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Export Spillovers from Foreign Direct Investment: Evidence from Turkey

Başak Dalgıç & Burcu Fazlıođlu & Michael Gasiorek

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Export Spillovers from Foreign Direct Investment: Evidence from Turkey

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(Preliminary Version)

Abstract

This paper explores export spillovers that arise from foreign direct investment generated linkages between domestic and foreign firms in Turkish manufacturing industry. By making use of a recent firm level dataset, we investigate how supplying to foreign affiliated firms, as proxied by their presence in downstream industries and foreign presence in firms' own industry affects (i) extensive and intensive margins of domestic firms' exporting, (ii) the quality of exports proxied by unit values, (iii) the decision of domestic firms to export or start exporting, (iv) firms' export orientation towards destination markets with high income levels. The results of the study suggest that even after controlling for firm heterogeneity, stronger presence of foreign firms in downstream industries yields better export performance of domestic firms. We do not find any evidence on the effect of supplying to foreign affiliated firms on the quality of exporting. Furthermore, it is shown that foreign presence in downstream industries is associated with higher probability of exporting, while foreign presence in firms' own industry is found to have a negative effect. Finally, we find evidence on the fact that supplying to multinationals in downstream industries is positively associated with firms' both intensive and extensive margins of exports towards developed regions of the world.

Keywords: FDI, Export Spillovers, Extensive Margin, Intensive Margin.

JEL Classifications: D22, F14, F23

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1. Introduction

Foreign direct investment (FDI) impacts on the economic performance of host countries directly and indirectly by contributing to capital savings, increasing production capacity and bringing along technology diffusion and management skills. The indirect effects of FDI, which are usually referred as spillover effects arises from a number of sources including the linkages formed between domestic and foreign owned firms and increased competition in the domestic market. A recent literature suggests that the interaction of domestic firms with foreign owned firms can also affect the export decision and performance of domestic firms i.e. create export spillovers (Görg and Greenaway, 2004; Greenaway and Kneller, 2004; Ruane and Sutherland, 2004; Kneller and Pisu, 2007; Wagner, 2007; Bajgar and Javorcik, 2013). Compared to the vast literature which investigates the impact of spillovers created by FDI on productivity and technology transfer (productivity spillovers)⁴, relatively little effort has been spent on export spillovers. This is despite the fact foreign presence might clearly affect the export decision and performance of firms through horizontal and vertical linkages (Rodriguez-Clare, 1996; Aitken et al., 1997).

Foreign presence might affect export market participation and export behavior of firms by improving their productivity⁵ through increasing competition or creating knowledge spillovers (Kneller and Pisu, 2007). The studies that have considered the impact of foreign presence on export behavior have mainly focused on horizontal linkages where domestic firms benefit from multinational firms that are operating within the domestic firms' own industry. Horizontal linkages may positively affect exporting behavior of domestically owned firms through increased competition, whereas it may also constrain exporting activity of these firms by hurting their profitability through decreased market shares and restrained access to skilled

⁴ See among others, Blomström, 1986; Harrison and Aitken, 1999; Blomström and Kokko, 2001; Javorcik, 2004; Keller and Yeaple, 2009; Blalock and Gertler, 2008; Mucchielli and Jabbour, 2004; Mervelede and Schoors, 2005; Javorcik and Spatareanu, 2011.

⁵ For a detailed discussion on productivity and export nexus pioneering the new new trade theory on firm heterogeneity, see Wagner (2012).

labor force (Blalock and Gertler, 2008)⁶. Besides, foreign presence can create positive export spillovers via vertical linkages. Improving productivity of firms, supplying multinationals in downstream industries can positively affect their decision of starting to export, entry into new export markets and starting to export new products. Foreign affiliated firms require their local suppliers to catch up with international standards in terms of quality, variety, managerial know-how, level of technology used in production processes.

In this study, we therefore focus on the existence of export spillovers that arise from FDI generated horizontal and vertical linkages between domestic and foreign affiliated firms in Turkey. We specifically test whether supplying to multinationals in downstream industries act as a channel for creating export spillovers in Turkish manufacturing industry. While doing so, we not only take into account export performance of firms at the intensive margins but also consider the extensive margins of exporting activity. We use the largest and most recent panel available for Turkish manufacturing firms covering the period 2006-2010. The case of Turkey is interesting since over the last decade it has witnessed a remarkable FDI inflow and a rapid rise in exports. In fact Turkey has integrated into the globalized world, while transforming into one of the major recipients of FDI in its region. According to the 2013 World Investment Report of the United Nations Conference of Trade and Development (UNCTAD), Turkey has been ranked 14th among the developing countries and 1st within the West-Asia Region. Alongside with this striking FDI performance Turkey has experienced a dramatic export boom after 2002. Over the period 2002-2012 Turkey's exports have increased by 325 percent.

We investigate how foreign presence in firms' own industry and supplying to foreign owned firms proxied by their presence in downstream industries affect (i) extensive and intensive margins of domestic firms' exporting, (ii) the quality of exports proxied by unit

⁶ Empirical evidence in the regarding literature is mixed. While some studies provide evidence on the positive impact of horizontal linkages i.e. export spillovers via horizontal linkages (see among others Kokko et al., 1997; Kneller and Pisu, 2007; Alvarez and Lopez, 2008), some of them finds zero or negative impact the impact (see among others Aitken and Harrison, 1999; Djankov and Hoekman, 2000; Greenaway et al., 2004).

values, (iii) decision of domestic firms to export or start exporting, (iv) firms' export orientation towards destination markets with high income level. We construct our horizontal and vertical FDI linkage variables utilizing Turkish input-output matrix and our firm level panel. Our horizontal linkage measure represents the foreign presence within an industry in which firms operate. While constructing our vertical linkage measure we assume that domestic firms are more likely to supply foreign firms, if foreign firms constitute a larger share of total output in the industries to which the industry of the domestic firm serves inputs. Just as our transaction level trade data allow us to perform firm-product-destination level estimations, to explore the existence of export spillovers; we regress various extensive and intensive margin measures on the foreign linkage and a number of control variables accounting for firm-product-destination as well as firm level heterogeneity. In order to identify the spillover effects arise from foreign presence on the decision to export, we estimate probit equations for various categorical variables alongside including a dynamic specification.

