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Article

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BANKING & FINANCE | RESEARCH ARTICLE

The effect of external credit on firms' exports size in Nigeria

Richard Kofi Akoto^{1*} and Charles Adjasi²

Abstract: Financial market inadequacies often constrain overseas trade flows because exporters largely rely on access to external credit to survive. This article examines the influence of external credit (bank finance; and suppliers and customer credit) on exports size of manufacturing firms in Nigeria using Two-Stage Least Square (2SLS) estimation procedure. We approximate exports size as the ratio of exports over total sales. The study also proxy access to external finance as bank finance as a proportion of total financing while suppliers and customer credit was defined as credit from suppliers and advances from institutional customers as a proportion of total financing. The findings reveal that bank credit is significant and negatively associated with exports size while suppliers and customer credit are positive and significantly drives exports size. Government should put stringent measures in place to ensure that Nigeria's exports meet overseas standards in terms of high-quality, packaging, and labeling, which are critical in selling exports in the international market. Policy should also be directed at reducing the cost of exporting in Nigeria. Finally, government should also consider establishing

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PUBLIC INTEREST STATEMENT

Exporters rely on credit to run and expand their businesses because their own internally generated funds are often not available or insufficient to cover the huge costs that are incurred in exporting. Major sources of this credit are bank loans and advances from suppliers and customers. Thus, access to credit is popularly known to promote exports for economic prosperity. This study primarily verified whether access to credit promotes exports size in Nigeria. It is discovered that while access to bank credit reduces exports size, advances from suppliers and customers promote it. Government should, therefore, put stringent measures in place to ensure that Nigeria's exports meet overseas standards in terms of quality, packaging, and labeling. Policy should also be directed at reducing the cost of exporting in Nigeria. Innovative tax incentives and credit guarantee schemes should also be considered to encourage suppliers and customers to extend more credit to exporters.

innovative tax incentives and credit guarantee schemes to encourage suppliers and institutional customers to extend more flexible credit to exporters.

Subjects: Development Policy; Economics and Development; Economics; Finance

Keywords: external credit; exports size; working capital; export rejection; Nigeria; Sub-Saharan Africa

JEL Classification: F14; G21; G23

1. Introduction

Generally, access to credit enhances liquidity of firms (Jöeveer, 2016) and put them in a better position to flourish. While this is true for all firms, it is often argued that firms that intend to participate in the foreign market need access to more external finance to mitigate the huge upfront costs of internationalization (Chaney, 2005; Manova, 2013). These authors further observe that access to finance is also crucial in overcoming the numerous international trade variable costs that exporters face. They argue that this is necessary since retained earnings and internal cash flows of the exporter alone may not be sufficient to offset the huge variable costs of foreign market participation. While it has been shown that access to external credit significantly enables potential exporters to jump the huge sunk and fixed costs of foreign market entry and enjoy overseas market participation, little is known about the importance of same credit in overcoming the exporters' variable costs of foreign market operation, a cost which is critical to be mitigated in order to increase firms' exports size. This article therefore investigates the effect of external credit on export levels of manufacturing firms with a particular focus on Nigeria. Such a knowledge is important to inform policy in determining whether more financial infrastructural roll out is vital to enhance exports size in Nigeria.

According to Djankov et al. (2010), Amiti & Weinstein (2011), and Manova (2013), access to finance is critical in promoting firm-level exports. These authors argue that exporters require constant access to external finance to enable them mitigate their marginal and other operational costs due to the inadequacy of retained earnings and internal cash flows. Also, exporters need external finance due to the longer time lag between their sales and cash receipts. Specifically, such finance is needed to purchase inputs to continue production, pay bills, and also offset the costs of duties, freight insurance, and shipping. It is important to note that entry into the export market does not guarantee continuous participation if the above costs cannot be met. In Africa, there is often the problem of sporadic and non-survivalist exporters. These are firms which are unable to sustain their export activities in the international market, a problem which may be due to financing constraints. Specifically, Djankov et al. (2010) note that lack of access to financial resources more adversely affects the availability of exporters' working capital than their non-exporting counterparts as cross-border shipping and delivery typically takes between 30 and 90 days longer to complete. Similarly, Amiti & Weinstein (2011) argue that exporters really need access to credit or trade finance to survive due to the longer time lag between their sales, and cash receipts. Furthermore, Manova (2013) opines that since retained earnings and internal cash flows alone are often woefully inadequate in meeting all the working capital needs of exporters, access to external finance by financially vulnerable exporting firms is crucial in mitigating their cost of shipping, duties, and freight insurance.

