

EXPORT INTENSITY BEHAVIOUR AND ITS DETERMINANTS  
FOR TURKISH MANUFACTURING FIRMS

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FOR TURKISH MANUFACTURING FIRMS

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**Abstract**

This paper examines export market entry behavior and export intensity of Turkish manufacturing firms. It tries to explain what kind of firm characteristics, domestic constraints, market properties or regional conditions affect export or do not export decision and export intensity levels of firms. Size and productivity, informal competitors in sector, industrial and regional properties are found influential in both decisions. Age, number of competitors in the market, customs regulations and crime in the country are effective on export intensity level. Tax administration is only influential on export market entry decisions of firms.

# Türk İmalat Sanayi Firmalarının İhracat Yoğunluğu ve Onun Belirleyicileri

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## Özet

Bu makale Türk imalat sanayi firmalarının ihracat yoğunluğunu ve dış pazara girme davranışlarını incelemektedir. Ne tür firma özelliklerinin, yerel kısıtlayıcıların, piyasa özelliklerinin, bölgesel durumların ihracat edip etmeme ve ihracat yoğunluğu seviyesini etkilediğini açıklamaya çalışmaktadır. Firma büyüklüğü, üretkenliği, sektördeki yasadışı rakipler, endüstriyel ve bölgesel etkenler her iki kararda da etkili bulundu. Firma yaşı, marketteki rakip sayısı, gümrük düzenlemeleri ve suç etkisi, firmaların ihracat yoğunluğunu belirlemede etkili olduğu görüldü. Vergi yönetiminin ise firmaların yabancı pazara girme hususunda önemli olduğu gözlemlendi.

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# Chapter 1

## Introduction

Turkey is one of the most intriguing economic actors with its rapid economic growth rate and financial advancements in last decade. Export volume of Turkish economy increased USD 28 billion (in 2000) to USD 132 billion (in 2008). Turkish firms became connected with foreign markets, especially in Europe, Middle East and Mediterranean regions, many Turkish firms went into an active position by exporting or investment in these new regions. At this point, a critical question occurs: "Why do some firms export whereas others do not?" When some firms go into export market, others do not. There should be some reasons which affecting decisions of the firms for exporting. In literature, it is generally accepted that larger and more productive firms go into export market. Selling abroad has some costs and most firms can not cover expenses of exportation. Melitz (2003) is one of the prominent paper that explains this positive sorting of more productive firms into export market. Arkolakis (2008) generates endogenous fixed cost model of Melitz to marginal entry cost model. Arkolakis observes that for French manufacturing firms, some big companies which have great shares in their countries do not export much. They sell a tiny amount of their commodities to foreign countries. As a conclusion, he showed that firms face with increasing marginal entry cost when they export, high productive firms have low costs of production and they can cover expenses of increasing marginal cost of exportation until a point.

My paper examines what kind of firm characteristics, domestic constraints, regional conditions, market or sector properties affect decisions of export propensity (the amount of foreign sales in total sales of the company) behavior of the firms. Most of the studies care about entry/exit decisions of the firms. They examine what determines a firm to go into export market. Papers which study entry/exit decisions of the firms may not surely catch the real incentives of the firms. There might be some differences for firms who are in export market. A firm which sells a tiny amount of its products to foreign countries may differ from a firm with a high level of export intensity. By merely caring about export entry/exit decision, we may not distinguish characteristics of firms in the export market. On the other hand, much of the trade literature focuses on the micro characteristics of the firms. Government policies and macro variables may also affect export intensity of the firms.

To understand the determinants of export intensity of Turkish manufacturing firms both at micro and macro level, I divide determinants of the export intensity into three categories. First branch includes characteristics of the firms. I use size, productivity, age, capital intensity, foreign ownership and regions of the firms. It is generally accepted that size and productivity are the components which are the main sorting variables into export activities. Exportation has costs such as advertisement, custom taxes or transportation. Size and productivity play important roles to cope with cost problems. Large sized companies

may earn more in the domestic area and can use this money to reach customers in the foreign market. On the other hand, more productive firms may decrease costs of the production and can reserve more funds to cover expenses of exportation. Senturk and Erdem(2008) find positive effect of the firm size (number of employees) on export intensity for the SMEs (small and medium sized enterprises) in Turkey. Ozler, Taymaz and Yilmaz (2008) observe that as the plant size increases, the likelihood of being an exporter increases as well, but at a decreasing rate. Also, there are some papers which show that size may have different effects for some firms. Sterlacchini (2001) works on 3659 Italian firms and observes that there is a positive impact of size on export probability and export intensity for small firms whereas for large firms, the relationship is U- shaped. Similar conclusion exists in Wagner (2001). Wagner finds a U-shape impact of size on export intensity for German manufacturing plants. For productivity vs. export intensity issue, Yoshino (2008) claims that efficient firms can export to more countries. When they expand their export markets, they can increase their profits and so, export intensity rates and productivity of the firms are positively correlated.

Moreover, the paper checks the relationship between age of the firms and export intensity. There are two different views on this issue. Majocchia (2005) finds that for manufacturing firms, industry experience is an important variable and that the relationship between age and export performance is positive. Majocchia remarks that firms need to develop an international network of partners and customers. In order to set up this network, firms need time and information. On the contrary, young firms may have different incentives for export intensity. Fryges (2006) works on high tech sectors in UK and Germany. He shows that high tech sector firms become active in export market in short time and reach a high level of internationalization stage. So, young firms in high tech sectors have higher export intensity level. Then, by the two papers, we can reach that age and export intensity may have different relationships in different countries and industries.

