Economic Horizons, January - April 2025, Volume 27, Number 1, 19 - 31
UDC: 33 ISSN: 1450-863 X

www. ekfak.kg.ac.rs

Original scientific paper
UDC: 665.6/7:004.7:339(669)
doi:10.5937/ekonhor2501019S

UNLOCKING NIGERIA'S NON-OIL EXPORT POTENTIAL: DO TRADE FINANCING AND DIGITAL PAYMENT PLAY A ROLE?

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Nigeria's poor non-oil export performance has been the focal point of the growth policy discourse since the 1970s, but the role of emerging driving factors has remained significantly less understood. Thus, this study explores the determinants of Nigeria's non-oil exports by explicitly considering trade credit and digital payment systems. The study employs the Autoregressive Distributed Lag Model and the monthly data from 2010 to 2023 so as to achieve its objective. The results show that increased trade credit and better e-payment systems significantly improve the non-oil export sector's performance. The one implication of this finding is that increasing trade credit and improving e-payment systems may serve as another alternative to unlocking and boosting Nigeria's non-oil export sector's potential. Therefore, the paper concludes that, with the promotion of trade credit and an increased use of e-payments, Nigeria can improve its non-oil export performance in order to foster sustainable economic growth.

Keywords: trade financing, digital payment, international trade, export, Nigeria

JEL Classification: F14, 016, O33

INTRODUCTION

In recent years, export financing and e-payment systems have become the essential drivers of export performance in developing economies, which is even more important where inadequate credit access and weak e-payment platforms remain significant challenges for export-oriented firms. This is because export financing boosts external trade by providing export-oriented domestic firms with the capital to expand their productivity, to innovate, and to target foreign markets. Along this line, e-payment systems also offer a platform for traders to conduct trade transactions through a secure and efficient channel, which is even more important in the quest for non-oil export-led economic growth, because e-payment systems reduce transaction costs, enhance transparency and speedy payment for goods and services. In Nigeria, however, limited access to export credit and the poor adoption of e-payment systems may have contributed to the weakening competitiveness of its exporters, especially those in

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the non-oil sector. The shortages and perhaps the inherent weakness of these critical trade enablers may have dampened the prospects of Nigeria's non-oil export growth, which remains a significant development agenda.

In addition, the difficulty in accessing export finance combined with an inefficient e-payment system has constrained the exporters' expansion potential, impeded their liquidity position, and magnified payment risks. Furthermore, another challenge that exporters seek to overcome is the stringent market access conditions imposed by foreign countries (i.e. importers). Thus, to make Nigerian firms be more competitive and achieve trade efficiency, export financing, particularly trade credit and a sound e-payment system, are imperative. Thus, this raises the question of whether Nigeria should increasingly support trade credit and continuously adopt e-payment systems to unlock the potential of the non-oil export sector. This study hypothesizes that the answer is "yes" if their operation enhances the performance of the non-oil export sector, and "no" if it does not. Therefore, this study aims to examine the emerging role of the trade credit and digital payment systems on the performance of Nigeria's non-oil export sector.

In light of the foregoing, there are three major considerations that motivate the focus of this study. First, there is little (if any) empirical evidence on the role of export financing and e-payment systems in promoting the non-oil export sector's performance, except for the study by O. O. Awe, A. A. Adepoju, O. Aromolaran, M. Oladosun, D. E. Azuh and U. Okorie (2021) that examines the role of e-payment systems and trade financing on trade performance. Thus, updated empirical knowledge is important because trade credit and e-payments enhance trade volume, efficiency, diversity, and financial risk mitigation, which is critical, particularly in the case of Nigeria, where crude oil exports have crowded out non-oil exports, which is a more sustainable and stable source of revenue for the government. Moreover, the evidence shows that the export revenue impact of the oil price slump imposes a costly and painful adjustment process in Nigeria (Oyejide, 2015). Second, adverse oil shocks and dwindling oil revenue inflows are a wake-up call for Nigeria to take non-oil exports more seriously. However, doing this requires an efficient digital payment system and export credit support. Third, there are serious concerns that the rate of Nigeria's export diversification away from oil to non-oil has significantly remained very sluggish. For example, Nigeria's non-oil exports as a share of total exports were 17% in September 2021 but dropped to 5% in the same month in 2022, whereas oil exports accounted for over 90%. This is a source of severe concern for the government's quest to diversify from oil to non-oil exports. In this context, the role of the emerging drivers that are expected to stimulate non-oil exports such as export financing and digital payment systems cannot be downplayed[1]. Moreover, the use of e-payment systems and trade credit has continued to surge after COVID-19. Trade credit has astronomically increased from N1.1 trillion in September to N3.2 billion in September 2023.

