MAKÜ | Journal of Mehmet Akif Ersoy University
Economics and Administrative Sciences Faculty

e-ISSN: 2149-1658
Volume: 12 / Issue: 2
June, 2025
pp.: 663-688

Exporter Premia, Self-selection and Learning-by-exporting: Evidence from Listed Firms in Türkiye *

Mustafa GÜDER[1]

1. Dr., Research Assistant, Aydın Adnan Menderes University, mustafa.guder@adu.edu.tr, https://orcid.org/0000-0001-7056-2365

* This paper is derived from a PhD dissertation entitled 'Heterogeneous Firms and Exporter Premia. Evidence from the Turkish Manufacturing Industry', completed by Mustafa GÜDER under the supervision of Prof. Dr. Ahmet Can BAKKALCI at Aydın Adnan Menderes University, Institute of Social Sciences, Department of Economics.

https://doi.org/10.30798/makuiibf.1606148

Abstract

The prevailing view claims that exporter firms (E) have advantages (exporter premia) over non-exporter firms (NE) in many respects. This study examines whether exporter premiums exist for the Turkish manufacturing industry and analyses the relationship between firm's export and productivity. The sample covers the period between 2016:Q3-2023:Q2 and 139 firms listed on Borsa İstanbul. Dataset consists of firm-based (micro) data. In the study, firstly, statistical comparison is made and it is found that exporter firms are mostly composed of larger firms, employ more employees, have higher productivity and profitability than non-exporters. Secondly, industry-level panel data analyses are applied for econometric model. According to the results of the analyses; exports, average wages and profitability are found to increase firm productivity. Lastly, with the method of Granger Bootstrap panel causality analysis revealed that there are causality relationships both from export to productivity and from productivity to export. Thus, it was concluded that both self-selection and learning-by-exporting effects exist in the Turkish manufacturing industry.

Keywords: ***Exporter premia, Self-selection, Learning-by-exporting, Firm heterogeneity, New trade theory, Bootstrap panel causality.***

Article Type	Application Date	Admission Date
Research Article	December 23, 2024	May 29, 2025

To cite this article: Güder, M. (2025). Exporter premia, self-selection and learning-by-exporting: Evidence from listed firms in Türkiye. *Journal of Mehmet Akif Ersoy University Economics and Administrative Sciences Faculty*, *12*(2), 663-688. https://doi.org/10.30798/makuiibf.1606148

1. INTRODUCTION

In standard macroeconomic models, output is usually determined by the amount of labour and capital used in the economy. This is based on the microeconomic assumption that producers are homogeneous (Mukoyama, 2022, p. 1). However, depending on the level of analysis, there are considerable differences in many characteristics between industries, firms and even production factors. The fact that firms in the same industry differ in many characteristics is called 'firm heterogeneity' (Bernard et al., 2012).

Existing studies consider a large number of factors as sources of heterogeneity. These include productivity, capital intensity, innovation/technology level, firm size, firm age or experience, market power, ownership structure (private-public or domestic-foreign), labour characteristics (education, age, gender, etc.). Within the framework of firm heterogeneity, some studies investigate the sources of heterogeneity and some studies investigate the consequences of heterogeneity. For this reason, some variables representing firm characteristics may be included as dependent variables in some studies and as independent variables in others. Therefore, the direction of causality between variables in heterogeneity studies may vary depending on the research question. For example, while Bleaney and Wakelin (2002) examine the effect of heterogeneity in firms' innovation activities on firm size, Schmitz (2021) analyses the effect of heterogeneity in firm size on innovation.

Empirical studies in the firm heterogeneity literature generally focus on firm productivity and firm export status. In some studies, productivity is considered as a reason for various inter-firm differences. In this context, the effects of different productivity levels on the environment (Kreickemeier & Richter, 2014; Wang & Zhu, 2021), product quality (Antoniades, 2015; Verhoogen, 2008), and propensity to participate in international markets (Engel et al., 2013; Lu et al., 2017; Plouffe, 2017) have been examined. On the other hand, in some studies, productivity differences are evaluated as a result of some other variables such as export status, plant size and capital intensity. Among these variables, the export status of the firm stands out as the dominant variable. In this direction, there is an immense literature suggesting that both exporting firms are more efficient and efficient firms export more. Melitz's (2003) study has been a milestone in the emergence of this literature. Melitz's theoretical framework, based on the heterogeneous firm model and called the New New Trade Theory (NNTT), analytically explains the empirical findings obtained from firm-level data, especially in the 1990s (Ciuriak et al., 2015).

Even in narrowly defined industries, exporters have superior characteristics in many respects compared to non-exporters. Pioneering studies have found that exporters have higher total factor productivity and a more capital-intensive and skilled labour production structure (Bernard et al., 1995; Bernard & Jensen, 1999). Higher labour quality leads exporters to pay higher wages and receive positive feedback in terms of productivity in return. In addition to these, there are some other advantages that exporting provides to firms, such as faster growth in sales and productivity, higher success measurement

indicators, risk allocation, internalisation of innovation and strengthening their capacity to stay in the market. These advantages of exporters are generally known as ‘exporter premia’ or ‘export premium’ (Hallak & Sivadasan, 2013; Schröder & Sørensen, 2012). Similarly, exporters' productivity advantages are referred to as “exporter productivity premia” (Powell & Wagner, 2011; Vogel & Wagner, 2011).

Increasing productivity in an economy is vital for the success of export-led growth strategies and economic development (Demena et al., 2022). Export activities are one of the main sources of productivity gains, especially in the manufacturing industry (Schwarzer, 2017). For this reason, the export-led growth target comes to the fore for developing countries with capital deficits and insufficient productivity levels. Similar to Türkiye, various export strategies have been implemented in developing country groups such as BRICS+ and Asian Tigers in parallel with the development of neoliberalism (Rodrik, 1997). Studies using similar methodology on this issue generally examine the causality of macroeconomic variables such as exports-output. (Bal et. al., 2020; Mamun et. al., 2019). However, one of the main objectives of these policies is to utilise export productivity premiums in the economic development path. This is because these premiums reduce average costs in the economy and create favourable conditions for a high value-added production structure. Therefore, a proper analysis of exporter premiums is a necessary process not only for macro policies but also for effective microeconomic policy making.

The manufacturing industry, which is analysed in the analysis part of this study, is the main industry of export-led growth. Manufacturing is the hotbed of innovations and productivity gains in the economy. Determining exporter premiums in this sector and allocating limited resources correctly basically allows policymakers to pick the winners (Yülek, 2018, pp. 132-224). Supporting firms with high potential to succeed in international markets ensures the success of foreign trade policies. These firms have certain common characteristics and need similar support to compensate for some endowment disadvantages. Governments play a proactive role in identifying similarities and providing optimal support. These can be tangible, such as major infrastructure investments in selected exporters' regions of operation and logistical support to facilitate cheaper market access; or financial, such as loans, investment, R&D and export incentives to facilitate access to capital. The public authority also has an important responsibility in organising the education system to train the labour force to meet the needs of exporters. However, in order to ensure all these, data at firm or facility level need to be analysed.

The main motivation of this study is to determine whether the findings on exporter premiums from other countries are valid for the Turkish manufacturing industry. Accordingly, the aim of the study is to determine the effect of the firm's export status on productivity and the direction of causality between exports and productivity.

The main difference of this study from others is that the company names are openly known. In many databases used by other studies, company information is not shared and company names are

included representatively. Thanks to this advantage, the direction of causality between exports and productivity can be determined for each firm in this study (Appendix 1). Another important issue regarding the originality of the study is that the Granger Bootstrap method is preferred as a causality analysis. Demir (2019), which is the only study that analyses the Turkish manufacturing industry using this method, uses sector-level data similar to other studies. For these reasons, this study is considered to be among the limited number of studies on Türkiye that examine firm heterogeneity using micro data. Moreover, based on this background, it is expected to be the first study to analyse BIST (Borsa Istanbul) firms within the framework of the existing hypotheses.

In the following section of the study, the theoretical dimension of the relationship between exports and productivity is explained. The third section presents a summary of the literature and the fourth section introduces the methodology, dataset and model. The fourth section presents the econometric analyses and the findings obtained from them. In the last section, the conclusions reached in line with the findings of the analyses are interpreted.

2. PRODUCTIVITY AND EXPORT

The main effect arising from the differences in the export status of firms is firm productivity. In the literature, the notion of 'performance' is generally used instead of 'productivity'. This is because productivity is considered as the primary indicator of firm performance. Productivity is usually analysed in terms of labour productivity (LP) or total factor productivity (TFP). There is evidence that exporters are superior in terms of both TFP (Alvarez & Lopez, 2005; Delgado et al., 2002; Lopez, 2009; Pavcnik, 2002;) and LP (Davies & Jeppesen, 2015; Camino-Mogro et al., 2020; Powell & Wagner, 2011; Trefler, 2004). Dalgıc, Fazlıoglu and Karaoglan (2015) show that the effect of foreign trade on LP is larger than that of TFP. Similarly, Irarrazabal et al. (2013) conclude that LP is the main source of the positive exporter TFP premium. In this respect, it is important to investigate the impact of exports on LP rather than TFP.

It is argued that the productivity advantage of exporters is mainly due to three reasons. First, competition in international markets is stronger than in domestic markets. As shown in Melitz's (2003) model, this competitive situation allows only the most efficient firms to remain in the export market. The second reason is that costs (transport, processing, etc.) are higher in export markets. Exporters have to be more efficient in order to cover these costs. The third reason is that exporters benefit from the positive externalities created by foreign markets in terms of their ability to access know-how, R&D and technological innovations (Delgado et al., 2002; Johansson, 2009, p. 6).

There is a general consensus in the literature that there are productivity differences between exporter and non-exporter firms. The most widespread debate on the superiority of exporters is whether the superiority arises before exporting or after export participation. This debate is related to the direction of causality and this relationship can also result from a two-way causality (Wagner, 2002). Assuming

that there is a causality from productivity to exports, the approach reaches the finding that export participation is the result of a conscious 'self-selection' (Yang & Mallick, 2010, p. 1219). In most of the studies in the literature, the source of the relationship between exports and productivity is the selection effect. Self-selection arises from the fact that exporting requires high costs. These consist of fixed exporting costs and variable iceberg costs (Schröder & Sørensen, 2012, p. 1314). Higher competition and higher costs make it inevitable for exporting firms to be composed of the most efficient firms. As a result, the most efficient firms choose to participate in the export market. The first two of the three arguments behind productivity differences are based on the self-selection effect. Wagner (2007) analysed a total of 45 studies from 37 different countries and concluded that the evidence for the self-selection effect is quite high, but the evidence for learning-by-exporting is limited.

