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The Impact of Exports on Firm Employment in Türkiye

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Türkiye'de İhracatın Firma İstihdamına Etkisi

Abstract

This study investigates the employment effects of exports on employment based on Turkish firm-level data over the period 2003-2015. To this aim, we adopt Propensity Score Matching (PSM) and Difference-in-Differences (DID) techniques to construct treatment models. The results show that exporting encourages firms' employment significantly. Specifically, this effect is more significant for Turkish manufacturing firms in labour-intensive and low/medium-low technology sectors and those paying lower wages.

Keywords : Exports, Firm, Employment, Treatment Models.

JEL Classification Codes : C21, D22, F14, F16, J21.

Öz

Bu çalışma, Türk firma düzeyindeki verilere dayanarak ihracatın istihdam üzerindeki etkisini 2003-2015 dönemi için araştırmaktadır. Bu amaçla, tedavi modelleri oluşturularak, Eğilim Skoru Eşleştirme (PSM) ve Fark İçerisinde Fark (DID) metodolojileri kullanılmıştır. Çalışmanın sonuçları, ihracatın firmaların istihdamını önemli ölçüde teşvik ettiğini göstermektedir. Özellikle, bu etki emek yoğun ve düşük/orta-düşük teknolojili ve daha düşük ücret ödeyen sektörlerdeki Türk imalat firmalarında daha fazladır.

Anahtar Sözcükler : İhracat, Firma, İstihdam, Tedavi Modelleri.

1. Introduction

Conventional trade theories rely on the concept of "comparative advantages" and claim that trade between countries takes place depending on different factor intensities. These theories suggest that trade raises the demand for labour-intensive products in countries with excess labour, and thus trade brings about employment growth in developing countries. However, conventional models are mainly based on cleaning all markets at some equilibrium. Therefore, in the long run, an increase in foreign trade will only give rise to inter-sectoral shifts of labour, whereas total employment will remain constant (Lall, 2004: 73). Contrary to this belief, new empirical results and theoretical developments following early 90's, have pointed out that there are significant links between employment levels and trade.

Initiated by the influential studies of Melitz (2003) and Bernard et al. (2003), "new" new trade theories elaborate on intra-industry trade among countries with similar factors of production by incorporating firm heterogeneity into their models and allowing for increasing returns to scale, lack of competition and product variety assumptions. Imperfect competition conditions in production enable intra-industry trade and offer predictions on which foreign trade might affect employment. "New-new international trade models claim that exporters employ more workers than non-exporter firms and try to explain this phenomenon with "self-selection" and "post-entry effects" hypotheses. The self-selection hypothesis claims that owing to the sunk costs of exporting, already better-performing firms could enter exporting markets, inheriting those firms' employing more labour into the definition of their better performance (Melitz, 2003; Bernard & Jensen, 2004). According to the post-entry effects hypothesis, on the other hand, firms will continue to improve in terms of efficiency, capital intensity and employment after they enter export markets as well. Post-entry mechanisms stress the importance of learning from foreign markets through both buyer-supplier relations in a direct manner and increased competition due to foreign manufacturers in an indirect manner (De Loecker, 2007: 70). Moreover, when technology transfer and economies of scale are active, exporters could benefit from possible higher use of capacity which is determined by international demand and thus, their performance will rise. In this scope, "new" new trade theories have two basic observations about the relationship between international trade and employment. Firstly, exporters employ more workers than non-exporters. On the other hand, exporting activities create a higher demand for skilled labour (Acemoğlu & Zilibotti, 2001: 563; Hallak, 2006: 238; Bustos, 2011: 305; Kugler & Verhoogen, 2012: 330). Producing export goods requires higher quality inputs concerning domestic production and hence requires labour with higher skill levels. These observations result from the structural differences between exporting firms in manufacturing technology and productivity from non-exporters.

Motivated by this literature, this study aims to identify the effects of exporting activities on employment for Turkish firm-level data between 2003 and 2015. The study assesses the impact of starting exporting activities on firm employment in the manufacturing industry. Secondly, with a novel approach to explore the potential channels of job creation

via exporting, we investigate whether different effects exist for firms (i) operating in medium-low-technology (MLT) and low-technology industries (LMT) versus high- or medium-high-technology (HMT) industries; (ii) operating in sectors paying low wages (LW) versus high wages (HW) and (iii) exporting goods with different factor intensities of firms (we subgroup exporter firms as primary good and natural resource-intensive goods (NRIP) exporters, labour-intensive good (LI) exporters, technology-intensive good (TI) exporters and human capital intensive goods exporters (HCI). Understanding how exports affect firm employment would only be possible through empirical analyses where different firm-level structural variables are controlled; this study employs treatment models that consider sample selection and potential endogeneity problems. They are estimated by adopting Propensity Score Matching (PSM) and Difference-in-Differences (DID) techniques.