In light of the modified export supply function predictions and the results obtained from the ARDL model, this study's analysis reveals that increases in trade credit and the usage of e-payment systems significantly raise the performance of the non-oil export sector in Nigeria, which finding implies that trade credit and e-payment can enhance the potential of Nigeria's non-oil export sector, thus contributing the important empirical information that can be used as the input in designing the policies aimed at improving the performance of the non-oil export sector so as to diversify and promote resilient export-led growth in Nigeria. This is important given the fact that Nigeria's main non-oil export products were cocoa (fermented and raw), sesame, cashew nuts, coconut, frozen shrimps and prawns, and ginger. However, Nigeria is relatively not doing well on non-oil exports compared to other countries. Some plausible reasons for this poor performance are the very challenging business environment, such as the high cost of technology and inadequate access to credit. Therefore, this study provides the information suggesting that, by promoting trade credit and increasing the use of e-payments, Nigeria can enhance its non-oil export performance in order to support export-led growth. In addition, the study also contributes to the existing

literature on the determinants of non-oil export performance, particularly the role of trade credit and digital payment systems.

Finally, this paper is organized into six sections. Following the Introduction, Section Two provides stylized facts, which is then followed by Section Three with its review of related studies. Section Four delineates the methodological framework so as to quantify the determinants of Nigeria's non-oil exports. In Section Five the empirical results are presented and discussed, while the paper's main conclusion and policy highlights are given in Section Six.

STYLIZED FACTS

In Nigeria, adequate trade financing and the adoption of digital payment systems can be pivotal for enhancing the country's non-oil export performance. In this light, the section examines the performance of Nigeria's non-oil exports, trade credit, digital payment, exchange rate, foreign exchange supply, and non-oil revenue from 2010 to 2023. The selection of these indicators for the stylized analysis was motivated by the fact that they are the drivers of export supply in Nigeria and would also serve as the foundation for the empirical framework of the paper outlined in Section Four. Table 1 shows that the performance of non-oil exports was quite volatile, increasing from US$223 million in 2010 to US$336 million in 2013, dropping to US$125 million in 2016 and peaking in 2019 at US$2.63 billion[2]. However, non-oil exports dropped again to US$846 million in 2021, up from US$138 million before shrinking to US$391 million and US$279 million in September 2022 and 2023, respectively.

As is shown in Table 1, trade-related financing increased but needs to be improved in order for it to drive non-oil exports in Nigeria. Trade credit increased from N783 billion to N954 billion in 2017 and maintained an upward trend from N1.07 trillion in September 2018 to N3.21 trillion in September 2023. In addition, it has been on the rise. The use of digital payment systems increased from N47.85 billion in September 2010 to about N103.97 trillion in September 2023, indicating a more ICT-intensive financial system.

Table 1 The key indicators

Year	Non-Oil Exports (US$' B)	Trade Credit (₦' B)	Digital Payment (N' B)	Official Exchange rate (N/US$)	Foreign Exchange supply (US$' M)	Non-oil Revenue (₦' M)
Sep-10	0.223	783.13	47.85	154.50	4,207.31	155,892
Sep-11	0.279	991.13	136.87	159.60	4,845.65	200,106
Sep-12	0.284	1,017.25	1,626.82	157.24	1,909.58	192,226
Sep-13	0.336	1,023.87	2,379.00	160.65	3,489.27	192,817
Sep-14	0.293	1,337.06	3,309.54	163.70	3,345.68	221,246
Sep-15	0.117	1,030.00	3,651.04	196.95	1,660.62	215,340
Sep-16	0.125	973.01	5,059.79	305.25	30.00	232,282
Sep-17	0.227	954.23	8,191.43	360.40	420.70	309,752
Sep-18	0.257	1,073.71	11,207.26	363.92	1,078.32	290,390
Sep-19	2.628	1,098.48	13,858.54	362.23	2,061.02	360,432
Sep-20	0.138	1,265.07	37,721.38	386.00	1,313.28	437,596
Sep-21	0.846	1,564.45	39,001.43	411.00	1,497.49	489,164
Sep-22	0.391	2,006.80	70,214.40	435.10	896.31	616,420
Sep-23	0.279	3,207.21	103,967.37	769.26	231.00	999,643

Source: Central Bank of Nigeria; Note: B means billion while M means million

In addition, Figures 1 and 2 plot the movement of some of the key indicators over time. Figure 1 demonstrates that the official foreign exchange rate was going up, indicating the depreciation of the impact of the recent devaluation of the naira. However, Figure 1 also reveals that the official FX supply was quite low, indicating the effects of the ongoing full pledge floating of the naira exchange rate.

