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Should Eximbanks Finance Firms with Direct Export Credits? An Empirical Study on the Credit Risk of Türk Eximbank

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Abstract

By crediting firms directly without financial intermediaries, export credit institutions decrease adverse selection problems in the free trade market. Our purpose in this study is to seek if Export-Import Banks (Eximbanks) should give direct credits or not by analyzing the case of Türk Eximbank. Türk Eximbank is exclusive in the world export credit market since it applies short-term direct credits substantially in addition to indirect credits and insurances. It takes letter of credits to assign exporters to the direct credits. The default risk of Türk Eximbank is also very low. We develop a credit risk model with financial and non-financial variables for 1114 small and medium-sized enterprise (SME) firms that take direct credits from Türk Eximbank within the period of 2003-2008. Our analysis reveals that specific sectors like Forest, Paper, and Furniture carries much more risk but seem to be over-supported by the Eximbank directly, although they don't exhibit high performances. Overall, by referencing the Türk Eximbank case, our model proposes that the direct credit mechanisms of Eximbanks are successful under certain defined criteria. In addition the monitoring role of Eximbanks in the credit environment may become more important to lessen information asymmetries between the credit market participants.

Keywords: Direct Credit, Firm Failure, Export Credit Institutions, Türk Eximbank, Adverse Selection

Jel Classification: G21

1. Introduction

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Financing of exports with credits are an important incentive element to strengthen the competitive position of the exporters, especially in developing countries. An "export credit" is in principle a financing arrangement of loan facility extended to an exporter by a bank in the exporter's country, but the expression is generally used also for an insurance or guarantee. Export credits can take the form of direct credits/financing, refinancing, interest-rate support (where the government supports a fixed interest-rate for the life of the credit), aid financing (credits and grants), export credit insurance and guarantees.

The capacities of banking systems and institutionalized export credit agencies have become increasingly important as they enhance countries' ability to take part in the world trade. Most of the developing countries took steps to establish their own credit institutions and these credit institutions present new credit instruments to expand exporting facilities. Export credit institutions such as US Eximbank, Japan Nexi, Germany Euler Hermes, France Coface, and United Kingdom ECGD finance every one dollar out of eight dollar of the World trade. Export credit institutions provide three basic functions: First, they assist exporters meet officially supported foreign credit competition. Secondly, when private lenders cannot finance those export sales, they provide financing to foreign buyers. Third, and perhaps their most important function, these institutions take risks beyond those that can be assumed by private lenders. They address two types of risks in an export transaction: political risks due to political actions taken by the government that impact payment by the buyer and commercial risks of nonpayment as a result of default, fluctuation in demand, unanticipated competition, shifts in tariffs, and or failure to take up goods that have been shipped according to the supply contract and other factors not covered under political risk (Krauss 2011).

The Eximbanks in all over the world have different field of activities. First, they may only cover trade insurances and guarantees in their export credit program. Generally, European countries such as Germany and France prefer to make only insurances since the insurance contracts in the export market is substantially developed by the efforts of private-chartered credit institutions like Euler Hermes and Coface. The second choice to follow for the Eximbanks is the allocation of both insurances and indirect credits by the participation of the commercial banks.

Asian countries such as India, Malaysia and Scandinavian countries such as Finland and Norway prefer both insurances and indirect credits to increase the trading volume in the market by covering shipment or pre-export facilities, etc.

The third choice for the Eximbanks involves direct credits in addition to insurances and indirect credits. For instance; the US and China which are the biggest players in the world trade, conduct direct credits in addition to indirect credits and insurances. Generally, the repayment term of a direct transaction in the United States is determined by numerous variables, including, but not limited to, the borrower's financial condition, the common repayment terms the market gives such products, specific industry practices, industry and country conditions, useful life, OECD and Berne Union agreements[4], and the matching of terms offered by other foreign government-sponsored financing. Repayment terms are generally in excess of seven years. On the other hand, the direct credits of China Eximbank work as a government subsidy rather than a loan agreement; since the Eximbank of China is a kind of government institution that adopts export development policies like the others such as State Development Bank of China and Agricultural Development Bank of China. Cull and Xu (2003) note that the direct government transfers of Eximbank China to the firms were not associated with higher profitability, while the traditional banking finance was positively associated with higher profitability.[5]

The lending institutions in both developed and developing countries cannot solve the problem of credit risk which causes firm failures whether they are dependent on the government or not. If the unsuccessful direct export credits increase the financing costs for all borrowers, the efforts of Eximbank's will create an opportunity cost for the economy as a whole since Eximbank's activities draw financial resources from the economy that would be available for other uses. Another consideration is that export financing raises the financing costs for all borrowers, thereby possibly crowding out some borrowers from the financial markets (Ilias 2011).

Due to this reason, monitoring the export credits is very important to prevent inefficient or corrupt practices related with specific borrowers and unnecessary uses of the borrower firms' assets.

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4 The Berne Union is the international credit and investment insurances association established in the Swiss city of Bern in 1934 by the private credit insurance firms of France, Italy and Spain together with UK. The aim of this association is to increase cross-border trade and create a platform for the trade between members.

5 The authors also point out that the Chinese financial system is not an efficient one to analyze. Besides of the system inefficiency, another handicap of the study of Cull and Xu (2003) comes from using the state-owned firms that use direct credits from Eximbank China in the data set. State-owned firms were generally alleged of not using resources efficiently.

According to Evans and Oye (2001), export credit agencies may offset possible financial market failures by providing export credits directly, by gathering and sharing information on risks. By reducing repayment risks, guarantees from Eximbanks allow lenders to offer financing to exporters and their foreign customers with fixed or floating competitive rates. Eximbanks have an important role in adjusting credit terms for non-financial externalities arising from the failure.

In this study, our aim is to investigate if Eximbanks should give direct credits or not inspiring from the case of Türk Eximbank. To our knowledge, whether the Eximbanks finance firms with direct credits are not being examined in the known literature yet. Firstly, we inquire the advantages of Türk Eximbank's direct credits instrument and its status of monitoring export credits. Türk Eximbank is a joint stock status profit-oriented company in Turkey that supports the exporters in all sectors of whole country. It provides credit in two ways: first by the intermediation of commercial banks and second in the direct form that we search in this study. Türk Eximbank has an established competitive advantage in the direct credit market although it conveys both indirect credits and insurances too. For instance, in 2011, 97.3 % of total credits (6.67 billion USD) are on short-term basis. 59 % of these short-term credits are given directly by Türk Eximbank and the remaining 41 % is intermediated by commercial banks indirectly. The assured direct market advantage of Türk Eximbank brings credit default exposure to the Eximbank that warrants a study as it provides a role model to the world for credit risk evaluation process of direct credits.

