Original Research Article
Bank credits and their influence on accounts receivable: The case of the forestry products sector in Turkey

Abstract

The leverage of bank credit may result in different consequences on current assets. As the accounting procedures report financial credit in two significant terms, short-term bank credit and long-term bank credit, the study tries to reveal the effect of those liabilities on the level of accounts receivable in the forestry products sub-sector in Turkey. The study examines a set of long-term data including current ratio, cash and cash equivalents ratio, and short-term inventories ratio as control variables to test two different models in which either short or long-term bank credit consequence is predicted. The results confirm that time constraints of bank credits have both significant roles on the level of account receivables. However, the significance is barely higher for the effect of long-term bank credit. Therefore, we conclude that the businesses of the forestry products sector in Turkey should also be sensitive primarily on the level of their long-term bank credit along with the level of short-term bank credit amongst the liabilities in balancing the accumulation of accounts receivable. Thus, businesses of the sector would better consider the level of bank credits in the conditions of risky, non-performing or accumulating account receivables.

Key words: Current assets, accounts receivable, bank credit, forestry products sector, Turkey.

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Introduction

Regardless of scale and industry, all businesses are taking advantage of leverage in their liabilities. However, the distribution in time of the leverage alternatives in terms of bank credit may have various influences on the current assets of a firm. For instance, the leverage of financial credit may result in different consequences on each part of current assets or cash, securities, accounts receivable, and inventories. The accounting procedures report financial credit in two significant terms, either short-term bank credit and/or long-term bank credits.

As the macroeconomic circumstances change, forestry sectors and their products have been among the effective and vulnerable parts of the global economy and in many countries [1,2,3,4] along with Turkey [5,6,7]. The forestry products sector has been assessed as a subsector of agriculture in Turkey. However, the main title of agriculture has created a general point of view in terms of incentives, taxation, and creditors' assessments or policies along with the ease of access to finance. Thus, forestry product sector like every subsector, could have been neglected upon its sector-specific characteristics [8]. We, therefore, decided to reveal the evidence of such a negligence which might be misleading, and which could alter the decisions of financial management and the means of creditors at least.

The aim of the study is to reveal the effect of the above-mentioned liabilities on the level of accounts receivable in the forestry products sub-sector of agriculture in Turkey. To reach this aim, the study examines a set of long-term and aggregate balance sheet data to test two different models which were designed uniquely for the study. The models predict either the short or the long-term bank credit effects. The results confirm that the two constraints in time for bank credits have both significant roles in forecasting the level of account receivables. Nevertheless, the significance has been found barely higher for the influence of long-term bank credit. Thus, the study presents evidence that a primary emphasis should be given on the level of the long-term bank credit before the level of short-term bank credit in balancing the accumulation of account receivable in the businesses of forestry products sector in Turkey.

Materials and Method

We have conducted an identical approach in this study as of Acikgoz et al. [8] where the model predicts inventories by cash and cash equivalents, short-term bank credits and accounts receivable in terms of preparing and analyzing the raw data for the forest products sector in Turkey, therefore some of the series are matching [8]. However, this research adds new series as current ratio and long-term bank credits within two new models.

The study takes the data series into consideration [9,10,11] and follows its below given detailed methodology. Central Bank of Turkey (CBRT) real sector statistics feed the study as the raw data from 1996 to 2017 in three years aggregate balance sheet averages available from 1998 to 2016 [12]. The data is a set of 57 observations for the series considered in terms of six variables or indicators in ratios. For each year the averages are calculated from 1998 to 2016 as the value in 2016 is the average of 2014, 2015, and 2016. CBRT data is classified as a set of NACE Rev. II and forestry products sub-sector is in the title of Sector A (Agriculture Sector).

The analysis informs on the variables and their series of three years aggregate balance sheet averages for a yearly average of 78 firms of all scales in three-year basis for 19 years of the time span (1998-2016) as in Acikgoz et al. [8]. The data of the study is of the forestry (including logging) sector for the time span from 1998 to 2009, and aggregate sectoral data of the sectoral subtitles (excluding furniture, manufacture of wood & wood products, and cork, straw and plaiting materials; paper and paper products; pulp, paper and paperboard; and others as products of wood, cork, straw and plaiting materials) from 2010 to 2016 as they are available in the CBRT real sector statistics or the identical raw data in Acikgoz et al. [8].

Subsequently, we design two models as Model A and Model B to reveal the impact of short-term and long-term bank credits respectively. We run linear regressions for the models, and we conduct statistical tests thereafter. STAR/STL is the dependent variable for both models. The independent variables are CR, C&CER, INV/STL, and STBC/STL for the Model A. Accordingly, the independent variables are CR, C&CER, INV/STL, and LTBC/TA for the Model B. We have added CR, C&CER, and INV/STL as control variables for the liquidity of the firms. All variables are used in percentages.

