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**Article**

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Cogent Economics & Finance

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*Suggested Citation:* Makina, Daniel (2024) : The long-run relationship between remittances and household consumption: evidence from Lesotho, Cogent Economics & Finance, ISSN 2332-2039, Taylor & Francis, Abingdon, Vol. 12, Iss. 1, pp. 1-13, <https://doi.org/10.1080/23322039.2024.2307098>

This Version is available at:

<https://hdl.handle.net/10419/321417>

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**To cite this article:** Daniel Makina (2024) The long-run relationship between remittances and household consumption: evidence from Lesotho, Cogent Economics & Finance, 12:1, 2307098, DOI: [10.1080/23322039.2024.2307098](https://doi.org/10.1080/23322039.2024.2307098)

**To link to this article:** <https://doi.org/10.1080/23322039.2024.2307098>



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Published online: 27 Jan 2024.



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# The long-run relationship between remittances and household consumption: evidence from Lesotho

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## ABSTRACT

The study examines the long-run relationship between remittances and household consumption in Lesotho for the period 1991-2019 using the Johansen cointegration technique and the Engle-Granger Residual Approach. Despite remittances in Lesotho representing over 20% of GDP which is highly significant relative to other African countries, a long-run relationship between remittances and household consumption has not been conclusively established in prior literature. The results of this study, however, confirms a significant positive long-run equilibrium relationship between household consumption, remittances and GNI per capita. According to the results, there exist a negative but insignificant relationship between household consumption and real interest rate. However, in the short-run, remittances negatively affect household consumption. This implies that increase in remittances in Lesotho reduce household consumption initially. A possible explanation is the existence of household consumption adjustment phase when remittances are first received. This means that in the short-run consumption is mostly financed from other income sources which may be informal, as the case with many developing countries. However, in the long run this pattern subsides.

## ARTICLE HISTORY

Received 7 September 2022  
Revised 9 January 2024  
Accepted 14 January 2024

## KEYWORDS

Remittances; migrants;  
household consumption;  
Johansen cointegration;  
Lesotho

## REVIEWING EDITOR

Robert Read, University of  
Lancaster, United Kingdom

## SUBJECTS

Anthropology - Soc Sci;  
Economics and  
Development; Economics

## JEL CLASSIFICATION

D12; I32; O15

## 1. Introduction

International remittances are one key outcome of migration with probably the most impact on countries of origin of migrants, and the role that remittances play both at the household and local community levels depends on how remittances are perceived by receiving households (Randazzo & Piracha, 2014, p. 2). In this regard, these researchers observe three views from literature. The first explains them in terms of the permanent income hypothesis, that is, viewing remittances as transitory income that are spent on activities such as human and physical capital development. On this basis, they can have a long-term impact on economic growth and development in migrant sending countries. Notably, the permanent income hypothesis assumes that consumers - (i) prefer a smooth pattern of consumption; (ii) are capable of forecasting future income; and (iii) have access to borrowing (Friedman, 1957). Hence, consumers can maximize consumption. Secondly, remittances are viewed as compensatory income spent more on consumption rather than investment goods (Chami et al., 2005). Thirdly, remittances are viewed just like any other source of income so that they do not materially affect the expenditure patterns of households. The first two views are related and are consistent with the behaviour of the recipients of remittances in developing countries. The usual drivers to migrate from poor to rich countries are income and consumption volatility. Therefore, remittances received are likely to first be directed to immediate consumption, and it is after consumption is satisfied when the remainder is directed to some other form of investment.

Notwithstanding the appeal of remittances in smoothing household consumption, long-run studies on remittances-household consumption nexus are still limited in many African countries. Although there

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are many studies that have examined the relationship, only a few studies have focused on the long-run relationship (Adelowokan et al., 2020; Akçay & Demirtaş, 2015; Nyasha & Odhiambo, 2020). In Lesotho, studies on remittances-consumption nexus are limited and have largely focused on the impacts of remittances on household consumption pattern using Household Budget Survey data (Tingum & Kuponiyi, 2020). To the best of our knowledge, no studies have investigated the long-run relationship between remittances and household consumption in Lesotho despite the country having a significant proportion of remittances in relationship to its GDP. It is against this backdrop that this paper investigates a long-run relationship between remittances and household consumption to complement literature on this phenomenon.

The rest of the paper is structured as follows. Section 2 provides the background of the case study country. Section 3 reviews relevant literature. Section 4 discusses the research methodology. Section 5 presents results and discusses them. Finally, section 6 concludes.

