



Impact of trade credit on international trade in Nigeria.

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Abstract

We analyse the impact of trade credit on international trade in Nigeria. Specifically, we quantify the impact of micro trade credit, measured by account receivables, bank credit and account payables on firms' export and imports. Through the theoretical lens of the partial equilibrium theory, we perform regression analysis on an unbalanced panel of 94 Nigerian listed firms within the period 2005-2012. Results reveal that account receivables are not significant in explaining changes in export, hence they are not major drivers of firms' exports in Nigeria, whereas, firms' imports will increase by 27.1% given one percent increase in account payable of the firm. Based on the empirical findings of this study, we recommend that Nigerian firms should take advantage of trade credit in order to boost their international trade, especially import.

Keywords: Trade credit, account receivables, account payables, bank credit

1.0 Introduction

There is no gainsaying the fact that every trade needs some forms of financing; as finance is often considered the oil of trade (Ready, Roussanov & Ward, 2017). Trade credit is recognized as one of the essential elements of trade finance and has therefore continued to occupy a prime position in the global contemporary international trade literature (Cowton & San-Jose, 2017). The reason for this increased research attention in the concept of trade credit is attributable to three main factors as explained in subsequent paragraphs.

First, financing decision of most firms is often impeded by lack of access to bank credit, hence, trade credit becomes a useful alternative, being an important external source of working capital for a

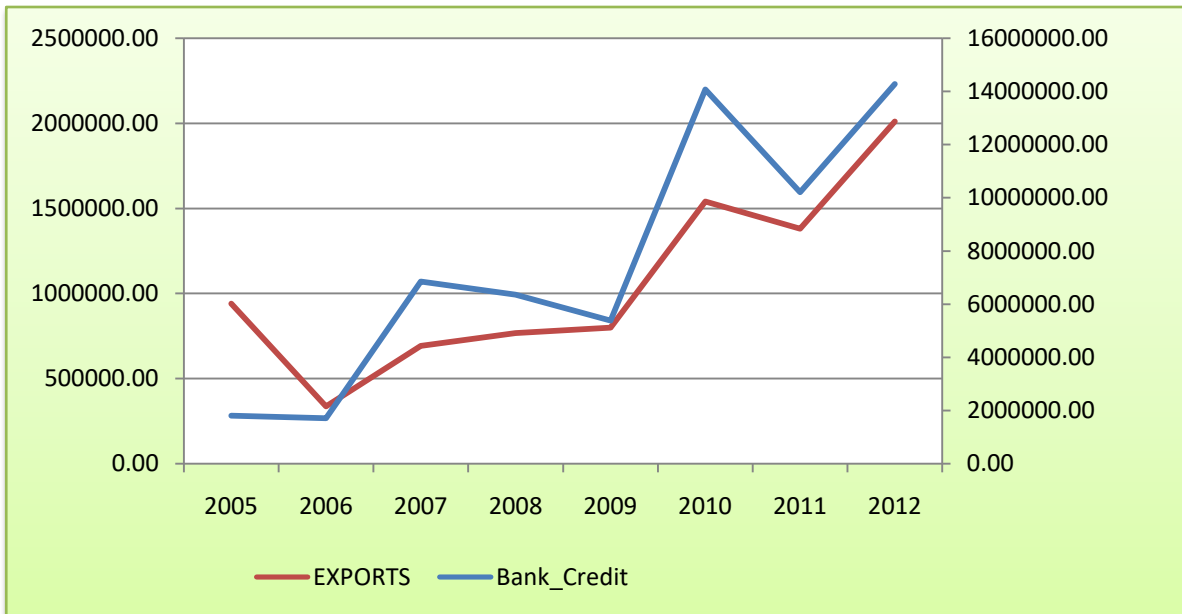


Figure 3: Trend of Export and Bank Credit of Listed Firms (2005-2012)

2.4 Import and Bank Credit of Listed Firms

Figure 4 presents a line chart showing the trend of import and bank credit of listed firms in Nigeria between 2005 and 2012. From the chart, bank credit fell by 5.27% between 2005 and 2006 while imports rose within this period by 19.53%. Between 2006 and 2007, there was a significant increase in both imports and bank credit with bank credit increasing by a higher proportion of 299.19% while imports increased by 149.59%. Between 2007 and 2008, imports fell by 17.93% while bank credit fell by 7.15% and further by 15.54% between 2008 and 2009 just as imports rose by 28.20% between 2008 and 2009. Furthermore, Bank credit increased by 161.62% between 2009 and 2010 while imports rose within this period by 68.22%. Finally, Both imports and bank credit fell between 2010 and 2011 by 15.81% and 27.45% respectively while they jointly rose again between 2011 and 2012 by 28.38% And 39.82% respectively.