Furthermore, Figure 2 indicates a strong correlation between trade credit and the adoption of digital payment systems. However, Figure 2 also shows a remarkable jump from 2019, which coincided with the adoption of online-based payments for goods and services due to COVID-19 and the government credit programs to support domestic firms during and after the pandemic. The link between trade credit and digital payment systems is critical for enhancing business efficiency and financial management. Trade credit allows businesses to buy goods and services on account, improving liquidity and fostering growth. Digital payment systems streamline the process, offering secure, quick, and transparent transactions. This integration reduces the risk of defaults, improves cash flow management, and fosters trust between trading partners.

LITERATURE REVIEW

Theoretical discussion

The theoretical connection between trade financing, digital payment, and export performance can be linked to the export supply functions. A. R. Bergstrom (1951) is amongst the earliest studies to have outlined the theoretical framework for analyzing export supply. The model predicts that the volume of exports is a function of the export price level and the general wage rate. However, the direction of the impact of the key determinants (the export price level & the general wage rate) on the volume of exports has remained ambiguous in the literature, in which light, the imperfect substitution model is broadly applied in the analysis of how exporters respond to conditions in their ability to supply goods and services to foreign markets. The model reflects the environment where exporters are faced with constraints and limitations in adjusting quantity due to, among other things, the production capacity, technology, and prevailing market conditions. I. Lukonga (1994) notes that exports could be better substitutes for domestic goods. Export demand is hypothesized to vary positively with the world economic activity and inversely with the export

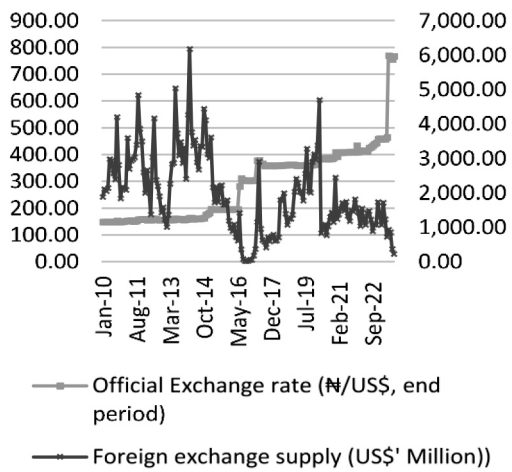

Figure 1 Exchange rate and FX supply

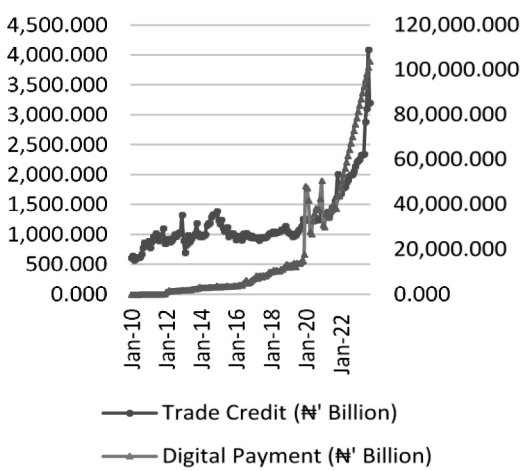

Figure 2 Trade credit and digital payment

Source: Central Bank of Nigeria

prices of the exporting country relative to the prices of foreign substitutes. In contrast, the export supply function is specified so as to positively depend on the cost of exports, negatively on input prices, and positively on the productive capacity. The model allows for the estimation of the demand- and supply-side determinants simultaneously.

In addition, A. Arize (1987) specifies a general export supply function, which assumes that firms are price takers and postulates that the supply of exports depends on the individual country's trend level of real income, deviations from this trend, and export and domestic prices. The volume of export supply is assumed to adjust towards the supplier's desired values. J. L. Newman, V. Lavy and P. de Vreyer (1995) analyze firm behavior by allowing firms and industries to produce two products in a joint production process. The firms are assumed to operate under a perfectly competitive setting in factor markets; therefore, all factor inputs are considered as exogenous. Export prices are also exogenous and operate under perfect competition in factor markets.

In sum, export supply functions are predicated on the notion that exporters respond to changes in different factors such as prices, production costs, exchange rates, and market conditions. The elasticity of export supply measures the responsiveness of the export quantity to changes in its driving factors. Higher elasticity indicates that exporters are more responsive to price changes or other factors. Lower elasticity suggests that exporters must be more responsive and face constraints in adjusting export quantities.

Empirical review

The empirical literature on the drivers of exports is large and has been evolving in recent years. However, the empirical findings of the literature appeared generally mixed with respect to the direction of the impact of the export supply determinants reflecting variations in terms of countries' structures, the methods used, and data measurements. For example, I. Lukonga (1994) found that domestic market conditions strongly influenced export performance in Nigeria. Specifically, the results showed that price incentives had a positive but small effect on agricultural exports. In contrast, the structural shift in the export supply function was linked to the export promotion incentives in the study. In addition, B. O. Oramah, O. Chukwurah and O. Ojeifo (1995) examined the operations of the Nigerian Export-Import Bank and found that the Bank had effectively provided credit support for Nigeria's non-oil exports in the period from 1991 to 1993.