The approach that assumes causality direction from exports to productivity aligns with the 'learning-by-exporting' effect (Maggioni, 2012, p. 1). The third argument underpins this learning effect. Accordingly, exporter firms learn productivity-enhancing capabilities from their foreign partners and competitors in the market as well as from market operating conditions. This learning process is continuous. According to Yasar et al. (2006, p. 277), although the learning effect is essentially reminiscent of Arrow's (1962) 'learning-by-doing' process, in Arrow's approach the learning process slows down after a certain period of time. However, the learning-by-exporting hypothesis involves a continuous learning process. In this respect, the learning-by-exporting hypothesis is closer to Rosenberg's (1982) 'learning-by-using' process, which emphasises the continuity of learning. Firms continuously learn the best methods of production, distribution and management from the actors they interact with in export markets; there is a diffusion of knowledge in the market towards exporters. Moreover, exporter firms increase their productivity by taking advantage of economies of scale arising from the structural conditions of international markets. In the meta-analysis of Mebratie and Van Bergeijk (2013), 44 per cent of the reviewed studies support the learning-by-exporting effect.

Apart from these views, a third alternative explanation for the relationship between exports and productivity is the so-called 'BEJK' approach proposed by Bernard et al. (2003). In this approach, Bertrand competition is assumed to be valid. Export costs arise from geographical barriers such as transport, language and tariffs and vary depending on the firm. There are no fixed costs of exporting. However, while exporting firms have geographical barriers, domestic firms do not. Because of this disadvantage, the success of exporter firms depends on being more efficient than domestic firms to compensate for the extra costs they have to incur. As a result, exporter firms are more efficient than domestic firms. However, there is not a large empirical literature supporting this approach.

Within this theoretical framework, exporters are expected to be more efficient than non-exporters before or after trade. In the introduction, evidence on exporter premiums from several countries was mentioned. Table 1 below compares the average values of various indicators of 139 firms in the Turkish manufacturing industry listed on the BIST. The table is constructed in terms of arithmetic

averages over the relevant period (2016:Q3-2023:Q2). The number of employees represents the quarterly average. Obtained through monetary values; average wage (short-term payables related to employee benefits/number of employees), productivity (net sales revenue/number of employees), profit (quarterly net operating profit or loss/net sales revenue), capital intensity (tangible fixed assets/number of employees) and firm size (total assets) are calculated in Turkish Lira ('TL') and based on realised values.

Table 1. Comparison of Exporter (E) and Non-exporter (NE) Firms

	Manufacturing Industry (139 firms)	
	Exporter (102 firms)	**Non-exporter (37 firms)**
Number of employees	2,111	538
Average wage (TL)	9,065	13,714
Productivity (TL)	520,191	353,933
Profit (%)	0.11	0.03
Capital intensity (TL)	2,607,755	8,226,002
Firm size (TL)	4,520,000,000	578,000,000

Source: Created by author by using Public Disclosure Platform (*Public Disclosure Platform [PDP]*) reports.
Note: In Table 1, based on the World Bank's regular entrepreneurship reports (World Bank, 2017; 2024), firms with an arithmetic average of 10 per cent or more of their export intensity in the examined periods (2016:Q3-2023:Q2) are defined as exporters. Firms with export intensity below this threshold are categorised as non-exporters.

The employment of exporters is on average about 3 times higher than that of non-exporters are reported in the Table 1. Moreover, the productivity of exporters is about 0.43 times higher than that of non-exporters, while their profitability is 3.66 times higher. The firm size of exporters, calculated in terms of total assets, is about 8 times that of non-exporters. These findings are consistent with the general findings mentioned in the literature section. On the other hand, in terms of average wages and capital intensity, exporters in the Turkish manufacturing industry do not have an advantage over non-exporters. This result, which is contrary to the theoretical expectation for wages, suggests that skill intensity is low in the analysed industry and other qualitative differences such as ownership structure among firms have a stronger determinant on wages. This may also be a consequence of more competitive international markets and hence lower-cost labour costs for exporters. On the other hand, the most likely reason for the contradictory results in the capital intensity premium is that exporters can utilise their capital stock more efficiently by taking advantage of their scale advantage. Thus, more output can be achieved with less input. In other words, there may be more efficient capital utilisation in exporter firms. In addition, according to NNTT, exporter firms face higher competitive pressure as a result of operating in international markets. This requires optimisation of production processes on the one hand and minimisation of capital expenditure on the other. One of the main methods of minimising capital expenditures is the internalisation of technology by the firm. Considering both the theory and the innovation literature, exporters are likely to use more advanced technologies, while non-exporter firms are likely to have older capital stocks. Therefore, non-exporter firms may have a more capital-intensive structure. Another reason for this is related to the nature of the products that firms trade. As is known, exporter firms generally produce differentiated products that meet the specific demand of consumers. The capacity of firms to differentiate their products is important especially in products for niche markets.

This requires an increase in labour intensity while limiting capital intensity in the production of these products. As a result, non-exporter firms producing more standardised products may lead to higher capital intensity. In terms of Türkiye's foreign trade composition, the fact that national exports are mostly composed of low value-added products leads to high labour intensity. Therefore, this situation may justify the lower capital intensity of exporter firms in Türkiye.

3. LITERATURE REVIEW

Firm-level evidence of the existence of exporter premiums has been obtained from many different countries, such as the USA (Bernard et al., 1995; Bernard & Jensen, 1999; Bernard et al., 2007), Germany (Bernard & Wagner, 1997; Powell & Wagner, 2011; Wagner, 2002), Taiwan (Aw et al., 2000; Aw & Hwang, 1995; Liu et al., 1999), South Korea (Aw et al., 2000), China (Kraay, 1999; Yang & Mallick, 2010), Italy (Castellani, 2002; Razzolini & Vannoni, 2011), Spain (Delgado et al., 2002), United Kingdom (Girma et al., 2004; Greenaway & Yu, 2004), Sweden (Hansson & Lundin, 2004), Australia (Palangkaraya & Yong, 2007), Ethiopia (Bigsten & Gebreeyesus, 2009), Norway (Irarrazabal et al., 2013), Japan (Kaoru et al., 2015), Portugal (Machado, 2019) and Ecuador (Camino-Mogro et al., 2020). These studies summarise that exporters are more efficient, larger and more profitable firms. It is also found that exporters employ more employees and engage in more capital-intensive production. Apart from these, Greenaway et al. (2005) for Sweden, Vogel and Wagner (2011) for Germany, Verardi and Wagner (2012) for the Euro Area, Rivers (2013) for Colombia, and Lei and Zongsen (2017) for China did not find any exporter premium in their analyses. On the other hand, studies investigating exporters' premium in Türkiye have been limited due to insufficient firm-level data (Aldan & Günay, 2008; Yasar & Morrison-Paul, 2008).

Some studies on the export-productivity relationship in Türkiye adopt a traditional approach. For example, Arvas and Uyar (2014) analysed the Turkish manufacturing industry using industry-level data, while Gungor (2017) and Koluman (2022) used sector-level data. However, empirical studies within the NNTT framework are conducted using micro (firm or plant-based) data. The number of studies analysing the relationship between exports and productivity in Türkiye using micro data is limited. In one of them, Taymaz and Yılmaz (2007) examined the effect of trade liberalisation on productivity. However, this does not show the effect of foreign trade or exports on productivity, but the results of the reduction of protectionism. Similarly, Yasar and Morrison-Paul (2008) show that exporters are superior to non-exporters in many respects, but the focus of this study is not on the effect of exports. The study analyses the effect of technology transfers provided by firms through foreign direct investment, exports or imports on productivity.

Apart from these, there are also studies that examine the direction of causality between exports and productivity in the Turkish manufacturing industry using micro data. For instance, Yasar et al. (2006; 2007), Dalgıc, Fazlıoglu and Gasiorek (2015b) and Dalgıc, Fazlıoglu and Karaoglan (2015)

provide evidence for the validity of the learning-by-exporting effect, while Kılıcaslan and Erdogan (2012) conclude that there is no evidence that exports increase firm productivity, hence there is no learning-by-exporting effect. On the other hand, Dalgıc, Fazlıoglu and Gasiorek (2015a) provide evidence for a self-selection effect. In addition, Aldan and Günay (2008), Maggioni (2012), and Ozarslan and Dogan (2021) find evidence for the existence of both self-selection and learning-by-exporting effects in the manufacturing industry.

4. DATA AND METHODOLOGY

This study aims to determine the effect of exports on productivity and the direction of causality between these two variables. For this purpose, the data of 139 firms operating in the manufacturing industry and listed in BIST for the period 2016:Q3-2023:Q2 are used in the analysis. During the data collection process, the data of all firms included in the manufacturing industry in the classification of the Public Disclosure Platform (PDP) were examined; as a result of the examination, firms that started to be listed within the analysis period and firms with incorrectly defined various indicators were excluded from the data set. Finally, 139 firms whose data were determined to be correct and started to be listed on the stock exchange before the analysis period were included in the analysis. The data set consists of a comprehensive heterogeneous panel with 28 quarters, 4 different variables and 15,568 observations. The data source is the PDP. The balance sheet and income statements published here include both quarterly and cumulative variables. Therefore, cumulative variables are converted to quarterly by taking their differences. Python (PyCharm 2023.2.3) coding language was used for data collection. The number of employees was obtained by analysing approximately 4,000 company reports (financial report and operational report) in the PDP. Table 2 shows the stock exchange codes of the firms included in the analysis.

Table 2. Firms Included in the Analysis

No	Code	No	Code	No	Code	No	Code	No	Code	No	Code	No	Code
1	ADEL	21	FMIZP	41	CEMAS	61	AFYON	81	BRKSN	101	SKTAS	121	TATGD
2	VESTL	22	EMKEL	42	CELHA	62	TUPRS	82	BAGFS	102	ROYAL	122	SELGD
3	VESBE	23	EGEEN	43	BURVA	63	TMPOL	83	AYGAZ	103	MNDRS	123	PNSUT
4	ULUSE	24	DITAS	44	BURCE	64	SEKUR	84	ALKIM	104	LUKSK	124	PINSU
5	TTRAK	25	BFREN	45	BRSAN	65	SASA	85	AKSA	105	KORDS	125	PETUN
6	PRKAB	26	BNTAS	46	USAK	66	SANFM	86	ACSEL	106	KRTEK	126	PENGD
7	TMSN	27	ARCLK	47	NUHCM	67	RTALB	87	VKING	107	HATEK	127	OYLUM
8	TOASO	28	ASUZU	48	NIBAS	68	PETKM	88	SAMAT	108	DESA	128	KRSTL
9	SILVR	29	ALCAR	49	KUTPO	69	MRSHL	89	PRZMA	109	DERIM	129	KNFRT
10	SAYAS	30	TUCLK	50	KONYA	70	HEKTS	90	MNDTR	110	DAGI	130	KERVT
11	PARSN	31	SARKY	51	GOLTS	71	GUBRF	91	KARTN	111	BOSSA	131	KENT
12	OTKAR	32	KRDMA	52	EGSER	72	GOODY	92	KAPLM	112	BRMEN	132	FRIGO
13	MAKTK	33	IZMDC	53	DOGUB	73	GEDZA	93	DURDO	113	BRKO	133	ERSU
14	KLMSN	34	ISDMR	54	CIMSA	74	EMNIS	94	BAKAB	114	BLCYT	134	EKIZ
15	KATMR	35	EREGL	55	CMENT	75	EPLAS	95	ALKA	115	ARSAN	135	DARDL
16	KARSN	36	ERBOS	56	CMBTN	76	EGPRO	96	GENTS	116	ATEKS	136	CCOLA
17	JANTS	37	DOKTA	57	BUCIM	77	EGGUB	97	DGNMO	117	ULKER	137	BANVT
18	IHEVA	38	DMSAS	58	BSOKE	78	DYOBY	98	YUNSA	118	ULUUN	138	AVOD
19	GEREL	39	CUSAN	59	BTCIM	79	DEVA	99	YATAS	119	TBORG	139	AEFES
20	FROTO	40	CEMTS	60	AKCNS	80	BRISA	100	SNPAM	120	TUKAS		

Source: Created by the author by using PDP reports.

