

Impact of Export Destinations on Firm Performance

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Abstract

This paper evaluates the role of export destinations on productivity, employment, and wages of Turkish firms by comparing the performance of firms that export to low-income destinations and high-income destinations with firms that do not export. A combination of propensity score matching and difference-in-differences methods are employed on a rich set of firm observables, including sector, region, employment, total factor productivity (TFP), capital intensity, wages, support from government, ownership, and the research and development intensity of firms. Four sets of findings

emerge from the analysis: i) Export entry has a positive causal effect on firm TFP and employment and this effect is strengthened as a firm continues to export. ii) In contrast, export entry has a moderate wage effect that emerges only with a lag. iii) Unlike exporting to high-income destinations, exporting to low-income destinations does not result in significantly higher firm TFP and wages. iv) The employment effect of exporting to low-income destinations is comparable to that of exporting to high-income destinations.

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IMPACT OF EXPORT DESTINATIONS ON FIRM PERFORMANCE

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I. INTRODUCTION

The relationship between exporting and productivity at the firm level has been a core topic in the empirical trade and industrial organization literature during the last decade. There is a consensus based on empirical work on countries with very different characteristics that exporter firms are, on average, more productive and larger in size and pay higher wages than non-exporters.¹ A more controversial issue has been to identify the direction of the causality, that is, whether more productive firms self-select into exporting or firms become more productive through learning by exporting (LBE).

A fact contributing to the complexity of the problem is that the self-selection and the LBE effects are not necessarily mutually exclusive. It is highly likely that more productive firms self-select into exporting and they further widen the productivity gap with respect to less productive non-exporters following their entry into exporting. The evidence for the self-selection is very strong.² These studies confirm a selection process that prevents firms under a certain productivity threshold from entering the export market due to the entry costs associated with exporting—a mechanism that was modeled by Melitz (2003).

The evidence is, however, less clear for LBE. While a considerable number of studies detect LBE,³ ample work shows no statistically significant LBE at all.⁴ Moreover, a third group of studies document partial LBE, i.e., they detect LBE only for entry into exporting but not for continuing to export or only for exporting to high-income destinations (HID) but not for exporting to low-income destinations (LID).⁵

¹ See e.g., Aw and Hwang (1995), Roberts and Tybout (1997), Bernard and Wagner (1997), Clerides et al. (1998), Aw et al. (2000), Baldwin and Gu (2003).

² See e.g., Delgado et al. (2002), Castellani (2002), Girma et al. (2004), Greenaway and Kneller (2008) and Wagner (2007) for a literature review.

³ See Alvarez and Lopez (2004), Bigsten et al. (2004), Blalock and Gertler (2004), Hahn (2004), Hansson and Lundin (2004), Van Biesebroeck (2005), Fernandes and Isgut (2005, 2007), De Loecker (2007), Park et al. (2010), Mallick and Yang (2013).

⁴ See e.g., Bernard (1995), Bernard and Jensen (1999), Isgut (2001), Fafchamps et al. (2002), Greenway et al. (2003), Arnold and Hussinger (2005), Pisu (2008), Tabrizy and Trofimenko (2010), Sharma and Mishra (2011), Vu et al. (2013).

⁵ See e.g., Kraay (1999), Damijan et al. (2004), Vacek (2010), Mukim (2011), Shevtsova (2012).

Several papers in the literature attempted to measure not only LBE per-se but also LBE by type of export destination. Damijan et al. (2004) report that a significant but temporary productivity improvement occurs for Slovenian firms only when they export to advanced foreign markets. Using matching techniques, Fernandes and Isgut (2005) find that LBE is higher for Colombian manufacturing plants in industries that deliver a larger share of their exports to HID. Employing a combination of matching and difference-in-differences techniques (DID), De Loecker (2007) detects a 20% instantaneous productivity increase for Slovenian firms entering into HID, 10% for entry into LID and 9% for overall export entry.

Park et al. (2010) identify the impact of exporting on firm productivity using exchange rate shocks during the 1998 Asian crisis as instruments and find that the productivity impact of export growth for Chinese firms is greater when they export to more developed countries. Similarly, Brambilla et al. (2012) use exogenous changes in exports and export destinations of Argentinean manufacturing firms brought about by the Brazilian currency devaluation of 1999 to identify a causal effect of exporting and of exporting to HID. They show that firms exporting to HID hired a higher proportion of skilled workers and paid higher average wages than firms exporting to LID and domestically-oriented firms.

Vacek (2010) uses GMM estimation techniques to show that only exports to more developed countries bring productivity gains to Czech manufacturing firms. Finally, Shevtsova (2012) finds by applying propensity score matching (PSM) techniques that Ukrainian firms that export to the European Union and other OECD countries experience higher advances in their total factor productivity (TFP) than firms exporting to CIS countries.

Detecting significant LBE only for exports to destinations with higher per-capita income than the country being examined is consistent with the concept of LBE due to two separate mechanisms. The first mechanism is through learning new and advanced production techniques by being exposed to foreign markets as Grossman and Helpman (1991) pointed out in their international technology diffusion model. The productivity increase through this mechanism does not necessarily require product upgrading but rather producing in a more efficient way. The second mechanism is through quality and product upgrading. In their

influential paper, Hausmann et al. (2007) develop an index of export quality at the country level, EXPY, that reflects the income level associated with the products a country exports. They find a large positive effect of EXPY on country growth.

