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Carolina Lennon

Trade in Services:
Cross-Border Trade vs. Commercial Presence.
Evidence of Complementarity

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Trade in Services: Cross-Border Trade vs. Commercial Presence. Evidence of Complementarity

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Abstract

This paper investigates empirically the relationship between trade and FDI in services. Using bilateral data on US foreign affiliates' sales and trade as well as data on barriers to FDI, the relationship is investigated using different panel techniques, including fixed effects and pseudo-maximum-likelihood techniques. As a first step, bilateral exports are explained by foreign affiliates' sales. Then, in order to control for endogeneity, a crossprice elasticity approach is used, in which exports are explained by the cost of investing abroad. The paper additionally investigates whether the relationship in services differs from that in goods, whether it depends on the motivations for FDI and varies across services. The main findings indicate a robust complementary relationship between trade and FDI in services, which is higher than that found in the goods case and mainly related to the horizontal type of FDI as well as to 'other private services'.

Trade in Services: Cross-Border Trade vs. Commercial Presence. Evidence of Complementarity *

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10th November 2009

Abstract

This paper investigates empirically the relationship between trade and FDI in services. Using bilateral data on US foreign affiliates' sales and trade as well as data on barriers to FDI, the relationship is investigated using different panel techniques, including fixed effects and pseudo-maximum-likelihood techniques. As a first step, bilateral exports are explained by foreign affiliates' sales. Then, in order to control for endogeneity, a cross-price elasticity approach is used, in which exports are explained by the cost of investing abroad. The paper additionally investigates whether the relationship in services differs from that in goods, whether it depends on the motivations for FDI and varies across services. The main findings indicate a robust complementary relationship between trade and FDI in services, which is higher than that found in the goods case and mainly related to the horizontal type of FDI as well as to "other private services".

Keywords: International Trade in Services, Modes of Supply, FDI.

JEL classification: F10, F14, F23, L80

1 Introduction

One of the main characteristics of trade in services is that only a limited number of services can be traded across the border. In fact, a larger number of services require physical contact between consumers and producers in order to allow the transaction to occur. To account for this, the definition of trade in services has been extended to include four different modes of supply through which international transactions in services can occur. Besides the conventional mode (cross-border trade, mode 1), the definition also includes movements of consumers to the countries where the services are provided (mode 2), commercial presence of services enterprises in the countries where the services are consumed (mode 3), and finally, temporary movement of workers (mode 4). This classification has been adopted as a framework for current multilateral negotiations under the GATS and regional agreements. Moreover, proposals for liberalization are stipulated by services sector and mode of supply. In this context, the interdependence between modes of supply is of particular importance as it would imply that trade policy measures taken in one mode might affect the supply of services traded in another mode.

The current paper focuses on the empirical relationship between mode 1 (cross-border trade) and mode 3 (commercial presence abroad). The reason for focusing on these two modes of supply stems from the fact that not only are they economically important, accounting for 80-90 percent of total trade in services,[1] but that they have also been extremely dynamic during the last decades, increasing at a faster rate than trade and foreign investment in goods (Figure 4 and Figure 5 in the annex).

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[1] According to Benassy-Quere et al. (2006), in 2000, services traded by these two modes accounted for more than 90 percent of total services trade in the USA and Japan, and for more than 80 percent in France and Germany. In a recent survey including a broader set of countries, Francois et al. (2009) estimated that 84 percent of total trade in services where in mode 1 and mode 3.

In addition, the theoretical relationship between trade and multinationals' operations (or FDI) has been widely investigated and tested for the manufacturing sector (see Section 2 for more detail), providing an analytical framework to which the services case can be compared. From a theoretical point of view, the literature on the organization of multinational activities indicates that, depending on the multinationals' motivation for FDI, one should expect either a complementary or a substitutive relationship. While this theory suggests a substitutive relationship for horizontally integrated firms, a complementary relationship is expected for vertically integrated firms. Empirical findings using aggregate data have given little support to the theory as they tend to find a complementary relationship in a world where the bulk of foreign investment is of the horizontal type. However, empirical analyses where the two motivations for FDI are clearly distinguished have confirmed this theory, finding a complementary relationship for vertically integrated firms and a substitutive relationship for those horizontally integrated.