Another component that I investigate is foreign ownership. Foreign firms invest in some countries to decrease their expenses. But here, there is a point which we need to intensify on. There might be two incentives for foreign firms to invest in a country. First, they may see the country as a market and invest to sell in the domestic country. Second, they may invest to diminish their production costs with cheap workers, low taxes etc. and sell abroad. If first option dominates, most probably we see negative or no affect on foreign ownership on export intensity results. If the second branch dominates, we can see positive relationship between the two. Yoshino (2008) and Hiep and Nishijima (2009) find that foreign ownership has positive impact on export intensity. On the contrary, Ozler, Taymaz and Yilmaz (2008) could not find any support for the effect of foreign ownership on export decision for Turkish manufacturing plants.

Regions of the firms may affect export intensity levels of the firms. Some regions may have advantages or disadvantages. If a region has high level transportation opportunities, high skilled labors around, firms in the region might have better conditions to enter foreign markets. Thus, location of the firm can affect the export intensity.

Finally, capital intensity of a firm may differently affect export intensity. The use of tools and machinery makes labors more effective. Rising capital intensity increases productivity of labor. Thus, we can expect capital intensity in economy may affect export behaviors of firms. Yoshino (2008) finds a positive impact of capital intensity for African countries whereas Hiep and Nishijima (2009) find a negative impact for Vietnamese companies. The important situation here can be the competitors in the foreign market. A country like Vietnam which has strong competitors in capital intense industries in its land such as South Korea, Taiwan, Singapore may have disadvantages. Then, this scenario might lower their exports in capital intense sectors. Firms may then focus on labor intense products. On the other hand, firms like those in Africa may increase their sales by concentrating on capital intense sectors by benefiting from lack of high capital intense producers around them. For Turkey, according to my results, it seems none of the external competitors dominate attitudes of the Turkish firms. Turkey is surrounded by either developed or developing countries. In some markets like Middle East region, capital intense products can be positive factor. On the other hand, capital intense products can be negative factor in some regions like Europe.

For the first branch, I find that size and productivity are positively affecting both export intensity rate and export market entry decision. Age has negative effect on export intensity level. Also, regional properties are important for firms' export behaviors.

Second branch of determinants of export intensity are market properties. Number of competitors, average GDP per capita and exchange rate values of export destinations for each industry, membership of a specific industry are the characteristics that I test. Number of competitors of a firm may determine its export performance. Cloughety and Zong (2008) consider domestic rivalry and international rivalry for airlines. They find that experiencing substantial domestic rivalry tend to perform better in export markets whereas international rivalry decreases export intensity of the firms.

Some industries export more with respect to others. Membership in an industry can have some advantages or disadvantages in export market and these conditions may affect export intensity rates. Iyer (2010) observes positive relationship between sector export intensity and firm export intensity for agriculture and forestry industries of New Zealand. I think we can specify three reasons for connection between sector and firm export behaviors. First, there might be a potential market for an industry. If some firms in an industry earn profit, it may attract attention of other firms and this may increase overall

export intensity. Second, costs may differ between the industries due to differences in potential export destinations. Every industry focuses on some specific places. For example, textile sector sells products usually into European and USA regions, but, main metal industry sells into Middle East and Mediterranean regions. Then, these regions can have different costs such as advertisement, customs or transportation.

Moreover, export destinations may affect firms in an industry. Concentrating into richer countries which have higher GDP per capita or poor countries which have low GDP per capita can influence export intensity rates of the firms. On the other hand, exporting to countries with high or low exchange rates may give different results. Detailed information about average GDP per capita and exchange rates of export destinations is given in data description section.

For the second branch, I find that industrial conditions affect a firm's activities on export market. Also, exporting to countries with high GDP per capita increase export levels whereas countries with high exchange rate lower export intensity levels.

Final set of determinants of export intensity is domestic constraints. Every country has distinctive structure. Government policies, location of the country, underground sources, democracy level may influence economical attitudes of the firms. Some firms may be affected by these factors and they create their export strategies according to them. I consider some obstacles which may affect trade operations of the firms. The obstacles that I focus on are tax rates, tax administration, business licensing and permits, political instability, crime, customs and trade regulations, informal sector competitors, inadequately educated workforce and access to finance. Hiep and Nishijima (2009) examine similar obstacles for Vietnam. They find that constraints by tax rates, crime and informal sector competitors have negative impacts on export intensity rates of the firms. They do not find significant results for other obstacles.

For the third branch, I find that informal competition in sector obstacle lowers export intensity level and export market entry probability where crime obstacle increases export intensity level. Tax administration affects export market entry in negative way.

## **Chapter 2**

### **Data Description**

I use World Bank Enterprise Survey (2008) for Turkey to determine export intensity behaviours of the firms. Data includes 1153 firms. Face to face interviews with the firm officers are implemented and information about firm characteristics and obstacles are held. This data set includes variables that make it easy to observe firms' export behaviour. I, also,

use TUIK (Turkish Statistical Institute) data to determine average GDP per capita and exchange rates of the destination countries per industry which is described in detail below. It provides detailed information about where and how much each industry sells their products. There is information about countries where each of the industry sells its products. I convert the nominal values into percentage level. Because of detailed information, I omitted countries whose export percentage is below %0,4 in the industry export. Finally, I received information about GDP per capita and exchange rates for the countries from “datamarket.com” which generates data from IMF and World Bank.

