# Exporters and importers of services: firm-level evidence on Italy

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## Abstract

This work contributes to the small but growing literature on international trade in services at firm level. Our dataset, based on a new Bank of Italy survey, provides information on exports and imports of services (excluding transportation and travel) in 2008-09 for almost 3,000 Italian industrial and services firms, divided by partner country and type of service. We report a set of stylized facts on services trade. We also analyze the choice between export and foreign direct investment in services at the firm level, thus innovating with respect to the previous literature using industry data. The main findings are as follows: the export and import of services is highly concentrated in just a few firms; firm-level variation in trade is positively correlated with firm size and productivity; country-level variation is to a large extent explained by the standard gravity variables: distance strongly reduces trade in services in spite of their intangibility; smaller and less productive firms choose to export rather than sell through foreign affiliates.

*JEL Classification*: F14; F23; L80.

*Keywords*: trade in services; firm heterogeneity; intensive and extensive margin; foreign affiliates; export versus FDI.

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# 1 Introduction

International trade in services is growing in importance anywhere in the world. Improvements in information and communication technologies have increased the tradability of many services (Baldwin 2006). At the same time there has also been some progress in the liberalization of trade in services. World exports of services currently represent about 20% of world exports of goods and services. Data referring to countries for which long-time statistical series on services trade are available suggest indeed an upward trend in the ratio of services trade on goods trade since the 1970s (Lipsey 2008).

Despite the increasing importance of trade in services, the empirical literature is relatively small and mainly relies on aggregate data. Firm-level evidence, in particular, is much scarcer than firm-level evidence on trade in goods (Francois and Hoekman 2010). Only very recently have the first studies using firm-level data on exporters and importers of services begun to appear, mostly as working papers (Breinlich and Criscuolo 2011 on UK, Walter and Dell'mour 2010 on Austria, Kelle and Kleinert 2010 on Germany, Ariu 2011 and Ariu and Mion 2010 on Belgium).

This paper contributes to this small but growing literature by providing firm-level evidence on exporters and importers of services in Italy. We use a new database, derived from a Bank of Italy survey, which includes detailed information on exports and imports of "other services" (i.e. services excluding transportation and travel, such as information and communication services, royalties and licences, legal, engineering, accounting and advertising services, etc.), by type of service and partner country, for 2,955 Italian manufacturing and service firms in 2008-09. Thanks to this rich set of information, we investigate the main types of services traded and the main sectors involved, the degree of concentration, the relation with firm heterogeneity and the role of standard gravity variables.

For a subsample of firms we also have detailed information on the activity of foreign affiliates. This allows us to study the relation between trade in services and ownership of foreign affiliates by firm, country and type of service and, in particular, the choice between export and foreign direct investment (FDI) in services. The provision of services through FDI is indeed often more important than the provision of services through cross-border trade (Francois and Hoekman 2010).

Our work is most closely related to Breinlich and Criscuolo (2011), who provide similar evidence on service traders in the United Kingdom. We extend their work in two ways. First, we focus on a different country, which is broadly similar in size but different under several respects (e.g., legal system, language, lower average firm size, share of manufacturing on GDP); this allows us to see whether their results are specific to the country under investigation or hold more generally. Despite Italy's lower specialization in services, trade in services is increasingly important: the sum of exports and imports in the "other services" item equals 4.8% of Italy's GDP in 2009 (5.3% in 2008, more than one tenth of the ratio of trade in goods to GDP) and has risen significantly over the last two decades (Figure 1). Second, while Breinlich and Criscuolo (2011) only include multinational activity as a binary variable, we exploit our rich firm-level information on foreign affiliates' sales by country of location and main sector of activity in order to investigate the relation between services exports, imports and FDI. There is usually no or little analysis of the relation between trade and ownership of foreign affiliates also among the other studies using detailed firm-level data on services trade (Ariu and Mion 2010, Ariu 2011, Kelle and Kleinert 2010, Walter and Dell'mour 2010).

Other studies focus instead on trade by firms in specific service sectors (Conti, Lo Turco and Maggioni 2010, Temouri, Vogel and Wagner 2010). However, trade in services is not necessarily restricted to firms whose main activity is encompassed by one of the service sectors: as we shall see, the contribution of manufacturing firms to both exports and imports of services is far from negligible (Kelle and Kleinert 2010).

There is also a wide literature using aggregate data (at the country-sector level) on trade in services (Freund and Weinhold 2002, Fillat Castejón, Francois and Woerz 2008, Head, Mayer and Ries 2009 and Christen and Francois 2010, Oldenski 2011). Christen and Francois (2010) and Oldenski (2011) are two recent studies focusing on the export versus FDI decision in services but both studies carry the analysis at the industry level. Two very recent exceptions that use firm-level data are Bhattacharya, Patnaik and Shah (2012) and Kelle, Kleniert, Raff and Toubal (2012). The first paper looks at Indian firms in the software sector and shows that more productive firms are less likely to invest abroad than export, contrary to what happens in the chemicals sector and to a very robust result for trade in goods (Helpman, Melitz and Yeaple, 2004). Compared to their study, our work looks at a broader set of sectors and explores the choice

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between export versus FDI at a more detailed level, controlling for service types and country characteristics. The second paper uses German data on exports and sales through foreign affiliates. While their data has a similar structure to our data, it does not include information on firms' productivity, which precludes them from testing the role of firms' characteristics on the export versus FDI decision.

Finally, our work also relates to the literature on goods trade. On the theoretical side, recent developments focus on heterogeneous firms (Melitz 2003, Melitz and Ottaviano 2008) and on multi-product firms (Bernard, Redding and Schott 2011, Eckel and Neary 2010, Mayer, Melitz and Ottaviano 2010). A large set of studies explores the various margins of trade (firms, products and countries) using very rich datasets on exporters and importers of goods (Eaton, Kortum and Kramarz 2004, 2008, Bernard, Jensen, Redding and Schott 2007, Bernard, Jensen and Schott 2009, Bernard, Jensen, Redding and Schott 2009, Manova and Zhang 2012, Mayer and Ottaviano 2007 and, for Italy, Castellani, Serti and Tomasi 2010).

The data we use has several advantages. First, it includes detailed information by type of service (with almost 30 different categories) and by partner country. Second, it is based on a highly representative sample of firms, covering more than 50% of Italy's total exports and imports included in "other services". Third, it refers to very recent years (2008 and 2009), which is an important asset since trends in ICT and service tradability are changing at a very fast pace. Fourth, it can be linked to other firm-level datasets, from which information on balance-sheet variables and on foreign affiliates is derived.

On the downside, data before 2008 is not available and, as a consequence, our dataset only covers the two years in which the global financial crisis was at its peak, although trade in services proved more resilient than trade in goods. Furthermore, the sampling scheme includes medium and large firms which are likely to participate in international activities and does not cover small or very small firms. Finally, our data does not cover trade in goods.

The rest of this paper is organized as follows: section 2 describes our data; section 3 and 4 report the main findings drawn from the empirical analysis of trade in services. Section 5 analyzes the relation between trade and foreign affiliates in services. Section 6 concludes.

# 2 Data description

Since 2008 the Bank of Italy collects firm-level data on international trade in services on a quarterly basis in order to compile the "services" item in the current account of Italy's balance of payments.[1] The survey scheme defines a threshold corresponding to about 70 million euros of sales. There are approximately 3,800 non-financial firms above this threshold, accounting for 45 per cent of total sales in the reference population.[2] In 2009, 2,616 firms provided data for at least one quarter. Restricting the sample to those firms which provided data for all the four quarters of 2009, we are left with 2,141 firms.[3] Data for banks is instead on a census basis and is collected by the Bank of Italy for supervision and statistical purposes. In 2009 814 banks were authorized to operate in Italy; more than half (433) were small banks (co-operative banks). The "full sample" is then composed of 2,955 firms.

We also use a smaller "CB sample" that includes the subset of firms for which complete balance sheet data is available for 2009. Balance sheet data is derived from Centrale dei bilanci (CB) and Cerved. CB is a commercial database maintained by a consortium of banks for credit risk evaluation purposes. For firms that are not included in CB, we use data from Cerved, which records the official financial statements filed at the Italian Chambers of Commerce. The sample size is now narrowed down from 2,955 to 1,489. This drop is mainly due to the the banking and insurance sector, which we do not include because the balance sheet structure for financial firms is very different compared to firms in manufacturing and other services.