Labour productivity, export intensity, average wage and profitability variables were derived from the data obtained. The methods used in the calculation of these variables are presented in Table 3.

Table 3. Description of Variables

Variables	Description	Calculation	Source
LP	Labour productivity	Natural logarithm of (Net sales revenues/number of employees)	(Public Disclosure Platform [PDP], (2023)
EI	Export intensity	Net foreign sales revenues/net total sales revenues	(PDP, 2023)
AW	Average wage	Natural logarithm of (Short-term payables related to employee benefits/number of employees)	(PDP, 2023)
PR	Profitability	Quarterly net operating profit or loss/net sales revenue	(PDP, 2023)

Source: Created by the author.

In many studies in the literature, it is seen that productivity is taken with two methods as TFP and LP. However, in studies where firm-level data are used, as in this study, only LP is preferred since plant-level data are not available. Therefore, LP represents the productivity variable in this study. In microeconomic theory, the average productivity of labour is measured by the amount of output per labour. However, the quantity of output is usually not clearly stated in financial statements. Such operational data and performance measures are usually provided through internal reports or management reports. In order to access operational data such as production quantity, it is necessary to obtain the company's internal operational reports or management reports. For this reason, in analyses based on micro data, variables such as sales revenue or value added, which indirectly represent output, are generally used. In our study, following many studies in the literature, revenue per employee (Net sales revenues/number of employee) was preferred (Alvarez & Gonzalez, 2023; Atabek-Demirhan, 2016; Batrakova & Davies, 2012; Camino-Mogro et al., 2020; Davies & Jeppesen, 2015; Girma et al., 2008; Lei & Zongsen, 2017; Lemonakis et al., 2013; Powell & Wagner, 2011; Wagner, 2002).

In the NNTT literature focusing on inter-firm heterogeneity, the export variable is usually included in the analyses as a dummy variable for export participation status or export intensity. In most studies, exports are treated only as a binary variable (1,0 dummy) to denote a firm's export status. (Alvarez & Gonzalez, 2023; Alvarez & Lopez, 2005; Atabek-Demirhan, 2016; Batrakova & Davies, 2012; Bernard & Jensen, 1999; Camino-Mogro et al., 2020; Cassiman & Martinez-Ros 2007; Cassiman et al., 2010; Cui et al., 2016; Fabling & Sanderson, 2013; Greenaway & Yu, 2004; Greenaway et al., 2005; Hagemejer & Kolasa, 2011; Javalgi et al., 1998; Johansson, 2009; Kaoru et al., 2015; Lemonakis et al., 2013; Lopez, 2009; Lukason & Laitinen, 2018; Machado, 2019; Poschl et al., 2009; Serrano & Myro, 2019; Sharma & Mishra, 2012). In some studies, only the export intensity variable was preferred. (Bekteshi, 2020; Brooks, 2006; Cavusgil, 1984; Majocchi et al., 2005; Sun & Hong, 2011; Tomiura, 2007). There are also studies that use both variables together (Abor, 2011; Bleaney & Wakelin, 2002; Girma et al., 2008; Schank et al., 2007; Verhoogen, 2008). In a different methodology, it is also common to group firms according to their export status and analyse them separately (Alcala & Hernandez, 2010;

Damijan et al., 2010; Davies & Jeppesen, 2015; Delgado et al., 2002; Lei & Zongsen, 2017; Powell & Wagner, 2011; Samadi et al., 2023; Wagner, 2002; Wickramasekera & Bianchi, 2013; Yang & Mallick, 2010; Yasar & Rejesus, 2005). However, in addition to the export status of companies, how much they participate in exports (export intensity) is also very important (Fryges & Wagner, 2008). This is because many studies have concluded that export participation has no effect on firm productivity. It can be thought that this is mainly due to the selection of the export variable as a dummy. In economic terms, it is inevitable that there are important linkage channels and cause-and-effect relationships between exports and productivity. Therefore, 'export intensity' variable is preferred to represent exports in our study. Export intensity is considered to be more useful for two reasons. The first one is that export intensity is the most widely used variable regarding the export status of the firm. In this way, it can be compared with other studies. Secondly, since export and sales information is clearly stated in the income statements of firms, the resistance of managers, especially in SMEs, to confidentiality is not encountered. Since export intensity is obtained through open information, it is more reliable (Majocchi et al., 2005, pp. 721-722).

In the literature, studies based on firm heterogeneity generally use annual, monthly, weekly or hourly wage averages as wage variables. In a few studies based on employee-employer data, wage variables containing more detailed information such as blue-white collar distinction or education level are used (Frıas et al., 2009; Schank et al., 2007; Tanaka, 2015). Yet, this information is only available at the facility level through special reports, surveys or mutual legal protocols. Alternatively, it is possible to use the personnel expenses item in the accounting statements as a wage variable; but it is not possible to access the accounting statements on company basis for similar reasons. In addition, the personnel expenses item is not included in the balance sheets and income statements used in our study. Another possible expense item that can be used to represent the wage variable is the cost of sales; however, in our study, this item was not deemed appropriate to represent the wage variable due to its content. Due to these reasons, it is quite difficult to access the wage information of active firms in Türkiye. In our study, an alternative method is preferred to represent the wage variable and the data of the 'short-term payables related to employee benefits' account in the balance sheets of the firms are used. The content of this account is described by the Public Oversight Accounting and Auditing Standards Authority as follows; '*wages, salaries and social security benefits, paid annual leave and paid sick leave, profit sharing and bonuses (payable within twelve months from the end of the period) and non-monetary benefits provided to existing employees (health benefits, lodging, vehicles and food and other services provided free of charge or at a discount)*' (Public Oversight Accounting and Auditing Standarts Authority, 2018, p. 6).

The profitability variable represents the percentage profit/loss ratio achieved by the firm in the relevant period. In the analysis, this variable is calculated as 'quarterly net operating profit or loss/quarterly net sales revenue' for each quarter following Atabek-Demirhan (2016). This study mainly

focuses on the effects of exports on production-related indicators such as productivity, wages and capital intensity. For this reason, it is deemed appropriate to use only the firm's operating profitability indicator.

A model, was constructed with the variables given in Table 3. The model of the study is shown in Equation (1).

$$\mathrm{LP}_{it} = \beta_0 + \beta_1 \mathrm{EI}_{it} + \beta_2 \mathrm{AW}_{it} + \beta_3 \mathrm{PR}_{it} + u_{it} \quad (1)$$

In the equation i, denotes the horizontal cross-sectional units (firms) of the study; t, denotes the time dimension; β_0, denotes the constant term and u_{it}, denotes the error term.

5. EMPIRICAL RESULTS

In this section of the study, the model in equation 1 is estimated to analyse the effect of exports on productivity. Since both the time and unit dimension of the data set are larger than one, the panel data analysis method was followed for model estimation. Stata 15 and Eviews 12 programmes were used for this purpose. In addition, (Granger Bootstrap) causality test was applied to determine the direction of the export-productivity relationship in the industry. Gauss 21 programme was used for this test. In the first subsection, panel data analysis is reported and in the following subsection, causality analysis results are presented.

5.1. Panel Data Analysis Results

The model in Equation 1 includes four different variables: productivity, average wages, exports and profitability. Descriptive statistics of these variables are presented in Table 4. The number of observations for each variable in the table is 3892.

Table 4. Descriptive Statistics

Variables	Mean value	Standart deviation	Minimum	Maximum
LP	481,916	867,720	7,027	13,800,000
AW	10,135	15,547	338	339,112
EI	0.320	0.265	0	1
PR	0.099	0.444	-20.057	4.284

Source: Created by the author.

In table 4, the summary statistics for the variables are reported. Higher mean values indicate a positive indicator for all variables. In the case of the total sample, the mean value of LP is 481,916, AW is 10,135 and PR is 0.09. The difference between the minimum and maximum values of these variables is high. The first reason for this is that firms have quite heterogeneous characteristics. The second reason is that the data set is constructed from quarterly firm reports. In some periods, extreme values may appear in firm reports due to cyclical reasons. On the other hand, EI, which expresses the share of export revenue in total sales revenue, takes a value between 0 and 1. A total of 5 firms in the dataset did not participate in any export activity in the period analysed. Therefore, the minimum value is 0. For some

firms, all of their income in a quarter period is derived from export activities. Such firms are called pure exporters (Mahakitsiri & Suwanprasert, 2023) and there are a small number of such firms in the dataset.

Another important indicator for the variables is the correlation relationship between them. The results of the Pearson correlation test are reported in Table 5.

Table 5. Correlation Between Labour Productivity, Average Wage, Export Intensity and Profitability

Variables	LP	AW	EI
AW	0.469*** (0.000)		
EI	-0.007 (0.657)	-0.089*** (0.000)	
PR	0.111*** (0.000)	-0.045*** (0.004)	0.044*** (0.005)

Note: p-values are reported between brackets. *** indicate significance at 1% level.

The NNTT and Melitz (2003) model suggests that, on the one hand, efficient firms are more likely to engage in exporting and, on the other hand, exporters are generally more efficient. However, the coefficient -0.007 in the correlation matrix representing the correlation between LP and EI is not statistically significant. This result implies that there is no direct relationship between export intensity and labour productivity or that the relationship is not linear. Therefore, the theoretical relationships between the two variables are more likely to be realised through non-linear channels. On the other hand, the correlation of labour productivity with average wages (0.469) and profitability (0.111) has a positive coefficient. This result is consistent with the neo-classical microeconomic theory. There is a negative, albeit weak, correlation (-0.089) between average wages and exports. The small coefficient indicates that the direct relationship between the two variables is limited. In fact, although exports are expected to lead to higher wages in the NNTT, the catalyst for this relationship is that exporters demand higher quality labour inputs. Therefore, in theory, this relationship is realised indirectly. As it is known, the correlation matrix reflects only direct relationships between variables. Finally, profitability is weakly positively correlated with exports (0.044) and negatively correlated with average wages (-0.045). The negative result indicates the existence of a trade-off relationship between the two variables due to firms' labour and capital preferences. The positive result, on the other hand, indicates that firms' export success can increase their profitability in line with the theoretical expectation.

