Services Trade and Labour Market Outcomes: Evidence from Italian Firms[1]

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Abstract

The paper investigates the relationship between services trade performance and employment characteristics in Italian firms during the period 2008-2017. We merge micro data on services trade transactions with employment and wage variables at the level of the firm. We find that firms engaged in services trade tend to have higher employment levels across all main occupational categories. We further refine our identification strategy and adopt an instrumental variable approach to account for all sources of potential endogeneity of services trade. We show that services exports have a positive causal impact on total employment at the firm level. This result is driven by a strong positive effect on white collars' employment in firms whose main activity is in the services sector, those located in the norther regions of Italy and engaged in both services exports and imports.

Keywords: Services trade; Employment; Firm-level data; Italy.

JEL codes: F14; F16

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A. Introduction

Services play a key role in international trade. The total value of cross-border services transactions amounted to 3.7 trillion US Dollars in 2017 (WTO, 2019). Counting other modes of services trade provision, including through a commercial presence in the importing country, the figure raises to 13.3 trillion US Dollars. In general, world trade in services has been growing faster than trade in goods (WTO, 2019). Internationally traded services are also increasingly used in production processes and embedded in production outputs, responding to technological progress and to firms' strategies to compete in modern economies (see for instance Francois & Reinert, 1996; Francois & Woerz, 2008; Berlingieri, 2015; Ariu *et al.*, 2019a; Hoekman & Shepherd, 2017).

These trends have fostered an expanding literature which investigates the patters and effects of services development, especially in the trade and trade policy domains (see for instance Arnold *et al.*, 2016; Beverelli *et al.*, 2017; Francois & Hoekman, 2010). A number of studies focused on the impact of various dimensions of services trade on the labour market, in terms of employment and wages for the various categories of workers involved.

Existing works on services trade and labour market outcomes have concentrated on the role of services imports or services offshoring. These studies identify theoretical mechanisms with opposite implications with respect to the impact of services imports on employment. On the one hand, importing foreign services lowers input prices, potentially increasing production and labour demand (scale effect). On the other hand, higher quality or cheaper service inputs may substitute for labour used in production, leading to a decrease in labour demand (substitution effect) (Amiti & Wei, 2005; Milberg & Winkler, 2010; and Winkler, 2010).

Consistent with this theoretical ambiguity, the results of empirical analyses at the sectoral level are mixed. Amiti & Wei (2005) find a positive correlation between services offshoring and employment in the UK between 1995 and 2001. Focusing on US sector-level data Amiti & Wei (2006) identify a negative effect of services offshoring on employment. This negative impact vanishes if a less disaggregated sector classification is used, suggesting that there is sufficient growth in labour demand in sub-sectors within these broader categories to offset the negative effect. In the case of Germany Schöller (2007) and Winkler (2010) find a negative impact of services offshoring on low-skilled labour in manufacturing sectors. Milberg & Winkler (2010) and

Milberg & Winkler (2015) extend this analysis to OECD countries and show that negative impacts are attenuated by the existence of labour market institutions that reduce economic insecurity.

However, related empirical country case studies analyzing firm level data tend to point to a systematically positive impact of services imports on downstream employment, in particular on high skill labour. These works include Crinò (2010) for the US case, Michel & Rycx (2012) for Belgium, Andersson *et al.* (2016) for Sweden, Eppinger (2019) for Germany and Ariu *et al.* (2019b) for Finland.

Less is known on the employment effect of services export performance on firms' employment outcomes. Theoretically, services exports in manufacturing sectors are part of the process of "servitization" (Vandermerwe & Rada, 1988), i.e. non-services firms including services in their domestic sales and export, typically in association with a good. This might trigger higher demand for goods exports from the same firm, which can use services as a lever to diversify its output with respect to competitors on the international markets. Therefore, higher services exports can be associated with higher demand opportunities and market power, which in turn might increase labour demand. While Ariu *et al.* (2019c) find evidence of the positive role of services exports to increase exports of goods, demand opportunities and market power for the population of Belgian firms, the implications on employment remain understudied. One exception is the empirical study by Nordås *et al.* (2019). These authors use Swedish micro data on firms and individual workers and show that services exports (as well as imports) stimulate labour demand, in particular of skilled workers.

The analysis presented in this paper contributes to this research strand by investigating the relationship between services trade performance and employment characteristics in Italian firms.

Our analysis is at the micro level. We merge micro data on services trade transactions with employment and wage variables at the level of the firm. Fixed effect estimations that controls for observable and unobservable heterogeneity originating in firm, sector, province and year idiosyncratic shocks show a positive relationship between services trade performance - both on the export and import side - and the level of total employment at the firm level as well as the level of employment in the three main occupational categories of managers, white collars and blue collars.