At the firm level, Verhoogen (2008) and Brambilla et al. (2012) argue that exporting to HID with higher valuation for quality leads to quality upgrades. Similarly, Bastos and Silva (2008) document that the quality of exported goods rises with the per-worker income of the importing country. These two mechanisms both imply a clear distinction between exporting to high and low-income destinations, in favor of the first. Moreover, they do not even support the existence of LBE when exporting to countries with a similar or lower per-capita GDP level than the exporting country itself. In fact, this may be the very reason for not finding an LBE for most of the high-income countries studied.

The case of Turkey presents a unique setting to revisit the inconclusive export destination-productivity link mainly because both high and low-income destinations have significant shares in the country's overall exports and because there is a high number of exporters⁶ and entrants to both types of destinations. Technically, this provides the researcher with enough observations to undertake a matching within specific industries and regions. Moreover, being in the upper middle group of the World Bank's per capita income classification, Turkey lies between high and low-income countries, a fact that allows to make a clear distinction between impacts of exporting to HID and LID.

Moreover, Turkey has experienced a structural shift in its export destinations from HID to LID in the last decade as evidenced in detail in Section II. This makes the Turkish case very fruitful to study also from a policy perspective since it may provide insights into understanding whether this shift can be considered an example of a successful export diversification that compensated for a significant demand shock in the main export market (EU) of a developing country or it is an exaggerated phenomenon with much lower benefits to the economy than what macro figures imply.

⁶ Among the 35 developing and 10 developed countries included in the Exporter Dynamics Database (Cebeci et al., 2012), Turkey is 2nd only to Spain in the number of exporters.

Several studies used various Turkish firm-level data to evaluate the impact of exporting on firm performance. Using 1989-2003 balance sheet data for Turkish manufacturing firms, Aldan and Gunay (2008) document that starting to export further increases labor productivity and employment. Lo Turco and Maggioni (2012) show that both starting to export and starting to import cause employment growth for Turkish manufacturing firms over the 2003-2008 period using PSM techniques. Applying a similar technique on 1990-2001 Turkish plant-level data, Maggioni (2012) and Yasar and Rejesus (2005) detect a positive impact of exporting on firm productivity.⁷

Based on the previous findings for several countries that differentiate between LBE effects of destination types and relevance for policy making, this paper specifically aims to measure LBE effects on productivity, employment, and wages of Turkish exporters by type of export destination (i.e. high or low-income). As for the technique, it uses a combination of DID and PSM techniques on 2005-2010 Turkish Structural Business Surveys. At the end, it documents that LBE effects on firm productivity and wages are significantly higher for exporting to HID relative to exporting to LID. As for the policy relevance, findings in the paper show that surging exports to LID cannot be a replacement for exporting to HID in terms of their benefits to the Turkish economy.

The rest of the paper is organized as follows: The second section describes the data used. In the third section, a descriptive analysis revealing the differences between unmatched high and low-income destination exporters is presented. The evaluation methodology is introduced in the fourth section. The fifth section presents the results and the sixth session concludes and discusses the policy implications.

⁷ Being related studies, Ozler and Yilmaz (2009) and Taymaz and Yilmaz (2007) both report that trade liberalization had a substantial positive impact on total factor productivity of export oriented sectors in Turkey during 1983-1996 and 1984-2000, respectively.

II. DATA

This paper makes use of two firm-level databases maintained by the Turkish Statistical Institute (Turkstat). The first one is a firm-level export database with customs information including exporter random id, destination country, year, and value of transactions.

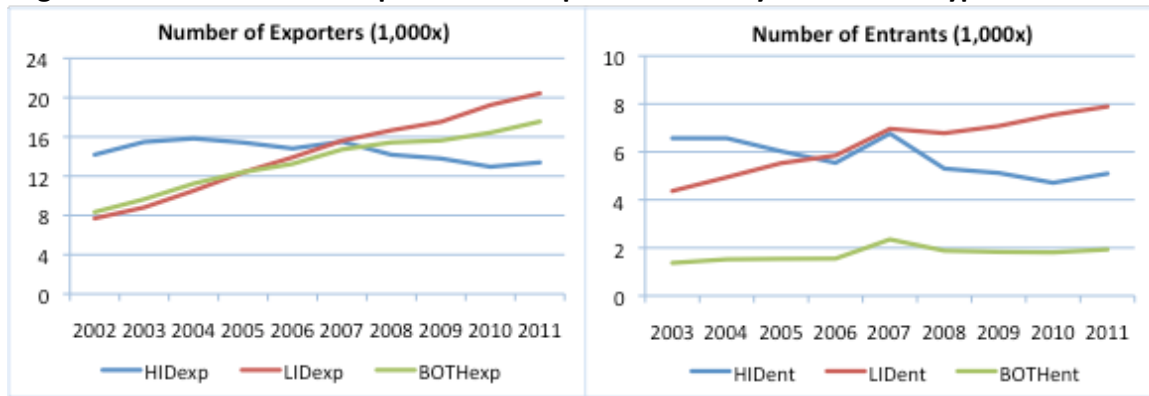
A first look into this database reveals the sharp change in the destination structure of Turkish exporters. Having experienced a six-fold increase during the 2002-2011 period, Turkish exports to LID⁸ reached over 54 billion USD in 2011 while exports to HID only doubled reaching 72 billion in 2011. The recent global crisis had a particularly strong impact on this convergence since Turkish exports to HID experienced a much sharper decrease (25%) than exports to LID (13%) in 2009.