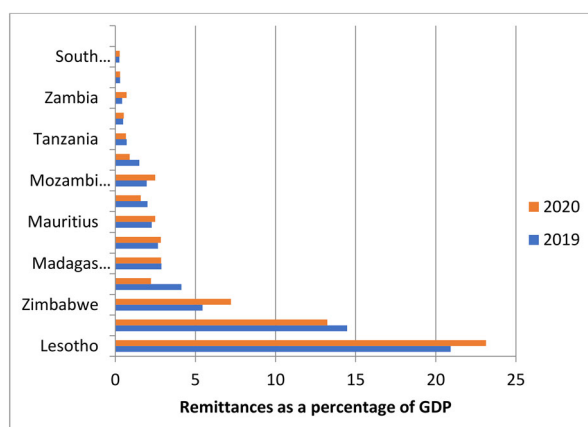
## 2. Background of the case study country

Crush et al. (2010) observe that Lesotho is one of the poorest countries in the world due to high unemployment, declining agricultural production, falling life expectancy, rising child mortality, and with half of its population living below the poverty line. As a result, for decades, migration has been a dominant means of survival for households. Since 1975, Lesotho has been the dominant supplier of labour to the South African mining sector (Rocchi & Del Sette, 2016).

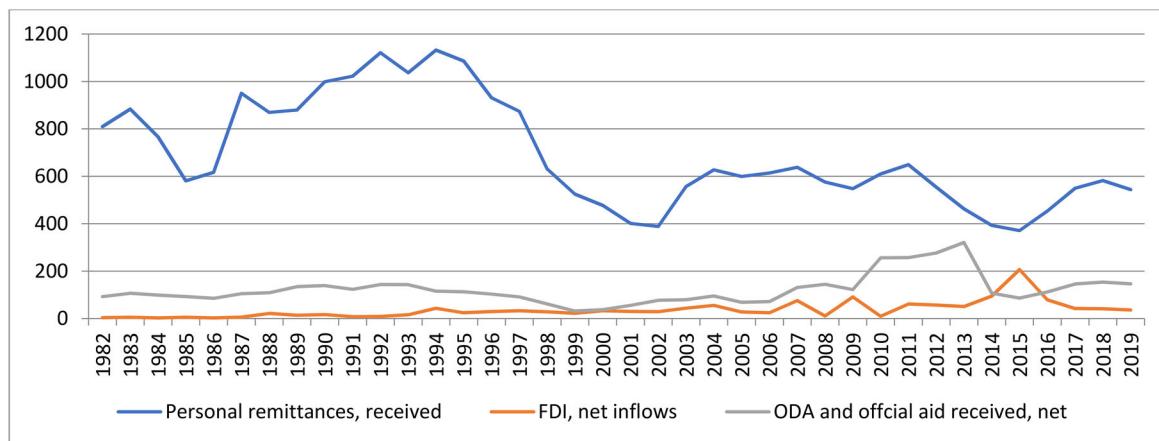
Most households and rural communities are dependent on remittances for their livelihood, and households that do not receive remittances are significantly worse off than those that receive (Crush et al., 2010). Migrant remittances are the country's major source of foreign exchange (Crush et al., 2010), accounting for 23% of GDP and 45% of exports in 2020. However, there has been a continuous drop in remittances inflow since 1987 because of less demand of Basotho manpower in the South African mining sector. In 1987 remittances were as high as 96.9% of GDP but had fallen to 25% of GDP by 2011 (Africa Development Indicators (ADI), 2013). Despite the drop in remittances, World Bank (2022) remittances data indicate that Lesotho is still highly dependent on remittances and was ranked as the highest remittances dependent country in 2019 and 2020 in Southern Africa. This is demonstrated in Figure 1 below.

According to 2022 World Bank data for Lesotho, remittance inflows reached US\$495m, while FDI and ODA reached US\$117 million and US\$145 million, respectively. This indicates the dominant role remittances have over FDI and ODA. Figure 2 below illustrates the trend of financial flows to Lesotho. Between 1982 and 2019, remittances continuously and significantly surpassed FDI and ODA.

Despite the outbreak of the COVID-19 pandemic in 2019, remittance inflows to Lesotho remained resilient as a percentage of GDP. The World Bank (2022) shows that while remittance inflows in value in Lesotho dropped by 13.8% between 2019 and 2020, as a proportion of GDP, there was a very minor decrease between 2019 and 2020 (that is, from 22% in 2019 to 20% in 2020). The reliance on



**Figure 1.** Dependence on remittances by SADC countries (2019–2020).  
Source: World Bank (2022).



**Figure 2.** 1982–2019 trend of financial inflows in Lesotho (values in million US\$).

Source: Authors' calculations based on World Bank (2022) data.

remittances in the country during the pandemic was strong since there were no substitutes to remittances as a means of livelihood for vulnerable families.