Before the model estimation, the correlation between the units should be determined. Accordingly, Pesaran's (2021) cross-sectional dependence (CD) test was applied to the variables. The findings obtained as a result of this test are presented in Table 6.

As a result of Pesaran CD test, all probability values are found to be 0.000. Thus, the null hypothesis of the test as ‘there is no horizontal cross-section dependence’ is rejected. Therefore, it is concluded that there is horizontal cross-section dependence for all variables.

Table 6. Cross-Section Dependence Test Results

Variables	CD Test Value
LP	389.927***
AW	351.85***
EI	21.216***
PR	45.236***

Note: *** indicate significance at 1% level.

Finally, the heterogeneity of the variables should be determined especially for the selection of the appropriate causality analysis. For this reason, the heterogeneity test was applied to the series (Blomquist & Westerlund, 2013). The results of this test are presented in Table 7.

Table 7. Heterogeneity Test Results

Variables	Δ^{HAC}	$\Delta_{adj.}^{HAC}$
LP	-5.627***	-5.982***
AW	-1.945*	-2.068 **
EI	-3.138***	-3.337***
PR	-4.422***	-4.701***

Note: ***, ** and * indicate significance at 1%, 5% and 10% level.

According to the heterogeneity test results, the null hypothesis 'slope coefficients are homogenous' is rejected for all variables. Therefore, it is concluded that variables are heterogeneous.

The model to be used in the analysis was determined through Hausman test. In addition, various tests were applied to test the cross-sectional dependence, heteroscedasticity and autocorrelation problems that reduce the reliability of the model estimation. The results of these tests are presented in Table 8.

Table 8. Hausman Test Statistic, Cross-sectional Dependence, Heteroscedasticity and Auto-Correlation Results

Tests	Hypotheses	Results
Hausman Test Statistic	H_0: There is no correlation between explanatory variables and unit effect (random effects model is appropriate). H_1: There is correlation between explanatory variables and unit effect (fixed effects model is appropriate).	2.29 (0.5151)
Cross-sectional Dependence (Pesaran's CD Test)	H_0: There is no cross-section dependence H_1: There is cross-section dependence	Pesaran CD= 264.351 (0.000)
Heteroscedasticity (Levene, Brown & Forsythe's Test)	H_0: There is no heteroscedasticity H_1: There is heteroscedasticity	W0= 6.8309235 df(138, 3753) Pr>F= (0.000)***
Auto-Correlation (Durbin-Watson & Baltagi-Wu's LBI Test)	H_0: There is no autocorrelation H_1: There is autocorrelation	Durbin-Watson 1.2659108 Baltagi-Wu 1.3598957

Note: *** indicate significance at 1% level.

The probability value of the Hausman test statistic is 0.5151. This value is greater than 0.05; therefore, the hypothesis H0 cannot be rejected. As a result, it is appropriate to use the random effects (RE) model. According to the results of Pesaran CD Test ($p<0.05$), Levene, Brown and Forsythe Test ($p<0.05$) and Durbin-Watson and Baltagi-Wu's LBI Test (since the test results are less than the critical value of 2), H0 hypotheses are rejected in all of the tests and it is concluded that cross-section dependence, heteroscedasticity and autocorrelation problems exist, respectively.

In line with these results, the Driscoll-Kraay estimator, which provides consistent and robust results under the presence of these three problems, was used (Driscoll & Kraay, 1998). The results of the model are reported in Table 9.

Table 9. Driscoll-Kraay Model Estimation

Dependent Variable: LP				
Independent Variables	**Coefficient**	**Standart Error**	**t**	**P>|t|**
EI	0.275*	[0.147]	1.87	0.072
AW	0.566***	[0.063]	8.86	0.000
PR	0.252***	[0.034]	7.40	0.000
Constant	7.375***	[0.782]	9.43	0.000
Wald chi2 (3)	284.82			
Prob>chi2	0.000			
R^2	0.237			

Note: *** and * indicate significance at 1% and 10% level.

The probability value (0.000) in Table 9 indicates that the model is statistically significant at $p<0.01$ level. The coefficient of determination (0.237) shows that the independent variables used in the model explain approximately 23.7% of the total change in the dependent variable. The rate is relatively low. However, this is usual in panel data analysis, especially due to the heterogeneity of the units. According to the RE estimation results, all independent variables have a statistically significant effect on the dependent variable. Accordingly, increases in export intensity, average wages and profits increase productivity in line with the theoretical expectation. The effect of exports on productivity supports the learning-by-exporting effect. This result obtained for the Turkish manufacturing industry is consistent with the findings of Yasar et al. (2006; 2007), Yasar and Rejesus (2005), Dalgıc, Fazlıoglu and Gasiorek (2015b) and Dalgıc, Fazlıoglu and Karaoglan (2015), while it does not support the findings of Kılıcaslan and Erdogan (2012).

In the previous literature, there are studies that conclude that there is no exporter premium or that there is an exporter premium only stemming from the self-selection effect (Aw & Hwang, 1995; Bernard & Jensen, 1999; Delgado et al., 2002; Lei & Zongsen, 2017; Liu et al., 1999; Wagner & Van Biesebroeck, 2008; Wagner, 2002; Vu, 2012;). The findings of this paper do not support the results of these studies in general. Nevertheless, the number of studies finding learning-by-exporting effect for different countries is quite high (Baldwin & Gu, 2004; Bigsten & Gebreeyesus, 2009; Blalock & Gertler, 2004; Damijan et al., 2010; De Loecker, 2007; Kaoru et al., 2015; Kraay, 1999; Palangkaraya & Yong,

2007; Razzolini & Vannoni, 2011; Sharma & Mishra, 2011; Van Biesebroeck, 2005a, 2005b; Yang & Mallick, 2010). However, it would be appropriate to elaborate here only on the studies that measure the export variable as export intensity. For instance, the findings on exports and average wages are quite consistent with the findings of Abor (2011) using a fixed effect model. Moreover, in this analysis, where a similar model is used, the coefficient of average wage is larger than the coefficient of exports. Moreover, the result for exports is also consistent with the findings of Sun and Hong (2011) using three different methods (Pooled OLS, FE and RE). Similar results are reported by Hashim and Banga (2009) for unskilled labour only and Castellani (2002) for growth in firm productivity (value added/emplyoee). Fryges and Wagner (2008) examine the effect of exports on labour productivity (sales/emplyoee) growth in terms of different deciles of export intensity using the GPS method and find evidence of a learning effect in a sub-range of export intensity.

In the literature, it is observed that the findings on the learning-by-exporting effect are mostly obtained from studies on developing countries. In this paper, this effect is supported by the case of Türkiye. These findings point to the importance of exports for productivity growth in developing countries.

5.2. Granger Bootstrap Causality Test Results

In the Granger (2003) approach, the causality relationship is based on the fact that the past values of one variable improve the predictions of another variable. There are three different causality tests widely used in the literature. The first one is the GMM estimator. In this method, cross-section dependence in the panel is not controlled and the heterogeneity of the parameters is ignored (Pesaran et al., 1999). In the second method developed by Hurlin (2008), although heterogeneity is controlled, cross-sectional dependence cannot be explained. The third method is Granger causality developed by Konya (2006). Granger causality has two important advantages over other tests: controlling the cross-sectional dependence in the panel (not requiring unit root test) and taking into account the heterogeneity of the parameters. Since our study focuses on the differences between firms on the basis of NNTT, the heterogeneity between the units in the panel should be taken into account. Therefore, following similar studies (Kar et al., 2011; Menyah et al., 2014), Granger-Bootstrap causality analysis, which is appropriate for the heterogeneous structure of the panel, was used to examine causality. The procedure of Emirmahmutoglu and Kose (2011) was followed in the analysis conducted through Gauss 21 software.

There are some studies that are similar to our study in terms of method or sample. For example, Demir (2019) examined the Turkish manufacturing industry with the same method. However, this study used sector-level data. Albayrak and Agazade (2017), using Granger causality test, concluded that there is a unidirectional long-run relationship from two different labour productivity indicators to exports. Ozdemir (2019) conducted a Granger causality test using aggregated macro data and found a

unidirectional causality relationship between exports and total factor productivity in the Turkish manufacturing industry.

In this study, micro-scale quarterly firm data are used. In the analysis, export variable is represented by export intensity (EI) and productivity variable is represented by labour productivity (LP). In addition, the causality relationship result can be known for each firm in the sample. In this respect, this paper differs from the previous literature. The causality test result for the industry is presented in Table 10. Firm-based results are presented in Appendix 1.

Table 10. Causality from Productivity to Exports and from Exports to Productivity: Granger Causality Test

Productivity→ Export	**Export→ Productivity**
Panel Fisher= 599.009	Panel Fisher= 612.234
Asymptotic p-value=0.000	Asymptotic p-value= 0.000
Bootstrap p-value= 0.000	Bootstrap p-value= 0.000

Source: Created by the author.

According to the results in Table 10, there is a bi-directional causality relationship for the industry in general. When the probability values in the causality test are considered, the null hypothesis of 'There is no Granger causality between the variables' is rejected for both directions of causality. In this respect, there is a causality relationship both from productivity to export and from export to productivity. In other words, both variables are important determinants of each other. Similar to these findings, there are studies reporting bidirectional causality for different countries such as the United Kingdom (Girma et al., 2004), Sweden (Hansson & Lundin, 2004), 9 different African countries (Van Biesebroeck, 2005b), Australia (Palangkaraya & Yong, 2007), Ethiopia (Bigsten & Gebreeyesus, 2009), China (Yang & Mallick, 2010) and Italy (Razzolini & Vannoni, 2011). Further, these results are consistent with many studies cited in the literature section that find both learning-by-exporting and self-selection effects in the Turkish manufacturing industry (Aldan & Günay, 2008; Maggioni, 2012; Ozarslan & Dogan, 2021). Unlike these studies, the analysis also presents the results of this causality on a firm-by-firm basis. As a result, for the group of firms analysed, exporting is a result of firms' own choices; on the other hand, exports are the determinant of productivity changes in exporting firms - theoretically, usually in the direction of increase.

6. CONCLUSION

Export activities are considered as a vital factor for developing countries. Because there is generally a productivity gap in these countries. Exports are an important determinant of productivity increases that support growth. Especially labour productivity, which is the main source of total productivity, is affected by export activities. Similar to many studies in the literature, this study reports the positive effect of exports on labour productivity for the Turkish manufacturing industry. Our significant findings on the productivity-export relationship underlying the Melitz (2003) model

encouraged the determination of the direction of causality between the two variables. As a result of the causality analysis, a bi-directional causality relationship was identified, where both productivity is an important determinant of exports and exports are an important determinant of productivity. These results indicate that the self-selection and learning-by-exporting hypotheses are valid in the Turkish manufacturing industry. In this respect, the results of the analyses are consistent with the findings of many similar studies, which are detailed in the literature section and find the existence of both effects. Unlike the literature, the results of the causality relationship on a firm-by-firm basis are also presented in the appendix section of the study. Thus, this study has shown that the existing analyses can be deepened by presenting the direction of the causality relationship on a more micro scale, and it has shown that selective incentive policies that can be applied on a firm basis can be implemented. Therefore, it has provided outputs not only at the sector level but also at the firm level for policies to select winners.

