zimbabwe. In South Africa, Sekati et al. (2020), evaluated the influence of real exchange rate volatility of the currency rate on FDI inflows using GARCH models. Their findings confirmed the hypothesis that exchange rate has a considerable and negative impact on foreign direct investment (FDI).

3. Methodology

In this section we outline the steps and procedures taken in our research. To do this, we used quarterly time series data from January 2010 to December 2022. The methodology used in this study is anchored on the risk aversion theory and the elasticity hypothesis.

The volatility of currency rates is thought to be adversely connected to foreign direct investment, as measured by capital inflows. Volatility of the rate of exchange creates uncertainty, which can deter foreign investors from making long-term commitments. Increased volatility of the rate of exchange can lead to higher risks and transaction costs, making investment decisions more challenging. On the other hand, stable exchange rates can provide a favorable investment climate, attracting foreign investors. Thus, we expect an undesirable relationship between volatility of the rate of exchange and FDI inflows.

Vector Error Correction Model (VECM) was employed in the study as it allows analysis of the long-term and short-term dynamic relationships among variables. In other words, VECM can capture both short-term deviations from equilibrium and the long-term equilibrium relationship between these variables. By permitting multivariate time series, the VECM generalizes the single-variable (univariate) autoregressive model (Brooks, 2008). All variables are expressed as logarithms since they aid to translate huge numbers to tiny ones and make taking variations in factors easier (Holden, 1997).

The model is specified as follows:

$$\ln FDI_t = a + \sum_{k=1}^{k} \beta_i lnFDI_{t-i} + \sum_{j=1}^{k} \pi_j lnER_{t-j} + \sum_{m=1}^{k} \sigma_m lnINF_{t-m} + \sum_{h=1}^{k} \alpha_h lnGDG_{t-h} + \sum_{p=1}^{k} \emptyset_p lnIR_{t-p} + \lambda_1 ECT_{t-1} + \mu_{1t}$$

$$\ln ER_t = a + \sum_{k=1}^{k} \beta_i lnFDI_{t-i} + \sum_{j=1}^{k} \pi_j lnER_{t-j} + \sum_{m=1}^{k} \sigma_m lnINF_{t-m} + \sum_{h=1}^{k} \alpha_h lnGDG_{t-h} + \sum_{p=1}^{k} \emptyset_p lnIR_{t-p} + \lambda_1 ECT_{t-2} + \mu_{2t}$$

$$\ln INF_t = a + \sum_{k=1}^{k} \beta_i lnFDI_{t-i} + \sum_{j=1}^{k} \pi_j lnER_{t-j} + \sum_{m=1}^{k} \sigma_m lnINF_{t-m} + \sum_{h=1}^{k} \alpha_h lnGDG_{t-h} + \sum_{p=1}^{k} \phi_p lnIR_{t-p} + \lambda_1 ECT_{t-5} + \mu_{5t}$$

$$\ln GDG_t = a + \sum_{k=1}^{k} \beta_i lnFDI_{t-i} + \sum_{j=1}^{k} \pi_j lnER_{t-j} + \sum_{m=1}^{k} \sigma_m lnINF_{t-m} + \sum_{h=1}^{k} \alpha_h lnGDG_{t-h} + \sum_{p=1}^{k} \emptyset_p lnIR_{t-p} + \lambda_1 ECT_{t-3} + \mu_{3t}$$

$$\ln IR_t = a + \sum_{k=1}^{k} \beta_i lnFDI_{t-i} + \sum_{j=1}^{k} \pi_j lnER_{t-j} + \sum_{m=1}^{k} \sigma_m lnINF_{t-m} + \sum_{h=1}^{k} \alpha_h lnGDG_{t-h} + \sum_{p=1}^{k} \phi_p lnIR_{t-p} + \lambda_1 ECT_{t-4} + \mu_{4t}$$

Where

FDI = Foreign Direct Investment

ER = Volatility of the exchange rate

INF = Inflation Rate

GDG = GDP growth

IR = Interest Rate

k = optimal lag length

ECT = Error Correction Term

a = intercept

$\beta_i, \pi_{j,} \sigma_m, \alpha_h \ and \ \phi_p$ = short run dynamic model modification coefficients long-term equilibrium

μ_{1t} = residuals in the equation.