We contribute to the regarding literature on the impact of exporting activities on employment in many aspects. First, Türkiye sets an interesting case study to the relevant literature, being a developing economy whose growth is mainly dependent on exports and who has historically experienced unemployment problems to a great extent. However, to our knowledge, a limited number of studies about Türkiye exist[1]. This study complements the previous literature on Türkiye by using a comprehensive dataset. Our choice of the period is important as exports grew over the period in question, and the export structure changed considerably, whereas employment growth remained low. The study differs from other studies about Türkiye in this regard; and facilitates critical assessments of the dynamics of the manufacturing industry, exports and employment in Türkiye. Most importantly, apart from the existing literature on the exports-employment nexus, our study also asks, "particularly for which type of firms and sectors do exports affect employment?". Accordingly, the effects of starting exporting activities on demand for labour is assessed concerning the technological and wage level of the sectors in which the firms operate and the factor intensity of export products.

2. Background Literature

Within the new-new international trade literature, as high sunk costs characterise entry to export markets, the strong positive relationship between firm performance and exports reflects that better firms are self-selected into export markets (Bernard & Jensen, 1997; Clerides et al., 1998; Isgut, 2001; Melitz, 2003). Firms that could cover the sunk costs of entering export markets can continue increasing their performance after the entry due to experiencing exporting. Accordingly, exporting creates a positive learning impact that

[1] *There is only a limited number of studies analysing the impact of trade on employment at firm or sector level for Türkiye. Taymaz (1999) estimates labour demand by using 4-digit manufacturing industry data over the period 1980-94. Krishna et al. (2001: 392) analyse the relationship between labour demand flexibility and total trade volume by sectoral data only for İstanbul region for the period 1983-1986. Using Turkish firm-level data over the period 1980-2001, Meschi et al. (2011: 60) analyses the relationship between trade openness, technology adoption and employment. Lo Turco and Maggioni (2013: 10) examine the effects of foreign trade on firms' employment over the period 2003-2005.*

pushes firms to the productivity frontier through buyer-supplier relations in a direct manner and increasing competition due to foreign producers in an indirect way compared to non-international firms. Moreover, when technology transfer and economies of scale are active, exporters could benefit from possible higher use of capacity, which is determined by international demand and thus, their performance will rise (Clerides, 1998; Tybout, 2000; Blalock & Gertler, 2004; De Loecker, 2007).

According to new-new trade theories, there are two basic interpretations of the relationship between exports and employment. The first one is that the contributions of exporters for production and jobs are more than non-exporter firms. Because the self-selection hypothesis, advocating for the idea that "better" firms become exporters, inherits the assumption that exporters employ more workers. Besides, several studies on the post-entry effect hypothesis show that firms increase their employment level even after they start exporting. This is mostly about labour demand augmenting the effect of exports which is generally explained by scale effects, i.e., more workers are needed to produce more products (Isgut, 2001; Melitz, 2003; Van Biesebroeck, 2005; De Loecker, 2007). The second interpretation of new-new trade theories about the export-employment relationship is the positive link between firm-level exports and skilled labour. This results from exporting activity and exporters' performance differentials regarding manufacturing technology and efficiency (Bernard et al., 2011; Bustos, 2011; Kugler & Verhoogen, 2012).

Alvarez and Lopez (2005) showed that exporters in Chili had more employees before they started exporting than non-exporters. The employment growth of the firms in question continued after they entered export markets. Hansson and Lundin (2004) -for Sweden- Greenaway and Yu (2004) -for the United Kingdom- state that exporters employ more labour than non-exporters in coherence with self-selection and learning by exporting hypotheses. De Loecker (2007) demonstrates that exporters use about five times more workers in Slovenia than non-exporters. Bernard et al. (2007) point out that exporters in the US manufacturing industry have 119% more employment; their employees are 19% more qualified and pay 17% higher wages compared to firms producing for only the domestic market.

As for the industry level, labour demand increases due to the growth of already exporting firms and the number of new firms starting to export. This increase in labour demand raises factor prices and decreases non-exporters profits. The decrease in internal market profits triggers low-productivity firms to leave the market, reallocating production and employment to high-productivity firms (Melitz, 2003; Bernard et al., 2007; Bernard et al., 2011). The movement of labour from shrinking firms that leave the market towards firms that grow by exporting is a significant result of trade liberalisation in foreign trade models, including firm heterogeneity. The "extensive margin" and "intensive margin" of foreign trade could explain this cyclical mechanism. While firms' production, profit and employment changes are the intensive margin resulting from trade liberalisation, new exporters' entry into the market stands for the extensive margin (Eaton et al., 2004; Bernard et al., 2007; Lawless, 2010). When an exporter starts to produce a new product or enters

markets in which it has never exported (extensive margin), this enhances the variety of products manufactured by the firm and market prospects, leading to more labour demand. Moreover, an increase in the production or sales volume of the firm (intensive margin) gives rise to the demand for more labour (Bernard et al., 2007).