In line with the results obtained, this study provides important policy implications for the Turkish economy. It points out that exports are important and should be encouraged in terms of both foreign trade and fiscal policies. Because for the firms analysed, export activity is a determinant factor that has direct or indirect effects on many parameters. For example, the implementation of policies that will reduce the export intensity of firms will lead to a decreasing effect on labour productivity. Labour productivity is the main determinant of total factor productivity, which is considered as the source of healthy economic growth. The choice of policies that will restrict exports has the potential to restrict the average productivity of the economy and thus growth. As a result, a larger share of firms' sales revenues from exports will have positive effects both on the firm level and on the national macroeconomic scale. Therefore, it is necessary to implement economic policies that will support more inclusion of exports by firms. In terms of the causality relationship reported in this study, policies that will support both learning and selection effects are expected to provide positive economic outcomes. The results indicate the existence of a virtuous cycle between exports and productivity.

Another important policy recommendation derived from our analyses is that policies that would lead to a decline in average wages and firm profitability should be avoided. This is because a decline in average wages and profitability reduces labour productivity. This can be expected to restrain growth at the macro scale similar to the relationship in export intensity. Based on these results, it can be argued that the current policy preferences in the Turkish economy involve some dichotomies. Because the contractionary policies implemented or expected to be implemented against the current inflation carry some risks. For instance, the fight against inflation based on regulations that reduce firm profitability and policies that reduce wages in real terms may have negative effects on firm productivity. For this reason, it is necessary to conduct effective SWOT analyses that take into account the dichotomies and trade off relationships between economic factors in the selection of current policy choices. Making

policy choices by considering these complex relationships will make it more likely that the policies to be determined will be successful.

In the light of this study, some suggestions can be made for future studies. For example, the analyses that we have only considered manufacturing industry firms can be applied for different industries in future studies. In addition, the scope of foreign trade in the analyses can be expanded to include import activities. Another important research issue is whether the findings are valid for different types of markets. The characteristics of the manufacturing industry analysed are in line with the monopolistic competition market assumed in heterogeneous firm theories. Instead, it is worth investigating, for example, exporter premiums and the export-productivity relationship in oligopolistic markets.

Ethics Committee approval was not required for this study.

The author declares that the study was conducted in accordance with research and publication ethics.

The author confirms that no part of the study was generated, either wholly or in part, using Artificial Intelligence (AI) tools.

The author declares that there are no financial conflicts of interest involving any institution, organization, or individual associated with this article.

The author affirms that the entire research process was performed by the sole declared author of the study.

REFERENCES

Abor, J. (2011). Do export status and export intensity increase firm performance?. *Thunderbird International Business Review*, *53*(1), 9-18. https://doi.org/10.1002/tie.20386

Albayrak, N. C., & Agazade, S. (2017). Emek verimliliği ve ihracat ilişkisi: Türk imalat sanayi örnegi. *Dumlupınar Universitesi Sosyal Bilimler Dergisi*, *53*, 11-25.

Alcala, F., & Hernandez, P. J. (2010). *Firms' main market, human capital, and wages*. SERIEs, *1*, 433-458. https://doi.org/10.1007/s13209-009-0007-6

Aldan, A., & Günay, M. (2008). *Entry to export markets and productivity: Analysis of matched firms in Turkey*. TCMB. https://www.tcmb.gov.tr/wps/wcm/connect/EN/TCMB+EN/Main+Menu/Publications/Research/Working+Paperss/2008/08-05

Alvarez, R., & Gonzalez, M. A. (2023). *Are innovation barriers different for Chilean exporters and non-exporters?*. Universidad de Chile, Departamento de Economía.

Alvarez, R., & Lopez, R. A. (2005). Exporting and performance: Evidence from Chilean plants. *Canadian Journal of Economics/Revue Canadienne D'économique*, *38*(4), 1384-1400. https://doi.org/10.1111/j.0008-4085.2005.00329.x

Antoniades, A. (2015). Heterogeneous firms, quality, and trade. *Journal of International Economics*, *95*(2), 263-273. https://doi.org/10.1016/j.jinteco.2014.10.002

Arrow, K. (1962). The Economic implications of learning by doing. *Review of Economic Studies*, *29*(80), 155–173. https://doi.org/10.2307/2295952

Arvas, M. A., & Uyar, B. (2014). Exports and firm productivity in Turkish manufacturing: An Olley-Pakes estimation. *International Journal of Economics and Financial Issues*, *4*(2), 243-257.

Atabek-Demirhan, A. (2016). To be exporter or not to be exporter? Entry–exit dynamics of Turkish manufacturing firms. *Empirical Economics*, *51*(1), 181-200. https://doi.org/10.1007/s00181-015-1005-0

Aw, B. Y., & Hwang, A. R. M. (1995). Productivity and the export market: A firm-level analysis. *Journal of Development Economics*, *47*(2), 313-332. https://doi.org/10.1016/0304-3878(94)00062-H

Aw, B. Y., Chung, S., & Roberts, M. J. (2000). Productivity and turnover in the export market: Micro-level evidence from the Republic of Korea and Taiwan (China). T*he World Bank Economic Review*, *14*(1), 65-90. https://doi.org/10.1093/wber/14.1.65

Bal, H., Akça, E. E., Mamun, A. H., & Bayraktar, M. (2020). Revisiting export-output growth nexus: Findings from Granger causality and leveraged bootstrap approach for Japan. *Dogus Universitesi Dergisi, 21*(2), 37-51.

Baldwin, J. R., & Gu, W. (2004). Trade liberalization: Export-market participation, productivity growth, and innovation. *Oxford Review of Economic Policy*, *20*(3), 372-392. https://doi.org/10.1093/oxrep/grh022

Batrakova, S., & Davies, R. B. (2012). Is there an environmental benefit to being an exporter? Evidence from firm-level data. *Review of World Economics*, *148*, 449-474. https://doi.org/10.1007/s10290-012-0125-2

Bekteshi, S. A. (2020). Firm size related to export performance. *International Journal of Economics and Business Administration*, *8*(1), 51-61. https://www.um.edu.mt/library/oar/handle/123456789/53838

Bernard, A. B., & Jensen, J. B. (1999). Exceptional exporter performance: Cause, effect, or both?. *Journal of International Economics*, *47*(1), 1-25. https://doi.org/10.1016/S0022-1996(98)00027-0

Bernard, A. B., Eaton, J., Jensen, J. B., & Kortum, S. (2003). Plants and productivity in international trade. *American Economic Review*, *93*(4), 1268-1290. https://doi.org/10.1257/000282803769206296

Bernard, A. B., Jensen, J. B., & Lawrence, R. Z. (1995). Exporters, jobs, and wages in US manufacturing: 1976-1987. *Brookings Papers on Economic Activity Microeconomics*, 1995, 67-119. https://doi.org/10.2307/2534772

Bernard, A. B., Jensen, J. B., Redding, S. J., & Schott, P. K. (2007). Firms in international trade. *Journal of Economic Perspectives*, *21*(3), 105-130. https://doi.org/10.1257/jep.21.3.105

Bernard, A. B., Jensen, J. B., Redding, S. J., & Schott, P. K. (2012). The empirics of firm heterogeneity and international trade. *Annual Review of Economics*, *4*(1), 283-313. https://doi.org/10.1146/annurev-economics-080511-110928

Bernard, A.B., & Wagner, J. (1997). Exports and success in German manufacturing. *Review of World Economics*, *133*, 134–157. https://doi.org/10.1007/BF02707680

Bigsten, A., & Gebreeyesus, M. (2009). Firm productivity and exports: Evidence from Ethiopian manufacturing. *The Journal of Development Studies*, *45*(10), 1594-1614. https://doi.org/10.1080/00220380902953058

Blalock, G., & Gertler, P. J. (2004). Learning from exporting revisited in a less developed setting. *Journal of Development Economics*, *75*(2), 397-416. https://doi.org/10.1016/j.jdeveco.2004.06.004

Bleaney, M., & Wakelin, K. (2002). Efficiency, innovation and exports. *Oxford Bulletin of Economics and Statistics*, *64*(1), 3-15. https://doi.org/10.1111/1468-0084.00001

Blomquist, J., & Westerlund, J. (2013). Testing slope homogeneity in large panels with serial correlation. *Economics Letters*, *121*(3), 374-378. https://doi.org/10.1016/j.econlet.2013.09.012

Brooks, E. L. (2006). Why don't firms export more? Product quality and Colombian plants. *Journal of Development Economics*, *80*(1), 160-178. https://doi.org/10.1016/j.jdeveco.2005.10.001

Camino-Mogro, S., Vera-Gilces, P., & Ordeñana-Rodriguez, X. (2020). *Microeconometric evidence between exporters and non-exporters: Differences in economic and productivity performance*. EPEL. http://economiclab.org/microeconometric-evidence-between-exporters-and-non-exporters-differences-in-economic-and-productivity-performance.html

Cassiman, B., & Martinez-Ros, E. (2007). *Product innovation and exports. Evidence from Spanish manufacturing.* IESE Business School.