Table A.1 provides a comparison of the two samples. Both samples are mainly composed of large firms. The median number of employees is 191 in the full sample, and 281 in the CB sample. The mean number of employees is 635 in the former, 755 in the latter. On average, the sum of exports and imports of services

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[1]Before 2008, data on services was derived from banks' aggregate reports on cross-border payment transactions, which did not include any firm-level information on exporters or importers.

[2]The reference population of the sample corresponds approximately to about 1,5 million firms whose center of economic interest is in Italy. In terms of sector coverage, the survey does not include banks, other non-insurance financial intermediaries or public administration entities.

[3]We chose to report results for 2009 instead of 2008, since in 2008 the sample size was smaller and the reporting quality was slightly lower, as one would indeed expect in the first year of a survey. This said, the checks we performed showed that all the main results hold for 2008 as well.

accounts for slightly more than 10 million euros in both samples.

Exports and imports of services are defined as transactions between resident units and non-resident units, in line with the 5th Balance of Payments Manual (IMF 1997). The concept of residence, which is also used in national accounts, is based on a unit having its "center of economic interest" within a country (see Lipsey 2008). For the purpose of this paper, we consider a subset of the services item that is defined as "other services" and includes the international service transactions which are not covered under transportation and travel.[4]

Exports and imports of services are disaggregated by partner country and by type of service. Types of services are defined according to the Extended Balance of Payments Services (EBOPS) classification. There are 29 types of services in our data (Table A.2)[5]. While being the most disaggregated level in the EBOPS classification, still it is much more aggregate than the usual product classifications available for trade in goods. Our analysis on the contribution of the "extensive margin" of service trade (i.e. variation in the number of service types traded) should take into account that available classifications for types of services are very coarse.

It is useful to compare our definition of international trade in services to the four modes through which services can be internationally traded according to the General Agreement on Trade in Services (GATS). Mode 1 (cross-border supply) takes place when the consumer receives a service from a foreign supplier without either the consumer or the supplier leaving their own countries. In mode 2 (consumption abroad), the consumer of a service moves to another country to obtain a service, while in mode 3 (commercial presence) services are supplied through a foreign affiliate in the country of the consumer. In mode 4 (presence of natural persons) an individual moves to the country of the consumer in order

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[4]Breinlich and Criscuolo (2011) also exclude travel and passenger transportation, which are often derived from other surveys in which detailed firm-level information is usually not available. For Italy, travel and passenger transport data are collected directly from travellers and not from firms. The survey on merchandise transport collects data on tariffs but not on sales. We also exclude the following minor items: merchanting, which is defined as the purchase and subsequent resale of a good (without the good entering or leaving the borders) and is currently recorded on a net basis in the "other business services" (according to the IMF's 6th Balance of Payments Manual, which will be implemented by 2014, merchanting is to be recorded under the "goods" item instead of the "services" item); construction services; government services, which cover all services associated with government sectors or with international and regional organizations and not classified under other items (i.e. such as expenditures of embassies and consulates).

[5]Only in one case is our classification more detailed than the EBOPS classification (the distinction between "agricultural services" and "mining and on-site processing services").

to provide a service. Our definition is in line with the recent literature using balance-of-payments data (Breinlich and Criscuolo 2011, Walter and Dell'mour 2010) and includes modes 1, 2 and 4, while it excludes mode 3.

For a subsample of firms we also have information on foreign affiliates. This allows us to get an estimate of the quantitative importance of the provision of services through the activities of foreign affiliates abroad (mode 3). Starting from year 2007 the Bank of Italy collected outward Foreign affiliates statistics (FATS).[6] The survey collects the following information on foreign affiliates: number of employees, sales, country of location and main sector of activity.[7] Using the VAT number as a firm identifier, we are able to match 878 firms out of 2,955 firms.[8]

One important issue is that foreign affiliates report only total sales, which might include also sales of manufacturing products. We therefore consider only foreign affiliates whose main sector of activity is in services. We also exclude foreign affiliates whose main sector of activity is in services but does not have any correspondence to our service types, either because it is typically not traded or because it is not included in our services trade data: holding companies, wholesale and retail trade, transportation and storage; accomodation and food service activities, public administration and defence. The type of service classification has been matched with the NACE rev. 2 classification of foreign affiliates' main sector of activity on the basis of the activity description, similarly to Christen and Francois (2010). The match results in a less detailed classification (12 types of services, Table A.3).[9]

A second important issue is that in our data no information is available on

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[6]FATS statistics include only majority-owned foreign affiliates, i.e. when the investor owns more than 50% of equity shares or voting rights. The definition is more restrictive than the one for FDI statistics, which include all foreign affiliates in which an investor owns at least 10% of equity shares or voting rights. Another difference is that FDI statistics are based on the immediate counterparty country principle, while FATS statistics are based on the ultimate country principle. For simplicity, in the rest of the paper we will use the term FDI to refer to the ownership of foreign affiliates in the FATS statistics.

[7]As Alfaro and Chen (2011), we choose to drop foreign affiliates with zero employees or zero sales. This excludes companies that are likely to be registered exclusively for tax purposes or that are not active yet.

[8]The reference population of the sample is made up of about 280,000 firms whose ultimate controlling institution is based in Italy. In terms of sector coverage, the survey does not include banks, other non-insurance financial intermediaries and the public administration. The sampling scheme is based on strata determined by the following variables: total assets, geographical area and past ownership of foreign affiliates.

[9]No match with NACE activity sectors was available for three types of service ("Franchises and similar rights", "Other royalties and license fees" and "Services between affiliated enterprises, not included elsewhere").

the destination country of foreign affiliates' sales. If host-country sales are only a small fraction of total sales, as in export-platform FDI models, our data would measure the export versus FDI decision with error. Available evidence reported by the Bureau of Economic Analysis for U.S. multinationals' foreign affiliates shows that export-platform FDI models are more common for the provision of goods than for the provision of services. According to the same source, in 2009 host-country sales of services accounted for 73% of foreign affiliates' total sales (BEA 2011). This suggests that the measurement error derived from using total sales instead of local sales is likely to be small.

# 3    Main patterns

This section presents the main patterns of trade in services.[10] We begin by looking at the distribution of firms in our full sample by industry and trade status (Table 1). We find that firms which export and import services represent 31.6% of our sample; if we exclude banks, the percentage goes up to 40.5%, in consequence of the weak presence of cooperative (and minor) banks in international transactions in services. It is much more likely that one is an importer without exporting (24.5%) rather than an exporter without importing (2.7%), in contrast to the findings on UK firms reported by Breinlich and Criscuolo (2011). This is in line with the differences in specialisation patterns between Italy and the United Kingdom: the former has a much larger share of activity in manufacturing and records a deficit in the other services balance, while the opposite is true for the latter.

Firms that do not export nor import represent 41.3% of our sample. This figure reflects the composition of our sample, which by construction only includes medium and large firms which are more likely to export or import services than small or very small firms.

There are some differences across industries. Firms in the "information and communication sector" and in the "professional, scientific and technical activities"

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[10]Since our data comes from a sample survey, we chose to report weighted data (with the exception of data on the number of firms) in order to make them representative of the reference population. The weights are based on inverse sampling probabilities, are in a range between 1 and 6 and include a component that takes into account the population of firms below the threshold (estimated on the basis of evidence from the previous data source). However, using unweighted data instead of weighted data does not appear to have any significant impact on all our main results.

sector are much more likely to be both exporters and importers. In contrast, firms in the "construction" and 'financial and insurance' sector are more likely to be neither exporters nor importers. It should also be noted that almost half of the firms in the "manufacturing" sector are exporters of services.

This is confirmed by Table 2, which reports the value of trade in services by industry. Manufacturing firms represent 35.5% of exports of services and 33.0% of imports.This percentage is much higher than in Belgium (about 15% for both flows, according to Ariu and Mion 2010) but only slightly higher than in Germany (about 25% for exports, 30% for imports, according to Kelle and Kleinert 2010 and Kelle 2012), a country which like Italy has a relatively high share of activity in the manufacturing sector. The two other large contributions come from firms in the "financial and insurance activities" sector (31.1% of exports and 27.2% of imports) and from firms in the "information and communication" sector (12.1% of exports and 23.1% of imports).[11]

Table 3 reports instead the value of trade by type of service. The largest types of services for both exports and imports are "reinsurance", "other miscellaneous business services" and "services between affiliated enterprises, n.i.e.". Other types of services with significant flows include "telecommunication services", "franchises and similar rights", "other royalties and license fees", "advertising and market research", "research and development services", "financial services" and "computer services".[12]

The distribution of the types of services traded is strongly related to the sector of activity, on both the export and the import side. Specifically, for manufacturing firms the most frequent types include services between affiliates, royalties and franchises and advertising; firms in the information and communication sector usually export and import computer services, telecommunication services and royalties and franchises; for insurance companies, more than 80% of exports and imports are concentrated in reinsurance; firms in the professional, scientific and technical activities sector tend to trade advertising, R&D, architectural and engineering and other technical services.