An important reason exporters demand more labour and pay higher wages under new-new trade theories is that goods produced for exporting require more skilled labour (Matsuyama, 2007; Verhoogen, 2008). Hallak (2006) states that exporting includes skill-intensive operations, and it is normal for exporters to employ more skilled employees. Bernard and Jensen (1997) link the increase in employment for exporters to the rise in demand for skilled labour in USA's manufacturing industry. The authors also mention that nearly the whole increase in the differential between wages for low and high-skilled employees results from exports. Munch and Skaksen (2008) examine the relationship between the education level of employees, wages and export performance of firms in Denmark and conclude that firms with a high exporting intensity pay higher wages and employ more skilled labour. According to Bustos (2011) and Kugler and Verhoogen (2012), there is a complementary relationship between the use of inputs of more quality and the use of more skilled labour, as producing export goods requires high-quality inputs and high-skilled labour.

The triggering effect of foreign trade on technological change will transform labour demand to benefit more skilled labour. Acemoğlu and Zilibotti (2001) mention that one of the reasons exporters have a higher demand for skilled labour is the complementarity between the requirement of better production technologies for exporting activity and the need to have skilled labour to use these technologies. The "Skill Biased Technological Change" hypothesis is based on complete complementarity between new technologies and skilled labour (Robbins, 2003). Since better-educated labour will learn to adopt and use new technologies more quickly, firms with a more technology-intensive production prefer skilled labour with higher learning potential (Lee & Vivarelli, 2006; Meschi et al., 2011). Under competitive pressure, firms operating in export markets must adopt technologies requiring more skills (Bustos, 2011). Feenstra and Hanson (1997) think transferring certain production phases from developed countries to developing ones requires skilled labour. However, the impact of this process on unskilled labour demand might be negative.

Wage differentials between exporters and firms that sell their products only to domestic markets increase for the use of advanced technology, more capital-intensive production, and thus having more skilled labour. The higher wages further raise costs for firms not involved in foreign trade (Yeaple, 2005). Such firms withdraw from production as costs increase and the skilled labour rate in these areas falls (Baldwin et al., 2004). Furthermore, as denoted above, the complementarity between the use of inputs of more quality and the use of more skilled labour is another mechanism underlying wage increases (Verhoogen, 2008; Kugler & Verhoogen, 2012). The indirect link between imported inputs and wages is further confirmed by Feng et al. (2016), who show that increasing intermediate

goods imports with the impact of exports increases firms' demand for skilled labour and wages.

There need to be more studies analysing the impact of firm behaviour on employment in Türkiye. Taymaz (1999) estimates labour demand using 4-digit manufacturing industry data from 1980-94. The study demonstrates that trade policy variables are quite important for employment. Krishna et al. (2001) analysed the relationship between labour demand flexibility and total trade volume by sectoral data only for the İstanbul region for 1983-1986, when there was a noticeable reform of trade policies in Türkiye. Taymaz finds that Türkiye's growing total trade volume did not increase labour demand flexibility. Meschi et al. (2011) analysed the relationship between trade openness, technology adoption and demand for skilled labour in Türkiye's manufacturing sector, using firm-level data from 1980-2001. The results of their analysis show that exports have a positive impact on professional labour demand. Turco and Maggioni (2013) examine the effects of foreign trade on firms' labour demand in the manufacturing industry from 2003 to 2005. Their results indicate that international economic integration did not cause any losses in employment despite Türkiye's stagnant labour market.

3. Data and Methodology

In this paper, we use comprehensive firm-level data for Turkish manufacturing firms sourced from merging Annual Industry and Service Statistics (AISS) and Annual Trade Statistics (ATS) collected by Turkish Statistical Institute (TURKSTAT)[2]. The nice feature of this dataset is that we can cover the entire population of Turkish firms having twenty or more employees from 24 two-digit manufacturing sub-sectors over the period 2003 and 2015. On an annual basis, on average, around 20000 firms are covered within our unbalanced firm-level panel.

Table: 1
Average Number of Employees Concerning Trade Status

Year	*Only-exporters*	*Only-importers*	*Two-way traders*	*Non-traders*
2003	48.61	91.80	178.12	48.57
2004	56.31	84.51	173.33	49.02
2005	47.51	79.43	157.35	43.95
2006	49.61	79.50	157.74	46.26
2007	48.78	84.94	167.99	51.01
2008	56.31	88.55	173.76	49.83
2009	54.45	88.06	167.81	51.85
2010	46.10	84.62	156.99	47.51
2011	48.02	83.83	161.38	49.96
2012	47.59	86.98	164.97	45.73
2013	49.64	91.22	168.25	46.55
2014	49.06	94.20	171.54	47.88
2015	50.08	93.68	175.79	48.37

[2] *This microdata was made available under a confidentiality agreement, and all the analyses were conducted in TURKSTAT's Microdata Research Centre, Ankara.*

The primary dependent variable of the study is the number of employees at the firm level, which is directly given in the dataset. Table 1 displays the average amount of employees in firms with a breakdown by trade type. For the analyses, firms are defined as one-way (only-exporters or only-importers) and two-way traders (firms that export and import). Accordingly, two-way traders have the highest average number of employees, while non-traders have the lowest figure.