Moreover, in order to come closer to a causal assessment of the effect of services trade on employment variables we tackle the issue of reverse causation by proposing an identification

strategy based on instrumental variables (IV) similarly to the approach taken in the recent works by Hummels *et al.* (2014) and Ariu *et al.* (2019b). We add to the literature on the firm-level empirical analysis of the employment effects of services trade by looking both at the import and export side of services trade. After controlling for various sources of endogeneity (reverse causality and omitted variables bias) we find that services exports have a positive causal impact on total employment at the firm level. This result is driven by a strong positive effect on white collars' employment but also on the number of managers. Finally, we show that these patterns of causal impact are particularly pronounced in the sub-population of firms whose main activity is in the services sector, for firms located in the northern regions of Italy, and for those engaged in both services exports and imports.

The remaining of this paper is structured as follows. Section B presents the data and offers the first suggestive evidence of a positive relationship between services trade performance and employment in the population of Italian firm. Section C presents the identification strategy used in the econometric exercises and Section D discusses estimation results. Section E concludes.

B. Micro data and descriptive evidence

The analysis conducted in this paper centers on the linkages between services trade performance and employment characteristics of Italian firms. The source of services trade data is the TTN (*Transazioni Trimestrali Non Finanziarie*, i.e. Quarterly Non-financial Transactions) section of the Direct Reporting (TTN-DR, henceforth) database managed by the Bank of Italy. The database includes information on exports and imports of services at the transaction level recorder for each quarter starting from the beginning of 2008. These transactions cover mostly mode 1 and to some extent mode 4 services trade. Modes 2 and 3 are excluded.[2] The TTN-DR is a survey with sampling weights, which we will use in the ensuing analysis (for more details on the survey design, see the Appendix).

[2] The General Agreement on Trade in Services (GATS) identifies and disciplines 4 modes of services trade. Mode 1 captures arms-length cross-border trade (e.g.: services cross the border through the internet). Mode 2 is for consumption abroad (e.g. travels). Mode 3 considers services exported through the establishment of a commercial presence in the importing country (i.e. Foreign Direct Investment, FDI). Mode 4 describes trade through the temporary movement of the exporter's personnel in the importing country. Comprehensive discussions of the four modes can be found in Francois & Hoekman (2010) or WTO (2019).

The TTN-DR provides a detailed classification of services (about 50 categories), which follows the Extended Balance of Payments Services Classification (EBOPS). Importantly the TTN-DR does not contain trade transactions in transport and travel services[3]. In the following analysis we also exclude international transactions in construction services, as these involve a limited number of firms. The TTN-DR microdata reports also the nationality of the counterpart. After excluding international organizations,[4] we remain with 220 countries as trade partners of Italian firms, about 12 per firm.

We merge the TTN-DR database with labour market data, taken from the Italian Social Security Agency INPS (*Istituto Nazionale di Previdenza Sociale*). The INPS dataset used in this paper covers the universe of Italian private firms. The variable of interest in this data is the number of employees[5]: it is available for each year as well as for five occupational categories: managers, white collars, blue collars, apprentices and the residual category "others". We focus only on the first three categories, which comprise the large majority of workers; they also reflect clear occupational tasks.[6]

Finally, we combine this information with balance sheet and profit & loss data available from the CADS dataset (Company Accounts Data Service), which includes data of all incorporated firms in Italy. Table 1 reports the percentage shares of firms in the resulting database by turnover category, after merging the three databases. Note that we find a small percentage of firms with a turnover below 10 million, the lower threshold in the sampling design of the TTN-DR database. This is due to changes in turnover after sampling. In order to avoid outliers and to work with a homogeneous population we only consider firms with actual turnover above Euro 10 million.

[3] Importantly the TTN-DR does not contain trade transactions in transport and travel services. Transport and travel services data are collected by the Bank of Italy in other *ad hoc* surveys, conducted on carriers and travelers, respectively.

[4] We exclude international organizations, as we want to focus on nations as trade partners for transactions of Italian firms.

[5] In the ensuing analysis, we refer to the total number of employees also as total employment. In theory, the two terms may differ because some firms do not have employees, but only the owners working at the firm. Nevertheless, the difference is relevant only for firms of very small size (less than 10 workers) and not in this case, where the sampling design of TTN excludes very small firms.