Diagnostic tests were performed to validate the parameters. First, stationarity tests were done to avoid spurious regression. In this analysis, the unit root test was conducted using the Augmented Dickey Fuller test (ADF). Non-stationary parameters were made stationary using the differencing approach (de-trending method). Descriptive statistics which offer a preliminary indication of variables used in regression analysis by providing several summary statistics on a variable such as the median, standard deviation, mean.

Whenever the time is nonstationary in level form, cointegration must be tested. Prior to determining cointegration, optimal lag length has to be test first since choosing a higher order lag length than the genuine lag length increases the model's associated mistakes are typically generated by mean squared prediction errors and underfitting

the lag duration. The optimal lag length test is carried out using the selection order criteria. The rule of thumb is that whatever criteria used, select the lag length with the smallest value. Cointegration tests were also contacted in this study to ascertain whether there is a long run relationship among variables.

The Durbin Watson (DW) test was used to assess detect autocorrelation. In a more mathematical sense, the D-W test statistic evaluates the linear connection between surrounding residuals from a regression model. If there is no serial relationship, the D-W statistic will be about 2. If there is a positive serial correlation, it will be less than two, and it will be nearly zero in the worst-case scenario. The D-W statistic will be between 2 and 4 if there is a negative correlation.

The study used quarterly time series analysis for empirical testing for the period from January 2010 to December 2022. Secondary data from the International Monetary Fund (IMF), World Bank, and ZIMSTAT databases were utilized in the study. Interest rates and Capital Inflows (FDI) were obtained from World bank. Exchange rates, GDP and inflation were collected from the IMF and ZIMSTATS websites respectively.

4. Data Presentation, Analysis and Interpretation

In this section we present the estimated Vector Error Correction Model (VECM) equation for examining the association between exchange rate volatility and FDI inflows in Zimbabwe from 1995 to 2022.

Table 1. Variables descriptive statistics

Variable	Mean	Standard Deviation	Skewness	Kurtosis
FDI	3.99	8.62	3.94	18.70
ER	14.19	4.38	0.89	4.17
INF	47.33	124.24	3.56	15.85
GDG	10.22	3.86	-0.45	2.17
IR	12.84	2.76	-0.13	1.72

Source: Authors' computations from STATA

Foreign Direct Investment had a mean of 3.99 and a standard deviation of 8.62, as seen in Table 1. It is positively skewed, which means that most of the findings are to the right of the mean. This might be due to outliers. A kurtosis value of 3 implies a normal distribution, and the closer the kurtosis value is to 3, the more normal the

data is. The value of the kurtosis for Foreign Direct Investment in the preceding table is 18.70, which is far from 3, suggesting that the variances are not normal.

The exchange rate has a mean of 14.19 and a standard deviation of 4.38, according to Table 1. It is positively skewed, which means that most of the findings are to the correct side of the mean. This might be due to outliers. With a skewness of 0.89, the observations are favorably skewed. Its kurtosis value is 4.17 which is above 3, however it is within a close range to 3 indicating that the distributions are almost normal.

Inflation had a mean of 47.33 and a standard deviation of 124.24. It is positively skewed, which means that most of the findings are to the correct direction of the mean. This might be due to outliers. However, the kurtosis value of inflation is 15.85 which is well above 3 indicating that the distributions are not normal.

In Table 1, the GDP growth has a mean of 10.22 and a standard deviation of 3.86. It is negatively skewed meaning that most of the observations are on the left of the mean. This may be attributed to outliers. The kurtosis value of Gross Domestic Product is 2.17, as shown in the table 1 above. Comparing to the kurtosis of other variables it is it is below 3, however it is within a close range to 3 indicating that the distributions are almost normal.