Rocchi & Del Sette (2016) observe that the Basotho have the tendency to return once living conditions get better after accumulation of remittance savings. Remittances are observed to be first channelled to consumption before any other purpose. According to World Bank (2022), Lesotho's Gini index stood at 50% in 2017 indicating higher income inequality which results in consumption volatility problems.

### 3. Literature review and hypothesis formulation

Empirical studies have largely confirmed that foreign capital inflows (whether in the form of foreign direct investment (FDI), migrant remittances and official development aid have a positive impact on economic growth (see for instance, Mowlaei, 2018 focusing on Africa). For many developing countries remittances have become their economic lifeline. Remittances are increasingly becoming an important developmental tool as they contribute to poverty reduction (Acosta et al., 2008, among others), economic growth (Adams & Page, 2005; Barajas et al., 2018, among others), entrepreneurship (Ajefu & Ogebe, 2019; Yang, 2008), education, the labour market through the supply of labour (Ambrosius & Cuecuecha, 2016; Edwards & Ureta, 2003; Kifle, 2007) and financial sector development (Aggarwal et al., 2011). Small, poor, and fragile African economies rely heavily on remittances as remittances constitute a significant proportion of their GDP.

Consumption is a critical component in any economy; it contributes to state expenditure through taxes collected on purchases made. Consumption expenditure is an important component of national income (Keynes, 1936). The Keynesian macro-economic model affirmed that household consumption plays a critical role in ensuring economic growth. Therefore, the overall impact of consumption on the economy would depend on household income. According to Keynes (1936), the fundamental psychological law is that people increase their consumption as their income increases, though not as much as the increase in their income. This implies that as household income increases, there is a greater tendency to increase their consumption and subsequently, contributes to economic growth. Household consumption can also impact financial development, poverty reduction, trade liberalization, and foreign capital flows (Yin et al., 2022).

Due to the importance of consumption in an economy, it is important to ascertain what determines household income and consumption. According to extant literature, household consumption is influenced by several variables, among which, remittances play a role (Yin et al., 2022). Theoretical literature support that migration is driven by altruism (see Johnson & Whitelaw, 1974; Lucas & Stark, 1985). Chami & Fischer (1996) argued that the process undertaken by a household to finance the migration of family members abroad may not be motivated by self-interest, but rather altruism. The altruistic nature of remittances is strong enough to explain that migrants remit to their family members for consumption

purpose. This effect is much stronger in developing countries where there are high levels of unemployment. Given the altruism model, consumption smoothing models suggest that more money is remitted when the economy worsens in the country of origin (Frankel, 2011). In fact, remittances are viewed to be a stable source of finance and to be counter-cyclical during crises – be it during financial crises, natural disasters, or political conflicts in remittance-recipient countries (Makina, 2014; Ratha, 2003; Ratha & Mohapatra, 2007). For instance, in Sub-Saharan Africa the aggregate fall in remittances due to the global financial crisis of 2007-2009 was smaller than the fall in private or official capital flows. Even beyond Africa, remittances remained more resilient relative to other categories of resource flows for many developing countries.

The counter-cyclical nature of remittances assumes that remittance sending decisions are made by individuals who possess a detailed knowledge of the needs of their family members in their home countries, and hence they tend to increase during economic downturns in the country of origin (Ratha, 2003). Using extensive data sets, Frankel (2011) has confirmed the validity of this observation which has profound implications for the importance of remittances in terms of household security through the role they play in smoothing household consumption, expenditure, and investment patterns. In contrast other private capital flows such as FDI and portfolio flows are procyclical, that is, they tend to flow into an economy during boom years, and either slow down or reverse during economic downturns.

Gustafsson & Makonnen (1993) have observed that many households in Lesotho are heavily dependent on remittances. It is an observation that supports the view that remittances constitute an increasingly important mechanism for the transfer of resources from developed to developing countries that are reliable and contribute to poverty reduction (Ratha & Mohapatra, 2012; World Bank, 2015).

There are essentially four strands of literature regarding remittances and consumption. The first strand investigated merely the relationship between remittances and consumption in general. The second strand focused on the short-run and long-run relationship between remittances and consumption. The second strand investigated whether remittances as source of income affected consumption differently from other sources of income. The third strand investigated how remittances affect volatility of consumption. The fourth strand focused on the short-run and long-run relationship between remittances and consumption. Most studies were undertaken at country level though there were few cross-country studies.