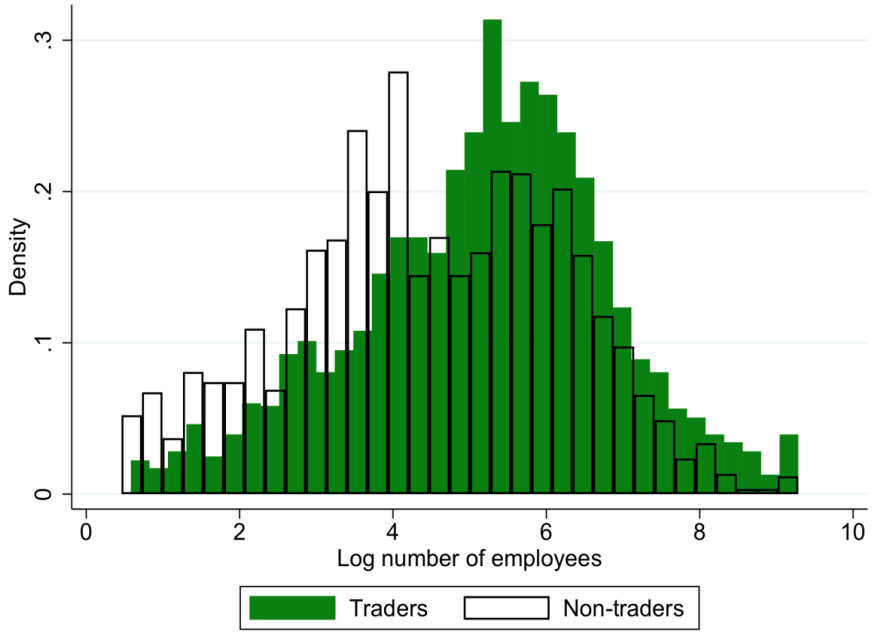
[6] Due to lack of a clear-cut interpretation of the content of the remaining two categories, we do not report category-specific results for them but we do not remove them from the data when considering the total employment level. The three categories considered in the analysis account for about 97% of the labour force.

Table 1: firms by turnover over time (percentage shares of sample population)

turnover (millions of Euros)	years										average
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
<=10	1.6	1.7	3.2	2.3	3.3	3.9	3.8	5.8	5.8	6.6	3.9
10-70	4.3	5.8	15.1	13.9	12.8	13.5	14.3	13.2	13.6	13.6	12.2
70-90	6.9	14.1	9.1	8.9	8.0	7.4	7.7	7.4	6.7	5.9	8.2
90-165	35.2	34.9	29.4	30.3	29.7	30.2	29.0	27.5	26.1	27.2	29.8
>=165	52.0	43.6	43.2	44.6	46.2	45.0	45.2	46.1	47.7	46.7	45.9
Total	100	100	100	100	100	100	100	100	100	100	100

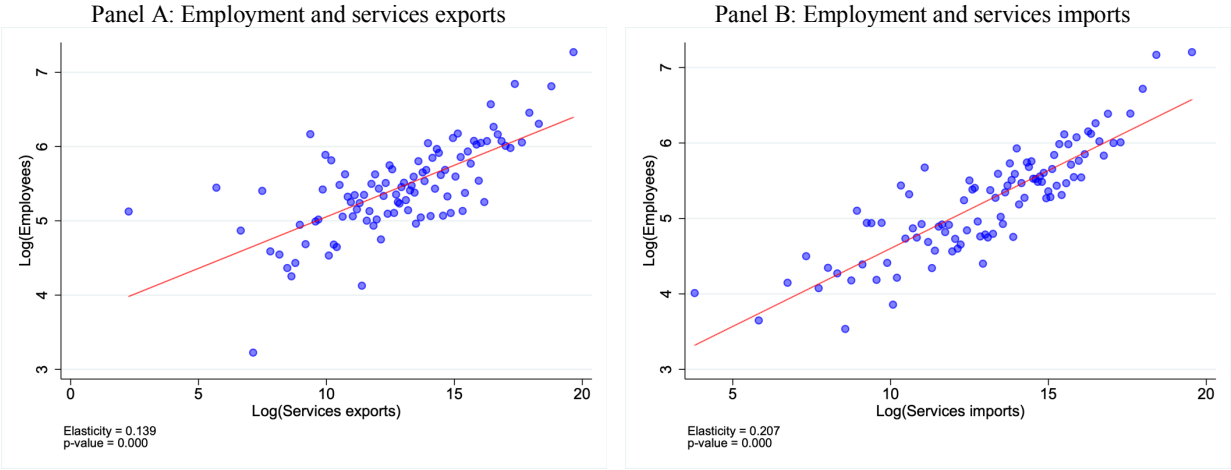
A first, rough assessment of the relationship between services trade and employment in our firm level data can be obtained by comparing the distribution of employment between firms more and less engaged in services trade. To that purpose we define the sub-population of `traders' as those firms that registered at least one services trade transaction (either export or import) in a number of years that is at least equal to half of the years each firm is included in the sample. Figure 1 shows that the distribution of total employment for the sub-population of traders (in green), when compared with that of firms less engaged in services trade (in white), has systematically greater (lower) mass at high (low) values of employment.