The left panel of Figure 1 presents the evolution of the number of exporters by the type of destination for exports. The blue line stands for exporters that serve only high-income destinations (HIDexp), the red line for exporters that serve only low-income destinations (LIDexp), and the green line for firms that export to both destinations (BOTHexp). Over the 2002-2011 period, the annual number of HIDexp decreased slightly from 14,000 to 13,000. In contrast, the number of LIDexp showed a consistent and sharp rise from around 8,000 to above 20,000. Finally, the number of BOTHexp also recorded a significant increase from around 8,000 to 18,000.⁹ As of 2007, the mid-year of the sample used in this study, the three types of firms had a roughly equal number of exporters, around 15,000.

⁸ For destination classification, the World Bank's 2009 income classification, which makes use of 2007 per capita GNI data, is used. High-income countries in that classification are taken as high-income destinations and all other income groups as low-income destinations.

⁹ For a detailed analysis of the sources of the export growth in the Turkish Economy, see Cebeci and Fernandes (2013) and the 2013 Country Economic Memorandum on Trade, World Bank.

Figure 1: Number of Total Exporters and Export Entrants by Destination Type



Source: Customs Database, Turkstat

The right-side panel of Figure 1 shows the number of entrant firms to the same destination categories. Here, a firm is defined as an entrant if the firm starts to export to the specific destination in the current year and did not export to any destination in the previous year. That is, a firm switching or extending from its current destination is not considered an entrant. For the number of entrants to high-income destinations (HIDent) and low-income destinations (LIDent), we see a picture very similar to the one for the number of exporters to corresponding destinations. LIDent, which is considerably lower than HIDent at the beginning of the period, doubles by showing a consistent increase over the period. HIDent decreases by 20% to around 5,000 in 2011.

The second database used in the study is the Structural Business Surveys (SBS) conducted by Turkish Statistical Institute (Turkstat) annually. This database includes all mining, industry, and services firms with at least 20 employees and a large sample of firms with less than 20 employees in these sectors. This study focuses just on manufacturing firms. The two databases are merged by random firm id and year. Firms with less than 20 employees (small firms) are excluded from this study because it is not possible to properly keep track of them over time due to annual re-sampling in the SBS. To illustrate, it is not obvious whether a small firm that appears in the SBS database entered the market for the first time that year or it was already in the market but did not show up in the database because it was not selected to the sample.

The merged and cleaned dataset includes around 94,000 firm-country-year combinations from 2005 to 2010.¹⁰ Slightly more than half the firms in the dataset are exporters and 13-14% of all exporters in a year are export starters.¹¹ Manufacturing firms with at least 20 employees account for 52-56% of total exports of the country. The rest is accounted by firms in agriculture, mining, services, mainly by traders, as well as by small firms in manufacturing. I expect the effect of excluding small firms from the study to be limited. Although the share of small firms ranges between 29-35% in total manufacturing employment, they account for only 10-12% of total manufacturing revenue and only 3-5% of total manufacturing exports over the study period.

The variables from the merged dataset used in the analysis are as follows: location (NUTS-2 level), industry (NACE 2-digit), government support status (yes vs. no), ownership (foreign vs. domestic), employment, wages paid, R&D expenditures, valued added, investments, material costs, and depreciation allowances. TFP, one of three outcome variables, is estimated by following the methodology introduced by Levinhson and Petrin (2003) for each NACE_2-digit industry separately. Value added, the dependent variable in the TFP estimation, is computed by deducting the value of labor and material costs from the value of total sales. Capital stock is estimated by using annual investments, depreciation allowance of firms, and sector-specific depreciation rates built by using the OECD Manual on Measurement of Capital Stocks and depreciation rate guidelines published by the Ministry of Finance. Finally, NACE 4-digit industry level price indices provided by Turkstat are used to deflate nominal values.

III. PRELIMINARY ANALYSIS

The aim of this section is to investigate if exporting is associated with better firm performance. Specifically, in order to understand how firms categorized by their export behavior differ in selected characteristics, I run five specifications on unmatched data by

¹⁰ Although the SBS is available for 2003 and 2004 as well, I do not include those years in the study since the data collection system took its current format only in 2005.

¹¹ Note that in order to be considered export entrant, a firm must exist in the SBS in the previous year.

defining a categorical variable, *EXPB*, which stands for a unique set of export behaviors in each specification. All five specifications are of the form below:

$$Y_{ijt} = \beta_0 + \beta_1 Empl_{it} + \beta_2 EXPB_{it} + \sum_j \lambda_j Industry_j + \sum_t \delta_t Year_t + \varepsilon_{ijt},$$

where subscripts *i*, *j* and *t* represent firm, industry, and year, respectively; Y_{ijt} is either employment, total factor productivity, total sales, or average wages, all in logs. Log employment $Empl_{it}$ is used to control for the firm size. NACE 2-digit industry and year dummies are included in all specifications.

Following previous studies,¹² I first run specification A, where the variable *EXPB* identifies exporter firms relative to the base category of *NoExport* in a year. The results of this specification, all significant at the 1% confidence level, are given in Panel A of Table 1. They show that exporter firms are on average 57% larger in size, 18% more productive, have 43% higher total sales, and pay 11% higher wages than non-exporters, even when the size (employment) of firms is controlled. This finding is consistent with the findings of the many previous studies mentioned in the Introduction.