The abbreviations used for the series or variables are as follows: STAR/STL (Short-Term Accounts Receivable on Short-Term Liabilities); CR (Current Ratio); C&CER (Cash and Cash Equivalents Ratio); INV/STL (Inventories on Short-Term Liabilities); STBC/STL (Short-Term Bank Credit including interest and capital installments for one year of long-term bank credits on Short-Term Liabilities); and LTBC/TA (Long-Term Bank Credit including short-term bank credits with interest and capital installments for one year of long-term bank credits on Total

Assets). The study follows the statistical procedure by reporting significant model summaries and ANOVA results [13,14,15,16,17,18,19]. We ensure the assumptions of the regressive models on serial correlation, heteroscedasticity, and normality with Breusch-Godfrey Serial Correlation LM tests [20,21], Breusch-Pagan-Godfrey heteroscedasticity tests [22,23], and Jarque Bera tests [24,25].

Then, we follow a statistical methodology with unit root tests which report that the variables are stationary at their first differences, co-integration tests, and causalities for which only significant test results are represented along with CUSUM tests for stability [15,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45]. Though study recesses before designing a vector error correction model which could be a further analysis direction as a potential [46,47], unit root tests include group analysis for individual and common root as well [72,73,74,75].

The model equations take into consideration STAR/STL as the dependent variable for each model and the independent variables other than CR, C&CER, and INV/STL are STBC/STL or LTBC/TA. The constants are given as β_0 and the error terms are ε_{it} for the model equations. The equations are given below for Model A and Model B respectively:

Model A, the equation (1):

$$\boldsymbol{Y_{STAR/STL\,it} = \beta_0 + \beta_{1a} x_{CR\,it} + \beta_{2a} x_{C\&CER\,it} + \beta_{3a} x_{INV/STL\,it} + \beta_{4a} x_{STBC/STL\,it} + \varepsilon_{it}} \quad (1)$$

Model B, the equation (2):

$$\boldsymbol{Y_{STAR/STL\,it} = \beta_0 + \beta_{1b} x_{CR\,it} + \beta_{2b} x_{C\&CER\,it} + \beta_{3b} x_{INV/STL\,it} + \beta_{4b} x_{LTBC/TA\,it} + \varepsilon_{it}} \quad (2)$$

Results and Discussion

Ratio analysis of firms has been used to reveal financial health or failure ever since Beaver [48] and Altman [49], meanwhile many studies visited liquidity in this context [50,51,52,53,54] along with the indicators or variables in the recent literature on distress and bankruptcy [55,56,57,58,59,60] and trade credits [61,62] or bank credits [63,64,65] including accounts receivable in a specific sector [66]. However, we have founded a gap therein. The nexus of bank credits used in time and accounts receivable still need or deserve to be explored in detail where the novelty of this study appears. Though non-bank credit sources rather look as if a choice of corporate sectors in long-term investments [65], bank credit usage finances lower scale firms in the first place. In the context of corporate liquidity, lines of credit have a dominant role as well [56].

Liquidity is also among the first step indicators for corporate failures [59]. If there occurs any mismatch between current assets and liabilities, the firm is potentially on the spot for a response to the financial distress [53]. Any risky accumulation of accounts receivable would therefore have the conditions become tougher. Cash flow is listed among the key causes of cash holdings for a firm [60,67,68]. Nevertheless, accounts receivable may create fluctuations in the net cash flow. Cash constrained trade partners may force to release more trade credit towards a retailer as well and the tendency of extending trade credits may also be problematic for the supplier [62] as a result of accumulation in the accounts receivable, thereafter financing turns out to be much in terms of bank credit even for the supplier itself at the end. Bauweraerts [58] suggests a negative correlation between the proportion of accruals in terms of total assets and a probable failure.

However, the medium of financing for the accumulation in accounts receivable remain unrevealed. There the question arises. Do the bank credits have impact on the accounts receivable? The more a firm could find the ability to finance the increasing part of its accounts receivable by bank credit usage, the more it might seek for new bank financing as it releases trade credit for its retailers or customers. The study takes the forest products sector of Turkey into consideration, since external sources of capital are costly, forest products sector used to prefer internal financing in Turkey [5] and financial capital is reported to be amongst the critical success factors for this sector's small and medium sized enterprises [69].

Yet, the findings of this study represent evidence that bank credits have become a source of finance not only for the firms themselves in the forestry products sector in Turkey but also for their accumulating accounts receivable in time. The results of the study also ensure the vital role of supply chain finance and credit risk [70,71] by revealing the nexus of account receivables and bank credit usage in the evidence of forest products sector in Turkey.

Before testing the data in the model equations, we focus on the long-term appearance of bank credits versus accounts receivable. Fig. 1 and Fig. 2 depict the accumulation of account receivables in comparison with the short or long-term bank credits in the time span of the study. The long-term bank credits eventually appear to represent a related flow while short-term bank credits remain relatively steady as compared to the accounts receivable (Fig. 1 and Fig. 2).