The first strand of empirical studies has found that remittances have a positive relationship with consumption. These include, among others: Ramcharan (2020) for Latin America and Caribbean countries; Dhakal & Oli (2020) for Nepal; Haider et al. (2016) for Bangladesh; Duval & Wolff (2016) for Kosovo; Javaid (2017) for Pakistan; Yameogo (2014) for Burkina Faso; Randazzo & Piracha (2014) for Senegal; and Ajefu & Ogebe (2020) for Burkina Faso, Kenya, Nigeria, Senegal, and Uganda; Akobeng (2022) for Ghana.

Regarding the second strand that investigated whether remittances as source of income affected consumption differently from other sources of income, there have been mixed results. Wang et al. (2021) investigated the average impacts of remittances on household consumption budgets in Kyrgyzstan and found limited impact on households' consumption shares. They observe that the impact of remittances on household budget tends to decrease over time for households that have a long history of receiving remittances. This happens when households invest part of the income and use the proceeds to finance household expenditure and hence depending less on remittances. This observation is disputed by Poirine (2006) who observed that there is no tendency for remittances to fall over time due to the so-called 'remittance fatigue'. Some studies have observed that remittances are fungible and hence recipients view them the same as other forms of income (Adams et al., 2008 for Ghana; Castaldo & Reilly, 2007 for Albania and Ang et al., 2009 for the Philippines). However, using the Philippines data, Tabuga (2007) observed mixed results and found that remittances are not only used for consumption purposes but are also invested on education and housing.

The third strand that investigated how remittances affect volatility of consumption observed several results. Economic volatility is a fact of life in Sub-Saharan Africa (SSA) as household-level shocks create large consumption fluctuations, raising the incidence of poverty (Bellon et al., 2020). Combes & Ebeke (2011) investigated the impact of remittances on household consumption instability in developing countries for the period 1975-2004 and found that remittances significantly reduce household consumption volatility. Mondal & Khanam (2018) examined the same issue for 84 developing countries during the



period 1980-2014 and found that in the long run volatility of household consumption can significantly be reduced by remittances. Furthermore, focusing on the effect of volatility during crises like the COVID-19 pandemic, Awode et al. (2021) investigated the impact of remittance volatility on GDP, consumption, investment, exports, and the exchange rate. The study found that remittance volatility exerts a negative but insignificant impact on GDP, consumption, investment, exports, and the exchange rate.

The fourth strand of literature that focused on the short-run and long-run relationship between remittances and consumption, the subject of this paper, largely observed a long-run relationship. Incaltarau & Maha (2012) examined the long-run effects of remittances on consumption in Romania for the period 1990-2009 and found remittances contributing to household consumption in the long-run. Adelowokan et al. (2020) examined the effect of remittances and foreign aid on private consumption for 29 Sub-Saharan Africa from 2002 to 2017 and found that remittances exerted positive impact on private consumption in the long-run, though the effect was insignificant. Akçay & Demirtaş (2015) investigated this issue in Morocco and found that remittances influence energy consumption in the short - and long-run, and also influence energy consumption indirectly through industrialization and economic growth in the long run. Their findings are consistent with the work of Rahman et al. (2021) on the impact of remittances on energy consumption in South Asian countries which found a long-run equilibrium relationship among remittances, energy consumption, GDP, and urbanization.

Therefore, in accordance with extant literature, and the fact that remittance inflows in Lesotho have been resilient over years like in Ghana, Nepal and Romania, remittances may have a long-run equilibrium relationship with consumption in the country. On this basis, the study tests the validity of the hypothesis:

*H1: Migrant remittances and household consumption are cointegrated.*

## 4. Methodology

The study uses time series data between 1991 and 2019. First, this time frame is adopted because the study uses the cointegration method which requires sufficient data to verify the presence cointegrating equations in the long run. The longer the period, the higher the quality of the equilibrium relationship established. Cointegration requires long spans of data to give cointegration test much power. Second, to the best of our knowledge, no studies have investigated the long-run relationship between remittances and household consumption in Lesotho. Third, the long time-frame allows the results to reflect the overall economic dispensation in Lesotho.