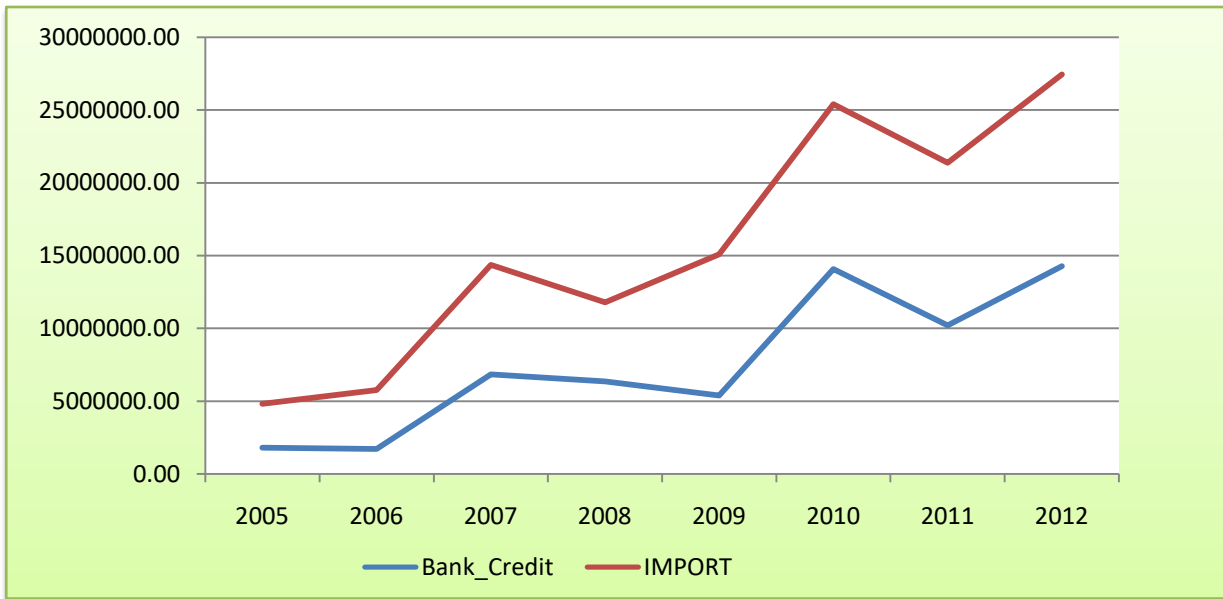


Figure 4: Trend of import and bank credit of listed firms (2005-2012)

3.0 Methods

This analysis involves examining the effect of trade credits on firm-level trade. Trade credit in this respect will be considered in terms of account payables, account receivables and bank borrowings in separate models.

3.1 Models

Model 1: Effect of Account Receivables on Firms' Export

$$Export_{t,j} = \pi_0 + \pi_1 AR_{t,j} + \pi_2 SIZE_{t,j} + \pi_3 EXP_{t,j} + \alpha_{t,j} \dots \dots \dots (1)$$

Where: $Export_{t,j}$ = real exports for firm j at time t

$AR_{t,j}$ = Account receivables

$SIZE_{t,j}$ = Firm size (as indicated by number of employee)

$EXP_{t,j}$ = Firm's Experience (indicated by AGE of firm)

$\alpha_{t,j}$ = Error term

Model 2: Effect of Account payables on Firms' Imports

$$Import_{t,j} = \vartheta_0 + \vartheta_1 AP_{t,j} + \vartheta_2 SIZE_{t,j} + \vartheta_3 EXP_{t,j} + \Omega_{t,j} \dots \dots \dots (2)$$

Where: $Import_{t,j}$ = real imports for firm j at time t

$AP_{t,j}$ = Account payables

$SIZE$ = Firm size (as indicated by number of employee)

EXP= Firm's Experience (indicated by AGE of firm)

$\Omega_{t,j}$ = Error term

Model 3: Effect of Bank Credit on Firms' Export

$$EXport_{t,j} = \phi_0 + \phi_1 BC_{t,j} + \phi_2 SIZE_{t,j} + \phi_3 EXP_{t,j} + \alpha_{t,j} \dots \dots \dots (3)$$