In spite of the assertion of the positive role of external credit in export level of firms, the available empirical evidence still remains unsettled with majority of the studies focusing on developed countries. For example, whereas one group of researchers such as Du & Girma (2007), Amiti & Weinstein (2011), Paravisini et al. (2011), Chor & Manova (2012), and Manova (2013) provides evidence that better access to external financial resources positively and significantly drives export size particularly in financially susceptible firms due to inadequacy of internal earnings, others such as Bellone et al. (2010), Stiebale (2011), Lancheros Demirel (2012), and Wagner (2019) argue otherwise and attribute firms' high exports size to the influence of foreign ownership,

productivity, technology among others. Thus, the inconclusiveness in the empirical literature and dearth of studies mainly in developing and emerging countries call for more rigorous work in the field, particularly given that these are regions where financial access is more lacking.

This study focuses on Nigeria since it is the biggest economy in sub-Saharan Africa and also harbors the largest network of enterprises (World Bank, 2014) suggesting that its exports size is very vital for the region in a lot of ways. For example, understanding the factors that promote firm-level export size in Nigeria is critical for policy not only for the country but also for the general economic growth and development of sub-Saharan Africa. Furthermore, Nigeria has also instituted several export development institutions and programs relative to most other countries in the region over the past decades, a characteristic which is capable of making exporting activity more pronounce in the country. To the best of our knowledge, this is the first paper that overtly examines this issue in Nigeria and one of the few in sub-Saharan Africa. Consequently, the study contributes significantly to the literature as it will help deepen our understanding of how external credit may influence firms' exports size from a developing and emerging country perspective.

The rest of the paper is organized as follows: Section 2 reviews the extant literature on how external finance may affect the magnitude of exports. Section 3 describes the data and methodology used in the study. Section 4 discusses the empirical results while section 5 concludes the paper.

2. Related literature

2.1. Theoretical literature

The study derives its theoretical foundation from the extension of the sunk cost hypothesis of international trade developed under the “new new trade theory” pioneered by Melitz (2003). It is important to note that Melitz's “new new trade theory” has further been developed by Chaney (2005), Manova (2008), Manova et al. (2011), and Manova (2013) who embed financial frictions, namely, the sunk and fixed costs of foreign market entry; and the variable costs of foreign market operations.

The trade economists who introduced financial frictions into the “new new trade theory” first contend that apart from the need for firms to produce above a certain threshold before they can internationalize as espoused by Melitz (2003), there is also a significant sunk and fixed costs that financially vulnerable firms need to mitigate through external financing. These costs include the costs of research into the viability of potential foreign markets; cost of customizing products to suite foreign tastes; regulatory compliance; and the cost of setting up of foreign distribution channels among others. These contributors later extend their earlier view to cover variable trade costs, which is a somewhat natural extension of the sunk cost hypothesis and advocate that exporters also need to cover these costs through external funding in order to survive in the export market. These costs include but not limited to expenditure on material inputs; payment of salaries; utility bills; duties; freight insurance; and shipping, all of which are incurred before export revenues are realized.

Under the extension of the sunk cost hypothesis of international trade to encompass variable costs of foreign market operations, it is expected that an exporter should have a continuous access to external finance which in this case is adequate working capital in order to mitigate its numerous variable trade costs outlined earlier. This financing is necessary to increase export size and thus help exporters to remain afloat since retained earnings and internal cash flows alone are often woefully insufficient and cannot cover the exporters' marginal and operational costs (Chaney, 2005; Manova, 2013). Additionally, Manova (2013) noted that an exporter's need for external capital to cover its variable trade costs is further aggravated since it takes a longer time lag between export sales and cash receipts when compared to their domestic counterparts. The authors therefore contend that a firm's entry into the export market does not guarantee its continuous participation if it cannot get access to external finance to overcome its huge variable costs of foreign market operations.

This study focusses on the variable international trade costs perspective of the argument rather than the sunk and fixed costs dimension, particularly due to the limited empirical research attention the former has received couple with the inconclusive research results it has so far yielded. Consequently, unlike the overwhelmingly positive role of external credit in overcoming the huge sunk and fixed costs of foreign market entry that has been shown, the role of external finance in mitigating the exporters' numerous variable trade costs which is vital to spur export size remains unclear. Though the upfront costs of internationalization; and the variable trade costs are both costs of international trade, it is important to note that the two have significant differences in terms of nature; and when they arise in the firm and thus may pose different levels of financial severity and importance to the firm.

In summary, it is essential to note that just like the importance of adequate production levels; and access to external credit to offset the huge upfront costs of internationalization which are critical to enjoy overseas market participation, it is argued that the exporters' numerous variable international trade costs are also important to be mitigated through external financing if they are to survive in the export market.