We define two treatment strategies to differentiate the effects of starting to export on non-traders vs only-importers. The first strategy aims to assess the impact of starting to export for non-traders. Accordingly, we build a treatment group of firms which are formerly non-traders (that is, firms that sell only to the domestic market) and then turn into one-way traders (that start exporting only). Within this strategy, we compose two models (Model 1 and Model 2). In the first treatment model, the treatment group is non-traders firms at the time (t-1), which start only-exporting at (t). In the second treatment model, the treatment group is firms that are non-traders at the time (t-1), which begin only-exporting at (t) and preserve their status at (t+1). For both treatment models, the control group is non-trader firms during the entire period.

The second strategy aims to evaluate the consequence of starting to export for only-importers. Consequently, we form another treatment group of firms which are formerly only-importers (that is, firms that import only but do not export) and then turn into two-way traders (that is, firms who import and start exporting). Within this strategy, we further compose two treatment models (Model 3 and Model 4). In the first treatment model of this strategy (namely Model 3), the treatment group is firms that are only-importers at (t-1), which start to export and become two-way traders at the time (t). In the second treatment model (Model 4), the treatment group is firms that are only-importers at (t-1), which become two-way traders at (t) and preserve their status at (t+1). For both of these treatment models, the control group consists of firms which are only-importers during the whole period.

To understand the different employment effects concerning the technology level of the sector in which the firm operates, we apply OECD's (2011) technology intensity classification and divide our dataset as firms operating in medium-low-technology and low-technology industries (LMT) versus high- or medium-high-technology (HMT) industries. Given that, approximately 81% of manufacturing firms operate in LMT industries. Further, to explore differences according to the average wage levels - a proxy for skill level within the industry- we divide firms as firms operating in sectors paying low wages (LW) versus high wages (HW). HW sectors represent the ones with average wages (calculated in 4-digit identification) above the manufacturing industry's average wage, whereas LW sectors represent the opposite case. Our dataset shows that around 58% of the firms operate in LW sectors. Finally, we categorise firms according to their export products' factor intensity level, where we follow the classification defined by Hinloopen and Marrewijk (2008). Hinloopen and Marrewijk distinct exported goods into six clusters which contain natural resource-intensive (NSI) products, primary products, unskilled labour-intensive (LI) products, human capital-intensive (HCI) products, technology-intensive (TI) products and others. Hence, we

group the exporter firms in our dataset into four sub-groups as primary and natural resource-intensive good exporters (NRIP), unskilled labour-intensive good exporters (LI), technology-intensive good exporters (TI) and human capital-intensive goods (HCI) exporters. To exemplify, a firm is labelled as an "HCI exporter" if human capital-intensive products constitute the major share of the firm's total exports. Approximately 16% of the exporting firms in our data set are NRIP exporters, 23.24% are HCI exporters, 27.97% are TI good exporters, and 32.92% are LI good exporters.

We employ treatment models to prevent sample selection and endogeneity problems where PSM estimates them and DID techniques. PSM methodology seeks firms that differ in export behaviour but have analogous observable features. The methodology assigns propensity scores to each firm, relying on their observable characteristics. Following a matching concerning these scores, firms are divided into treatment and control groups. Within this procedure, two groups are composed, where each group involves firms with similar structural characteristics and similar potential to export (with parallel propensity scores). Nonetheless, the treatment group has firms that have started exporting, while the control group covers firms that do not.

Rosenbaum and Rubin (1983:45) describes the propensity score of each firm as the conditional probability of getting treatment and calculates them estimating the probit equation below:

$$P_i(z_i) \equiv \Pr(d_i = 1|z_i) = E(d_i|z_i) \quad (1)$$

Here, the probability of starting to export constitutes the dependent variable, where independent variables in this probit equation are productivity (logarithm of real labour productivity defined as real value added per employee), the logarithm of the total number of employees, wage per employee (to proxy skill-intensity), capital intensity (capital per employee), average sectoral output, unit labour cost, concentration ratio, dummies to account for intangible and tangible investments of the firm, foreign affiliation status of the firm as well as two-digit industry, region and year dummies. Accordingly, di={0,1} designates the treatment status (takes one if the firms take the treatment and zero otherwise), and z alt i. shows the firm characteristics utilised in the propensity matching algorithm. After propensity scores are gathered, we apply the Kernel matching methodology. Average treatment effects (ATTs) are then calculated, showing the significance, direction and magnitude of the employment effects of firms' exporting activities.