Household consumption (CONT) is assumed to be a function of remittances (REMT), real per capita gross national income (PCGNI) and real interest rate (INTR). Sources of data for the various variables are: (1) CONT (World Bank national accounts data and OECD national accounts data files); (2) REMT (World Bank estimate based on IMF balance of payment (BOP) data); (3) PCGNI (World Bank national accounts data and OECD national accounts data files); and (4) INTR (IMF International Financial Statistics and Word Bank data on the GDP deflator). PCGNI is derived from deflating Gross National Income (GNI) by population and the GDP deflator. REMT is the measurement of transitory income and PCGNI is the measurement of permanent income (Ramcharran, 2020). Therefore, a relationship is assumed to exist between CONT and PCGNI, and between CONT and REMT. INTR decrease encourages household CONT (borrowing) and an increase motivates household savings (less consumption). This implies a negative relationship between CONT and INTR. But this relationship may not hold in societies with persistent hunger and poverty – people may borrow to finance consumption irrespective of the interest rate as they need to survive. Though banks try to restrict this behaviour, borrowers still succeed through false information. The choice of the variables adopted is consistent with that adopted by Ramcharran (2020).

### 4.1. Estimation model

The long-run relationship between remittances and household consumption is tested through cointegration analysis. The model is estimated using the Johansen cointegration technique and the Engle-Granger residual approach. The following model is specified:

$$\text{CONT} = C + \beta_1 \text{REMT} + \beta_2 \text{PCGNI} + \beta_3 \text{INTR} + U \quad (1)$$

where  $C$  represents the constant (drift),  $\beta_{i=1,\dots,n}$  are the coefficients and  $u$  the residual variable assumed to be a white noise error process. All variables are log-transformed to improve linearity. Before testing for cointegration, we test if the series are stationary using the Augmented Dickey-Fuller (ADF) unit root test. Dickey & Fuller (1979, 1981) developed a formal test for stationarity.

#### 4.2. The Johansen cointegration

The Johansen cointegration method assumes that variables have unit roots at levels but become stationary after first difference – implying that variables are integrated to the order of one or  $I(1)$  (Serino, 2012). Although Johansen's methodology is typically used in a setting where all variables are in the order  $I(1)$ , having stationary variables in the system is theoretically not an issue (Hjalmarsson & Österholm, 2007). According to Johansen (1995), there is little need to pre-test the variables in the system to establish their order of integration. The author simply means that if a single variable is  $I(0)$  instead of  $I(1)$ , this will reveal itself through a cointegrating vector whose space is spanned by the only stationary variable in the model. The idea of cointegration analysis is that although two or more variables have unit roots, their linear combination is stationary (Serino, 2012).

The Johansen cointegration test uses the maximum likelihood procedure to detect the presence of cointegrating vectors. The Johansen (1988) maximum likelihood approach to cointegrated models provides an efficient procedure for the estimation of cointegrating equations. The author derived likelihood ratio tests for various structural hypotheses concerning the cointegrating relationships and the speed of adjustment to the disequilibrium implied by the cointegrating relationships. The approach is based on Trace and maximum Eigen values. In accordance with the Johansen cointegration, variables used in the cointegration are in their raw log form. According to the null hypothesis, there are no cointegrating relationships among variables. However, if the null hypothesis is rejected, then variables are cointegrated. The Error Correction Model (ECM) is used when variables are cointegrated (Alogoskoufis & Smith, 1991). The ECM model establishes a short-term relationship between the variables, while correcting for the deviation from the long-term co-movement of the variables (Winarno et al., 2021). The model validates the long-run relationship and controls for short-run dynamics between the dependent and independent variables. The notion of an ECM is regarded to be a very powerful organising principle in applied econometrics. It has prompted a range of statistical developments, most notably the concept of cointegration (Engle & Granger, 1987). According to the ECM model, the Error Correction Term (ECT) is eliminated if there is no cointegration. If the ECT is negative, it means the presence of a long-run relationship among variables. ECT is computed based on cointegrating vectors.

#### 4.3. Engle-granger residual approach

The Engle-Granger residual approach requires that all series are stationary at the same level. According to Engle & Granger (1987), to test if variables are cointegrated requires an estimation of the static regression model (1) by Ordinary Least Squares (OLS) method. According to the authors, the residual series ( $u$ ) of the estimated equation is then tested for stationarity. Cointegration exists if the residual series is stationary of order  $I(0)$  (in levels)

The use of the two cointegration methods allows the researcher to investigate both the long-run and short-run dynamics of the relationship. While the Johansen cointegration investigates the short-run dynamics among variables through the ECM, the Engle-Granger residual approach investigates the long-run dynamics among variables through the OLS estimation. Specifically, the Johansen cointegration allows for more than one cointegrating relationships given by the Trace and maximum Eigen statistics. More so, unlike simple causal relationship methods through regression models, the Johansen cointegration method is more powerful in establishing the presence of equilibrium relationship through the ECM. Another advantage of the Johansen cointegration method is the fact that it allows the researcher to establish the number of cointegrating equations through the Trace and maximum Eigen statistics. The number of cointegrating equations indicate how significant the established relationship is. Causal



**Table 1.** Augmented dickey-fuller (ADF) unit root detection test at level.

Variables	Without trend and intercept	With intercept	With trend and intercept
CONT	1.0000	0.0006***	0.9878
REMT	0.3860	0.1120	0.2235
PCGNI	0.4063	0.0006***	0.0065***
INTR	0.4838	0.0009***	0.0028***

\*\*\* Significant at 1%.