We develop a credit risk model for Eximbank using the data of exporter firms which received direct export credits from Türk Eximbank. Although the commercial banking system in Turkey depends on relationship banking most of the time, Türk Eximbank has much more strict rules and transparency on issuing loans since it is supported by the government. Generally, the firms that could not prepare letter of credits and guarantee funds for Eximbank shift commercial banks for export-related borrowings in Turkey. This study covers 2003-2008 periods and particularly, post 2008 period is not covered to exclude the external and extraordinary factors which come with financial crisis of 2008. We discuss whether the variables of the credit risk model are consistent with literature and have economic meanings in this study. The minimization of firm failures and default risk for Eximbanks, that are established to boost the exports in the world, is very important to achieve the purpose of efficient usage of direct credits.

By decreasing information asymmetries between bank and the credit users, new financial models to build up trades between countries becomes increasingly important.

In part two of this study, the comparative performance of Türk Eximbank is elaborated. Eximbank in Turkey has a considerable influence on the banking system. It is the initiator of export credits and thence has an absolute advantage with low interest rates superior to the intermediary banks that distribute the Eximbank credits with commissions loaded on the interest rates. In the third part of the study, we search the candidate performance indicators of the exporter firms that apply to credits by studying the classical firm failure literature. The fourth part describes the Eximbank dataset and the logit analysis used in this study briefly. The results of the analysis are presented in the fifth part. The findings and proposals for future made at the end.

2. Comparative Performance of Türk Eximbank

Türk Eximbank's policies and operations have been formulated to work within the framework of the export-led growth strategies pursued by all Turkish governments mostly comes from right or center-right political origin since 1980s (Waterbury 1992). In the period of this structural adjustment, public resources are generally used not only to promote the export drive but also to stimulate export-led growth. The export performance of Turkey increased thereafter 1990. With 1996 EU Customs Union Agreement, Turkey became an important partner in the industry area due to customs taxes and nominal tariff rates which are reduced.

After the politically stable environment starting from 2002, Turkey followed an increasing pattern of export growth. When comparing the amount of exports of Turkey and the Euro area, which is the biggest trading partner, figure 1 shows that the export growth of Turkey is higher than the Euro area.

While the average annual growth rate of exports in the Euro area is 3.8 %, in Turkey it is at 10.6 % even larger than the world average growth rate of 5.1 % and is close to the developing Asia rate of on average 11 % according to the OECD.[6]

[6] As of 2012 year-end data, the annual Turkish exports reach 152.5 billion USD (www.treasury.gov.tr).

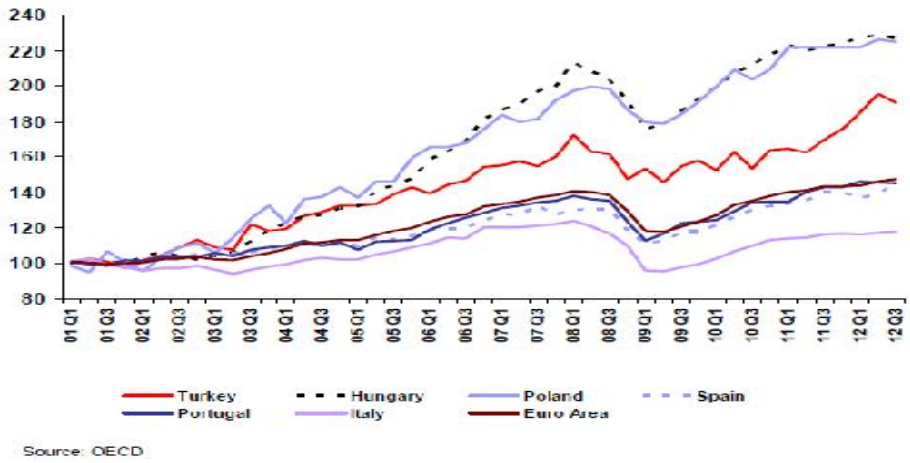

Figure 1: Exports in Europe and Turkey (2001=100)

Turkey's major exports are: textiles and clothing, automotive, iron and steel, white goods and chemicals and pharmaceuticals. Erlat and Erlat (2004) indicates that Turkey has a comparative advantage on raw materials and labor intensive goods especially on the traditional sectors such as agricultural product and textiles after 1990s. As the export-led growth continues to increase, the import amount is also increasing due to the appreciation of the Turkish Lira relative to the other foreign currencies after starting with the fluctuating exchange rate regime in Turkey in 2001.

Export credits and export promotions are very essential to increase the export revenues of the private sector trading firms (Onaran and Öztürk 2008). Starting from 1987, Türk Eximbank supports exporters, export-oriented manufacturers, overseas investors and firms engaged in foreign currency earning services with short, medium and long-term cash and non-cash credit programs.

It is one of the few export credit institutions in the world, which engages in direct lending activities as well as implementing insurance and guarantee schemes within the same institution as compared to most of the developing countries that focus only on the export insurance and guaranteeing mechanisms.

Except for the 1994, 2001 and 2009 crises, Eximbank credits exhibits an increasing pattern continuously. Figure 2 below presents the amount of Türk Eximbank short-term credits within 1989-2011; 97.3 % of the 6.6 billion cash credits of Türk Eximbank are short-term basis, while the remaining 2.7 % is on medium and long-term basis.

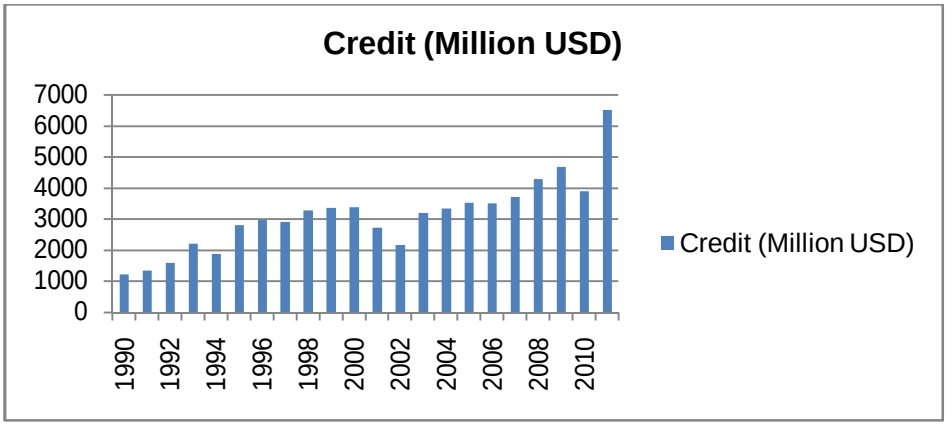

Figure 2: Türk Eximbank Short- Term Credits (1989-2011)

Due to the rising credit demand in Turkey, most of the direct credits have short-term coverage defined by Türk Eximbank; 59 % of these short-term direct credits are given by Türk Eximbank and the remaining 41 % are intermediated by commercial banks. Türk Eximbank is an active player in the short-term credit market with direct credits.

