UNIVERSITÀ POLITECNICA DELLE MARCHE
Dipartimento di Scienze Economiche e Sociali

DOES TRADE FOSTER EMPLOYMENT GROWTH IN EMERGING MARKETS? EVIDENCE FROM TURKEY

Alessia Lo Turco*, Daniela Maggioni§

QUADERNI DI RICERCA n. 383
ISSN: 2279-9575

October 2012

Abstract

This work investigates the impact of importing, exporting and *two-way* trading on the firm labour demand in Turkish manufacturing. Adopting multiple propensity score matching techniques and Difference in Difference estimator, we support the positive internationalisation effects on the firm employment growth for an emergent country. Our evidence reveals the existence of complementarity effects between exports and imports, which is strengthened for high trade intensity firms. Furthermore, only high intensity exporting seems to promote the workforce skill upgrading, as measured by the R&D worker share. The disclosed employment effect reflects the large positive impact of firm internationalisation on its production scale.

JEL Class.: C41, F14, F16, J62
Keywords: Importer, Exporter, Two-way traders, employment, firm growth, Turkey

Indirizzo: Dipartimento di Scienze Economiche e Sociali, Università Politecnica delle Marche; a.loturco@univpm.it; d.maggioni@univpm.it.

Contents

Does trade foster employment growth in emerging markets? Evidence from Turkey

Alessia Lo Turco[*], *Daniela Maggioni*[§]

[*] *Corresponding Author.* Università Politecnica delle Marche, Department of Economics and Social Sciences; Piazzale Martelli 8, 60122 Ancona - Italy. Tel.: +39-071-2207250. E-mail: *a.loturco@univpm.it*.

[§] Università Politecnica delle Marche, Department of Economics and Social Sciences; Piazzale Martelli 8, 60122 Ancona - Italy.
Tel.: +39-071-2207250. E-mail: *d.maggioni@univpm.it*.

1 Introduction and relevant literature

The recent economic success of emerging countries largely rests on their competitive manufacturing sector, which is increasingly integrated into the world economy. On the one hand, the export market represents an unprecedented opportunity of growth and innovation for the manufacturing firm. On the other hand, imported inputs enhance the possibility to acquire advanced technologies and/or to exploit new complementarities in production. Although both importing and exporting may drive to an internal restructuring process and bring about efficiency gains (Wagner, 2007; Halpern et al., 2005), the impact on the firm employment levels is more uncertain. The potential productivity improvement stemming from import and export activities might, indeed, turn into a permanent shift towards labour saving technologies with a consequent reduction in the firm employment level. Also, imported inputs may directly substitute for domestic labour. Nevertheless, this is only a part of the story and there are other channels, instead, supporting the employment creation effect of trade. If the higher productivity fostered by internationalisation leads to improved competitiveness and to the expansion of firm output and market share, trade could then positively affect the firm employment levels, even in face of a reduction in the overall labour intensity of manufacturing production. Finally, exporting might directly cause an expansion of the firm operation scale and, thus, of its employment level since it opens new business opportunities and increases the relevant market size of firms. Policy makers should, then, be concerned about the international integration of the manufacturing firms in developing economies, as it may have important consequences for the long term tendencies of an country in terms of employment creation and economic growth. As a matter of fact, countries' integration in the global economy brings about an important restructuring process, with low productivity firms exiting manufacturing (Melitz, 2003; Pavcnik, 2002; Paus et al., 2003; Fernandes, 2007). Then, if redundant workers are reallocated to low productivity and low growth potential activities (e.g. services), the country will experience a low productivity growth (Rodrik and McMillan, 2011). On the contrary, if trade fosters manufacturing firms' employment demand, redundant labour could be reallocated within manufacturing to such trading firms, which are usually the most productive ones. As a consequence, a higher overall productivity level and growth could be experienced by the whole country.

Our aim, then, is to shed some light on the trade impact on the firm employment level and composition by providing evidence for the Turkish manufacturing. The empirical strategy we adopt rests on the combination of Multiple

Propensity Score Matching (MPSM) with Difference−in−Differences (DID) estimation. This methodological choice allows us to dissect and isolate the role of each international strategy - importing, exporting and two-way trading - on employment accounting for selection on time invariant unobservables. The focus on emergent countries is of particular interest for the study of this topic under several points of view. First, while developed countries' import activity, especially from low income countries, is often driven by labour cost saving reasons, firms in emergent markets are more likely to search for technology and high quality inputs when they cross the national borders. This may directly or indirectly - through productivity improvements driven by technology transfers embodied in trade flows (Halpern et al., 2005)- affect the firm level and composition of employment in a different way, compared to a developed economy framework. Second, exports may offer firms in emergent countries - more than firms in developed countries - the opportunity to sensitively enlarge their operation scale, since their domestic market may be rather small. Third, global production chains intensively involve firms located in emerging economies and it becomes crucial to understand whether firms entering international production networks are also able to create important employment opportunities within these developing economies.

Within this framework Turkey can be considered an interesting case. Starting from the 1980s, the country has undergone a continuous and growing integration process in the global economy. The empirical evidence confirms that productivity gains are associated with the internationalisation of Turkish firms (Yasar and Rejesus, 2005; Morrison and Yasar, 2007; Maggioni, 2012) and this hints at the possibility of pro-competitive effects stemming from the firm activities in foreign markets. However, no investigation exists on the consequences of firm trade for the level of Turkish manufacturing employment and this is a gap that we try to fill. During the period of our analysis, the Turkish manufacturing sector has experienced an increase in the number of employees and accounts for an important share of the total economy employment. Nevertheless, its weight has decreased from about 41% in 2003 to 34% in 2008 and, regardless of the country sustained GDP growth (6% on average in our sample period), the Turkish unemployment rate has stayed at a very high level (about 11%) and the employment rate has been rather modest (well below the 50%). In this context, it is fundamental to clarify whether the firm internationalisation strategies have sustained the manufacturing labour demand or have contributed to the stagnation of the labour market. This is a crucial point in order to anticipate the future effects of the ongoing integration in the global economy in terms of unemployment reduction and employment creation. Furthermore, our investigation also aims at disclosing the impact of the

firm trade integration strategies on its employment composition in terms of the ratio of R&D to non R&D workers. Trade may indeed stimulate innovation (Fernandes and Paunov, 2010; Lo Turco and Maggioni, 2012a) and firms may engage in innovative efforts and endow themselves with skilled workforce in order to reap the opportunities stemming from international markets. The latter channel may clearly play a relevant role in the future growth pattern of the economy and in the development process, increasingly based on knowledge creation and innovation.

Our work is close to the wide literature on the import impact on the firm level labour demand in developing countries.[1] Most of the empirical contributions focus on the nexus between trade and the demand for skills, motivated by the theoretical possibility that foreign inputs and exported products may actually cause the skill upgrading of the firm labour force. As a matter of fact, trade may favour technology diffusion from the North to the South (Pissarides, 1997). Also, the growth of new intermediate imports and the insourcing of higher skill intensive production stages may drive an increase of the skill intensity in the developing country manufacturing sector (Feenstra and Hanson, 1997). In both cases, a larger share of skilled workers is required in order to cope with the new tasks and the new technologies. However, the existing evidence is not conclusive. While imports do not affect the relative demand for skilled workers in Chilean plants (Pavcnik, 2003), purchases of foreign machinery raise manufacturing firms' relative skilled labour demand in Ghana in the 90s, while exports do not matter (Görg and Strobl, 2002). On the contrary, increased involvement in imports, exports and foreign direct investment is associated with a reduced demand for skilled labor in China, but the opposite effect is detected for Brazil (Fajnzylber and Fernandes, 2009) and, as far as imports and exports are concerned, for Mexico (Harrison and Hanson, 1999). Previous studies, then, show a positive association may exist between the relative demand for the skilled and firm trade in developing and emergent markets, yet none investigates the impact of trade on the overall firm employment level.