We contribute to the limited literature on export spillovers from FDI in many ways. First of all, to the best of our knowledge this study is the first attempt to investigate the export spillovers that arise from FDI for Turkey. Focusing on a developing country is important since the potential for benefiting from export spillovers is higher than that of developed countries. Secondly, apart from the most of the studies in the regarding literature which focus on aggregate export propensity, we differentiate between different margins of trade. In other words, we not only take into account export performance of firms at the intensive margins but also consider extensive margins of exporting activity. Thirdly, with a very few exceptions, studies do not assess the quality of exports due to limitations in their datasets, while we analyze the effect of foreign presence in own and downstream industries on the quality of exports proxied by unit values. Finally, with a novel approach we incorporate the dimension

of geographical diversification into our investigation of export spillovers and, explore firms' export orientation towards destination markets with high income levels as another performance criterion.

The results of the study suggest that even after controlling for firm heterogeneity, stronger presence of foreign firms in downstream industries yields better export performance of domestic firms. Moreover, we observe stronger spillover effects for intensive margins of exports than that of extensive margins for our vertical linkage variable. Furthermore, it is shown that foreign presence in downstream industries is associated with higher probability of exporting. Despite the positive export spillovers that arise from supplying to multinationals in downstream industries, foreign presence in firms' own industries is found to have a negative effect on exporting activity. We do not find any evidence on the effect of supplying to foreign affiliated firms on the quality of exporting. Finally, our results indicate that stronger foreign presence in downstream industries is positively associated with firms' both intensive and extensive margins of exports towards developed regions of the world.

This paper is structured as follows. Section two briefly reviews the existing literature. Section three introduces the data and presents some descriptive evidence. Section four presents the methodology and results of our empirical investigation. Section five concludes.

2. Related Literature

Pioneering studies of Romer (1990) and Aghion and Howitt (1992) attributed a key role to knowledge yielding to an increased interest in the international linkages as channels to reach accumulated knowledge of the frontier economies. Among the knowledge diffusion channels FDI received special attention as it brings several benefits to host economies. The direct benefits of FDI stem from the fact that presence of multinational companies brings additional capital to the host country as well as increasing demand for labor and leading to

increased R&D expenditures by putting competitive pressure on domestic firms. In terms of knowledge transfer multinational firms provide access to frontier technologies as domestic firms are able to observe their production and management skills. Among the impacts of FDI a noticeable research effort has been paid on the productivity gains of domestic firms indirectly through interacting with multinational firms (Görg and Greenaway, 2004).

The related literature mainly concentrates on two different channels through which foreign firms create productivity gains for domestic firms, namely productivity spillovers from FDI. The earlier literature focuses on horizontal spillovers which examine the effect of FDI within a sector that domestic firm operates in. A more recent literature investigates vertical spillovers analyzing the effects of FDI in upstream or downstream industries that foreign firms interact with. The micro evidence⁷ on horizontal productivity spillovers is mixed presenting negative and insignificant effects of horizontal linkages on domestic firms (see among others Harrison and Aitken, 1999; Javorcik, 2004; Javorcik and Spatareanu, 2008, 2011; Fons-Rosen et al, 2013) along with the positive effects (see among others Konings, 2001; Keller and Yeaple, 2009). Empirical evidence is stronger in explaining positive vertical spillovers (see among others Blalock and Gertler, 2008; Mucchielli and Jabbour, 2004; Javorcik, 2004; Mervelede and Schoors, 2005; Javorcik and Spatareanu, 2008, 2011). Thus far, while the literature on the benefits of FDI mainly focuses on productivity gains, little effort has been put on other indirect benefits such as those related to exporting activity of the firms.

Expecting export related benefits from FDI is motivated by some stylized facts provided by the new new international trade literature. Regarding the exporting activity of firms, the international trade literature has witnessed a substantial progress over the past

⁷ Macroeconomic studies that focus explicitly on the knowledge spillover effect of FDI are scarce (see among others, Van Pottelsberghe de la Potterie and Lichtenberg, 2001).

eighteen years where the firm heterogeneity has become a core topic⁸. With the availability of firm level datasets a vast empirical literature has conveyed that internationalized firms show superior performance to the firms who serve only to the domestic markets⁹ as more productive firms self-select into exporting¹⁰. While one strand of this literature is concerned with exporting activity at intensive margins another strand investigates exporting activity at extensive margins. The latter branch of literature particularly focuses on multi-product firms and their existence in multiple destination markets¹¹. This literature presents that multi-product and multi-destination firms are substantial players of total exporting activity and only the most productive firms can sell a wider range of products to a wider range of markets where sunk costs market specific (Bernard et al. 2010). Thus regarding literature emphasizes that there is a high degree of persistence in exporting behavior as an evidence for sunk costs. Through increasing competition or creating knowledge spillovers presence of foreign affiliated firms affect sunk cost of exporting and productivity and hence export market participation (Kneller and Pisu, 2007).

As mentioned above, a handful of empirical studies assess the effect of FDI on exporting. Aitken et al. (1997) highlight the role of information externalities created by multinationals within an industry on export decision of firms. They state that sunk costs of exporting are lower for foreign affiliated firms who are already part of international production networks. Using plant-level data on Mexican manufacturing industry their study reveals that firms are more likely to export when there is a higher concentration of exporting activity by multinationals in the same industry and region. Kneller and Pisu (2004) in which both horizontal and vertical FDI motives exist, also focus on information externalities and

⁸ While the micro-econometrics of firms' engagement in international trade was pioneered by Bernard and Jensen (1999), Aw and Hwang (1995) and Roberts and Tybout (1997), the theoretical framework has been largely stimulated by the seminal works of Melitz (2003) and Bernard et al. (2003).