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[11]As expected, the ratio of services exports on turnover (total sales of goods and services) is relatively lower for manufacturing firms (about 3% on average) than for services firms (between 6 and 12% for information and communication, financial and insurance, transportation, professional, scientific and technical activities); for the latter, the ratio of services exports on turnover is slightly lower than the corresponding value for Austrian firms (Walter and Dell'mour 2010).

[12]The composition of trade by type of service is more precise under the new survey-based data collection compared to the previous settlement-based system, where a much larger share of flows was recorded under residual items such as "other miscellaneous business services".

Trade in services is highly concentrated among firms, as already found for the UK and for Austria by Breinlich and Criscuolo (2011) and Walter and Dell'mour (2010), respectively. Table 4 shows that the top 10 exporters account for 20.8% of the total export value in the reference population, and the top 100 exporters account for 45.5% of total export value. Imports are slightly less concentrated, with the top 100 importers accounting for 38.6% of total import value.[13]

Table 5 reports the distribution of exporters and export value by number of service types and countries. As it is also the case with trade in goods, there is a small number of exporters which export many products to many countries and account for a large share of total value. We find that a similar pattern holds for exports but not for imports of services. For exports, 5.1% of firms are large exporters (i.e. those exporting 5 or more service types to 10 or more countries) and account for 35.3% of total exports. For imports, instead, the share of large importers (i.e., those importing 5 or more types from 10 or more countries) is significantly higher (21.2%), and represents 50.8% of import value (Table 6).

Table 7 reports data on the distribution of the number of countries, the number of types of services, the total value of trade and the values per country, per number of types of services and per country-service combination. Looking at firms with positive exports, the median firm exports only one type of service to 4 different countries. There seems to be a larger variation in sources and types of imports: in the sample of firms with positive imports, the median firm imports 3 types of services from 5 different countries. In other terms, firms are more likely to export a single service type to many countries than to export several types of services, presumably reflecting firms' specialisation in producing a single type of service.[14] In contrast, firms are more likely to import two or more types of services; this may be explained considering that services are often used as intermediate inputs. For a large part of firms, the value of services exported or imported is quite small: the median value equals to 0.8 EUR millions for exports and 0.7 for imports.

Trade in services is also concentrated within firms. Tables 8 and 9 report the share on firms' exports or imports of their most important partner countries or types of services, respectively. The upper panel of Table 8 shows that for a firm

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[13]Trade in goods is also concentrated, with 700 large Italian exporters (0.4% of the universe of exporters) accounting for 43% of exports in 2009, according to Istat data.

[14]The main partner countries are France, Germany, Ireland, Switzerland, United Kingdom and United States; these six countries account for 45 percent of exports and 50 percent of imports.

exporting to two countries, the top country accounts on average for 82.7% of the firm's exports. Even for a firm exporting to a number of countries between 11 and 20, the top country receives more than half of the firm's exports. A similar pattern is found for imports (lower panel of Table 8). There is also within-firm concentration by service type (Table 9, upper and lower panels).

# 4    Analysis of firm and country-level variation

This section reports the results of regressions on firm and country-level variation, using either our full sample or our CB sample. We start with the following decomposition:

$$ln(value_i) = ln(countries_i) + ln(types_i) + ln(\overline{value_i}) \qquad (1)$$

where $ln(value_i)$ is the log of export value for firm $i$, $ln(countries_i)$ is the log of the number of countries firm $i$ exports to, $ln(types_i)$ is the log of the number of types of services exported and $ln(\overline{value_i})$ is the log of the average export value per country-service type combination. The first two can be defined as the extensive margins of trade (by country and type of service), while the latter corresponds to the intensive margin of trade.

For each of the three margins in equation 1, we estimate the following equation:

$$ln(margin_i) = \alpha + \beta ln(value_i) + \epsilon_i \qquad (2)$$

The upper panel of Table 10 shows that almost 70% of firm-level variation is explained by the intensive margin, i.e. by the export value per country-service type combination. The contribution of the intensive margin is very similar to the one found by Breinlich and Criscuolo (2011) for UK firms.

We then relate the firm-level margins of trade to firm size. Using data from the CB sample, we estimate the following equation:

$$ln(margin_i) = \alpha + \beta_1 ln(empl_i) + \beta_2 ln(valadd_i) + \sum_j \gamma_j ind_j + \epsilon_i \qquad (3)$$

where $ln(empl_i)$ is the log of the number of employees in firm $i$, $ln(valadd_i)$

is the log of value added per employee and $\sum_j ind_j$ is a set of two-digit industry fixed effects.

The lower panel of Table 10 shows that export value is positively correlated with both the number of employees and value added per employee. Size is positively and significantly correlated with all the three margins, while productivity is positively and significantly correlated with the intensive margin only.

A similar decomposition of import values shows that firm-level variation is again largely explained by the intensive margin (65%; Table 11). Controlling for two-digit industry fixed effects, size and productivity are positively correlated with all the three margins of firm-level variation in imports.

We then look at country-level variation of exports. The log of export value to country $c$ is decomposed as follows:

$$ ln(value_c) = ln(firms_c) + ln(types_c) + ln(\overline{value_c}) \tag{4} $$

where $ln(firms_c)$ is the log of the number of firms exporting to country $c$, $ln(types_c)$ is the log of the number of service types exported to country $c$ and $ln(\overline{value_c})$ is the log of the average export value per firm-service type combination in country $c$. We estimate the following equation:

$$ ln(margin_c) = \alpha + \beta ln(value_c) + \epsilon_c \tag{5} $$

where $ln(margin_c)$ is one of the three margins in equation 4. While firm-level variation is driven by the intensive margin, country-level variation is instead mainly driven by extensive margins: the number of firms exporting to a given country accounts for 41% of country-level variation in exports; the number of service types accounts for an additional 27% (Table 12, upper panel).

The lower panel of Table 12 regresses export value and each one of the three margins on the standard gravity variables: distance (taken from Cepii) and GDP (taken from the World Bank):

$$ ln(margin_c) = \alpha + \beta_1 ln(dist_c) + \beta_2 ln(GDP_c) + \epsilon_c \tag{6} $$

As expected, distance is negatively correlated with export values, with a coefficient equal to -0.64. However, the negative effect of distance only works through the extensive margins, by reducing the number of firms exporting to a

given market and the number of service types exported. Distance is instead not significantly correlated with the intensive margin, as also found by Breinlich and Criscuolo (2011) in contrast with previous findings on goods trade. The coefficient on GDP is positive (1.02) and significantly correlated with all thr three margins of exports. The results for imports are largely similar (Table 13).

Distance seems however to have a stronger impact on imports, with a coefficient equal to -0.85, again concentrated in the extensive margins. The impact of distance on service trade is broadly similar to that on goods trade. This finding is apparently surprising given the intangibility of services, but it can be explained by other features of services, such as the need for close interaction between producer and consumer. This is much harder to get when there are significant language or cultural differences, which generally increase with geographical distance.[15]

## 5  Trade in services and foreign affiliates

In this section we use detailed data on foreign affiliates that are available for a subsample of firms. We first present evidence on firms' status (exporter, importer and FDI in services). We then look at the choice between export and FDI. As mentioned in Section 2, we are able to match 878 firms; 205 firms are purely "domestic" firms, with zero exports, imports and foreign affiliates' sales. The distribution of the remaining 673 firms with at least some international activity in services is reported in Table 14. The most recurrent status is to be an exporter and importer, without any FDI. The second most recurrent status is to be only an importer. Only a very small number of firms is instead engaged in just exporting or just FDI. Firms with FDI in services represent about 18% of this subsample. In particular, firms with all three forms of international activity represent 12% of the subsample but account for an extremely large share of exports (66%), imports (53%) and especially foreign affiliates' sales (92%). Not only is trade in services highly concentrated, but foreign affiliates' activity is also extremely concentrated in a relatively small group of multinational firms that take part in all three forms of international activity.