Similarly, in Slovenia, J. Bekő (1999) found that exports were sensitive to trade cycles in global markets and that export supply had been price- and exchange-rate inelastic but income-sensitive between 1993 and 1997. In Japan, J. S. Mah (2006) established that the insurance system had not promoted export supply. J. S. Mah's (2006) findings also indicate that export relative price elasticity is around 0.8-1.0 and statistically significant, whereas no evidence supports the domestic demand pressure hypothesis in export supply. Using cointegration and error correction models, N. M. Nkang, S. O. Abang, O. E. Akpan and K. J. Offem (2007) examined Nigeria's palm kernel export supply function from 1970 to 2003. The long-term results showed that the producer price and foreign income negatively and significantly affected palm kernel exports. In addition, the estimates indicate that the producer price significantly undermined export supply, while foreign income was found to have an insignificant effect in the short run.

Furthermore, T. A. Oyejide (2015) established the fact that higher non-oil exports did not make up for revenue shortfalls in Nigeria following adverse oil price shocks but are crucial for economic growth in the medium to long run. Similarly, M. Raissi and V. Tulin (2018) found that Nigeria's exports were sensitive to international relative price competitiveness, the world demand, and energy shortages. The study also observed that supply-side constraints such as energy shortages dampened the price responsiveness in the short run. In a related context, R. Bhattacharyya and S. Ghosh (2019) observed that the decline in international prices during the recession had reduced the competitiveness of India's exports between 2001Q1 and 2014Q4. The results of the study also showed that the export firms had shifted their attention towards the domestic market due to the export deficit. In

Pakistan, S. I. Hussain, A. Hussain and M. M. Alam (2020) found the evidence that relative prices had an important influence on the export sector performance with respect to raw materials and value-added manufactured products. S. I. Hussain *et al* (2020) also produced evidence indicating that the cost of production significantly affected the growth of value-added manufactured and cotton waste exports. The findings also revealed that the production capacity and domestic demand pressure had significantly influenced the long-term export supply of almost all manufactured and primary export categories.

In addition, O. O. Awe *et al* (2021) use the Bayesian time-varying parameter dynamic linear model to reveal that domestic income and the lending rate influence non-oil export in Nigeria. Similarly, H. O. Ozekhome (2021) used the ARDL cointegration and error correction model to establish the fact that financial development had improved export diversification in both the short run and the long run in Nigeria between 1980 and 2021. In a related context in Pakistan, S. I. Hussain and U. Mazhar (2022) used the ARDL model to show that domestic demand pressure significantly reduced the supply of aggregate, primary, and manufactured exports in both the long run and the short run. Also, E. Frohm (2023) examines how margins adjust to bilateral and US-dollar exchange rate changes using fixed-effect regression on the bilateral trade data at the HS2-product level. The results showed that the exporter's exchange rate depreciation increased the nominal exports between the non-US countries, whereas the bilateral exchange rate had a negligible impact. In addition, K. Farid, T. Mahmood, M. Mumtaz and S. H. Ansari (2023) showed that FDI enhanced export in the long-term link between 2000 and 2020 in a panel of 5 large-scale manufacturing firms in Pakistan.

Using a fixed effect model, Z. Li, H. Chen, S. Lu, and P. Failler (2024) found more recently that better digital payment systems boosted trade performance and enhanced trade networks by reducing cross-border capital restrictions in 25 countries from 2012 to 2020. Interestingly, Li *et al*'s (2024) findings suggest that the impact of digital payment on external trade varies across countries with different levels of trade openness, which means that the policy environment matters. However, W. Gani (2024) used the ARDL model and observed that the pandemic had not affected industrial export performance during the COVID-19 pandemic in Tunisia from 2014 to 2022. Similarly, G. Palazzo (2024) examined the effect of the fundamental exchange rate dynamics on sectoral export performance in Argentina between 1980 and 2015. The results show that the probability of the export sector increases by 2.5% due to higher labor intensity during prolonged devaluation periods. The findings also indicate that export surges are more likely to occur in the sectors related to competitive industries. L. Brandt and K. Lim (2024) analyzed the determinants of Chinese export performance using the general equilibrium model and the results showed that foreign demand, better access to imported intermediates, and factor productivity growth were the main drivers of export performance in China.