For the case of Turkey, the only firm level study on the trade-employment

[1] Several papers also have dealt with the consequences of trade on the labour demand in advanced economies. The findings usually point at a negative effect of offshoring on the conditional labour demand (OECD, 2007; Görg and Hanley, 2005) with the major role played by imports of intermediates from cheap labour countries (Harrison and McMillan, 2007; Cadarso et al., 2008; Falk and Wolfmayr, 2008; Lo Turco and Maggioni, 2012b). The cross-country sector level evidence also shows a negative offshoring impact on the unconditional labour demand (OECD, 2007). The latter detrimental effect is confirmed at plant level on German data, but only when offshoring practices are concomitant to a plant restructuring process consisting in spin-off, closedown, selling-off of parts of the plant (Moser et al., 2009).

nexus we are aware of is the one by Meschi et al. (2011). The authors detect a positive effect of the firm export activity on the skill demand. Concerning imports, firms belonging to the sectors enjoying higher growth in the share of foreign inputs from advanced countries also increase the share of skilled workers. However, they do not test for the firm specific import activity and do not focus on the total employment level. Even if skill upgrading may enhance economic growth, the absorptive capacity of manufacturing sector in terms of overall employment is also important to assess the country welfare prospects. Additionally, the ratio between white collars and blue collars that has been investigated may not be able to totally capture the upgrading in the firm knowledge creation and innovative abilities.

With respect to the previous literature our work provides some original contributions. First, we explore and isolate the impact of importing, exporting and importing&exporting on the employment level, whereas the few existing works on trade and employment levels have rather focused on imports. Second, we explore the impact of trade strategies on the relative demand of R&D workers. Although our data do not include information on the split of workers between blue and white collars, which is usually used to capture the skill level of firm workforce, the analysis of the relative demand for R&D workers actually may give important insights on the relationship between firm trade and the technological upgrading of production based on firm autonomous innovation efforts. Finally, we test the trade-employment nexus in an emerging country framework, thus contributing to the literature on developing economies that has mainly investigated the skilled labour relative demand. In particular, our study provides evidence on a country for which the trade consequences on labour demand have been neglected regardless of the growing integration of Turkish firms in global production networks and of the manufacturing sector importance for the country recent sustained economic growth.

The work is organised as follows: the next section presents the data and some descriptive evidence on trade and employment at the firm level; section 3 deals with the empirical strategy and the estimation technique; section 4 displays the main results of our analysis and section 5 investigates the role of firm trade intensity. Finally, section 6 discusses the evidence and concludes.

2 Data and descriptive evidence

We make use of the following data sources to build up our sample.

The Structural Business Statistics (SBS) - The Annual Industry and Service Statistics collect information on firm turnover, input costs, employment, investment activity, the primary 4 digit NACE (rev 1.1) sector of activity and the region of location over the period 2003-2008. These data cover the whole population of firms with more than 20 employees and a representative sample of firms with less than 20 employees. The economic activities that are included in the survey are the ones in the NACE sections from C to K, and from M to O.

The Foreign Trade Statistics (FTS) - Foreign trade flows at firm level provided by Turkstat are sourced from customs declarations and are available for the 2002-2009 time span. The import and export flows are collected for the universe of the importers and exporters of goods at 12-digit Gümrük Tarife Istatistik Pozisyonu (GTIP) classification: the first 8 digits correspond to Combined Nomenclature (CN) classification, and the last 4 digits are national.

Sample and definition of starters - To proceed in the exploration of the effect of imports and exports on the firm labour demand we restrict our analysis to firms in the manufacturing sector with at least 20 employees,[2] and we merge the SBS and FTS databases by means of the common firm identifying code, thus gathering information on trade for all the firms included in the SBS. The initial sample is made up of 126,552 firm-year observations in the 2003-2008 time span, 65% of which is active in one of the two trading activities. In particular, on average, in our sample period, 51% of firms are exporters and 53% of them are importers. The firm is defined as exporter if it sells a part of its turnover abroad. The definition of import status is, instead, related to the purchases abroad of intermediates, which are defined according to the Broad Economic Category (BEC) classification.[3]

As discussed in the introduction, our focus is the trade impact on the firm labour demand, both in terms of overall employment level and composition. We measure the firm labour as the logarithm of the total number of employees, L, and the labour composition as the ratio of R&D to non R&D workers within the firm, R. To gather a preliminary idea about the relationship between firm employment and its activity in the foreign markets we regress the

[2] Firms with at least 20 employees account for a large share of Turkish manufacturing: they contribute to 87% of turnover and production value and 75% of employment in 2009. Similar figures are recorded for previous years. Additionally, since our interest is on trade activity that is mostly performed by large firms, due to the existence of entry sunk costs, we are confident that this sample restriction does not drive to any consistent bias in our results.

[3] The following BEC codes concern intermediate materials: 111, 121, 21, 22, 31, 322, 42 and 53.

level and variation (indicated by Δ) of our outcomes on importer and exporter dummies with the inclusion of two digit NACE Rev 1.1 sector and time dummies. We also test for three mutual exclusive international status, exporter only, importer only and two-way trader. The trade "premia" obtained from these regressions are displayed in Table 1. From the top panel, it emerges that importers and exporters present a larger workforce and a higher R&D to non R&D workers ratio than the remaining firms in the sector. When the import and the export activity indicators are included in the same specification an employment premium is displayed for both internationalisation strategies compared to the pure domestic activity, even if importing presents a higher premium. For the R&D workers' ratio, instead, both international strategies enjoy similar premia. Furthermore, our analysis suggests the existence of potential complementarities between export and import activities as two-way starters display sensitively larger premia for both the outcomes under investigation with respect to the groups of exporters only and importers only. A similar pattern of significance and relative coefficient size is detected in the bottom panel for the regressions of labour growth, while only two-way traders display a significant and high change in the R&D to non R&D workers ratio.

This descriptive analysis reveals a superiority of internationalised firms in terms of both employment level and share of employees in R&D. Nevertheless, it is not possible to draw any conclusion about the causal nexus and in order to highlight the consequences of firm trade for its workforce in the next section we will rest on a MPSM approach. Within this empirical framework, we define export starter as a firm that exports in t and did not export in the previous year, i.e. $t-1$. The same definition is used to obtain the sets of import starters and two-way starters, for which the treatment is the starting of import activity and the concomitant starting of both import and export activity, respectively. These three groups of firms, alternatively, will represent the treated units in our analysis. The control group is made up of never traders, firms that never export nor import over the sample period. By focusing on starters and never traders we mitigate the potential reverse causality driven by trade persistence over time and we identify the break represented by the entry in the foreign market.[4] According to this definition, then, we end up with five different waves - year 2004, year 2005, year 2006, year 2007, and year 2008 - of starters and the size of each group is shown in Table 2 by wave and

[4]In a robustness check we make use of a more stringent definition focusing on export (import) starters identified as the firms exporting (importing) in t and not exporting (importing) in the previous two years, i.e. $t-1$ and $t-2$. The latter definition has the advantage to reduce the incidence of switchers in our treated sample, but presents the disadvantage to downsize the sample for the analysis due also to the loss of one starter wave and missing data for previous years.

