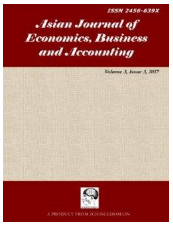

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Misleading Aggregate Considerations in Sector-Specific Causalities: Long-term Bank Credit Usage in Fishing vs. Agriculture in Turkey

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

As an alternative source of financing the assets, bank credits have ever been on the spot of business finance and financial analysis. Those sources of financing have mostly compared with the short-term appearance of either liabilities or liquidity. The relevant finance literature ensures that the long-term appearance of bank credits in the balance sheets of businesses is not only affected by the composition of short-term liabilities but also the liquidity. Nevertheless, bank credit usage, especially in the long-term, may have different characteristics amongst sectors. Some sectors may even deserve a thorough analysis in their challenge of bank credit finance. The fishing sector and the businesses which it contains may have been neglected in terms of revealing the causalities which might have been hidden by considering its aspects as a supplement in the aggregate figures of the agriculture sector in Turkey. Thus, this study aims at the core debt and liability variables along with a liquidity control variable, cash and cash equivalents or cash, to reveal the causality and cointegration aspects on the long-term bank credit potential in the nexus of these two inter-related sectors. We hereby compare the results of the model designed for the study in between fishing and agriculture sectors in Turkey for the time span of available and comparable data which

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has been represented by the Central Bank of Turkey as a part of nonfinancial or real sector data from 1996 up to 2009. The findings depict that fishing sector, unlikely to agriculture sector in which it is generally added and forced to share the same investment atmosphere of incentives, policy implications, and attitudes of the creditors, does have different features in terms of long-term bank credit usage. Cash and cash equivalents are not significant regressors for the agriculture sector, however, fishing sector has evidence in the long-run that cash and cash equivalents have noteworthy impact in the long-term bank credits. The results of the study will therefore help both the decisions on the creditors' and fishing sector sides enriching the profound details and sector specific reasoning for which an aggregate point of view where fishing sector is seen as a part of agriculture sector could not reflect the sector's characteristics on the path to develop the fishing sector and the businesses therein. We also believe that this study will present evidence for any policies and incentives in promoting new investments in the fishing sector of Turkey.

Keywords: Financial analysis; fishing sector; agriculture sector; bank credit; cash.

JEL classification: G20, G30, G40, M40.

1. INTRODUCTION

Many people across the world still rely on fisheries and their production not only for their livelihood but also for the employment reasons and as enterprises. As a part of the economic activity, fisheries and fishing sector increasingly benefit from aquaculture; however, capture, fish and shellfish farming have been rather steady while overall production of fishing or fisheries in the world rises [1,2,3].

The relevant literature contains either a general economic analysis on fishing sector [4,5,6] or on a set of selected leading firms for a supplement within the sector [7] or with a national or regional perspective [8,9] or focusing only on the aquaculture support [1]. Yet, a profound appraisal of the sector's financial appearance remains unrevealed.

Sector specific loans for agriculture including forestry and fishing in Turkey has risen by 4 times from 2009 to 2016, circa 0.7 billion, 11.5 billion, and 56.9 billion TRL in 1996, 2009, and 2016 respectively where the percentage change had been 15 times from 1996 to 2009. The data queries reflect that sector specific loans for overall maritime activities, where fishing barely has a very limited niche, has only risen by 4 times from 1996 to 2016, circa 0.005 billion, 0.006 billion, and 0.020 billion TRL in 1996, 2009, and 2016 respectively, however the increase had been only 20% in between the years 1996-2009 [10].

Nevertheless, the production in capture fisheries is decreasing as 520, 464, and 335 metric tons in 1996, 2009, and 2016 respectively. Tough the increasing aquaculture production support as 33, 160, 250 metric tons, the total production remains steady as 553, 624, 585 metric tons in 1996, 2009, and 2016 respectively in Turkey. Note that the study uses a time span from 1996 to 2009, and the last comparable data is available for the year 2016. Like other sectors of Turkish economy, the fishing sector has also lived macroeconomic constraints in terms of inflation, interest rates, costs, and pricing challenges as well. Therefore, financing has become more and more crucial [3,11].

The financing decision on the assets always considers long-term bank credit as an alternative. Therefore, bank credits have ever been on the spot of business finance. Financial analysis to explore the causes here and beyond deserves further considerations. Each source of financing could be assessed by other alternatives such as the ones of the short-run. However, all liabilities will be paid in the future and the required power comes with liquidity. The relevant finance literature investigates the long-term appearance of bank credits in the balance sheets, however not for all sectors or subsectors. The accumulation in terms of bank credit is not only a function of the alignment of short-term liabilities but it also refers to the liquidity level for any firm of any scale. The long-term usage level of bank credit usage may have diverse characteristics amongst sectors. Some sectors may therefore need a thorough analysis. This study evaluates the fishing sector and the businesses in Turkey with an equivalent appraisal of the causalities which might have been hidden. The fishing sector or any subsidiary sector might have been neglected in the considerations because of being a supplement in the aggregate figures of an upper category. This aggregate category is the agriculture sector in Turkey here.

