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Investigating the causal nexus between remittances and economic growth in Zimbabwean

Knowledge Jonasi[1], Tendai Towo[2], Talent Kondo[3], Ezekiel Chitombo[4], Phillip Dangaiso[5], Elizabeth Vakai[6]
National University of Science and Technology, Bulawayo, Zimbabwe[1]
Bindura University of Science Education, Bindura, Zimbabwe[2,3,4]
Chinhoyi University of Technology, Chinhoyi, Zimbabwe[5]
JartaVak Entreprises, 1st Floor, Construction House, Harare, Zimbabwe[6]
knowledge.jonasi@nust.ac.zw[1], ttowo@buse.ac.zw[2], tkondo@buse.ac.zw[3], echitombo@buse.ac.zw[4], phillipdangaiso@gmail.com[5], etvakai@gmail.com[6]

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Abstract
Purpose: This study aims to examine the nexus between remittances and economic growth in Zimbabwe.
Methods: The research employed the Granger Causality test using annual time series data from 1980 to 2022. Preliminary diagnostic tests including stationarity, cointegration, and error correction modeling were conducted to ensure methodological rigor.
Results: Findings reveal that remittances are not significantly influenced by GDP, as shown by a P-value of 0.5158. Conversely, remittances significantly drive Zimbabwe's economic growth with a P-value of 0.0429. This highlights remittances as a vital income source that fuels household consumption, investment, and financial inclusion. The unidirectional causality emphasizes their role as a stable economic pillar independent of GDP fluctuations.
Conclusion: The study demonstrates that remittances Granger-cause economic growth in Zimbabwe, but GDP does not Granger-cause remittances. This underlines the critical role of remittance inflows in sustaining consumption, supporting human capital investment, and strengthening financial development in the context of economic instability and high emigration.
Limitation: The research faced challenges in accessing complete and reliable data, requiring innovative strategies to address missing values and restricting analysis to annual data.
Contribution: The results provide context-specific evidence useful for scholars and policymakers in designing strategies to better channel remittances into productive investments. The study contributes by clarifying the causal mechanism between remittances and growth in Zimbabwe and offering insights for policy initiatives aimed at economic recovery and sustainable development.

Keywords: *Economic Growth, Granger-caused, Remittances, Time Series Data, Zimbabwe*

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1. Introduction

A nation's economic growth is driven by multiple factors, such as technological advancement, capital accumulation, job creation, and the quality of governance and institutions (Anoke, 2023; Ayuba, 2023; Bilgic, 2007). Over the years, remittance flows have emerged as vital external funding sources, particularly in developing countries. Remittances refer to money sent by individuals, often migrant

workers, to their families or communities in their home countries (Garikai, 2020). These financial transfers have grown dramatically in recent decades, becoming a major driver of development in many low- and middle-income countries (LMICs). According to Group (2022), remittance flows worldwide increased from $57 billion in 1982 to $626 billion in 2022, underscoring their increasing importance. Particularly, remittances have surpassed official development assistance (ODA), foreign direct investment (FDI), and portfolio flows as the principal source of foreign financial inflows to these countries (Al-Islam, Prachee, & Saifullah, 2022; Khan, 2024). While the impact of remittances on recipient countries has been extensively researched, there remains significant variation in how these transfers influence economic growth and development outcomes. On one hand, remittances contribute directly to poverty alleviation by raising household incomes and facilitating access to essential services such as healthcare and education (Cazachevici, Havranek, & Horvath, 2020). They also serve as a tool for human capital development, especially in countries where public services may be inadequate (Pant, Bashyal, & Pant, 2023). Conversely, remittances play a less visible but equally important role in fostering entrepreneurship by providing capital for small businesses and supporting community development (Cui, Umair, Ibragimove Gayratovich, & Dilanchiev, 2023). Thus, these transfers not only reduce poverty but also act as catalysts for broader economic development in recipient nations.

The growing significance of remittances is especially evident in several developing countries, where they often exceed other forms of foreign financial flow. In 2021, for example, India, Mexico, and China were the top three recipients of remittances, with India receiving approximately $89 billion, followed by Mexico with $54 billion and China with $53 billion (Dhakal & Paudel, 2023). Smaller economies, such as Lebanon, Tonga, and Tajikistan, also experienced significant remittance inflows relative to their GDPs. In 2021remittances accounted for 54% of Lebanon f's GDP, followed by Tonga (44%) and Tajikistan (34%) (Dhakal & Paudel, 2023). These figures highlight the absolute magnitude of remittance inflows and their critical role in sustaining the economies of smaller, often vulnerable, nations (Sonkar & Sarkar, 2020).

Remittances have become an increasingly important source of capital in sub-Saharan Africa. The region is the most highly exposed to the effects of the global crisis, and remittances grew an estimated 5.2% to $53 billion in 2022, compared with 16.4% in 2021, despite global economic challenges (Khan, 2024). As elucidated by Muhammed, Adenike, and Salahudeen (2020), countries like Gambia (27%), Lesotho (23%), and Comoros (19%) have particularly high remittance inflows relative to their GDP, underscoring the significance of these transfers to their economies. This trend is expected to continue, as the World Bank forecasts a 7.1% increase in remittance flows in 2023, partly driven by higher commodity prices, which incentivize migrants to send more money home (Khan, 2024).