Table 1 also shows that the Interest Rate had an average of 12.84 and a standard deviation of 2.76. It is negatively skewed, which means that most of the findings are far to the left of the mean. This might be due to outliers. A skewness rating of 0 shows that the observations are not skewed in any direction. In Table 1 above, the kurtosis value of Interest Rate is 1.72, showing that the distributions of variables do not appear normal.

An Augmented Dickey Fuller test was employed to determine variable stationarity. The test is necessary because performing regressions on non-stationary data might result in spurious regressions. Following the tests, all variables, including Foreign direct investment, exchange rate, inflation, GDP growth, and interest rate, were non-stationary initially but turned stationary following the first difference, indicating that they are integrated of order 1. At a minimum predicted level of 1%, these variables became stationary.

Table 2. Results of the stationarity tests for all variables

Variable	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value	P-Value
FDI	3.17	3.75	3.00	2.63	0.02
ER	5.33	3.75	3.00	2.63	0.00
INF	3.86	3.75	3.00	2.63	0.00
GDG	5.17	3.75	3.00	2.63	0.00
IR	5.20	3.75	3.00	2.63	0.00

Source: Authors' computations from STATA

The p-value in every variable in Table 2 is 0.00, except for Foreign Direct Investment, which has a p-value of 0.02; hence, we reject the null hypothesis and concluded that the data is stationary at first difference. Because all the variables are stationary at the initial difference, a cointegration test was required to determine whether to continue with Vector Auto Regression or utilize the Vector Error Correction Model, as illustrated below.

Table 3. Optimal lag test results

Lag	FPE	AIC	HQIC	SBIC
0	0.0019	7.93178	7.9969	8.1772
1	0.0013	7.49484	7.8855	8.9674
2	0.0005	6.29059	7.0068	8.9903
3	0.0006	5.40763	6.4494	9.3345
4	1.900	-75.1786	-73.8112	-70.0246

Source: Authors' computations from STATA

The Akaike Information Criterion (AIC) was utilized and the latency with the minimum AIC figure was 3. As a result, the best lag length is 3 lags.

Table 4. Cointegration Test

Maximum Rank	Trace Statistic	5% Critical Value	Max Statistic	5% Critical Value
0	85.82	68.521	42.29	33.460
1	43.53	47.213	30.02	27.072

2	13.52	29.682	8.32	20.974
3	5.19	15.414	5.11	14.071
4	0.08	3.76	0.08	3.762

Source: Authors' computations from STATA

As demonstrated in Table 4 above, utilizing the trace data, we reject the null hypothesis of no cointegration since the trace statistic (85.82) is larger than the 5% critical value (68.52). We do not reject the null assumption for a maximum rank of one cointegrated equation since the trace statistic (43.53) is smaller than the 5% critical value (47.21) and infer that there is only one cointegrated equation in the model.

The variables in the VECM equation were estimated in their log form only, since they were not stationary at levels, the output expresses the depended variables in their first difference form which is on the far left.

The VECM findings for Foreign direct investment in the short term are shown in Table 5 below.

Table 5. Foreign Direct Investment short run VECM Results

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
D_logy						
_ce1						
L1.	-.4200976	.1366168	-3.08	0.002	-.6878616	-.1523337
logy						
LD.	-.1712082	.1920433	-0.89	0.373	-.5476061	.2051898
L2D.	.2168899	.2087608	1.04	0.299	-.1922737	.6260535
loger						
LD.	-.1257401	.7624352	-0.16	0.869	-1.620085	1.368605
L2D.	.4250221	.692666	0.61	0.539	-.9325782	1.782622
loginf						
LD.	-.427904	.1316815	-3.25	0.001	-.685995	-.169813
L2D.	-.317708	.13752	-2.31	0.021	-.5872422	-.0481737
loggdg						
LD.	-3.425036	1.287614	-2.66	0.008	-5.948713	-.9013587
L2D.	-2.429577	.9613419	-2.53	0.011	-4.313772	-.5453811
logir						
LD.	-4.854558	2.831751	-1.71	0.086	-10.40469	.6955712
L2D.	.5690159	2.653811	0.21	0.830	-4.632357	5.770389
_cons	-.0649624	.1996708	-0.33	0.745	-.4563101	.3263852