Cassiman, B., Golovko, E., & Martínez-Ros, E. (2010). Innovation, exports and productivity. *International Journal of Industrial Organization*, *28*(4), 372-376. https://doi.org/10.1016/j.ijindorg.2010.03.005

Castellani, D. (2002). Export behavior and productivity growth: Evidence from Italian manufacturing firms. *Weltwirtschaftliches Archiv*, *138*(4), 605-628. https://doi.org/10.1007/BF02707654

Cavusgil, S. T. (1984). Differences among exporting firms based on their degree of internationalization. *Journal of Business Research*, *12*(2), 195-208. https://doi.org/10.1016/0148-2963(84)90006-7

Ciuriak, D., Lapham, B., Wolfe, R., Collins-Williams, T., & Curtis, J. (2015). Firms in international trade: Trade policy implications of the new new trade theory. *Global Policy*, *6*(2), 130-140. https://doi.org/10.1111/1758-5899.12183

Cui, J., Lapan, H., & Moschini, G. (2016). Productivity, export, and environmental performance: Air pollutants in the United States. *American Journal of Agricultural Economics*, *98*(2), 447-467. https://doi.org/10.1093/ajae/aav066

Dalgıc, B., Fazlıoglu, B., & Gasiorek, M. (2015a). Costs of trade and self-selection into exporting and importing: The case of Turkish manufacturing firms. *Economics*, *9*(1), 1-29. https://doi.org/10.5018/economics-ejournal.ja.2015-15

Dalgıc, B., Fazlıoglu, B., & Gasiorek, M. (2015b). *Does it matter where you export and does real productivity really rise with exporting*? Munich Personal RePEc Archive, MPRA Paper No. 69956. https://mpra.ub.uni-muenchen.de/id/eprint/69956

Dalgıc, B., Fazlıoglu, B., & Karaoglan, D. (2015). Entry to foreign markets and productivity: Evidence from a matched sample of Turkish manufacturing firms. T*he Journal of International Trade & Economic Development*, *24*(5), 638-659. https://doi.org/10.1080/09638199.2014.948904

Damijan, J. P., Kostevc, C., & Polanec, S. (2010). From innovation to exporting or vice versa?. *World Economy*, *33*(3), 374-398. https://doi.org/10.1111/j.1467-9701.2010.01260.x

Davies, R. B., & Jeppesen, T. (2015). Export mode, firm heterogeneity, and source country characteristics. *Review of World Economics*, 151, 169-195. https://doi.org/10.1007/s10290-014-0207-4

De Loecker, J. (2007). Do exports generate higher productivity? Evidence from Slovenia. *Journal of International Economics*, *73*(1), 69-98. https://doi.org/10.1016/j.jinteco.2007.03.003

Delgado, M. A., Farinas, J. C., & Ruano, S. (2002). Firm productivity and export markets: A non-parametric approach. *Journal of International Economics*, *57*(2), 397-422. https://doi.org/10.1016/S0022-1996(01)00154-4

Demena, B. A., Msami, J., Mmari, D., & Van Bergeijk, P. A. (2022). Productivity premia and firm heterogeneity in Eastern Africa. In B. A. Demena & P.A.G. Van Bergeijk (Eds.), *Trade and investment in East Africa: Prospects, challenges and pathways to sustainability* (pp. 131-161). Springer Nature Singapore. https://doi.org/10.1007/978-981-19-4211-2_7

Demir, I. (2019). *Türkiye imalat sanayi alt sektörlerinde ihracat ile emek verimliliği arasındaki nedensellik ilişkisi.* [Unpublished master's thesis], Pamukkale University.

Driscoll, J. C., & Kraay, A. C. (1998). Consistent covariance matrix estimation with spatially dependent panel data. *Review of Economics and Statistics*, *80*(4), 549-560. https://doi.org/10.1162/003465398557825

Emirmahmutoglu, F., & Kose, N. (2011). Testing for Granger causality in heterogeneous mixed panels, *Economic Modelling*, *28*, 870–876. https://doi.org/10.1016/j.econmod.2010.10.018

Engel, D., Procher, V., & Schmidt, C. M. (2013). Does firm heterogeneity affect foreign market entry and exit symmetrically? Empirical evidence for French firms. *Journal of Economic Behavior & Organization*, (85), 35-47. https://doi.org/10.1016/j.jebo.2012.10.016

Fabling, R., & Sanderson, L. (2013). Exporting and firm performance: Market entry, investment and expansion. *Journal of International Economics*, *89*(2), 422-431. https://doi.org/10.1016/j.jinteco.2012.08.008

Frıas, J. A., Kaplan, D. S., Verhoogen, E. A., & Alfaro-Serrano, D. (2009). Exports and wage premia: Evidence from Mexican employer-employee data. *Unpub. paper, Columbia University*. https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=4dbeb709e9b56d30dca6c6a414d7688281d55607

Fryges, H., & Wagner, J. (2008). Exports and productivity growth: First evidence from a continuous treatment approach. *Review of World Economics*, *144*, 695-722. https://doi.org/10.1007/s10290-008-0166-8

Girma, S., Görg, H., & Hanley, A. (2008). R&D and exporting: A comparison of British and Irish firms. *Review of World Economics*, *144*, 750-773. https://doi.org/10.1007/s10290-008-0168-6

Girma, S., Greenaway, A., & Kneller, R. (2004). Does exporting increase productivity? A microeconometric analysis of matched firms. *Review of International Economics*, *12*(5), 855-866. https://doi.org/10.1111/j.1467-9396.2004.00486.x

Granger, C. W. (2003). Some aspects of causal relationships. *Journal of Econometrics*, *112*(1), 69-69.

Greenaway, D., & Yu, Z. (2004). Firm-level interactions between exporting and productivity: Industry-specific evidence. *Review of World Economics*, *140*, 376-392. https://doi.org/10.1007/BF02665981

Greenaway, D., Gullstrand, J., & Kneller, R. (2005). Exporting may not always boost firm productivity. *Review of World Economics*, *141*, 561-582. https://doi.org/10.1007/s10290-005-0045-5

Gungor, A. G. (2017 September, 7-8). *Kuresel kriz surecinde imalat sanayi alt sektorlerinde verimlilik degismeleri ve rekabet gucu iliskisi* [Conference presentation]. IV. International Caucasus-Central Asia Foreign Trade and Logistics Congress. Aydın/Türkiye. https://ulk.ist/media/kitap/IV-UKODTLK/kuresel-kriz-surecinde-imalat-sanayi-alt-sektorlerinde-verimlilik-degis_XW8GLZr.pdf

Hagemejer, J., & Kolasa, M. (2011). Internationalisation and economic performance of enterprises: Evidence from Polish firm-level Data. *The World Economy*, *34*(1), 74-100. https://doi.org/10.1111/j.1467-9701.2010.01294.x

Hallak, J. C., & Sivadasan, J. (2013). Product and process productivity: Implications for quality choice and conditional exporter premia. *Journal of International Economics*, *91*(1), 53-67. https://doi.org/10.1016/j.jinteco.2013.05.001

Hansson, P., & Lundin, L. L. (2004). Exports as an indicator on or promoter of successful Swedish manufacturing firms in the 1990s. *Review of World Economics*, *140*, 415-445. https://doi.org/10.1007/BF02665983

Hashim, D., & Banga, R. (2009). *Impact of trade on labour productivity and wage inequality in India*. Munich Personal RePEc Archive, MPRA Paper No. 35200. https://mpra.ub.uni-muenchen.de/35200/

Hurlin, C. (2008). *Testing for Granger non causality in heterogeneous panels*. Department of Economics: University of Orleans Working Paper.

Irarrazabal, A., Moxnes, A., & Ulltveit-Moe, K. H. (2013). Heterogeneous firms or heterogeneous workers? Implications for exporter premiums and the gains from trade. *Review of Economics and Statistics*, *95*(3), 839-849. https://doi.org/10.1162/REST_a_00285

Javalgi, R. G., Lawson, D., Gross, A. C., & White, D. S. (1998). Firm characteristics and export propensity: A comparison of manufacturers and manufacturing-based service providers. *International Business Review*, *7*(5), 521-534. https://doi.org/10.1016/S0969-5931(98)00027-4

Johansson, S. (2009). *Market experiences and export decisions in heterogeneous firms*. Centre of Excellence for Science and Innovation Studies (CESIS), (196). https://static.sys.kth.se/itm/wp/cesis/cesiswp196.pdf

Kaoru, H., Daisuke, M., & Miho, T. (2015). *Learning by export: Does the presence of foreign affiliate companies matter?* (No. 15053). RIETI. https://www.rieti.go.jp/jp/publications/dp/15e053.pdf

Kar, M., Nazlıoglu, S., & Agır, H. (2011). Financial development and economic growth nexus in the MENA countries: Bootstrap panel Granger causality analysis. *Economic Modelling*, *28*(1-2), 685-693. https://doi.org/10.1016/j.econmod.2010.05.015

Kılıcaslan, Y., & Erdogan, L. (2012). Industry orientation, exporting and productivity. Modern Economy, *3*(1), 81-90. https://doi.org/10.4236/me.2012.31012

Koluman, A. (2022). *Türkiye imalat sanayinde firma bazlı ihracatı etkileyen faktörler*. [Unpublished master's thesis], Tarsus University.

Konya, L. (2006). Exports and growth: Granger causality analysis on OECD countries with a panel data approach. *Economic Modelling*, *23*(6), 978-992. https://doi.org/10.1016/j.econmod.2006.04.008

Kraay, A. (1999). Exports and economic performance: Evidence from a panel of Chinese enterprises. *Revue d'Economie du Developpement*, *1*(2), 183-207.

Kreickemeier, U., & Richter, P. M. (2014). Trade and the environment: The role of firm heterogeneity. *Review of International Economics*, *22*(2), 209-225. https://doi.org/10.1111/roie.12092

Lei, Y., & Zongsen, Z. (2017). Do exports firms outperform non-export ones? An empirical study on different classification of manufacturing industries in China. *China Finance and Economic Review*, *6*(4), 78-98. https://doi.org/10.1515/cfer-2017-060405

Lemonakis, C., Voulgaris, F., Christakis, S., & Vassakis, K. (2013). *Profit performance of exporting and non-exporting agricultural manufacturing firms:The case of Greece* [Conference presentation]. 8th NHIBE International Conference New Horizons in Industry and Education, Chania/Greece. https://doi.org/10.13140/RG.2.1.4330.0007

Liu, J. T., Tsou, M. W., & Hammitt, J. K. (1999). Export activity and productivity: Evidence from the Taiwan electronics industry. *Weltwirtschaftliches Archiv, 135*(4), 675-691. https://doi.org/10.1007/BF02707390

Lopez, R. A. (2009). Do firms increase productivity in order to become exporters?. *Oxford Bulletin of Economics and Statistics, 71*(5), 621-642. https://doi.org/10.1111/j.1468-0084.2009.00558.x

Lu, J., Lu, Y., Sun, Y., & Tao, Z. (2017). Intermediaries, firm heterogeneity and exporting behaviour. *The World Economy, 40*(7), 1381-1404. https://doi.org/10.1111/twec.12423

Lukason, O., & Laitinen, E. K. (2018). Failure of exporting and non-exporting firms: Do the financial predictors vary?. *Review of International Business and Strategy*, *28*(3/4), 317-330.