4. Results

4.1. Results For the Overall Manufacturing Industry

ATTs estimated for the overall manufacturing industry are shown in Table 2. Results indicate that exporting activity increases firm employment in a statistically significant manner. In other words, our results confirm the post-entry effects hypothesis regarding employment generation. Panel A shows the results for non-trader firms which start only-

exporting at time t, on the level of employment for the periods t (see Emp_t), t + 1 (see Emp_{t+1}) and t + 2 (see Emp_{t+2}) for Model 1 and Model 2, respectively.

Model 2 provides the employment impact of exporting for non-trading firms that start only-exporting at a time t and continue exporting for at least one period. Accordingly, when firms start exporting at time t, the employment level of exporters increases by 7.1%. The impact of exports on employment increases further in the following period t+1 and reaches 8.8% points; then it drops to 8.1% points in t+2. In Model 2, where the treatment period is extended as such, exporting behaviour, which is defined more sustainably compared to Model 1, creates a stronger impact on firm employment. For instance, in Model 1, the rise in employment is 8.8% points at time t+1, while the same increase is 9.8 for Model 2.

Table: 2
PSM Estimations

PANEL A: Only-exporters vs Non-traders			
	PSM		
	Emp_t	Emp_{t+1}	Emp_{t+2}
ATT (Model 1)	0.071*** (0.002)	0.088*** (0.029)	0.081*** (0.019)
ATT (Model 2)	0.080*** (0.004)	0.098*** (0.037)	0.089*** (0.018)
PANEL B: Two-way-traders vs Only-importers			
	PSM		
	Emp_t	Emp_{t+1}	Emp_{t+2}
ATT (Model 3)	0.077** (0.031)	0.099*** (0.061)	0.088** (0.041)
ATT (Model 4)	0.084** (0.034)	0.099*** (0.025)	0.091*** (0.023)

*Notes: (i) Emp represents the number of employees. (ii) Standard errors are shown in parenthesis. (iii) Asterisks show statistical significance of ATT; ***: (p <%1); **: (p<%5); *: (p<%10).*

In Table 2, Panel B shows the results for Model 3 and Model 4. Accordingly, the employment impact of exporting for already importers is more visible than that of start-only-exporting firms, which are non-traders. While the increase in employment for an importer firm that started only-exporting at time t and continued its exporting activity during t+1 is 8.4% points for times t, 9.9% points for times t+1 and 9.1% points for times t+2; for a firm which had never engaged in foreign trading and then started to export, the same ATTs are 8, 9.8 and 8.9 respectively. These findings are compatible with several studies revealing that importers already cover certain fixed costs related to exporting and, therefore, can benefit from exporting activity more than non-traders. Some empirical studies that confirm the learning by-exporting hypothesis claim that this is relevant only under certain circumstances; and relates to post-entry effects of exporting where imported inputs are used intensively (Silva et al., 2012: 255; Castellani et al., 2010: 424). The fundamental argument of the studies is that importing intermediate and capital goods enables foreign know-how to be transferred directly to the domestic production processes. On the other hand, importing activity ensures obtaining information about foreign markets (for instance, consumer taste and preferences, regulations and competitive pressure in foreign markets etc.) and thus could decrease export-related sunk costs (Eaton & Kortum, 2001: 742; Smeets & Warzynski, 2013: 238).

The estimations of the PSM-DID model are shown in Table 3. It uses DID methodology to control deviations due to time-invariant factors that cannot be observed. DID approach eliminates the effect of crises in demand shocks and/or unobservable factors, providing more precise estimates of the treatment effects. ATTs from DID estimations reflect "the difference between the employment rates before and after the treatment period of firms that started exporting" and "the difference between the employment rates before and after the treatment period of non-exporters". They support the results of PSM estimations (Panel A). In Model 1, the rate of increase in the number of employees in time t+1 in comparison to time t-1 -before exporting-for firms that started exporting in time t (treatment group) is always higher than that of firms with similar characteristics which have never engaged in foreign trade (control group). When the treatment period is extended, the difference increases from 1.1% to %1.9%, revealing the impact of starting to export in the long run. In addition, it is seen that in Model 2, where the treatment period is extended, exporting behaviour, which is defined more sustainably compared to Model 1, creates a stronger impact on firm employment.