⁹ See Greenaway and Kneller (2007), Wagner (2007) and Wagner (2012) for a survey of the empirical evidence.

¹⁰ There is a vast empirical evidence supporting the self selection hypothesis (see among others Roberts and Tybout, 1997; Bernard and Jensen, 1999; Aw et al., 2000; Bernard and Wagner, 1997; Isgut, 2001)

¹¹ See among others Eaton et al. (2004) for determinants of geographical diversification and Arkolakis and Muendler (2010); Bernard et al. (2007) for product diversification.

show that foreign affiliated firms are more likely to export and export more intensively. Considering the trade openness of the Uruguay economy, Kokko et al. (1997) show that the probability of exporting increases with the presence of foreign firms established after 1973 (more outward-oriented period), whereas the likelihood of exporting is not affected by the presence of foreign firms established before 1972 (Uruguay's inward-oriented period). Greenaway et al. (2004) defines knowledge spillovers, competition and information externalities as possible transmission mechanisms via which multinationals affect firms' exporting behavior in UK. They show that the intensity of foreign firms' R&D expenditure, the relative importance of foreign affiliated firms' production and their export activities have a positive impact on the probability of exporting. Among them the level of foreign production in an industry is the most influential one. In terms of export propensity, a positive impact associated with foreign affiliation is evident. While they verify the effects of knowledge spillovers and competition channels on export propensity, they cannot find any support for information externalities. Utilizing firm-level data for Ireland, Ruane and Sutherland (2004) consider the presence of multinationals and the export share of multinationals separately and, for the former they find positive effects while they find negative effects for the latter.

Using a dataset of British manufacturing firms Kneller and Pisu (2007) not only assess the extent of horizontal but also vertical spillovers from foreign affiliated firms towards domestic companies. Their results indicate diverse effects of foreign presence on export participation and export propensity of domestic firms. Accordingly, export decision of domestic firms is found to be affected by FDI only through backward linkages whereas horizontal or forward linkages do not have any effect on export participation of domestic firms. With regard to export propensity they find a strong positive effect of multinationals in downstream sectors.

Bajgar and Javorcik (2013) criticizes above mentioned literature on FDI and export nexus for ignoring time-invariant firm heterogeneity; investigating export behavior of firms only at intensive margins and not assessing quality of exports due to limitations in their datasets. Furthermore they assert that, with the exception of Aitken et al.'s (1997) study, the regarding literature only focuses on developed countries. To overcome these constraints Bajgar and Javorcik (2013) contribute to the literature by investigating the presence of horizontal and vertical spillovers from multinationals on different margins of domestic-firm exporting and on the quality of exports by domestic firms for a developing country Romania. Their results convey that presence of foreign affiliated firms in downstream sectors is positively associated with the probability of starting to export, the number of products exported and export destinations (i.e. extensive margins of exporting) whereas, foreign presence in own sector has a negative effect. Besides, they do not find solid evidence on the impact of foreign presence in downstream sectors on the quality of firms' exports proxied by unit values.

3. Data and Descriptive Evidence

A key feature of the Turkish economy over the last decade has been the robust economic growth with an average annual rate of 5 percent. This remarkable performance of growth together with prudent fiscal policies and major structural reforms has integrated the Turkish economy into the globalized world, while transforming Turkey into one of the major recipients of FDI in its region. Turkey has become the 13th most attractive FDI destination in the world by \$123 billion of FDI in the past decade (2012 A.T. Kearney FDI Confidence Index)¹². Alongside with this striking economic performance Turkey has experienced a

¹² FDI inflows to Turkey have had an upward trend particularly since 2005 and reached to \$22 billion in 2007 with its highest level ever recorded. However, as most of the emerging economies Turkey was hit by the global crisis in 2008 and affected by the global decline in capital flows leading it to a fluctuating course of FDI since 2009.

dramatic export boom after 2002. Turkey's total trade volume increased from \$88 billion in 2002 to \$389 in 2012, an increase of 342% in a decade's time. Turkey's exports increased by 325 percent (to \$153 billion from \$36 billion) over the same period. This compares to the average export performance of its peers in the same income group (Brazil, China, Mexico, and South Africa) whose exports grew by 212 percent in the same period. While Turkey has undergone a structural transformation process both in terms of production and trade patterns along with sectoral and geographical diversification¹³, its integration into global value chains increased substantially in the meantime.

Considering this notable performance in terms of FDI inflows and exports we try to understand to what extent FDI leads to export spillovers in Turkey. We not only take into account export performance at the intensive margins but also consider the extensive margins of exporting activity. For our purpose we use a recent dataset on Turkish manufacturing firms¹⁴ over the period 2006–2010. Our unbalanced panel relies on two different sources of data collected by Turkish State Institute of Statistics (TURKSTAT). The first one is “The Annual Industry and Service Statistics” and the second one is “Annual Trade Statistics”¹⁵. In order to conduct our analyses we merged two datasets. Table 1 presents number of total firms and number of exporters in each year over the analysis period.

The Annual Industry and Service Statistics is a census for the firms with more than 19 employees while it is a representative survey for firms with less than 20 employees. In this dataset, firms are classified according to their main activity, as identified by EuroStat's NACE

¹³ 2002-2012 period witnesses a structural shift away from traditional export sectors of textiles and clothing towards machinery and metals. A transition across destination markets occurs where the EU and EFTA lose grounds towards new markets in the MENA as well as in Europe and Central Asia.