In specification B, the aim is to reveal whether firms that start to export and continue to export show similarities with respect to non-exporters. Hence, two distinct *EXPB* variables are defined as:

- i. EntrytoExport: identifying firms that did not export in t-1 but export in t (among firms that are present in the database both in t-1 and t),
- ii. ContinuetoExport: Firms that entered the export market within the period studied and continue to export until the current year.

The results from this specification in Panel B of Table 1 also show coefficients that are all significant at the 1% level. The key finding of specification B is that continuing to export is more strongly associated with all firm outcome variables than starting to export, relative to

¹² See for example Bernard and Jensen (1999), Clerides et al. (1998), Girma et al. 2004, De Loecker 2007.

non-exporters. A comparison of Panel A and Panel B indicates that firms that continue to export within the period are outperformed by the broader export category used in specification A. This result is actually expected since the export category in specification A, unlike the *ContinuetoExport* group in Panel B, includes old and more established exporters, that is, firms that were already exporting in the first year of the study period, 2005.

In specification C, six distinct *EXPB* are defined to identify destination specific patterns:

- i. *EntrytoHigh*: Firms that enter HID only,
- ii. *EntrytoLow*: Firms that enter LID only,
- iii. *EntrytoBoth*: Firms that enter both types of destinations in the same year,
- iv. *ContinuetoHigh*: Firms that enter and continue to export to HID only,
- v. *ContinuetoLow*: Firms that enter and continue to export to LID only,
- vi. *ContinuetoBoth*: Firms that enter and continue to export to both HID and LID in the same year.

Multiple noteworthy findings emerge from Specification C, whose results are shown in Panel C of Table 1. First, within each destination and for all four firm outcomes, continuing to export yields a higher differential than starting to export, relative to non-exporters. In other words, the difference between entrant and continuing firms observed in Panel B holds for each destination type as well. Second, a ranking emerges among destinations both for entry and continuing exporters. For entry, *EntrytoBoth* has the highest effect on all firm characteristics followed by *EntrytoHigh* only. *EntrytoLow* has considerably lower effects on firm employment, TFP, and wages. Actually, *EntrytoLow* has a positive coefficient (0.05) for productivity and a negative (-0.02) coefficient for wages. That is, firms that start to export to LID pay 2% lower wages than non-exporters, though this effect is not statistically significant. The same destination ranking is valid for continuing exporters. Differences in size, productivity, and wages between non-exporters and continuing firms are higher for *ContinuetoBoth*, followed by *ContinuetoHigh* and *ContinuetoLow*. Here, unlike the wages-*EntrytoLow* relationship, a positive wages-*ContinuetoLow* relationship is observed, though it is significant at the 10% confidence level only.

Finally, I run Specifications D and E to understand whether the characteristics of firms that are persistent in their specific export destination differ from those of firms that leave their destination in the following year. Specification D is run on a dataset that includes only firms that export to HID only in year t and by defining two distinct *EXPB* variables as:

- i. ExtendtoLow: Firms that export only to HID in t-1 but to both HID and LID in t,
- ii. SwitchtoLow: Firms that export only to HID in year t-1 but only to LID in year t.

The findings presented in the Panel D of Table 1 suggest that firms that were HID only exporters and add LID to their portfolio employ 14% more employees and sell 16% more than those firms that continue to HID only. Their TFP is also 3% higher at the 10% significance level but there is no significant difference in the wages they pay. On the other hand, no statistically significant difference is observed in any measures between firms that continue to HID only and those that leave HID and enter LID.

Table 1: Correlation of Selected Firm Characteristics with various Export Behaviors

Regressor	Panel A				Panel B				Panel C			
	Empl.	TFP	Sales	Wage	Empl.	TFP	Sales	Wage	Empl.	TFP	Sales	Wage
Employment		0.27*	1.13*	0.18*		0.25*	1.07*	0.12*		0.24*	1.07*	0.12*
Export	0.57*	0.18*	0.43*	0.11*								
EntrytoExport					0.29*	0.08*	0.35*	0.05*				
ContinuetoExport					0.35*	0.11*	0.39*	0.07*				
EntrytoHigh									0.35*	0.13*	0.31*	0.09*
EntryttoLow									0.14*	0.05**	0.30*	-0.02*
EntrytoBoth									0.44*	0.07*	0.43*	0.07*
ContinuetoHigh									0.37*	0.13*	0.34*	0.12*
ContinuetoLow									0.17*	0.07**	0.36*	0.03***
ContinuetoBoth									0.56*	0.15*	0.48*	0.08*
Observations	93,981	93,981	93,981	93,981	51,153	51,153	51,153	51,153	49,693	49,693	49,693	49,693
R ²	0.05	0.64	0.63	0.26	0.03	0.61	0.45	0.15	0.03	0.60	0.44	0.15
Dummies	Sector Year	Sector Year	Sector Year	Sector Year	Sector Year	Sector Year	Sector Year	Sector Year	Sector Year	Sector Year	Sector Year	Sector Year