Source: Authors' computation from STATA

Table 5 shows that _ce1 is an error correction term with a coefficient of -0.42. At the 1% level of significance, the error term of correlation is significant statistically. Save for the rate of exchange and interest rate, inflation and GDP growth are statistically significant, indicating that the foreign direct Investment equation has a short run causal impact.

Table 6. VECM results for rate of exchange in the short run

D_loger						
_ce1						
L1.	-.0205769	.0389684	-0.53	0.597	-.0969536	.0557998
logy						
LD.	-.015769	.0547782	-0.29	0.773	-.1231323	.0915943
L2D.	-.0403714	.0595467	-0.68	0.498	-.1570808	.0763379
loger						
LD.	-.2302857	.2174761	-1.06	0.290	-.6565311	.1959597
L2D.	-.1483967	.1975752	-0.75	0.453	-.535637	.2388437
loginf						
LD.	.0574608	.0375607	1.53	0.126	-.0161568	.1310784
L2D.	-.0453942	.039226	-1.16	0.247	-.1222759	.0314874
loggdg						
LD.	-.451451	.3672775	-1.23	0.219	-1.171302	.2683998
L2D.	.3342113	.2742121	1.22	0.223	-.2032345	.871657
logir						
LD.	-1.609358	.8077254	-1.99	0.046	-3.192471	-.0262458
L2D.	-.0205206	.7569699	-0.03	0.978	-1.504154	1.463113
_cons	.0400123	.0569539	0.70	0.482	-.0716152	.1516399

Source: Students' STATA computations

As shown in Table 6, _ce1 is the error correction term with a coefficient of -0.02. The error correction term is statistically insignificant. This means in the short run there is no causality in the rate of exchange equation because all variables are statistically insignificant in the rate of exchange equation.

Table 7. VECM results for inflation in the short run

D_loginf						
_ce1						
L1.	.6891783	.2645041	2.61	0.009	.1707598	1.207597
logy						
LD.	-.5415309	.3718156	-1.46	0.145	-1.270276	.1872142
L2D.	.1895227	.4041823	0.47	0.639	-.60266	.9817055
loger						
LD.	1.246122	1.476153	0.84	0.399	-1.647085	4.139328
L2D.	-.8246972	1.341072	-0.61	0.539	-3.453151	1.803757
loginf						
LD.	.2695716	.2549489	1.06	0.290	-.2301191	.7692624
L2D.	-.2237647	.2662528	-0.84	0.401	-.7456106	.2980813
loggdg						
LD.	3.792802	2.492953	1.52	0.128	-1.093296	8.6789
L2D.	2.22064	1.861257	1.19	0.233	-1.427356	5.868636
logir						
LD.	10.15288	5.482561	1.85	0.064	-.5927412	20.8985
L2D.	4.496764	5.13805	0.88	0.381	-5.573629	14.56716
_cons	-.0384183	.3865833	-0.10	0.921	-.7961076	.719271

Source: Authors' computations from STATA

Table 7 above illustrates that the error correction term _ce1 has a coefficient of 0.69 and it is statistically significant at 1% level of significance. All other variables are statistically insignificant therefore we cannot infer the causativeness in the short run for the inflation equation.

Table 8 below shows the VECM results for GDP growth in the short run.