Figure 1: Distribution of total employment for traders and non-traders



Similar patterns can be draws after distinguishing between services exports and imports and accounting for the intensive margins of trade. Figure 2 plots the average values of firm-level services exports (Panel A) and imports (Panel B) against the average number of employees for each firm.[7]

Figure 2: Total employment and services trade, exports and imports values



Both panels display a positive and statistically significant relationship. All in all, simple descriptive[8] exercises are suggestive of a positive relationship between services trade performance and employment at the firm-level.

C. Econometric specification, identification strategy and estimation sample

In this section we propose an econometric strategy to further investigate the relationship between services trade performance and employment within the population of Italian firms covered in our sample.

[7] For the sake of clarity in an empirical context with a large number of observations the scatterplots in Figure 2 are binned. They have been generated using the binscatter command in STATA. Since the command does not allow for the use of weights, the coefficients and p-values reported below each scatterplot are instead derived from bivariate regressions featuring the appropriate survey weights.

[8] For a more structured descriptive analysis of the data please refer to

We start by exploiting the full structure of the data which allows to account for various sources of potentially confounding heterogeneity using control variables and fixed effects. More precisely, we take the log of total employment y_{ijpt} valued for firm i (active in sector j and located in the Italian province p) at time t as the dependent variable in a linear regression framework.[9] We regress y_{ijpt} on a firm-time-level indicator of services trade performance $x_{ijp(t-1)}$. In the following analysis $x_{ijp(t-1)}$ will is equal in turn to (i) the log of services exports and (ii) the log of services imports. For each version of x we propose the following specification:

$$y_{ijpt} = \alpha + \beta x_{ijp(t-1)} + \boldsymbol{\delta}' \boldsymbol{k}_{ijp(t-1)} + \xi_j + \xi_p + \xi_t + \xi_i + \varepsilon_{ijpt} \qquad (1)$$

where $\boldsymbol{k}_{ijp(t-1)}$ is a vector of controls that includes firm age, the log of capital stock and the log of trade in goods.[10] Our parameter of interest is β, the elasticity of the employment variable with respect to the services trade variable (exports or imports). The vector of control ($\boldsymbol{k}_{ijp(t-1)}$) represents the first step in our identification strategy. Indeed, it permits to partial out the variation of services trade performance that commoves with time-varying technological features as well as trade in goods performance of each firm. Moreover, we improve the identification of the coefficient β using a battery of fixed effects (ξ_j, ξ_p, ξ_t, and ξ_i are respectively sector, province, time and firm fixed effects). This second step reduces the risk of endogeneity coming from observable (omitted) or unobservable heterogeneity originating at the level of each individual firm (but also at the province and sector level for the few firms changing location and/or sector of main affiliation during the sample period) and in each year of the sample and potentially confounding our relationship of interest. One example would be the time invariant quality of the firm, which might positively affect both its level of employment and its services trade performance.

[9] Sector j corresponds to the firm's main sector of affiliation taken from the INPS dataset. Sectors are classified using the NACE Rev. 2 nomenclature and they are at 2 digits. Overall the data cover 77 sectors, ranging from primary sectors to industrial and almost all services sectors. Provinces p are administrative units corresponding to NUTS level 3 using the European classification and they may be considered as similar to US counties. Overall in our data we have 102 provinces (out of a total of 110).

[10] For both capital intensity and goods trade, we take the values lagged by one year. Data on goods trade are from the CADS dataset, which reports for the total value of total exports of the main sector of activity of the firm (no further details on the countries of destination, nor of products is available). To ensure that the values of this variable refer only to goods exports (not exports of services), we consider positive values of firms in the industrial sectors (mining and manufacturing) and set the value to zero for services firms using the main sector code (NACE Rev. 2). Some data are missing because exports are surveyed only for a subsample of limited liability firms (joint stock companies).

While this strategy allows for a clear identification of the relationship between services trade performance and employment within firms it is not conclusive as for the empirical assessment of the causal effect of services trade performance on employment. In fact, a positive within-firm relationship between these two variables might not originate from the theoretical mechanisms explaining the causal impact of services trade on employment reviewed in Section A, but rather from the effect of employment on services trade performance. Consider for instance a variation in firm's employment due to a shock which is exogenous to the firm's services trade performance (such as a fiscal policy shock targeting employment). Such variation might impact on services trade by altering the resources available to support the firm's services trade strategy.