**TABLE 1: Means, numbers, standard deviations and min/max values of variables**

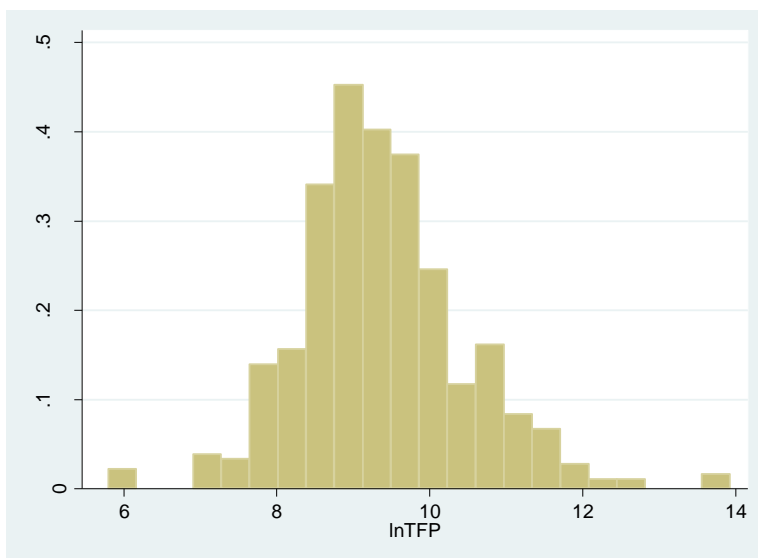
variable	variable code	observation	mean	std. dev.	min	max
size large	size1	335	**	**	**	**
size medium	size2	452	**	**	**	**
size small	***	365	**	**	**	**
age of the firm	age	1143	17,89	0,348	1	83
foreign ownership	foreown	1152	2	0,367	0	100
logarithms of TFP	lnTFP	484	9,38	0,05	5,794915	13,92754
GDP per capita	gdpcap1	829	28909,45	212,44	21268,88	41297,18
exchange rate	exch1	829	107,1744	0,08476	101,9252	109,6297
number of competitors	competitor	643	3	0,103	0	more than 5
logarithms of capital intensity	lncapint	547	9,62	0,0737	4,2007670	16,01274
tax rates	tax	1152	2,3	0,04	0	4
business licensing and permits	bus	1152	1,36	0,04	0	4
transportation	trans	1152	0,85	0,036	0	4
political instability	polinst	1152	2,44	0,042	0	4
crime, theft and disorder	crime	1152	0,53	0,034	0	4
informal sector competitors	informalcomp	1152	1,65	0,045	0	4
customs and trade regulations	customreg	1152	0,76	0,035	0	4
inadequately educated workforce	inadeqeduc	1152	1,56	0,041	0	4
access to finance	accfin	1152	0,96	0,036	0	4
tax administration	taxad	1152	1,26	0,038	0	4

Below, the variables which I use to explain export intensity are described in detail. Also, detailed information about the variables is given in Table 1.

In the survey, size is divided into three categories: Small (number of workers<19), Medium (number of workers between 20 and 100) and Large(number of workers>100). In my regression, I use large and medium firms as dummy variables. Number of competitors defined as a dummy variable too. Options for firms to choose were “none”, “one”, “2 to 5” and “more than 5”. Firms which compete with less than or equal to five and more than five

are the two categories which I describe. Capital intensity is total net book value of machinery and equipment over total permanent production workers. Foreign ownership is in the percentage values. In my data, 1100 firms are domestic and 9 firms are fully foreign owned. TFP is another component which I use. To calculate TFP, I use constant returns to scale production function ( $Y=A.K^\alpha.L^{1-\alpha}$  where “A” is productivity, “K” is capital and “L” is labor, “ $\alpha$ ” is capital share and “ $1-\alpha$ ” is labor share). I estimate log of the production function. I find capital share “ $\alpha$ ” 0,218 and labor share “ $1-\alpha$ ” 0,781. The estimated value of “ $\alpha$ ” then used to generate the TFP residuals for each firm. LnTFP values are between 5,79 and 13,92. Distribution of LnTFP is described in Graph 1.

**Graph 1 : Numbers of firms in each productivity level**



Age is observed directly from the data. The youngest firm is only one year old whereas the oldest firm is 83 years old. GDP per capita and exchange rates values of the export destination countries for each industry are calculated from TUIK export data. A simple example is given below.

Let me take an industry which is exporting to five destinations. Proportions of exports and exchange rates are as given:

	A	B	C	D	E
Sales:	10%	20%	5%	50%	15%
Exchange rates:	110	108	97	102	88
Weights:	11	+ 21.6	+4.85	+ 51	+ 13.2 = 101.65 TOTAL

Then, real effective exchange rate is 101.65 on average foreign country set for this industry. Same calculation is true for GDP per capita. Results are given in Table2. Here,

exchange rate is the real effective exchange rate. It means that a consumer in different countries pays money according to effective exchange rate of his country. For example, a person in country A pays 90 domestic money where in country B, he pays 110 domestic money. Here, money value of country A is high and its real exchange rate is low.

To determine the obstacles which firms face when they operate, firms are asked if they perceive these obstacles as serious constraints. Answers were given between zero and four where 0=no obstacle, 1=minor; 2=moderate;3=major; and 4=very severe. I specify a strict rule to determine my dummies. I put {0,1,2} answers to dummy zero and {3,4} answers to dummy one.

I also check industry and region impacts on export intensity rates as dummy variables. Industries are food, textiles, garments, chemicals, plastics and rubber, non metallic mineral products, basic metals, fabricated metal products, machinery and equipment, and electronics (Table 3). On the other hand, regions are Marmara, South, Central Anatolia, Black Sea-East and Aegean. Food and garments are used as control variables in industry dummies and Central Anatolia region is used as control variable in regressions (Table 4)

**TABLE 2: Means of exchange rate, GDP per capita values of export destination countries and export intensity rates per industry**

	exchange	gdpcap	expint
WOOD AND WOOD PRODUCTS			
	102,504	35941,2973	
FOOD-15			
	108,237	26246,3576	12,4
TEXTILES-17			
	106,602	29948,4503	22,34
GARMENTS-18			
	101,925	41297,1781	27,84
CHEMICALS-24			
	108,501	21268,883	12,46
PLASTICS AND RUBBER-25			
	108,590	28346,1496	20,76
NON METALIC PRODUCTS-26			
	109,461	24984,8619	16,16
BASIC METALS-27			
	107,698	37436,191	13,26
FABRICATE METAL PRODUCTS-28			
	109,629	25891,4	12,5
MACHINERY AND EQUIPMENT-29			
	107,681	25966,5208	17,67
ELECTRONICS-31			
	109,575	27014,5295	27,15