¹⁴ Over the period the share of Turkish manufacturing industry in GDP was 23.5% on average. While manufacturing industry constituted 13.5% of overall employment in Turkey, it generated 93.5% of the total export volume. With such a large share the characteristics of manufacturing industry play an important role in determining Turkish export performance. Besides, manufacturing industry has been the top sector attracting FDI flows over the period in question. For example, manufacturing industry accounts for the 43.3 percent of total inflows in 2012.

¹⁵ These datasets are available under a confidential agreement by which all the elaborations can only be conducted at the Microdata Research Centre of TURKSTAT under the respect of the law on the statistic secret and the personal data protection.

Rev.1.1 standard codes for sectoral classification. It provides detailed information on a number of structural variables which are mainly seen on a firm's balance sheet such as, revenues, value added, intermediate inputs cost, tangible and intangible investment costs^{16,17}, information on industry and geographical location, the number of employees as well as foreign ownership information. In order to carry out our analyses we select the whole population of private Turkish manufacturing firms with 20 employees or more^{18,19}. The information on foreign affiliation enables us to distinguish between purely domestic firms, mixed ownership status and purely foreign ownership. We define firms as foreign affiliated if the share of foreign ownership is positive.

The second source of data we utilize are firm level foreign trade flows which are sourced from customs declarations. The import and export flows are collected for the whole universe of imports and exports at 12-digit GTIP (Customs Tariff Statistics Position) classification, the first 8 digits of whom correspond to CN classification whereas the last 4 digits are national. The information on the origin/destination countries and physical quantity of trade flows is also available in Annual Trade Statistics dataset. Physical quantity of trade flows are measured by both kilograms and supplementary units. We constructed unit values of

¹⁶ All nominal values are deflated using 4-digit NACE price indices with the base year 2003. For capital goods we use an aggregate investment deflator provided by the Ministry of Development.

¹⁷ We calculate capital stock series of firms applying the perpetual inventory methodology using the data on investment cost series for machinery and equipment, building and structure, transportation equipment and computer and programming.

¹⁸ Firms with 20 and more than 20 employees account for a large share of Turkish manufacturing industry. For example, they constitute 87% of production in value and 75% of employment in 2009. It shows a similar pattern in the previous and following years.

¹⁹ The original sample size in the merged dataset was slightly larger but we applied a cleaning procedure which is largely inspired by Hall and Mairesse (1995). We threw out the abnormal observations (zero / negative) for the main variables such as output, intermediate inputs, labor cost etc. Then, we excluded observations where main variables and ratios (e.g. employee, value added per employee, capital per employee) displays extraordinary jumps and drops over one year. Finally, we excluded firms in NACE sectors 16 (Manufacture of tobacco products), 23 (Manufacture of coke, refined petroleum products and nuclear fuel), 30 (Manufacture of office, accounting and computing machinery), 37 (Recycling) since they include small number of firms.

export flows for each product-destination pair by dividing export value over quantities exported measured in kilograms²⁰.

We construct our horizontal and vertical FDI linkage variables using our firm level panel and Turkish input-output tables for 2002 prepared by TURKSTAT. They use Turkish Liras at current prices as units and NACE Rev.1.1. industrial classification where each manufacturing industry corresponds to one or several 2-digit industries in terms of NACE including 59 sectors. We match the firm data with the input output table concentrating only on the manufacturing sectors.

Our horizontal linkage measure is originated from Aitken and Harrison (1999) and represents the foreign presence within an industry in which firms operates (own industry). It is calculated as follows:

$$FDI_OWN_{jt} = \frac{\sum_{i \in J_j} f_{it} Y_{it}}{\sum_{i \in J_j} Y_{it}}$$

where J_j denote the set of all manufacturing firms in sector j , f_{it} is a dummy representing whether firm i has foreign affiliation, and Y_{it} is the total output of the firm.

We assume that a domestic firm is more likely to supply foreign affiliated firms and the benefits of FDI are realized through vertical linkages, if foreign firms constitute a larger share of total output in the industries to which the industry of the domestic firm serves inputs. Accordingly, we determine vertical linkages through supplying foreign affiliated firms in downstream industries following Kneller and Pisu (2007) and Javorcik and Bajgar (2013). Foreign presence in downstream industries is defined as the weighted sum of own-industry foreign presence in downstream industries. The weights are the shares of the total output of

²⁰ We dropped duplicate observations of firm-product-destinations, where the description of the product was empty, entries of reported quantity was zero and, observations that reported free trade zones as the destination market.

the upstream industry supplied as inputs to each downstream industry, where they sum to less than 1²¹. It is calculated as follows:

$$FDI_DOWN_{jt} = \sum_{d \in J} L_{jd} FDI_OWN_{dt}$$

where J denote the set of all manufacturing firms and L_{jd} denote the total output of the upstream industry j supplies as inputs to each downstream industry d .

Table 2 provides the average values of our foreign presence variables for our 19 manufacturing industries at the two-digit level. One can observe from the table that foreign presence is characterized by significant variation across industries. Motor vehicles industry has the highest values in terms of both FDI linkage variables. The lowest own-industry FDI presence is in leather industry, whereas the lowest down-industry FDI presence is seen in other transport vehicles industry.

Figure 1 shows the correlation between exports and FDI linkage measure in downstream industries. Accordingly supplying multinationals in downstream industries seems to be positively associated with the intensive and extensive margins of exports except for some minority of industries.

4. Empirical Strategy and Results

Studies in the existing literature assert that presence of foreign firms can promote domestic firms' export performance through reducing export costs via knowledge spillovers. In line with this literature we aim to test for the existence of export spillovers that arise from FDI generated linkages between domestic and foreign firms. We investigate export spillovers over several outcome variables. Table 3 presents our outcome variables of interest. In fact we explore the impact of horizontal and vertical linkages on the intensive margin of exports as

²¹ We give more weight to upstream industries which supply a larger share of their output as inputs to downstream industries rather than selling it for final consumption.

well as on the extensive margins. Besides, we investigate the effect of foreign presence on the quality of exports which is proxied by unit values.