METHODOLOGY

This study relies on the modified non-oil export supply function as the theoretical basis of its empirical framework. The model explains how non-oil export supply responds to several factors. For example, the model predicts that a higher relative price of exported goods relative to domestic products increases export supply. The model also suggests that the productive capacity is expected to have a positive effect on non-oil exports. The exchange rate is also crucial for non-oil exports because a weaker domestic currency makes exports cheaper and more competitive in global markets, increasing export supply. Finally, trade policies in the form of tariffs and non-tariff barriers can influence exports by stimulating or discouraging foreign trade. However, due to data limitations, it was impossible to include all the variables discussed above; however, in addition to the exchange rate and the relative price, the export supply specification of S. I. Hussain *et al* (2020) and W. Gani (2024) was slightly modified so as to account for trade credit and e-payment in line with the goal of this research study. Therefore, the empirical model is specified as follows:

$$nox_t = \alpha + \beta_1 tcre_t + \beta_2 epay_t + \beta_3 exr_t + \beta_4 fxp_t + \beta_5 fxs_t + \mu \quad (1)$$

According to Equation (1), *nox* represents the non-oil exports, *tcre* measures trade credit, *epay* denotes the sum of various e-payment systems, *exr* is the exchange rate, *fxp* is the relative price and *fxs* denotes foreign exchange supply. The β_i' are the estimable parameters of the model, and *t* stands for the time, whereas μ is the error term. The hypothesized signs of the elasticities are as follows: $\beta_1>0$, $\beta_2>0$, $\beta_3>0$, $\beta_4>0$, $\beta_5>0$. In addition, the empirical model embodies the hypothesis that if the export price for domestically produced goods in the international market is higher than the domestic price, it will increase the relative profitability of producing exportable goods. Firms tend to shift their resources from the non-traded sector to exportable production, which in turn would enhance the volume of the country's exports; hence, a positive estimate for the relative price coefficient is expected (Hussain *et al*, 2020). The exchange rate coefficient is expected to be positive because a higher exchange rate (indicating the depreciation of the domestic currency) makes exports cheaper in the international markets and spurs competitiveness (Gani, 2024). The higher the liquidity of the domestic foreign exchange market, the easier it is for non-oil exporters to access FX for their operations, such as importing intermediates. The key variables of interest, namely trade credit and e-payment, are expected to affect non-oil export performance positively.

However, for the empirical estimation of Equation (1), this study proxied the *nox* with the naira value of Nigeria's volume of non-oil exports measured in billions of US dollars. In addition, the findings of the study by Z. Li *et al* (2024) justify the inclusion of digital payment in Equation (1). Z. Li *et al* (2024) show that digital payment exerts an important influence on international trade. Furthermore, this study proxies the exchange rate with the nominal bilateral naira official exchange rate per unit of the US dollar. In addition, the evidence obtained from the studies by N. Milenković (2012), R. Kovačević (2022), G. Palazzo (2024), and L. Brandt and K. Lim (2024) provide the empirical justification for the inclusion of the exchange rate in Equation (1). Also, the findings of the studies by M. Čupić and S. Vržina (2024) and A. Matray, K. Müller, C. Xu and P. Kabir (2024) justify the inclusion of trade credit in Equation (1). Finally, the modified non-oil export supply model provides the theoretical basis for the inclusion of the relative price in Equation (1). The indices of the average world prices of Nigeria's major agricultural export commodities are used as the proxy for the relative price.

The estimation technique used is the ARDL bounds testing approach to cointegration and error correction model in order to analyze the short- and long-term relationships. This approach is applicable when variables combine stationary and non-stationary series. All the data used were sourced from the Central Bank of Nigeria's Statistical Bulletin online from January 2010 to September 2023.

RESULTS AND DISCUSSION

Table 2 presents the correlation matrix of the non-oil exports with e-payments and trade credit, which was found to be low at 9% and 7%, respectively. A negative correlation of about 4% is found between the non-oil exports and the relative price, whereas FX supply (fxs) has a positive correlation of about 14% with the flow of the non-oil exports. Overall, the correlation analysis does not indicate the evidence of multicollinearity. Therefore, this study can proceed with regression analysis. In addition, Table 3 reports the descriptive statistics, showing that the non-oil exports averaged US$465 million with the minimum and maximum values of about US$114 million and US$2.63 billion, respectively, which resulted in the standard deviation of about US$355 million.

In addition, Table 3 shows that the e-payments averaged about N18.8 trillion with the standard deviation of N28.8 trillion. During the sample period, the e-payments recorded the lowest value of N20.6 billion and the highest amount of N103.97 trillion. The average value of trade credit was 1.2 trillion with the standard deviation of N502 million, close to the minimum value of N572.5 million compared with the maximum trade credit of N4.09 trillion during the period of observation. The exchange rate average of N290.3 naira per US dollar fluctuates around N133 naira/US around the mean. The lowest exchange rate

Table 2 The correlation matrix

	nox	epay	tcre	exr	fxp	fxs
nox	1.000	0.089	0.072	0.043	-0.036	0.139
epay	0.089	1.000	0.912	0.843	-0.696	-0.342
tcre	0.072	0.912	1.000	0.775	-0.542	-0.271
exr	0.043	0.843	0.775	1.000	-0.756	-0.524
fxp	-0.036	-0.696	-0.542	-0.756	1.000	0.436
fxs	0.139	-0.342	-0.271	-0.524	0.436	1.000