In order to minimize the risk of endogeneity potentially arising from reverse causation we adopt an instrumental variable approach following the work by Hummels *et al.* (2014) and Ariu *et al.* (2019b). We instrument services trade import (export) performance at the firm level with a function of foreign export supply (import demand) shocks which plausibly impact on Italian firms' employment decisions only through services trade. More precisely, we construct an instrument for firm-year-level services imports (exports) as the weighted sum – over countries and services sectors – of country- and services sector-specific exports to all destinations (imports from all sources) but Italy in a given year. To maximize the strength of these instruments, the weight for each country- and service- specific flow is given by the lagged share of firm's aggregate services imports (exports) accounted for by the combination of that specific services sector and that specific country. Formally, we define the instrument for services exports and services imports as follows:

$$\text{Instrument imports}_{it} = \sum_{C}\sum_{s} \text{WEXP}_{cst} \times \frac{\text{Imports}_{ics(t-1)}}{\text{Imports}_{i(t-1)}} \qquad (2)$$

$$\text{Instrument exports}_{it} = \sum_{C}\sum_{s} \text{WIMP}_{cst} \times \frac{\text{Exports}_{ics(t-1)}}{\text{Exports}_{i(t-1)}} \qquad (3)$$

where WEXP_{cst} (WIMP_{cst}) measures country c exports (imports) of services sector s to (from) the rest of the world excluding Italy. We take bilateral services trade data from the WTO-

UNCTAD-ITC annual trade in services dataset.[11] $\text{Imports}_{ics(t-1)}$ and $\text{Imports}_{i(t-1)}$ ($\text{Exports}_{ics(t-1)}$ and $\text{Exports}_{i(t-1)}$) are instead firm i's imports from (exports to) country c of services sector s and firm i's services total imports (exports) respectively. All these variables are lagged by one year.

The excludability of these instruments and in particular the exogeneity of the firm-specific shares (the ratios in equations (2) and (3)) is crucially given by the highly specialized and relatively constant over time services trade strategy of Italian firms. Indeed, even though our analysis is based on a very low number of distinct services sectors (10 as opposed to the 28 used by Ariu *et al.*, 2019b) the median sector-partner country combination in terms of number of exporting (importing) firms counts only 3 (4) firms in 2009 and 4 (5) firms in 2017. This ensures that trade relationships defined by the combination of individual firms, trade partners and services sectors are pre-determined and arguably exogenous to the firm-level employment dynamics.

The final estimation sample for total employment comprises 12344 observations (2034 firms). Table 2 reports summary statistics for that sample as well as for those where we have occupation-specific data.

[11] The WTO-UNCTAD-ITC dataset is publicly available (through a bulk download) at https://www.wto.org/english/res_e/statis_e/trade_datasets_e.htm. We merged the WTO-UNCTAD-ITC dataset with the Italian firm level using a simple concordance between 10 aggregate services sectors in the TTN-DR dataset (communication; finance & insurance; computer and ICT services; intangibles; trade related services; professional - including professional and management consulting services, as well as architectural, engineering, and other scientific and technical services; research and development; other business services - including waste management, agricultural and mining services; personal and recreational services and merchanting) and EBOPS 2010 (up to 3 digits) services sectors in the WTO-UNCTAD-ITC dataset.

Table 2: Summary statistics, total employment estimation sample

Variable	N	Mean	Median	St.Dev	min	max
Panel A: total employment specification						
Employment	12,433	790.8	329.8	1550.4	5.0	10763.5
Log of employment	12,433	5.7	5.8	1.4	1.6	9.3
Services exports (lagged, in log)	12,433	9.0	11.7	6.9	0.0	23.2
Services imports (lagged, in log)	12,433	13.3	14.1	3.8	0.0	22.8
Firm age (lagged)	12,433	38.2	34.0	22.0	8.0	173
Capital stock (lagged)	12,433	16.8	17.0	2.2	0.0	24.8
Exports of goods (lagged, in log)	12,433	7.8	0.0	8.9	0.0	23.6
Panel B: manager employment specification						
Employment	11,091	19.7	9.5	30.6	.1	191.8
Log of employment	11,091	2.2	2.2	1.2	-2.5	5.3
Services exports (lagged, in log)	11,091	9.4	12.2	6.9	0.0	23.2
Services imports (lagged, in log)	11,091	13.6	14.3	3.6	0.0	22.8
Firm age (lagged)	11,091	38.7	34.0	22.4	8.0	173.0
Capital stock (lagged)	11,091	17.0	17.2	2.2	0.0	24.7
Exports of goods (lagged, in log)	11,091	8.3	0.0	8.97	0.0	23.64
Panel C: white collar employment specification						
Employment	12,433	432.1	146.2	967.9	1.0	7024.9
Log of employment	12,433	5.0	5.0	1.4	0.0	8.9
Services exports (lagged, in log)	12,433	9.0	11.7	6.9	0.0	23.2
Services imports (lagged, in log)	12,433	13.3	14.1	3.8	0.0	22.8
Firm age (lagged)	12,433	38.2	34.0	22.0	8.0	173.0
Capital stock (lagged)	12,433	16.8	17.0	2.2	0.0	24.7
Exports of goods (lagged, in log)	12,433	7.8	0.0	8.9	0.0	23.6
Panel D: blue collar employment specification						
Employment	10,156	373.0	136.1	818.5	.1	6089.5
Log of employment	10,156	4.6	4.9	1.9	-2.5	8.7
Services exports (lagged, in log)	10,156	8.9	11.5	6.9	0.0	23.2
Services imports (lagged, in log)	10,156	13.3	14.0	3.9	0.0	22.8
Firm age (lagged)	10,156	39.4	35.0	22.4	8.0	173.0
Capital stock (lagged)	10,156	17.2	17.2	1.7	7.8	24.7
Exports of goods (lagged, in log)	10,156	9.2	14.0	9.0	0.0	23.5