**TABLE 3: Numbers of firms for each industry**

industry	observation	percent	cumulative
food	158	13,72	19,53
textiles	179	15,54	35,07
garments	128	11,11	46,18
chemicals	107	9,29	55,47
plastics & rubber	43	3,73	59,2
metallic mineral products	110	9,55	68,75
basic metals	19	1,65	70,4
fabricate metal products	38	3,3	73,7
machinery and equipment	34	2,95	76,65
electronics (31 & 32)	13	1,13	77,78

**TABLE 4: Numbers of firms for each region**

region	observation	percent	cumulative
Marmara	424	36,81	36,81
Aegean	199	17,27	54,08
Black Sea - Eastern	109	9,46	63,54
Central Anatolia	183	15,89	79,43
South	237	20,57	100
Total	1,152	100.00	

I want to summarize about domestic constraints which I derive from Enterprise Survey Country Profile for Turkey (2008). Firm operations are not only dependent on characteristics of firms. They also depend on external factors. For exportation, customs and trade regulations are important. Firms need import or export licenses to trade with other countries. During getting licenses or customs operations, they might lose time or bribe customs officers. Transportation is a substantial component for firm operations. Firms can face additional costs due to loss, merchandise theft, breakage or spoilage during transportation. On the other hand, business licensing and permits can be another problem for firm operations. The number of permits and approvals that businesses need to obtain, and the time it takes to obtain them, are expensive and time consuming. The legislation status of a country can affect investments and legal forms of the firms. Tax administration can be another difficulty for firm managers. Senior managers and public officials meet and discuss the tax conditions of the firm. Number of tax inspections in a year or time spent by managers for these meetings can constitute problem for firm operations. Crime can also be



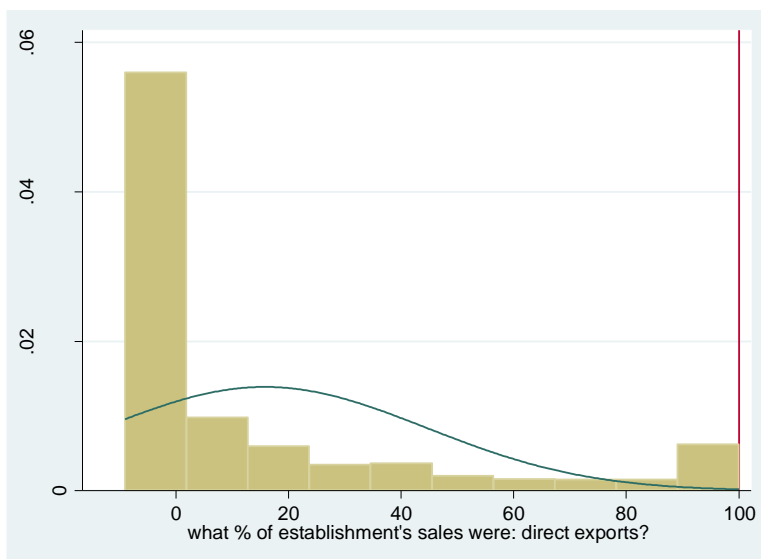
a constraint for firms. Crime may cause some risks on firms. During transportation or in the production facilities, there can be problematic situations such as theft or plunder. Then, firms need to increase security expenses and this lowers the resources for production activities. So, foreign and domestic investors perceive crime as an indication of social instability and crime thus indirectly can increase the cost of doing business. Similarly, a large informal sector has serious consequences for the formal private sector. The informal sector may create unfair competition for formal firms. Besides, political instability is important for firms. People are risk averse in general. To make investment or increase firm operations, they want to see the future clearly. Political stability can constitute confidence environment for them. Lastly, efficient financial markets can lower money finance from internal funds and informal sources such as family or friends.

## Chapter 3

### Model

In my model, I want to examine the motives of export behaviour of the firms. To do this, I first check which components affect export/ do not export decision, by using probit model. Second, I check export intensity of firms, by using Tobit model. The reason why I use Tobit model instead of OLS is the huge number of non exporting firms. Graph 2 shows number of firms with respect to export intensity rates in ten percentiles. It is easy to see that there is a positive mass of firms located at zero and OLS results will be biased.

**Graph 2 : Density of firms with respect to export intensity rates for each ten percentiles**



Note: The curve shows possible normal distribution of the firms. But, high numbers of non exporting firms kills normal distribution and make OLS inefficient.

The probit model tries to estimate the probability of an observation with some specific characteristics to fall into two categories in a model. In my study, the two groups are exporters and non exporters.

Let  $Y^*$  be a latent (unobservable) variable and defined such that;  
 $Y_i^* = \beta_1 \cdot A_i + \beta_2 \cdot B_i + \beta_3 \cdot C_{ij} + \beta_4 \cdot D_i + \epsilon_i$  where  $\epsilon_i \sim N(0,1)$ . “i” represents firm and “j” represents industry. Independent variables are defined such that  $A_i$  is the vector of firm characteristics,  $B_i$  is the vector of domestic constraints,  $C_{ij}$  is the vector of market properties and  $D_i$  is the vector of the regional conditions. Then, using latent variable, I can define observable export  $Y$  as the decision to export or not;

$$Y = \begin{cases} 1 & \text{if } Y^* > 0 \\ 0 & \text{if } Y^* = 0 \end{cases}$$

The tobit model supposes that there is a latent variable  $y_i^*$ . This variable linearly depends on  $x_i$  via a parameter vector  $\beta$  which determines the relationship between the independent variable and the latent variable. The observable variable  $y_i$  is defined to be equal to the latent variable whenever the latent variable is above zero and zero otherwise. Model is as below and explanatory variables are same as the probit model.