This study aims to reveal the impact of the core debt and liability variables along with a liquidity control variable, cash and cash equivalents, to reveal the causality and cointegration dependence on the long-term bank credit potential.

The study takes into consideration the possibility of any misleading aggregate considerations in sector-specific causalities as well. Therefore, we have decided to compare the level of long-term bank credit usage and the causalities thereunto between the fishing and the agriculture in Turkey in the long-run. Since the fishing sector is seen as a part of the agriculture sector. We assessed the comparison with the data available for these sectors. To reveal the nexus of these two inter-related sectors, we design a model we evaluate the model for the available and comparable data which has been represented by the Central Bank of Turkey as a part of nonfinancial or real sector data from 1996 up to 2009.

The findings illustrate that fishing sector, which is generally added and forced to share the same investment atmosphere in terms of incentives, policy implications, and attitudes of the creditors, does have different features in the long-term bank credit usage.

The most significant result of the comparison depicts that cash and cash equivalents are not significant regressors for the agriculture sector, however, there is substantial evidence in the long-run that cash and cash equivalents have noteworthy impact.

We confirm that the evidence represented in the study will aid both the decisions on the creditors' and sector's sides enriching the profound details and sector specific reasoning for which an aggregate point of view, where fishing sector is seen as a part of agriculture sector, could not imitate the characteristics on the path to develop the fishing sector and the businesses therein. We also believe that this study will present evidence for any policies and incentives in promoting new investments in the fishing sector of Turkey.

The variables selected for the study are long-term bank credits on total assets, short-term bank credits on short-term liabilities, cash and cash equivalents on short-term liabilities, total debts on total assets, and short-term liabilities on total liabilities.

2. MATERIALS AND METHODS

The abbreviations for the variables which are all taken in percentages of their denominators are given below:

LTBC/TA	:	Long Term Bank Credit to Total Assets Ratio
STBC/STL	:	Short Term Bank Credit to Short Term Liabilities Ratio
C&CER	:	Cash and Cash Equivalents Ratio
TD/TA	:	Total Debt / Total Assets
STL/TL	:	Short Term Liabilities to Total Liabilities Ratio

We then design a model equation for each of the sectors. We appraised the results of the tests for the fishing sector as the Model X in the study, and similarly for the agriculture sector we retested the equation for the Model Y. Therefore, a common model equation is designed for both models (Model X which refers to the fishing sector and Model Y to the agriculture sector):

$$Y_{LTBC/TA\,it} = \beta_0 + \beta_1 x_{STBC/STL\,it} + \beta_2 x_{C\&CER\,it} + \beta_3 x_{TD/TA\,it} + \beta_4 x_{STL/TL\,it} + \varepsilon_{it}$$

We have used the Central Bank of Turkey (CBRT) data for the study. CBRT is using NACE II Rev. 2 codes and titles in terms of statistical classification of economic activities in the European Community, revised second version. As a sub-sector for agriculture (Sector A: Agriculture, forestry, and fishing) in NACE II Rev. 2 codes. Fishing sector refers (Sector A3) including fishing activities or fishery including marine and freshwater fishing or aquaculture [12,13].

Since the available data for the fishing sector is in the time span of 1996 to 2009, there are missed data for the year 2005 as 2002, 2003, and 2004 in that time span, we have decided to provide data series for the variables by randomly selecting yearly aggregate averages. The total businesses of the available data are lesser in numbers for the fishing sector than the agriculture sector and there are no missing data for the whole agriculture sector. Thus, we have provided data series of three years' averages from the aggregate totals of all scale businesses in the agriculture sector in order to normalize the series.

The data series and calculations for the variables consist of reciprocated assessments for the Model X and Model Y. We use the raw data of fishing and agriculture sector in Turkey for the time span of 1996-2019 from the real sector statistics of CBRT [12]. We calculated a data set for the long-term series of the variables (14 years, 1996 to 2009) for the fishing sector. and from 1998 to 2009 as three years' averages (12 years, 1998 to 2009; i.e. 1998 is the average of the years 1996, 1997, and 1998 up to 2016 as the average of 2014, 2015, and 2016). The data sets consist the all scale aggregate raw data from a total of 414 firms for which a set is randomly selected for 162 firms and circa 12 firms a year for 14 years period in the fishing sector and from a total of 2877 firms and circa 80 firms a year for 12 years period in the aggregate totals of 959 in the agriculture sector for the same period however in three years averages to normalize the data. Note that the averages of the same firms could be used in the recent years for the data set of the series.