D. Estimation results

Baseline estimates

We start discussing our results from the estimates of equation (1) where the identification strategy solely relies on fixed effects. Table 3 shows a positive and statistically significant relationship between services trade performance - both on the export and import side - and employment across all main occupational categories.

Table 3: Services trade and employment - Fixed Effects

Dep. variable:	log of employment							
	All occupations		Mangers		White collars		Blue collars	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Services exports	0.0032***		0.0023**		0.0038***		0.0158***	
	[0.0010]		[0.0012]		[0.0009]		[0.0031]	
Services imports		0.0146***		0.0097***		0.0158***		0.0169***
		[0.0031]		[0.0033]		[0.0031]		[0.0042]
Observations	12,433	12,433	11,091	11,091	12,433	12,433	10,156	10,156
R-squared	0.979	0.979	0.954	0.955	0.977	0.977	0.955	0.955
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# Firms	2034	2034	1796	1796	2034	2034	1674	1674

All specification include a constant, firm age, a measure of trade in goods and of capital intensity at the firm-year level. All variables are in logs. Province and sector fixed effects are always included, however they are lergerly collinear with firm-fixed effects as there are very few sector changes and province changes within firm. Robust standard errors clustered at the firm-level are reported in square brackets. *** p<0.01, ** p<0.05, * p<0.1

The magnitude is systematically stronger on the import side. On average, firms with services import performance which is 1 standard deviation higher than the mean (28,5% higher) have a 41.6% (28,5*1,46) higher level of total employment with respect to firms with average services import performance. With respect to the mean value of services exports, a 1 standard deviation higher performance (77% higher services exports) is associated only with a 24.6% (77*0.32) higher level of total employment. These relationships are also particularly strong for blue collars, signaling how larger firms in terms of blue collars' employment have also on average better performances in services trade. These results are obtained by exploiting within-firm variation which suggests how services trade performance and employment of all occupational categories (blue collars in particular) strongly commove within the same firm over time.

While these patterns are particularly interesting as they indicate that higher volumes of services trade are indeed associated with more jobs across all professional categories at the firm level, they are not conclusive as for the empirical assessment of a causal impact of services trade on employment. To tackle causality, Table 4 reports the estimates from our IV exercise.

Table 4: Services trade and employment - baseline IV exercise

Dep. variable:	log of employment							
	All occupations		Mangers		White collars		Blue collars	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Services exports	0.0030***		0.0031*		0.0039***		0.0026	
	[0.0011]		[0.0017]		[0.0011]		[0.0020]	
Services imports		0.0033		-0.0021		0.0016		0.0177
		[0.0062]		[0.0083]		[0.0062]		[0.0127]
	First stage estimates							
Instrument exports	0.3703***		0.3713***		0.3703***		0.3659***	
	[0.0083]		[0.0086]		[0.0083]		[0.0093]	
Intrument imports		0.1367***		0.1452***		0.1367***		0.1433***
		[0.0144]		[0.0154]		[0.0144]		[0.0168]
F test	372.7	90.46	360.1	88.44	372.7	90.46	278.3	73.07
Observations	12,433	12,433	11,091	11,091	12,433	12,433	10,156	10,156
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# Firms	2034	2034	1796	1796	2034	2034	1674	1674

All specification include a constant, firm age, a measure of trade in goods and of capital intensity at the firm-year level. All variables are in logs. Province and sector fixed effects are always included, however they are lergerly collinear with firm-fixed effects as there are very few sector changes and province changes within firm. Robust standard errors clustered at the firm-level are reported in square brackets. *** p<0.01, ** p<0.05, * p<0.1

2SLS estimates reveal that services exports have a positive and significant causal effect on total employment. The magnitude of the coefficient of the second stage in column (1) of Table 4 is very close to its counterpart in Table (3). With respect to the mean value of services exports, a 1 standard deviation increase in firm-level performance (77% higher services exports) determines a 23.1% (77*0.3) increase in the level of total employment. Using the estimates in columns (3) and (5) we conclude that a more moderate increase in services export of 10% increases managers' employment by 3% and white collars' employment by almost 4%. While these effects are smaller relatively to those found in other country case studies (see for instance Ariu *et al.*, 2019b) they still represent sensible changes in the level of employment.