$$y = \begin{cases} y^* & \text{if } y^* > 0 \\ 0 & \text{if } y^* = 0 \end{cases} \quad \text{where } y_i^* = \beta_1 \cdot A_i + \beta_2 \cdot B_i + \beta_3 \cdot C_{ij} + \beta_4 \cdot D_i + \mu_i, \mu_i \sim N(0, \sigma).$$

When I estimate my models, I face two problems. The first is that there are many firms with zero exports and tobit model is used to deal with this problem. Second problem is endogeneity of some domestic constraints. It is possible that firms with positive exports can face some problems which non exporters do not. If I regress directly, I might have biased answers. I use the Hausman test for endogeneity which evaluates the significance of an estimator versus an alternative estimator. I use Hausman test on all the domestic constraints and see that “customs, trade and regulations” is the only endogenous variable according to test results. The results of Hausman test as in below. “Prob>F” value shows probability of rejection that the variable is endogenous. If the “Prob>F” value gets smaller, probability of rejection decreases and we can conclude that the endogeneity of the variable exists. In table 5, we can see that customs, trade and regulations is the only significant “Prob>F” value and so, it is an endogenous variable.

**Table 5: Hausman Test Results for Domestic Constraints**

	F statistics	Prob>F
customs trade and regulations	15,55	0.0001
transportation	0,74	0.3915
business licensing	3,07	0.0804
crime	2,55	0.1110
tax rates	2,8	0.0949
tax administration	3,05	0.0813
political instability	2,21	0.1375
inadequately educated workforce	0,06	0.8000
informal comptetiton	0,43	0.5105
access to finance	0	0.9848

I think it is clear that exporting firms can have more problems with customs and regulations compared to non exporting firms. I use instrumental variable to cope with the problem. I instrument “customs and regulations” with mean value averaged across industry and region, following Clarke (2005), Yoshino (2008) and Hiep, Nishijima (2009). I calculate average “customs and regulations” obstacle level for each industry and region. Table 5 gives detailed information. For example, for firms which are in Marmara region and food industry, average obstacle value is 0,41. I also use Smith-Blundell model (as in book of Jeffrey M. Wooldridge, Econometric Analysis of Cross Section and Panel Data) to deal with endogeneity problem of “customs, trade and regulations”.

Model assumes that ;

$$\begin{aligned} \text{expint}_i &= \max(0, d_1 \cdot z_{1i} + \gamma_{3i} \cdot \text{customreg}_i + u_{1i}) \\ &= \max(0, \alpha_{1i} \cdot \text{size}_i + \alpha_{2i} \cdot \text{size}_i^2 + \alpha_{3i} \cdot \text{age}_i + \alpha_{4i} \cdot \text{age}_i^2 + \alpha_{5i} \cdot \text{foreown}_i + \alpha_{6i} \cdot \text{competitor}_i + \\ &\quad \gamma_{1i} \cdot \text{informalcomp}_i + \gamma_{2i} \cdot \text{taxad}_i + \gamma_{3i} \cdot \text{customreg}_i + u_{1i}). \\ \text{customreg}_i &= z_i \cdot d_2 + v_2 = z_{1i} \cdot d_{21} + z_{2i} \cdot d_{22} + v_2 = (\alpha_{1i} \cdot \text{size}_i + \alpha_{2i} \cdot \text{size}_i^2 + \alpha_{3i} \cdot \text{age}_i + \alpha_{4i} \cdot \text{age}_i^2 + \alpha_{5i} \cdot \text{foreown}_i \\ &\quad + \alpha_{6i} \cdot \text{competitor}_i + \gamma_{1i} \cdot \text{informalcomp}_i + \gamma_{2i} \cdot \text{taxad}_i + \beta_{1i} \cdot \text{trans}_i + \beta_{2i} \cdot \text{dealcustom}_i), \text{ where } (u_1; v_2) \text{ are} \\ &\text{zero-mean normally distributed and independent of } z. \end{aligned}$$

The Smith-Blundell procedure is as follows:

(a) Estimate the reduced form of customreg by OLS; this step gives  $d_2$ . Define the reduced-form OLS residuals as  $v_2 = \text{customreg} - z_i \cdot d_2$ .

(b) Estimate a standard Tobit of expint on  $z_1$ , customreg, and  $v_2$ . This step gives consistent estimators of  $d_1$ ,  $\gamma_{3i}$ ,  $\text{expint}_i$ .

I first, regress the endogenous variable on other variables and some variables ( I use transportation and unofficial payments to deal with customs/imports) which are influential

on endogenous variables. Then, I define reduced form of OLS residuals. In the end, I regress the dependent variable on independent variables by adding the defined OLS residual variable. Results are given in Table 8 in regression 1+.

**TABLE 6 : Means of customs, trade and regulations obstacle for each region/industry**

	<b>CUSTOMS</b>	<b>Marmara</b>	<b>South</b>	<b>Centanatolia</b>	<b>Blackseaeastern</b>	<b>Aegean</b>
1	food	0,41	1,13	0,39	0,85	0,3
2	textiles	0,76	0,31	0,45	0,8	0,78
3	garments	1,09	0,53	0,27	1	1,04
4	chemicals	1,1	1,36	0,68	0	1,15
5	plastics	1,04	0,25	1,5	1	1,83
6	nonmetalics	0,72	0,69	0,33	0,625	0,82
7	basicmetals	0,75	0,5	1,6	1	0
8	fabricatemetals	0,27	0,28	0,63	0,25	0,5
9	machequ	1	0,66	0,54	1,5	1
10	electronics	1,33	1,33	3	0	0,75