We then focus on the export versus FDI decision. In the standard model (Helpman et al. 2004), firms face a trade-off between fixed costs and variable

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[15]We replicate the gravity equations separately on manufacturing and services firms; the results are largely similar.

costs. FDI implies higher fixed costs, but lower variable costs than export (as firms save on transportation costs or tariffs by producing abroad instead of shipping goods across the border). Firms choose the mode of supply depending on their productivity. Only the most productive firms find it profitable to invest abroad; firms with intermediate productivity levels choose to export, while the least productive firms will sell their output only domestically. Although initially conceived for trade in goods, this model can be extended to trade in services. While there are no physical transportation costs for services, it is not hard to think of other variable costs thare are higher when services are exported than when services are provided through foreign affiliates (tariffs, communication and coordination costs, costs of providing the services at distance, etc.). Bhattacharya et al. (2012) modify the Helpman et al. (2004) model assuming that, when services are exported, there is a risk of low service quality due to the distance between the producer and the consumer. If this risk is sufficiently high, the productivity ranking is reversed, so that more productive firms find it profitable to export while less productive firms choose FDI. provided at a distance there is a risk of product quality when services are provided at a distance (i.e when they are exported).

To test these competing predictions, we use data on foreign affiliates' sales in order to compute a measure of the propensity to export relative to sell through foreign affiliates. Table 15 reports the share of exports on the sum of exports and foreign affiliates' sales by type of service. There is a huge variability across sectors: the share goes from a minimum of 0 (news agency services) to a maximum of 0.89 (research and development services). The ranking is very similar to the one reported by Oldenski (2011) on U.S. data. As in her work, research and development, architectural and engineering and other business services tend to have a high propensity to export relative to FDI, while financial and insurance services have an extremely low share of exports on the sum of exports and foreign affiliates' sales (0.01 and 0.04 respectively).[16]

We report the results of a simple specification to explain the main determinants of the propensity to export services:

[16]The very low export ratio for financial and insurance services presumably reflects to a large extent regulatory issues. It does not depend on measurement issues, since exports and foreign affiliates' sales are both measured on a gross basis (i.e. gross premia for insurance).

$$\frac{exp_{ick}}{(exp_{ick} + sales_{ick})} = \alpha + \beta_1 ln(dist_c) + \beta_2 ln(GDP_c) + \beta_3 ln(empl_i) +$$
$$+ \beta_4 ln(prod_i) + \sum_j \gamma_j ind_j + \sum_k \delta_k type_k + \epsilon_{ick} \tag{7}$$

where the dependent variable is the ratio of exports to the sum of exports and foreign affiliates' sales by firm $i$ to country $c$ in service type $k$. The dependent variable is regressed on country-level variables (GDP and distance) and firm-level variables (size, proxied by employment, and productivity, proxied by sales per employee). We also control for industry and service type fixed effects. This takes into account several sector or service type-specific factors, including regulations that restrict FDI or trade in specific sectors or types of services. The sample is made of all firm-country-type combinations for which we record positive exports or foreign affiliates' sales. We estimate this specification with various alternative methods: OLS, tobit and fractional logit.

Table 16 shows that the export share is smaller in larger markets (the coefficient on GDP is negative and significant) while it is not significantly related to distance. It is also smaller in larger and more productive firms, as suggested by the negative and significant coefficients on the firm-level variables. The results are robust to the inclusion of firm fixed effects or country fixed effects (columns (2) and (3), respectively) or to estimation methods for limited dependent variables (tobit and fractional logit in columns (4) and (5), respectively). To get an estimate of the magnitude of the relation, using estimates in column (1) we find that the export ratio falls by 3.7 percentage points after a one standard deviation increase in employment (2.2 percentage point after a one standard deviation increase in productivity, 1.5 percentage points after a one standard deviation increase in GDP).

The finding that smaller and less productive firms are more likely to export than to sell through foreign affiliates is consistent with Helpman et al. (2004). It does not provide support instead to the evidence reported by Bhattacharya et al. (2012) for the Indian software sector. The negative relation between market size and export ratio is in line with evidence reported by Kelle et al. (2012) for Germany. It might be explained on the basis of fixed costs of FDI: in a larger market with bigger sales opportunities, firms are more likely to find it profitable to pay for the fixed costs of FDI.

We run further robustness checks in unreported regressions. The results are unchanged after the inclusion of a common language dummy, which is not significantly different from zero. We also include an index of FDI regulatory restrictiveness, which varies by country and sector and is available for a subsample of 42 countries (OECD 2007). As expected, the coefficient on restrictions to FDI is always positive and weakly significant: exports are preferred to FDI if there are higher barriers to the latter. The findings on the other variables remain largely unchanged.

Finally, we take into account the sample selection issue. We consider all the firm-type-country cells for which we do not observe neither export nor foreign affiliates' sales. We then estimate a multinomial logit, where the dependent variable can take three outcomes: 0 for neither export nor FDI; 1 for export (export ratio greater or equal than 0.5); 2 for FDI (export ratio between 0 and 0.5). As expected, the probability of export or FDI, relative to the base outcome of zero foreign activity, is increasing with firm size, productivity and GDP and decreasing with distance. The probability of FDI relative to export is increasing with firm size, productivity and GDP (although the latter variable is not significant). It is also not significantly related to distance, in line with our previous findings.

# 6  Concluding remarks

This work contributes to the firm-level literature on international trade in services, using data derived from a new Bank of Italy survey on exports and imports of services covering almost 3,000 Italian industrial and services firms. The richness of our data, which includes information on the partner country and on the type of service traded, allows us to provide a first comparison to the stylized facts on service traders reported by previous literature, such as those reported by Breinlich and Criscuolo (2011) for their sample of UK firms. In addition, we are able to report detailed firm-level evidence on the relation between trade and FDI in services. This is important, given that the provision of services through foreign affiliates is often more significant than through cross-border trade.

Our main findings can be summarized as follows. Importing services is much more likely than exporting services. Firms in the services sector are not the only ones that actually export services; about one third of the total value of exports of services comes from manufacturing firms. Trade in services is highly concentrated

across firms: the top 10 firms represent about 20% of the total value of exports and imports in the reference population. Firm-level variation in the value of traded services is largely driven by the intensive margin. Country-level variation is instead mainly driven by the extensive margin. The standard gravity variables explain a large fraction of country-level variation. In particular, distance reduces services trade similarly to what results from estimates for goods trade, despite the intangibility of services and the absence of physical transport costs. Further research should focus on cultural and legal determinants which may explain the negative effect of geographical distance.

We also innovate on previous literature by reporting detailed firm-level evidence on the relation between trade in services and the activity of foreign affiliates. We find a huge variability across sectors in the propensity to export relative to sell through foreign affiliates. We also find that exports are preferred to foreign affiliates' sales by smaller and less productive firms and in smaller markets.

Overall, our findings support most, but not all, the stylized facts on services trade reported by Breinlich and Criscuolo (2011) in their study of UK firms. In particular, in contrast to them we find that importing services is much more likely than exporting services; their finding presumably reflects UK's strong comparative advantage in services. Moreover, we find that FDI activity in services is even more concentrated than the already highly concentrated trade. The extremely high level of concentration is in line with the general pattern observed in services (Christen and Francois 2010) and casts some doubts on the conclusion that theoretical models of goods trade may be applied to trade in services without significant modifications.

The high level of firm heterogeneity suggests that liberalization in services trade could have significant effects on aggregate productivity, following a reallocation of market shares in favour of more productive exporters, as pointed out in recent models of trade with heterogeneous firms (Melitz 2003). Services trade could also have important effects on productivity through the import side, since most services purchased from abroad are intermediate inputs. Further research is required to study the relation between trade in services and productivity.

# Acknowledgements

# References

Alfaro L., Chen M. 2011. Surviving the global financial crisis: foreign ownership and establishment performance, NBER Working Papers, no. 17141.

Ariu A., 2011, The margins of trade: services vs goods, mimeo.

Ariu A., Mion G. 2010, Trade in services: IT and task content, National Bank of Belgium Working Papers, no. 200.

Baldwin R. 2006, Globalisation: the great unbundling(s), paper for the Finnish Prime Minister Office, Economic Council of Finland as part of EU Presidency, September.

BEA 2011, Operations of U.S. multinational companies in the United States and abroad, November.

Bernard A.B., Jensen J.B., Schott P. 2009. Importers, exporters and multinationals: a portrait of firms in the U.S. that trade goods, in Dunne T., Jensen J.B., Roberts M.J. Producer dynamics: new evidence from micro data, Chicago, University of Chicago Press.

Bernard A.B., Jensen J.B., Redding S.J., Schott P. 2007. Firms in international trade, Journal of Economic Perspectives, 21(3), 105-130.