At this point, one may wonder why Türk Eximbank prefer to give direct credits most of the time rather than extending these credits with the intermediation of the other banks? First of all, Türk Eximbank could better monitor the market by direct lending.

The indirect participation of the other commercial banks in Turkey sometimes create adverse selection problems; since the Eximbank does not have any intervention on the credit customers selected by the other commercial banks in open market conditions. The selection procedures of Eximbanks are formulated by the authorities on account of the bank has a mission to increase trade by using its competitive advantage in export credit sector. In a broader sense, Türk Eximbank provides direct credits to whole sectors and regions in the country. Thus the information asymmetries between Türk Eximbank and exporters are very low.

Second, Türk Eximbank allocates direct credits to exporters in exchange for the letter of credit which provides full collateral to the Eximbank.

The firms that could take the commercial letter of credit from the major banks in Turkey generally apply to the Türk Eximbank for credits directly. The letter of credits guarantee the payment from the buyers to the exporters under the condition that the goods have been supplied as agreed upon standards and quality and certain documents such as bill of exchange, invoice, insurance certificate, transport receipts and other official licenses are presented. Hence the trade risk in addition to the country risk shifts to the exporter's bank if the exporter firm proves itself to these well-known commercial banks. The commercial banks accept firm collaterals or landed property for launching export credits indirectly due to the commercial circumstances and these types of collaterals are difficult and time-consuming to convert cash in the financial markets. Information asymmetries are eliminated between Türk Eximbank and the recognized exporters with these letters of credit acceptable in all international transactions.

Third and perhaps the more practical reason about the augmentation of direct credits of Türk Eximbank in the market economy is low interest rates without commissions. The Eximbank direct credit interest rates are 1% lower than the intermediary commercial banks that have to count up commissions. On the other hand, Türk Eximbank is first-of-its-kind in the world with low interest rates credits on the short-term credit market. US direct loans for instance generally cover medium and long-term nationally-oriented specific projects based on fixed-rates. Other areas alike Mexico and Latin America that conduct miscellaneous types of finance besides direct credits have higher amounts of interest rates and legal difficulties.

Finally, we come out that the Türk Eximbank in Turkey has a remarkable reputation on the short-term credit market with low troubled credit rates. Figure 3 below illustrates the amount of troubled credits to the total credits.

It is observed from this figure that the Türk Eximbank averages of troubled credits (dashed-line) are lower than the banking sector averages starting from 2005 after the banking system is internationalized.

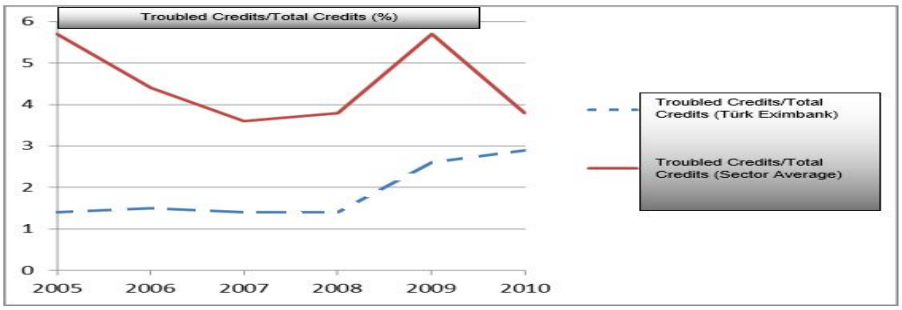

Figure 3: Troubled Credits / Total Credits Ratio - Türk Eximbank and Banking Sector in Turkey (2005-2010)

In the 2009 crisis, most of the exporters, particularly the small and medium sized enterprises (SMEs) that are vital points for the economy were severely affected because of these troubled credits. The troubled credits of 3.7 % in the banking system in December 2008 grow to 5.3 % in December 2009 according to Deloitte Türk Finance Sector Investigation (2010). However, the effect of credit crisis on the small firms in the non-financial sector is much more rigorous than the banking system as a whole in consideration of 7.6 % troubled rate SME credits.

According to the figure 3, the amount of troubled credits of commercial banks is substantially higher than the Türk Eximbank which signals that the banking sector in Turkey has more credit payback problems than the Eximbank totally. As against with the other commercial banks, Türk Eximbank does not have any fund loss due to the failure of the unsuccessful direct credits; since it takes letter of credits, credit fund guaranty and domestic / foreign government bonds as 100 % collateral to credit risk. Nevertheless, it has clear guidelines and crediting procedures for payback in accordance to the other intermediary banks that depend on banking relations commonly.

3. Literature

The development of financial analysis models for firm failures is substantially beneficial for managers and other authorized persons to conduct an “early warning system” (Huang et al. 2008).

After the failure of the biggest firms in the world such as WorldCom and Enron, the global investors became more sensitive to credit risks and firm failures, especially since most of these firms are considered in "too big to fail" category. Firm failure means that firm cannot keep going on operations in a qualified sense due to inadequate profits (Ahn, Cho and Kim 2000). Firm failures may be the result of mismanagement, bad marketing, and lack of competitive skills or economic recessions. Wu (2010) characterize the firms as unsuccessful if the firms do not pay their debts to creditors, preferred shareholders, suppliers etc. or have protested bills and is being in bankruptcy position. Kuo et al. (2003) defines unsuccessful small and medium sized enterprises (SMEs) as having a delay in debt payments, uncovered checks or protested bills problems, unacceptable accounts in banks, bad credit history or a net value lower than the value of real assets.

Beaver (1966) is the pioneer of firm failure academic models that grounds on the financial ratios. Based on two classification tests using financial ratios, Beaver developed one variable discriminant analysis and depicts financial distress by uncovered checks, default or bankruptcy application for dividends and bond payments. As a response to Beaver (1966); Tamari (1966) and Moses and Liao (1987) developed easy and intuitive risk index models to test the failure. Altman (1968) developed the Z-score model to predict bankruptcy of the firms. The popular Z score model is a multivariate discriminant analysis technique that predicts bankruptcy on a 95 % accuracy rate and uses 5 basic types of ratios: (1) working capital/total assets, (2) retained earnings/total assets, (3) EBIT/total assets, (4) equity market value/total book value of debt, (5) sales/total assets.