What can be expected in the case of services? A substitutive relationship can be argued. Given the services sector's high reliance on proximity of supplier and consumer, it is reasonable to think that most of the investments in the sector should be of the horizontal type and, therefore, according to the theory presented above, a substitutive relationship should be expected. In addition, communication technologies are increasingly permitting cross-border "disembodied" trade in services,[2] which, in turn, might replace services originally provided through commercial presence.

However, a complementary relationship might also occur. Chanda (2006) considers case studies of services firms with overseas operations and finds strong facilitating relationships

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[2]Freund and Weinhold (2002) using data on US exports and Lennon (2008) for OECD countries found that new communication technologies have a positive impact on services exports.

across modes. Interestingly, most of the case studies presented by her are of the horizontal type such as that of the multinational *Ernst and Young*. Besides its strong physical overseas presence (mode 3), *Ernst and Young*'s projects with clients often involve movement of employees between the company's offices (mode 4), and the firm also provides services such as access to its on-line data bases (mode 1). This, in turn, suggests that firms in the services sectors are employing different modes of supply to deliver services to their customers. In other words, rather than facing a choice between exporting and investing, they provide services using several modes.[3]

Recent empirical analyses using data on services find a positive relationship between trade and FDI. A complementary relationship has been found in Buch and Lipponer (2007) using a dataset on German banks, in Li et al. (2003) and Moshirian et al. (2005) employing US data for the insurance and the banking sector, respectively, and finally, in Grünfeld and Moxnes (2003) and Fillat-Castejon et al. (2008) for OECD countries. The latter provides an analytical framework allowing complementarity between the two modes of supply, in which foreign sales of services are represented as a CES composite of foreign affiliates' sales and cross-border trade in services.

The current paper expands the previous literature in a number of directions. Using bilateral data on US foreign affiliates' sales and trade, I employ comparable data for services and goods and clearly distinguish between the two motivations for FDI. First and foremost, this allows me to answer two questions that to the best of my knowledge have not yet been raised in the literature: how different is the services case from the case of goods, and how well does the theory described above apply to services. Since at a higher level of aggregation

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[3]Even though this does not imply a complementary relationship at the product level, at the firm level, where sales of horizontally integrated foreign affiliates can reinforce exports to the host market, this complementarity can be observed.

a complementary relationship has also been found for the manufacturing sector, it is more interesting to contrast results for services with that for goods, rather than to investigate the services sector alone.[4] In addition, as we have learned from previous research in the field, one needs to distinguish between the two motivations for FDI in order to properly verify the theory; consequently, in this paper the relationship is investigated for each type of motivation separately.

From a methodological point of view, in contrast to previous analyses in the services field which have relied on FDI stocks or/and flows data to describe commercial presence abroad, this paper employs data on foreign affiliates' sales. Not only do these data correctly measure mode 3 as indicated in WTO (2006), but they also describe better MNC production in the host country. In addition, with the exception of Buch and Lipponer (2007), the studies on services have relied on aggregate data on FDI at the country level. Instead, I use bilateral data for both trade and sales by affiliates, which might help to reduce aggregation bias. Finally, following previous analyses for the manufacturing sector,[5] at the end of the paper the endogeneity arising from regressing trade on commercial presence is addressed through the use of a cross-price elasticity approach where trade is explained by the cost of investing abroad.

The main findings of this paper indicate a robust complementary relationship between trade and FDI in services, which is higher than that found in the case of goods, and mainly related to the horizontal type of FDI and to "other private services". These results have both policy and theoretical implications; they suggest that further trade liberalization in services will not meet its expectations unless restrictions in commercial presence remain low. On

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[4]Therefore, these data are more suitable to draw policy conclusions and to investigate whether affiliates' production displaces exports to the host market.

[5]Amiti and Wakelin (2003) and Clausing (2000).

the other hand, this paper's results do not confirm the predictions of the literature on the organization of multinationals for the case of services, as the complementary relationship in services is found to be mainly related to the horizontal type of FDI. Moreover, because services now account for the bulk of total FDI flows,[6] more research in this area would improve not only our understanding of the services sector, but also that of multinational corporations as a whole.

This paper is organized as follows: Section 2 presents a review of the literature on the relationship between trade and foreign investment in manufacturing; in Section 3, the data and some stylized facts using the US case are presented; Section 4 presents the estimation strategy and results. Firstly, bilateral exports are explained by affiliates' sales. This exercise is carried out for both services and goods as well as for multinationals' motivations for FDI. Secondly, results from the robustness checks are presented. Finally, the cross-price elasticity approach is applied. Section 5 concludes.