Bernard A.B., Jensen J.B., Redding S.J., Schott P. 2009. The margins of US trade, American Economic Review, 99(2), 487-493.

Bernard A.B., Redding S.J., Schott P. 2011. Multi-product firms and trade liberalization, Quarterly Journal of Economics, 126(3), 1271-1318.

Bhattacharya R., Patnaik I., Shah A. 2012, Export versus FDI in services, The World Economy, 35, 61-78.

Breinlich H., Criscuolo C. 2011. International trade in services: a portrait of importers and exporters, Journal of International Economics, 84, 188-206.

Castellani D., Serti F., Tomasi C., 2010. Firms in international trade: importers and exporters heterogeneity in the Italian manufacturing industry, The World Economy, 33, 424-457.

Christen E., Francois J. 2010. Modes of delivery in services, CEPR Discussion paper. no. 7912.

Conti G., Lo Turco A., Maggioni D. 2010. Exporters in services: new evidence from Italian firms, Applied Economics Quarterly, 56(1), 73-98.

Eaton J., Kortum S., Kramarz F. 2004. Dissecting trade: firms, industries, and export destinations, American Economic Review, 94(2), 150-154.

Eaton J., Kortum S., Kramarz F. 2008. An anatomy of international trade: evidence from French firms, NBER Working Paper, no. 14610.

Eckel C., Neary J.P. 2010. Multi-product firms and flexible manufacturing in the global economy, Review of Economic Studies, 77(1), 188-217.

Fillat Castejón C., Francois J., Woerz, J. 2008. Cross-border trade and FDI in services, CEPR Discussion paper. no. 7074.

Francois J., Hoekman B. 2010. Services trade and policy, Journal of Economic Literature, 48, 642-692.

Freund C., Weinhold D. 2002. The Internet and international trade in services, American Economic Review, 92(2), 236-240.

Head K., Mayer T., Ries J. 2009. How remote is the offshoring threat? European Economic Review, 53, 429-444.

Helpman E., Melitz M., Yeaple S.R. 2004. Export Versus FDI with heterogeneous firms, American Economic Review, 94(1), 300-316.

IMF 1997, Balance of payments manual, 5th edition, Washington.

Kelle M. 2012. Crossing industrial borders: German manufacturers as services exporters, Centro Studi Luca d'Agliano Development Studies working papers, no. 329.

Kelle M., Kleinert J. 2010. German firms in service trade, Applied Economics Quarterly, 56(1), 51-71.

Kelle M., Kleinert J., Raff H., Toubal F. 2012. Cross-border and foreign-affiliate sales of services: evidence from German micro-data, CESifo working paper, no. 3806.

Lipsey R.E. 2008. Measuring international trade in services, in Reinsdorf M.B., Slaughter M.J. (eds) International trade in services and intangibles in the era of globalization, NBER.

Manova K., Zhang Z. 2012. Export prices across firms and destinations, Quarterly Journal of Economics, 127(1), 379-436.

Mayer T., Melitz M.J., Ottaviano G.I.P. 2010. Market size, competition and the product mix of exporters, Research series 201010-202, National Bank of Belgium.

Mayer T., Ottaviano G.I.P. 2007, The happy few: the internationalisation of European firms. Bruegel Blueprint Series, vol. III.

Melitz M.J. 2003. The impact of trade on intra-industry reallocations and aggregate industry productivity, Econometrica, 71(6), 1695-1725.

Melitz M.J., Ottaviano G.I.P. 2008. Market size, trade, and productivity, Review of Economic Studies, 75(1), 295-316.

Oldenski L. 2011, Export versus FDI and the communication of complex information, Journal of International Economics, forthcoming.

Temouri Y., Vogel A., Wagner J. 2010, Self-selection into export markets by business services firms: evidence from France, Germany and the United Kingdom, IZA Discussion Paper, no. 5147.

Walter P., Dell'mour R. 2010, Firm level analysis of international trade in services, IFC Working Papers, no. 4, March.

# Tables and figures

Figure 1: **Italy: Exports and imports of other services (% of GDP)**



Source: Bank of Italy. Transport and travel services are not included.
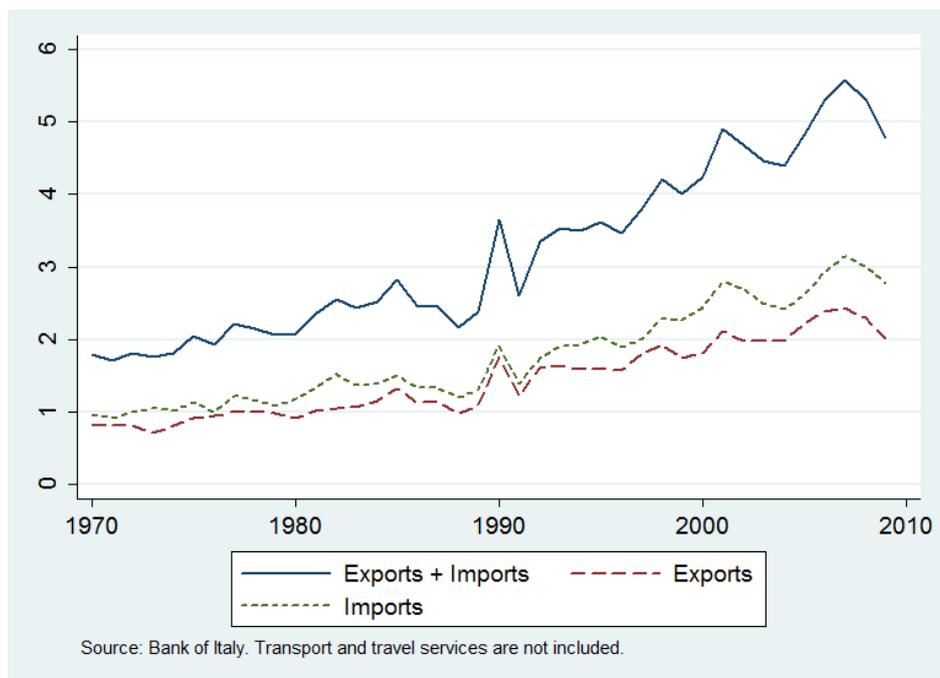
Table 1: **Number of firms by industry and trade status**

| Industry | Not exp, not imp | Exp only | Imp only | Exp & imp | Total |
|---|---|---|---|---|---|
| Manufacturing | 203 | 36 | 300 | 426 | 965 |
| Electricity, gas, water | 33 | 4 | 47 | 17 | 101 |
| Construction | 34 | 6 | 15 | 13 | 68 |
| Wholesale and retail trade | 183 | 16 | 152 | 119 | 470 |
| Transportation and storage | 18 | 2 | 20 | 40 | 80 |
| Accommodation and food service | 3 | 0 | 6 | 8 | 17 |
| Information and communication | 7 | 0 | 21 | 58 | 86 |
| Finance and insurance | 698 | 12 | 119 | 170 | 999 |
| Real estate | 13 | 0 | 4 | 1 | 18 |
| Professional and other activities | 6 | 1 | 4 | 34 | 45 |
| Administrative activities | 9 | 2 | 20 | 24 | 55 |
| Other | 12 | 1 | 15 | 23 | 51 |
| Total | 1219 | 80 | 723 | 933 | 2955 |
| *Total (row %)* | *41.3* | *2.7* | *24.5* | *31.6* | *100.0* |

The table reports the number of firms by industry and services trade status (neither exporter nor importer; exporter only; importer only; exporter and importer). The last row reports the row percentage for the total. Full sample. Unweighted data.

Table 2: **Value of trade in services by industry**

| Industry | Exports | % | Imports | % |
|---|---|---|---|---|
| Manufacturing | 9816 | 35.5 | 10719 | 33.0 |
| Electricity, gas, water | 55 | 0.2 | 393 | 1.2 |
| Construction | 130 | 0.5 | 127 | 0.4 |
| Wholesale and retail trade | 1238 | 4.5 | 1757 | 5.4 |
| Transportation and storage | 1853 | 6.7 | 1228 | 3.8 |
| Accommodation and food service activ. | 153 | 0.6 | 54 | 0.2 |
| Information and communication | 3343 | 12.1 | 7507 | 23.1 |
| Financial and insurance (incl. banks) | 8607 | 31.1 | 8844 | 27.2 |
| Real estate activities | 17 | 0.1 | 76 | 0.2 |
| Professional, scientific and technical activ. | 1180 | 4.3 | 831 | 2.6 |
| Administrative and support service activ. | 224 | 0.8 | 514 | 1.6 |
| Other | 1040 | 3.8 | 439 | 1.4 |
| Total | 27657 | 100.0 | 32490 | 100.0 |

The table reports the value of exports and imports of services by industry (EUR millions and column percentages). Full sample. Weighted data.