The model focuses on LTBC/TA as the dependent (LTBC includes STBC), and it also credits the ratios of STBC/STL, C&CER, TD/TA, and STL/TL as the independent variables.

We have tested the equation for the data series in a similar point of view as in the references [14, 15,16,17].

In the findings section of the study, the model's results in the linear regression with the variables are offered in detail. The tests ensure normality, multi autocorrelation, heteroscedasticity, and collinearity assumptions as well [18,19,20,21,22, 23] for a Least Squares (LS) NLS and ARMA, or ANOVA method [24,25,26,27,28,29,30]. We have also checked ADF (Augmented Dickey Fuller) tests for unit root and group common and individual unit root [31,32,33,34,35], single-equation cointegration tests, and Granger causality. Though the significant positive results of group unit root tests at level, the series are found I(1) stationary series. We detected many cointegrating equations within the variables at level aa a result of single equation cointegration tests in Engle Granger with Schwarz info criterion at max lag. The model design ensures each variable of the group is eminent and significantly effective on long-term bank credit usage, except C&CER for the agriculture sector or Model Y. The study also visits CUSUM tests for the sake of stability check and diagnosis for both models. Chow forecast and Chow breakpoint tests are also run in order to test whether the significance change before and after a year of breakpoint or structural change which appears only in the fishing sector for the year 2005 [36,37,38,39,40, 41,42,43,44].

3. RESULTS AND DISCUSSION

Business finance amongst different sectors has ever been visited financial ratios even as industrial averages as the indicators of status, performance, and failure in terms of not only liquidity including cash and cash equivalents and but also liabilities [14,15,16,45,46,47,48,49,50, 51,52]. Cash and its features have also been on the spot along with the usage of trade credit and bank credit [53,54,55,56,57,58]. Cash and cash equivalents are required for a better payback power of bank credits. However, they expectedly have impact on the overall usage of bank credit for the firms particularly in the long-run. As the most liquid part of the current assets, cash and cash equivalents as well as leverage are cited among the covenants in credits [59,60].

However, each indicator might have sector specific differentiation in their impact in the long-run. Any generalization herein might be misleading as well. Revealing the variations, therefore, would help to understand the nature of even a subsector compared with the upper level title. The study aims to discover such variations in causalities of bank credits in the example of fishing sector against its aggregate and elder next of kin agriculture sector.

The study presents the significant results of the statistical tests and the appearance of the main variables.

A simultaneous comparison simply exhibits the relevance of LTBC/TA and C&CER in the fishing sector in time (Fig. 1 and Fig. 2).

Table 1 reports brief summaries of the models X and Y for the fishing and agriculture sector respectively. Both models have significant results in coefficients and other metrics, excluding C&CER only for the agriculture sector (Table 2 and Table 3). This very result is the core comparison of the study and there lies the novelty in the relevant literature. Unlikely for the agriculture sector. C&CER is significantly effective on long-term bank credit usage in the fishing sector. However, the fishing sector might have a set of hidden characteristics though it is generally considered as a consolidated part of the agriculture sector. Table 4 fundamentally ensures the assumptions of the regressions run for both models.

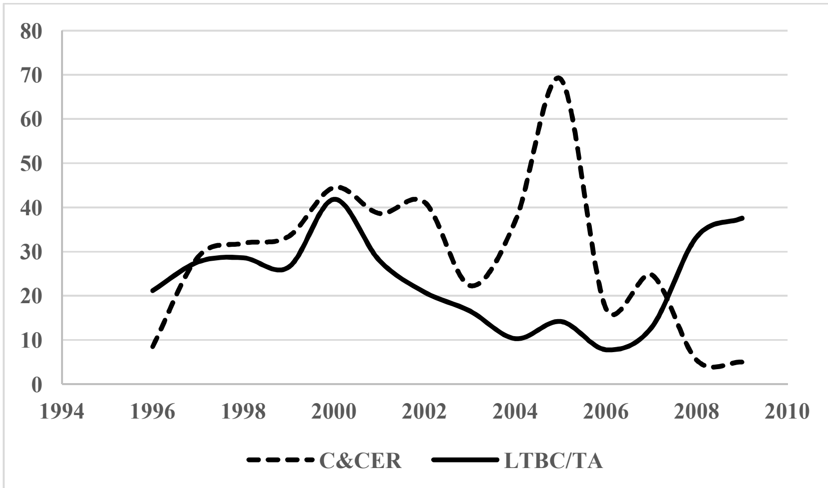

Fig. 1. LTBC/TA versus C&CER in the fishing sector of Turkey (1996-2009)
Source: Calculations on CBRT raw data

Table 1. Brief summaries of regressions on the tested models with the same variables