After the 1980s, multivariate discriminant analysis leaves their place to other models such as logit, probit and linear probability models that have fewer prerequisites. These models try to find the best combination of variables that differentiate successful and unsuccessful firms. Ohlson (1980) uses the logit analysis (LA) and Zmijevski (1984) uses the probit analysis (PA) firstly. These models appoint the firms as successful or non-successful firms according to a predetermined cut-off point.

In addition to financial ratios, macroeconomic factors and industrial factors are studied with these models (Mensah 1984). Sohn and Kim (2007) which analyzes SMEs in Korea propose the use of financial and non-financial variables together with logit failure tests. The qualitative nonfinancial variables are more appropriate for the SMEs due to the non-availability of the systemic data.

Factors such as age, size and legal structure is considered to affect the failure of the firm. The experience, education and managerial skills of firm owner or manager besides firm resources also decrease the firm failure probability (Headd 2003; Boden and Nucci 2000). Pederzoli, Thoma and Torricelli (2013) emphasizes that SMEs struggle financial constraints when they try to obtain credit from banks. The constraints are more severe for innovative SMEs. They examine the role of innovative assets such as patents in credit risk logit modeling. Based on a unique data set of innovative SMEs in the EU15 countries, Switzerland and Norway with default years of 2005-2008, they indicate that the value of the patent portfolio always reduces the probability of default if coupled with an appropriate equity level. If compared with the standard model based on accounting variables only, the model with the innovation-related variables improves in and out-of-sample accuracy. Srinivasan and Kim (1988) model the Fortune 500 firms with the analythical hierarchy process for the credit granting decision of experts. The credibility of the firms is analyzed according to the financial power and payment practices of the firms. By using data for Spanish commercial and savings bank, Salas and Saurina (2002) also anticipate the possibility of a bank bankruptcy by microeconomic bank level variables such as family indebtedness, rapid past credit or branch expansion besides the others such as net interest margin, capital ratio, size and market power.

The determination of firm failure risk is very important for countries like Turkey that show high volatility, since the Turkish firms in comparison with other developed country firms face more political risk due to inconsistent socio-economic conditions and dramatic crises in the past (Muzır and Çağlar 2009). The limited studies generally focus on the existent credit evaluation processes of Turkey and firm failure forecasting models based on the financial ratios of all firms in Turkey instead of specifying the exporters or firm characteristics (Aktaş 1993; Yurdakul and İç 2004; Vuran 2009; Arslan and Karan 2009). Aktaş (1993) uses the total debt/equity, EBIT/interest expenses, sales/equity, operating profit/sales ratios to test the financial failure probability of 60 firms.

According to Aktaş the accuracy of the models depends on the validity of the financial tables employed and on long-term economical and financial stabilization. Sampling 122 both publicly held and closed firm, Vuran (2009) searches for the financial variables that forecast financial firm failures.

The failure can be forecasted one year in advance with these ratios: sales/assets, total debt/assets, and cash flows/interest expenses. The results of discriminant and logistic regression do not expose any significant differences. Arslan and Karan (2009) studied 1,166 Turkish SMEs for the year 2007 and found that for domestic firms, the results present a direct relationship between the likelihood of corporate default and net profit margin, but the relationship turns negative for gross profit margin. For international firms, likelihood of corporate default increases with the ratio of inventories to total assets but decreases with net profits and net sales. According to Yurdakul and İç (2004), a credit evaluation of Turkish firms that only depends on financial and economical analysis may not be adequate because technical factors like technology, productivity, management competency, quality improvements, and location of the firms should also be considered.

Christensen, Copead and Copead (1987) show the continuity of successful exporter performance depends on firm characteristics, export management practices and manager perceptions. Ayhan and Hacıhasanoğlu (2007) note the export amount in Turkey could only be increased if the firms work efficiently. Using the data of SMEs in Turkey, Caner and Karan (2012) find that efficient and internationally competitive SMEs are unlikely to default. Firms with high creditworthiness are also managed by owners themselves and focus on their core businesses. Küçüktalaslı, Arslan-Ayaydin and Karan (2012) highlight that to ensure the high quality of financial services, financial institutions should decrease the information asymmetries between the institutions and the creditors. The less developed credit areas in Turkey such as the southeastern region should be supported more according to the authors.

4. Data and Methodology

This study probes the determinants of the firm failure of exporters that use direct credits from Türk Eximbank. For this purpose, excluding the Pre-Export credits intermediated by other banks, we cover the data set of *direct credit programs* including Pre-Export Credits, SME Pre-Export Credits, Foreign Trade Firms Short Term Trade Credit, Pre-shipment Export Credits, International Transportation Marketing Credits, Tourism Credits and Credit Program For Foreign Currency Earning Services.

The data set have *1152 firms* that take credit from Eximbank in the period between 2003 and 2008.

We used the 2008 year-end balance sheets and income statement tables lastly to predict failure, since the financial variables after 2008 crises distort the data set. The credit evaluation process of Türk Eximbank takes one year in time, so we stopped the credit period at the end of 2009. Our final model is based on 1114 firms after excluding the firms which have problems in their dataset within this period and covers a panel data set of 6684 (1114*6) row.

The power of the arguments in this study mostly comes from the data set. First, we handle the firms that take direct credits from Türk Eximbank to search the effect of the direct lending option that Türk Eximbank has an absolute advantage with low interest rates without commissions as an initiator in Turkey. Second, the 1114 exporter firm level data is highly valuable for Turkey to evaluate the failure potential. We define the criteria of credit approvals applicable to exporter firms to lessen the adverse selection problem. Third, 80 % of the firms selected in this study are compatible with the SME definition of Turkish Law 9617. The SMEs are more exposed to credit risk relative to large-sized firms and they are the market makers of the export-led growth mostly depend on the imported goods from abroad in Turkey. Only 20 % of the firms covered in the dataset of this study are not considered as SMEs which asserts that the results of this study have high representative power for SMEs. The SMEs have legal problems about credit taking processes or payback issues with lots of the banks in Turkey since they are generally backed onto the relationship form banking. So from this perspective, direct lending may be an important Eximbank credit-guaranteed mechanism, since the Türk Eximbank have a monitoring role on the export credit market as we discussed in part 2.

In parallel with the literature, the dependent variable representing the firm failure is defined as a binary discontinuous variable that takes the value of 1 (0) if it is unsuccessful (successful). (See Table 1) The firm is defined as unsuccessful if it has one of the three problems: credit default, protested bills and uncovered checks.[7] Finally, we analyzed 6684 observations, of which 6069 of them are considered as successful and 615 of them are unsuccessful (Table 1). These 615 cases belong to 311 firms that are unsuccessful for one year or more than one year.

[7] After recorded unsuccessful (1), if the firm does not pay the protested bills or has uncovered checks again in the following years according to The Central Bank of the Republic of Turkey data, this firm is considered as unsuccessful (1) for these following years as the recorded year.