Source: Authors

Table 3 The summary statistics

Indicator/measurement	Mean	SD	Median	Min	Max
nox (US$, mill)	464.47	354.79	373.99	114.14	2,627.87
epay (N, mill)	18,803,760.5	25,882,062.9	6,404,778.7	20,690.0	103,967,369.7
tcre (N, mill)	1,212,503.3	502,633.7	1,029,996.3	572,457.2	4,094,421.8
exr (naira/US$)	290.31	133.78	305.25	150.00	770.88
fxp (US$-based: 2010 = 100)	82.00	19.36	82.50	47.93	124.55
fxs (US$' mill)	1950.26	1149.57	1750.43	30.00	6179.92

Source: Authors

was N150, whereas the highest was N770.88 per dollar. The indices of the average world prices of Nigeria's major agricultural export commodities are used as the proxy for the relative price (fxp), and the average value is 82, with the standard deviation of about 19.4. The minimum value is 47.9, and the maximum value is 124.55.

Furthermore, Table 4 reports the variance inflation factor (VIF) for multicollinearity detection. Multicollinearity occurs when independent variables in a regression model are highly correlated, leading to unreliable estimated coefficients. Table 4 shows that the VIFs for the variables are all less than 5, suggesting that multicollinearity is not a concern. Further checks for stationarity using the ADF and PP techniques are conducted. The stationarity test result in Table 5 reveals that the variables are both I(0) and I(1) at varying significance levels, which means that the conventional test for long-term relationships, such as the Johansen cointegration technique, may not be appropriate. The results are validated by the outcome of the KPSS and the Zivot-Andrews unit root testing procedures, where structural breaks are taken into account.

Table 4 The variance inflation factors (VIF)

	Variable	VIF
1	lepay	4.4775374
2	ltcre	2.6447591
3	lexr	5.8320007
4	lfxp	2.7084047
5	lfxs	1.3258024

Source: Authors

The test results for the long-term relationship using the ARDL bound testing approach reported in Table 7 indicate the long-term association between the non-oil exports, trade credit, e-payments, and the other variables considered, which is because the F-statistic value of 4.404 exceeds the upper bond value of 3.807. This aligns with the findings of S. I. Hussain *et al* (2020) for Pakistan. The long-term estimates are presented in Table 8, which accounts for the fact that, while the second and fourth lags of electronic payment (epay) were negative and statistically significant, only the second lag was positive. This means that the long-term impact is not stable, which does not align with the findings of H. O. Ozekhome (2021), where

Table 5 The ADF and PP unit root testing

Variables	Augmented Dickey-Fuller (ADF)			Philip-Perron (PP)		
	Level	First diff.	Decision	Level	First diff.	Decision
nox	-0.332	-14.612*	I(1)	-9.1019**	-27.5921**	I(0)
epay	-2.648*	-8.067**	I(0)	-2.6145	-11.6846*	I(1)
tcre	0.2086	-11.5926	I(1)	-0.3711	-15.371**	I(1)
exr	2.3128*	-9.3168	I(0)	0.6254	-12.3025*	I(1)
fxp	-3.3472	-9.9437*	I(1)	-1.4434	-11.8999*	I(1)
fxs	-2.8684**	-9.1962	I(0)	-2.7242*	-11.8297**	I(0)

Source: Authors

Table 6 The KPSS and breakpoint stationarity tests

Variables	KPSS			Zivot-Andrews (ZA)				
	Level	First diff.	Decision	Level	Break date	First diff.	Break date	Decision
nox	0.2343	0.023**	I(1)	-5.1265	64	-14.88**	3	I(1)
epay	0.4273	0.101**	I(1)	-9.168**	24	-9.739**	26	I(0)
tcre	0.47**	0.127**	I(0)	-3.757	127	-12.40**	59	I(1)
exr	0.2505	0.079*	I(1)	-4.366	77	-13.712**	160	I(1)
fxp	0.200**	0.071**	I(0)	-5.51**	129	-11.127**	128	I(0)
fxs	0.204*	0.039**	I(0)	-3.883	100	-10.107*	81	I(1)

Source: Authors

financial development was found to positively and significantly impact export diversification in the long run. The difference could be traced to the difference in measurement and the indicators used.