2   Literature review

Once the new theory of the firm allows for different stages of production to be geographically dispersed,[7] two types of foreign investment can be distinguished: horizontal and vertical FDI. In the case of horizontal FDI, the firm duplicates a stage of its production process in another country. On the other hand, for the vertical type of FDI, the firm decides to relocate the production of a particular component to another country; therefore, rather than duplicating, the firm relocates a part of the production process to a new country. For example,

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[6]As indicated in UNCTAD (2004), the share of services in foreign investment has been increasing, and during the period 2001-2002 the sector accounted for two-thirds of total FDI inflows and for 70% of total outflows.

[7]See for instance the theoretical works of Brainard (1993) and Grossman et al. (2006).

maquiladoras in Mexico have been set up by foreign multinationals to assemble and re-export the final product back to the home country.

For each type of FDI, there is a distinct motivation for a firm to invest abroad. In the case of horizontal FDI, the firm avoids transport costs associated with cross-border trade by supplying the market directly through an affiliate. The horizontal investment is then mainly driven by the size of the market and the transport costs of the final product.[8] In the case of vertical FDI, the firm exploits differences in factor prices between countries by splitting its production process geographically. In this case, the investment is mainly driven by factor and input price considerations.[9]

Moreover, the theory expects each type of investment to have a different effect on trade. In the case of horizontal investment, FDI can be seen as a substitute for trade, as exports are replaced by sales of locally produced goods. In the case of vertical investment, FDI and trade can be seen as complements since investing abroad generates trade in intermediate goods between the headquarters and the affiliate.

As indicated by Navaretti and Venables (2004), at least until recently there has been a consensus that the overwhelming proportion of FDI is horizontal rather than vertical, since FDI originates and goes predominantly to developed countries, implying that multinationals seek access to large markets rather than cheaper production locations. Hence one should expect to find empirically a substitutive relationship between FDI and trade.[10]

Empirical studies using aggregate data, however, usually find a complementary relationship. Foreign markets are served through both exports and FDI, the largest importing coun-

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[8]Another factor commonly cited as a determinant of horizontal FDI is firm-level economies of scale.

[9]Another factor commonly cited as a determinant of vertical FDI is plant-level economies of scale.

[10]Similarly, Brainard (1997) finds that foreign affiliates' activities are higher when the host and the home country have a similar level of development; that is, between countries whose factor cost structures are likely to be similar.

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tries are also the largest recipients of foreign investment.[11] Exceptions to these findings exist when more disaggregated data or product-level data are used. As indicated by the theory of the firm, one should expect the sign of the relationship to depend on the type of firms' motivations for FDI. Consequently, analyses investigating the relationship for each type of the motivations have given support to the theory. In particular, Blonigen (2001) found that Japanese affiliates' employment in US plants producing specific auto parts was negatively related to Japanese exports of those same products (exports vs. horizontal FDI). Conversely, he also found a complementary relationship when analyzing the location of Japanese automobile parts production in the United States and Japanese exports of automobile parts to the United States (exports vs. vertical FDI). Similarly, Head and Ries (2001), using firm-level data on Japanese manufacturers from 1965 to 1989, found that FDI substituted exports for 19 large Japanese electronic enterprises and automobile assemblers which were not vertically integrated and, therefore, typically did not supply overseas affiliates.

3 Data and Stylized Facts

3.1 Sales by affiliates and cross-border trade data

This paper uses data on sales by US majority-owned foreign affiliates published by the US Bureau of Economic Analysis (BEA) and drawn from benchmark and annual sample surveys of US direct investment abroad.[12] One outstanding feature of these data is the detail in which sales by US affiliates have been classified. Besides the geographical breakdown by host country, sales have been recorded by the type of product (services and goods), by the

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[11]Some articles finding a complementary relationship are those of Lipsey and Weiss (1981) and Clausing (2000). For a complete review of the empirical literature on the relationship between trade and FDI see Head and Ries (2004).