In Zimbabwe, remittances have become an essential lifeline for many families, particularly in the face of economic instability and high unemployment rates. The number of Zimbabweans living abroad has steadily increased, with parallel growth in remittance flows. By 2021, total remittances to Zimbabwe reached $2.4 billion, a 46% increase from the previous year (Maune and Matanda, 2022). These funds play a critical role in providing for households, especially in rural areas, where poverty rates are high and local economic opportunities are limited. While official remittance figures have steadily risen, the true magnitude of remittance inflows may be even greater, as many Zimbabweans send money through informal channels, bypassing official financial systems (Mukoka 2020). Despite the growing importance of remittances to Zimbabwe's economy, the developmental impact of these flows remains under-examined in both academic research and policy discourse (Maune and Matanda, 2022). Although several studies have addressed the contribution of remittances to household income and poverty alleviation, less attention has been paid to the broader developmental effects on communities and the economy at large. Remittances are often considered private transfers, but their cumulative effect on economic growth, infrastructure development, and long-term poverty reduction is not being realized.

One of the key challenges in fully understanding the impact of remittances is the complexity of the relationship between migration, remittance flows, and developmental outcomes. Research has shown that remittances are more likely to benefit households in the short term by improving their living standards and addressing their immediate needs (Meyer & Shera, 2017). However, their long-term

impact on development is less clear, with some studies suggesting that remittances could perpetuate dependency or even contribute to brain drain (Kapesa, Nyagadza, Mugano, & Cheza, 2023; Towo & Jonasi, 2024). Conversely, others argue that remittances can help build human capital by funding education and healthcare or by supporting entrepreneurial activities that foster economic diversification (Pant et al., 2023).

In Zimbabwe, remittances play a particularly critical role in mitigating the negative effects of migration and economic instability. Over the past decade, migration has remained a significant strategy for Zimbabweans seeking better employment and educational opportunities abroad, particularly in South Africa, the United Kingdom, the United States, Australia, and Canada (Maune & Matanda, 2022). Remittances sent back home have not only provided immediate financial relief but have also contributed to the country's foreign exchange reserves, easing some pressure on the local currency. This has been particularly vital in the context of Zimbabwe's economy, which has struggled with hyperinflation, unemployment, and a lack of investment in critical sectors.

While remittances have undeniably had a positive effect on many households, the challenge remains to fully leverage their potential for broader development goals. The developmental potential of remittances has been underutilized, with limited research on how remittances can be better channeled into long-term economic strategies. There is a need for comprehensive policies that can integrate remittances into national development plans, enhancing their role not only as a tool for poverty reduction but also as a mechanism for sustainable growth and diversification of the economy. This study aims to explore the relationship between remittance inflows and Zimbabwe's economic growth to gain insights into how remittances can be better harnessed to support long-term economic development, reduce poverty, and foster entrepreneurship. The remainder of the study is organized as follows: section two provide a literature review, section three offer the methodology used to archive the study objective and section four provide the interpretation and discussion of the results, as well as policy recommendations.

2. Literature review

Remittances have emerged as a significant source of income for many developing countries and influence economic growth in various ways. Theories linking remittances to economic growth primarily revolve around consumption, investment, and human capital development. The remittance-driven growth hypothesis posits that remittances enhance household income, leading to increased consumption and investment in the local economy. This influx of funds can stimulate the demand for goods and services, thereby fostering economic activity and growth.

Investment and human capital theories suggest that remittances enable families to invest in education and health. Households receiving remittances often allocate funds towards educational expenses, which can lead to a more skilled workforce. This investment in human capital is crucial for enhancing productivity and innovation, ultimately contributing to long-term economic growth in the region. Research by Inoue (2024) supports this theory, indicating that remittances can improve educational outcomes and health status, which are essential for sustainable development.

The financial market development theory further elaborates on the impact of remittances by suggesting that they can stimulate the development of financial markets in recipient countries (Tamirat, 2023). As households receive remittances, they may seek banking services, leading to increased financial inclusion in the banking sector. This can enhance savings and access to credit, thereby promoting entrepreneurship and investment (Tanha et al., 2022). Studies have shown that remittances can lead to greater financial sector development, which is vital for economic diversification and growth.

However, dependency theory argues that reliance on remittances can create a cycle of dependency, inhibiting sustainable development. Critics of the remittance-driven growth hypothesis point out that excessive reliance on remittances may discourage local investment and create economic vulnerabilities. For instance, Olubukola, Matowanyika, Makurumidze, Bhebhe, and Sifile (2021) found no causal relationship between economic growth and remittances in Zimbabwe, suggesting that an over-reliance on remittances could hinder local economic initiatives. The theories linking remittances to economic

growth highlight the multifaceted nature of this link. While remittances can drive economic growth through increased consumption, investment in human capital, and financial market development, concerns about dependency and sustainability exist.