**Table 2.** Augmented dickey-fuller (ADF) unit root detection test at 1<sup>st</sup> difference.

Variables	Without trend and intercept	Intercept	Trend and Intercept
CONT	0.0510*	0.0152**	0.0040***
REMT	0.0007***	0.0215**	0.0315**
PCGNI	0.0006***	0.0129**	0.0481**
INTR	0.0000***	0.0000**	0.0004***

\*\*\*significant at 1%.

\*\*significant at 5%.

\*significant at 10%.

**Table 3.** Johansen cointegration test.

Statistic	Likelihood ratio: None*	Likelihood ratio: At Most one	Likelihood ratio: At Most two	Likelihood ratio: At Most three*
Trace statistic	59.92105	27.59800	14.40219	6.488560
Critical value at 5%	47.85613	29.79707	15.49471	3.841465
(p-value)	0.0025	0.0878	0.0725	0.0109
Max-Eigen statistic	32.32305	13.19581	7.913629	6.488560
Critical value at 5%	27.58434	21.13162	14.26460	3.841465
(p-value)	0.0114	0.4344	0.3875	0.0109

\*denotes rejection of the null hypothesis at 0.05 level.

relationship studies through OLS method (see Incaltarau & Maha (2012) and Mondal & Khanam (2018)) would neither establish cointegrating equations nor establish a firm equilibrium relationship.

## 5. Results and discussion

Tables 1 and 2 indicate the ADF unit root test performed at level and at first difference respectively. According to the null hypothesis, there is a unit root. The null hypothesis is only rejected if p-value  $\leq$  0.05, meaning the series is stationary. Tables 1 and 2 report p-values following the ADF unit root test.

According to Table 1, for without trend and intercept, all variables are non-stationary at level. Some of the variables are stationary at level when with intercept and with trend and intercept are used. At 1<sup>st</sup> difference shown in Table 2, all the variables become stationary.

To capture the number of cointegrating equations, the Johansen co-integration test is applied by using two tests, namely, the Trace test and the Max Eigen test.

Table 3 is the Johansen Cointegration test result with the Trace and Max Eigen tests using up to three lags. The Trace and Max Eigen statistics are compared to their corresponding critical values at 5% level. The null hypothesis is that there is no cointegration among the variables. The likelihood ratios (none, at most one, at most two, at most three) are the null hypotheses.

1. Likelihood ratio: None (There is no cointegrating equation). At this level we reject the null hypothesis because the Trace statistic (59.92105) is greater than the critical value at 5%. This is clearly indicated by p-value which is less than 5%, meaning there are cointegrating equations. We also reject the null hypothesis using Max-Eigen statistics.
2. Likelihood ratio: At Most one and At Most two (there are at most one or two cointegrating equations). Here we fail to reject the null hypothesis for the two ratios since both Trace and Max-Eigen values are lower than critical values. p-values are more than 5%.
3. Likelihood ratio: At Most three (there are at most three cointegrating equation). Here we reject the null hypothesis, meaning that there are at least three cointegrating equations. Both the Trace and Max-Eigen values are greater than the critical values at 5%.

**Table 4.** Error correction model.

Variable	Coefficient	STD. Error	t-statistic	Prob
C	9.1085	2.7613	6.5902	0.0210
$\Delta \ln \text{CONT}(-1)$	-1.6890	0.2751	-7.1828	0.0171
$\Delta \ln \text{CONT}(-2)$	1.8457	0.6454	6.4987	0.0251
$\Delta \ln \text{REMT}$	-0.0521	0.0034	-7.3216	0.0121
$\Delta \ln \text{REMT}(-1)$	-0.0252	0.0021	-5.2814	0.0313
$\Delta \ln \text{REMT}(-2)$	0.0135	0.0064	2.0436	0.1143
$\Delta \ln \text{PCGNI}$	0.0042	0.0035	0.4572	0.5483
$\Delta \ln \text{PCGNI}(-1)$	-0.7665	0.3203	-1.3192	0.2269
$\Delta \ln \text{PCGNI}(-2)$	0.0417	0.0057	5.4725	0.0272
$\Delta \ln \text{INTR}$	0.0963	0.0043	0.6542	0.6521
$\Delta \ln \text{INTR}(-1)$	-0.0820	0.1161	-0.7218	0.4507
$\Delta \ln \text{INTR}(-2)$	-0.0424	0.0514	-0.8252	0.4321
ECT(-1)	-1.4131	0.3144	-5.3452	0.0350