2.2. Empirical literature

The empirical literature that examines the impact of external finance on firm-level exports are scanty and indicate mixed results with little attention on developing countries. Whereas some studies report a positive role of external finance in export intensity of firms (see, Amiti & Weinstein, 2011; Castellani et al., *in press*; Chor & Manova, 2012; Du & Girma, 2007; Paravisini et al., 2011), others find no such evidence (see, Bellone et al., 2010; Berman & Héricourt, 2010; Lancheros & Demirel, 2012; Manez & Vicente-Chirivella, 2020; Stiebale, 2011; Wagner, 2019). Generally, studies that report positive association between external finance and exports attribute such an observation to lack of adequate internal earnings or cash flows in the firm to overcome the total working capital needed to pay off the firm's marginal costs of trade and production. Consequently, such exporters tend to depend more on external finance to drive their exports.

On the other hand, those that observe no relationship between external credit and exports size infer three main reasons why this may happen. First, they indicated the possibility that sampled firms may not be financially constrained since they have adequate internal earnings or cash flows to overcome their working capital needs. Second, some argue that since exporting is often considered as more profitable relative to pure domestic production, exporters may be financially independent due to the huge profit they may accumulate from foreign sales which makes external credit insignificant to their operations. Third, others relate that financial factors may not influence foreign market sales once all observable and unobservable factors have been properly accounted for since exporters are intrinsically profitable. According to this view, accounting for endogeneity issues is essential in examining the effect of finance on exports size. It is fascinating to note that though few studies like Du & Girma (2007), Berman & Héricourt (2010), and Lancheros & Demirel (2012), investigate the role of external credit in firms' exports size from developing and emerging country perspective, none of these papers explicitly focus on sub-Saharan Africa¹ where lack of access to finance is more severe.

On the positive impact of bank credit and exports, Du & Girma (2007) examine the relationship between export intensity, bank credit, and Foreign Direct Investment (FDI) for more than 28,000 manufacturing firms in China. Using a longitudinal data from the Annual Report of Industrial Enterprise Statistics database over the period 1999–2002, the study finds that bank credit is positively associated with firm-level export. This finding suggests that access to external finance or bank credit is vital for financially vulnerable firms in driving their magnitude of exports.

Similarly, Amiti & Weinstein (2011) investigate the association between bank health and export levels of Japanese firms during the country's 1990s financial crises. Specifically, the authors match exporters with the main banks that provide them with trade finance.² Using data from the Development Bank of Japan (DBJ), and Nikkei NEEDS Financial Quest, over the period 1990–2010,

the study shows that banks' financial health is a critical factor in determining firm-level exports. In other words, banks that were financially weak during the crises were less able to financially support their clients³ resulting in the fall of those firms' export level. The finding partly implies that adequate access to financial resources is essential for firms that depend on external finance to boost their exports.

Contributing to the literature, Paravisini et al. (2011) study the link between bank credit and export volume of a panel of Peruvian firms over the period 2007–2009. The findings reveal that a 10% drop in the supply of bank credit leads to a decrease of 2.3% in the volume of annual exports. This finding therefore underscores the need for adequate access to external finance to boost firms' exports size.

In a related study, Chor & Manova (2012) analyze the relationship between the recent international trade collapse and credit conditions over the period 2006 and 2009. With the aid of US import data, the authors observe that deficiencies in credit supply in source countries were an important conduit through which the crises affected trade volumes.

Similarly, Castellani et al. (in press) investigate the association between export intensity and early-stage financing diversity of startups and established firms. Using data from the Global Entrepreneurship Monitor for over 13,000 firms from 46 countries, the study finds that early-stage financing diversity positively drives export intensity suggesting that access to external credit is critical for increased export levels.

On studies that report no relationship between external credit and exports, Bellone et al. (2010) investigate the effect of financial factors on export intensity of 25,000 French manufacturing firms as part of their study over the period 1993–2005. With the aid of data from *Enquête Annuelle d'Entreprise* and *DIANE* databases, the authors find no evidence of positive association between financial health and firms' export share. The implication of this result is that access to financial resources is insignificant in boosting firm-level exports.

Using data from World Bank Enterprise Surveys over the period 1998–2004, Berman & Héricourt (2010) examine the influence of financial factors on exporting decisions of 5,000 manufacturing firms in 9 developing and emerging countries. Findings from the study confirm that access to finance is not essential in boosting firm-level exports.

Similarly, Stiebale (2011) investigates the link between financial factors and firms' export market entry and level of sales behavior. Using data from *AMADEUS* database over the period 1998–2005 for French manufacturing firms, the author observes that financial factors do not influence foreign trade once all observed and unobserved factors are properly controlled for.