Now I can define my model in detail. I generated seven different regressions in both probit and tobit models. In all models, size, lnTFP, age, age square, foreign ownership, and number of competitors are used. I define these as “core variables”. Addition to core variables, I add other variables in separate regressions. The reason for following this model is multicollinearity problem. Especially, there are high correlations between domestic constraints. Firms which have plenty of operations can have problems with lots of constraints. Then, to reduce multicollinearity problem, I use these variables in different regressions. Also, “mean GDP per capita per industry” and “mean exchange rate per industry” have high correlation. In first regression, addition to core variables, I use “customs, trade and regulations”, “tax administration” and “informal sector competitors”, in second regression, I apply “transportation”, access to finance” and “political instability”, in third regression “inadequately educated workforce”, “business licensing and permits”, “tax rates” and “crime”. In forth regression, addition to core variables, I employ “mean gdp per capita per industry”, “capital intensity and “industrial dummies”, in fifth regression, I use “mean exchange rate per industry”, “capital intensity” and “industrial dummies”. In sixth regression, I check regional conditions and “crime” obstacle together to determine if crime obstacle is important for some specific regions. I use mean GDP per capita and mean exchange rate for export destination countries per industry with industrial dummies is that I want to observe the effects which are not caught by the industry dummies.

## Chapter 4

### Results

Table 7 gives means of the variables with respect to export intensity rates. I divided export intensity rates into five categories. First column are the firms which do not export. Second column includes firms whose export intensity rates between 1 and 20. Similarly, columns three, four and five include firms with 21-40, 41-70 and 71-100 export intensity rates. The table can give an idea why some variables are influential on export intensity rates. Number of observations in regressions decline below 500. The reason of this decline is caused by TFP calculation. To calculate TFP of firms, I need capital volume which is missing for some firms. Therefore, TFP calculation can be done for 484 firms.

**TABLE 7 : Information about the variables with respect to export intensity rates**

expint	Between 71 and 100	Between 41 and 70	Between 21 and 40	Between 1 and 20	0
InTFP	9,56	9,53	9,81	9,58	9,13
age	14,82	22,6	22,07	20,54	17,88
size	2,41	2,46	2,4	2,35	1,78
foreown	3,62	3,21	4,73	3,4	1,52
capint	32671	46118	26070	69224	117606
customreg	1,04	1,05	1,14	0,98	0,52
buslicence	1,31	1,4	1,22	1,45	1,35
polinst	2,53	2,5	2,36	2,35	2,46
tax	2,49	2,31	2,19	2,14	2,35
taxad	1,48	1,29	1,21	1,16	1,26
informalcomp	1,56	1,48	1,9	1,4	1,73
trans	0,87	0,9	0,92	0,91	0,8
crime	0,57	0,39	0,44	0,47	0,56
inadeqeduc	1,68	1,62	1,61	1,53	1,54
accfin	0,97	0,9	1,17	0,98	0,94
density of observations	103	41	86	220	666

Regression results are in tables 8,9 and 10. I put tobit and probit results into same table for the same regressions. Tables enable the reader to see what factors affect export intensity behaviour and/or export market entry decision. Significant results are denoted by (\*) in regressions with 95% confidence intervals. I will investigate all the independent variables one by one in detail.

The size of firm is the significant in all regressions. I divided size into three categories. Large and medium sized firms were put into regressions where small sized firms were used as a control variable. Export intensity rates are between zero and a hundred. Then, we can read a tobit model such that if a firm is medium sized, its export intensity rate is 13 points higher than that of a small sized firm on average. For large firms, export intensity rate is 22 points higher than that of a small sized firm on average. Probit model shows us that size of a firm is a determinant to enter export market. Larger/medium sized firms go into export market with higher probability. Firms pay some costs to export. I can interpret the situation such that small sized firms earn less in domestic area and so, they do not have enough capital to pay the fixed exportation costs. These results are consistent with the previous empirical and theoretical literature.

Total factor productivity is significant in all regressions. I use the log of total factor productivity (TFP from now on). LnTFP values are between 5,79 and 13,92. Distribution of LnTFP is described in Graph 1. In tobit models, one percent improvement in LnTFP increases export intensity 3 points on average. TFP is also important on the entry decision. I think the reason behind TFP impact on export decision is that more productive firms can earn more profits by producing more with the same level of inputs. So, it becomes possible to pay the fixed entry costs.

Age is another important variable for export behaviour of the firms. In tobit regression, age is significant and has a small but negative effect on export intensity. In data, dominant numbers of firms are below age 20. The distribution is described in Graph 3. In my opinion, the reason for negative effect of age on export intensity rates can be due to financial changes of Turkey in last two decades. In last twenty years, Turkish economy has strengthened its relations with global economy. With high growth rates of the economy in last ten years, Turkish firms have become powerful enough to compete with foreign competitors in global market. Between 2000 and 2008, export volume of Turkey increased USD 27 billion to USD 132 billion. I believe these changes affected all the components in Turkish economy. For new born firms, exportation became an important target and opportunity as a conclusion of the economic developments. On the other hand, dominance of some firms in the domestic market can be another reason for new born firms to export in higher rates. Lastly, age is not significant in probit model which says that age is not a factor for a firm to go into export market. But, if a firm is exporting, age can affect its export intensity rate.

Foreign ownership is in percentage values. I cannot find any significant result about foreign ownership in any of the models. This may be because some foreign investors care about cost of production and sell abroad whereas others care about the Turkish market and sell in the country. It seems that no view dominates other and as a conclusion, foreign ownership is not a determinant factor on export behaviour of Turkish firms.