Table 3: Outcome Variables

	Description	Level
<i>TOTAL_EXP</i>	log of total value of exports in dollars	firm; firm-product-destination
<i>EXPINT</i>	log of total value of exports over total sales	firm
<i>EXP/PRODDEST</i>	log of total value of exports in dollars per product-destination pair	firm
<i>NPDE</i>	log of number of product-destination pairs exported	firm
<i>NDE</i>	log of number of destinations exported	firm
<i>NPE</i>	log of number of products exported	firm
<i>VOLUME</i>	log of physical quantity exported in kilograms	firm-product-destination
<i>UNIT_VALUE</i>	log of unit value	firm-product-destination

In our empirical investigation we first incorporate Bajgar and Javorcik's (2013) empirical strategy and employ the following general model of estimation to test for the export spillovers where Y_{it} is one of our outcome variables:

$$Y_{it} = \beta_1 FDI_OWN_{it-1} + \beta_2 FDI_DOWN_{it-1} + \delta Controls + \eta_i + \varepsilon_{it}$$

One can see from Table 3 that while some regressions are estimated at firm level some of them are estimated at firm-product-destination level. Our FDI-linkage variables are lagged one year. Depending on the variable of interest, the index i denotes either firms or firm-product-destination combinations, where η_i represents time-invariant fixed effects. By incorporating time invariant heterogeneity we account for the ambiguity in the existing literature on whether their evidence on export spillovers is driven by the composition of the firms within each industry or by actual change within firms. We utilize a series of control variables denoted by the vector of *Controls* including the logarithm of number of employees,

region²² and year dummies. All the regressions apply only to the sample of domestically-owned exporters. This non-random sample could lead to selection bias if the determinants of being an exporter are correlated with the error term. However, as stated in firm heterogeneity and international trade literature, as long as selection into exporting is driven by time-invariant firm heterogeneity where firm specific characteristics have a crucial linkage with internalization status; using fixed effects estimator solves this problem (see Bajgar and Javorcik, 2013).

The results from the firm level fixed effects models for alternative outcome variables are shown in Table 4. The first two columns provide the impact of foreign presence on total export value and export intensity of domestically owned exporters, respectively. The coefficients on the FDI linkage measure in downstream sectors are positive and statistically significant. This finding on our vertical linkage variable supports the view that supplying multinationals in downstream industries create export spillovers improving domestic firms' performance in terms of their export value. The coefficients of the horizontal linkage variable are negatively significant. While the rationale behind this finding is unclear, it might be consistent with the previous literature which suggests that foreign firms might prevent knowledge spillovers to domestically owned firms that operate within the same industry because of competition (Javorcik, 2004). While foreign firms competing with domestic firms may try to restrain information leakages they may also prevent domestically owned firms access skilled working force by paying higher wages (Blalock and Gertler, 2008). The third column includes information on both intensive and extensive margin of exports. In line with the results on intensive margin indicators, export spillovers through supplying multinationals

²² The region dummy identifies the 12 Turkish regions distributed according to the NUTS2 classification.

in downstream industries are again at work. Yet foreign presence in firms own industry is found to have a negative effect on exports per product destination pairs²³.

The remaining three columns provide evidence on the effect of foreign presence on extensive margin of firms' exports. According to the findings in column four and five, stronger presence of foreign owned firms in downstream industries is associated with better performance of domestically owned exporters in terms of the diversity of destination markets and product-destination pairs. However, there is no significant effect of vertical linkage variable on number of products exported. Consistent with the findings of Bajgar and Javorcik (2013) for Romanian manufacturing firms, our results on the intensive margin indicators are relatively higher and stronger compared to those of extensive margin indicators.

In Table 5, we proceed by firm-product-destination level estimations. The first two columns of the regressions on total exports value and volume, in which we control for firm-product-destination fixed effects, reinforce the view that higher presence of foreign firms in downstream industries yields better export performance. When we turn to the regression on the unit value of exports the negative and significant coefficient on the foreign presence indicator in downstream industries contradicts our expectation of the positive effect of supplying inputs to foreign affiliated firms on the quality of exporting. This unexpected result is also evident in Bajgar and Javorcik's (2013) study. On the other hand, stronger foreign presence within the same industry is associated with higher unit values. This finding might be consistent with the literature proposing negative horizontal spillover effects in efficiency terms. i.e. as foreign firms acquire market shares in the host economy and divert demand from domestic firms the average costs of the domestic firms might increase (Aitken and Harrison, 1999). Thus increasing costs might lead to increased average prices for domestic firms.

²³ As a robustness check we replicate these and the remaining regressions excluding own-industry FDI-linkage variable. This exclusion do not significantly alter our results. They are available upon request.

Next, we investigate export spillovers originated from foreign presence by splitting the products into two categories. We adopt the classification proposed by Rauch (1999) and regress the firm-product-destination level outcome variables on our FDI linkage variables for differentiated and non-differentiated products separately. In column five and six of Table 6 the effect of foreign presence on unit values is presented for differentiated and non-differentiated products respectively. While differentiated products represent the products of the sectors with greater scope of quality differentiation we would expect that domestic firms were to upgrade the quality of their exports through interacting with foreign firms in downstream industries. But, in line with the results in Table 5 we find significant negative coefficient on our vertical linkage variable for differentiated products, whereas this coefficient turns to be insignificant for the non-differentiated products. In the first four columns of Table 6 we see the results for total exports value and volume regressions (1st and 3rd are for differentiated products; 2nd and 4th are for non-differentiated products). For non-differentiated products we cannot find any significant evidence on export spillovers neither for value or volume of exports. As for the differentiated products evidence on export spillovers becomes significant implying that spillover effects from foreign presence which has been presented so far are mainly driven by differentiated products.