Model	Dependent	Independents	Adj. R Square	DW	Sign.
X	LTBC/TA	STBC/STL, C&CER, TD/TA, and STL/TL	0.9434	1.5976	0.000**
Y	LTBC/TA	STBC/STL, C&CER, TD/TA, and STL/TL	0.9864	2.0685	0.000**

***. 0.01 significance and most coefficients of 0.05 significance including constants. Either LS: Least Squares (NLS and ARMA) where the dependent variable is followed by the regressors (independent variables) with ARMA and PDL terms or ANOVA tests summaries. Model X refers to the model designed with aggregate variables for fishing sector of Turkey. Model Y refers to the model designed with aggregate variables for agriculture sector of Turkey for the same time span*

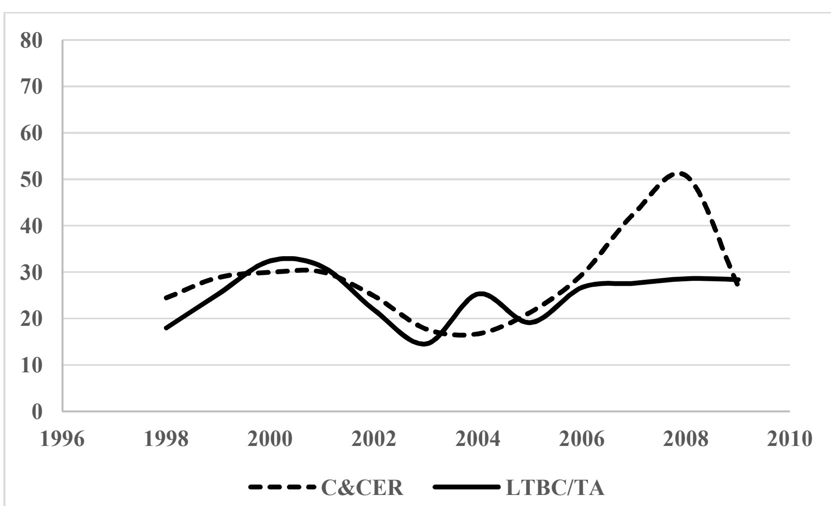

Fig. 2. LTBC/TA versus C&CER in agriculture sector of Turkey (1998-2009)
Source: Calculations on CBRT raw data

Table 2. Summaries of the Model X

Regression	R Square	Adjusted R Square	Durbin-Watson	Significance
LTBC/TA (Dependent)	0.9608	0.9434	1.5975	0.0000**
Independents	**Coefficients**	**Prob.**	**Coef. Variance**	**Centered VIFs**
C	-25.6655	0.0014		
STBC/STL	0.5460	0.0000	0.0039	1.4134
C&CER	-0.1303	0.0164	0.0020	1.2737
TD/TA	0.2813	0.0359	0.0130	1.6309
STL/TL	0.2717	0.0167	0.0086	1.9358

*[a] LS Results, ANOVA, LTBC/TA is the dependent variable. Predictors: (Constant), STBC/STL, C&CER, TD/TA, STL/TL. **. 0.01 significance. All centered VIFs lie within the interval 0 to 10 ensuring no collinearity for independents*

Table 3. Summaries of the Model Y

Regression	R Square	Adjusted R Square	Durbin-Watson	Significance
LTBC/TA (Dependent)	0.9913	0.9864	2.0685	0.0000**
Independents	**Coefficients**	**Prob.**	**Coef. Variance**	**Centered VIFs**
C	-20.5230	0.0001		
STBC/STL	0.5585	0.0000	0.0010	1.5590
C&CER	-0.1669	0.5724	0.0008	2.0043
TD/TA	0.8358	0.0000	0.0083	8.9451
STL/TL	-0.4828	0.0001	0.0038	10.5738

*[a] LS Results, ANOVA, LTBC/TA is the dependent variable. Predictors: (Constant), STBC/STL, C&CER, TD/TA, STL/TL. **. 0.01 significance. All centered VIFs lie within the interval 0 to 10 ensuring no collinearity for independents*

Table 4. Tests for fundamental assumptions

Test	Model X Prob. *	Model Y Prob. *
Breusch and Godfrey Serial Correlation LM	0.9292	0.2804
Breusch, Pagan and Godfrey Heteroscedasticity	0.2670	0.3213
Jarque Bera Test: Prob.	0.7955	0.6495

*Breusch and Godfrey Serial Correlation LM with Obs*R-squared Prob.Chi-Square (2) and Breusch, Pagan and Godfrey Heteroscedasticity with Obs*R-squared Prob.Chi-Square (4). All tests confirm the assumptions for serial correlation, heteroscedasticity, and normality as p values > 0.05 [18,19,20,21,22,23]*

Table 5 and Table 6 reflect ADF unit root tests' results where the series for both models are I(1) and stationary at their first differences. However, group unit root test for the models both gave affirmative results at the level rejecting the null hypotheses of common and/or individual unit root, except PP-Fisher test for the agriculture sector. Table 7 and Table 8 represent the results of unit root test for the group of the series ensuring there is no unit root either in common or in an individual form at the level of variables. Though the results of PP - Fisher test for Model Y, Im et al. and ADF – Fisher tests both confirms the stationarity in the groups (Tables 7 and 8).