Regressor	Panel D				Panel E			
	Empl.	TFP	Sales	Wage	Empl.	TFP	Sales	Wage
Employment		0.29*	1.15*	0.19*		0.24*	1.04*	0.11*
ExtendtoLow	0.14*	0.03***	0.16*	0.01				
SwitchtoLow	-0.01	-0.01	0.08	-0.03				
ExtendtoHigh					0.15*	0.08*	0.14*	0.04*
SwitchtoHigh					0.22*	0.04	-0.03	0.03
Observations	7,495	7,495	7,495	7,495	5,001	5,001	5,001	5,001
R ²	0.03	0.63	0.65	0.28	0.04	0.71	0.60	0.19
Dummies	Sector Year	Sector Year	Sector Year	Sector Year	Sector Year	Sector Year	Sector Year	Sector Year

*, **, ***: Significant at 1%, 5%, 10% significance level, respectively

Specification E is run on a dataset that includes only firms that export to LID only in year t and by defining two distinct *EXPB* variables as:

- i. ExtendtoHigh: Firms that export only to LID in year $t-1$ but to BD in year t ,
- ii. SwitchtoHigh: Firms that export only to LID in year $t-1$ but only to HID in year t .

The estimated coefficients for employment and total sales for firms that add HID to BID are very similar to those for firms that add BID to HID in Specification D. In contrast, this time an 8% TFP and a 4% wage differential, both significant at the 1% level, are observed indicating that firms that expand to HID from BID are more productive and pay more than those continuing to export to BID only. Firms that leave BID and enter HID employ 20% more workers than those continuing to export to BID only. However, there is no significant difference between these two groups in productivity, sales, and wages.

This descriptive analysis clearly shows the considerable differences in firm characteristics between non-exporters and exporters as well as between exporters to high and low-income destinations. In the next section, I describe the methodology that will be used to investigate what portion of these differences is due to LBE.

IV. EVALUATION METHODOLOGY

In order to estimate the causal effect of exporting on firm performance outcomes, I follow the average treatment model suggested by Heckman et al. (1997). The model is based on the idea of comparing the outcome variable performances of matched firms in treatment and control groups after the treatment is applied. Ideally, the treatment effect would be computed as the difference between the outcome levels of a firm under the condition that it starts to export and under the condition that it does not export. Since it is not possible to observe a firm in both conditions at the same time, we instead compare the outcome variable of exporter entrant firms with that of similar firms that do not export.

Formally, my aim is to compute the causal effect of starting to export on firm TFP, called average treatment effect on the treated (ATT), using the following expression $[E(Y(1)|EXP=1) - E(Y(0)|EXP=1)]$, where the first term denotes the expected outcome variable of an entrant once it exports and the second term denotes a hypothetical situation, the expected outcome variable of an exporter, had it not started to export. Since it is impossible to observe this second term, the counterfactual, I instead compute the ATT in an alternative way commonly used in the evaluation literature:¹³

$$\begin{aligned} & E(Y(1)|EXP=1) - E(Y(0)|EXP=0)] \\ &= [E(Y(1)|EXP=1) - E(Y(0)|EXP=1)] + [E(Y(1)|EXP=1) - E(Y(0)|EXP=1)] \\ &= ATT + SELECTION BIAS \end{aligned}$$

The above equation states that the ATT can be properly measured by selecting a control group among non-exporters instead of export entrants under the assumption that the selection bias is equal to 0, that is, expected TFP levels of matched non-exporters and export entrants are the same in the absence of export entry. This is widely accepted to be the most crucial step of any impact evaluation and depends on satisfying two criteria:

- i. all firm characteristics, except for the treatment itself, that have a potential to create a differential in the outcome variable between the firms in the control and treatment groups should be controlled for,
- ii. there should not be a significant difference in the controlled characteristics of matched firms before the treatment.

If these two criteria are met, a proper matching is achieved with no significant selection bias left and the remaining difference in the outcome variables of matched firms can be attributed to the treatment, in my case entry into exporting. Obviously, meeting these two criteria depends on the availability of a large set of firm observable variables. The number of

¹³ See Blundell and Costa Dias (2009) for a review of the related literature.

observations in the estimating sample is also critical as the higher is the number of characteristics to be controlled for, the more data-demanding the process becomes.

As for the specific matching algorithm, I use a combination of the difference-in-differences (DID) technique, developed by Ashenfelter and Card (1985), and propensity score matching technique (PSM) proposed by Rosenbaum and Rubin (1983). PSM matches firms in the control and treatment groups based on a predicted probability score of being subject to treatment obtained by applying a Probit model on selected characteristics of firms before the treatment. DID is used to remove the effect of uncontrolled time invariant differences between matched firms as well as trend effects in the treatment group.

PSM techniques were used by several researchers to evaluate the impact of starting to export on firm outcomes. Girma et al. (2004) use TFP, size, ownership, and wages as covariates and dummies for region, sector, and year to compute propensity scores. Fernandes and Isgut (2005) match firms within industry-region using employment, wage, capital, productivity, the real exchange rate, the volume of exports in the industry and the region, and the number of exporters in the industry and the region. De Loecker (2007) uses TFP, capital, and a private ownership dummy.