The distribution of the unsuccessful 615 cases according to the years follows an increasing pattern: year 2003-43, year 2004-55, year 2005-58, year 2006-93, year 2007-172, year 2008-194. It should be underlined that during the 2003-2008 period the growth rate in nominal export credits of Eximbank was about 300%, but the number of unsuccessful cases increased approximately 450%.

Table 1: Firm Failure Variable Definition

Unsuccessful (1) (If the firm has one of the three problems) (615 cases during 2003-2008)	1. Credit default (222)
	2. Protested bills (275)
	3. Uncovered checks (127)
Successful (0) (If the firm does not have any one the three problems) (6069 cases during 2003-2008)	

As independent variables, the financial ratios calculated from the fiscal year end financial tables of the firms between 2003-2008 periods are used in the study. Out of lots of variables, we omit the financial variables that have more than 0.50 correlations. [8] Moreover, we eliminated the variables that have a variance inflation factor (VIF) larger than 5 to solve the multicollinearity problem. After these adjustments, the financial variables used in this study are presented in table 2 below.

[8] All variables shown in this study are available with the authors upon request.

Table 2: Independent Variables

Financial Variables
Current Ratio (Current Assets / Short-Term Debt)
Net Working Capital Ratio [(Current Assets – Short-Term Debt) / Total Assets]
Net Sales / Total Assets
Net Profit / Total Assets
Net Profit / Equity
Gross Profit / Net Sales
Earnings Before Interest and Taxes (EBIT) / Net Sales
Total Debt / Total Assets**
Long-Term Debt / Total Assets**
Interest Coverage Ratio (EBIT/Interest Amount)
Equity / Long-Term Assets
Total Debt / Equity
Current Assets / Total Assets
Sales Growth Ratio [(Net Sales$_t$-Net Sales$_{t-1}$)/Net Sales$_{t-1}$]*
Export/Net Sales
Ln (Export)
Other Variables
Firm Age (Current Date – The Date of Foundation)
Euro Exchange Rate Volatility (Monthly Standard Deviation)
Annual Change in Eximbank Currency Interest Rate
Sector
Legal Status
City
Geographic Region

* Caching 2002 year data, we use the average of 2004, 2005, 2006, 2007 and 2008 to calculate the sales growth ratio of 2003.

** We eliminated 38 firms from the data set since the ratios of total debt / total assets and long-term debt / total assets observed were larger than 1 in these firms, which is not theoretically possible.

In addition to the financial variables, the important non-financial variables such as firm age, Euro exchange rate volatility, yearly change in Eximbank currency interest rate, sector, legal status, city and the geographic region the firm operates in is controlled in the study. The 22 sectors, 4 types of legal status and 7 geographic regions in Turkey are completely shown in Appendix.

Table 3 describes the summary statistics for these firms. In addition in the below table 4, successful and unsuccessful firms are grouped as numbers and percentages according to firm age, number of employee, legal status of the firm, sector and geographic region.

Table 3: Summary Statistics

	N	Mini	Maxi	Aver	St.
Firm Age	68	0.00	84.00	15.25	10.6
Employee Number	68	100	8107.0	234.6	554.
Current Ratio	66	0.00	549.79	1.92	11.8
Net Working Capital Ratio	66	-0.92	1.00	0.14	0.20
Net Sales / Total Assets	66	0.00	72.10	1.80	1.98
Net Profit / Total Assets	66	-0.82	0.61	0.03	0.07
Net Profit / Equity	66	-8.27	22.29	0.08	0.65
Gross Profit / Net Sales	66	-3.04	1.00	0.14	0.12
EBIT / Net Sales	66	-25.26	54.61	0.06	0.77
Total Debt / Total Assets	66	0.00	1.94	0.64	0.21
Long-Term Debt / Total Assets	66	0.00	1.85	0.08	0.13
Equity / Long-Term Assets	66	-2.00	6068.2	13.08	182.
Total Debt / Equity	66	-	712.23	4.55	15.9
Current Assets / Total Assets	66	0.00	1.00	0.69	0.22
Sales Growth Ratio	66	-1.00	7451.8	3.36	116.
Export/Net Sales	66	0.00	15.17	0.34	0.38
Ln (Export)	66	0.00	22.04	13.18	5.71
Euro Exchange Rate Volatility	66	0.05	0.15	0.10	0.03
Annual Change in Eximbank Currency Interest	66	-0.34	0.33	0.02	0.21

Table 4: Successful and Unsuccessful Firms (Percentages in parentheses)

	Successf	Unsucces	Total
Firm Age			
0-5	726 (10.86)	54 (0.8)	780 (11.66)
6-20	3.609 (53.99)	431 (6.44)	4.040 (60.44)
21-50	1.654 (24.74)	125 (1.87)	1.779 (26.61)
51 or more	80 (1.19)	5 (0.70)	85 (1.27)
Number of			
1-10	753 (11.26)	99 (1.48)	852 (12.75)
11-50	2.002 (29.95)	260 (3.88)	2.262 (33.84)
51-250	1.995 (29.84)	177 (2.64)	2.172 (32.49)
251or more	1.319 (19.73)	79 (11.81)	1.398 (20.91)
Legal Status			
Incorporation	3.703 (55.40)	269 (4.02)	3.972 (59.43)
Limited	2.291 (34.27)	343 (5.13)	2.634 (39.40)
Collective	34 (0.5)	2 (0.02)	36 (0.53)
Sole	41 (0.6)	1 (0.001)	42 (0.6)
Sector			
Real Estate	363 (5.43)	39 (0.58)	402 (6.01)
Textile	2.148 (32.14)	252 (3.77)	2.400 (35.91)
Food-Agriculture	663 (9.91)	87 (1.30)	750 (11.22)
Iron-Steel	305 (4.56)	7 (0.10)	312 (4.67)
Trade (Internal	276 (4.13)	30 (0.45)	306 (4.58)
Automotive	287 (4.29)	31 (0.46)	318 (4.76)
Electric-Electronic	200 (2.99)	10 (0.15)	210 (3.14)
Energy	47 (0.7)	1 (0.01)	48 (0.72)
Transportation-	297 (4.44)	27 (0.40)	324 (4.85)
Machine	287 (4.29)	13 (0.19)	300 (4.49)
Consumer	240 (3.59)	30 (0.45)	270 (4.04)
Mining	129 (1.93)	9 (0.13)	138 (2.06)
Chemistry-	230 (3.44)	34 (0.51)	264 (3.95)
Package Materials	115 (1.72)	5 (0.07)	120 (1.80)
Tourism-Hotel	74 (1.10)	4 (0.06)	78 (1.16)
Jeweler	89 (1.33)	7 (0.10)	96 (1.44)
Leather	118 (1.77)	14 (0.21)	132 (1.97)
Publication-	24 (0.36)	0 (0)	24 (0.36)
Servicing	6 (0.09)	0 (0)	6 (0.09)
Forest-Paper-	77 (1.15)	1 (0.01)	78 (1.17)
Health	23 (0.34)	1 (0.01)	24 (0.36)
Stone-Soil and	71 (1.06)	13 (0.19)	84 (1.26)
Geographic			
Marmara	2.762 (41.32)	244 (3.65)	3.006 (44.97)
Central Anatolia	854 (12.78)	100 (1.50)	954 (14.27)