Table 3: **Value of trade in services by service type traded**

| Type of service | Export | % | Import | % |
|---|---:|---:|---:|---:|
| Telecommunication services | 2155 | 7.8 | 2567 | 7.9 |
| Postal services | 0 | 0.0 | 16 | 0.0 |
| Courier services | 79 | 0.3 | 70 | 0.2 |
| Life insurance and pension funding | 93 | 0.3 | 47 | 0.1 |
| Freight insurance | 14 | 0.1 | 55 | 0.2 |
| Other direct insurance | 389 | 1.4 | 847 | 2.6 |
| Reinsurance | 5833 | 21.1 | 6260 | 19.3 |
| Auxiliary services | 851 | 3.1 | 515 | 1.6 |
| Financial services | 1626 | 5.9 | 1688 | 5.2 |
| Computer services | 995 | 3.6 | 2399 | 7.4 |
| News agency services | 10 | 0.0 | 23 | 0.1 |
| Other information provision services | 11 | 0.0 | 87 | 0.3 |
| Franchises and similar rights | 1126 | 4.1 | 2639 | 8.1 |
| Other royalties and license fees | 1412 | 5.1 | 2208 | 6.8 |
| Legal services | 8 | 0.0 | 219 | 0.7 |
| Accounting, auditing, book-keeping | 246 | 0.9 | 524 | 1.6 |
| Business and management consultancy | 466 | 1.7 | 704 | 2.2 |
| Advertising, market research | 1331 | 4.8 | 1567 | 4.8 |
| Research and development services | 1605 | 5.8 | 1082 | 3.3 |
| Architectural, engineering | 859 | 3.1 | 1379 | 4.2 |
| Waste treatment and depollution | 781 | 2.8 | 189 | 0.6 |
| Agricultural services | 0 | 0.0 | 0 | 0.0 |
| Mining and on-site processing services | 3 | 0.0 | 99 | 0.3 |
| Other miscellaneous business services | 3717 | 13.4 | 3880 | 11.9 |
| Services between affiliated enterprises, n.i.e. | 3880 | 14.0 | 2993 | 9.2 |
| Audio-visual and related services | 136 | 0.5 | 149 | 0.5 |
| Education services | 4 | 0.0 | 17 | 0.1 |
| Health services | 3 | 0.0 | 9 | 0.0 |
| Other personal services | 24 | 0.1 | 260 | 0.8 |
| Total | 27657 | 100.0 | 32490 | 100.0 |

The table reports the value of exports and imports of services by service type traded (EUR millions and column percentages). Full sample. Weighted data.

Table 4:   **Top exporters and importers of services: share on total trade value**

|         | Top 5 | Top 10 | Top 20 | Top 50 | Top 100 |
|---------|-------|--------|--------|--------|---------|
| Export  | 14.7  | 20.8   | 27.9   | 38.2   | 45.5    |
| Import  | 14.2  | 18.7   | 23.3   | 31.8   | 38.6    |

The table reports the percentage share of total trade values in reference population (weighted) accounted for by exports or imports of the top 5, 10, 20, 50 and 100 exporters or importers (unweighted). Full sample.

Table 5: **Distribution of exporters and export value by number of service types and countries**

| | No. countries | | | | | | |
|---|---|---|---|---|---|---|---|
| **No. types** | 1 | 2 | 3 | 4 | 5-9 | 10+ | All |
| | Number of exporters | | | | | | |
| 1 | 22.7 | 6.5 | 5.3 | 1.8 | 6.1 | 9.4 | 51.8 |
| 2 | 3.8 | 4.2 | 2.3 | 0.9 | 4.2 | 3.9 | 19.4 |
| 3 | 0.5 | 1.1 | 1.5 | 1.1 | 4.4 | 4.4 | 12.9 |
| 4 | 0.0 | 0.5 | 0.4 | 0.4 | 2.2 | 3.9 | 7.4 |
| 5+ | 0.0 | 0.1 | 0.4 | 0.6 | 2.3 | 5.1 | 8.4 |
| All | 27.0 | 12.3 | 9.9 | 4.7 | 19.2 | 26.8 | 100.0 |
| | Export value | | | | | | |
| 1 | 6.0 | 1.7 | 0.9 | 1.2 | 2.0 | 14.9 | 26.8 |
| 2 | 4.4 | 0.6 | 0.6 | 0.2 | 2.4 | 8.3 | 16.5 |
| 3 | 0.0 | 1.6 | 1.0 | 0.3 | 3.7 | 4.3 | 11.1 |
| 4 | 0.0 | 0.1 | 0.1 | 0.0 | 1.5 | 5.6 | 7.3 |
| 5+ | 0.0 | 0.0 | 0.5 | 0.2 | 2.2 | 35.3 | 38.3 |
| All | 10.4 | 4.1 | 3.1 | 2.1 | 11.8 | 68.5 | 100.0 |

The table reports the percentage distribution of number of exporters and export value by number of exported service types and number of destination countries. For instance, the cell in second row and second column indicates that 22.7 percent of exporters export only one service type to only one country. Full sample (only firms with positive exports). Weighted data for export value.

Table 6: **Distribution of importers and import value by number of service types and countries**

| No. types | No. countries | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5-9 | 10+ | All |
| | Number of importers | | | | | | |
| 1 | 11.9 | 2.9 | 1.8 | 0.8 | 2.0 | 2.5 | 21.8 |
| 2 | 3.3 | 5.2 | 1.5 | 1.7 | 2.4 | 2.0 | 16.1 |
| 3 | 1.3 | 1.6 | 2.1 | 2.0 | 3.7 | 2.5 | 13.2 |
| 4 | 0.8 | 0.4 | 1.6 | 0.8 | 4.1 | 3.2 | 11.0 |
| 5+ | 0.6 | 1.2 | 1.1 | 2.1 | 11.7 | 21.2 | 37.9 |
| All | 17.8 | 11.3 | 8.1 | 7.4 | 23.9 | 31.4 | 100.0 |
| | Import value | | | | | | |
| 1 | 1.8 | 0.6 | 0.6 | 1.4 | 1.0 | 4.3 | 9.8 |
| 2 | 1.7 | 0.3 | 0.2 | 0.3 | 1.1 | 3.8 | 7.4 |
| 3 | 0.5 | 0.6 | 0.2 | 1.0 | 0.7 | 1.9 | 4.9 |
| 4 | 6.3 | 0.2 | 0.5 | 0.4 | 1.0 | 5.4 | 13.9 |
| 5+ | 0.3 | 4.7 | 0.2 | 0.3 | 7.6 | 50.8 | 64.0 |
| All | 10.7 | 6.4 | 1.8 | 3.4 | 11.4 | 66.2 | 100.0 |

The table reports the percentage distribution of number of importers and import value by number of imported service types and number of source countries. For instance, the cell in second row and second column indicates that 11.9 percent of importers import only one service type from only one country. Full sample (only firms with positive imports). Weighted data for import value.

Table 7: **Number of service types and countries per firm**

| | No. of countries | No. of types | Value (total) | Value per country | Value per type | Value per country*type |
|---|---|---|---|---|---|---|
| | | | Export | | | |
| 1 pct. | 1 | 1 | 0.0 | 0.0 | 0.0 | 0.0 |
| 25 pct. | 1 | 1 | 0.1 | 0.0 | 0.1 | 0.0 |
| 50 pct. | 4 | 1 | 0.8 | 0.2 | 0.5 | 0.1 |
| 75 pct. | 10 | 3 | 5.7 | 0.8 | 2.7 | 0.4 |
| 99 pct. | 63 | 8 | 239.0 | 43.1 | 105.7 | 37.9 |
| Mean | 8.9 | 2.1 | 14.0 | 2.5 | 6.5 | 1.7 |
| | | | Import | | | |
| 1 pct. | 1 | 1 | 0.0 | 0.0 | 0.0 | 0.0 |
| 25 pct. | 2 | 2 | 0.1 | 0.0 | 0.0 | 0.0 |
| 50 pct. | 5 | 3 | 0.7 | 0.1 | 0.2 | 0.0 |
| 75 pct. | 13 | 6 | 4.2 | 0.5 | 0.9 | 0.1 |
| 99 pct. | 59 | 14 | 141.1 | 26.0 | 47.5 | 11.2 |
| Mean | 9.9 | 4.2 | 10.2 | 2.0 | 2.6 | 0.7 |

The table reports summary statistics for the distribution per firm of the following indicators: number of trading countries, number of traded service types, trade value, trade value per country, trade value per service type, trade value per country-service type combination. Values in EUR millions. Full sample. Only firms with positive exports (1013) in the upper panel and positive imports (1656) in the lower panel. Weighted data for export and import values.