The choice of a comprehensive set of control variables for the PSM is an important step in order to eliminate selection bias. To ensure a proper matching, I first group firms by their industry, region, government support status, and foreign ownership status.¹⁴ Then, I match firms within each group by their propensity scores obtained from a probit including as regressors lagged TFP, employment, capital intensity, wages, and R&D intensity. The motivation for considering these variables and the details of the procedure are as follows:

¹⁴ Instead of grouping, these 4 dummy variables could be used in the PSM computation itself. I do not follow that approach because in that case some firms in a given group (as defined by the four variables) could still match to firms in a different group (as defined by the four variables) based on the computed propensity score. It is important for the quality of the match to ensure that firms that are matched belong to the same industry, region, government export status, and foreign ownership status as performance of firms belonging to different groups in these four variables might be affected by group specific factors. Matching two firms in different groups would result in wrongly attributing the effect of a sector specific factor to the impact of export destination.

a) Variables for Grouping Firms: I divide firms into groups by their industry, region, government support status, and foreign ownership status. The total number of potential groups formed by the interaction of these four variables is equal to 960, though the actual number of groups that include at least an exporter and a non-exporter in a year is 546.

- i. Industry: PSM is undertaken within each of 23 NACE 2-digit industries because different industries might be subject to different growth paths. In fact, the share of manufactured metals in total exports increased significantly while the share of textiles and clothing declined during the period studied.
- ii. Region: PSM is undertaken within each of five regions: Istanbul, East, West, North, and South. Given the large income discrepancies among regions and government policies to foster growth in less developed regions, the location of a firm can have an effect on that firm's performance trajectory.
- iii. Government Support Status: It is possible to identify in the database if a firm gets in a year a direct support in any form from the government. Whether for exporting or other activities, support from the government has the potential to affect the export status and the productivity of firms. Beyond that, getting support from government is a good proxy for a firm's willingness and organizational preparedness to export. Firms are assigned to one of the four support status categories:
 - Never: Firm does not get any support both in year $t-1$ and t ,
 - Both: Firm gets support both in year $t-1$ and t ,
 - Start: Firm does not get any support in $t-1$ but gets support in t ,
 - End: Firm gets support in $t-1$ but not in t .
- iv. Foreign Ownership Status: PSM is undertaken for "full-domestic" firms (those whose capital is 100% domestic) and for "not full-domestic" firms separately as firms' propensity to export and their choice of export destinations may be affected by the developments in and characteristics of the source country.

b) Variables Used in the Propensity Score Estimation: I include the lagged value of an outcome variable as the main covariate in the propensity score estimation for that outcome variable. In addition, because the three firm outcomes may affect one another's trajectories, lags of the other two of these variables are considered in propensity score estimation for the third firm outcome. Specifically, lagged wage is included as a regressor in the probit regression for entry into exporting from which propensity scores are obtained to be used in the estimation of LBE effects on firm TFP because wage is a good proxy to control for the education and skill level of employees, which can alter not only the future wage but also productivity and employment levels.

Another regressor that is included in the probit regressions for entry into exporting is capital per employee due to its close relationship with productivity and employment. Yet another regressor of particular interest is the firm's R&D intensity, which is measured as the share of R&D expenditures in the total expenditure of firms. Independent of the export status of a firm, R&D activities can contribute to firm productivity.¹⁵ Controlling for R&D intensity of matched firms prevents the productivity increases caused by increased R&D activities from being wrongly attributed to exporting due to the positive correlation among these variables.

As for the specific PSM method, I implement Nearest Neighbor matching with a Caliper suggested by Cochran and Rubin (1973) that matches a firm in the treatment group with the firm/firms with the closest propensity score in the control group, as long as the differences between propensity scores are lower than a pre-determined level (caliper).¹⁶ Formally, for each firm i in the treatment group, the matching firm j among all firms k in the control group is selected such that:

$$\mu > \|p_i - p_j\| = \min \|p_i - p_k\|,$$

¹⁵ Aw, Roberts and Xu (2011) document that while exporting raises productivity of a firm by 2%, R&D raises by 4.8% and both activities together raises by 5.6%.

¹⁶ I use STATA's Psmatch2 module developed by Leuven and Sianesi (2003).

where p represents the propensity score and μ is the caliper. Having matched the firms in control and treatment groups, the causal effect of exporting on a given firm outcome y is estimated by:

$$LBE_t^{DD} = (1/N_t) \sum_i \left(\sum_{t=1} (y_{it} - y_{it-1}) - \sum_{t=1} \sum_j w_{ij} (y_{jt} - y_{jt-1}) \right)$$

where subscript t is a time operator, N is the number of matched firms i in the treatment group, y_{it} is the outcome variable for i , y_{jt} is the outcome variable for matched firm j in the control group, and w_{ij} is the weight of a specific j among all j 's matched with a specific i . If $t=1$, the formula above gives the LBE effect at the year of entry into export markets.

I compute t-statistics and bias tests to check if covariates are well balanced in the control and treatment groups before the treatment. In the literature a remaining bias lower than 5% or 3% after the matching is considered sufficient to conclude that the covariates examined are well balanced. Although these benchmarks are useful in general, I observe by trying different estimation scenarios that no matter how small it is, any bias in the main covariate (e.g., lagged TFP in the ATT estimation for TFP) contributes to the estimated ATT coefficient by a very large magnitude. Therefore, while fine-tuning the matching procedure, I aim to decrease the bias in the main covariate as much as possible while keeping biases for other covariates under a tolerable level (i.e. less than 3% in absolute terms). The summary results of the balancing tests are presented in the Appendix.