In order to capture the spillover effects arise from foreign presence on decision to export we define four categories of firms as export starters (two types: starter1, starter2) and export sustainers (two types: sustainer1, sustainer2). An export starter is defined as a firm which operated but had never exported in the previous year or 2 years and start exporting. An export sustainer is defined as a firm which is an export starter and continues to export one year further. Thus, we end up with four (three) cohorts for export starters each corresponds to a year between 2007 and 2010, whereas we have three (two) cohorts for sustainers corresponding to a year between 2007 and 2009. We estimate four probit regressions for all

domestically owned manufacturing firms on four separate pooled samples of export market entrants and never exporters. In table 7 we present the results from estimating these probit regressions. Columns 1 and 2 reveal that entry into export markets is positively associated with presence of foreign firms in downstream industries while it is negatively affected by the presence of foreign firms in own industries. Columns 3 and 4 provide evidence on sustained entry into exporting. The results are similar to those of export starters.

Alternatively, we analyze export market participation of domestically owned manufacturing firms by employing a dynamic specification. Our aim is to understand whether export market participation decision is affected by foreign presence even after past trade experience is controlled for. In fact, we account for the presence of sunk costs by means of past trade experience where the coefficient of the lagged dependent variable is interpreted as the measure of sunk costs (see Roberts and Tybout, 1997; Bernard and Jensen, 2004; Muuls and Pisu, 2009). We estimate a random effects dynamic probit model following Wooldridge's (2005) methodology²⁴. In column 5 of Table 7 we observe the results from this dynamic probit specification, where our binary dependent variable is defined as a dummy equal to 1 if a firm exports in a given year and 0 otherwise. The coefficient on the vertical measure suggest that export market participation is positively associated with presence of foreign firms in downstream industries, while there is no significant effect of multinationals in own industries on the probability of exporting²⁵.

Finally, with a novel approach we incorporate the dimension of geographical diversification into our investigation of export spillovers. The characteristics of the markets that firms export also gain special importance in firm heterogeneity and trade literature.

²⁴ We utilize Wooldridge's (2005) methodology to deal with the initial condition bias existing in dynamic limited dependent variable models and the possible correlation between the controls and unobserved heterogeneity.

²⁵ The coefficient of the lagged export status is positively significant indicating that firms face sunk costs of engaging into export markets. Moreover, the initial export status' coefficient is high in magnitude and statistically significant correcting for the bias introduced by the 'initial condition' problem. They are available upon request.

According to the models of exporters to asymmetric markets, firms with lower productivity levels serve markets with low productivity thresholds whereas higher productivity firms can export to the markets with high productivity thresholds (Helpman et al. 2007; Chaney, 2008)²⁶. Thus, improving productivity of firms, supplying multinationals in downstream industries can indirectly affect firms' participation in developed export markets i.e. create export spillovers. We introduce firms' export orientation towards destination markets with high income levels²⁷ as another export performance criterion and define three different firm level indicators as number of products exported to high income countries (HI_NPE), number of high income destinations exported (HI_NDE) and, total value of exports to high income destinations (HI_TOTAL_EXP). We regress these indicators on our FDI linkage variables controlling for firm level time invariant heterogeneity. Results from these fixed effects regressions are presented in Table 8. Accordingly, we find evidence on the fact that stronger foreign presence in downstream industries is positively associated with firms' both intensive and extensive margins of exports towards developed regions of the world. Specifically, as the foreign presence in downstream industries increases, within a firm, the number of high income export destinations and number of products exported to these destinations increases as well as the value of exports.

Our analyses have shown that export spillovers do arise from supplying multinationals in downstream industries and we observe stronger spillover effects for intensive margins of exports than that of extensive margins. As stated in firm heterogeneity and trade literature, exporting firms already show superior performance to the firms who serve only to the domestic markets as more productive firms self-select into exporting. Thus while productivity

²⁶ Empirical evidence supports this view that exporters to more developed economies show ex-ante superior performance compared to the less developed country exporters (Serti and Tomasi, 2009; Conti et al., 2010; Silva et al., 2013).

²⁷ In order to group export markets, we use World Bank's classification of countries according to their income levels (gross national income per capita), in which countries with 2007 per-capita gross national incomes higher than \$11,456 computed in U.S. dollars using the Atlas conversion factor are defined as high income countries.

is expected to be positively associated with exporting activity, we would like to additionally control for productivity²⁸ of firms to support our results on the existence of export spillovers. The results from the regarding regressions suggests that stronger presence of foreign firms in downstream industries yields better export performance of domestic firms (see Table 9).

5. Conclusion

Recently Turkey has shown a significant performance in increasing the extent of its international exposure, both in terms of increased inward flows of FDI and exporting activity. Just as the interaction of domestic firms with foreign owned firms can affect the export decision and performance of domestic firms, in this paper we explore the extent to which these increased inward FDI has affected exporting activity of Turkish firms. Particularly, by making use of a recent firm level dataset over the period 2006-2010, we investigate whether supplying to multinationals in downstream industries create export spillovers in Turkish manufacturing industry.

The results of the study suggest that even after controlling for firm heterogeneity, presence of foreign firms in downstream industries creates export spillovers for Turkish manufacturing firms both at the intensive and extensive margins. Moreover, we observe stronger spillover effects for intensive margins of exports than that of extensive margins for our vertical linkage variable. Specifically, within firms, stronger presence of foreign firms in downstream industries yields higher value of exports; greater intensity of exports; higher value of exports per any product destination pair; larger number of product-destination pairs exported and larger number of destinations exported. Along with the firm level regressions, the results yielding from more disaggregate data in which firm-product-destination fixed

²⁸ We employ total factor productivity (TFP) as our productivity measure. We calculate TFP utilizing the Levinsohn and Petrin's (2003) semi-parametric approach. In this approach, TFP is measured as the residual of labor and capital under Cobb-Douglas technology, employing the firms' usage of intermediate inputs as a proxy for unobserved productivity shocks.

effects are controlled for, reinforce our finding that higher presence of foreign firms in downstream industries brings about better export performance. However, we do not find any evidence on the effect of supplying to foreign affiliated firms on the quality of exporting. Next, classifying the products into two categories a la Rauch (1999), we show that spillover effects from foreign presence are mainly driven by differentiated products. Despite the positive export spillovers that arise from supplying to multinationals in downstream industries, foreign presence in firms' own industries is found to have a negative effect on exporting activity.