Table 1: Import and Export Premia

Outcome:	L_t				R_t			
Importer	0.810***		0.663***		0.754***		0.523***	
	[0.011]		[0.010]		[0.137]		[0.090]	
Exporter		0.623***	0.309***			0.733***	0.486***	
		[0.011]	[0.010]			[0.148]	[0.110]	
Importer Only				0.525***				0.675***
				[0.013]				[0.164]
Exporter Only				0.150***				0.659***
				[0.010]				[0.196]
Two-Way Trader				0.971***				1.011***
				[0.013]				[0.194]
Const	3.573***	3.699***	3.526***	3.562***	0.589***	0.646***	0.511***	0.472***
	[0.019]	[0.020]	[0.018]	[0.018]	[0.060]	[0.059]	[0.062]	[0.069]
Observations	104,578	104,578	104,578	104,578	101,842	101,842	101,842	101,842
R^2	0.182	0.115	0.201	0.2052	0.002	0.002	0.002	0.002

Δ Outcome:	ΔL_t				ΔR_t			
Importer	0.059***		0.050***		0.038**		0.043*	
	[0.003]		[0.003]		[0.019]		[0.024]	
Exporter		0.042***	0.019***			0.011	-0.009	
		[0.003]	[0.003]			[0.019]	[0.024]	
Importer Only				0.0583***				0.046
				[0.005]				[0.031]
Exporter Only				0.0293***				-0.005
				[0.005]				[0.036]
Two-Way Trader				0.0693***				0.034*
				[0.0037]				[0.020]
Const	0.053***	0.063***	0.050***	0.0474***	-0.322***	-0.308***	-0.320***	-0.321***
	[0.005]	[0.005]	[0.006]	[0.006]	[0.052]	[0.051]	[0.052]	[0.052]
Observations	78,509	78,509	78,509	78,509	76,253	76,253	76,253	76,253
R^2	0.016	0.013	0.016	0.016	0.002	0.002	0.002	0.002

Notes: * Significant at 10% level; ** significant at 5% level; *** significant at 1% level. Robust standard errors are in brackets. Dummy indicators for years and two digit NACE Rev 1.1 sectors are included in all estimations but not reported for the sake of brevity. *Importer* (*Exporter*)is a dummy taking value 1 if the firm imports (exports) in year t. Our data present some missing values for the firm R&D employment.

Table 2: Sample of Trade Starters

	Export	Import	Two-way
2004	205	273	106
2005	289	344	98
2006	297	418	150
2007	264	351	105
2008	245	214	74
Total	1300	1600	533

Notes: Export, Import and Two-way label the firms that start export, import, two-way trading at time *t*, and did not perform that activity in the previous year.

typology of trade activity. Being interested in a multitreatment setting the reference control group may consist of both the population of never traders (neither exporting nor importing in the sample period) and each group of starters as we will explain in the next section. It is worth to notice that our final sample for the empirical evaluation of the causal effect of trade on employment will be much smaller than the starting one since it is made up of all those firms that neither export nor import in $t-1$.

3 The empirical strategy

In order to assess the impact of trade on employment at the firm level, we follow Lechner (2001, 2002) and adopt a multiple treatment approach that allows for a more complex framework where the firm may undergo several treatments at the same time, and where importing and exporting may represent both mutually exclusive strategies and joint strategies. If we indicate with m and x respectively the import and export treatments, we have a set of four mutually exclusive states for the firm: (0,0) is the no treatment case, neither importing nor exporting; (m,0) represents the import starting only; (0,x) represents the export starting only; finally, (m,x) represents the case of both import and export starting.

Our aim is to evaluate the Average Treatment effects on the Treated (ATT) for each treatment a. Since each participant receives just one treatment the remaining ones are potential counterfactuals and the comparison of each state S with the others leads to a full set of ATT effects:

$$\gamma_{a,b} = E(Y^a_{post}|S=a) - E(Y^b_{post}|S=a) \quad (1)$$
$$with\ a,b = (0,0),(m,0),(0,x),(m,x)$$

that denotes the expected (average) effect on outcome Y of treatment *a*, in the post-treatment period, relative to treatment *b* for a participant drawn randomly from the firms undergoing the treatment *a*. As $E(Y^b_{post}|S=a)$ is clearly not observable, it is proxied by the outcome of the units that actually undergo the treatment of comparison *b*, $E(Y^b_{post}|S=b)$. However, participants to different treatments display different characteristics and this proxy may drive to a selection bias, that we try to reduce applying MPSM and DID estimation. Thanks to the matching approach we account for any difference in observables between the treated and the control group, while the DID allows for time-invariant unobservables affecting the decision to enter the treatment. As a consequence, our parameters of interest compare the after/before differences in the treated outcome to the after/before differences in the control group one and can be computed as:

$$\gamma^{DID}_{a,b} = [E(Y^a_{post}|S=a) - E(Y^a_{pre}|S=a)] - [E(Y^b_{post}|S=b) - E(Y^b_{pre}|S=b)] \quad (2)$$

In particular, for each variable of interest, we can obtain different ATT effects for the following pairs:

- $(0,x)/(0,0)$ - Export Starters/Never Traders;
- $(m,0)/(0,0)$ - Import Starters/Never Traders;
- $(m,x)/(0,0)$ - Two-Way Starters/Never Traders;
- $(m,x)/(0,x)$ - Two-Way Starters/Export Starters;
- $(m,x)/(m,0)$ - Two-Way Starters/Import Starters;
- $(m,0)/(0,x)$ - Import Starters/Export Starters;

where the first group of firms represents the group of treated, while the second group of firms builds up the control group.[5] Due to the informational richness of firm level data and the use of DID that allows to take into account

[5]Theoretically, it would be possible to analyse a larger set of treatment combinations, for example $(0,x)/(m,x)$ where the control group consists of Two-Way Traders. Anyway, this would lead us to select the matched controls in a very small sample and to use the same control units several times since the number of treated is sensitively larger than the num-

of selection on unobservables, we are confident that the conditional independence assumption (Lechner, 2001) holds and, as a consequence, the differences in outcomes between treated units and matched controls, after the matching procedure, can be attributed to the treatment and the resulting effects may be interpreted as causal ones.

In order to find the control units to be matched with the treated units we estimate a multinomial logit model for the entry into exporting only, importing only and both exporting and importing from which we recover the propensity scores for each of the four states above defined. The chosen specification includes the first lag of the following firm variables: the logarithm of output (y), labour productivity (lp), employment level (l) and wage (w), a dummy for multiplant firms ($multi$) and two-digit sector, region and year dummies. The results are displayed in Table 5 in the Appendix.[6] Making use of the resulting propensity scores we apply the Nearest Neighbour (NN) matching with replacement. Also, matching is implemented cross−section by cross−section so that the treated and control units refer to the same year. In Table 6 in the Appendix we show some tests for the quality of the matching for each of the above pairs. The share of treated firms out of the common support is very low for every matching pair. Also, it is evident that when the control group consists of never traders the matching procedure importantly and significantly helps to reduce the bias and allows to obtain matched controls that do not present any significant observable differences with treated units. This is due to the large sample of never traders. On the contrary, the matching of import starters as treated units with export starters as control group presents some problems highlighted by the increase in the median bias after

ber of untreated. It would follow a bad quality of the matching strategy. Thus, we preferred to focus on the cases reported in the text. We consider the latter the most interesting ones for our aim, since they reflect the start or widening of the firm internationalisation process. Also, the combination (0,x)/(m,0) represents the specular case of (m,0)/(0,x) that is actually investigated and we then decide not to present it in the text.