Where: $Export_{t,j}$ = real exports for firm j at time t

$BC_{t,j}$ = Bank credit given to firm j at time t

$SIZE_{t,j}$ = Firm size (as indicated by number of employee)

$EXP_{t,j}$ = Firm's Experience (indicated by AGE of firm)

$\Omega_{t,j}$ = Error term

Model 4: Effect of Bank Credit on Firms' Import

$$Import_{t,j} = \sigma_0 + \sigma_1 BC_{t,j} + \sigma_2 SIZE_{t,j} + \sigma_3 EXP_{t,j} + \Omega_{t,j} \dots \dots \dots (4)$$

Where: $Import_{t,j}$ = real imports for firm j at time t

$BC_{t,j}$ = Bank credit

$SIZE_{t,j}$ = Firm size (as indicated by number of employee)

$EXP_{t,j}$ = Firm's experience (indicated by AGE of firm)

$\Omega_{t,j}$ = Error term

3.2 Estimation techniques

This section presents the data analytical techniques employed in this study. Basically, the study relies on panel data, hence, panel econometrics was employed in its analysis. The preference for this estimation technique is not just because it enables a cross-sectional time series analysis which usually makes provision for broader set of data points, but also because of its ability to control for heterogeneity and endogeneity among panel groups. Panel data estimation allows for the control of individual-specific effects, usually unobservable, which may be correlated with other explanatory variables included in the specification of the relationship between dependent and explanatory variables (Hausman and Taylor, 1981). With additional informative data, one can get more reliable estimates and test more sophisticated behavioral models with less restrictive assumptions (Baltagiet *al.*, 2005). Pooling data across different firms allows for increasing the degrees of freedom on one hand; and offers a better way of comparing the results than running separate regressions.

Another advantage of panel data set is its ability to give more informative data, more variability, less collinearity among the variables, more degrees of freedom and more efficiency. In addition, it is better able to identify and measure effects that are simply not detectable in pure cross-section or pure time-series data (Baltagi *et al.*, 2005).

3.3 Panel Data Estimation Technique

The basic framework for panel data regression takes the form:

$$Y_{it} = \beta X'_{it} + \alpha Z'_i + \varepsilon_{it} \dots \dots \dots (5)$$

In the equation above, the heterogeneity or individual effect is Z'_i which may represent a constant term or a set of observable and unobservable variables (Individual effect). When the individual effect Z'_i contains only a constant term, OLS estimation provides a consistent and efficient estimates of the underlying parameters (Kyereboah-Coleman, 2007); but if Z'_i is un-observable and correlated with X'_{it} , then emerges the need to use other estimation method because OLS will give rise to biased and inconsistent estimates.

Similarly for endogeneity issues, it is generally assumed that the explanatory variables on the right hand side of the regression equation are statistically independent of the disturbance ε_{it} such that the disturbance term ε_{it} is assumed to be uncorrelated with columns of the parameters X'_{it} and Z'_i as stated in equation (5), and has zero mean and constant variance $\sigma^2\eta$ (Hausman and Taylor, 1981). If this assumption is violated, then OLS estimation will yield biased estimates of the underlying parameters of β (Mayston, 2002). This condition is also applicable regardless of the infinite large sample of observations taken during the estimation process, because the OLS estimation will not be a consistent estimator of the true underlying values (Gujarati, 1999).

Hence, endogeneity problems arise when the explanatory variables are correlated with the disturbance term ε_{it} (Mayston, 2002; Hausman and Taylor, 1981). In order to circumvent these problems, panel estimation techniques of fixed and random effects will be adopted in this study, in addition to the traditional pooled regression estimation. The random effect estimator is used if the individual specific component is assumed to be random with respect to the explanatory variables. The fixed effects estimator is used if the individual specific component is not independent with respect to the explanatory variables. Decisions will be made between the fixed and random effect models using the Hausman specification test.

3.4 Partial equilibrium theory

This study is underpinned by the partial equilibrium theory of international trade. Partial equilibrium trade analysis is useful for analyzing the welfare effects of trade policies, unlike the general equilibrium trade analysis which broadly pictures the effect of trade policy on the whole economy.

One very key assumption of the partial equilibrium analysis is zero transportation cost (Koo and Kennedy 2005). Transportation cost includes costs of insurance, handling and freight. Therefore failure to suppress this leads to a price wedge between importing and exporting market prices (Koo and Kennedy 2005). Basically, the assumption of zero transportation cost allows researchers to determine the exact direction of price movements when considering the impact of various policy instruments. In the context of this analysis, the assumption of zero transportation cost is necessary to isolate the effect of trade credit¹ on international trade. By so doing, results obtained will be a typical reflection the fact that price differences among countries are solely due to trade credit and not other instruments of trade finance.