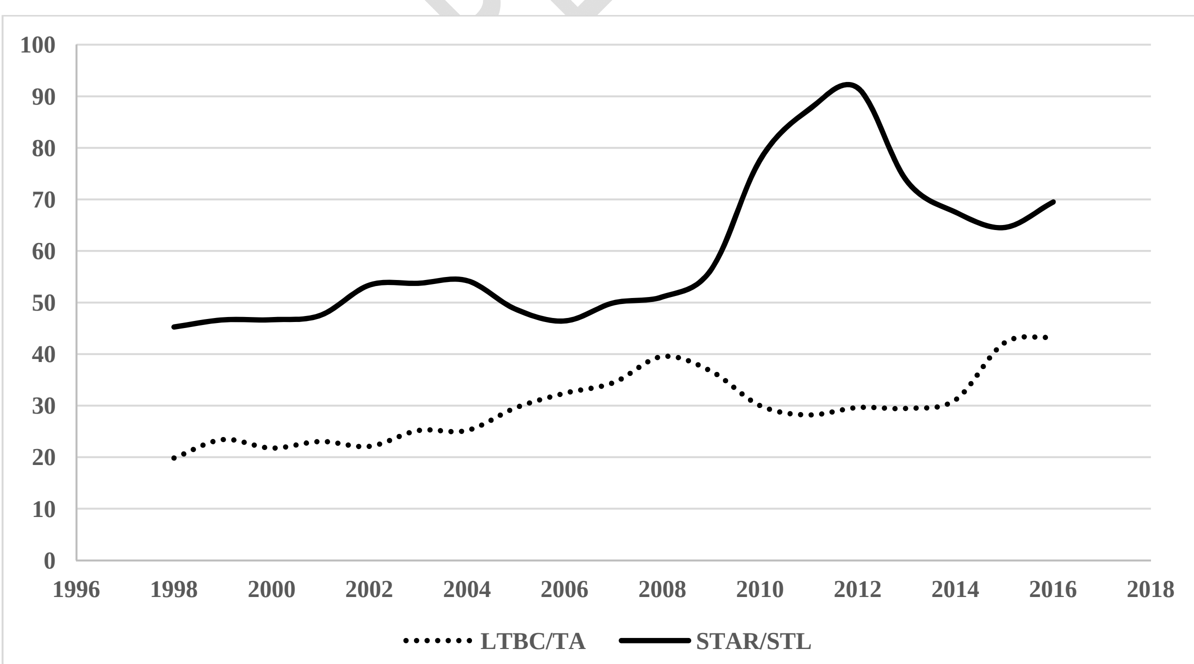

Fig. 1. LTBC/TA and STAR/STL in forestry products sector in Turkey (1998 – 2016)

Source: Calculations on CBRT data, and Acikgoz et al. [8] for STAR/STL.

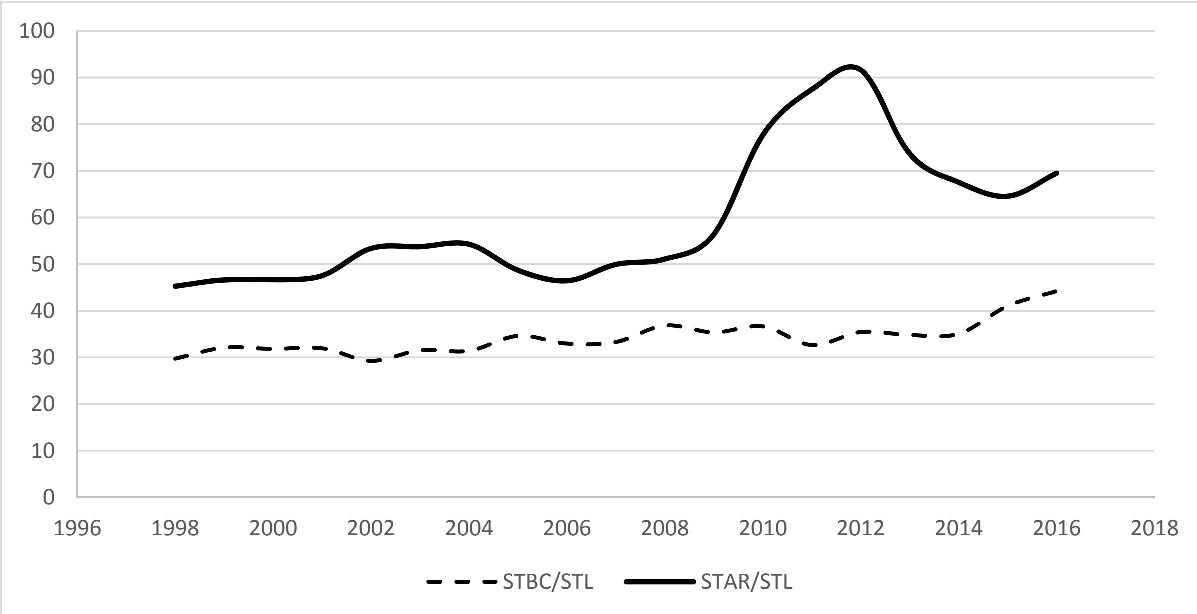

Fig. 2. STBC/STL and STAR/STL in forestry products sector in Turkey (1998 – 2016)
Source: Calculations on CBRT data as in Acikgoz et al. [8] for both series.