Table 8:   **Concentration of firm exports and imports by country**

| Country ranking | No. of partner countries | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 1 | 2 | 3 | 4 | 5 | 6-10 | 11-20 | 21+ |
| | | | | Export | | | | |
| 1 | 100.0 | 82.7 | 72.7 | 73.3 | 66.0 | 59.5 | 54.9 | 38.7 |
| 2 | . | 17.3 | 21.5 | 17.2 | 19.2 | 19.6 | 17.1 | 16.2 |
| 3 | . | . | 5.8 | 6.9 | 9.7 | 9.4 | 9.5 | 10.4 |
| 4 | . | . | . | 2.6 | 3.7 | 5.4 | 5.8 | 7.5 |
| 5 | . | . | . | . | 1.3 | 3.2 | 3.8 | 5.3 |
| No. firms | 272 | 116 | 101 | 56 | 54 | 163 | 129 | 122 |
| | | | | Import | | | | |
| 1 | 100.0 | 83.1 | 73.8 | 70.8 | 70.5 | 60.8 | 49.7 | 43.2 |
| 2 | . | 16.9 | 20.5 | 20.0 | 18.0 | 19.4 | 19.4 | 16.5 |
| 3 | . | . | 5.7 | 7.0 | 7.4 | 9.5 | 10.9 | 9.9 |
| 4 | . | . | . | 2.1 | 2.9 | 5.1 | 6.6 | 6.7 |
| 5 | . | . | . | . | 1.2 | 2.7 | 4.2 | 4.8 |
| No. firms | 303 | 184 | 141 | 119 | 100 | 337 | 264 | 208 |

The table reports the average fraction of a firm's exports or imports accounted for by its five most important markets for a firm exporting to or importing from a number of countries reported in the column headings. Full sample (only firms with positive exports in the upper panel and positive imports in the lower panel). Unweighted data.

Table 9: **Concentration of firm exports and imports by service type**

| Service type ranking | No. of service types | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6-10 | 11+ |
| | Export | | | | | | |
| 1 | 100.0 | 83.5 | 77.3 | 72.7 | 67.3 | 65.6 | 52.6 |
| 2 | . | 16.5 | 18.5 | 18.0 | 20.5 | 20.4 | 28.3 |
| 3 | . | . | 4.2 | 7.3 | 8.0 | 8.3 | 8.9 |
| 4 | . | . | . | 2.0 | 3.1 | 3.6 | 6.5 |
| 5 | . | . | . | . | 1.1 | 1.3 | 2.3 |
| No. firms | 533 | 191 | 133 | 73 | 37 | 44 | 2 |
| | Import | | | | | | |
| 1 | 100.0 | 80.5 | 74.9 | 71.9 | 66.6 | 60.9 | 54.8 |
| 2 | . | 19.5 | 20.2 | 19.2 | 21.0 | 21.3 | 21.3 |
| 3 | . | . | 4.9 | 6.9 | 8.3 | 9.5 | 10.0 |
| 4 | . | . | . | 2.0 | 3.1 | 4.4 | 5.7 |
| 5 | . | . | . | . | 1.0 | 2.3 | 3.3 |
| No. firms | 382 | 249 | 214 | 186 | 152 | 396 | 77 |

The table reports the average fraction of a firm's exports or imports accounted for by its five most important service types for a firm exporting or importing a number of service types reported in the column headings. Full sample (only firms with positive exports in the upper panel and positive imports in the lower panel). Unweighted data.

Table 10: **Firm-level margins: exports**

| Variables | (1) Ln(Value) | (2) Ln(No. of countries) | (3) Ln(No. of types) | (4) Ln(Value per country*type) |
|---|---|---|---|---|
| | Full sample (including banks) | | | |
| Ln(Value) | 1.000*** | 0.216*** | 0.088*** | 0.697*** |
| | (0.000) | (0.012) | (0.007) | (0.015) |
| Observations | 1013 | 1013 | 1013 | 1013 |
| $R^2$ | 1.000 | 0.416 | 0.254 | 0.739 |
| | CB sample | | | |
| Ln(Employees) | 0.725*** | 0.318*** | 0.159*** | 0.249*** |
| | (0.087) | (0.035) | (0.025) | (0.074) |
| Ln(Value added per employee) | 0.408** | 0.064 | 0.035 | 0.309*** |
| | (0.162) | (0.061) | (0.045) | (0.111) |
| | | | | |
| Industry FE | Yes | Yes | Yes | Yes |
| Observations | 614 | 614 | 614 | 614 |
| $R^2$ | 0.303 | 0.349 | 0.200 | 0.203 |

The table reports OLS estimates of equation 2 (upper panel) and equation 3 (lower panel). The dependent variable is reported in the column heading (log of export value by firm $i$ and its three margins: log of number of destination countries, log of number of exported service types, log of average export value per country-service type combination). It is regressed on the log of export value (upper panel) and on the log of employees and log of value added per employee. Two-digit industry fixed effects are included in lower panel. Full sample (only firms with positive exports). Weighted regressions. Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 11: **Firm-level margins: imports**

| Variables | (1) Ln(Value) | (2) Ln(No. of countries) | (3) Ln(No. of types) | (4) Ln(Value per country*type) |
|---|---|---|---|---|
| | Full sample (including banks) | | | |
| Ln(Value) | 1.000*** | 0.203*** | 0.144*** | 0.653*** |
| | (0.000) | (0.009) | (0.007) | (0.014) |
| Observations | 1656 | 1656 | 1656 | 1656 |
| $R^2$ | 1.000 | 0.405 | 0.340 | 0.671 |
| | CB sample | | | |
| Ln(Employees) | 0.945*** | 0.330*** | 0.190*** | 0.424*** |
| | (0.081) | (0.029) | (0.023) | (0.069) |
| Ln(Value added per employee) | 0.664*** | 0.182*** | 0.130*** | 0.352*** |
| | (0.139) | (0.050) | (0.037) | (0.110) |
| Industry FE | Yes | Yes | Yes | Yes |
| Observations | 987 | 987 | 987 | 987 |
| $R^2$ | 0.350 | 0.314 | 0.221 | 0.189 |

The table reports OLS estimates of equation 2 (upper panel) and equation 3 (lower panel) (with exports replaced by imports). The dependent variable is reported in the column heading (log of import value by firm $i$ and its three margins: log of number of source countries, log of number of imported service types, log of average import value per country-service type combination). It is regressed on the log of import value (upper panel) and on the log of employees and log of value added per employee. Two-digit industry fixed effects are included in lower panel. Full sample (only firms with positive imports). Weighted regressions. Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 12: **Country-level margins: exports**

| Variables | (1) Ln(Value) | (2) Ln(No. of firms) | (3) Ln(No. of types) | (4) Ln(Value per firm*type) |
|---|---|---|---|---|
| Ln(Value) | 1.000*** | 0.411*** | 0.268*** | 0.321*** |
| | (0.000) | (0.016) | (0.010) | (0.024) |
| Observations | 230 | 230 | 230 | 230 |
| $R^2$ | 1.000 | 0.791 | 0.772 | 0.478 |
| Ln(Distance) | -0.644*** | -0.467*** | -0.267*** | 0.089 |
| | (0.182) | (0.103) | (0.063) | (0.086) |
| Ln(GDP) | 1.018*** | 0.494*** | 0.301*** | 0.223*** |
| | (0.060) | (0.025) | (0.018) | (0.037) |
| Observations | 191 | 191 | 191 | 191 |
| $R^2$ | 0.697 | 0.766 | 0.675 | 0.139 |