Workers' or migrant remittances refer to the financial resources that migrants transmit to their families for support while residing abroad, which may be in the form of cash or goods (Mukoka, 2020). Transfers optimally executed between individuals or households, customized to the specific requirements of the recipients, have the capacity to mitigate poverty. Chinembiri (2017) defines remittances as the sum of employee remuneration and personal transfer. Personal transfers, irrespective of origin, encompass monetary or in-kind transfers between residents and nonresidents. Wellalage and Locke (2020) provide a more comprehensive definition that encompasses the transfer of capital assets, consumer products, skills, and technological knowledge, in addition to monetary or currency transfers. This study defines remittances as money transfers via official channels that migrants send to support their friends and families' welfare.

A body of theoretical and empirical work exists on remittance flows and their relationship with economic growth. The theory of altruism is a fundamental motive for remitting funds. Lucas and Stark (1985) suggest that altruism reflects a migrant's concern for relatives and family members remaining in the home country, whereby the emigrant gains gratification from their well-being. Migrants engage in remittances due to their concern about the household spending of their relatives. Tenaye (2019) asserts that migrants remit funds due to their emotional connection to their parents in their countries of origin. Damiyano and Dorasamy (2019) assert that individuals remit funds due to the positive utility gained from their families' consumption. The aforementioned narratives provide the most cogent explanations for the Zimbabwean context, as most migrants remit funds to support their families' consumption, education, healthcare, and developmental requirements.

According to the Pure Self-Interest theory, people give money to advance their own interests or achieve self-realization. According to King, Frykman, and Vullnetari (2013), the idea was more popular among the younger, educated population that moved abroad in search of better employment prospects because of international salary disparities. To maintain their social assets and relationships with friends and family when they anticipate going home, migrants would send money home (Lucas & Stark, 1985). As part of their preparations for returning home, remitted monies are designed to be used for investments back home and to pay individuals who manage the investments or other valuable assets (Damiyano & Dorasamy, 2019). Chinembiri (2017) points out that another reason why the self-interest theory holds is the anticipation of inheritance; thus, people remit money as a way to demonstrate good moral behavior in preparation for their return to their home country.

Chami, Hakura, and Montiel (2012) investigated the causal impact of remittances on development in Lebanon, Tonga, El Salvador, and Tunisia from 1970 to 1998. The results indicate that remittances adversely affect the development of the recipient country. The research indicates that the recipient nation encounters significant ethical risks due to remittances, which are the primary source of their adverse consequences. The migration of young adults to affluent countries due to remittances leads to societal detriment. Ahmed, Mughal, and Martínez-Zarzoso (2021) utilized development variables in Latin America, including economic growth, poverty alleviation, and inequality, to analyze the correlation between remittances and development. They used household surveys across 11 Latin American countries to collect macroeconomic and microeconomic data. Research revealed that nine out of ten countries had elevated non-remittance income Gini coefficients, signifying that eliminating remittances would exacerbate income inequality. Research indicates that in countries where migrants originate from the lower income quintiles, particularly El Salvador, Mexico, and the Dominican Republic, remittances diminish extreme poverty by an average of 35%.

Magai (2020) utilized data from the World Bank Development Indicators spanning 1993 to 2020 to examine the causal relationship between overseas remittances and the economic growth of Tanzania. This study investigated the causal relationship between foreign remittances and Tanzania's economic growth using Granger Causality analysis. A 0.27% increase in GDP growth is observed when the

remittance-to-GDP ratio escalates from 0.7% to 2.3%. Consequently, the study concluded that international remittances data is a crucial factor influencing Kenya's economic growth. Kinyua (2021) employed a Keynesian econometric model to examine the impact of remittances on significant macroeconomic variables in East Africa. The study's findings indicate that remittances to East Africa significantly influence macroeconomic dynamics and contribute substantially to economic growth. The research indicates that a US$1 rise in remittances directly elevates consumption, imports, income, and investment by US$0.552, US$0.479, US$1.328, and US$0.255, respectively, in East Africa.

Maune, Matanda, and Chitombo (2023) examined the impact of offshore remittances on Zimbabwe's economic growth. The relationship between the two variables was empirically analyzed using secondary data obtained from the World Bank's World Development Indicators database for 1960–2020. An autoregressive distributed lag model was employed. The primary findings indicate that, across the three-year period analyzed, there exist both unidirectional and bidirectional causal links between overseas remittances and economic growth. Foreign remittances have a positive and considerable effect on Zimbabwe's gross domestic product. Before dollarization, Zimbabwe's economic growth was negatively affected. In Zimbabwe, the two variables studied demonstrated a strong positive correlation during the dollarization period. A robust negative statistical correlation was identified between mistake correction and Zimbabwe's economic growth rate. The formulation and implementation of policies at both the individual and governmental levels are significantly influenced by the practical ramifications of this issue. This study addresses a knowledge gap by elucidating the relationship between foreign remittances and economic growth in Zimbabwe over three distinct economic cycles.