The lack of a significant causal effect of services imports is partly at odds with other case studies but fully consistent with the theoretical ambiguity discussed in Section A. Indeed, the composition

of a scale and a substitution effect of services imports might prevent the identification of a clear-cut sign for their net causal effect on employment.

These baseline results are robust to the contemporaneous inclusion of services exports and imports in the same specification as well as to the inclusion of sector-year and province-year fixed effects. This augmented battery of fixed effects controls for unobserved aggregate and time contingent shocks that might impact - with sectoral or geographic heterogeneity - Italian firms as well as the rest of world, codetermining Italian firms services demand and world services export supply and therefore undermining the exogeneity of our instrument for services imports. [12]

Heterogeneity of baseline results

We now turn to the question of whether and how the baseline patterns of services trade's causal impact on employment are heterogenous across aggregate sectors of firms affiliation, the geographic location of Italian firms or the scope of their engagement in services trade.

Table 5 presents the results of the 8 specifications reported in Table 4 replicated on the sub-population of services firms as well as on firms active in other industries. Table 6 instead shows the estimates for the sub-population of firms located in the northern regions of Italy versus those headquartered in the southern part of the country. Finally, Table 7 replicates the baseline IV exercise on the subset of firms that contemporarily imported and exported services for a number of years at least equal to half the period they are observed in the sample (`super traders') versus firms less engaged in services trade.

Overall these additional results confirm the positive causal effect of services exports on total employment, managers' and white collars' employment (i) for firms whose main sector of affiliation is in services; (ii) for those firms located in the northern regions of Italy; and (iii) for firms highly engaged in services trade. Services imports do not seem to impact on employment in any of the sub-populations considered in these exercises. Two notable differences stand out with respect to the baseline IV exercise: services exports seems to have a positive effect on blue collars' employment in super traders and apart from the subpopulation of firms in northern regins of Italy services trade exports do not have any statistically significant effect on managers' employment.

[12] Results of these robustness tests are available upon request.

Table 5: Services trade and employment - Industry VS Services

Dep. variable:	log of employment							
	All occupations		Mangers		White collars		Blue collars	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Industry								
Services exports	0.0001		0.0013		0.0007		0.0027	
	[0.0011]		[0.0016]		[0.0011]		[0.0023]	
Services imports		0.0056		0.0063		0.0045		0.0091
		[0.0079]		[0.0079]		[0.0075]		[0.0142]
F test	243,2	44.06	249.6	9.430	242,6	44.06	212.8	4.507
Observations	7,421	7,421	6,919	6,919	7,421	7,421	6,922	6,922
# Firms	1170	1170	1170	1170	1170	1170	1101	1101
Fixed effects	Province, Sector, Year and Firm							
Panel B: Services								
Services exports	0.0078***		0.0056		0.0092***		0.0049	
	[0.0025]		[0.0040]		[0.0024]		[0.0046]	
Services imports		-0.0065		-0.0122		-0.0110		0.0426
		[0.0111]		[0.0185]		[0.0114]		[0.0278]
F test	585.7	34.95	488.4	26.86	585.7	34.95	319	25.01
Observations	4,605	4,605	3,776	3,776	4,605	4,605	2,874	2,874
# Firms	799	799	642	642	799	799	515	515
Fixed effects	Province, Sector, Year and Firm							

All specification include a constant, firm age, a measure of trade in goods and of capital intensity at the firm-year level. Estimates from the first stage are available upon request. All variables are in logs. Province and sector fixed effects are always included, however they are lergerly collinear with firm-fixed effects as there are very few sector changes and province changes within firm. Robust standard errors clustered at the firm-level are reported in square brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 6: Services trade and employment - Northern Italy VS other regions

Dep. variable:	log of employment							
	All occupations		Mangers		White collars		Blue collars	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Northern regions								
Services exports	0.0033***		0.0032**		0.0043***		0.0015	
	[0.0011]		[0.0016]		[0.0011]		[0.0020]	
Services imports		0.0018		-0.0047		0.0026		0.0101
		[0.0060]		[0.0081]		[0.0060]		[0.0107]
F test	334.3	68.51	303.5	63.97	334.3	68.51	251.4	55.26
Observations	9,836	9,836	8,901	8,901	9,836	9,836	8,078	8,078
# Firms	1605	1605	1438	1438	1605	1605	1317	1317
Fixed effects	Province, Sector, Year and Firm							
Panel B: Southern regions								
Services exports	0.0018		0.0031		0.0017		0.0061	
	[0.0032]		[0.0056]		[0.0031]		[0.0057]	
Services imports		0.0030		0.0015		-0.0043		0.0301
		[0.0173]		[0.0237]		[0.0169]		[0.0390]
F test	381.9	21.15	382.8	24.24	381.9	21.15	297.1	17.38
Observations	2,584	2,584	2,176	2,176	2,584	2,584	2,066	2,066
# Firms	442	442	369	369	442	442	365	365
Fixed effects	Province, Sector, Year and Firm							