We then conducted single-equation cointegration tests (Engle-Granger with Schwarz information criterion) for the group of the series at their level (Table 9 and Table 10). The results confirm that there are many significant cointegrated equations with different specifications including LTBC/TA dependent for both models. Therefore, we may confirm the evidence of long-term significance of both regressive models (Model X and Model Y) in both sectors (Fishing and Agriculture). However, C&CER is a significant independent variable in Model X but it is apparently not for Model Y.

The study has attained some significant results in terms of pairwise Granger causality within variables (Table 11).

Though there is no evidence that causality exist from C&CER to LTBC/TA in the shorter time or periods. TD/TA is the nexus which explains the co-integrations which exist in the longer periods (Tables 8, 9, 10).

CUSUM and CUSUM square tests results are given in Figs. 3 and 4 for Model X and in Figs. 5 and 6 for Model Y. The stability has a breakpoint in the years of 2004 and 2005 for Model X or for the fishing sector (Fig. 4). On the other hand, CUSUM test result for Model Y or for the agriculture sector depicts a change in the trend after the year 2008 (Fig. 5). Therefore, we have further analyzed the period after 2005 for Model X and our findings confirm the estimates of the model for that specific period for Model X (Table 12).

Table 5. ADF test for series at the level and at the first differences for Model X

Series		At the level		At the first difference	
		t-Statistic	Prob. *	t-Statistic	Prob. *
LTBC/TA	ADF test statistics	- 0.086045	0.6351	- 3.282975	0.0035
	1% level	- 2.754993		- 2.771926	
	5% level	- 1.970978		- 1.974028	
	10% level	- 1.603693		- 1.602922	
STBC/STL	ADF test statistics	- 0.074176	0.6377	- 5.044522	0.0001
	1% level	- 2.771926		- 2.771926	
	5% level	- 1.974028		- 1.974028	
	10% level	- 1.602922		- 1.602922	
C&CER	ADF test statistics	- 1.062840	0.2445	- 5.231578	0.0001
	1% level	- 2.754993		- 2.771926	
	5% level	- 1.970978		- 1.974028	
	10% level	- 1.603693		- 1.602922	
TD/TA	ADF test statistics	0.081112	0.6879	- 3.547635	0.0025
	1% level	- 2.792154		- 2.816740	
	5% level	- 1.977738		- 1.982344	
	10% level	- 1.602074		- 1.601144	
STL/TL	ADF test statistics	- 0.494428	0.4819	- 4.023950	0.0008
	1% level	- 2.754993		- 2.771926	
	5% level	- 1.970978		- 1.974028	
	10% level	- 1.603693		- 1.602922	

*Fishing sector: Model X. Augmented Dickey Fuller Test (ADF) results and critical values at level and first differences for none. Null Hypothesis: Series has a unit root. Exogenous: None. Lag Length: 0 (Automatic - based on SIC, max. lag=2). *MacKinnon one-sided p-values [43]. Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 10-13 [33]*

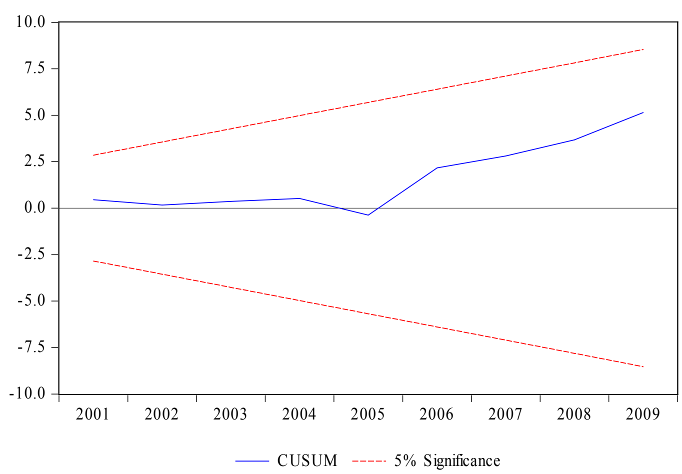

Fig. 3. CUSUM test for Model X (Fishing sector)

Table 6. ADF test for series at the level and at the first differences for Model Y