Maune et al. (2023) also analyzed the relationship between foreign direct investment, gross capital formation, personal remittances, and gross domestic product in Zimbabwe from 1960 to 2020. A random effects model was used to examine this association using data from the World Development Indicators database. The random effects model was selected after the Hausman test was implemented. Outcomes: All regression coefficients of the nation's gross domestic product demonstrated a direct or positive link with the three independent variables. The analysis reveals that gross capital formation significantly contributed to Zimbabwe's gross domestic product, exceeding the contributions of foreign direct investment and personal remittances during the examined period. The coefficients of determination for the independent variables were all statistically significant. Foreign direct investment represented 57.24%, gross capital formation 68.47%, and personal remittances 48.76% of foreign direct investment during the same period. This study examined the knowledge gap by emphasizing the relationship between foreign direct investment, gross capital formation, personal remittances, and gross domestic product in Zimbabwe.

The exploration of the causal relationship between remittances and economic growth in Zimbabwe presents a novel perspective on how financial inflows from abroad can influence the country's economic landscape. Unlike many existing studies that broadly focus on the macroeconomic effects of remittances, this study specifically investigates the unique context of Zimbabwe, a country marked by significant economic instability and high levels of emigration. The study employed advanced econometric techniques to establish a clearer causal link rather than merely correlational insights that often dominate the literature. This research highlights the potential policy implications of remittances as a tool for economic recovery and development in Zimbabwe. The nature of remittances on economic growth helps policymakers better harness these financial flows to foster sustainable development, improve living standards, and address poverty in the country. Thus, this study contributes a fresh and nuanced understanding of the causal relationship between remittances and economic growth in Zimbabwe, emphasizing the importance of context-specific analysis and providing valuable insights for both academia and policymakers.

3. Research methodology

This section elucidates the models that are pertinent and employed by other researchers for data analysis in the review. A theoretical examination of the Granger causation method is presented. This study utilized the Granger model and Granger causality. The use of Granger originated in the early 1980s when Sims (1980) and Litterman (1986) contended that Granger methods are preferable for anticipating

the behavior of other economic variables, exceeding the prediction power of structural equations. This is because Granger incorporates lagged values of all variables in the system as independent explanatory factors, thereby enhancing the model's explanatory power. Consequently, Granger accounts for delays in policy execution and the responses of economic agents to these delays. Essential preliminary data analyses were conducted, including tests for stationarity, autocorrelation, model definition, heteroscedasticity, and lag length selection. If the variables under investigation are non-stationary at level I (0), the Auto Regressive Distributed Lag (ARDL) bound test model and the Error Correction Model (ECM) are utilized for cointegration analysis. This model was derived from Dritsaki, Dritsaki, and Adamopoulos (2004).

$$GDP_{1t} = \alpha_{11} + \sum_{l=1_{p1}}^{P_1} \beta_{11l}\, GDP_{1t-l} + \sum_{l=1_{P1}}^{P1} \delta_{11l} IREM_{1t-l} + \varepsilon_{1t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots Eq1$$

$$IREM_{1t} = \alpha_{11} + \sum_{l=1_{p1}}^{P_1} \beta_{11l}\, IREM_{1t-l} + \sum_{l=1_{P_1}}^{P1} \delta_{11l} GDP_{1t-l} + \varepsilon_{2t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots Eq2$$

From the above model, IRM and GDP represent remittances and Gross Domestic respectively. Including the error term is important because it makes the models stochastic (Gujarati & Poter, 2012). Error term captors' different factors that might influence variables under study, thus different factors are excluded from the model. It contributes to estimating the inaccuracy of factors in a model and human indeterminacy.

3.1 Data source

Statistical data, which incorporate Remittances and Economic Growth. Remittance data were gathered from the Reserve Bank of Zimbabwe (RBZ) Annual Reports and GDP data were gathered from the World Bank World Development Indicators. Annual time series data from 1980 to 2022 were used. The accessibility of data in this period and the significance of the sample size, in accordance with Gujarati (2009), paves the way for the determination of this period.

4. Results and disscusion

The results of this study are presented, interpreted, and discussed in this section.

4.1 Descriptive statistics

Descriptive Statistics are shown in Table 1. below

Table 1. Descriptive statistics

	DIREM	GDP
Mean	0.262383	-0.028410
Median	0.004493	-0.258720
Maximum	11.83946	19.93898
Minimum	-5.657391	-18.32350
Std. Dev	2.520422	7.639343
Skewness	3.747300	-0.005893
Kurtosis	12.78384	3.679218
Jarque-Bera	188.8875	0.807583
Probability	0.000000	0.667783
Observations	42	42

Source: Processed data by Eviews 10 (2024)

As shown in Table 1, GDP had a low mean of -0.028 and a high standard deviation of 7.63. A negative skewness of 0.0058 indicates that, during the study period. This suggests that firms were not producing enough output to stimulate economic output, and both foreign and domestic investors were very low due to macroeconomic factors such as inflation. The time series are mesokurtic, as indicated by an above-average kurtosis of 3.8.With 2.5 standard deviations from the mean, remittances demonstrated considerable volatility (sensitivity to external factors). Remittances show a similarly wide range, with

a maximum return of 11.8% and a minimum of -5.65%. A positive skewness of 3.74 indicates that there was a greater positive inflow of money from abroad. Consequently, long-term remittances generated average inflows of 26%. A kurtosis of 12.78 indicates leptokurtic characteristics and high peaking.