In contributing to the debate, Lancheros and Demirel (2012) study the effect of finance on exporting decisions of service firms in Indian. Using data from *Prowess* database over the period 1999–2007, the study finds no relationship between external finance and exports. The paper recommends that in increasing international trade activity, policy should be directed toward investment in plant size, technology, and productivity since these factors are strongly related to exports rather than financial development.

Also, Wagner (2019) examines the relationship between credit restrictions and exporting activities of small- and medium-sized enterprises in 25 European countries and finds a statistically significant inverse association between more severe problems in access to credit and exporting activities (decision to exports; and exports share). The findings suggest that firms that are financially constrained rather tend to participate in the exports market and also export more.

In a recent study, Manez & Vicente-Chirivella (2020) examine the role of financial constraints in the exporting behavior (export decision; firms starting to export; export intensity; and export persistence) of Spanish manufacturing firms over the period 1992 to 2014. Using different procedures to estimate the financial health of the firms, the study finds that financial health is critical in explaining small- and medium-scale enterprises (SMEs) export decision but same cannot be observed for large firms. The authors also observe that financial health is not vital in large firms' export intensity while this association for SMEs is inconclusive and depends on the financial score used to estimate financial health.

In summary, the empirical work that investigates the influence of external finance on export intensity of firms is inconclusive with little attention on sub-Saharan Africa. Whereas some papers find a positive role of external credit in exports size of firms, others observe no such role. This inconclusiveness of results and dearth of identical studies in sub-Saharan Africa inevitably call for more rigorous empirical work to ascertain the real impact of external credit on exports size from sub-Saharan Africa perspective. The findings of the study have important policy implications for Nigeria and other economies in sub-Saharan Africa, many of which are currently looking for pragmatic ways to boost their exports in order to impel their economic performance.

3. Methodology

3.1. Data

The study uses the 2014 World Bank Enterprise Surveys standardized data on manufacturing firms in Nigeria. It is the most recent survey conducted by the Group (Enterprise Survey team of the World Bank Group) on Nigeria. The paper focuses on access to external finance and exports size and, therefore, extracts data on level of external finance (bank finance; and suppliers and customers credit) the firm uses; their magnitude of export; and other relevant firm-level characteristics. One of the key aims of the Survey is to provide researchers with reliable and comprehensive firm-level data to enable them analyze factors that affect the development of businesses in the developing and emerging world.

The Survey (Enterprise survey) collects data after every 5 to 8 years on member countries and targets over 1,000 firms per country in each survey. It adopts the "Global methodology" which is characterized by consistent method of implementation, uniform universe, a random sampling technique, and a face-to-face interview in its data collection process. Specifically, the surveys use a stratified random sampling procedure to classify all the population units within homogeneous groups (based on location; business sector; and firm size) and adopts a simple random approach to elicit its samples. Survey weights are also employ to deal with differing probabilities of selection over varied strata. As a result, the approach generates representative samples and creates indicators that are credible for member countries. In all, 1,147 manufacturing firms were surveyed in 2014. Out of these, only 375 of them were exporters suggesting that although there are many manufacturing firms in Nigeria, many of them do not export. This study is exclusively on exporters and therefore uses information on all the 375 exporters that were covered in the study. It is important to state that these firms are of different sizes and from different sub-sectors, a characteristic which enables us to have a balance sample of exporting firms.

3.2. Model specification

This study investigates the influence of external finance on the magnitude of firms' export in Nigeria. Specifically, the paper focuses on bank credit since it is the most formal source of external credit to the firm. The empirical model which follows the work of Berman & Héricourt (2010) is specified below:

$$\text{Exportsize}_i = \alpha + \beta_1 \text{ExternalCredit}_i + X_i + \mu_i \quad (1)$$

where $Exportsize_i$ is the dependent variable and represents exports size of firm i , $ExternalCredit_i$ denotes the level of external credit (bank credit; and suppliers and customer credit) used by firm i . X_i represents a vector of control variables for firm i including: firm age, monthly power outages, customs processing time, ownership, labor productivity, and firm size. μ_i is the error term. The definition of the dependent and independent variables are provided in Table 1. Our choice of control variables follows standard trade literature.

It is expected that external credit (bank credit; and suppliers and customer credit) should be significant and positively related to exports size due to the positive role of external finance in enhancing firms' export level. Furthermore, firm age is expected to be negatively associated with exports size signifying that younger firms are more aggressive and thus export more in Nigeria while average monthly power outages is anticipated to have a negative relationship with exports size. Similarly, unwieldy customs processing time is expected to be negatively related to exports size while ownership is likely to be positively associated due to availability of more credit to foreign firms relative to their domestic counterparts. Finally, labor productivity and firm size are expected to be positively associated with export levels in the study signifying that more productive and larger firms export more in Nigeria.