Series		At the level		At the first difference	
		t-Statistic	Prob. *	t-Statistic	Prob. *
LTBC/TA	ADF test statistics	0.020586	0.6680	-3.654630	0.0020
	1% level	-2.792154		-2.816740	
	5% level	-1.977738		-1.982344	
	10% level	-1.602074		-1.601144	
STBC/STL	ADF test statistics	0.080072	0.6876	-3.807537	0.0021
	1% level	-2.792154		-2.886101	
	5% level	-1.977738		-1.995865	
	10% level	-1.602074		-1.599088	
C&CER	ADF test statistics	-0.379463	0.5183	-3.535528	0.0029
	1% level	-2.847250		-2.847250	
	5% level	-1.988198		-1.988198	
	10% level	-1.600140		-1.600140	
TD/TA	ADF test statistics	-0.632666	0.4202	-2.021645	0.0464
	1% level	-2.792154		-2.816740	
	5% level	-1.977738		-1.982344	
	10% level	-1.602074		-1.601144	
STL/TL	ADF test statistics	-1.147177	0.2131	-2.918539	0.0082
	1% level	-2.792154		-2.816740	
	5% level	-1.977738		-1.982344	
	10% level	-1.602074		-1.601144	

*Agriculture sector: Model Y. Augmented Dickey Fuller Test (ADF) results and critical values at level and first differences for none. Null Hypothesis: Series has a unit root. Exogenous: None. Lag Length: 0 (Automatic - based on SIC, max. lag=2). *MacKinnon one-sided p-values [43]. Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 8-11 [33]*

Table 7. Group unit root tests for level variables of Model X

Group	Method	Statistic	Prob.**	Cross-sections	Obs
LTBC/TA, STBC/STL, C&CER, TD/TA, and STL/TL	Null: Unit root (common)				
	Levin, Lin and Chu t	-2.38705	0.0085	5	64
	Null: Unit root (individual)				
	Im, Pesaran and Shin W-stat	-2.57103	0.0051	5	64
	ADF - Fisher Chi-square	23.4132	0.0093	5	64
	PP - Fisher Chi-square	20.6688	0.0235	5	65

*** Fisher tests use an asymptotic Chi-square distribution, other tests assume asymptotic normality [31,32,33,34, 35]. Sample: 1998-2016.: Individual effects for exogenous variables. Schwarz info criterion, level, individual intercept. Maximum lag. Automatic selection of lag length based on SIC: 0 to 1 with the selection of Newey-West automatic bandwidth and with Bartlett kernel [61,62,63]*

Table 8. Group unit root tests for level variables of Model Y

Group	Method	Statistic	Prob.**	Cross-sections	Obs
LTBC/TA, STBC/STL, C&CER, TD/TA, and STL/TL	Null: Unit root (common)				
	Levin, Lin and Chu t	-2.73112	0.0032	5	53
	Null: Unit root (individual)				
	Im, Pesaran and Shin W-stat	-2.39962	0.0082	5	53
	ADF - Fisher Chi-square	24.1425	0.0072	5	53
	PP - Fisher Chi-square	10.9790	0.3592	5	55

*** Fisher tests use an asymptotic Chi-square distribution, other tests assume asymptotic normality [31,32,33,34, 35]. Sample: 1998-2016.: Individual effects for exogenous variables. Schwarz info criterion, level, individual intercept. Maximum lag. Automatic selection of lag length based on SIC: 0 to 1 with the selection of Newey-West automatic bandwidth and with Bartlett kernel [61,62,63]*

Table 9. Single-equation cointegration tests for group of series at level (Model X)

Equation and Trend Specification	Lag	Dependent	Tau-statistic	Prob.*	z-statistic	Prob.*
None	1	LTBC/TA	-3.834957	0.2153	-36.18883	0.0000
None	1	STBC/STL	-4.394710	0.1134	-42.15732	0.0000
Constant	1	C&CER	-2.956676	0.6727	-20.45569	0.0002
Linear Trend	1	TD/TA	-3.789787	0.5093	-34.70560	0.0000
Quadratic Trend	0	LTBC/TA	-6.812867	0.0477	-19.14746	0.0612
Quadratic Trend	1	TD/TA	-3.419623	0.7904	-29.32932	0.0000

**MacKinnon p-values [43]. Engle Granger with Schwarz info criterion max lag. Sample: 1998-2009. Included observations: 14. Null hypothesis: Series are not cointegrated. Automatic lags specification based on Schwarz criterion (max. lag=1-2). All results have 5 stochastic trends in asymptotic distribution [40,41]*

Table 10. Single-equation cointegration tests for group of series at level (Model Y)