Table 8. GDP growth short run VECM results

D_loggdg						
_ce1						
L1.	.0077222	.0458846	0.17	0.866	-.08221	.0976544
logy						
LD.	.1210637	.0645004	1.88	0.061	-.0053547	.2474821
L2D.	-.1102392	.0701152	-1.57	0.116	-.2476624	.0271839
loger						
LD.	.0976009	.2560743	0.38	0.703	-.4042955	.5994972
L2D.	-.0579776	.2326413	-0.25	0.803	-.5139462	.397991
loginf						
LD.	-.0296206	.044227	-0.67	0.503	-.116304	.0570628
L2D.	.0554499	.046188	1.20	0.230	-.0350768	.1459767
loggdg						
LD.	-.0631675	.4324628	-0.15	0.884	-.9107789	.784444
L2D.	-.2304433	.3228798	-0.71	0.475	-.8632761	.4023896
logir						
LD.	-.2928071	.9510822	-0.31	0.758	-2.156894	1.57128
L2D.	.5702064	.8913186	0.64	0.522	-1.176746	2.317159
_cons	-.0698029	.0670622	-1.04	0.298	-.2012423	.0616366

Source: Authors' computations from STATA

Table 8 above shows that all variables are statistically insignificant therefore we cannot infer the causality in the short run for the GDP growth equation.

Table 9 below shows the VECM results for interest rate in the short run.

Table 9. Interest rate short run VECM results

D_logir						
_ce1						
L1.	.0161979	.0175999	0.92	0.357	-.0182973	.050693
logy						
LD.	-.0223109	.0247403	-0.90	0.367	-.070801	.0261792
L2D.	-.0028357	.026894	-0.11	0.916	-.055547	.0498755
loger						
LD.	-.0025818	.0982221	-0.03	0.979	-.1950935	.1899299
L2D.	.0194666	.0892339	0.22	0.827	-.1554287	.1943619
loginf						
LD.	-.0091634	.0169641	-0.54	0.589	-.0424124	.0240856
L2D.	-.0130923	.0177163	-0.74	0.460	-.0478155	.021631
loggdg						
LD.	.0736604	.1658792	0.44	0.657	-.2514568	.3987776
L2D.	.0737204	.1238466	0.60	0.552	-.1690145	.3164552
logir						
LD.	-.2695297	.3648053	-0.74	0.460	-.984535	.4454757
L2D.	-.0266687	.3418819	-0.08	0.938	-.6967449	.6434075
_cons	.0339004	.025723	1.32	0.188	-.0165156	.0843165

Source: Authors' computations from STATA

From Table 9 above, all variables are statistically insignificant therefore we cannot determine the interest rate equation's short-term causality.

The short run VECM results are in tandem with the specifications of the model. It is a requirement that for us to proceed with VECM, there must be at least 1 cointegrating equation in the model. This is evidenced by the stata output on cointegration test appendix 5 and table 4.4 and from the short run VECM results as illustrated in Table 9 above. There is at least 1 cointegrating equation in the foreign direct investment equation.

Table 10 demonstrates how exchange rates, inflation, GDP growth, and interest rates impact foreign direct investment inflows over time.

Table 10. Long Run VECM results for foreign direct investment

Cointegrating equations

Equation	Parms	chi2	P>chi2
_ce1	4	66.37687	0.0000

Identification: beta is exactly identified

Johansen normalization restriction imposed

beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_ce1						
logy	1	.	.	.	.	.
loger	2.216111	1.058923	2.09	0.036	.1406604	4.291562
loginf	-.9084015	.2281488	-3.98	0.000	-1.355565	-.4612382
loggdg	-8.172963	1.377288	-5.93	0.000	-10.8724	-5.473529
logir	-16.2485	2.314476	-7.02	0.000	-20.78479	-11.71221
_cons	38.82417	.	.	.	.	.