**TABLE 8 : Tobit and probit model of regressions 1,1+,2 and 3.**

variables	tobit				probit		
	1	1+	2	3	1	2	3
size1	18,926*	18,863*	22,853*	22,515*	1,258*	1,409*	1,407*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
size2	12,481	12,215*	13,737*	13,401*	0,849*	0,884*	0,883*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
lnTFP	2,412	2,363*	3,050*	3,109*	0,207*	0,245*	0,241*
	(0.006)	(0.000)	(0.000)	(0.000)	(0.010)	(0.000)	(0.000)
age	-0,255	-0,242	-0,247	-0,221	-0,016	-0,016	-0,016
	(0.308)	(0.311)	(0.305)	(0.360)	(0.376)	(0.360)	(0.382)
age_2	0,0002	0,001	0,002	0,001	0,0003	0,0003	0,0002
	(0.585)	(0.683)	(0.605)	(0.718)	(0.376)	(0.379)	(0.425)
foreown	0,008	0,0087	0,044	0,035	0,003	0,006	0,005
	(0.888)	(0.876)	(0.430)	(0.523)	(0.479)	(0.209)	(0.263)
competitor	5,185*	5,093*	4,459*	4,580*	0,053	0,004	0,003
	(0.008)	(0.006)	(0.020)	(0.016)	(0.744)	(0.977)	(0.984)
customreg	21,988	23,792*			1,162		
	(0.130)	(0.007)			(0.120)		
taxad	-3,827	-2,035			-0,369*		
	(0.101)	(0.335)			(-0,016)		
informalcomp	-3,648*	-3,565*			-0,371*		
	(0.067)	(0.041)			(0.049)		
trans			2,214			0,119	
			(0.418)			(0.535)	
accfin			0,892			0,122	
			(0.721)			(0.495)	
polinst			1,44			-0,106	
			(0.398)			(0.404)	
inadeqeduc				-0,081			-0,091
				(0.965)			(0.513)
buslicence				-2,433			-0,107
				(0.239)			(0.498)
tax				1,92			0,009
				(0.279)			(0.940)
crime				7,806*			0,187
				(0.054)			(0.444)
number of obs.	483	483	483	483	483	483	483
wald ( or LR) chi2	81.63	108.50	93.54	97.80	95.84	102.63	102.68
Pseudo R2		0.0368	0.0317	0.0332		0.1533	0.1534

Note: In regression 1, mean of customs obstacle for region and industry is used for instrumental variable. In regression 2, Smith Blundell model is used.

**TABLE 9 : Tobit and probit model of regressions 4 and 5.**

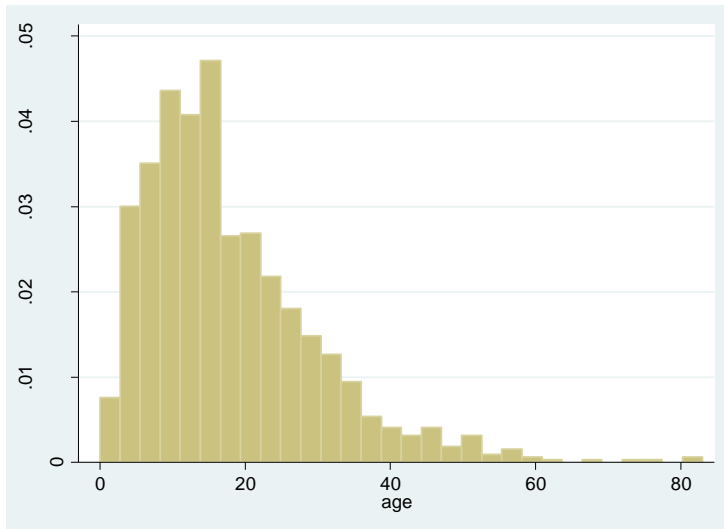
variable	tobit		probit	
	4	5	4	5
size1	21,543*	21,543*	1,437*	1,437*
	(0.000)	(0.000)	(0.000)	(0.000)
sizeM	12,141*	12,141*	0,852*	0,852*
	(0.000)	(0.000)	(0.000)	(0.000)
lnTFP	3,666*	3,666*	0,279*	0,279*
	(0.000)	(0.000)	(0.000)	(0.000)
age	-0,491*	-0,491*	-0,032	-0,032
	(0.046)	(0.046)	(0.100)	(0.100)
age_2	0,006	0,006	0,0005	0,0005
	(0.157)	(0.157)	(0.127)	(0.127)
foreown	0,051	0,051	0,007	0,007
	(0.372)	(0.372)	(0.187)	(0.187)
competitor	4,644*	4,644*	0,031	0,031
	(0.026)	(0.026)	(0.858)	(0.858)
gdpcap	0,000516*		1,60E-05	
	(0.013)		(0.278)	
exchange		-0,0012*		-4,00E-04
		(0.013)		(0.278)
textiles	7,035*	6,920*	0,529*	0,526*
	(0.011)	(0.011)	(0.004)	(0.004)
fabricatmetal	8,552	10,587	0,578	0,628*
	(0.170)	(0.122)	(0.112)	(0.098)
chemicals	10,612*	7,79	0,745*	0,672*
	(0.026)	(0.044)	(0.007)	(0.005)
nonmetalics	15,791*	17,064	0,698*	0,726*
	(0.002)	(0.002)	(0.007)	(0.008)
basicmetals	0,541	6,271	0,205	0,371
	(0.928)	(0.385)	(0.658)	(0.420)
plastics	12,753*	14,977	0,807*	0,857*
	(0.025)	(0.016)	(0.015)	(0.012)
mach & equ.	12,086*	10,93	0,733*	0,706*
	(0.064)	(0.079)	(0.043)	(0.048)
electronics	9,497	12,35	0,829	0,895
	(0.289)	(0.211)	(0.146)	(0.123)
number of obs.	446	446	446	446
wald (or LR) chi2	103.36	103.36	112.75	112.75
Pseudo R2	0.0382	0.382	0.1824	0.1824