Equation and Trend Specification	Lag	Dependent	Tau-statistic	Prob.*	z-statistic	Prob.*
Constant	0	LTBC/TA	-3.706052	0.3967	-13.79113	0.0157
Constant	0	STBC/STL	-3.617275	0.4251	-13.80136	0.0159
Quadratic Trend	1	LTBC/TA	-4.320752	0.5105	-49.00954	0.0000
Quadratic Trend	1	STBC/STL	-4.711805	0.3998	-58.32334	0.0000
Quadratic Trend	1	TD/TA	-4.161087	0.5605	-44.48467	0.0000
Quadratic Trend	1	STL/TL	-4.482901	0.4614	-52.90787	0.0000

**MacKinnon p-values [43]. Engle Granger with Schwarz info criterion max lag. Sample: 1998-2009. Included observations: 12. Null hypothesis: Series are not cointegrated. Automatic lags specification based on Schwarz criterion (max. lag=1). All results have 5 stochastic trends in asymptotic distribution [40,41]*

Table 11. Significant results of pairwise granger causality tests (Only for the Model X)

Lag	Null Hypothesis	Obs.	F-Statistic	Prob.
1	C&CER does not Granger Cause TD/TA	13	6.66683	0.0273
2	LTBC/TA does not Granger Cause TD/TA	12	8.83407	0.0122
2	STBC/STL does not Granger Cause C&CER	12	8.54108	0.0132
2	STBC/STL does not Granger Cause TD/TA	12	5.09278	0.0431
3	STBC/STL does not Granger Cause STL/TL	11	7.06349	0.0447

Group of the series. Reports the only significant result at 0.05 level for Pairwise Granger Causality Tests on the group of the series for Lag 0 to 3. Sample 1996–2009 [37]

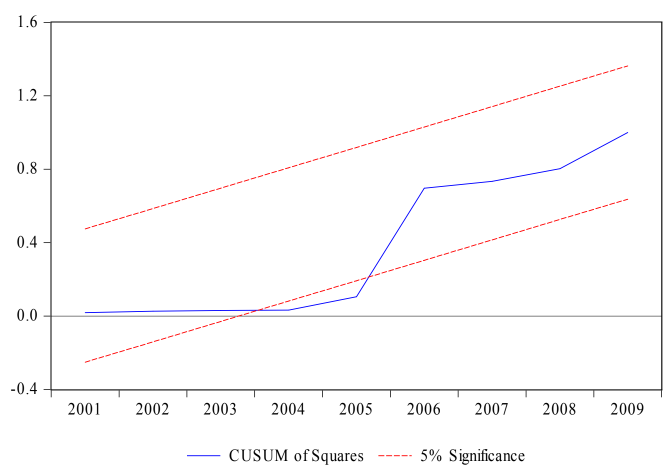

Fig. 4. CUSUM of squares test for the Model X (Fishing sector)

We may conclude that the model equation's significance remains as it is before and after the breakpoint year which had already determined either as 2004 or 2005 in Fig. 4. Thus, the findings of Chow tests have given most significant results for the year 2005 (Table 12). Note that Chow forecast test and Chow breakpoint test do not have any conflicting results in 2005, but they have had for the year 2004 (Table 12).

Though the probability value is on the edge for the coefficient of C&CER, unrestricted test results are still significant as a regressive equation for the period before the breakpoint year 2005 or for the sample of 1996-2004 (Table 13).

Table 12. Significant F-test summaries of the chow forecast test results for the Model X

Breakpoint year: 2005		Value	df	Probability
Chow forecast or breakpoint tests*	F-statistic	24.06337	(5, 4)	0.0044
	Likelihood ratio	48.11155	5[1]	0.0000
Chow breakpoint test	Wald statistic	120.3168	5[1]	0.0000

Specification: LTBC/TA: STBC/STL C&CER, TD/TA, STL/TL, and C. Test predictions for observations from 2005 to 2009. Chow breakpoint test for the year 2005 and for the equation sample 1996-2009.[1] Prob Chi squares.
** The same results have taken for both tests [36]*

Table 13. The results of the unrestricted test equations for the Model X

Dependent	Adjusted R Square	Significance
LTBC/TA	0.9945	0.0000**
Independents	**Coefficients**	**Prob.**
C	-46.6973	0.0001
STBC/STL	0.6496	0.0000
C&CER	-0.0696	0.0436
TD/TA	0.6026	0.0007
STL/TL	0.1576	0.0209

*Sample 1996-2004. Averages of aggregate totals. LTBC/TA is the dependent variable, Included observations: 9. Predictors: (Constant), STBC/STL, C&CER, TD/TA, STL/TL. **. 0.01 significance [36]*