3.3. Estimation technique

This study employs instrumental⁴ variable estimation procedure via two-stage least squares (2SLS) to estimate the model. This method is chosen in the study among the family of least squares because unlike the indirect least squares (ILS) estimation procedure for example, the 2SLS approach is more robust and useable with all types of identified equations (Lopez-Espin et al., 2012). Furthermore, though the three-stage least squares (3SLS) estimation technique is more efficient, it is less preferred in practice relative to the 2SLS approach because the former is computationally more expensive (Belsley, 1988) and also ineffective with small sample sizes. We also use an alternative estimator, limited information maximum likelihood (LIML) for robustness and show the results in Table A1 in the appendix. This estimator performs better than 2SLS when the sample size is not very large and also when the excluded instruments are weak. Thus, the choice of this alternative estimator is justified given the sample size of the study. The study uses STATA version 12 for all data management and estimation purposes.

Table 1. Definition of variables

Variable	Definition
Exports size	Ratio of Exports over total sales multiplied by 100.
Bank credit	Bank finance as a proportion of total financing.
Suppliers and Customer Credit	Credit from suppliers and advances from institutional customers as a proportion of total financing.
Firm age	Number of years the firm has been in business
Monthly power outages	Natural logarithm of average number of monthly power outages.
Customs processing time	Natural logarithm of average number of days it takes to process all paper works with custom officials at the port before goods are exported out of the country.
Ownership	A dummy variable = 1 if firm is foreign own, 0 otherwise. A firm has foreign ownership status if at least 10% of its shareholders are foreign nationals.
Productivity	Natural logarithm of labour productivity and defined as sales over number of employees.
Firm size	Natural logarithm of current value of total asset.
FinStatement	A dummy variable = 1 if firm was audited in the last financial year by external auditors, 0 otherwise.

3.4. Identification issues and post estimation tests

In the empirical model, the study recognizes that bank credit has the possibility of being endogenous to exports size. Specifically, exports size can also determine the quantum of bank credit an exporter can access given the rigidities that often characterize the granting of bank loans. However, it is important to note that the firm's export size is not expected to similarly drive the amount of supplier and customer credit an exporter can access due to the relative flexibility in accessing this type of financing. Consequently, the study instrumented particularly only for bank credit as a way of addressing possible endogeneity issues that may arise in the use of finance in the model. In doing so, the study uses an instrumental variable (IV) which is expected to be relevant (that is, strongly correlated with the endogenous regressor) and valid (that is uncorrelated with the regression error term). Instrument validity also means that the instrument must not be correlated with any unobserved factors that influence the dependent variable. This implies that the instrument must not affect the explained variable directly. However, instrument validity cannot be determined practically when the model of estimation is just-identified⁵ (exactly identified), and in such circumstances validity is proven based on persuasive argument (Cameron & Trivedi, 2009).

In practice, finding an instrument which is both relevant and valid is difficult. In this paper, we use FinStatement (whether the firm's financial statement has been externally audited within the last accounting period) as instrument to control for use of bank finance suggesting that our model is just-identified. The choice of this instrument is premised on the fact that, firms that are externally audited stand a better chance of accessing more bank credit relative to those that are not since it shows a certain level of reliability and trust in their financial statements which are often assessed by banks before granting loans. This implies that our instrument is likely to be highly correlated with our endogenous regressor. It is essential for us to note that in the credit market, the borrower's capacity to repay is the most important factor that influence whether their credit applications will be considered. It is also reasonable to argue that this instrument is not likely to affect firms' exports size directly.

In testing for endogeneity in the study, the regression-based test of exogeneity shown in Table A2 in the Appendix rejects at 10% the null hypothesis that bank credit is exogenous, suggesting that the variable is indeed endogenous. For the instrument's strength, the study compares the F-value in the first-stage regression of the model with Staiger and Stock (1997) rule-of-thumb of F-statistic > 10 being enough to rule out issues of weak instrument. In this study, the F-value is 15.69 and significant at 1% which is > Staiger and Stock's rule-of-thumb of 10 implying that the instrument is strong. Table A3 in the Appendix shows this result.

The study also uses Cragg & Donald (1993) and Stock & Yogo (2005) critical values as a further check on the instrument's strength. The Stock & Yogo (2005) critical values demonstrate "2SLS size of nominal 5% Wald test" and "LIML size of nominal 5% Wald test" at rejection rates of 10%, 15%, 20%, and 25%. Their table also reports "2SLS relative bias" at rejection rates of 5%, 10%, 20%, and 30% under the joint scheme where two instruments are employed. In using this method, concerns about weak instrument can be ignored if the Cragg-Donald F-statistic is > a critical value of any of the schemes at the researcher's choice of rejection rate. In this paper, the Cragg-Donald F-statistic is 47.84 while the "2SLS size of nominal 5% Wald test and "LIML size of nominal 5% Wald test" stands at 16.38 at 10% confirming the earlier test that the instrument is strong. Table A4 in the appendix shows this result.