Source: Authors' computations from STATA

Table 10 above shows the long-run connection between variables. _ce is the error correction term. Since foreign direct investment was listed first in our VECM equation, it is treated as the dependent variable. All variables are in log form, so interpretation will be in elasticity form and the signs will be reversed. Rate of exchange has a coefficient of -2.22 meaning that in the long run, a 1% increase in Rate of exchange will lead to a 2.22% decrease in Foreign Direct Investment. On the other hand, Inflation, GDP growth and Interest Rate has impacted positively on Foreign Direct Investment. Inflation has a coefficient of 0.91 meaning that in the long run, a 1% increase in Inflation will lead to a 0.91% increase in Foreign Direct Investment. GDP growth has a correlation of 8.17, which means that a one percentage point improvement in GDP leads to a 8.17 percent increase in Foreign Direct Investment in the long term. Interest Rate has a coefficient of 16.25, which means that a 1% increase in interest rates will result in a 16.25% rise in foreign direct investment in the long term. Except for the rate of exchange, which is statistically significant at the 5% level of significance, all variables are statistically significant at the 1% level of significance.

The long run VECM results in this model resonates well with economic theory, for instance the risk aversion theory. The theory outlines that significant movements in the rate of exchange impacted negatively on FDI inflows. Apart from economic theory, the results speak to the findings of Mlambo and Bonga-Bonga (2019), Ncube and Ndlovu (2020), Zerihum and Adem (2021). Though Moyo and Bonga-Bonga (2019) used panel data analysis, their results are like those in this study. Furthermore, Ncube and Ndlovu (2020) used autoregressive distributed lag (ARDL) and they also find similar results to this study.

The autocorrelation test is carried out by employing the Lagrange-multiplier test and the findings are shown in Table 11 below:

Table 11. Autocorrelation Test

Lagrange-multiplier test			
lag	Chi2	Df	Prob>chi
1	14.22	25	0.96
2	23.70	25	0.54
3	30.43	25	0.21

Source: Authors' computations in STATA

From table 11, the probability values at lag one, two and three are greater than 0.10, it implies that the errors are not serially correlated at 10% level of significance at all lags.

Normality Test was carried out to check if variables are normally distributed.

Table 12. Jarque Bera Test

Equation	**Chi2**	**Df**	**Prop > Chi2**
D_logy	2.45	2.00	0.29
D_loger	0.68	2.00	0.71
D_loginf	0.52	2.00	0.77
D_loggdg	3.03	2.00	0.22
D_logir	0.03	2.00	0.99
ALL	6.71	10.00	0.75

Source: Authors' computation in STATA

Table 12 above shows that the probability value for all variables (variable ALL) is equal to 0.75 which means overally the errors from all equations are not normally distributed.

Model stability is tested using Eigenvalue stability as shown in Table 13.

Table 13. Eigenvalue Stability Test

Eigenvalue Stability Condition	
Eigenvalue	Modulus
1	1
1	1
1	1
1	1
0.76	0.82
0.76	0.82
0.57	0.76
0.57	0.76
0.14	0.76
0.14	0.76
0.11	0.69
0.11	0.69
0.51	0.50
0.51	0.50
0.34	0.34

Source: Authors' computation in STATA

As shown in Figure 13, the VECM specification imposes 4-unit moduli, that are equal to the total amount of endogenous variables in our model (4), implying that the model is stable. The vector error correction Model regression outcomes have been laid out and addressed in this chapter. The study's conclusion and policy suggestions based on the data gathered in this chapter were presented in the next chapter, which also highlighted important areas that needed more research.

5. Conclusion

In the preceding section we interpreted the results from the vector error correction model (VECM). The research findings indicate that there is evidence to reject the null hypothesis that exchange rate volatility has no effect on FDI inflows. The results show that that there exist a statistically significant and negative relationship between exchange rate volatility and foreign direct investment inflows into Zimbabwe. All other factors, such as inflation, GDP growth, and interest rates, showed positive

effects that were statistically significant. These findings are consistent with previous theoretical literature, such as the Risk Aversion Theory and the concept of Portfolio Balance Theory. Based on the results of the study, we recommend that the authorities need to strengthen hedging mechanisms to protect investors against exchange rate fluctuations. For instance, the Reserve Bank of Zimbabwe (RBZ) can consider establishing currency hedging instruments or providing incentives for investors to use financial derivative products to manage rate of exchange risks. This can help alleviate concerns about volatility and encourage Foreign Direct Investment inflows.