**Table 5.** OLS regression for the whole period.

Variable	C	REMT	PCGNI	INTR
Coefficient	6.4635	0.0312	0.0091	-0.0006
Std Error	0.8251	0.0085	0.0027	0.0013
P-value	0.0033	0.0026	0.0322	0.7706

The Johansen maximum likelihood cointegration test indicates that there are more than three cointegrating equations. However, in accordance with the Johansen's cointegration procedure, we cannot conclude a long-run relationship at this level based on Trace and Max-Eigen statistics. To know if there is a long-run equilibrium relationship, the ECM is used to estimate the ECT. If the ECT coefficient is negative, then there is an equilibrium long-run relationship among variables. Variables might be cointegrated (meaning there is equilibrium long-run relationship among variables) but disequilibrium still plausible in the short-run (Serino, 2012). The ECM is therefore used to verify the short-run relationship. The ECT is computed based on the cointegrating vectors reported in the Trace and Max Eigen test (Table 3). Table 4 indicates the estimation of the ECM with two lags. Results show that the ECT(-1) is negative and significant, indicating that there exists a long-run equilibrium relationship among the variables involved.

In the short-run, remittances show a significant negative effect on consumption in the current period, and again, affect consumption significantly negative in the first lag. The results are insignificant in the second lag, though positive. It is obvious that remittances may reduce household consumption immediately when received as there exist household consumption adjustment phase when remittances are first received. But as time passes, and in conjunction with acquiring a different economic status as a result of increase in remittances received, household consumption normalizes and gears towards expensive economic goods. This implies that remittances will have a strong positive impact on consumption in the long-run, consistent with the OLS regression results in Table 5. This is consistent with Keynes (1936) perception about consumption. The author noted that people increase their consumption as their income increases. The second lag result is an early signal to support this notion. However, by increasing the income of recipients, remittances can lead to changes in savings, expenditure patterns, and household behaviour (Ramcharan, 2020). According to the author, the level of income, social-economic status, and location correlates with the household consumption behaviour. It is obvious that when households become richer, they will migrate to urban areas, whereby they will be exposed to goods with high market value.

PCGNI affects consumption positively in the current period, though not significant. In the first and second lags, PCGNI affects consumption negatively and positively respectively. In a country like Lesotho, it is obvious that average individual contribution to the GNI in a very short period is minimal due to persistent unemployment issues. But, as time passes by, this pattern subsides due to the compounding effects of PCGNI, as demonstrated in Table 5, whereby PCGNI shows a significant positive relationship with consumption in the long run. The result in the second lag also suggests that PCGNI may affect consumption significantly over time. The case of real interest rate shows negative insignificant impact on consumption in the first and second lags. In the current period, the effect on consumption is weak, though positive. The results indicate a low response in consumption to changes in real interest rate or

the ability of households to make inter-temporal choice between present and future consumption through borrowing and savings. This is consistent with the findings of Ramcharan (2020). According to the author, the INTR-CONT relationship shown by the result is a common phenomenon in countries with underdeveloped financial markets and relatively inefficient financial institutions. Since in Lesotho the financial sector is poorly developed, the financial literacy levels among the Basotho would automatically be low. In essence, many have no access to formal savings and borrowing. Borrowing and savings may be informal through social financial groups as the case with many South Africans in informal settlements and relatively less developed provinces. Given this setup, the INTR-CONT relationship established by the study is plausible.

While the Johansen cointegration reveals the short-run dynamics among variables through the ECM, the Engle-Granger Residual Approach reveals the long-run dynamics through the OLS regression. However, both methods are used to reveal the presence or absence of cointegration. Unlike the Johansen cointegration, the Engle-Granger Residual approach requires that the series are stationary at the same level before cointegration analysis. The study then estimated Equation (1) through the OLS method for the whole period. Table 5 reports the estimation results.

The results indicate that there is a significant positive long-run relationship between CONT, REMT, and PCGNI. This is plausible since remittances are private transfers directly affecting the lives of migrants' households. Given the level of poverty and inequality in Lesotho, it is then normal that migrants are motivated and will do their best to remit regularly to solve consumption instability issue among their beloved ones back home. Mores so, the altruistic nature of remittances (see Chami & Fischer, 1996; Johnson & Whitelaw, 1974; Lucas & Stark, 1985) means that migrants will consistently remit money back home for their beloved ones to solve consumption instability problems. The case of Lesotho, like many developing countries, reveals that poverty and unemployment implies that the primary motive to emigrate from the country will be poverty and hunger.