Aegean	1.419 (21.23)	135 (2.02)	1.554 (23.25)
Mediterranean	401 (6.00)	49 (0.73)	450 (6.73)
Eastern Anatolia	43 (0.64)	5 (0.07)	48 (0.72)
South East	408 (6.10)	66 (0.99)	474 (7.09)
Black Sea Region	182 (2.72)	16 (0.24)	198 (2.96)

Table 4 indicates that we have 3609 successful observations with an age between 6-20 years, 2002 successful observations with 11-50 employees and 3703 successful observations of incorporations. The number of successful firm observations is higher in the traditional textile sector (2148 firm) and of course in the Marmara region (2762 firm) due to our metropolis İstanbul. The Aegean part that is popular with the city of İzmir has 1419 successful observation. The number of successful observations in Central Anatolia comes thereafter with 854 firms. After the 1923 Republic regime in Turkey was accepted, Atatürk government determined Ankara as capital city and supported the modern development of sectors such as industrial equipment, furniture, cement, construction, agricultural equipment and food sector in the central area. The unsuccessful firms in our sample have low percentage (1.50%) in Central Anatolia when we compare it to Marmara (3.65%) and Aegean (2.02%).

We choose a logistic regression (logit) model for this study. This is not a new methodology for firm failures but used as a main flexible approach to test the credit risk. Altman and Sabato (2007) aim to predict the credibility of SMEs by testing more than 2000 US firms in the 1994-2002 period and find that the logistic regression model has approximately more than 30 % accuracy rate according to the traditional firm failure models. Muzır and Çağlar (2009) test unsuccessful İstanbul Stock Exchange (ISE) firms between 1998-2003 data by using eight models: Beaver's one variable model (1966), Altman's Z-Score and revised Z-Score model (1968), Altman's ZETA model (1977), Deakin's firm failure model (1972), Ohlson's O-Score Model (1980), Zavgren's BPR model (1982) and Zmijewski Financial Distress Prediction Model (1984). They show that a binary logistic regression model shows the greatest performance. Ünsal and Güler (2005) have also some evidence about the logistic regression method being a better method to analyze the financial situation of the Turkish Banking sector than other methods.

The results of the logit model are objective, because lots of the assumptions of the logit model are compatible with economic realities and distributions of the financial data. In a logistic regression, a dependent variable does not have to be normally distributed. It is based on the cumulative logistic probability function.

The strength of the logit model grow from the discrete variables and categorical variables included (Lai and Jing, 2010).

5. Results

The relation between selected independent variables and firm failure of firms that take direct credits is analyzed by the Stepwise Forward Conditional method under Logistic Regression Analysis.

The significant variables in the logit model are exhibited in table 5. Chi-square value of the logit model is 377.292 and significance rate is smaller than 0.001 (.000) which asserts that the relation between independent variables and dependent variables is supported and selected parameters of the achieved model are significant. The Hosmer and Lemeshow (α= % 5) test results specifies the χ^2 statistic take a high value of 0.965 which is greater than 0.05 level, so we fail to reject the null hypothesis that there is no difference between observed and model-predicted values, implying that the model's estimates fit the data at an acceptable level. The results of the analysis determine Nagelkerke R^2 value as 0.12 and Cox-Snell R^2 value as 0.055. Sometimes these indicators could take low values despite independent and dependent variables have strong relation (Tchantchane 2009: 230-232).

Table 5: Logit Results

Variables	Coefficient	Standard Deviation	Wald	df	Sig.	Exp (B)*
Constant	-3.609	5.307	0.462	1	0.497	0.027
Ln (Export)	-0.02	0.008	6.829		0.009	0.98
Net Profit / Total Assets	-1.549	0.573	7.306	1	0.007	0.212
Total Debt / Total Assets	0.749	0.229	10.681	1	0.001	2.116
Euro Exchange Rate Volatility	-3.487	1.384	.353	1	0.012	0.031
Annual Change in Eximbank Foreign Currency Interest Rate	-2.771	0.218	162.206	1	0.000	0.063
Employee Number	-0.001	0	10.295	1	0.001	0.999
Limited Type Firm (type 2)	-0.5	0.094	28.34	1	0.000	0.606
Iron-Steel (sector 4)	1.331	0389	11.707	1	.001	3.785
Machine Construction (sector 10)	0.922	0.292	9.966	1	0.002	2.514
Forest, Paper, Furniture (sector 20)	3.265	1.176	7.701	1	0.006	26.173
Aksaray (city 68)	-1.663	0.627	7.038	1	0.008	0.19
Bartın (city 74)	-3.644	0.868	17.628	1	0.000	0.026
Düzce (city 81)	-1.766	0.613	8.313	1	0.004	0.171
Central Anatolia Region (region 2)	-0.343	0.125	7.532	1	0.006	0.709
South East Anatolia Region (region 6)	-0.474	0.150	10.03	1	0.002	0.622

* Exp (B) statistics in other words odds ratio indicate the effect of one unit change of independent variables on the likelihood ratio.

The export variable (standardized as natural logarithm) has a Wald statistic of (6.829) and is significant at 5 % level. Calculated by the difference between a restricted and an unrestricted model, the Wald statistic shows the importance of the addition of the stated variable in the logit model. The Ln(Export) variable, which has a negative coefficient and a low odd ratio (0.027), reveals a lower probability of the firm being unsuccessful with increases in the exports amount. If the export capacity of the firm increases, the default probability generally decreases since the productivity, size and sales revenue of the firm increases (Bernard and Jensen 2002, Harris and Li 2010).

One of the known financial indicators is the profitability. The Net Profit / Total Assets ratio has a Wald statistic of (7.306) and is significant at a 5 % level. The higher the ratio of Net Profit / Total Assets, the lower the probability of the firm is being unsuccessful. This is not a big surprise, since more profitable firms could conduct more healthy and successful operations. The negative coefficient and the 0.98 odd ratio in the model verifies the literature. More healthy firms are known about their use of assets more productively. The second famous financial indicator is the debt ratio. The Total Debt/Assets ratio has a Wald statistic of (10.681) and is significant at 5 % level according to table 5. The positive coefficient and high odd ratio (2.116) in the model shows that an increase in the variable increases the probability of being an unsuccessful firm. The debt ratio increases firm failure in our model consistent with the other logit studies in the known literature (Ohlson 1980; Zmijevski 1984). It also verifies the failure studies of Vuran (2009), Aktaş (1993) and the other limited studies in this area in Turkey.