4.2 Unit Root Test

For each time series, unit root tests were performed at a 5% significance level using the Augmented Dick-Fuller (ADF) test to ensure that non-stationary variables were differenced to become stationary before being fitted into the model. The calculated ADF Test statistic was compared to the critical values at the 5% significance level as part of the choice criterion.

Table 2. Stationarity Test

Variable	ADF Value	Hypothesis	Critical value at 5%	Trend	Intercept	Order of Integration	Decision
DREM	-6.891892	H_0 The time series is stationary	-2.935001	NO	NO	I(1)	Series is stationary
GDP	-4.228080	H_0 The time series is stationary	-2.933158	NO	NO	I(0)	Series is stationary

Source: Processed data by Eviews 10 (2023)

The results of the unit root tests are presented in Table 2. remittances are stationary at I(1), and GDP is stationary at I(0), according to the results, which are supported by the absolute values of the ADF test that are higher than the critical values at the 5% significance level. This permits researchers to conduct a co-integration test.

4.3 Co-integration Test

The cointegration test is a statistical method used to determine whether a long-term equilibrium relationship exists between two or more non-stationary time-series variables (Nugraheni, Kellen, & de Rozari, 2021). When individual time series data exhibit trends or are influenced by stochastic processes, they may not be stationary, meaning that their statistical properties, such as the mean and variance, change over time. However, if a linear combination of these variables results in a stationary series, it indicates that the variables share a common long-term trend, suggesting that they move together over time. Cointegration analysis is essential in econometrics because it allows researchers to identify meaningful relationships among economic variables that may not be evident when examining each variable in isolation. The absence of I (2) variables allows for the use of the ARDL bound test approach with Pesaran tables (Pesaran, Shin, & Smith, 2001) to test for a long-run relationship. The ARDL bound test's flexibility in accommodating different lag lengths for each variable enhances its ability to capture the dynamic relationships between them (Kondo & Mutsvangwa). In contrast, the Engle-Granger method typically assumes the same lag structure for both variables (Nasir and Ahsan, 2023). The co-integration test results are presented below.

Table 3. Co-integration Test

F Statistics	Upper Bound	Lower Bound	Number of Parameters
6.617348	3.87	3.1	2

Source: Processed data by Eviews 10 (2024)

The ARDL test above indicates that the variables in question move together in the long run, or there is a long-run association among the variables. This is proven by the F statistic value, which is larger than the upper and lower bounds at the 5% level of significance.

4.4 Other Diagnostic Tests

Husnain, Nasrullah, Khan, and Banerjee (2021) contend that to guarantee the robustness and impartiality of the estimated model, the research must assess the model's goodness of fit and perform diagnostic tests. The present study submitted the short-run model to tests for normality, serial correlation, and heteroscedasticity, revealing no evidence of abnormality, so showing that the model successfully passed the Jarque-Bera normality test and that the errors were normally distributed. The study could not reject the null hypothesis of no serial correlation according to the LM test and found no indication of serial correlation or heteroscedasticity in the error term's disturbances. The diagnostic tests indicate that the estimated model is robust, with no abnormalities identified in the residuals of the model.

Table 4. Other Diagnostic tests

Diagnostic test	P-value	Critical value	F-value	Conclusion
Ramsey test	0.3004	0.05	0.0946	The model is correctly specified
Serial LM test	0.2445	0.05	0.1753	There is no autocorrelation
Heteroskedasticity	0.7727	0.05	0.7386	The residuals are homoscedastic

Source: Processed data by Eviews 10 (2024)

4.5 Error Correction Method

This study utilized the ECM model to assess the long-term speed of adjustment between GDP and remittances.

Table 5. ECM results

Variable	Coefficient	Probability
CointEq(-1)*	-1.085427	0.0000

Source: Processed data by Eviews 10 (2024)

The findings in Table 5 reveal a long-term structure that illustrates a causal relationship between the variables. The study concludes that there is a long-run reversion to equilibrium in any case of disequilibrium using5% significance level. This indicates that any departures from equilibrium are rapidly rectified, requiring an adjustment speed of 109% to revert from the short-run to the long-run equilibrium. The adjustment time of -1.085427 indicates that the system returns to long-run equilibrium at a rate of 109.

4.6 Stability test

To check whether the model was stable, this study conducted the CUSUM and CUSUMSQ tests to investigate the stability of the long-run and short-run coefficients, as suggested by Pesaran, Shin, and Smith (1999).