[12]Sales data cover the period from 1983 to 2004 and include 63 host countries.

geographical destination of sales (sales back to the US, sales in the local market, and sales in third countries), and finally, by the type of affiliation of clients (affiliated and unaffiliated). This article uses the two latter classifications in order to distinguish horizontal from vertical FDI as they can give us some indications about the motivation for overseas production. In this respect, it can be reasonably assumed that US affiliates with large sales back to the US and within the firm's boundaries (affiliated sales) might be vertically integrated. However, those affiliates serving local markets and unaffiliated clients might represent horizontal FDI.[13]

The data on bilateral trade in services are drawn from the US Balance of Payments accounts published by the BEA.[14] Following the indications of WTO (2006) on the allocation of balance of payments statistics to modes of supply, I construct mode 1 by subtracting travel and construction services from services exports.[15] The data on bilateral trade in goods come from Comtrade.

3.2   US stylized facts

Figure 1 compares US exports to sales by US affiliates abroad for both services and goods. The flows are presented as an index (base year 1983) to illustrate the growth trend from 1983 to 2004. From this figure two interesting facts can be observed. First, over the period, services exports and sales of services by affiliates have increased at a higher rate than those of goods. While sales of services have increased more than 8 fold and services exports more than 6 fold, goods exports and sales of goods have only increased 4 fold. Second, the increase

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[13]However, exports to third countries (i.e. export platforms) could result from either vertically or horizontally integrated enterprises.

[14]Data from the US Balance of Payments include 31 US partner countries and cover the period from 1986 to 2005.

[15]Travel services should be allocated as mode 2 (i.e. consumption abroad). Even if construction statistics include some components that should be allocated as mode 1, they also account for components that should be allocated as mode 3. Unfortunately, the level of aggregation of the data does not allow us to extract those components, hence their inclusion in our estimations might generate a positive bias in the coefficients of interest.

Figure 1: BOP Exports v/s Sales by Affiliates
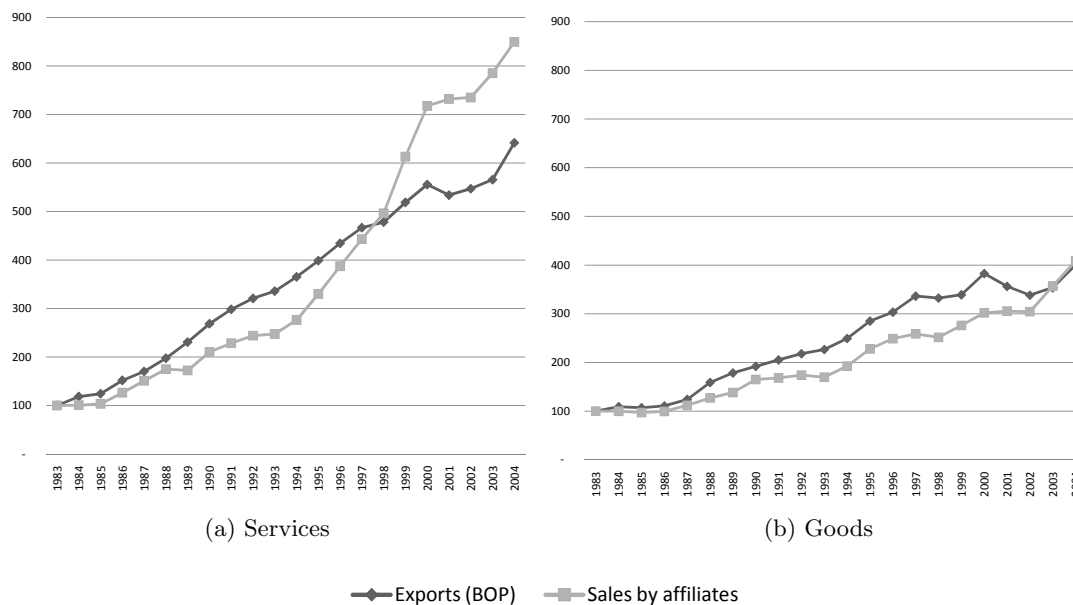
(a) Services

(b) Goods

◆—Exports (BOP)   ■—Sales by affiliates

Source: BEA, benchmark and annual sample surveys of U.S. Parent firms and their affiliates
abroad and balance of payments.

in exports of services has not come at the expense of the US commercial presence abroad. In
fact, sales of services by US affiliates have grown at a faster pace than US exports of services.
Moreover, the growth rate of sales of services accelerated from 1993 on, which, interestingly,
coincided with the mass use of internet.