In percentages, STBC/STL has already been reported to be at the minimum level as 29.27 percent in 2002 and as 29.73 in 1998 which is very close to the minimum; and at the maximum level as 44.22 in 2016 [8]. Confirming those results, this study also adds minimum LTBC/TA as 19.84 in 1998 and maximum LTBC/TA as 43.28 in 2016. These findings confirm a concurrently rising levels of bank credit usage along the time span from 1998 to 2016 in the forest products sector in Turkey. Accordingly, STAR/STL has identically been found at its minimum as 45.27 in 1998 and at its risky maximum as 91.62 in 2012 with an average of 59.58 percent in 1998-2016 period while the average of STBC/STL is 34.25 [8]. This study also reveals the average for LTBC/TA as 29.84 percent within the same time span. Control variables ensure C&CER 12.69 (minimum, 1998), 37.21 (maximum, 2013), 22.06 (average) and INV/STL 43.34 (minimum, 2009), 55.86 (maximum, 2013), 49.82 percent (average) as Acikgoz et al. [8]. However, the famous liquidity indicator CR has hereby acquired and added in the control variables' set as 109.99 (minimum, 1998), 167.71 (maximum, 2012), and 134.41 percent (average) for the forest products sector. Note that all control variables as well as the dependent variable STAR/STL, excluding INV/STL (2009), are at their minimums in 1998 and at their maximums either in 2012 or 2013.

Table 1 and Table 2 inform on the model summaries. Table 3 and Table 4 represent the ANOVA results for both models respectively. The results which ensure the significance of the equations of the study and their regressions run are given in Table 3 and Table 4.

Table 1. Summaries for the Model A

R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
0,997[a]	0,995	0,994	1,16379	1,556

[a]. Predictors: (Constant), CR, C&CER, INV/STL, and STBC/STL as independents and STAR/STL is the dependent variable for the model.

Table 2. Summaries for the Model B

R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
0,998[a]	0,995	0,994	1,14756	1,541

[a]. Predictors: (Constant), CR, C&CER, INV/STL, and LTBC/TA. STAR/STL is the dependent variable and the independent variables are CR, C&CER, INV/STL, and LTBC/TA for the model.

Table 3. ANOVA results of the Model A

Model's	Sum of Squares	df	Mean Square	F	Sig.
Regression	3746,148	4	936,537	691,470	0,000[a]
Residual	18,962	14	1,354		
Total	3765,110	18			

[a]. Predictors: (Constant), CR, C&CER, INV/STL, and STBC/STL. STAR/STL is the dependent variable and the independent variables are CR, C&CER, INV/STL, and STBC/STL for the model. **. Significant at the 0.01 level.

Table 4. ANOVA results of the Model B

Model's	Sum of Squares	df	Mean Square	F	Sig.
Regression	3746,674	4	936,668	711,276	0,000[a]
Residual	18,436	14	1,317		
Total	3765,110	18			

[a]. Predictors: (Constant), CR, C&CER, INV/STL, and LTBC/TA. STAR/STL is the dependent variable and the independent variables are CR, C&CER, INV/STL, and LTBC/TA for the model. **. Significant at the 0.01 level.

Table 5. Coefficients of the Model A

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	*t*	Sig.	Tolerance	VIF
(Constant)	-31,798	6,657		-4,776	0,000		
CR	1,105	0,032	1,441	34,428	0,000	0,205	4,869
C&CER	-1,067	0,058	-0,523	-18,278	0,000	0,439	2,276
INV/STL	-0,907	0,145	-0,253	-6,270	0,000	0,220	4,540
STBC/STL	0,339	0,106	0,086	3,191	0,007	0,493	2,029

57 observations for 19 years as three years' averages. VIFs and tolerances are between 0-5. STAR/STL is the dependent variable for the model, the independent variables are CR, C&CER, INV/STL, and STBC/STL for the model.

Table 6. Coefficients of the Model B

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	*t*	Sig.	Tolerance	VIF
(Constant)	-25,316	4,991		-5,073	0,000		
CR	1,122	0,029	1,463	38,699	0,000	0,245	4,085
C&CER	-1,057	0,057	-0,518	-18,684	0,000	0,455	2,198
INV/STL	-0,951	0,133	-0,266	-7,137	0,000	0,252	3,965
LTBC/TA	0,163	0,049	0,078	3,297	0,005	0,624	1,602

57 observations for 19 years as three years' averages. VIFs and tolerances are between 0-5. STAR/STL is the dependent variable for the model, the independent variables are CR, C&CER, INV/STL, and LTBC/TA for the model.

Nevertheless, Table 5 and Table 6 summarize the coefficients of these regressions along with significant betas for all the independent variables including both bank credit terms. The INV/STL and C&CER both have negative coefficients which informs their inverse correlations for both models (Table 5 and Table 6). Table 7 and Table 8 confirm zero mean values for residuals with Table 9 and Table 10 ensuring collinearity diagnostics and assuring the assumptions for the Model A and Model B respectively.

Table 7. Residuals statistics for the Model A

	Minimum	Maximum	Mean	Std. Deviation
Predicted Value	45,0521	92,5367	59,5813	14,42634
Residual	-1,75405	1,59332	0,00000	1,02637
Std. Predicted Value	-1,007	2,284	0,000	1,000
Std. Residual	-1,507	1,369	0,000	0,882

STAR/STL is the dependent variable for the model. The independent variables are CR, C&CER, INV/STL, and STBC/STL for the model.