Furthermore, employing the theory of partial equilibrium analysis enables us to calculate the individual elasticities of import and export to trade credit. The same can be extended to each of the control variables especially real exchange rate. The later can be used in testing Marshall-Lerner condition² about how exchange rate adjustments can affect Nigeria's trade balance through changes in the prices of tradeable goods and services.

4.0 Results and discussion

This chapter presents the result of analysis as well as some discussions. It is organized into three broad sections, namely; descriptive analysis, empirical analysis and discussions of results. Each of these sections is further explained below.

¹ By ignoring transportation cost, I can be quite sure that I am examining only the effect of trade credit (not trade credit and something else) on international trade.

² Marshall Lerner condition states that if the sum of the devaluing nation's demand elasticity for imports plus the foreign nation's demand elasticity for export is greater than one, then a devaluation will improve the devaluing nation's trade balance.

Table 1 gives a description of the variables used in this study, particularly the minimum, maximum, mean and standard deviation of each variable employed in subsequent analysis.

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
EXPORTS	273	0	56169000	782105.70	3604892.601
IMPORT	514	0	288453123	11143344.29	26485817.039
Account_Payables	676	3836	113935243	4684366.50	12188048.668
Account_receivables	665	4220	126284746	6012537.72	13793371.202
Bank_Credit	508	174	213665715	4950995.13	15843266.292
Age	684	1	89	41.81	16.524

Source: Computed from companies' annual reports

4.1 Correlation analysis

The Tables2 and Table 3 summarize the results of correlation analyses among the variables. This exercise serves two important purposes. First is to determine whether there are bivariate relationship between each pair of the dependent and independent variables. The second is to ensure that the correlations among the explanatory variables are not so high to the extent of posing multi-collinearity problems.

Table 2 gives a detailed summary of the relationship between key explanatory variables considered in this study. The result shows that there is a positive association between export and account receivable and bank credit. The relationship among the variables is adjudged at 5% and 1% levels of significance. From the result, a positive relationship exists between export and account receivable and export and account payable. These relationships are both statistically significant at the conventional levels of significance.

Table 2: Relationship between export and explanatory variables

	Export	Account_receivables	Bank_Credit	Age
Exports	1			
Account_receivables	0.146*	1		
Bank_Credit	0.188**	0.551**	1	
Age	-0.073	0.037	-0.025	1

*. Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Computed from companies' annual reports

Table 3 gives a summary of the relationship between account payable, bank credit, age of firm and import. The result shows that all independent variables except age of firms are positively correlated

with dependent variable (import). This implies that account payable and bank credit are positively associated to import while age of firms is negatively related to import.

Table 3: Relationship between import and explanatory variables

	Import	Account_Payables	Bank_Credit	Age
Import	1			
Account_Payables	0.779**	1		
Bank_Credit	0.783**	0.800**	1	
Age	-0.036	-0.034	-0.025	1

** Correlation is significant at the 0.01 level (2-tailed).

Source: Computed from companies' annual reports

4.2 Impact of trade credit on export and import

Building on the previous sections, we examine the impact of trade credit on import and export of listed firms in Nigeria from 2005 to 2012. In order to determine this relationship, we estimate the pooled regression assuming that the intercept is equal across companies and years. We also assume different constant for each companies and perform both fixed and random effect regressions. Comparison between fixed and random effect is then carried out by considering the statistical values obtained from the Hausman test.

Table 4 presents the results of regression analysis showing the impact of trade credit on total export. Drawing on the Hausman test value of 20.03 ($P < 0.05$), we reject the null hypothesis that 'there is no correlation between the unique errors and the independent variables'; therefore we conclude that differences in coefficients are statistically significant and that the preferred model is not random effects. Hence, we interpret the Fixed effects model. Considering the fixed effect model, the F-statistics value of 15.46 ($p < 0.05$) indicates that account receivable, age of firms and bank credit jointly affect export. On the other hand, the explanatory variables jointly account for about 21.2% of the variations in export, in the fixed effect regression model.

From the results, age of firms is positively related to export and the relationship is statistically significant at 5% level. This implies that older firms tend to export more products in Nigeria. A unit increase in firm's age will lead to a 0.158 percent increase in export. Conversely, account receivables are not significant in explaining changes in export; hence they are not major drivers of firms export. Meanwhile, bank credit is positively related to export, as one percent increase in bank credit will result in 3.2 percent rise in firm's exports but this result is significant only a 10% level.