Machado, L. P. M. (2019). *Exporter firms behaviour, evidence from Portuguese firms using microdata* (No. 0136). Gabinete de Estratégia e Estudos, Ministério da Economia. https://www.gee.gov.pt//RePEc/WorkingPapers/GEE_PAPERS_136.pdf

Maggioni, D. (2012). Learning by exporting in Turkey: An investigation for existence and channels. *Global Economy Journal, 12*(2), 1-15. https://doi.org/10.1515/1524-5861.1865

Mahakitsiri, D., & Suwanprasert, W. (2023). Who are pure exporters?. *The World Economy, 46*(6), 1759-1781. https://doi.org/10.1111/twec.13351

Majocchi, A., Bacchiocchi, E., & Mayrhofer, U. (2005). Firm size, business experience and export intensity in SMEs: A longitudinal approach to complex relationships. *International Business Review, 14*(6), 719-738. https://doi.org/10.1016/j.ibusrev.2005.07.004

Mamun, A., Bal, H., & Akca, E. E. (2019). The export-output growth nexus in Bangladesh: A leveraged bootstrap approach. *Journal of Asia Business Studies*, *13*(2), 196-213. https://doi.org/10.1108/JABS-09-2017-0159

Mebratie, A. D., & Van Bergeijk, P. A. (2013). Firm heterogeneity and development: A meta-analysis of FDI productivity spillovers. *The Journal of International Trade & Economic Development, 22*(1), 53-74. https://doi.org/10.1080/09638199.2013.745281

Melitz, J. M. (2003). The impact of trade on intra-industry reallocations and aggregate industry productivity. *Econometrica*, *71*(6), 1695–725. https://doi.org/10.1111/1468-0262.00467

Menyah, K., Nazlıoglu, S., & Wolde-Rufael, Y. (2014). Financial development, trade openness and economic growth in African countries: New insights from a panel causality approach. *Economic Modelling*, *37*, 386-394. https://doi.org/10.1016/j.econmod.2013.11.044

Mukoyama, T. (2022). *Heterogeneous firms*. [Draft Book]. https://phdmacrobook.org/wp-content/uploads/2023/12/draft2023_02_09.pdf

Ozarslan, D., & Dogan, M. (2021). İhracat piyasasına giris yapmanın verimlilik ve diğer firma gostergeleri uzerindeki etkisi: Türkiye imalat sanayii örnegi. *Izmir Iktisat Dergisi, 36*(3), 567-588. https://doi.org/10.24988/ije.202136305

Ozdemir, O. (2019). Türkiye'de toplam faktör verimliliği, ekonomik büyüme ve ihracat arasındaki ilişkinin nedensellik analizi. *Finans Politik & Ekonomik Yorumlar, 56*(647), 23-63.

Palangkaraya, A., & Yong, J. (2007). *Exporter and Non-Exporter Productivity Differentials: Evidence from Australian Manufacturing Establishments* (No. wp2007n04). Melbourne Institute of Applied Economic and Social Research. http://melbourneinstitute.unimelb.edu.au/downloads/working_paper_series/wp2007n04.pdf

Pavcnik, N. (2002). Trade liberalization, exit, and productivity improvements: Evidence from Chilean plants. *The Review of Economic Studies, 69*(1), 245-276. https://doi.org/10.1111/1467-937X.00205

Pesaran, M. H. (2021). General diagnostic tests for cross-sectional dependence in panels. *Empirical Economics, 60*(1), 13-50. https://doi.org/10.1007/s00181-020-01875-7

Pesaran, M. H., Shin, Y., & Smith, R. P. (1999). Pooled mean group estimation of dynamic heterogeneous panels. *Journal of the American Statistical Association, 94*(446), 621–634. https://doi.org/10.1080/01621459.1999.10474156

Plouffe, M. (2017). Firm heterogeneity and trade-policy stances evidence from a survey of Japanese producers. *Business and Politics, 19*(1), 1-40. https://doi.org/10.1017/bap.2016.6

Poschl, J., Stehrer, R., & Stollinger, R. (2009). *Characteristics of exporting and non-exporting firms in Austria* (No. 2009/10-01). FIW-Research Reports. https://www.econstor.eu/bitstream/10419/121207/1/fiw-rp_2009-10-01.pdf

Powell, D., & J. Wagner (2011), *The exporter productivity premium along the productivity distribution: First evidence from a quantile regression approach for fixed effects panel data models*. IZA Discussion Paper No. 5112.

Public Disclosure Platform. (2023). BIST Sirketleri [Data set]. https://www.kap.org.tr/tr/bist-sirketler

Public Oversight Accounting and Auditing Standarts Authority. (2018). Calısanlara Saglanan Faydalar (Türkiye Muhasebe Standardı No. 19). Kamu Gozetimi Kurumu, https://www.kgk.gov.tr/Portalv2Uploads/files/DynamicContentFiles/T%C3%BCrkiye%20Muhasebe%20Standartlar%C4%B1/TMSTFRS2018Seti/TMS/TMS_19_2018.pdf

Razzolini, T., & Vannoni, D. (2011). Export premia and subcontracting discount: Passive strategies and performance in domestic and foreign markets. *The World Economy, 34*(6), 984-1013. https://doi.org/10.1111/j.1467-9701.2011.01329.x

Rivers, D. A. (2013). *Are exporters more productive than non-exporters*? (No. 2013-2). CIBC Working Paper. https://hdl.handle.net/10419/121973

Rodrik, D. (1997). Trade strategy, investment and exports: Another look at East Asia. *Pacific Economic Review, 2*(1), 1-24. https://doi.org/10.1111/1468-0106.t01-1-00020

Rosenberg, N. (1982). *Inside the black box: Technology and economics*. Cambridge University Press.

Samadi, M., Mirnezami, S. R., Khayyatian, M. S., & Torabi Khargh, M. (2023). The difference between exporter and non-exporter knowledge-based firms: The case of Iranian firms in the chemical industry. *Review of International Business and Strategy, 33*(5), 830-854.

Schank, T., Schnabel, C., & Wagner, J. (2007). Do exporters really pay higher wages? First evidence from German linked employer–employee data. *Journal of International Economics, 72*(1), 52-74. https://doi.org/10.1016/j.jinteco.2006.08.004

Schmitz, T. (2021). Endogenous growth, firm heterogeneity and the long-run impact of financial crises. *European Economic Review, 132*(103637), 1-21. https://doi.org/10.1016/j.euroecorev.2020.103637

Schröder, P. J., & Sørensen, A. (2012). Second thoughts on the exporter productivity premium. *Canadian Journal of Economics/Revue canadienne d'économique, 45*(4), 1310-1331. https://doi.org/10.1111/j.1540-5982.2012.01742.x

Schwarzer, J. (2017). *The effects of exporting on labour productivity: Evidence from German firms*. CEP Working Paper, 2017/2. https://www.cepweb.org/wp-content/uploads/CEP-WP-2017-2-The-Effects-of-Exporting-on-Labour-Productivity.pdf

Serrano, J., & Myro, R. (2019). From domestic to exporter, what happens? Evidence for Spanish manufacturing firms. *Structural Change and Economic Dynamics, 51*, 380-392. https://doi.org/10.1016/j.strueco.2019.01.005

Sharma, C., & Mishra, R. K. (2011). Does export and productivity growth linkage exist? Evidence from the Indian manufacturing industry. *International Review of Applied Economics, 25*(6), 633-652. https://doi.org/10.1080/02692171.2011.557046

Sharma, C., & Mishra, R. K. (2012). Export participation and productivity performance of firms in the Indian transport manufacturing. *Journal of Manufacturing Technology Management, 23*(3), 351-369.

Sun, X., & Hong, J. (2011). Exports, ownership and firm productivity: Evidence from China. *The World Economy, 34*(7), 1199-1215. https://doi.org/10.1111/j.1467-9701.2011.01373.x

Tanaka, A. (2015). *Wage premiums for exporters and multinational enterprises: Evidence from Japanese linked employer-employee data*. RIETI. https://www.rieti.go.jp/jp/publications/dp/15e106.pdf

Taymaz, E., & Yılmaz, K. (2007). Productivity and trade orientation: Turkish manufacturing industry before and after the customs union. *The Journal of International Trade and Diplomacy, 1*(1), 127-154.

Tomiura, E. (2007). Effects of R&D and networking on the export decision of Japanese firms. *Research Policy, 36*(5), 758-767. https://doi.org/10.1016/j.respol.2007.02.020

Trefler, D. (2004). The long and short of the Canada-US free trade agreement. *American Economic Review, 94*(4), 870-895. https://doi.org/10.1257/0002828042002633

Van Biesebroeck, J. (2005a). Exporting raises productivity in sub-Saharan African manufacturing firms. *Journal of International Economics, 67*(2), 373-391. https://doi.org/10.1016/j.jinteco.2004.12.002

Van Biesebroeck, J. (2005b). Firm size matters: Growth and productivity growth in African manufacturing. *Economic Development and Cultural Change, 53*(3), 545-583.

Verardi, V., & Wagner, J. (2012). Productivity premia for German manufacturing firms exporting to the Euro-area and beyond: First evidence from robust fixed effects estimations. *The World Economy, 35*(6), 694-712. https://doi.org/10.1111/j.1467-9701.2011.01414.x

Verhoogen, E. A. (2008). Trade, quality upgrading, and wage inequality in the Mexican manufacturing sector. *The Quarterly Journal of Economics, 123*(2), 489-530. https://doi.org/10.1162/qjec.2008.123.2.489

Vogel, A., & Wagner, J. (2011). Robust estimates of exporter productivity premia in German business services enterprises. *Economic and Business Review, 13*(1). https://doi.org/10.15458/2335-4216.1217

Vu, V. H. (2012). *Higher productivity in exporters: Self-selection, learning by exporting or both? Evidence from Vietnamese Manufacturing SMEs.* Munich Personal RePEc Archive, MPRA Paper No. 40708. https://mpra.ub.uni-muenchen.de/40708/1/MPRA_paper_40708.pdf

Wagner, J. (2002). The causal effects of exports on firm size and labor productivity: First evidence from a matching approach. *Economics Letters, 77*(2), 287-292. https://doi.org/10.1016/S0165-1765(02)00131-3

Wagner, J. (2007). Exports and productivity: A survey of the evidence from firm-level data. *World Economy, 30*(1), 60-82. https://doi.org/10.1111/j.1467-9701.2007.00872.x

Wagner, J., & Van Biesebroeck, J. (2008). Understanding cross-country differences in export premia-comparable evidence for 14 countries. *Review of World Economics, 144*(4), 596-635. https://doi.org/10.5167/uzh-9823

Wang, Q., & Zhu, L. (2021). Environmental regulation, firm heterogeneity, and intra-industry reallocation. *China Economic Review, 68*(101648), 1-17. https://doi.org/10.1016/j.chieco.2021.101648

Wickramasekera, R., & Bianchi, C. C. (2013). Management characteristics and the decision to internationalize: Exploration of exporters vs. non-exporters within the Chilean wine industry. *Journal of Wine Research, 24*(3), 195-209. https://doi.org/10.1080/09571264.2013.795484

World Bank. (2017). *Enterprise surveys: Indicator descriptions*. WB. https://www.enterprisesurveys.org/content/dam/enterprisesurveys/documents/methodology/Indicator-Description.pdf

World Bank. (2024). *Enterprise surveys: Indicator descriptions*. WB. https://www.enterprisesurveys.org/content/dam/enterprisesurveys/documents/methodology/Indicator-Description.pdf

Yang, Y., & Mallick, S. (2010). Export premium, self-selection and learning-by-exporting: Evidence from Chinese matched firms. *The World Economy, 33*(10), 1218-1240. https://doi.org/10.1111/j.1467-9701.2010.01277.x

Yasar, M., & Morrison-Paul, C. J. (2008). Foreign technology transfer and productivity: Evidence from a matched sample. *Journal of Business & Economic Statistics, 26*(1), 105-112. https://doi.org/10.1198/073500107000000197

Yasar, M., & Rejesus, R. M. (2005). Exporting status and firm performance: Evidence from a matched sample. *Economics Letters, 88*(3), 397-402. https://doi.org/10.1016/j.econlet.2005.05.001

Yasar, M., Garcia, P., Nelson, C. H., & Rejesus, R. M. (2007). Is there evidence of learning-by-exporting in Turkish manufacturing industries?. *International Review of Applied Economics, 21*(2), 293-305. https://doi.org/10.1080/02692170701189193

Yasar, M., Nelson, C. H., & Rejesus, R. (2006). Productivity and exporting status of manufacturing firms: Evidence from quantile regressions. *Review of World Economics, 142*, 675-694. https://doi.org/10.1007/s10290-006-0088-2

Yülek, M. A. (2018). *How nations succeed*. Palgrave Macmillan.