Focusing on the spillover effects on export decision of firms, we show that entry into export markets is positively associated with presence of foreign firms in downstream industries while it is negatively affected by the presence of foreign firms in own industries. Finally, our results reveal that supplying to multinationals promotes exporting activity of firms' both at the intensive and extensive margins towards developed regions of the world.

Tables and Figures

Table 1: Number of Firms and Exporters, 2006-2010

Year	Number of Firms	Number of Exporters
2006	19,536	9,729
2007	18,481	9,294
2008	17,926	9,149
2009	15,487	8,435
2010	21,089	10,475

Table 2: Foreign Presence Measures by 2-digit NACE Industries

NACE	Sector	FDI_OWN	FDI_DOWN
15	<i>Food and Beverages</i>	0.194	0.112
17	<i>Textiles</i>	0.033	0.051
18	<i>Apparel</i>	0.063	0.066
19	<i>Leather</i>	0.018	0.040
20	<i>Wood</i>	0.087	0.077
21	<i>Paper</i>	0.314	0.145
22	<i>Printing</i>	0.074	0.024
24	<i>Chemical</i>	0.426	0.167
25	<i>Rubber</i>	0.258	0.194
26	<i>Non-Metallic Minerals</i>	0.201	0.079
27	<i>Basic Metal</i>	0.142	0.186
28	<i>Metal Products</i>	0.169	0.161
29	<i>Machinery & Equipment</i>	0.238	0.109
31	<i>Electrical Machinery</i>	0.400	0.145
32	<i>Radio TV</i>	0.607	0.394
33	<i>Medical & Optical Instruments</i>	0.090	0.107
34	<i>Motor Vehicles</i>	0.758	0.356
35	<i>Other Transports</i>	0.136	0.011
36	<i>Furniture</i>	0.126	0.055

Table 4: Export Spillovers: Firm Level Fixed Effects Estimations

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>TOTAL_EXP</i>	<i>EXPINT</i>	<i>EXP/PRODDEST</i>	<i>NPDE</i>	<i>NDE</i>	<i>NPE</i>
FDI_OWN (own sector)	-0.9371* (0.071)	-0.9361* (0.084)	-0.7811** (0.044)	-0.156 (0.452)	-0.5106** (0.029)	-0.5865** (0.046)
FDI_DOWN (downstream sector)	3.4991** (0.025)	4.3947*** (0.009)	2.1997* (0.077)	1.2994** (0.039)	2.0862*** (0.002)	0.7808 (0.395)
Observations	31,013	31,013	31,013	31,013	31,013	31,013
R-squared	0.045	0.019	0.028	0.031	0.041	0.021

Notes: Robust p-values in parentheses below the coefficients. Asterisks denote significance levels *** p<0.01, ** p<0.05, * p<0.1. All regressions include firm fixed effects, region, year dummies and log number of employees as controls. FDI-linkage variables are lagged one year.

Table 5: Export Spillovers: Firm-Product-Destination Level Fixed Effects Estimations

	(1)	(2)	(3)
	<i>TOTAL_EXP</i>	<i>VOLUME</i>	<i>UNIT VALUE</i>
FDI_OWN (own sector)	-0.2573 (0.217)	-0.5280** (0.028)	0.2707*** (0.007)
FDI_DOWN (downstream sector)	1.2771** (0.044)	2.0239*** (0.005)	-0.7467** (0.016)
Observations	703,418	703,418	703,418
R-squared	0.012	0.008	0.007

Notes: Robust p-values in parentheses below the coefficients. Asterisks denote significance levels *** p<0.01, ** p<0.05, * p<0.1. All regressions include firm-product-destination fixed effects, region, year dummies and log number of employees as controls. FDI-linkage variables are lagged one year.

Table 6: Export Spillovers: Differentiated vs. Non-Differentiated Products

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>TOTAL_EXP</i>	<i>TOTAL_EXP</i>	<i>VOLUME</i>	<i>VOLUME</i>	<i>UNIT VALUE</i>	<i>UNIT VALUE</i>
FDI_OWN (own sector)	-0.4178* (0.058)	0.6195 (0.380)	-	-0.2354 (0.897)	0.3218*** (0.003)	0.8549** (0.013)
FDI_DOWN (downstream sector)	1.8011*** (0.007)	2.5364 (0.298)	2.4046*** (0.001)	3.2393 (0.236)	-0.6035** (0.034)	-0.7029 (0.951)
Observations	655,034	44,037	655,034	44,037	655,034	44,037
R-squared	0.001	0.002	0.000	0.001	0.008	0.009

Notes: Robust p-values in parentheses below the coefficients. Asterisks denote significance levels *** p<0.01, ** p<0.05, * p<0.1. All regressions include firm-product-destination fixed effects, region, year dummies and log number of employees as controls. FDI-linkage variables are lagged one year.