[6]Results from multinomial logit suggest that firm output positively and significantly affects the adoption of every internationalisation strategy. The same is true for the status of multiplant firm. Lower wages also ease the firm entry into export markets and the firm joint involvement in export and import markets, but no effect is displayed for the starting to import. It follows that firms in emergent countries may take advantage from lower labour costs and, as a consequence, lower production costs, in order to succeed in competing with foreign firms, so that cost competition may reveal fruitful for firm internationalisation. Contrary to previous evidence in literature, large firms and high productivity firms appear to be less involved in international markets. However these findings are probably driven by the inclusion of firm output that is largely correlated with both size and labour productivity. We think this issue does not represent a concern in our strategy, since the aim of the multinomial logit estimation is not to explain the firm selection in foreign markets, but to balance all covariates (Caliendo and Kopeinig, 2008).

the matching. However, Figure 1 shows that the distribution of the propensity score for matched controls overlaps the one of treated firms after the matching procedure for all the treatments. Summing up, this evidence confirms the general validity of the matching, even if some caution should be paid for the results obtained comparing the (m,0) treatment with the (0,x) counterfactual.

4 Results

We compute the DID ATT effects for the year of the treatment and till two years after the start of the treatment. We, then, compare outcomes in each of the three years (t, $t+1$, $t+2$) with the ones in the pre-treatment year, *t-1*.[7] We report the results for our outcomes of interest in the first six columns of Table 3. In the last three columns of this Table, instead, we explore the role of trade on the firm operation scale, which is supposed to be the main channel through which importing and exporting may, directly or indirectly, affect employment. Below the coefficients, we show their standard errors that are computed pursuing three different approaches. Firstly, we calculate analytic standard errors, $A.s.e.$, as suggested by Lechner (2001). Secondly, to account for the possible bias in standard errors driven by the use of estimated propensity scores in the matching, we calculate bootstrapped standard errors (Caliendo and Kopeinig, 2008), $B.s.e.$. Finally, resting on Abadie and Imbens (2008) who argue that, in the case of NN matching, sub-sampling based bootstrapped standard errors, $S.s.e.$, give more reliable small sample variance estimates, we report them too. We find that internationalisation promotes the firm employment, contrarily to the possibility of employment downsizing following the firm import or export activities. In other words, the overall employment reduction stemming from labour saving induced by the firm internationalisation is not supported by our data. Furthermore, it seems that there are no significant and great differences between the two types of involvement in foreign markets in terms of impact on labour demand. As a matter of fact, the ATT effects reveal increases of employment for firms starting to import, or to export with respect to never traders, that are quite similar in magnitude, while the effect for two-way starters is higher. In the entry year, for example, starting to import or starting to export increases the firm employment growth by about 6 and 7% respectively, while starting to import and export at the same time increases employment growth by 18%. The employment enhancing role

[7] It is worth to notice that the ATT effects at time $t+1$ and $t+2$ are computed on a smaller sample of firms because of unavailable data for the most recent starter waves, the exit of the treated units and of the respective matched control units.

of internationalisation lasts, at least, till the second year after the entry in foreign markets. More importantly, it is worth to notice that the impact of trade grows over time even if at a declining rate.

Our evidence also suggests the existence of complementarity effects between exports and imports. As already discussed above, starting the two international activities at the same time delivers an additional gain which turns into an ATT coefficient that is more than the sum of the ones related to the single trade strategies. Also, the results display that the start of an additional strategy for firms already involved in foreign markets (either export or import markets) drives to further workforce expansions. These benefits in terms of employment stemming from a deeper firm integration in international markets reveal that the adoption of more complex internationalisation strategies may activate virtuous circles within firm. This may have important consequences on the firm activity and its labour demand and, then, on the country labour market.

Moving the attention to the ratio of R&D workers to non R&D workers, it emerges that no firm international strategy has a positive and significant effect on the upgrading of the workforce in terms of in-house innovation effort. This outcome can hinge upon several explanations. Firstly, the country specialisation sectors are less knowledge and research intensive and, even in high tech sectors the country is still more focused on the lower end production phases of the global production chains. It may then be less likely for firms to engage in an autonomous R&D effort. However, innovation may well run through other channels too that are not properly captured by our measure for a country at such a stage of development. In this case, indeed, the introduction of new products and processes may simply stem from small incremental innovations which often do not require the establishment of a formal R&D division.[8]

As discussed in the introduction, imports and exports may positively and directly impact on the production scale of the firm, thus pushing the firm demand for labour. Also, the potential productivity improvements stemming from trade foster the firm competitiveness and they may indirectly lead to the

[8]The lack of any information about the split between blue and white collars prevents us from the investigation of the impact of firm internationalisation strategies on the skill ratio. This measure, though, presents some shortcomings, as clerical workers, usually recorded as skilled workers, often do not contribute to the firm innovation activity. However, in order to extend our investigation on the employment composition, we also focused on the trade impact on the firm average wage. In the literature, the latter is usually adopted as a proxy of the labour quality (Bernard and Jensen, 2004). We found no effect of trade on the firm average wage. Results are not shown for brevity, but they are available upon request.

Table 3: Employment Effects of Firm Trade: Baseline Results

Outcomes:	**Employment**						**Output**		
	Total			**R&D/Non R&D Employment**					
	ΔL_0	ΔL_1	ΔL_2	ΔR_0	ΔR_1	ΔR_2	ΔY_0	ΔY_1	ΔY_2
	EXPORT STARTERS VS NEVER								
γ^{DID}	0.057	0.097	0.034	0.142	0.137	0.021	0.097	0.178	0.156
$A.s.e.^a$	[0.021]***	[0.034]***	[0.045]	[0.146]	[0.183]	[0.306]	[0.027]***	[0.040]***	[0.061]**
$B.s.e.^b$	[0.024]**	[0.036]***	[0.058]	[0.159]	[0.194]	[0.317]	[0.030]***	[0.047]***	[0.070]**
$S.s.e.^c$	[0.027]**	[0.042]	[0.064]	[0.169]	[0.231]	[0.344]	[0.033]***	[0.050]***	[0.082]*
Starters	1299	861	493	1299	861	493	1299	861	493
Controls	1105	737	424	1105	737	424	1105	737	424
	IMPORT STARTERS VS NEVER								
γ^{DID}	0.074	0.117	0.145	0.097	-0.089	-0.516	0.202	0.294	0.320
$A.s.e.$	[0.018]***	[0.027]***	[0.038]***	[0.12]	[0.124]	[0.197]***	[0.024]***	[0.035]***	[0.050]***
$B.s.e.$	[0.020]***	[0.029]***	[0.040]***	[0.141]	[0.159]	[0.224]**	[0.028]***	[0.038]***	[0.059]***
$S.s.e.$	[0.025]***	[0.034]***	[0.050]***	[0.148]	[0.171]	[0.256]**	[0.031]***	[0.045]***	[0.070]***
Starters	1596	1144	669	1596	1144	669	1596	1144	669
Controls	1223	882	537	1223	882	537	1223	882	537
	TWO-WAY STARTERS VS NEVER								
γ^{DID}	0.182	0.275	0.310	0.052	0.093	0.256	0.325	0.566	0.667
$A.s.e.$	[0.031]***	[0.044]***	[0.060]***	[0.156]	[0.185]	[0.236]	[0.042]***	[0.058]***	[0.080]***
$B.s.e.$	[0.039]***	[0.055]***	[0.077]***	[0.190]	[0.254]	[0.351]	[0.047]***	[0.071]***	[0.100]***
$S.s.e.$	[0.044]***	[0.059]***	[0.080]***	[0.201]	[0.279]	[0.373]	[0.055]***	[0.081]***	[0.104]***
Starters	533	386	246	533	386	246	533	386	246
Controls	492	353	223	492	353	223	492	353	223
	TWO-WAY STARTERS VS EXPORT STARTERS								
γ^{DID}	0.064	0.093	0.055	-0.224	0.042	0.224	0.128	0.198	0.205
$A.s.e.$	[0.031]**	[0.043]**	[0.066]	[0.337]	[0.369]	[0.615]	[0.042]***	[0.054]***	[0.083]**
$B.s.e.$	[0.035]*	[0.054]*	[0.085]	[0.336]	[0.382]	[0.567]	[0.041]***	[0.066]***	[0.091]**
$S.s.e.$	[0.040]	[0.058]	[0.081]	[0.344]	[0.387]	[0.568]	[0.050]**	[0.070]***	[0.100]**
Starters	533	393	271	533	393	271	533	393	271
Controls	392	289	201	392	289	201	392	289	201
	TWO-WAY STARTERS VS IMPORT STARTERS								
γ^{DID}	0.091	0.121	0.187	-0.108	-0.009	0.166	0.180	0.274	0.334
$A.s.e.$	[0.029]***	[0.041]***	[0.059]***	[0.170]	[0.168]	[0.219]	[0.040]***	[0.055]***	[0.079]***
$B.s.e.$	[0.034]***	[0.052]**	[0.078]**	[0.262]	[0.286]	[0.392]	[0.038]***	[0.064]***	[0.098]***
$S.s.e.$	[0.036]**	[0.051]**	[0.077]**	[0.299]	[0.337]	[0.443]	[0.053]***	[0.076]***	[0.115]***
Starters	532	410	281	532	410	281	532	410	281
Controls	416	322	225	416	322	225	416	322	225
	IMPORT STARTERS VS EXPORT STARTERS								
γ^{DID}	-0.001	-0.051	0.022	0.111	-0.381	0.301	-0.077	-0.087	-0.079
$A.s.e.$	[0.021]	[0.034]	[0.054]	[0.156]	[0.235]	[0.252]	[0.054]	[0.073]	[0.097]
$B.s.e.$	[0.023]	[0.035]	[0.059]	[0.228]	[0.338]	[0.427]	[0.030]	[0.045]	[0.071]
$S.s.e.$	[0.027]	[0.040]	[0.066]	[0.240]	[0.375]	[0.429]	[0.073]	[0.091]	[0.128]
Starters	1564	1100	635	1564	1100	635	1564	1068	612
Controls	722	511	321	722	511	321	722	498	310