As another indicator, Türk Eximbank may follow the Euro Exchange Rate Volatility, because more than half of the exports of Turkey are conducted with the European Union. Within the 2003-2009 periods, there are significant fluctuations in the euro Exchange rate. From 1.70 TL level in 2003, euro exchange rate bounces 2.20 TL at the end of 2009. The negative coefficient and low odd ratio (0.031) of Euro Exchange Rate Volatility demonstrates that the increase in euro volatility decreases the firm being in an unsuccessful category for the analysis period. It is not easy to forecast the effect of Euro exchange rate on exporters for Türk Eximbank, since a fluctuating-rate regime in Turkey is being accepted after 2001. The Eximbank could build up hedging mechanisms to protect against unexpected changes on the currency rates, instead of intervening in the currency rates or rejecting the exporters' desire on direct credits. On the other hand, change in foreign currency interest rates directly affects the credit decision of exporters due to the rise in interest costs. The coefficient of annual change in the Eximbank Foreign Currency Interest Rate is significantly negative in the model, so an increase in this variable is associated with a decrease in the probability of being an unsuccessful firm. Starting from 2003 onwards, there is an increasing trend in Eximbank exchange interest rate till 2006. The reason of the decrease in firm failure between 2003-2006, when there is an increasing trend in Eximbank exchange currency interest rate, might be that the good export performance decreases the interest costs' of exporters.

However, the export performance is not known well before, the Eximbank should be covered from the Currency Interest Rates Changes again by using hedging or swaps. Abdul-Malek (1976) and Donnalley and Sheey (1996) that works on country risk and currency risk models emphasizes that export specific risks are sometimes more important than credit risks for exporters. They focus currency risk evaluation and risk management process in their studies.

Regarding the firm characteristics, the negative coefficient and 0.999 odd ratio of Employee Number in the model shows that an increase in this variable decreases the probability of the firm being unsuccessful. The large-sized firms have an advantage to use economies of scale and increase their funds relative to the small firms; besides they have tax advantages and are in better position to hire qualified employees (Audretsch and Mahmood, 1994). In its direct credit portfolio, Türk Eximbank should better take large-sized firms of Turkey and the other countries'. In addition, it is found that limited firms that have 1 up to 50 shareholders generally have low failure rates. The binary variable of limited type firm (type 2) has a Wald statistic of (28.34) and is significant at a 5 % level according to table 5. Having after incorporations of 55.40 % success rate, remember from table 4 that 34.27 % of firms in this study is successful of limited type. The limited type firms are smaller than incorporations, more flexible under changing consumer preferences and global conditions and quickly adaptable to the changing environment (Mata and Portugal, 2002).

Table 5 shows that the odd ratios of Iron-Steel (sector 4), Machine Construction (sector 10) and Forest, Paper, Furniture (sector 20) variables are 3.785, 2.514 and 26.173 respectively; and their significance levels are 0.001, 0.002 and 0.006 accordingly. The positive coefficient of these variables shows that the firms that work in these sectors have much more failure risk. Particularly the odd ratio of Forest, Paper, Furniture sector is remarkable. Considering the very high exp(B) value of sector variables, Forest, Paper, Furniture, Machine Construction and Iron, Steel industries are carrying significant risk and not compatible with overall industry performance. This result indicates that the funds of Eximbank might be allocated inefficiently by crediting them, or alternatively the bank made a positive discrimination to support those industries.

According to the statistics of Ministry of Economy in 2003-2008 period, the economic performance of those sectors are above average; and the realized exports from the Iron-Steel, Machine Construction and Forest, Paper and Furniture sectors[9] rise to a 32 % share in total exports of Turkey in 2008, being 25 % of total exports of Turkey in 2003. The weight of those three sectors constitutes about 10% of total export credits of Eximbank (see table 4). If we look at the approximate distribution of industrial short-term credits in 2005-2009 period of Türk Eximbank, Machine Construction sector is in the 2nd rank with a 16 % share and Iron-Steel sector is in the 3rd rank with a 10 % share. Increasing industrial shares in total exports indicates that more firms covered in this study have excessive credit usage from Türk Eximbank which may cause an increase of the failure probability. The Eximbank should evaluate the firm characteristics and diversify the direct credit approvals according to the different industries rather than specifying the eligible ones. [10]

The Central Anatolia Region (region 2) and South East Anatolia Region (region 6) variables have odd ratios of 0.709 and 0.622 respectively, and significant at $\alpha = \%\ 5$. The negative coefficients (-0.343, -0.474) indicates that the failure rate of businesses in these regions decline. These two regions are generally supported by Turkish governments to increase business opportunities. Central Anatolia has a competitive advantage in the exports arena as against on the other regions of Turkey. According to the statistics of Ministry of Economy, 2003 export amounts in the Central Anatolia were 2.92 billion USD that is increasing to 8.44 billion USD in 2008, being a 188.5 % increase on average more than the average 179 % of increase in Turkey's exports for the 2003-2008 period. South East Anatolia mostly fits to the definition of rural area among the other six regions of Turkey that should be supported with more flexible and appropriate lending schemes.

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[9] The share of wood and forestry products is especially important in Turkey's total exports with 2,5 % share realized in 2009. Today, Turkey exports in wood and forestry products to more than 200 countries. The forestry products and enterprises of furniture industry within Turkish manufacturing industry is the third important field of industry where SMEs operate. In terms of number of workplaces, they have a share of about 25 %. In creating employment, they hold a 10 % share (http://www.turkishpaper.org/EN/Genel/BelgeGoster.aspx?).

[10] Within the scope of the Export Finance Intermediation Loan (EFIL-IV), which was put into force with an agreement between Türk Eximbank and the International Bank for Reconstruction and Development (World Bank), electric-electronic, automotive supplier and metal ware industries have been included to the eligible sectors in addition to ship/yacht building and machinery manufacturing industries (Annual Report Eximbank, 2011).

The previous logit findings of Küçüktalaslı, Arslan-Ayaydin and Karan (2012) about this region on consumer lending shows that the relation of the failure rate of households that use credits in South East Anatolia region declines as well.