Table: 3
PSM-DID Estimations

PANEL A: Only-exporters vs Non-traders		
	DID	
	Emp_{t+1}- Emp_{t-1}	Emp_{t+2}- Emp_{t-1}
ATT (Model 1)	0.011** (0.005)	0.019*** (0.002)
ATT (Model 2)	0.015*** (0.000)	0,020*** (0.012)
PANEL B: Two-way-traders vs Only-importers		
	DID	
	Emp_{t+1}- Emp_{t-1}	Emp_{t+2}- Emp_{t-1}
ATT (Model 3)	0.014*** (0.000)	0.021*** (0.000)
ATT (Model 4)	0.018*** (0.000)	0.023*** (0.009)

*Notes: (i) Emp represents the number of employees. (ii) Standard errors are shown in parenthesis. (iii) Asterisks show statistical significance of ATT; ***: (p <%1); **: (p<%5); *: (p<%10).*

In Table 3, Panel B presents DID results for Model 3 and Model 4. Results of Model 3 and Model 4 have stronger analysis findings. In parallel with the results of PSM estimations, the employment impact of exporting for already importers is more pronounced than the impact of start only-exporting on non-traders. This suggests that contact with international suppliers creates mechanisms whereby both technological and foreign markets-related knowledge could be obtained, decreasing the costs of starting to export and playing a complementary role between exports and imports for manufacturing firms in Türkiye (Mıhçı & Bolatoğlu, 2019).

4.2. Possible Mechanisms

To highlight the job creation opportunities in the Turkish manufacturing industry, we distinguish between several sub-samples of firms regarding technological knowledge intensity, wage level and factor intensity level of their export goods and apply the PSM routines to these sub-samples. Biases that stem from the self-selection of potential firms into

export markets can be controlled in PSM estimations. Besides the sample selection bias, DID eliminates the biases that could arise from external shocks to treatment and control groups during the analysis period and/or time-invariant and unobservable factors over time. Therefore, from this point on, merely DID estimations will be presented.

One of the reasons why exporters have a higher demand for skilled labour is the complementarity between the fact that exporting activities require relatively better production technologies and the need to have skilled labour to apply these technologies. In that case, the triggering effect of foreign trade on technological change will transform labour demand on behalf of more skilled labour (Acemoğlu & Zilibotti, 2001: 565; Lee & Vivarelli, 2006: 180; Meschi et al., 2011: 65; Bustos, 2011: 306). Based on this discussion, the classification of sectors that firms operate in, in terms of technological knowledge intensity, enables a more in-depth analysis of the role of exporting on firm employment. In this scope, results under this technology classification are shown in Table 4. Panel A indicates ATTs regarding LMT-intensive sectors, while Panel B shows the results for MHT-intensive sectors.

Table: 4
PSM-DID Estimates w.r.to Technology Intensity

	Low/Medium-Low Technology			Medium-High/High Technology		
PANEL A: Only-exporters vs Non-traders						
	DID			DID		
	Emp_{t}- Emp_{t-1}	Emp_{t+1}- Emp_{t-1}	Emp_{t+2}-Emp_{t-1}	Emp_{t}- Emp_{t-1}	Emp_{t+1}- Emp_{t-1}	Emp_{t+2}-Emp_{t-1}
ATT (Model 1)	0.022***	0.029***	0.024***	0.010***	0.014	0.011
	(0.002)	(0.000)	(0.001)	(0.000)	(0.025)	(0.022)
ATT (Model 2)	0.028***	0.032***	0.026***	0.013***	0.009	0.020
	(0.000)	(0.000)	(0.012)	(0.000)	(0.021)	(0.022)
PANEL B: Two-way-traders vs Only-importers						
ATT (Model 3)	0.024***	0.030**	0.021***	0.013***	0.017	0.007
	(0.009)	(0.012)	(0.006)	(0.000)	(0.022)	(0.020)
ATT (Model 4)	0.028***	0.033***	0.027***	0.014***	0.018*	0.011
	(0.000)	(0.000)	(0.002)	(0.000)	(0.010)	(0.010)

*Notes: (i) Emp represents the number of employees. (ii) Standard errors are shown in parenthesis. (iii) Asterisks show statistical significance of ATT; ***: (p <%1); **: (p<%5); *: (p<%10).*

In an overview of DID findings, it is seen that the impact of only-start export on firm employment is more evident in LMT-intensive sectors. For instance, in Model 1, the rate of employment growth for firms in LMT-intensive sectors once they start to export between times t/t-1; t+1/t-1; t+2/t-1, is higher than the rate of employment growth over the same period for firms with similar characteristics which have never been involved in foreign trade by 2.2%, 2.9% and 2.5% respectively. The same differences are only significant for the period t/t-1 once firms started to export for firms in MHT-intensive sectors. When the results of estimations in Model 2 are compared with Model 1, it is observed that the extended treatment period represents stronger findings. Assessment of the results for Model 3 and Model 4 reveals that exporting creates more pronounced and significant effects on employment for firms in LMT-intensive sectors than MHT-intensive sectors. Moreover, when the findings of Models 3 and 4 are compared with the conclusions of Models 1 and 2, it is seen that exporting creates stronger increases in employment for importers already. In other words, two-way trade impacts firm employment more than one-way trade for both sub-

samples. It is concluded that exporting significantly impacts employment for MHT-intensive sectors only over t-1/t, but there is no such impact for extended periods (t+1/t-1, t+2/t-1). The only exception to this is seen in Model 4, time t+1/t-1.