* Significant at 10% level; ** significant at 5% level; *** significant at 1% level. Standard errors in brackets.
[a] Analytical standard errors. [b] Bootstrapped standard errors. [c] Bootstrapped standard errors from the sub-sampling procedure.
$\Delta L_0/\Delta R_0/\Delta Y_0$, $\Delta L_1/\Delta R_1/\Delta Y_1$ and $\Delta L_2/\Delta R_2/\Delta Y_2$ refer to the outcome change between $t-1$ and t, $t+1$ and $t+2$, respectively.

growth in the firm output and market share.[9] Unluckily we can not compute an indicator of Total Factor Productivity, due to the lack of any information on the capital assets and to a too short time-span to apply the perpetual inventory method. However, we still can investigate whether the employment expansion induced by the firm internationalisation process comes with an expansion of output. Building on the MPSM framework described above, we estimate the impact of importing, exporting and two-way trading on firm output. The relative results are shown in the last three columns of Table 3. The evidence supports the importance of the scale expansion as the channel fueling the employment increase, since exporting, importing and two-way trading all positively affect the firm output growth. More in detail, the complementarity between the two trade activities is confirmed by the larger ATTs shown for two-way traders.

The comparison of the results on employment and output levels reveals that each internationalisation strategy leads to a reduction of the firm labour requirement per unit of output and this effect is stronger when firms start to import. Nevertheless, from our evidence internationalisation strategies create a relevant divide across firms in terms of employment capacity. As the role of size is determinant in a number of crucial issues for the firm life - such as investments and credit access - two completely different development paths may emerge for the trading and pure domestic firm.

Robustness Checks - Table 7 proves the robustness of our findings to three checks.[10] First, we tried a different logit specification in the computation of propensity scores for the matching, adding the lag of further firm observable characteristics as regressors: the firm status of investor in tangible and intangible assets, the status of subcontractors and a dummy for firms subcontracting a part of their production to third parties. The latter variables were excluded in the baseline estimation strategy since they are usually not available in firm level datasets and we wanted to get results comparable with the standard literature dealing with the explanation of the firm trade activities. However, they can affect the firm internationalisation and our previous findings and, as a consequence, it is important to control for them. Second, we make use of a more restrictive definition of starters resting on the firm activity at

[9] Previous studies on preceding time periods have shown a positive impact of exporting on productivity and a positive association between importing and productivity for the Turkish manufacturing firms (Yasar and Rejesus, 2005; Morrison and Yasar, 2007; Maggioni, 2012).

[10] Since Table 3 has not shown any relevant difference in significance between the two sets of bootstrapped standard errors, B.s.e. and S.s.e., for the robustness checks we only display B.s.e. As a matter of fact, bootstrapping is time consuming and we were forced to leave it aside because of time constraints.

both *t-1* and *t-2*, thus the export/import/two-way starters are the ones starting to export/import/doing both activities in *t* and not exporting/importing/trading either at time *t-1* or at time *t-2*. Third, the import status is defined considering the overall purchases abroad and not focusing on intermediate materials only. All these controls deliver results that are substantially similar to the ones found above.[11]

Finally, besides the NN matching, we have also applied kernel matching that leads to similar conclusions, and the relative results are available upon request.

5 Further investigation: the role of trade intensity

Is the employment expansion an effect shared by all firms adopting internationalisation strategies or is it confined to the ones that are more intensively involved in foreign markets? In order to answer this question we verify whether employment effects of trade are homogeneous across high and low trade intensity firms. We split each sample of export, import and two-way starters in two groups: one for high intensity and the other one for low intensity. The export (import) starters are classified as high intensity starters if their export (import) share is higher than the median share within this firm group. On the contrary, we classify two-way starters as high intensity firms those with at least one between import share and export share higher than the reference median value. Then, ATT effects are computed retaining the treated units of each group of intensity and their respective control units. As the number of trading groups has doubled and their relative size has consequently shrunk, in this analysis we only consider never traders as control groups. Thus, we estimate whether there exists some heterogeneity in the impact of start to trade according to the degree of involvement in foreign markets. The picture emerging from Table 4 discloses a positive and significant role of import and export entry regardless of the trade intensity.[12] By comparing the high and low intensity export and import starters, we detect no relevant difference for the employment growth. However, coefficients for low intensity export starters are barely significant. Concerning two-way starters,

[11] The only difference concerns the loss of significance for ATT employment effects stemming from the addition of a further internationalisation strategy for already exporting or importing firms, when we adopt the more stringent definition of starters. However, it is likely that the latter result is driven by the small size of the starting group of controls in the matching strategy, being the export starters and import starters, respectively.

[12] Because of time constraints and being bootstrapping time-consuming, this analysis only rests on analytical standard errors.

we find instead larger benefits stemming from a high intensive involvement in foreign markets. Moving to the description of the labour composition, some positive benefits for export and import starters are shown for the group of traders with high intensity, even if, in some cases the significance level is low. The positive impact for high intensity export starters recalls the general finding on exporting as the main driver of new product introduction (Bratti and Felice, 2012; Salomon and Shaver, 2005; Hahn and Park, 2011), confirmed for Turkey by Lo Turco and Maggioni (2012a). On the contrary, the negative coefficient in $t+2$ displayed for import starters may be driven by a wider expansion of non R&D employment with respect to the R&D one.

Summing up, this investigation reveals positive effects of starting to trade on firm employment, regardless of the firm degree of involvement in foreign markets. Furthermore, the entry in both import and export markets with a high trade intensity may deliver additional gains.