The study, however, does not test whether the instrument is uncorrelated with the regression error term because the model is exactly identified, and in such a case such a test is impracticable but rather a persuasive argument is resorted to (Cameron & Trivedi, 2009). As a result, the study argues that "whether a firm's financial statement is externally audited" within the last financial year is not correlated with the error term or affects exports size directly. Rather, such a status is used to screen potential loan seekers where firms which were externally audited are given credit to expand their exports since they can repay their loans. It is imperative to note that

Table 2. Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Exports Size	375	39.5580	20.4696	1	100
Bank Credit	375	12.5539	14.2887	0	90
Suppliers and Customer Credit	375	17.8310	17.5514	0	100
Firm Age	320	18.1313	13.8513	1	99
Monthly Power Outages	375	3.0668	0.8987	0	7.6009
Customs Processing Time	375	1.0533	0.7639	0	4.2195
Productivity	375	11.7093	1.6202	6.3969	20.0301
Firm Size	375	11.0930	2.7145	2.3026	25.3284
Dummy Variable:					
Ownership:-	Frequency	Percentage			
Foreign	142	37.87			
Domestic	233	62.13			
Total Obs.	375	100			

Source: Author's computation based on 2014 World Bank's Enterprise Survey Standardized data for Nigeria.

more profitable firms are more likely to self-select themselves to be externally audited and creditors are not unaware of this.

4. Empirical results

4.1. Descriptive statistics

The descriptive summary statistics for the explained and explanatory variables are provided in [Table 2](#). The table shows that close to 38% of exporters are foreign owned with a mean exports size of about 40% and an average age of eighteen (18) years. On average, bank credit represents approximately 13% of total financing of exporting firms and credit from suppliers and advances from customers constitute approximately 18% of total financing. This suggests that exporters in Nigeria use more supplier and customer credit to finance their exporting activities relative to credit from bank sources. The study also employs a correlation matrix to check for the level of multi-collinearity among the independent variables. The result that is provided in [Table 3](#) confirms that multi-collinearity may not be a problem among the covariates.

4.2. Regression results

The study presents the regression results for the influence of external credit (bank credit; and suppliers and customer credit) on exports size in [Table 4](#). Contrary to our expectation, the table shows a negatively significant association between bank credit and exports size suggesting that bank finance is exports reducing. However, it is critical to note that there is an intuitive explanation for this finding in Nigeria, namely, terms of trade and cost of exports in Nigeria.

In exporting, it is important for products to meet certain international standards, particularly in terms of quality, packaging, and labeling. Export products that do not meet these basic but important terms of trade would therefore face rejection in the foreign market. Thus, the American market, the European Union, and Asia which are the major trading partners of Nigeria often turn away a lot of export products from Nigeria and other African countries for not meeting the above requirements. Nwagbara (2019) reports that the Nigerian Investment Promotion Council (NIPC) has identified poor packaging and labeling as the key reasons responsible for the rejection

Table 3. Correlation matrix

	Exports size	Bank Credit	Suppliers and Customer Credit	Firm Age	Monthly Power Outages	Customs Processing Time	Ownership	Productivity	Firm Size
Exports size	1.0000								
Bank Credit	-0.0878	1.0000							
Suppliers and Customer Credit	0.1062	0.1808	1.0000						
Firm Age	-0.1684	0.0204	-0.1599	1.0000					
Monthly Power Outages	-0.1288	-0.1140	-0.0827	0.0450	1.0000				
Customs Processing Time	-0.1775	0.2626	0.0539	0.0839	-0.0487	1.0000			
Ownership	-0.0248	0.2399	0.2282	0.0202	-0.1552	0.0377	1.0000		
Productivity	-0.0212	0.0058	-0.1014	0.1339	0.0479	0.0390	-0.0888	1.0000	
Firm Size	-0.1805	0.0059	-0.1459	0.1291	0.0394	-0.0487	-0.1147	0.0990	1.0000

Source: Author's computation based on 2014 World Bank's Enterprise Survey Standardized data for Nigeria.