All specification include a constant, firm age, a measure of trade in goods and of capital intensity at the firm-year level. Estimates from the first stage are available upon request. All variables are in logs. Province and sector fixed effects are always included, however they are lergerly collinear with firm-fixed effects as there are very few sector changes and province changes within firm. Robust standard errors clustered at the firm-level are reported in square brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 7: Services trade and employment - Super traders VS others

Dep. variable:	log of employment							
	All occupations		Mangers		White collars		Blue collars	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Super traders								
Services exports	0.0038**		0.0027		0.0038**		0.0076**	
	[0.0017]		[0.0026]		[0.0018]		[0.0036]	
Services imports		0.0122		0.0170		0.0134		0.0210
		[0.0087]		[0.0118]		[0.0089]		[0.0202]
F test	402.5	27.30	369.7	26.74	402.5	27.30	309.7	19.16
Observations	7,321	7,321	6,832	6,832	7,321	7,321	5,907	5,907
# Firms	1293	1293	1196	1196	1293	1293	1056	1056
Fixed effects	Province, Sector, Year and Firm							
Panel B: Other firms								
Services exports	0.0005		0.0013		0.0014		0.0022	
	[0.0013]		[0.0019]		[0.0012]		[0.0034]	
Services imports		-0.0037		-0.0176		-0.0089		0.0072
		[0.0105]		[0.0152]		[0.0104]		[0.0167]
F test	220.2	56.59	197.2	59.47	220.2	56.59	157.2	54.83
Observations	4,748	4,748	3,944	3,944	4,748	4,748	3,960	3,960
# Firms	1009	1009	835	835	1009	1009	839	839
Fixed effects	Province, Sector, Year and Firm							

All specification include a constant, firm age, a measure of trade in goods and of capital intensity at the firm-year level. Estimates from the first stage are available upon request. All variables are in logs. Province and sector fixed effects are always included, however they are lergerly collinear with firm-fixed effects as there are very few sector changes and province changes within firm. Robust standard errors clustered at the firm-level are reported in square brackets. *** p<0.01, ** p<0.05, * p<0.1

E. Conclusions

This paper presents a case study of Italian firms which offers an empirical investigation of the relationship between services trade and employment performance at the firm level. The identification strategy in the econometric analysis allows to assess the causal impact of services trade exports and imports on total employment as well as across the three main occupational categories of managers, white collars and blue collars. Descriptive analysis and a first regression exercise with fixed effects confirm the positive relationship between import and export of services

and employment both across and within firms. Moreover, IV regression analysis shows a positive causal effect of services exports on total employment. This result is novel to the literature and mainly driven by a positive impact of services exports on managers' and white collars' employment, mostly observed in the sub-population of firms whose main activity is in the services sector, firms located in the northern regions of Italy and firms highly engaged in services trade. This research has important policy implications, as suggested by recent work that highlights the presence of a large and untapped potential for services trade liberalization, especially in the context of domestic, non-discriminatory, behind the border barriers (WTO, 2019). Estimating the causal effect of services trade on the employment performance of Italian firms provides useful insights that can shape the national efforts and agenda in the design of services trade policy and services trade promotion.

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Appendix

Micro data: TTN-DR

The TTN-DR is a survey.[13] However, it covers the universe of firms with a yearly turnover equal or superior to the threshold of Euro 165 million. According to the survey design described in Bank of Italy (2016), the database and the associated probability weights are defined to be representative of the population of Italian firms (across all sectors of the economy, excluding financial firms but including insurance firms) with an annual turnover above Euro 10 million. The survey design also features two strata. The first one consists of Italian firms above the 10 million turnover threshold that have executed a cross-border transaction with a foreign entity though an Italian bank. These firms are listed in the Supervisory Reports (Matrice dei Conti) a register containing detailed information of Italian banks, mainly for supervisory purposes. About 80% of sample observations are taken from this group. The second stratum consists of Italian firms above the 10 million turnover threshold and that are not listed in the above described register. The TTN-DR is compiled with the purpose of identifying the bulk of the phenomenon of services trade as the database is used to compute the `services' values in the current account of Italy's balance of payments (Federico & Tosti, 2017).[14]

Services classification in the TTN-DR provides a detailed classification of services (about 50 categories), which follows the Extended Balance of Payments Services Classification (EBOPS).

[13] The methodological note on the survey design is available in Italian at https://www.bancaditalia.it/statistiche/basi-dati/bird/transazioni-internazionali/BIRD_Nota_metodologica_090117.pdf (Bank of Italy, 2016).

[14] According to Bank of Italy (2016), the subset of the reference population in the TTN-DR which consists of firms above a 90 million turnover threshold for the first stratum plus the firms above a 165 million turnover threshold for the second group account for about 95% of services trade.