Table 7: Export Spillovers: Entry into Exporting

	(1)	(2)	(3)	(4)	(5)
	Pooled Probit Regressions				Dyn. Probit Reg.
	<i>starter1</i>	<i>starter2</i>	<i>sustain1</i>	<i>sustain2</i>	<i>expdum</i>
FDI_OWN (own sector)	-0.3848*** (0.000)	-0.4938*** (0.000)	-0.3876*** (0.002)	-0.5404*** (0.005)	0.0177 (0.856)
FDI_DOWN (downstream sector)	0.4649** (0.030)	0.5330* (0.067)	0.7601*** (0.006)	0.4512* (0.069)	1.6209*** (0.000)
Observations	51,957	44,166	48,725	37,934	60,033
Pseudo R-squared	0.0038	0.0048	0.0036	0.0052	0.0099

Notes: Robust p-values in parentheses below the coefficients. Asterisks denote significance levels *** p<0.01, ** p<0.05, * p<0.1. All regressions include region, year dummies and log number of employees as controls. In column 5, the regression include lagged export status, initial export status, mean of explanatory variables and as well as region, sector and year dummies as controls. FDI-linkage variables are lagged one year.

Table 8: Export Spillovers: High Income Export Market Orientation

	(1)	(2)	(3)
	NPE	NDE	TOTAL_EXP
FDI_OWN (own sector)	-0.0011 (0.997)	-0.6840*** (0.006)	-1.3164* (0.054)
FDI_DOWN (downstream sector)	0.9807* (0.093)	2.6943*** (0.000)	3.6913* (0.061)
Observations	24841	24841	24841
R-squared	0.015	0.024	0.032

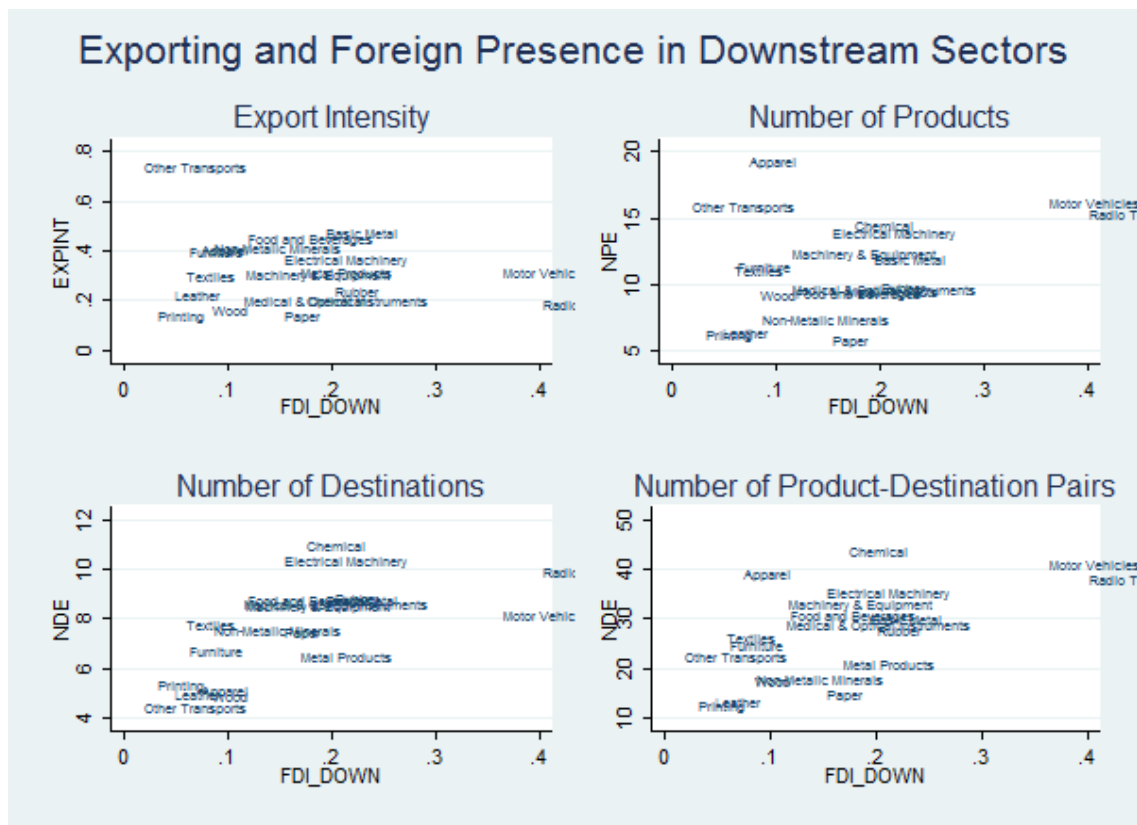
Notes: Robust p-values in parentheses below the coefficients. Asterisks denote significance levels *** p<0.01, ** p<0.05, * p<0.1. All regressions include firm fixed effects, region, year dummies and log number of employees as controls. FDI-linkage variables are lagged one year.

Table 9: Export Spillovers: Controlling for Productivity

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>TOTAL_EXP</i>	<i>EXPINT</i>	<i>EXP/PRODEST</i>	<i>NPDE</i>	<i>NDE</i>	<i>NPE</i>
FDI_OWN (own sector)	-1.0791** (0.030)	-0.9582* (0.093)	-0.7471* (0.098)	-0.3320 (0.306)	-0.5238** (0.027)	-0.0265 (0.930)
FDI_DOWN (downstream sector)	3.618*** (0.006)	3.4672** (0.042)	1.3932* (0.092)	2.2248** (0.021)	2.1452*** (0.002)	0.8660 (0.354)
L.TFP	0.2452*** (0.000)	0.0519*** (0.002)	0.1411*** (0.000)	0.1041*** (0.000)	0.0710*** (0.000)	0.0705*** (0.000)
Observations	29905	29905	29905	29905	29905	29905
R-squared	0.062	0.019	0.037	0.037	0.045	0.025

Notes: Robust p-values in parentheses below the coefficients. Asterisks denote significance levels *** p<0.01, ** p<0.05, * p<0.1. All regressions include firm fixed effects, region, year dummies and log number of employees as controls.

Figure 1: Foreign Presence in Downstream Industries and Exports



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