Table 4: Employment Effects: Trade Intensity

	Employment						*R&D/NonR&D*					
	ΔL_0	ΔL_1	ΔL_2	ΔL_0	ΔL_1	ΔL_2	ΔR_0	ΔR_1	ΔR_2	ΔR_0	ΔR_1	ΔR_2
	High Intensity			Low Intensity			High Intensity			Low Intensity		
	EXPORT STARTER VS NEVER											
γ^{DID}	0.061	0.115	0.034	0.062	0.091	0.045	0.528	0.512	0.543	-0.186	-0.126	-0.337
$A.s.e^a$	[0.027]**	[0.046]**	[0.064]	[0.033]*	[0.048]*	[0.064]	[0.222]**	[0.291]*	[0.513]	[0.181]	[0.197]	[0.317]
Starters	648	412	228	647	448	264	648	412	228	647	448	264
Controls	519	333	187	584	403	236	519	333	187	584	403	236
	IMPORT STARTER VS NEVER											
γ^{DID}	0.052	0.122	0.185	0.086	0.106	0.104	0.277	-0.003	-0.414	-0.062	-0.167	-0.67
$A.s.e^a$	[0.022]**	[0.033]***	[0.046]***	[0.029]***	[0.040]***	[0.057]*	[0.155]*	[0.140]	[0.200]**	[0.183]	[0.210]	[0.360]*
Starters	796	559	345	798	583	322	796	559	345	798	583	322
Controls	553	390	250	668	490	285	553	390	250	668	490	285
	TWO-WAY STARTER VS NEVER											
γ^{DID}	0.218	0.320	0.369	0.086	0.153	0.160	-0.035	-0.122	0.053	0.282	0.637	0.675
$A.s.e^a$	[0.038]***	[0.052]***	[0.071]***	[0.051]*	[0.077]**	[0.104]	[0.145]	[0.197]	[0.246]	[0.446]	[0.457]	[0.602]
Starters	391	288	180	142	98	66	391	288	180	142	98	66
Controls	352	257	158	140	96	65	352	257	158	140	96	65

* Significant at 10% level; ** significant at 5% level; *** significant at 1% level. Standard errors in brackets.
Analytical standard errors are displayed.
$\Delta L_0/\Delta R_0$, $\Delta L_1/\Delta R_1$ and $\Delta L_2/\Delta R_2$ refer to the outcome change between $t-1$ and t, $t+1$ and $t+2$, respectively.

6 Conclusion

With this paper we have contributed to the scant evidence on the employment consequences of firms' internationalisation strategies for an emergent country. Contrary to previous empirical literature, mainly focused on the impact of imports on the white to blue collar ratio, we have analysed the firm overall employment level and composition in terms of R&D workers. For the first time, we have simultaneously investigated firm export and import activities and we have isolated and compared the impact of each trade strategy and of their joint adoption in a MPSM framework. Our results highlight that the penetration of foreign markets and the acquisition of foreign inputs have a similar sizable impact on the domestic labour demand. However, entering the export and the import markets at the same time delivers the highest employment growth in the entry and the following years, thus suggesting the existence of complementarity effects between the two strategies. The investigation of the trade intensity reveals that the positive effects on labour demand hold, regardless of the firm degree of involvement in foreign markets. Firms entering both export and import markets with a high intensity, however, experience higher employment growth. Finally, only high intensity exporting increases the share of R&D employees and this confirms the role of such trade activity as driver of innovation.

Our results do not support employment losses from the ongoing international integration process. On the contrary, within the stagnant Turkish labour market, the firm trade activity positively shapes the evolution of manufacturing employment and may counterbalance any other phenomenon negatively affecting it. More importantly, we show that entry in foreign markets, both the import and the export one, relevantly increases the firm scale of operations. It follows that internationalisation provides firms with higher growth prospects, thus representing a fundamental channel for employment creation.

In conclusion, our evidence on Turkey suggests that policy makers in emerging economies should be concerned about enhancing the firm involvement in foreign markets, as it represents a powerful tool to foster firm growth.

Acknowledgments The data used in this work are from the Foreign Trade Data, the Annual Business Statistics and the Production Surveys provided by Turkish Statistical Office (Turkstat). All elaborations have been conducted at the Microdata Research Centre of Turkstat under the respect of the law on the statistic secret and the personal data protection. The results and the opinions expressed in this article are exclusive responsibility of the authors

and, by no means, represent official statistics. We are grateful to Bülent Tungul, Mahamut Özgür, Kenan Orhan and Erdal Yildirim from Turkstat for their help with foreign trade data. We also thank Vedat Metin, Ülkü Ünsal and Oğuzhan Turkoğlu from dissemination department. We are grateful to Elizabeth J. Casabianca, Fabio Fiorillo, Alberto Russo and Stefano Staffolani for useful comments and suggestions.

Funding This work was supported by "Ministero dell'Istruzione, dell'Università e della Ricerca" through the Research Project of National Relevance (PRIN) 2009 on Structural Change.

References

Abadie, A., Imbens, G.W., 2008. On the failure of the bootstrap for matching estimators. Econometrica 76, 1537–1557.

Bernard, A.B., Jensen, J.B., 2004. Why some firms export? The Review of Economics and Statistics 86, 561–569.

Bratti, M., Felice, G., 2012. Are exporters more likely to introduce product innovations? Forthcoming in The World Economy .

Cadarso, M.A., Gomez, N., Lopez, L.A., Tobarra, M.A., 2008. The EU enlargement and the impact of outsourcing on industrial employment in Spain, 1993-2003. Structural Change and Economic Dynamics 19, 95–108.

Caliendo, M., Kopeinig, S., 2008. Some practical guidance for the implementation of propensity score matching. Journal of Economic Surveys 22, 31–72.

Fajnzylber, P., Fernandes, A., 2009. International economic activities and skilled labour demand: evidence from Brazil and China. Applied Economics 41, 563–577.

Falk, M., Wolfmayr, Y., 2008. Services and materials outsourcing to low-wage countries and employment: Empirical evidence from EU countries. Structural Change and Economic Dynamics 19, 38–52.

Feenstra, R.C., Hanson, G.H., 1997. Foreign direct investment and relative wages: Evidence from Mexico's maquiladoras. Journal of International Economics 42, 371–393.

Fernandes, A.M., 2007. Trade policy, trade volumes and plant-level productivity in Colombian manufacturing industries. Journal of International Economics 71, 52–71.

Fernandes, A.M., Paunov, C., 2010. Does Trade Stimulate Innovation?: Evidence from Firm-Product Data. OECD Development Centre Working Papers 286. OECD Publishing.

Görg, H., Hanley, A., 2005. Labour demand effects of international outsourcing: evidence from plant-level data. International Review of Economics and Finance 14, 365–376.

Görg, H., Strobl, E., 2002. Relative wages, openness and skill-biased technological change. IZA Discussion Papers 596. IZA.

Hahn, C.H., Park, C.G., 2011. Direction of causality in innovation-exporting linkage: evidence from microdata on Korean manufacturing. Korea and the World Economy 12, 367–398.

Halpern, L., Koren, M., Szeidl, A., 2005. Imports and Productivity. CEPR Discussion Papers 5139. C.E.P.R. Discussion Papers.

Harrison, A., Hanson, G., 1999. Who gains from trade reform? some remaining puzzles. Journal of Development Economics , 125–154.

Harrison, A., McMillan, M., 2007. Offshoring jobs? multinationals and US manufacturing employment. IPC Working Paper Series .

Lechner, M., 2001. Identification and estimation of causal effects of multiple treatments under the conditional independence assumption, in: Lechner, M., Pfeiffer, F. (Eds.), Econometric Evaluation of Labour Market Policies. Physica-Verlag, Heidelberg, pp. 1 – 18.