Table 8. Residuals statistics for the Model B

	Minimum	Maximum	Mean	Std. Deviation
Predicted Value	44,5231	92,4125	59,5813	14,42735
Residual	-2,08089	2,12231	0,00000	1,01205
Std. Predicted Value	-1,044	2,276	0,000	1,000
Std. Residual	-1,813	1,849	0,000	0,882

STAR/STL is the dependent variable for the model. The independent variables are CR, C&CER, INV/STL, and LTBC/TA for the model.

The fundamental assumptions of the regressive models on serial correlation, heteroscedasticity, and normality have certifying results (Table 11 and Table 12). Nonetheless, we decided to explore stability diagnostics by conducting CUSUM tests for the models. Fig. 3 and Fig. 4 ensure that there is no structural change within the time span for each model respectively.

Table 9. Collinearity diagnostics of the Model A

			Variance Proportions				
Dimension	Eigenvalue	Condition Index	(Constant)	CR	C&CER	INV/STL	STBC/STL
1	4,926	1,000	0,00	0,00	0,00	0,00	0,00
2	0,058	9,244	0,00	0,00	0,51	0,00	0,01
3	0,011	21,594	0,00	0,05	0,05	0,03	0,30
4	0,005	30,824	0,09	0,40	0,34	0,02	0,06
5	0,001	86,793	0,91	0,55	0,10	0,95	0,63

The study uses 57 observations for each variable in 19 years of time span. Condition index is below 20 up to the third dimension. STAR/STL is the dependent variable and the independent variables are CR, C&CER, INV/STL, and STBC/STL for the model.

Table 10. Collinearity diagnostics of the Model B

			Variance Proportions				
Dimension	Eigenvalue	Condition Index	(Constant)	CR	C&CER	INV/STL	LTBC/TA
1	4,897	1,000	0,00	0,00	0,00	0,00	0,00
2	0,059	9,112	0,00	0,00	0,47	0,00	0,11
3	0,038	11,382	0,01	0,01	0,07	0,01	0,46
4	0,006	29,575	0,15	0,51	0,41	0,00	0,01
5	0,001	71,986	0,84	0,48	0,05	0,99	0,41

The study uses 57 observations for each variable in 19 years of time span. Condition index is below 20 up to the third dimension. STAR/STL is the dependent variable and the independent variables are CR, C&CER, INV/STL, and LTBC/TA for the model.

We then follow with cointegration rank tests at the unrestricted constraints for both models. Before testing the cointegration, we further analyzed the models by determining that the series are fed by stationary data. For this aim ADF tests are conducted and the results affirm that the series are I(1) or they are stationary at their first differences (Table 13) along with group unit root tests (Table 14).