Findings under the technology classification of manufacturing industry firms indicate that the positive employment impact of exports instead appears in LMT-intensive sectors. This stronger employment effect created by exports in sectors where relatively less skilled labour is employed, such as textile, food and furniture production, may be explained by the scale effect or technological convergence effect that could arise with exporting activity. The scale effect, which will be generated through opening out to foreign markets from domestic ones, might lead to employment growth by increasing the demand for unskilled labour even further in these sectors where production is relatively based on unskilled labour. On the other hand, when complementarity between more advanced technologies that come along with exports and more skilled labour is taken into consideration, employment effects of exports which appear more strongly in lower technology-intensive sectors might point out to augmented demand for skilled labour through the improvement of production methods in relevant sectors. Hence, in low- and middle-income countries like Türkiye, where manufacturing and exports concentrate on low/medium-low technology-intensive sectors, the production is based mainly on inputs and capital goods imported from high-income countries and the necessity to transfer some production processes from those countries causing foreign trade to create a skill augmenting effect (see Acemoğlu & Zilibotti, 2001: 564; Pavcnik, 2003: 320; Lee & Vivarelli, 2006: 167).

Table: 5
PSM-DID Estimates w.r.to Wage Level

	Low-Wage Sectors			High-Wage Sectors		
PANEL A: Only-exporters vs Non-traders						
	DID			DID		
	Emp_t- Emp_{t-1}	Emp_{t+1}- Emp_{t-1}	Emp_{t+2}-Emp_{t-1}	Emp_t- Emp_{t-1}	Emp_{t+1}- Emp_{t-1}	Emp_{t+2}-Emp_{t-1}
ATT (Model 1)	0.034*** (0.010)	0.038*** (0.013)	0.025** (0.010)	0.011 (0.021)	0.017 (0.021)	0.013 (0.022)
ATT (Model 2)	0.039*** (0.012)	0.041*** (0.014)	0.026*** (0.009)	0.015*** (0.000)	0.019** (0.009)	0.023 (0.022)
PANEL B: Two-way-traders vs Only-importers						
ATT (Model 3)	0.034*** (0.000)	0.041*** (0.000)	0.027*** (0.000)	0.012* (0.007)	0.014 (0.021)	0.005 (0.021)
ATT (Model 4)	0.035*** (0.001)	0.043*** (0.003)	0.027*** (0.004)	0.018** (0.008)	0.014*** (0.002)	0.011 (0.031)

*Notes: (i) Emp represents the number of employees. (ii) Standard errors are shown in parenthesis. (iii) Asterisks show statistical significance of ATT; ***: (p <%1); **: (p<%5); *: (p<%10).*

Table 5 includes ATTs calculated by DID estimations for sub-samples covering LW and HW sectors. The results show that ATTs estimated for LW sectors are higher than those in HW. This finding demonstrates that the positive employment impact of starting to export in Türkiye's manufacturing sector is more pronounced in the LW sectors. The DID estimations in question are 3.4%, 3.8% and 2.5% for periods t/t-1, t+1/t-1 and t+2/t-1, respectively, for Model 1. The same ATTs calculated for Model 2 are 3.9%, 4.1% and 2.6%, respectively and higher than those of Model 1 for each period. As for the estimations by Model 3 and Model 4, employment effects for two-way trade are again more evident for

firms in low-wage sectors. Above, it was mentioned that the impact of exports on employment appears more strongly and could be considered within the scope of technological convergence for firms producing with relatively low technology. Starting to export could improve production methods in those sectors and increase the demand for skilled labour. Here, export's higher employment growth in low-wage sectors weakens the convergence hypothesis from the complementarity between exports and skilled labour. Accordingly, it could be stated that exporting instead increases the demand for unskilled labour in Türkiye.