Table 4. Effect of external credit on exports size

Variable	2SLS
Constant	68.9010*** (0.000)
Bank Credit	-0.3069** (0.030)
Suppliers and Customer Credit	0.1235* (0.095)
Firm Age	-0.1756** (0.033)
Monthly Power Outages	-3.1894*** (0.000)
Customs Processing Time	-3.8195*** (0.000)
Ownership	-1.4789 (0.345)
Productivity	0.3501 (0.421)
Firm Size	-1.2548*** (0.000)
Test Statistics	
Observation	320
Wald Chi ²	494.75
Prob>Chi ²	0.0000
P-value of regression-based test of endogeneity	0.081

Note: ***, ** and * show 1, 5 and 10 per cent significance levels, respectively. P-values in parentheses are based on robust SEs clustered around sub-sector. The H₀(null hypothesis) of the regression-based test of endogeneity is that the variable is exogenous.

Source: Author's computation based on 2014 World Bank's Enterprise Survey data for Nigeria.

of Nigerian exports in the international market over the years. Specifically, the report note that 30% of Nigerian exports to the United States alone are rejected due to poor packaging and labeling. Similarly, Obinna et al. (2019) relate that the National Agency for Food and Drug Administration and Control (NAFDAC) of Nigeria has also attributed the rejection of over 70% of all Nigerian food exports over the years to the failure of most exporters to pass their products through standard quality checks at home before exporting. The report reveals that in Nigeria most exporters prefer “short cuts” to export their products. Thus, when these products are rejected back to Nigeria, those that are still in good condition end up being sold domestically, a phenomenon which discourages the firms from future exporting and thus tend to concentrate more on domestic production and sales. It is therefore critical to note that, with the prevalence of the above condition, the positive role of external credit (bank credit) in firms' export size cannot be seen.

Another explanation for the significantly negative relationship between exports size and bank credit in Nigeria is the prevalence of high cost of exporting in the country. According to Census and Economic Information Center (CEIC) data in 2020, the cost of exporting a 20-foot container load of export products in Nigeria peaked at USD1564.000 in 2013 and remain same up to 2014 from a record low of USD614.500 in 2005. This amount encompasses all the fees the exporter has to pay in completing all the necessary procedures to export a 20-footer container particularly at the port couple with inland transport. It, however, excludes trade taxes and tariffs. This phenomenal increase in the cost of exporting in Nigeria at the time of the investigation which the study did not control for due to the cross-sectional nature of the data is a disincentive to increased export levels and could push most exporters to focus more on domestic production and sales. In this study, the seemingly smaller number of exporters relative to domestic producers in Nigeria during the period of study as

reveal in the data appears to corroborate this position. Thus, it is important to state that the positive role of bank credit in exports size as espoused by Chaney (2005), Manova (2008), and Manova (2013) among others may not be realized if the cost of exporting is not kept under a reasonable level. Consequently, the finding in this study contradicts the work of Du & Girma (2007) who examine the association between export intensity, bank credit, and FDI for more than 28,000 manufacturing firms in China and note that bank credit is critical in propelling the exports of financially vulnerable firms. Additionally, it also contests the findings of Amiti & Weinstein (2011) who investigate the financial health of banks and export level of Japanese firms and observe that banks' financial health is critical for increased firm-level exports.

In consonance with our a priori expectation, the alternative credit finance variable "suppliers and customer credit" shows a significantly positive relationship with exports size implying that exporters with access to this source of credit export more in Nigeria. This development can be attributed to the sound interpersonal relationship between suppliers and customers (as providers of credit) and the exporting firms in Nigeria. In fact, such relationship helps in reducing the challenges associated with information asymmetry and encourage the creditors to extend such credit on a more flexible terms to exporters, which enables them to relatively survive better. Furthermore, it is important to note that, often, suppliers and customer credit are repaid with the exporters products which are normally produced according to unique specification of these creditors. Thus, this feature of suppliers and customer credit helps significantly in dealing with the continuous rejection of export products produced using bank credit. It is critical to note that due to a much more rigorous check of the product before acceptance by the creditors, exporters are normally more 'cautious' when producing and exporting directly to their suppliers and customers compared to when producing and exporting to the general overseas market using bank credit, which is not normally settled using export products. This result confirms the extension of the "sunk cost hypothesis" of overseas trade that encompasses the exporters' variable trade costs and argues that access to external credit is necessary to mitigate the exporters' marginal and operational costs in order to increase exports level. It also supports prior empirical works including Du & Girma (2007), Amiti & Weinstein (2011), and Chor & Manova (2012) who find that access to external credit by financially susceptible firms is vital in promoting exports.

Firm age has a significantly negative association with exports size signifying that younger firms export more in Nigeria. Furthermore, and in line with our a priori expectation, average monthly power outages has significantly negative relationship with exports size. Similarly and confirming our a priori expectation, unwieldy customs processing time has a significantly negative association with exports. Finally, Table 4 also shows that smaller firms export more in Nigeria relative to their larger counterparts.