Aksaray (city 68), Bartın (city 74) and Düzce (city 81) variables have odd ratios respectively at 0.190, 0.026, 0.171; the significance levels are 0.008, 0.000 and 0.004 accordingly. The export amounts of Aksaray, Bartın and Düzce provinces in Turkey's total exports are found only 0.05 %, 0.007 % and 0.06 % respectively, which asserts that these provinces have low shares in the export amount of country generally. In these three provinces per capita GDPs are lower than Turkey's per capita GDP and they take incentives from the government most of the time to increase the trading activities. For these reasons their failure rate are found as low. However the weights of these cities in Eximbank credits are very small, so this result has limited impact.

Finally, we check the classification accuracy of the model which assumes that the cost of false classification of Type 1 error is more than the costs of Type 2 error. Type 1 error marks the unsuccessful firm as successful, while Type 2 error marks the successful firm as unsuccessful in the sample. To minimize the Type 1 error, cut-off points between 0.5 and 0.1 are calculated to determine firm failure probability. 0.1 is the cut-off value that is accepted to minimize the type 1 error.[11] Classification results for Cut-off point 0.5-0.1 interval is shown under table 6:

[11] Altman (1968) and Deakin (1972) use different cut-off points to minimize the false classification ratios. Ohlson (1980) and Palepu (1986) use the intersection points of two different groups as cut-off, while Frydman, Altman and Kao (1980) and Barniv, Agarwal and Leach (2002) use the cut-off points that minimize the false classification number. Chi and Tang (2006) use the cut-off point that minimize Type I error.

Table 6: Classification Results for Cut-off between 0.5-0.1

Observed			**Forecasted**		
			Failure		Accuracy Rate
			0	1	
Cut-off Point =0.5	Failure	0	6067	2	100.0 %
		1	604	11	1.8%
	Total Percentage				90.9%
Cut-off Point =0.4	Failure	0	6055	14	99.8%
		1	600	15	2.4%
	Total Percentage				90.8%
Cut-off Point =0.3	Failure	0	5992	77	98.7%
					6.5%
	Total Percentage				90.2%
Cut-off Point =0.2	Failure	0	5646	423	93.0%
		1	473	142	23.1%
	Total Percentage				86.6%
Cut-off Point =0.1	Failure	0	4215	1854	69.5 %
		1	231	384	62.4 %
	Total Percentage				68.8 %

At a cut-off point of 0.1, successful firms (0) are predicted at a 69.5 % accuracy rate and unsuccessful firms (1) are predicted at a 62.4 % accuracy rate. An accuracy rate of total 68.8 % is realized. Hence, we obtain a significant statistical credit risk model to determine the failure of firms that use direct credits of Türk Eximbank and our results and credit evaluation criteria are robust for the analysis period.

6. Discussion

This study analyses the determinants of the firm failure of exporters using direct credits from Türk Eximbank. There are many empirical papers that study the determinants of firm failure. However the effect of direct credits on exporter firms' failures and the role of Eximbanks on the credit process have not being studied yet.

The credit agencies called Eximbanks in all over the world have different field of activities, ranging from direct and indirect credits to insurances and guarantees. Most of the Eximbanks in Europe only provide export insurances. The other Eximbanks in developed countries like US give only long term export credits under specific conditions.

Turkish Eximbank is the unique example among others; the bank not only provides export insurance to export companies, but also lends with low interest rates on the short term credit market in the direct form predominantly. It has lower default rates than the intermediary commercial banks in the system. Türk Eximbank works transparently and competitively with its established rules rather than relying on the relationship banking as most commercial banks in Turkey prefer to increase its portfolio. In addition, the bank does not have any fund loss due to the failure of unsuccessful direct credits, since it takes letter of credits, credit fund guaranty and domestic/foreign government bonds as 100 % collateral to credit risk. The letter of credits undertakes the payment risks that are fairly material for the exporters' ability to reach the direct financial sources of Türk Eximbank. Particularly, this paper is searching if Eximbanks should give direct export credits or not, inspired by the success of Turkish experience.

Our basic risk model which is derived from the data of Türk Eximbank indicates that not only financial variables, but also firm specific and macro economic variables are significant in detecting credit risk of the company. These variables are Export size, Net Profit / Total Assets, Total Debt / Total Assets, Euro Exchange Rate Volatility, Annual Change in Eximbank Interest Rate, Employee Number, Firm Type, Forest, Paper, Furniture, Machine Construction and Iron, Steel sectors and three provinces and two regional factors. Most of the variables have consistent meanings with literature except for some specific sectors like Forest, Paper, Furniture, Machine Construction and Iron, Steel sectors. The research indicates that the companies of those sectors are carrying more credit risk with very high odd ratios in the logit model. However official economical reports which reveals that these industries achieved above average performance during the research period, are not confirming this result for the Turkish economy.

The inconsistency between economical reports and our results indicate that the funds of the bank might be allocated inefficiently, by heavily crediting Forest, Paper, Furniture, Machine, Construction and Iron, Steel sectors. Considering the credit guarantee mechanism of the bank, without harming the public funds, some companies in these sectors may be over-supported. To have more evidence on this issue, an additional research is needed. We limited the study by using the audited financial tables of exporters in before 2008 crisis period.

Export credit institutions alleviate market failures in the effective provision of export credits as well as insurance and guarantees especially in times of crisis. Separate analysis could be conducted about the effect of crises on Eximbank credits as a further research.

We point out that the financial evaluations of the exporter firms using direct credits from Türk Eximbank prevent the inefficient usage of these credits and curbs information asymmetries between the Eximbank and its borrowers. Hence, our research draws attention that the direct credit mechanism of Türk Eximbank is specific and advisable for export-oriented economies if applied properly. However there could be a minor political influence on the direct credit policies since the aim of the Türk Eximbank is to support and promote solutions to exporters alike the other Eximbanks in the whole world, but there is not a reflex of public about that issue. The models prosper in future to attribute Eximbanks as a market maker role in the export credit market by depending on its influence on interest rates and term structure. Consequently, Eximbanks as profit-oriented institutions does not want to bear the risk of exports.

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Appendix: Sectors, Geographic Region and the Legal Status

No	Sectors
1	Real Estate
2	Textile
3	Food-Agriculture
4	Iron-Steel
5	Trade (Internal and External)
6	Automotive
7	Electric-Electronic
8	Energy
9	Transportation-Shipping
10	Machine Construction
11	Consumer Durables
12	Mining
13	Chemistry-Cosmetic-Plastic
14	Package Materials Industry
15	Tourism-Hotel
16	Jewelers
17	Leather Productions-Footwear
18	Publication-Printing
19	Servicing
20	Forest-Paper-Furniture
21	Health Productions-Hospital
22	Stone-Soil and Glass productions

No	Legal Status
1	Incorporation
2	Limited
3	Collective
4	Sole proprietorship

No	Geographic Region
1	Marmara
2	Central Anatolia
3	Aegean
4	Mediterranean
5	Eastern Anatolia
6	South East Anatolia
7	Black Sea Region