I limit destination-specific estimations to the sample of firms that export to only either high-income or low-income destinations over three years. That is, no attempt is made to estimate the causal effect for firms that export to both high and low-income destinations at the same time as it would not be possible to distinguish between impacts of high and low-income destinations. The same concern is valid for the comparison of firms that continue to export to a type of destination with those expanding/switching to the other type of destination because LBE caused by exporting to the original type of destination might extend beyond that year, even if a firm does not export to that type of destination anymore.

As a result, I perform 27 ATT computations to assess the causal effect of exporting on firm performance in Turkey. Nine of these ATT computations correspond to the estimation of a causal effect of exporting on one of three outcome variables (TFP, employment, wages) at year of export entry, second and third years of exporting without any distinction between types of destinations. The remaining 18 ATT computations correspond to the estimation of the causal effects of exporting to HID or to LID separately. I repeat these estimations by replacing HID with EU+EFTA and LID with MENA.

V. ESTIMATION RESULTS

The results from PSM-DID estimation of LBE effects from entering into export markets are presented in Table 2. Exporting has an instantaneous positive and significant effect on firm TFP. That is, an export entrant becomes 6.3% more productive than a non-exporter firm that was comparable a year before. This productivity differential increases as a firm continues to export. After three years of exporting, a firm is 12.1% more productive than a matched firm that did not export over the period.

The impact of starting to export on firm employment follows a similar path. Firm employment of exporters are 5.3% higher in the year of export entry and 10.3% higher after three years of exporting, relative to non-exporters. The results for firm wages are more interesting. Upon entry into exporting, there is almost no immediate impact on wages. However, a 2.7% wage premium emerges in the second year and this increases to 4.1% in the third year of exporting.

Table 2: Learning by Exporting Effect

Outcome Variable	t		
	1	2	3
TFP	0.063***	0.082**	0.121**
Employment	0.053***	0.079**	0.103**
Wage	0.001	0.027*	0.041**
N of Treated	4,396	2,275	1,108
N of Controls	25,184	14,254	7,375

*, **, ***: Significant at 10%, 5%, 1% significance level, respectively.

Destination-specific LBE estimations are presented in Table 3. The TFP premium of entry into HID is 7.4%, which is a slightly higher impact than the impact observed for overall export entry. The TFP effect of exporting increases to 11.7% at the end of the third year. In contrast, entry into LID yields a positive but insignificant effect on firm TFP that continues to be positive but stays insignificant after three years of exporting.

Table 3: Learning by Exporting Effect by High and Low-income Destinations

Outcome Variable	High Income Destination			Low Income Destination		
	1	t 2	3	1	t 2	3
TFP	0.074**	0.089**	0.117**	0.023	0.033	0.034
Employment	0.066**	0.083**	0.095*	0.049**	0.072**	0.081*
Wage	0.012	0.034*	0.043*	0.005	0.016	0.014
N of Treated	2,041	961	437	1,573	694	384
N of Controls	25,184	14,254	7,375	25,184	14,254	7,375

*, **, ***: Significant at 10%, 5%, 1% significance level, respectively

Unlike TFP, exporting to either type of destination results in significant employment gains for firms in Turkey. The instantaneous effect upon entry is 6.6% for exporting to HID and 4.9% to LID, both effects are significant. Both magnitudes increase as a firm continues to export to that specific type of destination. Finally, exporting to HID differs from exporting to LID in its effect on firm wages. As is the case for overall exporting, wages paid by firms exporting to HID increase more than those paid by matched firms in the control group starting from the second year of exporting. The exact magnitudes are similar to those in overall exporting. In contrast, although the LBE effect from exporting to LID on firm employment increases starting from the second year, it is still insignificant in the third year.

In Table 4, LBE results are given for EU+EFTA and MENA separately. Not surprisingly, EU results are very similar to HID results and MENA results are similar to LID results. Although they are the same in the first year of exporting, the TFP impact of exporting to EU+EFTA is 0.02% lower than that of exporting to HID in the third year of exporting.

Table 4: Learning by Exporting Effect by EU and MENA

Outcome Variable	EU+EFTA			MENA		
	1	t 2	3	1	t 2	3
TFP	0.074**	0.081**	0.097*	0.029	0.024	0.031
Employment	0.069**	0.079**	0.091*	0.056**	0.071**	0.079*
Wage	0.013	0.035*	0.038*	0.010	0.014	0.019
N of Treated	1,618	787	382	1,449	627	345
N of Controls	25,184	14,254	7,375	25,184	14,254	7,375

*, **: Significant at 10%, 5% significance level, respectively

VI. CONCLUSION AND POLICY IMPLICATIONS

This paper has attempted to answer a popular question at the intersection of the trade and industrial organization literatures: Does the impact of exporting on firm performance differ by the income level of the destination country? To measure the causal impact of exporting by destination type, a strict matching procedure is applied on a rich data set of Turkish firms. Specifically, firms in the same industry, location, government support, and ownership status groups are matched based on the estimated propensity scores from a probit regression of starting to export using pre-export levels of TFP, employment, wages, capital intensity, and R&D intensity.

Several important results have emerged: exporting per-se results in persistently higher firm TFP and employment starting from the year of entry into export markets but in a moderate wage effect that starts only after the second year of exporting. Regarding destination-specific exporting effects, unlike exporting to high-income destinations, exporting to low-income destinations does not result in significantly higher TFP and wages. In contrast, the employment effects of exporting to low-income destinations are comparable to those of exporting to high-income destinations.