Taking advantage of the further classifications of US sales data, Figure 2 and Figure 3
present US sales by geographical destination and by affiliation, respectively. Similarly to
Figure 1, they are presented as an index (base year 1983). From these figures it can be
observed that the impressive growth of services sales has been mainly due to a significant
increase in unaffiliated sales and sales in the local market.[16] This implies that the increase
of affiliates' sales abroad has been mainly associated with an increase in the operations of
horizontally integrated firms. On the contrary, in the case of goods, sales to all geographical

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[16]The growth of services sales to other foreign markets has also been impressive, but we cannot classify them
either as vertical or horizontal FDI.

Figure 2: Sales by affiliates by destination
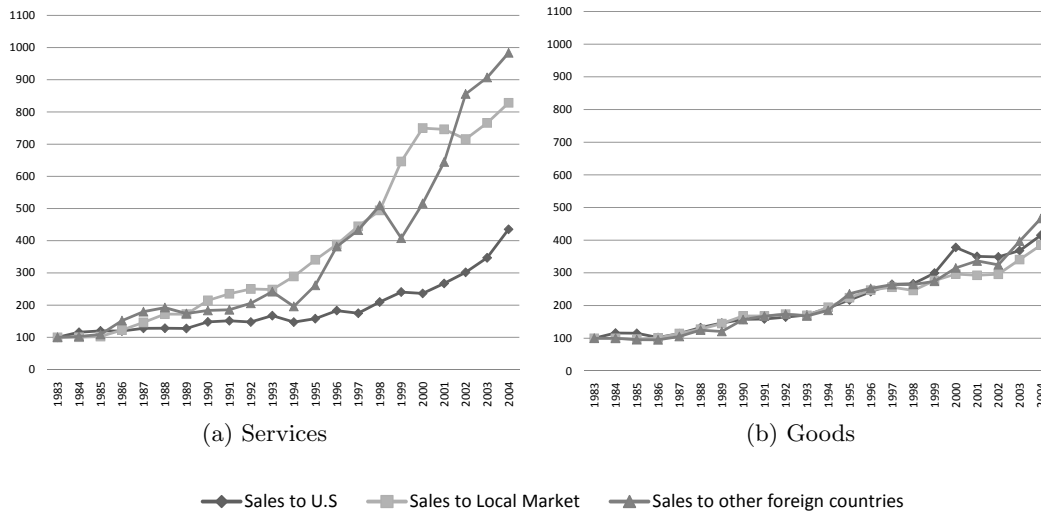
(a) Services   (b) Goods

◆ Sales to U.S   ■ Sales to Local Market   ▲ Sales to other foreign countries

Source: BEA, benchmark and annual sample surveys of U.S. Parent firms and their affiliates abroad

destinations have been increasing at a similar pace, although affiliated sales of goods have been increasing faster than unaffiliated sales, which can be associated with the vertical motivation for FDI.

Finally, Table 10 in the annex presents the US affiliates' sales for the year 2004. Total US affiliates' sales amounted to US$ 3.144 billion, of which 63% represented sales to the local market and 72% unaffiliated sales, implying that the majority of US foreign affiliates were horizontally integrated. However, compared to sales of goods, services sales were relatively more market-seeking, with 78% serving the local market and 85% representing unaffiliated sales.

Summarizing the stylized facts, cross-border trade and commercial presence have been following the same growth pattern for both services and goods, which, in turn, can be considered in both cases as a sign of complementarity between trade and FDI. However, the source of complementarity might be different for these two sectors. In the case of goods, these trends have been accompanied by an increase in affiliated sales (i.e. vertical FDI), which is in line

Figure 3: Affiliated vs. Unaffiliated Sales
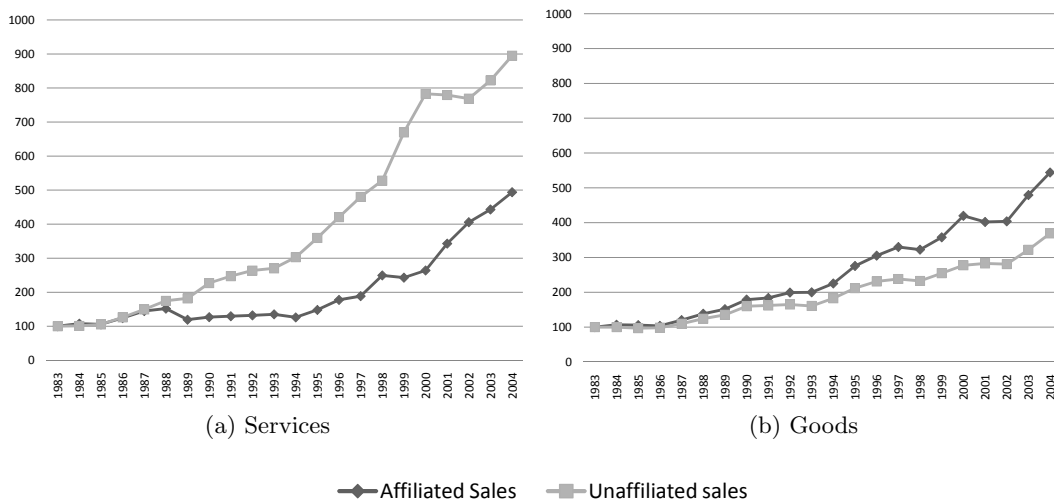
(a) Services