More so, the government may reduce overreliance on few sectors of the economy or industries to enhance Foreign Direct Investment resilience to exchange rate volatility. Encouraging diversification of the economy by supporting emerging AI technologies in various sector of the economy. The government for example can actively promote investment and use of AI technologies infrastructure and logistics, manufacturing, agriculture, tourism, and services sectors.so as to attract a broader range of investors. This diversification can help reduce the vulnerability of Foreign Direct Investment inflows to rate of exchange fluctuations. We also urge that the government should put monetary policies that stabilizes prices such as controlling the money supply, managing inflation expectations, and developing inflation targeting frameworks. This includes providing clear communication about policy objectives, decisions, and their rationale. The government can aim to create an investor-friendly interest rate regime by implementing policies that ensure a stable and predictable interest rate environment. This includes avoiding sudden and drastic interest rate changes, providing long-term interest rate guidance, and minimizing interest rate volatility. Interest rate certainty can boost investor confidence and promote long-term investment commitments. By establishing a transparent and credible monetary policy framework, the government can foster investor confidence and attract long-term FDI inflows.

Alongside monetary policy, sound fiscal policy is critical for maintaining macroeconomic stability. The government should aim for prudent fiscal management, including controlling budget deficits, reducing public debt, and ensuring fiscal discipline. These measures can help contain inflationary pressures and create a favorable investment climate, encouraging FDI inflows. Moreover, the government should actively engage in investment promotion activities, including marketing the country’s investment opportunities, participating in international investment forums, and establishing investment promotion agencies. These initiatives can help attract FDI inflows despite the potential positive relationship with

inflation. The positive relationship between GDP growth and FDI inflows highlights the importance of maintaining a stable and growing economy. The government should focus on policies that promote sustainable economic growth, such as investing in infrastructure, improving productivity, attracting private investment, and diversifying the economy. Upgrading infrastructure, such as rail, road and air transport modes is of paramount importance. The need for interrupted electricity and water supply cannot be over emphasized. In this digital era, 4th industrial revolution technologies are badly needed in communication, banking and financial services if Zimbabwe is to effectively attract meaningful foreign direct investment flows. By fostering a favorable economic climate, Zimbabwe can attract more FDI inflows.

Sound macroeconomic policies are crucial for attracting FDI. The government should prioritize policies that maintain price stability, control inflation, and manage fiscal deficits. This can be achieved through prudent fiscal management, effective monetary policies, and maintaining a stable exchange rate. A stable macroeconomic environment instills confidence in investors and makes Zimbabwe an attractive destination for FDI. Investing in human capital is crucial for sustainable economic growth and attracting FDI. The government should prioritize education and skills development initiatives to enhance the quality and productivity of the workforce. This can be achieved through investing in education infrastructure, research and innovations especially at vocational training centers, colleges and universities.

The government can consider offering targeted investment incentives to offset the impact of higher interest rates on FDI inflows. These incentives could include tax breaks, reduced regulatory burdens, streamlined administrative procedures, and specific sectoral incentives to attract investment. By providing attractive investment conditions, Zimbabwe can offset the potential negative effects of higher interest rates. Promoting economic diversification can reduce the vulnerability of FDI inflows to interest rate fluctuations. By expanding and developing various sectors of the economy, such as manufacturing, agriculture, tourism, and services, Zimbabwe can attract investors with diverse interests and investment preferences. Economic diversification can help mitigate the impact of interest rate changes on FDI inflows.

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