The findings in this paper support previous evidence showing a significant difference between the effects of exporting to LID and to HID, in favor of the latter. In particular, it is in line with Damijan et al. (2004), De Loecker (2007), Park et al. (2010), Vacek (2010), and Shevtsova (2012) in that the productivity of firms exporting to HID increases more than that of firms exporting to LID.

Moreover, it supports the finding of Brambilla et al. (2012) on Argentina that firms exporting to high-income countries pay higher average wages than exporters to lower-income countries and domestic firms and the finding of Cebeci, Lederman, and Rojas (2013) that exporting to high-income destinations results in higher firm employment than exporting to low-income destinations. On the other hand, a positive wage effect documented in this paper for firms exporting to the EU starting from the second year of exporting might seem to be in partial contradiction to Cebeci, Lederman, and Rojas (2013), who do not detect a positive correlation between not only the MENA share but also the EU share in total exports of a firm and the wage it pays. This discrepancy emerges because the analysis in this paper is based on the performance measurement of export entrants and excludes old exporters. As exporter entry to the low-skilled textile and clothing sector, which has been the main export item to the EU until recent years, decreased considerably during the last decade,¹⁷ this paper is believed to reflect the recent dynamics of the Turkish economy better.

In addition to its contribution to the exports and productivity literature, the findings in this paper have rich policy implications for Turkey. Although from the perspective of market diversification and short-run external balance it may be desirable for manufacturing firms in Turkey to export increasingly to MENA, this paper shows that increasing exports to MENA is far from mitigating the long-term negative effects caused by the stagnation of exports to the EU since, relative to MENA, exporting to the EU contributes significantly more to firm employment, wages, and especially productivity, which are key variables for sustainable export growth.

¹⁷ See the Appendix for entry figures by sectors.

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APPENDIX

Table AI: Test Results for Balancing

Activity	Covariate	Sample	Outcome Variable					
			TFP		Employment		Wages	
			%bias	p>t	%bias	p>t	%bias	p>t
Exporting	TFP	Unmatched	6.9	0.000	6.9	0.000	6.9	0.000
		Matched	0.4	0.871	1.6	0.699	1.1	0.726
	Employment	Unmatched	27.1	0.000	27.1	0.000	27.1	0.000
		Matched	1.8	0.584	0.4	0.862	-0.5	0.837
	Wage	Unmatched	18.1	0.000	18.1	0.000	18.1	0.000
		Matched	-1.6	0.649	-2.3	0.507	0.6	0.815
	R&D	Unmatched	7.5	0.000	7.5	0.000	7.5	0.000
		Matched	-2.6	0.098	0.1	0.972	2.6	0.104
	Capital Intensity	Unmatched	2.3	0.046	2.3	0.046	2.3	0.046
		Matched	1.0	0.198	0.0	0.972	0.9	0.209
Exporting to HID only	TFP	Unmatched	16.9	0.000	16.9	0.000	16.9	0.000
		Matched	0.2	0.960	1.2	0.719	1.5	0.603
	Employment	Unmatched	37.8	0.000	37.8	0.000	37.8	0.000
		Matched	1.4	0.675	0.2	0.953	1.5	0.610
	Wage	Unmatched	26.7	0.000	26.7	0.000	26.7	0.000
		Matched	-3.1	0.333	-0.1	0.988	-0.1	0.973
	R&D	Unmatched	6.1	0.017	6.1	0.017	6.1	0.017
		Matched	1.9	0.413	-2.2	0.680	1.9	0.419
	Capital Intensity	Unmatched	-3.5	0.247	-3.5	0.247	-3.5	0.247
		Matched	2.3	0.416	2.0	0.521	1.2	0.719
Exporting to LID only	TFP	Unmatched	-1.5	0.574	-1.5	0.574	-1.5	0.574
		Matched	-0.1	0.984	0.7	0.718	0.2	0.976
	Employment	Unmatched	4.0	0.175	4.0	0.175	4.0	0.175
		Matched	3.0	0.448	0.2	0.965	2.0	0.527
	Wage	Unmatched	4.1	0.163	4.1	0.163	4.1	0.163
		Matched	-2.4	0.578	-2.7	0.492	0.1	0.986
	R&D	Unmatched	7.5	0.005	7.5	0.005	7.5	0.005
		Matched	1.8	0.558	2.3	0.432	1.4	0.648
	Capital Intensity	Unmatched	2.5	0.461	2.5	0.461	2.5	0.461
		Matched	1.7	0.627	0.3	0.931	1.0	0.766

Table AII: Sector Distribution of Export Entrants (%)

Sector	2003	2004	2005	2006	2007	2008	2009	2010
Agriculture	6.9	5.8	6.3	5.6	5.0	5.3	6.0	5.8
Chemical Products	13.3	14.0	14.0	14.7	15.5	14.9	16.1	16.6
Machinery	18.1	19.4	20.2	20.7	20.5	21.8	21.0	21.2
Metals	13.2	13.4	13.6	14.2	14.2	15.1	15.3	15.4
Others	21.1	21.0	20.3	20.0	20.1	20.5	20.4	20.6
Textile & Clothing M.	23.1	22.3	21.3	20.2	19.1	16.9	16.6	16.5
Transportation Vehi.	4.3	4.1	4.3	4.7	5.6	5.6	4.7	4.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0