(b) Goods

◆—Affiliated Sales   ■—Unaffiliated sales

Source: BEA, benchmark and annual sample surveys of U.S. Parent firms and their affiliates abroad

with the theory of multinational firms. By contrast, in the case of services, these trends have been accompanied by a considerable increase in unaffiliated sales and sales to the local market (i.e. horizontal FDI). Finally, the bulk of the US affiliates represents horizontal FDI, though affiliates supplying services are more market-seeking than those supplying goods.

4   Empirical estimation

The empirical analysis is divided into two sections. In the first section, bilateral exports are explained by affiliates' sales. The analysis is carried out, for both goods and services, using total sales, sales by type of affiliation and sales by geographical destination as explanatory variables. At the end of this section, robustness checks are presented. In the second empirical section, a cross-price elasticity approach is implemented, in which services exports are explained by the costs that services enterprises face when investing abroad.

Throughout the first and the second empirical sections, bilateral exports are explained by a set of gravity variables. The gravity equation is a log-linear specification, where bilateral

flows from country i to country j are proportional to country's masses and inversely related to their bilateral distance.[17] In particular, the estimations in this paper are based on the following gravity equation:

$$\ln(X_{USAjt}) = \beta_0 + \beta_1 \ln(Y_{jt}) + \beta_{tc}TC_{USAj} + \beta_t D_t + \mu_{ijt} \tag{1}$$

where the US exports to country j at time t (X_{USAjt}) are explained by the market size (Y_{jt}) of US trading partners at time t, by a vector of variables (TC_{USAj}) depicting transaction costs between the US and its trading partners, and by a set of time dummies (D_t).[18] Specifically, the paper uses the partner countries' GDP as a proxy for market size and, as proxies for transaction costs, the distance between Washington and the partners capital city, a dummy variable for common language, and a dummy variable for landlocked countries.[19] In the first empirical section, the gravity equation (1) is extended to incorporate the sales of US affiliates hosted in country j at time t, and in the second section, to incorporate the cost of investing abroad.

4.1 Sales by affiliates as determinant of cross-border trade

This section reports the results from regressions where bilateral exports are explained by affiliates' sales. Similar to cross-border trade, it has been shown that FDI and multinationals' activities are deterred by geographical distance and boosted by market size. Indeed, gravity variables explain around 70-80 percent of cross-country variation in FDI and multinationals'

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[17]The gravity model for explaining bilateral trade patterns is well documented and has a rich history beginning with Tinbergen (1962). Furthermore, the model is firmly grounded in economic theory (See Baier and Bergstrand (2001) for more details).

[18]In a second step, transaction costs and partner characteristics are accounted for by using fixed effects.

[19]GDP data come from the World Development Indicators (WDI), and data on transaction costs from the CEPII distances database.

activities.[20] Therefore, instead of using sales as an explanatory variable, this section uses the residuals from sales regressions in order to reduce the degree of multicollinearity with the remaining regressors.[21] In particular, the residuals are obtained from regressing the log of sales by US affiliates in the host country j at time t on the set of variables indicated in equation (1).

Using data on sales rather than on the cost of investing has advantages and disadvantages. Regarding the advantages, a higher number of observations is available for sales data in terms of country coverage and years considered, allowing the use of different panel techniques. Moreover, the detail of US sales data allows us to distinguish not only sales of goods from sales of services, but also horizontal from vertical FDI. Therefore, they allow for a straightforward comparison between the two sectors and the two motivations for FDI. However, the use of sales by affiliates as determinant of trade can give rise to three statistical concerns. First, a positive relationship might arise because common factors affecting trade and sales in the same direction have not been included in the estimating model. Second, if firms tend to locate in markets they already know through exports, the model might suffer from reverse causality.[22] Finally, at the product level, multinationals decide whether to serve a foreign market by exporting to it or by investing into it. This trade-off means that exports and FDI are simultaneously determined; thus, both exports and FDI are endogenous variables.