APPENDIX

Appendix 1. Causality Relationship from Productivity to Export and from Export to Productivity Based on Units: Granger Causality Test

		Productivity →Export			Export →Productivity		
No	**Firm Code**	**Lag**	**Wald Statics**	**P-value**	**Lag**	**Wald Statics**	**P-value**
1	ADEL	5	9.979	0.076	5	4.274	0.511
2	VESTL	5	8.159	0.148	5	4.929	0.425
3	VESBE	5	7.891	0.162	5	10.405	0.065
4	ULUSE	5	10.823	0.055	5	4.194	0.522
5	TTRAK	5	13.826	0.017	5	2.543	0.770
6	PRKAB	5	15.571	0.008	5	2.570	0.766
7	TMSN	5	13.511	0.019	5	8.978	0.110
8	TOASO	3	1.958	0.581	3	4.366	0.225
9	SILVR	5	7.891	0.162	5	14.927	0.011
10	SAYAS	4	4.873	0.301	4	11.494	0.022
11	PARSN	3	0.205	0.977	3	3.415	0.332
12	OTKAR	1	0.344	0.558	1	0.502	0.479
13	MAKTK	3	0.830	0.842	3	8.696	0.034
14	KLMSN	5	5.277	0.383	5.	2.223	0.818
15	KATMR	1	0.511	0.475	1	0.464	0.496
16	KARSN	1	1.160	0.281	1	1.982	0.159
17	JANTS	1	0.397	0.529	1	0.682	0.409
18	IHEVA	1	1.267	0.260	1	0.431	0.511
19	GEREL	3	4.813	0.186	3	9.081	0.028
20	FROTO	1	2.310	0.129	1	0.060	0.806
21	FMIZP	5	17.335	0.004	5	5.550	0.352
22	EMKEL	3	4.097	0.251	3	15.232	0.002
23	EGEEN	3	6.928	0.074	3	10.544	0.014
24	DITAS	1	0.035	0.851	1	0.442	0.506
25	BFREN	1	0.228	0.633	1	0.964	0.326
26	BNTAS	1	0.315	0.574	1	1.970	0.160
27	ARCLK	2	6.882	0.032	2	1.266	0.531
28	ASUZU	2	4.675	0.097	2	0.841	0.657
29	ALCAR	1	0.068	0.795	1	1.453	0.228
30	TUCLK	1	0.049	0.825	1	0.184	0.668
31	SARKY	1	0.322	0.571	1	0.012	0.914
32	KRDMA	1	0.026	0.872	1	0.825	0.364
33	IZMDC	1	0.310	0.578	1	0.645	0.422
34	ISDMR	1	0.816	0.366	1	3.578	0.059
35	EREGL	1	0.586	0.444	1	12.085	0.001
36	ERBOS	1	0.353	0.552	1	6.155	0.013
37	DOKTA	1	0.360	0.548	1	10.849	0.001
38	DMSAS	1	0.019	0.890	1	7.126	0.008
39	CUSAN	3	5.668	0.129	3	6.282	0.099
40	CEMTS	4	6.437	0.169	4	9.546	0.049
41	CEMAS	5	9.736	0.083	5	14.257	0.014
42	CELHA	4	6.331	0.176	4	12.770	0.012
43	BURVA	5	12.708	0.026	5	10.185	0.070
44	BURCE	5	18.114	0.003	5	12.273	0.031
45	BRSAN	5	11.368	0.045	5	28.334	0.000
46	USAK	5	2.669	0.751	5	16.704	0.005
47	NUHCM	3	5.268	0.153	3	6.083	0.108
48	NIBAS	1	0.000	0.994	1	1.172	0.279
49	KUTPO	1	0.056	0.813	1	3.581	0.058
50	KONYA	2	3.464	0.177	2	3.723	0.155
51	GOLTS	1	0.425	0.514	1	0.525	0.469
52	EGSER	1	0.187	0.665	1	0.186	0.667
53	DOGUB	1	0.861	0.353	1	0.882	0.348
54	CIMSA	1	0.078	0.781	1	0.040	0.842
55	CMENT	1	1.129	0.288	1	1.156	0.282
56	CMBTN	1	0.837	0.360	1	0.921	0.337
57	BUCIM	2	4.787	0.091	2	3.019	0.221
58	BSOKE	3	7.440	0.059	3	5.086	0.166
59	BTCIM	5	14.340	0.014	5	6.072	0.299
60	AKCNS	4	18.260	0.001	4	1.026	0.906

61	AFYON	5	11.033	0.051	5	3.353	0.646
62	TUPRS	1	0.429	0.513	1	1.205	0.272
63	TMPOL	3	9.128	0.028	3	1.179	0.758
64	SEKUR	5	13.325	0.021	5	17.202	0.004
65	SASA	5	3.471	0.628	5	19.138	0.002
66	SANFM	2	0.639	0.727	2	5.933	0.051
67	RTALB	1	0.054	0.817	1	0.185	0.667
68	PETKM	1	0.009	0.926	1	0.188	0.664
69	MRSHL	1	0.010	0.919	1	0.087	0.768
70	HEKTS	1	0.078	0.780	1	0.030	0.862
71	GUBRF	1	0.009	0.923	1	0.158	0.691
72	GOODY	1	0.0302	0.858	1	0.651	0.420
73	GEDZA	1	0.869	0.351	1	0.700	0.403
74	EMNIS	1	0.087	0.768	1	0.141	0.707
75	EPLAS	1	0.059	0.808	1	0.007	0.935
76	EGPRO	1	0.206	0.650	1	0.767	0.381
77	EGGUB	1	0.765	0.382	1	0.324	0.569
78	DYOBY	1	0.217	0.641	1	0.005	0.944
79	DEVA	2	1.707	0.426	2	0.537	0.765
80	BRISA	1	0.623	0.430	1	0.029	0.865
81	BRKSN	1	0.027	0.868	1	0.308	0.579
82	BAGFS	1	0.333	0.564	1	0.114	0.735
83	AYGAZ	1	0.778	0.378	1	0.043	0.835
84	ALKIM	1	1.055	0.304	1	0.729	0.393
85	AKSA	1	0.904	0.342	1	2.090	0.148
86	ACSEL	1	2.151	0.143	1	0.566	0.452
87	VKING	1	0.715	0.398	1	0.986	0.321
88	SAMAT	1	0.763	0.382	1	2.157	0.142
89	PRZMA	1	0.788	0.375	1	10.212	0.001
90	MNDTR	2	6.745	0.034	2	5.088	0.079
91	KARTN	1	2.854	0.091	1	2.566	0.109
92	KAPLM	5	10.207	0.070	5	16.060	0.007
93	DURDO	1	7.886	0.005	1	2.095	0.148
94	BAKAB	1	7.860	0.005	1	3.404	0.065
95	ALKA	3	8.049	0.045	3	7.891	0.048
96	GENTS	2	4.219	0.121	2	6.963	0.031
97	DGNMO	2	5.236	0.073	2	7.586	0.023
98	YUNSA	4	4.582	0.333	4	15.404	0.004
99	YATAS	3	8.978	0.030	3	6.571	0.087
100	SNPAM	1	2.202	0.138	1	0.845	0.358
101	SKTAS	1	2.171	0.141	1	3.277	0.070
102	ROYAL	4	6.987	0.137	4	15.259	0.004
103	MNDRS	1	0.424	0.515	1	1.131	0.287
104	LUKSK	1	0.142	0.706	1	3.459	0.063
105	KORDS	1	0.380	0.538	1	4.792	0.029
106	KRTEK	1	0.039	0.844	1	2.280	0.131
107	HATEK	1	0.033	0.856	1	3.088	0.079
108	DESA	1	0.239	0.625	1	0.662	0.416
109	DERIM	1	0.015	0.903	1	3.298	0.069
110	DAGI	4	13.496	0.009	4	2.733	0.604
111	BOSSA	5	25.179	0.000	5	5.609	0.346
112	BRMEN	4	13.905	0.008	4	4.801	0.308
113	BRKO	4	21.370	0.000	4	8.534	0.074
114	BLCYT	5	39.880	0.000	5	3.874	0.568
115	ARSAN	5	45.788	0.000	5	10.137	0.071
116	ATEKS	5	9.417	0.094	5	8.740	0.120
117	ULKER	4	13.382	0.010	4	8.088	0.088
118	ULUUN	5	30.802	0.000	5	4.119	0.532
119	TBORG	3	13.026	0.005	3	6.666	0.083
120	TUKAS	3	6.542	0.088	3	4.609	0.203
121	TATGD	2	10.360	0.006	2	6.039	0.049
122	SELGD	4	4.934	0.294	4	8.260	0.083
123	PNSUT	1	0.005	0.941	1	0.102	0.750
124	PINSU	2	8.057	0.018	2	0.304	0.859
125	PETUN	4	8.983	0.062	4	10.943	0.027
126	PENGD	1	0.143	0.706	1	6.151	0.013
127	OYLUM	1	1.244	0.265	1	0.444	0.505
128	KRSTL	1	2.675	0.102	1	0.326	0.568
129	KNFRT	2	10.111	0.006	2	1.539	0.463
130	KERVT	4	7.833	0.098	4	7.658	0.105
131	KENT	4	2.822	0.588	4	11.748	0.019
132	FRIGO	4	8.645	0.071	4	9.545	0.049
133	ERSU	4	18.581	0.001	4	19.298	0.001
134	EKIZ	5	4.372	0.497	5	38.170	0.000
135	DARDL	5	14.529	0.013	5	15.588	0.008
136	CCOLA	5	2.391	0.793	5	11.809	0.037
137	BANVT	4	1.684	0.794	4	9.442	0.051
138	AVOD	4	0.431	0.980	4	12.353	0.015
139	AEFES	1	4.499	0.034	1	0.138	0.710
			Panel Fisher= 599.009 Asymptotic p-value=0.000 Bootstrap p-value= 0.000			Panel Fisher= 612.234 Asymptotic p-value= 0.000 Bootstrap p-value= 0.000	