The table reports OLS estimates of equation 5 (upper panel) and equation 6 (lower panel). The dependent variable is reported in the column heading (log of export value to country $c$ and its three margins: log of number of exporting firms, log of number of exported service types, log of average export value per firm-service type combination). It is regressed on the log of export value (upper panel) and on the log of country $c$'s distance and GDP. Full sample (only firms with positive exports). Unweighted regressions. Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 13: **Country-level margins: imports**

| Variables | (1) Ln(Value) | (2) Ln(No. of firms) | (3) Ln(No. of types) | (4) Ln(Value per firm*type) |
|---|---|---|---|---|
| Ln(Value) | 1.000*** | 0.431*** | 0.255*** | 0.315*** |
| | (0.000) | (0.021) | (0.011) | (0.031) |
| Observations | 223 | 223 | 223 | 223 |
| $R^2$ | 1.000 | 0.779 | 0.760 | 0.441 |
| Ln(Distance) | -0.847*** | -0.559*** | -0.279*** | -0.009 |
| | (0.191) | (0.115) | (0.056) | (0.090) |
| Ln(GDP) | 1.043*** | 0.567*** | 0.313*** | 0.163*** |
| | (0.073) | (0.029) | (0.019) | (0.045) |
| Observations | 188 | 188 | 188 | 188 |
| $R^2$ | 0.612 | 0.765 | 0.661 | 0.068 |

The table reports OLS estimates of equation 5 (upper panel) and equation 6 (lower panel) (with exports replaced by imports). The dependent variable is reported in the column heading (log of import value to country $c$ and its three margins: log of number of importing firms, log of number of imported service types, log of average import value per firm-service type combination). It is regressed on the log of import value (upper panel) and on the log of country $c$'s distance and GDP. Full sample (only firms with positive imports). Unweighted regressions. Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 14:  **Trade and FDI status in services**

| Status | Obs | % Obs | % Exp | % Imp | % FDI |
|---|---|---|---|---|---|
| Only export | 37 | 5.5 | 1.6 | 0.0 | 0.0 |
| Only import | 227 | 33.7 | 0.0 | 5.5 | 0.0 |
| Only FDI | 10 | 1.5 | 0.0 | 0.0 | 3.9 |
| Export and import | 289 | 42.9 | 32.7 | 40.1 | 0.0 |
| Export and FDI | 5 | 0.7 | 0.1 | 0.0 | 1.2 |
| Import and FDI | 24 | 3.6 | 0.0 | 1.0 | 2.6 |
| Export, import and FDI | 81 | 12.0 | 65.6 | 53.3 | 92.3 |
| Total | 673 | 100.0 | 100.0 | 100.0 | 100.0 |

The table reports the distribution of firms by trade and FDI status in services (number of firms, percentage distribution, percentage distribution in terms of export value, percentage distribution in terms of import value, percentage distribution in terms of foreign affiliates' sales). Only firms with positive exports, imports or foreign affiliates' sales.

Table 15:  **Ratio of exports to the sum of exports and foreign affiliates' sales by service type**

| Type of service | Share |
|---|---|
| Research and development services | 0.89 |
| Architectural and engineering services | 0.61 |
| Advertising and market research | 0.42 |
| Computer services | 0.41 |
| Other business, professional and technical services | 0.21 |
| Communication services | 0.12 |
| Business and management consultancy | 0.10 |
| Insurance services | 0.04 |
| Audio-visual and related services | 0.01 |
| Other personal, cultural and recreational services | 0.01 |
| Financial services (except holding) | 0.01 |
| News agency services | 0.00 |

The table reports the ratio of exports to the sum of exports and foreign affiliates' sales by type of service (ranked in decreasing order).

Table 16: **Ratio of exports to the sum of exports and foreign affiliates' sales**

|  | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Ln(Distance) | 0.000 | 0.007* |  | -0.000 | -0.001 |
|  | (0.005) | (0.004) |  | (0.001) | (0.002) |
| Ln(GDP) | -0.008*** | -0.011*** |  | -0.001*** | -0.005*** |
|  | (0.002) | (0.002) |  | (0.000) | (0.001) |
| Ln(Sales per employee) | -0.019*** |  | -0.019*** | -0.002*** | -0.014*** |
|  | (0.004) |  | (0.004) | (0.001) | (0.003) |
| Ln(Employees) | -0.023*** |  | -0.025*** | -0.002*** | -0.013*** |
|  | (0.003) |  | (0.003) | (0.000) | (0.002) |
| Observations | 5574 | 5611 | 5666 | 5574 | 5574 |
| Countries | 135 | 135 | 145 | 135 | 135 |
| Method | OLS | OLS | OLS | Tobit | Frac. logit |
| Industry FE | X | X | X | X | X |
| Service type FE | X | X | X | X | X |
| Firm FE |  | X |  |  |  |
| Country FE |  |  | X |  |  |
| $R^2$ | 0.221 | 0.606 | 0.250 | - | - |

The table reports estimates of equation 7 (coefficients from OLS equation in columns (1)-(3), marginal effects for tobit in column (4) and fractional logit in column (5)). The dependent variable is the ratio of exports to the sum of exports and foreign affiliates' sales by firm $i$ to country $c$ in service type $k$. It is regressed on country $c$'s log of distance and GDP, firm $i$'s log of employees and productivity (measured by the log of sales per employee) and two-digit industry and service type fixed effects. Columns (2) and (3) control for firm and country fixed effects, respectively. The number of observations is slightly smaller in columns (1), (4) and (5) than in columns (2) and (3) because of firms without sales and employment data and countries without GDP or distance data. Standard errors (clustered at country level) in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

# Appendix

Table A.1: **Samples**

| Variable | Full sample Mean | Full sample Median | CB sample Mean | CB sample Median |
|---|---|---|---|---|
| Employees (units) | 635 | 191 | 755 | 281 |
| Total sales (EUR millions) | 339 | 115 | 437 | 147 |
| Exports of services (EUR millions) | 5 | 0 | 5 | 0 |
| Imports of services (EUR millions) | 6 | 0 | 7 | 0 |
| Value added (EUR millions) | | | 68 | 21 |
| Wage bill (EUR millions) | | | 38 | 13 |
| Value added per employee (EUR thousands) | | | 115 | 75 |
| Wages per employee (EUR thousands) | | | 58 | 49 |
| No. firms | 2955 | 2955 | 1489 | 1489 |

The table reports summary statistics for the full and CB samples. Unweighted data.

Table A.2: **Classification of service types**

| Type of service | EBOPS code |
|---|---|
| *Communications services* | *245* |
|    Telecommunication services | 247 |
|    Postal services | 958 |
|    Courier services | 959 |
| *Insurance services* | *253* |
|    Life insurance and pension funding (premiums and claims) | 254 |
|    Freight insurance (premiums and claims) | 255 |
|    Other direct insurance (premiums and claims) | 256 |
|    Reinsurance (premiums and claims) | 257 |
|    Auxiliary services | 258 |
| *Financial services* | *260* |
|    Financial services | 260 |
| *Computer and information services* | *262* |
|    Computer services | 263 |
|    News agency services | 889 |
|    Other information provision services | 890 |
| *Royalties and license fees* | *266* |
|    Franchises and similar rights | 891 |
|    Other royalties and license fees | 892 |
| *Other business services* | *268* |
|    Legal services | 275 |
|    Accounting, auditing, book-keeping and tax consulting services | 276 |
|    Business and management consultancy, public relations services | 277 |
|    Advertising, market research and public opinion polling | 278 |
|    Research and development services | 279 |
|    Architectural, engineering and other technical consultancy | 280 |
|    Waste treatment and depollution | 282 |
|    Agricultural services | 283 |
|    Mining and on-site processing services | 283 |
|    Other miscellaneous business, professional and technical services | 284 |
|    Services between affiliated enterprises, n.i.e. | 285 |
| *Personal, cultural and recreational services* | *287* |
|    Audio-visual and related services | 288 |
|    Education services | 895 |
|    Health services | 896 |
|    Other | 897 |

The table reports a list of service types and the corresponding EBOPS codes. Service types in italics correspond to aggregations of service types.

Table A.3: **Match between EBOPS service types and NACE activities**

| Type of service | EBOPS code | Nace rev. 2 code |
|---|---|---|
| Communication services | 245 | 53, 61 |
| Insurance services | 253 | 65 |
| Financial services (except holding) | 260 | 64 (ex.642), 66 |
| Computer services | 263 | 62 |
| News agency services | 889-890 | 63 |
| Business and management consultancy | 277 | 70 |
| Advertising and market research | 278 | 73 |
| Research and development services | 279 | 72 |
| Architectural and engineering services | 280 | 71 |
| Other business, professional and technical services | 275-276, 282-284 | 37-39, 68-69, 74, 77-82 |
| Audio-visual and related services | 288 | 59-60 |
| Other personal, cultural and recreational services | 895-897 | 75, 85-88, 90-96 |
| *Types of services without match in NACE* | | |
| Franchises and similar rights | 891 | |
| Other royalties and license fees | 892 | |
| Services between affiliated enterprises, n.i.e. | 285 | |

The table reports the correspondence between EBOPS service types codes and NACE rev. 2 industry codes.