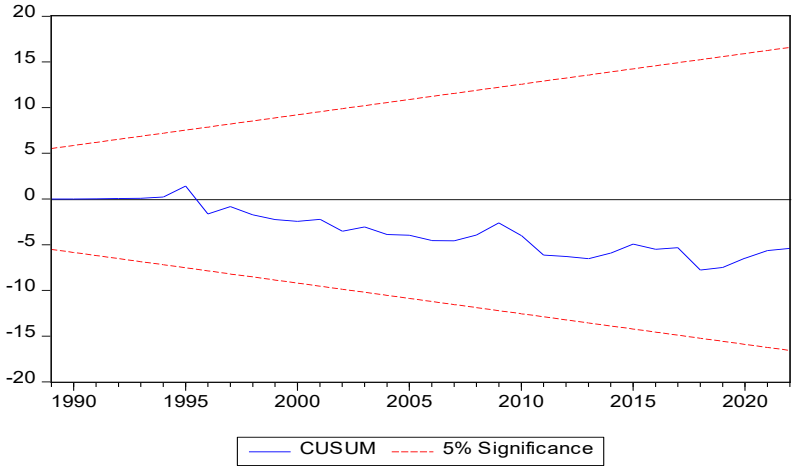

Figure 1. CUSUM Test
Source: Processed data by Eviews 10 (2024)

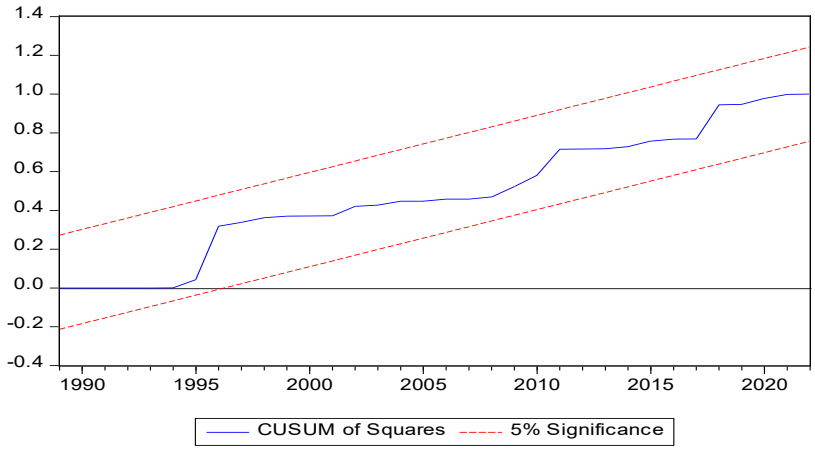

Figure 2. CUSUMSQ Test
Source: Processed data by Eviews 10 (2024)

The graphs illustrating the stability of the coefficients are depicted in Figures 4.1 and 4.2, which illustrate the CUSUM and CUSUMSQ tests. The graphs for both stability tests indicate that the investment remains within the key thresholds at the 5 percent level of significance. Subsequent to the completion of all diagnostic tests conducted on the model, stability assessments further validated the adequacy of the Granger causality model.

4.7 Impulse response function

The role of impulse response functions in the current research is to reveal the reaction path of remittances and economic growth in the model due to a single unit of standard deviation in external shocks (Sukmadilaga et al., 2022). These external shocks include the effects of the contemporary Covid-19 pandemic and the ongoing brutal invasion of Ukraine by Russia, and any other factors that are captured through the error terms in the system, which are assumed to follow a white noise process (independently and identically distributed). Thus, impulse response functions explain the reaction of variables in the model due to external factors (shocks) over time (Ogundipe, Oye, Ogundipe, & Osabohien, 2020).

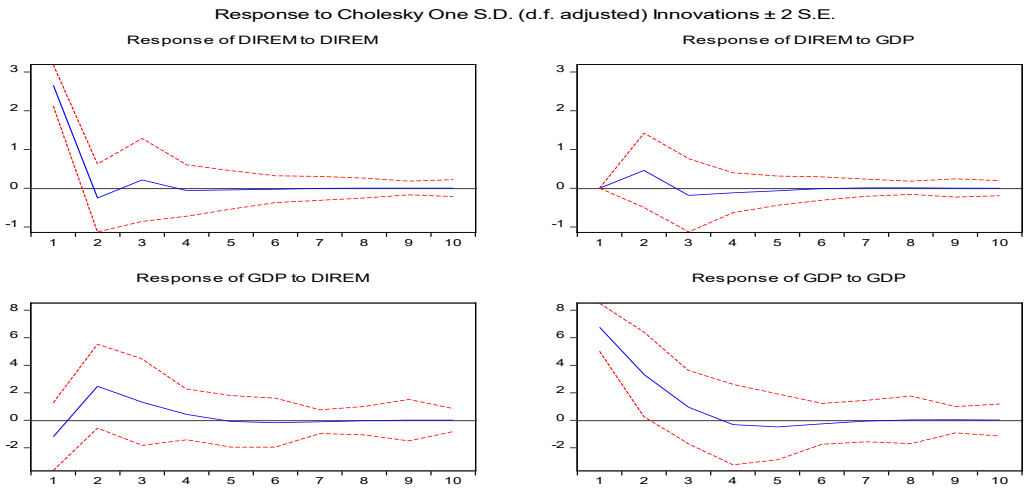

Figure 4. Impulse response function

The study utilized impulse response functions to assess the effects of shocks in one dependent variable within the Granger model on the other variables in the causation system. The outcomes of the impulse response functions are shown in Figure 4.3. The impulse response function results demonstrate that the effects of GDP shocks on remittances dissipate over six years. Consequently, the effects are neutralized in the long-term equilibrium. The GDP's response to remittance shocks is positive after eight years.