Table: 6
PSM-DID Estimates w.r.to Factor Intensity

	Only-exporters vs Non-traders			*Two-way-traders vs Only-importers*		
	DID			DID		
PANEL A: Natural resource-intensive/Primary good exporters						
	Emp_{t}- Emp_{t-1}	Emp_{t+1}- Emp_{t-1}	Emp_{t+2}-Emp_{t-1}	Emp_{t}- Emp_{t-1}	Emp_{t+1}- Emp_{t-1}	Emp_{t+2}-Emp_{t-1}
ATT (Model 1)	0.028 (0.021)	0.029* (0.017)	0.024 (0.019)	0.030*** (0.011)	0.035*** (0.012)	0.027*** (0.000)
ATT (Model 2)	0.029** (0.014)	0.029** (0.015)	0.025** (0.013)	0.030*** (0.011)	0.039*** (0.012)	0.027** (0.014)
PANEL B: Labour-intensive good exporters						
ATT (Model 1)	0.042*** (0.015)	0.044*** (0.016)	0.047*** (0.016)	0.044*** (0.014)	0.042*** (0.015)	0.041*** (0.014)
ATT (Model 2)	0.044*** (0.001)	0.045*** (0.007)	0.048*** (0.008)	0.045*** (0.011)	0.045*** (0.009)	0.043*** (0.000)
PANEL C: Human capital-intensive good exporters						
ATT (Model 1)	0.019*** (0.007)	0.023** (0.010)	0.013 (0.021)	0.022*** (0.006)	0.023** (0.011)	0.026 (0.019)
ATT (Model 2)	0.021** (0.011)	0.026** (0.013)	0.015 (0.016)	0.024* (0.014)	0.025** (0.013)	0.021 (0.016)
PANEL D: Technology-intensive good exporters						
ATT (Model 1)	0.013 (0.022)	0.015 (0.029)	0.004 (0.025)	0.025 (0.024)	0.023 (0.022)	0.009 (0.019)
ATT (Model 2)	0.013 (0.032)	0.005 (0.027)	0.006 (0.023)	0.010* (0.006)	0.013 (0.012)	0.014 (0.012)

*Notes: (i) Emp represents the number of employees. (ii) Standard errors are shown in parenthesis. (iii) Asterisks show statistical significance of ATT; ***: (p <%1); **: (p<%5); *: (p<%10).*

Employment effects in the manufacturing industry created by exporting are estimated for sub-samples classified by the sophistication level of firms' export goods. Hinloopen and Marrewijk's (2008: 2314) classification was used to reflect the level of sophistication of firm export. In Table 6, Panels A, B, C and D cover PSM-DID estimations for NRIP good exporters, LI good exporters, HCI good exporters, and TI good exporters, respectively[3]. Accordingly, the strongest impact on employment is observed for LI good exporters. While the employment impact of exporting is stronger for LI good exporters concerning all other firm groups, LI good exporters are followed by NRIP good exporters and HCI good exporters in this respect. As for TI good exporters, starting to export had no significant impact on firm employment. Supporting our previous findings, these results confirm that positive employment effects of exportin are more evident for low technology-intensive firms that employ relatively unskilled labour and have relatively lower wages in Türkiye's

[3] *If the biggest share in a firm's export basket belongs to technology-intensive goods, we define the firm as technology-intensive goods exporter. Therefore, these firms do not necessarily export only technology-intensive goods.*

manufacturing industry. Because in Türkiye, the majority of exports in the manufacturing industry are conventionally in such sectors, it could be stated that export growth realised over the period in question increased the demand for unskilled labour rather than skilled labour in the Turkish manufacturing industry.

5. Conclusion

This study shows that the post-entry effects hypothesis suggested by the new-new international trade theory is relevant for firms in the Turkish manufacturing industry, where exporting increases firm employment significantly. Results further indicate that importer firms cover certain fixed costs related to exporting and could benefit from export activity more than non-traders. This effect is evident when firms start to export for the following periods and are more pronounced for two-way traders.

Exporting creates different effects on different types of firms. Our findings under the classification by technology intensity show that the positive employment impact of exporting is revealed mainly in low and medium-low technology (MLT) intensive sectors. Stronger effects of exporting in those sectors that employ relatively less skilled labour could be explained by the scale effect, which enhances unskilled labour due to market growth. Our further analyses by the classification of firms based on the wage level of the sectors they operate in indicate that exporting leads to higher employment growth in low-wage sectors and weakens the convergence hypothesis that stems from complementarity between export and skilled labour. Our analyses based on the factor intensity level of export goods show that the strongest impact on firm employment is for labour-intensive goods exporters. This result confirms that the positive employment effects of exporting are more pronounced for low technology-intensive firms which employ relatively unskilled labour and have relatively lower wages. Therefore, one can conclude that export growth experienced over the period in question increased the demand for unskilled labour rather than skilled labour in the Turkish manufacturing industry.

Our findings are consistence with the fact that exporting is mainly based on unskilled labour in Türkiye. Despite the facts, the share of medium-technology sectors increased considerably, and the quality of export goods was enhanced over the 2003-2015 period; manufacturing industry exports lagged in producing high-tech and high-value-added products and could not reach the upper layers of global value chains. Namely, the fact that export goods still need to be higher technology- and unskilled labour-intensive with low value-added is one of the reasons why the improvement in exports could not be reflected in skilled labour employment. From the policy perspective, the low contribution of exports to increase skills in a developing country, as Türkiye points out, is an important problem regarding the composition of exports and labour. In this respect, Türkiye must implement structural reforms for transformations that improve the content and quality of economic growth. The most important objective of these structural reforms should be to ensure that Türkiye invests in technologies that will bring about better production models, creating higher value-added products. It is also important to form incentive policies targeting the

correct firms and sectors to accelerate the development of the manufacturing industry and enable its shift to products with higher value-added content.

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