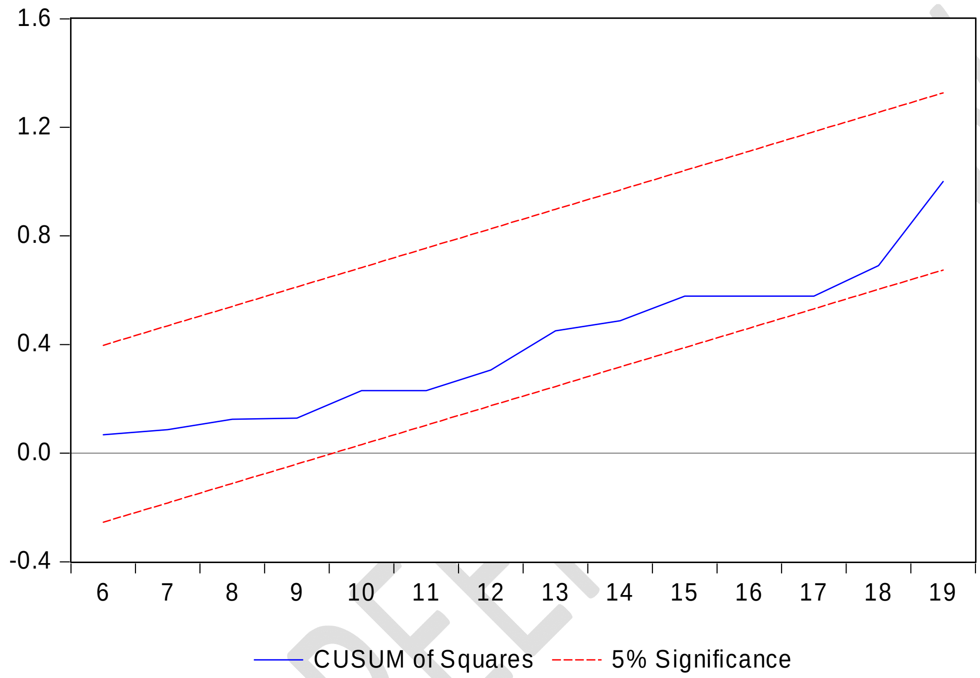

Fig. 3. CUSUM test for the Model A

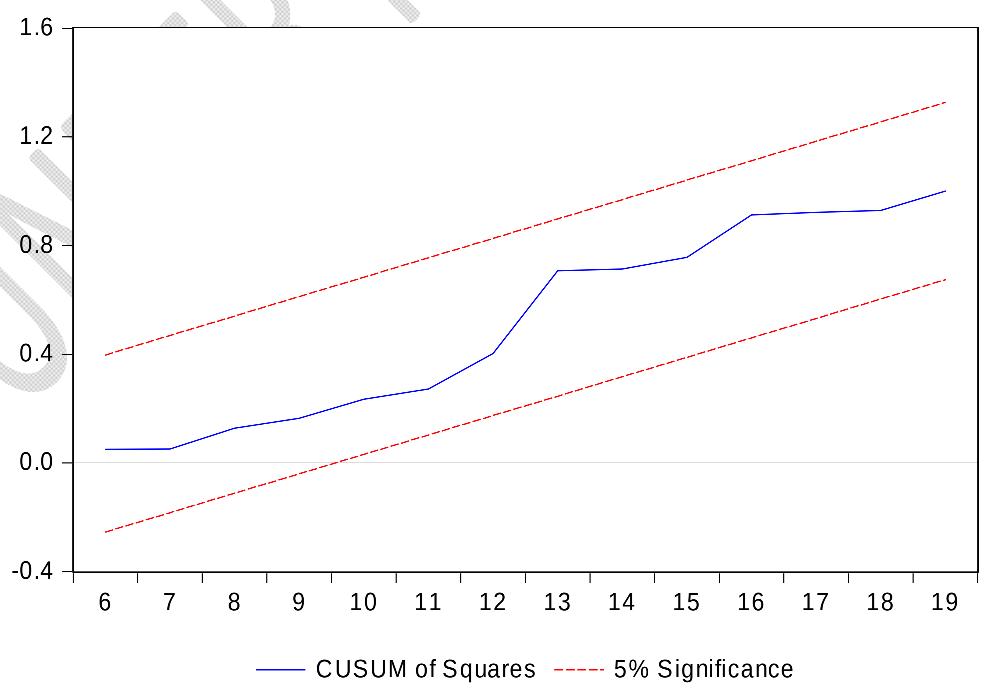

Fig. 4. CUSUM test for the Model B

Table 11. Tests confirming assumptions of the regression for the Model A

Test	Prob. *
Breusch-Godfrey Serial Correlation LM Test: Obs*R-squared Prob. Chi-Square (2)	0.6775
Breusch-Pagan-Godfrey Heteroscedasticity Test: Obs*R-squared Prob. Chi-Square (4)	0.8092
Jarque Bera Test: Prob.	0.4219

All tests assure that there is no serial correlation, no heteroscedasticity, and normality for the model as p values > 0.05 [20,21,22,23,24,25].

Table 12. Tests confirming assumptions of the regression for the Model B

Test	Prob. *
Breusch-Godfrey Serial Correlation LM Test: Obs*R-squared Prob. Chi-Square (2)	0.2316
Breusch-Pagan-Godfrey Heteroscedasticity Test: Obs*R-squared Prob. Chi-Square (4)	0.2877
Jarque Bera Test: Prob.	0.9314

All tests assure that there is no serial correlation, no heteroscedasticity, and normality for the model as p values > 0.05 [20,21,22,23,24,25].

The cointegration tests have significantly assure that there are cointegrating equations among the variables of the models. We revealed that it might be written at most four cointegrating equations by using the variables of the models respectively (Table 15 and Table 16).

We finally checked the pairwise causalities by the Granger tests [26] and we have reached many causalities between the variables including the ones of STAR/STL, STBC/STL and LTBC/TA. The liquidity indicators or the control variables of the models as CR, C&CER, and INV/STL have expectedly been ranked significant in any directions. Ensuring the reliability of the model, the results of the Granger causalities have much more extended the findings of Acikgoz et al. [8] in terms of matching series which are INV/STL, C&CER, STBC/STL, and STAR/STL. However, not only STBC but also LTBC or both variables of bank credits do have impact within the group of variables ensuring short-term reliability and robustness for the models of this study which significantly represent the impact of bank credits as being either a cause for STAR/STL or as an affected variable. The results depict that there are two significant two-way Granger causalities which are among STAR/STL and CR with CR and STAR/STL in both ways; and C&CER and CR with CR and C&CER in both ways among all causalities. These findings affirm the everlasting importance of CR or current ratio in liquidity and credit usage. Note that Model B has much causalities by itself (Table 17).

Table 13. ADF tests for series at the level and first differences

Series	Level		First differences	
	t-Statistic	**Prob. ***	**t-Statistic**	**Prob. ***
STAR/STL	0.418312	0.7932	-2.594472	**0.0129**
CR	0.585786	0.8333	-2.758571	**0.0089**
C&CER	0.213656	0.7367	-3.792793	**0.0008**
INV/STL	0.037204	0.6817	-3.733902	**0.0009**
STBC/STL	1.328466	0.9472	-4.602953	**0.0001**
LTBC/TA	1.263232	0.9409	-3.251745	**0.0029**

ADF (Augmented Dickey Fuller) test results. Null Hypothesis: Series has a unit root. Exogenous: None. Lag Length: 0 (Automatic-based on SIC, maxlag=3). *MacKinnon [37] one-sided p-values. Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 17. At the level critical values are: 1% level (-2.699769) ; 5% level (-1.961409) ; 10% level (-1.606610) respectively. At the level of first differences critical values are: 1% level (-2.708094) ; 5% level (-1.962813) ; 10% level (-1.606129) respectively.