Moreover, responses to remittances resulting from specific shocks, such as COVID-19, the Russia-Ukraine conflict, and the Middle Eastern conflict between the Philippines and Palestine, signify long-term patterns. The response of GDP to intrinsic shocks, such as exchange rate fluctuations and inflation, signifies long-term equilibrium. In conclusion, the impulse response functions of GDP and remittances in the current study demonstrate long-term dynamics, with responses lasting no more than six years. The initial direction of responses (positive or negative) varies considerably depending on the source of innovation and the response variable in the Granger model.

4.8 Lag length criteria

In econometric modeling using Granger models, it is crucial to accurately ascertain the optimal lag length. Choosing the correct lag length is essential for establishing dependable causal links between variables and mitigating the problems associated with serial correlation. Various techniques are available for ascertaining the appropriate lag duration, including the Akaike Information Criterion (AIC), established in 1974, the Schwarz Information Criterion (SIC), formulated in 1978, and the Hannan-Quinn Information Criterion. The AIC and SIC are significant for researchers because of their efficiency and consistency. Ogundipe et al. (2020) observes that "AIC is efficient but inconsistent, whereas SIC is inefficient yet highly consistent." Diebold and Richter (2023) and Greene, Copeland, and Deekens (2021) assert that the AIC often overfits models with larger sample sizes, whilst the SIC may result in under-parameterization with smaller samples. Consequently, conventional wisdom indicates a compromise between uniformity and efficiency. Considering these factors, the researcher utilized both AIC and SIC to ascertain the suitable lag time for the model. The fundamental premise of employing these information criteria is to choose the lag time that minimizes the corresponding values of the AIC and SIC. When the minimum values are observed at varying lag lengths for the AIC and SIC, the Hannan-Quinn Information Criterion (HQIC) is employed to aid in determining the appropriate lag duration. The ideal lag is determined by selecting the lag duration that corresponds to the minimal values of both criteria. The results are presented in Table 6.

Table 6. Lag length criteria

Lag order	**Akaike Information Criterion**	**Schwarz Information Criterion**	**Hannan-Quinn information criterion**
0	11.96423	12.02815	11.08223
1	11.97281	12.34267	11.94723
2	11.86729*	12.00450*	11.85634*
3	11.91652	12.48311	12.19205

Source: Processed data by Eviews 10 (2024)

Granger analysis necessitates the selection of a suitable lag length prior to estimating the multi-equation system. The optimal lag length is determined to be two, as indicated by the minimum values of most of the information criteria.

4.9 Granger Causality Test

Granger causality examines whether the historical values of a time series can be used to predict another time series. When one-time series remittances are Granger-caused by another GDP, then previous values of remittances are a better predictor of GDP than past values of GDP alone. Table 7 displays the results of the pairwise Granger causality test.

Table 7. Pairwise Granger Causality Test

Hypothesis	**F-Statistics**	**Probability value**
GDP does not Granger Cause DIREM	0.67468	0.5158
DREM does not Granger Cause GDP	3.45049	0.0429

Source: Processed data by Eviews 10 (2024)

4.10 Results Interpretations and Discussion

The findings presented in Table 7 reveal critical insights into the relationship between remittances and economic growth in Zimbabwe, aligning closely with established theories in this field, particularly investment and human capital theory and financial market development theory. The results indicate that remittances are not significantly influenced by GDP, as shown by a p-value of 0.5158, which exceeds the 5% significance threshold. This suggests that Zimbabwe's economic progress does not exert control over the inflow of remittances, challenging the assumption that GDP growth typically drives remittance flows, as proven by Bucevska (2022).The data reveal that remittances are a driving force behind Zimbabwe's economic growth, evidenced by a P-value of 0.0429, which is below the 5% significance level. This finding underscores the notion that remittances are an essential source of income for households, enabling increased consumption and investment in local economies. Investment and human capital theory, together with Golder, Rumaly, Hossain, and Nigar (2023) and Nyasha and Odhiambo (2022), supports this interpretation, as remittances often facilitate investments in education and health, thereby enhancing human capital. In Zimbabwe, the influx of remittances likely allows families to allocate funds towards education and healthcare, improving overall productivity and contributing to economic growth. However, financial market development theory complements these findings by suggesting that remittances can stimulate financial market development. As households receive remittances, they may engage more with financial institutions, leading to increased savings and access to credit. Financial inclusion can promote entrepreneurship and investment in local businesses, further propelling economic growth. By showing that remittances significantly contribute to economic advancement in Zimbabwe, the results align with the idea that remittance flows can enhance a country's financial landscape, fostering greater economic resilience and diversification.