Remittances represent one of the major international flows of financial resources in Lesotho. In 2020, remittances received in Lesotho as a proportion of GDP stood at 20 percent. Dhakal & Oli (2020) study in Nepal found that remittances strongly support household consumption and that remittances are the major source of income for Nepalese people which covers about 28% of total GDP on average per year. This is a very strong correlation between poor countries and the receipt of remittances. One of the biggest contributions of remittance inflows to a country's government expenditure is the consumption augmentation effect of remittances which lead to more tax revenue arising from household consumption. The more remittance inflows in developing countries, the more the tax revenue for governments.

Nevertheless, the estimation indicates a negative but insignificant long-run relationship between CONT and INTR. If remittances are already solving consumption volatility issues among households in Lesotho, it is normal that household would not be interested in loans or interest earned on savings to finance consumption. Hence, a negative or weak relationship is plausible. A similar study in Romania by Incaltarau & Maha (2012) reported a negative relationship between household consumption and credits. According to the study, if wages are the main income source for household consumption in Romania, then there is no need to finance consumption with credit. The case of Lesotho already indicates a high reliance on cross-border remittances by households, meaning that many households lack jobs. Credit is only accorded to those with wages, investments or those who are owners of businesses. For poor households, it is plausible that they lack access to credit.

However, the study cannot draw any conclusions regarding cointegration based only on the estimated models. After the regression, the residuals are saved, and the ADF unit root test is performed at level. Table 6 reports the ADF unit root test on the residuals.

**Table 6.** Augmented dickey-fuller (ADF) unit root test for residuals at level.

Test Options	P-value of Residual Series
Without constant and trend	0.0033
With constant	0.0009
With constant and trend	0.0003

p-value  $\leq 0.05$  indicates that the series is stationary.

According to Table 6, the residuals are stationary at level, indicating the presence of cointegration. The results of the Engle-Granger Residual Approach are consistent with those of the Johansen cointegration. It is therefore evident that a long-run relationship exists among variables involved. While the long-run relationship is positive between CONT, REMT and PCGNI, it is negative between CONT and INTR though insignificant.

The variable of interest is remittances, and according to the Johansen and Engle-Granger cointegration results, remittances have a significant positive impact on household consumption in the long-run. The result complements with those of Incaltarau & Maha (2012), Adu-Darko (2019), Dhakal & Oli (2020) and Ramcharran (2020) conducted in Romania, Ghana, Nepal and Latin American and Caribbean countries respectively. The overall trend indicates that the impact of remittances on household consumption depends on the volume of remittances received (volume) and the ratio of remittances to GDP. According to World Bank (2022), between 2014 and 2020, remittance inflows in Ghana, Lesotho, Nepal, and Romania increased by 113%, 19%, 38% and 50% respectively. This indicates a consistent inflow of remittances. Hence, the results of this study and those found in Romania, Ghana and Nepal indicate a strong correlation between remittances and household consumption among developing countries. More so, Lesotho is highly dependent on remittances with the ratio of remittances to GDP of 22% and 20% in 2019 and 2020 respectively. The case of Nepal revealed up to 24% in 2019 and 2020 (World Bank, 2022). This also corroborates the results found in Lesotho and Nepal. Given this evidence, one can surmise that the ratio of remittances to GDP and the volume of remittances received contribute significantly to the effect of remittances on household consumption.

## 6. Conclusion

The paper investigates the long-run relationship between remittances and household consumption in Lesotho using cointegration analysis. The cointegration analysis indicates that variables in the study are cointegrated - implying that there is a positive long-run equilibrium relationship between consumption, personal remittances, and per capita GNI. The results clearly show that remittances have a positive long-run equilibrium relationship with consumption, meaning that an increase in remittances leads to consumption augmentation. The consumption augmentation effect of remittances may contribute to savings, capital formation and investment in real and financial assets which may have a multiplier growth effect (Ramcharran, 2019). However, it is important to note that the additional value derived because of investing remittances in education and business would affect the level of consumption in the long run. Therefore, we can argue that the impacts of remittances on consumption may come from the direct use of remittances to finance consumption or indirectly through wealth acquired by investing remittances in education and business. The results are consistent with the remittance-consumption literature at large.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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## Data availability statement

The data used in the paper can be provided on request.

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