Table 14. Group unit root tests for the first differences

Group	Method	Statistic	Prob.**	Cross-sections	Obs
None	Null: Unit root (common)				
	Levin, Lin and Chu t	-8.12651	0.0000	6	102
	Null: Unit root (individual)				
	ADF - Fisher Chi-square	76.4785	0.0000	6	102
	PP - Fisher Chi-square	76.4304	0.0000	6	102
Individual intercept	Null: Unit root (common)				
	Levin, Lin and Chu t	-5.34509	0.0000	6	102
	Null: Unit root (individual)				
	Im, Pesaran and Shin W-stat	-5.11681	0.0000	6	102
	ADF - Fisher Chi-square	46.3714	0.0000	6	102
	PP - Fisher Chi-square	46.3286	0.0000	6	102
Individual intercept and trend	Null: Unit root (common)				
	Levin, Lin and Chu t	-4.71723	0.0000	6	100
	Breitung t-stat	-4.73417	0.0000	6	94
	Null: Unit root (individual)				
	Im, Pesaran and Shin W-stat	-3.96219	0.0000	6	100
	ADF - Fisher Chi-square	34.9743	0.0005	6	100
	PP - Fisher Chi-square	32.8517	0.0010	6	102

Group: STAR/STL, CR, C&CER, INV/STL, STBC/STL, and LTBC/TA ** Fisher tests use an asymptotic Chi-square distribution, other tests assume asymptotic normality [15,32,33,34,35]. Sample: 1998-2016. Exogenous variables: None, Individual effects, and individual linear trends respectively. Maximum lag. Automatic selection of lag length based on SIC: 0 to 2 with the selection of Newey-West automatic bandwidth and with kernel at Bartlett [42,72,73,74,75].

Table 15. Unrestricted cointegration rank tests in the Model A for the group of the series

Hyp. No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.993526	161.9389	69.81889	0.0000
At most 1 *	0.894105	76.25955	47.85613	0.0000
At most 2 *	0.786396	38.08928	29.79707	0.0044
At most 3	0.302015	11.84752	15.49471	0.1644
At most 4 *	0.286345	5.735040	3.841466	0.0166
Hyp. No. of CE(s)	**Eigenvalue**	**Max-Eigen Statistic**	**0.05 Critical Value**	**Prob.****
None *	0.993526	85.67930	33.87687	0.0000
At most 1 *	0.894105	38.17027	27.58434	0.0015
At most 2 *	0.786396	26.24177	21.13162	0.0087
At most 3	0.302015	6.112477	14.26460	0.5988
At most 4 *	0.286345	5.735040	3.841466	0.0166

Group: STAR/STL, CR, C&CER, INV/STL, and STBC/STL. Unrestricted Cointegration Rank Test: Trace and Maximum Eigenvalue [30,31,36]. Sample: Adjusted from 2000 to 2016. Included observations (after adjustments): 17. Trend assumption: Linear deterministic trend. Lags interval (in first differences): 1 to 1. * rejection at the 0.05 level. **MacKinnon-Haug-Michelis [38] p-values. Both Trace and Max-eigenvalue tests indicate 3 cointegrating equations at the 0.05 level.

These results are consistent with one-way Granger causalities for the series which were presented in Acikgoz et al. [8] where no two-way causalities could be determined for a different model which predicts short-term inventories by cash and cash equivalents, short-term bank credits, and accounts receivable in the short-term, and all matching and identical causalities are with Model A in which STBC is only considered.

Table 16. Unrestricted cointegration rank tests in the Model B for the group of the series

Hyp. No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.977205	132.3380	69.81889	0.0000
At most 1 *	0.868532	68.05728	47.85613	0.0002
At most 2 *	0.561627	33.56448	29.79707	0.0176
At most 3 *	0.487098	19.54482	15.49471	0.0116
At most 4 *	0.382469	8.194437	3.841466	0.0042
Hyp. No. of CE(s)	**Eigenvalue**	**Max-Eigen Statistic**	**0.05 Critical Value**	**Prob.****
None *	0.977205	64.28073	33.87687	0.0000
At most 1 *	0.868532	34.49280	27.58434	0.0055
At most 2	0.561627	14.01966	21.13162	0.3634
At most 3	0.487098	11.35039	14.26460	0.1375
At most 4 *	0.382469	8.194437	3.841466	0.0042

Group: STAR/STL, CR, C&CER, INV/STL, and LTBC/TA. Unrestricted Cointegration Rank Test: Trace and Maximum Eigenvalue [30,31,36]. Sample: Adjusted from 2000 to 2016. Included observations (after adjustments): 17. Trend assumption: Linear deterministic trend. Lags interval (in first differences): 1 to 1. * rejection at the 0.05 level. **MacKinnon-Haug-Michelis [38] p-values. Trace test indicates 5 cointegrating equations, however Max-eigenvalue tests indicate 2 cointegrating equations at the 0.05 level.