Lechner, M., 2002. Some practical issues in the evaluation of heterogeneous labour market programmes by matching methods. Journal Of The Royal Statistical Society Series A 165, 59–82.

Lo Turco, A., Maggioni, D., 2012a. Imports, exports and the firm product scope: evidence from Turkey. mimeo. Università Politecnica delle Marche.

Lo Turco, A., Maggioni, D., 2012b. Offshoring to high and low income countries and the labor demand. evidence from italian firms. Review of International Economics 20, 636–653.

Maggioni, D., 2012. Learning by exporting in turkey: An investigation for existence and channels. Global Economy Journal 12, 5.

Melitz, M.J., 2003. The impact of trade on intra-industry reallocations and aggregate industry productivity. Econometrica 71, 1695–1725.

Meschi, E., Taymaz, E., Vivarelli, M., 2011. Trade, technology and skills: Evidence from Turkish microdata. Labour Economics 18, 60–70.

Morrison, C.J., Yasar, M., 2007. International linkages and productivity at the plant level: Foreign direct investment, exports, imports and licensing. Journal of International Economics 71, 373–388.

Moser, C., Urban, D., di Mauro, B.W., 2009. Offshoring, Firm Performance and Establishment-level Employment: Identifying Productivity and Downsizing Effects. CEPR Discussion Papers Series 7455. CEPR.

OECD, 2007. Offshoring and Employment: Trends and Impacts. Technical Report. OECD.

Paus, E., Reinhardt, N., Robinson, M., 2003. Trade liberalization and productivity growth in Latin American manufacturing, 1970-98. Journal of Policy Reform 6, 1–15.

Pavcnik, N., 2002. Trade liberalization, exit, and productivity improvement: Evidence from Chilean plants. Review of Economic Studies 69, 245–76.

Pavcnik, N., 2003. What explains skill upgrading in less developed countries? Journal of Development Economics 71, 311–328.

Pissarides, C.A., 1997. Learning by trading and the returns to human capital in developing countries. The World Bank Economic Review 11, 17–32.

Rodrik, D., McMillan, R., 2011. Globalization, structural change and productivity growth. NBER Working Paper 17143. NBER.

Salomon, R.M., Shaver, M.J., 2005. Learning by exporting: New insights from examining firm innovation. Journal of Economics & Management Strategy 14, 431–460.

Wagner, J., 2007. Exports and productivity: A survey of the evidence from firm-level data. The World Economy 30, 60–82.

Yasar, M., Rejesus, R.M., 2005. Exporting status and firm performance: Evidence from a matched sample. Economics Letters 88, 397–402.

Appendix

Table 5: MPSM-Multinomial Logit Estimates

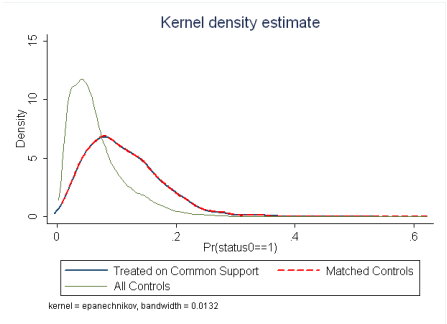
	(0,x)	(m,0)	(m,x)
y_{t-1}	0.670***	1.034***	0.960***
	[0.042]	[0.038]	[0.062]
l_{t-1}	-0.475***	-0.399***	-0.319***
	[0.062]	[0.054]	[0.085]
lp_{t-1}	-0.361***	-0.272***	-0.273***
	[0.037]	[0.035]	[0.055]
w_{t-1}	-0.311***	-0.001	-0.247*
	[0.085]	[0.083]	[0.131]
$multi_{t-1}$	0.295***	0.143**	0.345***
	[0.073]	[0.069]	[0.109]
Const.	-4.991***	-12.760***	-11.699***
	[0.770]	[0.716]	[1.156]
Observations	17,495	17,495	17,495
Pseudo-R^2	0.109	0.109	0.109
Wald Chi^2	2649.213	2649.213	2649.213
Log-likelihood	-10814.3	-10814.3	-10814.3

Notes: * Significant at 10% level; ** significant at 5% level; *** significant at 1% level. Standard errors in brackets. Sector and time dummies are included, but not shown.

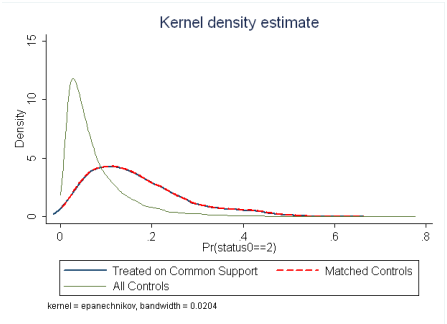
Table 6: Balancing Tests for MPSM

	Treated Firms	Control Firms	% Treated Firms Out of Support	Median Bias Before	Median Bias After	% Drop Bias
$(0,x)/(0,0)$	1300	1105	0.08	6.97	2.15	69.20
$(m,0)/(0,0)$	1600	1223	0.25	7.52	1.03	86.37
$(m,x)/(0,0)$	533	492	0.00	10.40	1.85	82.22
$(m,x)/(0,x)$	533	392	0.00	5.55	3.30	40.57
$(m,x)/(m,0)$	533	416	0.19	5.34	2.92	45.34
$(m,0)/(0,x)$	1600	722	2.25	4.79	5.84	-22.02

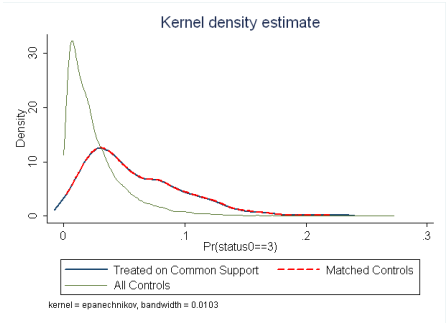
Notes: The covariate balancing tests for all the investigated pairs of combinations in the MPSM are shown.



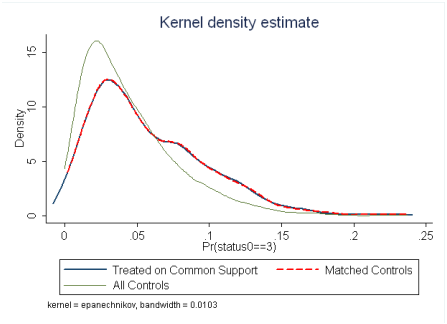
(a) Export-Starters/Never



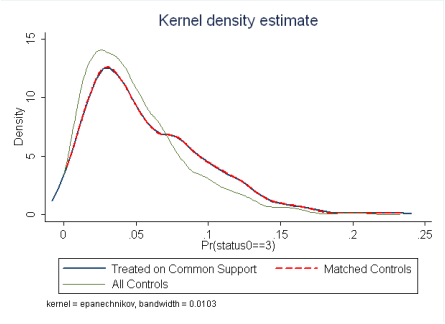
(b) Import-Starters/Never



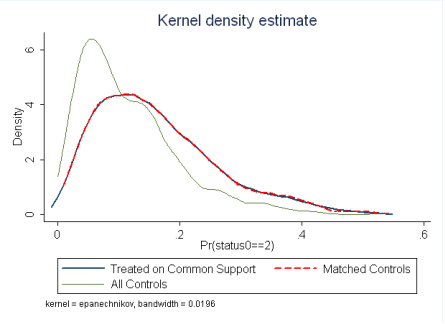
(c) Two-way-Starters/Never



(d) Two-way/Export-Starters



(e) Two-way/Import-Starters



(f) Import/Export-Starters

Figure 1: Propensity score densities for the treated and matched and unmatched controls

Notes: IMPORT STARTER/EXPORT STARTER/TWOWAY STARTER) refers to the firm that imports/exports/imports and exports in t and did not import/export/import and export in $t-1$ and $t-2$. NEVER refers to firms which neither exports nor imports during the whole sample time span.