**TABLE 10 : Tobit and probit model of regression 6.**

	<b>tobit</b>	<b>probit</b>
	6	6
variable		
size1	21,878*	1,394*
	(0.000)	(0.000)
size2	12,872*	0,868*
	(0.000)	(0.000)
lnTFP	3,08*	0,24*
	(0.000)	(0.000)
age	-0,243	-0,015
	(0.299)	(0.411)
age_2	0,001	0,0002
	(0.686)	(0.434)
foreown	0,031	0,005
	(0.560)	(0.243)
competitor	3,242*	-0,097
	(0.089)	(0.541)
Aegean	16,297*	0,806*
	(0.000)	(0.000)
Blacksea & eastern	0,443	-0,057
	(0.911)	(0.838)
Marmara	7,737*	0,476*
	(0.004)	(0.010)
South	5,225*	0,391*
	(0.097)	(0.059)
crime11	7,188*	0,139
	(0.064)	(0.572)
number of obs.	483	483
wald (or LR) chi2	126.08	121.03
Pseudo R2	0.0428	0.1808

**Graph 3: Number of firms for each age**



Number of competitors is significant in tobit model. I define number of competitors as a dummy variable. Having competitors less than or equal to five and more than five are the two categories. Firms with more than five competitors export 5 points more than the firms with less than or equal to five competitors. Increase in competitors in domestic market has a positive effect on export sales. I think increase in competitors in domestic market lowers profits and exporting brings them opportunity to increase their profits. On the other hand, by probit model, number of competitors is not a determinant for a firm to go into export market.

Regression results for domestic constraints are as follows: In the tobit model, informal sector competitors and crime are the significant variables for export intensity decisions. All the domestic constraints are dummy variables. I can describe them as firms which have low or high scale problems about a specific constraint. Tax administration is a determinant of export market entry decision. It lowers probability of being an exporter. Informal sector competitors have a negative impact on export intensity. On the other hand, informal sector competitors are an obstacle which affects export market entry decision. As a result, informal competitors in the sector have two effects. First, they prevent firms from entering export market. Second, if the firms are in export market, they limit export intensity rates. My comment is that exportation has some risks and costs. If a firm sells most of its products abroad, they might face with high export costs and risks. A firm, which encounters with this obstacle, might want to limit its export intensity level or choose not to export to decrease its costs and risks.

Crime obstacle is a positive factor for export intensity rates. It enhances export intensity level 7,8 points on average. %88 of trade in the country is being done by highway.

On the other hand, export is being done by %50 seaway and %40 highway. Crime increases security costs and firms may decrease these costs by selling abroad.

Customs, trade and regulations obstacle is significant in Smith-Blundell model. The reason behind positive correlation between customs obstacle and export intensity can be the conditions of customs services. When firms face with problems in customs, they may bribe to accelerate customs operations. Then, firm manager knows that this obstacle brings him some additional costs when firm makes exportation. So, he may think that the money that he pays should be effective for the company. If he pays some money and do not receive high profit from exportation, export sales will lose its value. Then, to gain more profit from abroad, he may decide to increase its sales in foreign market.

GDP per capita and exchange rate of foreign country set (destinations of export activities) per industry have significant results in tobit model. One thousand dollars increase in GDP per capita per industry increases 5,1 points export intensity of a firm in a specific industry. On the other hand, a one point increase in exchange rate per industry lowers export intensity 1,2 points. These results tell us that destination of an export operation matters. Exporting to rich countries with a high GDP per capita is a positive factor for firms where exporting to countries with high real effective exchange rates diminishes export intensity rates. My comment on GDP per capita result is that countries with high gdp per capita may provide better conditions for exporting firms. Custom taxes, transportation or information about the market may be helpful for exporting firms. On the other hand, demand for goods can be high in these countries and firms which concentrate on these countries can have advantage to increase their sales.

Industry dummies have significant results in both models. They tell us that membership in an industry affects export intensity rates of a representative firm. The fact that industry effects are significant show that everything else constant, some industries are more prone to exports than others. Learning opportunities can be one of the reasons. In an industry, firms can watch each other and by learning from high export intense firms, a firm can learn how to decrease costs (such as advertisement or production costs) and increase its export rates. On the other hand, destinations can affect industry as a whole. Because of competition in foreign market, some industries can focus on some specific regions and opportunities in this region (such as lack of local producers in some markets) can be a positive impact on all firms with enough size and productivity. Moreover, probit model results show that membership in an industry also affects going into foreign market. This is interesting because results tell that similar firms with size or productivity might have different decisions for export market entry. I think this condition indicates that costs that firms face when they enter export market can be different because of being a member of an industry and so, decisions of similar firms can be different. Also, industry dummies do not change the main (core variables) results of the regressions.

Regional conditions have significant results in both models. Results are again with respect to control variable (Central Anatolia region). Export intensity rates and export market entry is dependent on location of the firms. Transportation can be one of the reasons. Marmara, Aegean and South regions are near the sea and big airports are located in these regions. So, firms in these regions have advantage for transportation. On the other hand, productive worker can be another reason for export behaviours. Big cities such as Istanbul, Izmir, Antalya, Adana and Bursa are located in these regions and high skilled workers live in these cities. If a firm wants to increase its productivity and lower production costs, it needs these people. But, if this firm is in Central or East of Turkey, they will not find productive workers easily. Then, this can affect their export behaviour.

## **Chapter 5**

### **Conclusion**

I examined export intensity and export entry behaviour of the firms in Turkish manufacturing system. By tobit analyses and probit model, I find that size and InTFP are the main firm characteristics that determine the export intensity and export entry decisions of the firms. Number of the competitors and age are the two firm characteristics that affect export intensity rates. Finally, foreign ownership and capital intensity have not got any impact on export behaviours of the firms. For domestic constraints, informal sector competitors have negative impact on export intensity and export market entry. Crime obstacle is the positive factor for generating export intensity levels of the firms where tax administration is a negative factor for export entry decisions of the firms. Customs, trade and regulations obstacle is also a positive factor for export intensity level. Industry properties are effective determinants of export behaviours. Being a member of an industry can change attitudes of a firm. Also, export destinations impacts on firms. Selling to regions with different gdp per capita and exchange rates can determine levels of export intensity. Moreover, regions that plants locate affect export strategies of firms. Physical conditions and human resources of the regions are important topics for export behaviours.

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