In a similar fashion, Table 8 demonstrates that the effect of trade credit is unexpectedly negative but insignificant, whereas the exchange rate (exr) is, as expected, negative but statistically insignificant. The relative price of Nigeria's major agricultural export commodities is favorable at the levels with the coefficient of about 1.76, suggesting that higher prices increase non-oil exports. However, the estimated coefficient of the second lag is higher. Yet, it becomes negative, showing that Nigeria's non-oil exports drop due to high competition in global markets and limited market access for Nigeria's products. Finally, the estimates show that the long-term effect of domestic FX supply is negative and statistically significant (-0.263), which means that a percentage change in FX supply reduces non-oil exports. This can be explained by the non-oil exporters who often face challenges when accessing US dollars in a foreign exchange market. This constrains productivity and exports as well, because they have limited access to FX to enable them to purchase requisite intermediates.

Table 7 The bound testing result

F-statistic	p-value
4.40365745	0.01830081
lower	upper
2.64252343	3.80662074

Source: Authors

Digging further into the results, Table 8 reveals that the first and third lags of the electronic payments (e-pay) positively and significantly impact the non-oil export performance, which conforms with the result obtained by Li *et al* (2024), who found that digital payment exerted a significant positive impact on international trade and reduced cross-border capital restrictions. The export price coefficient (fxp) is positive and statistically significant, meaning

Table 8 The long-term estimates

Term	Estimate	Std. Error	p-value
(Intercept)	2.0711	1.3472	0.1264
L(lnox, 1)	0.0704	0.0789	0.3741
L(lnox, 2)	0.3001	0.0761	0.0001
L(lnox, 3)	0.1515	0.0798	0.0596
lepay	0.0043	0.2084	0.9836
L(lepay, 1)	0.4583	0.2953	0.1229
L(lepay, 2)	-0.7205	0.2935	0.0153
L(lepay, 3)	0.9141	0.3062	0.0033
L(lepay, 4)	-0.6097	0.2093	0.0042
ltcre	-0.0422	0.1977	0.8314
lexr	-0.1680	0.2040	0.4116
lfxp	1.7578	0.6811	0.0109
L(lfxp, 1)	-2.1523	0.6799	0.0019
lfxs	0.1764	0.1002	0.0804
L(lfxs, 1)	-0.1052	0.1354	0.4385
L(lfxs, 2)	0.1367	0.1329	0.3053
L(lfxs, 3)	-0.2627	0.1334	0.0509
L(lfxs, 4)	0.1335	0.0981	0.1758

Source: Authors

Table 9 The results of the short-term error correction model

Variable	Estimate	Std. error	Statistic	p-value
(Intercept)	2.071	0.398	5.198	0.000
d(L(lnox, 1))	-0.452	0.092	-4.889	0.000
d(L(lnox, 2))	-0.151	0.074	-2.047	0.042
d(lepay)	0.004	0.199	0.022	0.983
d(L(lepay, 1))	0.416	0.194	2.145	0.034
d(L(lepay, 2))	-0.304	0.197	-1.544	0.125
d(L(lepay, 3))	0.610	0.203	2.999	0.003
d(lfxp)	1.758	0.642	2.738	0.007
d(lfxs)	0.176	0.092	1.922	0.057
d(L(lfxs, 1))	-0.008	0.088	-0.085	0.933
d(L(lfxs, 2))	0.129	0.089	1.449	0.149
d(L(lfxs, 3))	-0.133	0.090	-1.486	0.139
ect	-0.478	0.091	-5.229	0.000

Post-estimation tests

Test type	Statistic	p-value
Breusch-Godfrey (autocorrelation)	5.6751	0.2248
Breusch-Pagan (heteroscedasticity)	6.2786	0.9014
Ramsey RESET (misspecification)	0.83804	0.4347
Jarque-Bera (normality)	82.201	0.2216

Source: Authors

that higher export prices stimulate non-oil exports, especially in the agricultural sector. In the short run, higher FX supply in the foreign exchange market by the CBN leads to an improvement in non-oil exports by about 0.18%, which means that non-oil exporters have higher productivity and export volumes given their greater access to FX in meeting their intermediate input demand. Finally, the diagnostics tests were performed satisfactorily, and no evidence of serial correlation, heteroscedasticity, or model misspecification was found. In addition, the Jarque-Bera normality test is also acceptable.

Furthermore, the result of the contemporaneous error correction model is given in Table 9, which describes how quickly the system returns to equilibrium after a deviation or shock. The negative sign indicates that the adjustment process corrects any disequilibrium. Specifically, it implies that, if there is a deviation from the long-run equilibrium, the variable will adjust in the opposite direction in order to correct the error. The value of 0.478 means that approximately 47.8% of the deviation from equilibrium is corrected each month. The speed of the adjustment of -0.478 signifies a moderate adjustment rate, suggesting that the variable corrects nearly half of the disequilibrium in one month, which is neither very fast nor slow.