5. Conclusion

Using the 2014 World Bank's Enterprise Surveys standardized data for Nigeria and employing 2SLS estimation technique, the study assessed the influence of external credit (bank credit; and suppliers and customer credit) on export size of manufacturing firms in Nigeria. The findings revealed that bank credit has a significantly negative relationship with exports size. This finding is due to the constant rejection of Nigerian exports in the international market as a result of poor quality, packaging, and labeling; coupled with the high cost of exporting in the country. Consequently, these phenomena served as a disincentive to exporting as it compelled most exporters to concentrate more on domestic production and sales rather than exports thereby negating the positive role of external finance in export size.

However, an alternative external credit in the form of "suppliers and customer credit" significantly increased exports size in Nigeria in the study. This development is attributed to the sound interpersonal relationship between this providers of credit and the exporting firms which encourage the former to extend credit to the latter on a more flexible terms. This flexible credit enables exporters to survive better in the international market relative to those who use bank credit, which is more rigid in its accessibility and use. Furthermore, since suppliers and customer credit can be repaid with the exporters products which are often produced according to the unique specification of the creditors, its use largely mitigates

the constant rejection of export products in the foreign market relative to exports produced using bank credit. It is important to note that due to the high level of rigorous check or inspection that is often applied to export products by suppliers and customers as they take direct delivery of their 'special orders' in repayment of their debts, exporters become more 'careful' when producing and exporting to them relative to when producing and exporting to the general international market using bank credit, which is not normally repaid using export products.

The findings have important policy implications for Nigeria. First, government should call for more collaboration among the various agencies responsible for exporting in Nigeria like the Shippers Council; Nigerian Customs Service; Nigeria Export Promotion Council; Standard Organization of Nigeria; National Agency for Food and Drug Administration and Control; among others to promote Nigerian Exports. Specifically, stringent measures should be put in place to ensure that the country's exports meet international standards in terms of quality, packaging and labeling in order to avoid the incessant rejection of the country's exports in the international market. Second, policy should also be directed at reducing the cost of exporting in Nigeria. Third, government should also provide innovative tax incentives⁶ and reliable credit guarantee schemes to encourage suppliers and customers to extend more credit to exporters.

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Notes

1. Dearth of identical studies in sub-Saharan Africa is frequently attributed to unavailability of credible data up until recently.
2. Notably, bank loans and letters of credit
3. The exporters
4. "FinStatement" is used as instrument in this study and it is defined as whether a firm's financial statement has been externally audited in the last financial year.
5. A model is just-identified when the number of excluded instruments is equal to the number of suspected endogenous regressors.
6. A reduction in suppliers' and customers' tax commitments and the provision of reliable credit guarantee schemes should be considered here.

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APPENDIX

Table A1. Effect of external credit on exports size: Alternative model

Variable	LIML
Constant	68.9010*** (0.000)
Bank Credit	-0.3069** (0.030)
Suppliers and Customer Credit	0.1235* (0.095)
Firm Age	-0.1756** (0.033)
Monthly Power Outages	-3.1894*** (0.000)
Customs Processing Time	-3.8195*** (0.000)
Ownership	-1.4789 (0.345)
Productivity	0.3501 (0.421)
Firm Size	-1.2548*** (0.000)
Test Statistics	
Observation	320
Wald Chi ²	494.75
Prob>Chi ²	0.0000

Note: ***, ** and * show 1, 5 and 10 per cent significance levels, respectively. P-values in parentheses are based on robust SEs clustered around sub-sector.

Source: Author’s computation based on 2014 World Bank Enterprise Survey data for Nigeria.

Table A2. Test of endogeneity

H₀: variable is exogenous

Robust regression F(1, 13) = 3.58885 (P = 0.081)

Source: Author's computation based on 2014 World Bank Enterprise Survey Standardized data for Nigeria.

Table A3. First-stage regression summary statistics: Post estimation test (F-test) on the strength of the instrument "FinStatement"

IV	F(1, 13)	Prob > F
FinStatement	15.69	0.0016

Source: Author's computation based on 2014 World Bank Enterprise Survey Standardized data for Nigeria

Table A4. First-stage regression summary statistics: Post estimation test on the strength of the instrument "FinStatement"

Variable	R-Sq.	Adjusted R-Sq.	Partial R-Sq.	F (1,147)	Prob > F
Bank	0.2578	0.2387	0.1333	15.6933	0.0016

Table A4. Cragg–Donald minimum eigenvalue statistic = 47.84

H ₀ = Instruments are weak	Critical values			
	10%	15%	20%	25%
2SLS Size of nominal 5% Wald test	16.38	8.96	6.66	5.53
LIML Size of nominal 5% Wald test	16.38	8.96	6.66	5.53

Source: Author's computation based on 2014 World Bank Enterprise Survey's Standardized data for Nigeria.



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