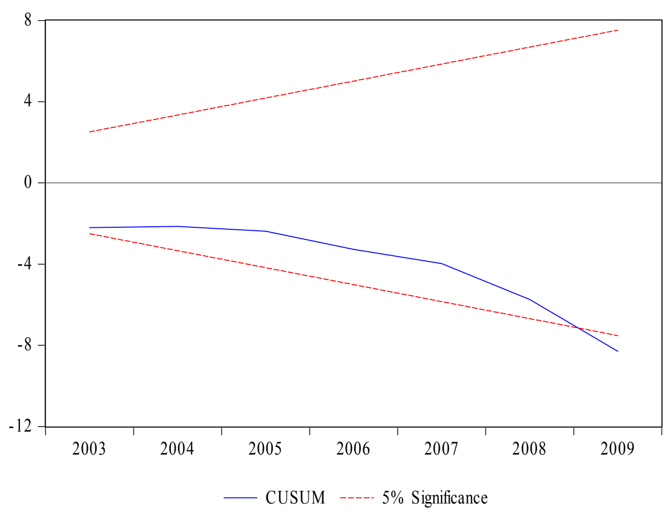

Fig. 5. CUSUM test for the Model Y (Agriculture sector)

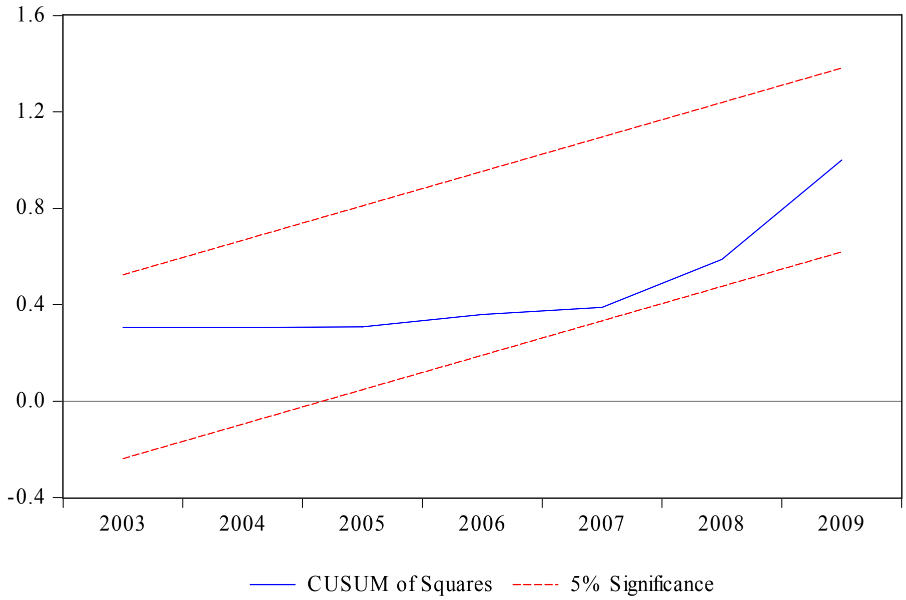

Fig. 6. CUSUM of squares test for the Model Y (Agriculture sector)

4. CONCLUSION

We may conclude that this study is a good step forward to determine sector specific conditions in terms of bank credit and its potential. The study tests two models, Model X and Model Y, in a common model equation for the fishing sector and for the aggregate data available in the agriculture sector.

Both models eventually depict significant results in coefficients and other metrics, excluding cash and cash equivalents only for the agriculture sector in the direction to better estimate long-term bank credit usage. The differentiation on cash and cash equivalents remains as the core comparative finding of the study determining the novelty. The agriculture and fishing sectors in Turkey have different aspects in the causalities of bank credit usage in time. Nonetheless, cash and cash equivalents significantly affect long-term bank credit usage in the fishing sector along with short-term liabilities driven variables. As a consolidated part of the agriculture sector in the general economic considerations, the study explores the hidden characteristics of the fishing sector in terms of long-term bank credits and their causalities. Although the fishing sector might have been added and forced to share the same investment atmosphere in terms of incentives, policy implications, and attitudes of the creditors, its profound features at least in terms of long-term bank credit usage would help much in the decision-making processes. Thereafter in Turkey, this study eventually confirms that cash and cash equivalents ratio is not one of the significant regressors in the long-term evidence of the agriculture sector. However, this study reports affirmative evidence that cash and cash equivalents have remarkable impact in the long-term bank credits for the fishing sector in the long-run.

Though the limitations, such as the limited available time span for the variables in the comparison, local data, and aggregate figures, the study is expected to motivate further financial analysis for the sectors held in this study and for the revealing of other sectors in the future potential studies which will use a similar methodology in the same flow.

There is a sum of sector specific reasoning for which an aggregate point of view where fishing sector is seen as a part of the agriculture sector could not reflect the sector’s characteristics in the procedures conducted to promote and develop the fishing sector and the businesses therein. We also believe that this study will enlighten the scene for any policy implications in the financing atmosphere for the fishing sector in Turkey.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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