Table 4: Impact of trade credit on export

Variables	Pooled	Fixed	Random
ln_ar	0.641 (0.107)	-0.128 (0.193)	0.447 (0.129)
ln_bk	0.05 (0.072)	0.032* (0.061)	0.077 (0.059)
Age	-0.016** (0.01)	0.158** (0.036)	0.022 (0.018)
_cons	2.402 (1.053)	6.149 (1.701)	2.964 (1.393)
Number of Obs	215	215	215
F-Statistics	25.36 (0.0000)	15.46 (0.0000)	40.76 (0.0000)
R-Squared	0.2650	0.2124	0.1458
LM Statistics	89.45 (0.0000)		
Hausman	20.03 (0.0002)		

Note: *, **, *** indicate significance at the 10%, 5% and 1% levels of significance respectively

Source: Computed from companies' annual reports

Table 5 captures the impact of account payables, bank credit and firm's age on import. Based on the Hausman test value of 70.40 (P < 0.05), we reject the null hypothesis that 'the unique errors are not correlated with the independent variables'; therefore we conclude that the preferred model is not random effects. Hence, we interpret the fixed effects model. Considering the fixed effect model, the F-statistics value of 20.62 (p < 0.05) indicates that account payable, age of firms and bank credit jointly affect import. On the other hand, the explanatory variables jointly account for about 18.7% of the variations in import, in the fixed effect regression model. Therefore, results of the fixed effect regression shows that account payable is positively related to import but the relationship is statistically significant only at 10% level. It is however noteworthy that the positive relationship between account payable and import is in line with our *a priori* expectation. Firms import will increase by 27.1% given one percent increase in account payable of the firm. Suffice to say, a positive relationship exists between age of firms and import. This relationship is statistically significant at 5% level. This shows that older firms tend to import more. Similarly, bank credit is positively related to import, as one percent increase in bank credit will lead to 2.3% rise in import and this result is significant at 5%.

Table 5: Impact of trade credit on import

Variables	Pooled	Fixed	Random
ln_ap	1.013* (0.054)	0.271* (0.078)	0.598* (0.064)
ln_bk	0.081** (0.036)	0.023** (0.028)	0.056** (0.028)
Age	0.007 (0.004)	0.07** (0.017)	0.022*** (0.008)
_cons	-1.39 (0.633)	7.44 (0.992)	4.031 (0.882)
Number of Obs	350	350	350
F-Statistics	230.85 (0.0000)	20.62 (0.0000)	139.50 (0.0000)

R-Squaared	0.6668	0.1869	0.1570
LM Statistics	266.77 (0.0000)		
Hausman		70.40 (0.0000)	

Note: *, **, *** indicate significance at the 10%, 5% and 1% levels of significance respectively

Source: Computed from companies' annual reports

5.0 Conclusion

This study quantifies the impact of trade credit on international trade in Nigeria using data drawn from 94 listed firms within the period 2005-2012. Result of the panel regression analysis shows that firm's import will increase by 27.1% given one percent increase in account payable of the firm. Suffice to say, a positive relationship exists between age of firms and import. This relationship is statistically significant at 5% level. This shows that older firms tends to import more. On the contrary, bank credit is not a significant determinant of firms import. Furthermore, account receivable, age of firms and bank credit jointly affect export. A unit increase in firm's age will lead to a 0.158 percent increase in export. Conversely, account payables are not significant in explaining changes in export, hence they are not major drivers of firms export in Nigeria.

Based on the findings from this study, it is recommended that Nigerian firms should utilize more of trade credit to boost their international trade. This is in most cases more preferred than taking bank loans which might be difficult to access due to bureaucratic collateral demands or even diverted when eventually gotten. Firms should also be empowered to stay in business for a long period since older firms tend to export more than new firms. This means that such older firms can take advantage of their age to secure long term credit contracts which will further enhance their production and subsequently exports.

Our study was not without limitations; non-availability of updated data was the most limiting constraint, which explains why our sample frame was taken within the period 2005-2012. Consequently, this research could be enriched by undertaking a survey of the identified firms in order to supplement available secondary data with some primary observations. In this way, trade credit could even be unbundled into sectoral levels across manufacturing, service and agricultural industries to further deepen the analysis.

Conflict of Interest

The authors declare there is no conflict of interest.

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