Table 7: Employment Effects of Firm Trade: Robustness Checks

	Alternative Logit Specification						**Starter definition based on both $t-1$ and $t-2$**						**Overall Imports**					
	Employment			*R&D/NonR&D*			*Employment*			*R&D/NonR&D*			*Employment*			*R&D/NonR&D*		
	ΔL_0	ΔL_1	ΔL_2	ΔR_0	ΔR_1	ΔR_2	ΔL_0	ΔL_1	ΔL_2	ΔR_0	ΔR_1	ΔR_2	ΔL_0	ΔL_1	ΔL_2	ΔR_0	ΔR_1	ΔR_2
Export Starters vs Never																		
γ^{DID}	0.074	0.100	0.083	0.134	0.194	0.272	0.075	0.132	0.16	-0.121	-0.216	-0.193	0.071	0.128	0.062	0.044	0.359	0.413
$A.s.e.$[a]	[0.021]***	[0.032]***	[0.046]*	[0.147]	[0.170]	[0.262]	[0.025]***	[0.044]***	[0.077]**	[0.084]	[0.154]	[0.223]	[0.021]***	[0.033]***	[0.047]	[0.156]	[0.169]**	[0.281]
$B.s.e.$[b]	[0.024]***	[0.036]***	[0.052]	[0.159]	[0.199]	[0.311]	[0.031]***	[0.054]***	[0.090]*	[0.121]	[0.201]	[0.261]	[0.026]***	[0.039]***	[0.059]	[0.158]	[0.213]*	[0.346]
Starters	1298	840	486	1298	840	486	611	345	182	611	345	182	1250	818	475	1250	818	475
Controls	1089	713	415	1089	713	415	546	306	162	546	306	162	1099	732	432	1099	732	432
Import Starters vs Never																		
γ^{DID}	0.066	0.064	0.102	0.119	0.041	-0.048	0.067	0.116	0.153	0.241	0.120	0.485	0.078	0.093	0.113	0.049	0.064	-0.139
$A.s.e.$	[0.018]***	[0.027]**	[0.040]**	[0.108]	[0.115]	[0.143]	[0.020]***	[0.034]***	[0.069]**	[0.185]	[0.241]	[0.257]*	[0.018]***	[0.027]***	[0.041]***	[0.099]	[0.123]	[0.189]
$B.s.e.$	[0.022]	[0.030]**	[0.049]**	[0.138]	[0.163]	[0.216]	[0.024]***	[0.046]***	[0.082]**	[0.196]	[0.238]	[0.373]	[0.021]***	[0.029]***	[0.045]**	[0.135]	[0.155]	[0.249]
Starters	1597	1156	679	1597	1156	679	704	470	224	704	470	224	1601	1125	642	1601	1125	642
Controls	1219	882	536	1219	882	536	598	394	198	598	394	198	1229	856	503	1229	856	503
Two-way Starters vs Never																		
γ^{DID}	0.209	0.309	0.316	-0.220	0.120	0.103	0.115	0.185	0.168	0.128	-0.025	0.07	0.172	0.243	0.298	-0.273	0.032	0.054
$A.s.e.$	[0.036]***	[0.049]***	[0.068]***	[0.263]	[0.193]	[0.245]	[0.045]***	[0.072]***	[0.108]	[0.191]	[0.266]	[0.512]	[0.029]***	[0.045]***	[0.054]***	[0.159]*	[0.172]	[0.205]
$B.s.e.$	[0.038]***	[0.052]***	[0.072]***	[0.219]	[0.249]	[0.324]	[0.052]**	[0.083]**	[0.142]	[0.242]	[0.337]	[0.682]	[0.039]***	[0.052]***	[0.074]***	[0.174]	[0.240]	[0.302]
Starters	533	384	241	533	384	241	195	122	74	195	122	74	547	394	248	547	394	248
Controls	484	349	218	484	349	218	187	117	70	187	117	70	497	354	222	497	354	222
Two-way Starters vs Export Starters																		
γ^{DID}	0.085	0.129	0.113	-0.446	-0.091	-0.033	0.034	0.076	0.014	-0.081	-0.164	0.163	0.081	0.087	0.085	0.1	0.25	0.268
$A.s.e.$	[0.030]***	[0.044]***	[0.068]*	[0.259]*	[0.207]	[0.341]	[0.043]	[0.091]	[0.125]	[0.18]	[0.23]	[0.551]	[0.031]***	[0.046]*	[0.062]	[0.189]	[0.254]	[0.405]
$B.s.e.$	[0.037]**	[0.048]***	[0.080]	[0.365]	[0.420]	[0.598]	[0.047]	[0.081]	[0.152]	[0.212]	[0.354]	[0.669]	[0.038]	[0.052]*	[0.077]	[0.348]	[0.410]	[0.610]
Starters	532	405	268	532	405	268	193	124	69	193	124	69	547	392	263	547	392	263
Controls	398	302	197	398	302	197	153	97	55	153	97	55	390	286	195	390	286	195
Two-way Starters vs Import Starters																		
γ^{DID}	0.093	0.139	0.180	-0.090	-0.029	0.116	0.053	0.04	0.055	-0.536	-0.265	-0.358	0.081	0.111	0.121	0.010	0.175	0.31
$A.s.e.$	[0.031]***	[0.042]***	[0.060]***	[0.134]	[0.169]	[0.220]	[0.038]	[0.068]	[0.124]	[0.511]	[0.21]	[0.568]	[0.031]***	[0.045]**	[0.063]*	[0.199]	[0.234]	[0.311]
$B.s.e.$	[0.034]***	[0.048]***	[0.075]**	[0.288]	[0.309]	[0.419]	[0.042]	[0.080]	[0.162]	[0.459]	[0.589]	[0.897]	[0.032]**	[0.051]**	[0.066]*	[0.250]	[0.260]	[0.363]
Starters	531	400	272	531	400	272	194	128	77	194	128	77	547	405	280	547	405	280
Controls	425	321	219	425	321	219	154	106	64	154	106	64	433	328	232	433	328	232
Import Starters vs Export Starters																		
γ^{DID}	0.004	-0.021	0.066	0.302	0.548	0.942	0.014	0.037	-0.007	0.189	-0.231	-0.193	-0.006	-0.051	0.016	0.178	-0.230	0.337
$A.s.e.$	[0.020]	[0.031]	[0.049]	[0.247]	[0.293]*	[0.323]***	[0.029]	[0.047]	[0.089]	[0.188]	[0.257]	[0.442]	[0.023]	[0.033]	[0.050]	[0.158]	[0.232]	[0.243]
$B.s.e.$	[0.023]	[0.037]	[0.060]	[0.282]	[0.353]	[0.428]**	[0.026]	[0.054]	[0.097]	[0.198]	[0.294]	[0.497]	[0.022]	[0.036]	[0.061]	[0.222]	[0.357]	[0.439]
Starters	1577	1127	608	1577	1127	608	686	449	209	686	449	209	1574	1096	597	1574	1096	597
Controls	731	521	318	731	521	318	337	213	114	337	213	114	719	495	303	719	495	303

Notes: * Significant at 10% level; ** significant at 5% level; *** significant at 1% level. Standard errors in brackets.

[a] Analytical standard errors.

[b] Bootstrapped standard errors.

IMPORT STARTER/EXPORT STARTER/TWO-WAY STARTER refers to the firm that imports/exports/imports and exports in t and did not import/export/import and export in $t-1$. NEVER refers to the firm which neither exports nor imports during the whole sample time span.