In addition, Figure 2 shows the CUSUM and CUSUM of squares tests. The cumulative sum test is within the confidence range, indicating no evidence of a structural break or that the model's parameters are stable. Likewise, the cumulative sum of squares is also within the confidence range, suggesting no evidence of change in variance, which means that the model is

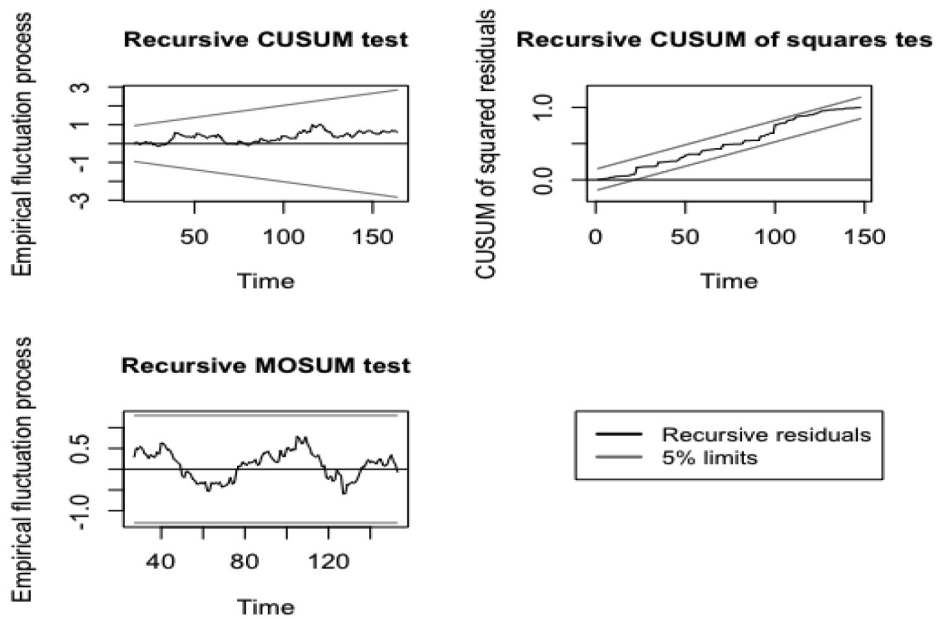

Figure 2 The parameter stability tests

Source: Authors

homoscedastic (i.e. it satisfies the constant variance requirement). The Recursive MOSUM (Moving Sum) test also detects structural changes in the model over time. The MOSUM statistics are within the confidence range, suggesting no significant structural change and validating the findings of the earlier parameter stability test.

CONCLUSION

This study analyzes the impact of trade financing and the e-payment system on non-oil export performance in Nigeria using data from January 2010 to September 2023. The main finding reveals a positive and significant impact of trade credit and the e-payment systems on non-oil export performance, which suggests that increased trade credit and e-payment systems significantly improve the performance of the non-oil export sector in Nigeria. The one implication of this finding is that increasing trade credit and continuously adopting e-payment may serve as another alternative to unlocking the potential of Nigeria's non-oil export sector. In addition, this study observes that the timing of the adoption of electronic payment with a three-period lag proves to be particularly advantageous for enhancing non-oil export performance in Nigeria.

For policy implications, the findings of the research study highlight the three key areas for consideration, namely (i) enhancing and scaling up the non-oil sector's incentives, such as agricultural credit guarantee schemes and non-oil export stimulation facility, so as to provide affordable finance, increase the export-orientation of domestic firms, and amplify non-oil exports; (ii) increasing investments and foreign exchange supply to the agriculture and manufacturing sectors in order to boost non-oil exports; and (iii) implementing the new roadmap outlined in Nigeria's trade policy in order to unlock the potentials of the non-oil sector. These policy considerations are implicative of the fact that Nigeria can enhance its non-oil export performance and drive sustainable economic growth in the long run. Therefore, this study concludes that, with the promotion of trade credit and the increased use of e-payments, Nigeria can improve its non-

oil export performance so as to foster sustainable economic growth. However, it may be of interest for future studies to address the limitations such as the availability and reliability of disaggregated data on export financing and payment systems. A more detailed breakdown of non-oil exports by sectors could offer deeper insights into the sector-specific effects. Considering the impact of e-payments on the digital infrastructure and the potential skewing of the results by using agriculture export prices instead of the export-to-domestic price ratio are also areas for future research consideration.

ENDNOTES

1 In this study, digital payment or e-payment refers to electronic transactions, facilitated by platforms like the NIBSS Instant Payment (NIP), NIBSS Fast Fund, NIBSS Electronic Funds Transfer (NEFT), and electronic card payments via PoS terminals, mobile payments, internet (Web) transactions.

2 https://nepc.gov.ng/cms/wp-content/uploads/2022/05/A-EMMERGING-ISSUES-DISRUPTING-NIGERIAS-NON-OIL-EXPORT-AND-INNOVATIVE-SOLUTIONS-new_compressed.pdf

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Received on 13th July 2024,
after revision,
accepted for publication on 10th April 2025.
Published online on 25th April 2025.

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