The unidirectional causality identified in this study, where remittances contribute to economic growth but not vice versa, further emphasizes the importance of remittances as a stable economic pillar. This finding aligns with previous research, such as that by Wilson, Jayanthakumaran, and Verma (2019) and Hussain, Bajaj, Kumari, and Al-Faryan (2023), who similarly concluded that remittances positively impact economic development. However, these results contrast with those of Maune and Matanda (2022), who found a bidirectional relationship, and Cui et al. (2023), who reported no causality between remittances and economic growth in the short run. Such discrepancies in the literature may stem from differences in methodologies, contexts, or time periods analyzed, highlighting the complexity of the remittance-growth nexus.The findings from Zimbabwe reinforce key theories regarding the role of remittances in fostering economic growth. Remittances are a crucial driver of economic activity, enabling investments in human capital and stimulating financial market development. By establishing that remittances contribute to economic growth independently of GDP, this study provides valuable insights for policymakers aiming to leverage remittance flows for sustainable economic development in Pakistan.

5. Conclusion

This study reveals a distinct one-way causal relationship between remittances and economic growth in Zimbabwe, indicating that while remittances serve as a significant driver of economic expansion, reverse economic growth leading to increased remittances does not occur. This finding provides evidence of the critical role that remittances play in supporting the economy, particularly in a context where traditional economic mechanisms may be under pressure. The Cointegration test further reinforces this perspective, demonstrating a stable long-term relationship between remittances and economic growth, suggesting that these two variables move in tandem over time.

- Policymakers should encourage the establishment of various organizations that provide remittance services beyond traditional financial institutions to enhance remittance flows. For example, in countries such as Mexico, companies such as Western Union and MoneyGram operate alongside local cooperatives and fintech startups, providing a range of options for remittance senders and receivers. In Zimbabwe, integrating mobile money services such as EcoCash with traditional banking can improve accessibility. This model can help tap into the

informal remittance market, broaden the reach of remittance services, and ensure that funds are utilized effectively within local economies.

- Policymakers in Zimbabwe should focus on creating comprehensive legal frameworks that facilitate efficient remittance operations in Zimbabwe. This can be modelled after the Philippines, where the government has established a regulatory framework that supports remittance services while protecting consumers from fraud. The Reserve Bank of Zimbabwe (RBZ) can implement policies that promote competition among service providers, similar to the remittance regulation strategies used in countries such as India, which have successfully reduced transfer costs and increased the use of formal channels.
- The government should collaborate with local and international financial institutions to develop user-friendly remittance platforms. For instance, integrating technology similar to the M-Pesa model in Kenya, which allows easy mobile money transfers, can streamline the remittance process in Zimbabwe. This initiative could include partnerships with technology companies to create apps that facilitate real-time transfers, making it easier for users to send and receive money efficiently and securely.
- Financial literacy programs targeted at remittance recipients can significantly amplify remittances' positive impact. These programs can be modelled after initiatives in countries such as Ghana, where NGOs and government agencies have collaborated to educate households on budgeting, saving, and investing remittance income. In Zimbabwe, such programs could be implemented through community workshops, leveraging local NGOs to provide tailored education to maximize the benefits of remittance inflows.
- Enhancing financial inclusion in remittance-dependent households is crucial. Policymakers should collaborate with microfinance institutions and banks to create tailored financial products for these households. For example, in Bangladesh, the Grameen Bank has successfully provided microloans to low-income families, enabling them to invest in small businesses. Zimbabwe can adopt similar strategies to ensure that remittance recipients have access to credit facilities that foster entrepreneurship and economic development.
- A continuous assessment of remittance policies is essential. Zimbabwe should implement a monitoring and evaluation framework similar to that used in countries such as Mexico, where the government regularly assesses the economic impact of remittances through comprehensive data collection and analysis. This framework enables policymakers to track the effectiveness of remittance-related strategies, allowing for timely adjustments and improvements.
- Engaging the diaspora can significantly enhance remittance flows. Initiatives such as investment forums modelled after Nigeria's "Diaspora Investment Summit" can be implemented in Zimbabwe. These forums can connect diaspora members with local entrepreneurs, fostering investment opportunities in local businesses and projects. Encouraging diaspora members to participate in community development initiatives can help leverage their financial contributions for broader economic benefits.

5.1 Limitations

In examining the causal relationship between remittances and economic growth in Zimbabwe, this study faced significant limitations related to data availability and quality. One of the primary challenges was the difficulty in obtaining the necessary data from reputable sources such as the World Bank and the International Monetary Fund. The core issue revolved around effectively addressing missing values within the dataset. Handling missing data is a critical aspect of empirical research because it can significantly influence the results and conclusions drawn from the analysis. This study evaluated various strategies to manage these gaps, weighing the pros and cons of each approach to determine the most suitable method that would align with the research methodology. Owing to these challenges, the research was constrained to working with limited quality data. As a result, the study had to use annual data and eliminate quarterly data.

5.2 Suggestions

This report advocated for further examination of the influence of overseas remittances on private investment in Zimbabwe. The researcher suggests that future studies examine remittances and economic growth through panel analysis employing family models such as ARCH and GARCH. This would enable a deeper understanding of the effects of international remittance.

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