Table 17. Significant results of Model A and B in pairwise Granger causalities

Model	Lag	Null Hypothesis:	Obs.	F-Statistic	Prob.
A, B	1	CR does not Granger Cause STAR/STL	18	6.18525	0.0251
A, B	1	STAR/STL does not Granger Cause CR	18	15.6258	0.0013
A, [8]	1	STAR/STL does not Granger Cause C&CER	18	9.38310	0.0079
A, [8]	1	INV/STL does not Granger Cause STAR/STL	18	7.98634	0.0128
A, B	1	C&CER does not Granger Cause CR	18	6.80568	0.0198
A, B	1	CR does not Granger Cause C&CER	18	10.4682	0.0055
A, B	1	INV/STL does not Granger Cause CR	18	6.60646	0.0213
B	1	C&CER does not Granger Cause LTBC/TA	18	9.45548	0.0077
B	1	INV/STL does not Granger Cause LTBC/TA	18	4.94124	0.0420
A, B	2	STAR/STL does not Granger Cause CR	17	4.95151	0.0270
A, [8]	2	STAR/STL does not Granger Cause C&CER	17	4.90193	0.0278
A, [8]	2	STBC/STL does not Granger Cause STAR/STL	17	11.8486	0.0014
A, B	2	CR does not Granger Cause C&CER	17	5.10881	0.0248
A, B	2	INV/STL does not Granger Cause CR	17	6.56433	0.0119
A, [8]	2	C&CER does not Granger Cause STBC/STL	17	5.53551	0.0198
B	2	LTBC/TA does not Granger Cause STAR/STL	17	4.86204	0.0284
B	2	C&CER does not Granger Cause LTBC/TA	17	11.3006	0.0017
B	2	INV/STL does not Granger Cause LTBC/TA	17	5.32290	0.0221
A, [8]	3	STBC/STL does not Granger Cause STAR/STL	16	7.31097	0.0087
A, B	3	INV/STL does not Granger Cause CR	16	4.89157	0.0276
A, [8]	3	C&CER does not Granger Cause STBC/STL	16	4.54038	0.0335
B	3	C&CER does not Granger Cause LTBC/TA	16	5.08952	0.0248
A, B	4	INV/STL does not Granger Cause CR	15	5.47651	0.0333
A, [8]	4	C&CER does not Granger Cause STBC/STL	15	5.32004	0.0355
B	4	C&CER does not Granger Cause LTBC/TA	15	5.89892	0.0283
B	5	C&CER does not Granger Cause LTBC/TA	14	11.3842	0.0363

Significant results only which reject the null hypothesis for pairwise Granger causality tests and does confirm causality [26] for the group of the series in Model A and B at lag 1 to 5 at 0.01 and 0.05 levels for the sample 1998-2016. A: Model A, refers to a causality found in Model A. B: Model B, refers to a causality found in Model B. [8]: Identically matching results of Acikgoz et al. [8].

Three cointegrating equations are revealed in Model A. However, Model B presents a new variable LTBC/TA which has a role in eight different and significant causalities along with five cointegrating equations in this study. Therefore, the models are also valid in longer time periods than the time span of the study (Table 15, Table 16, and Table 17).

Conclusion

The advantage of leverage in the liabilities may depend on the distribution in time of the alternatives in terms of both short and long run bank credits held in a firm. In this context, the main result of the study is that the financial credit does have influences on the accounts receivable of the businesses in sector specific conditions. The study reveals the effect of the liabilities in terms of bank credit on the level of accounts receivable in the forestry products sub-sector of agriculture in Turkey after examining a set of long-term and aggregate balance sheet data and testing two different designs of models which aim to predict either the short or the long-term bank credit effects.

Finally, we may confirm that bank credits in time constraints have significant roles in forecasting the level of account receivables. Nevertheless, the significance is just higher for the influence of long-term bank credit. The study offers evidence that a primary emphasis should be given on the level of the long-term bank credit rather than the level of short-term bank credit in balancing the accumulation of accounts receivable in the businesses of the forestry products sector in Turkey. As financial credit held is reported in two different terms, short-term bank credit and/or long-term bank credits, the study explores their significant influences on accounts receivable via liquidity.

For a firm operating in forestry products sector, it is found worth considering the accumulation of accounts receivable and by which financing decisions it would have been altered. Furthermore, marketing strategies, which are to consist of the main factors affecting the accumulation of accounts receivable, should rather consider the vital role of bank credit usage thereunto. The results of the study present a new and novel aspect to the potential policy implications, which should be considered as related to the level of the accounts receivable, for the sector specific or public incentives on credit and taxation. Nevertheless, the decisions would also favor from these results as the financial management of the firms in forestry products sector reconsiders on the due time, on the quantity, and on the quality of the accounts receivable for which they would have been accrued in time. Though the long-term evidence, the study has also some limitations related to the local and aggregate data in averages for ratio analysis and the assumptions of its methodology used.

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