In this section, the use of gravity variables, time fixed effects and importing country fixed effects is intended to address the first statistical concern. As indicated above, gravity variables are important determinants of both FDI and trade, hence their inclusion would help to partially control for factors affecting both flows at the same time. Similarly, time fixed

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[20]See Brainard (1997), Shatz and Venables (2000) and Clausing (2000) for empirical estimations of multinationals' activities using a gravity framework, and Kleinert and Toubal (2009) for theoretical foundations.

[21]As in Buch and Lipponer (2007).

[22]This prevents us from using regressions where sales are explained by exports, as an alternative estimation.

effects can help to control for time-varying factors in the US and in the world such as the US market size and global shocks. Finally, US trading partner fixed effects allow us to control not only for factors with low or no variation over the period that are specific to the host country, such as relative endowment in natural resources and corruption level, but also for time-invariant bilateral variables. In this respect, besides distance and common language, which have already been included in the set of gravity variables, the country fixed effects can control for factors such as past colonial links between the US and the host country, shared origin of legal systems, and time zone differences. To address reverse causality, sales by affiliates are lagged by one and two years. Finally, to address simultaneity between trade and sales, in the second empirical section, the relationship between trade and FDI is tested using as an alternative strategy: the cross-price elasticity approach.

Even though importing country fixed effects account for time-invariant factors of US trading partners, they can not fully account for what Anderson and van Wincoop (2003) referred to as countries' multilateral resistance. In the standard new trade theory, the multilateral resistance is modeled as a function of the price index of the importing country,[23] which can fluctuate over time. The omission of the importer's price index or country-year fixed effects might, therefore, generate correlation among error terms within each group of trading partners observations. Accordingly, inferences are based on robust errors clustered by importing country.

Table 1 reports regressions results using ordinary least squares, and Table 2 using trading partner fixed effects (within estimations). Specifically, the tables present the results of regressing goods exports and services exports on total sales of goods and total sales of services,

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[23]More precisely, the price index relates to products of the monopolistic sector and reflects importing countries' proximity to world economic centers

Table 1: Dependent variable: Ln(Exports)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				One period lag		Two periods lag	
	Goods	Serv	Goods	Serv	Goods	Serv	Goods
Ln(Distance)	−0.46**	−0.51***	−0.52**	−0.51***	−0.51**	−0.50***	−0.51**
	[0.18]	[0.08]	[0.21]	[0.09]	[0.21]	[0.09]	[0.21]
Common lang.	0.50**	0.54***	0.46*	0.53***	0.45*	0.53***	0.45*
	[0.19]	[0.13]	[0.26]	[0.13]	[0.26]	[0.13]	[0.26]
Landlocked	−0.72***	0.47***	−0.25	0.47***	−0.25	0.46***	−0.24
	[0.26]	[0.09]	[0.21]	[0.08]	[0.22]	[0.08]	[0.22]
Ln(GDP)	0.71***	0.72***	0.65***	0.73***	0.65***	0.73***	0.65***
	[0.06]	[0.04]	[0.10]	[0.04]	[0.10]	[0.04]	[0.10]
Sales of Goods	0.25**		0.18				
	[0.11]		[0.13]				
Sales of Serv.		0.32***					
		[0.05]					
Sales of Serv. (t-1)				0.31***			
				[0.05]			
Sales of Goods (t-1)					0.16		
					[0.13]		
Sales of Serv. (t-2)						0.29***	
						[0.05]	
Sales of Goods (t-2)							0.15
							[0.12]
Constant	−6.14***	−7.42***	−3.75	−7.48***	−3.75	−7.50***	−3.75
	[1.36]	[1.49]	[3.35]	[1.51]	[3.35]	[1.51]	[3.35]
Adj. R^2	0.733	0.868	0.619	0.868	0.616	0.867	0.615
No. of obs	1116	426	426	426	426	426	426

OLS regressions. Robust standard errors adjusted by partner country clusters are in brackets. All models include time dummies. ***, ** and * represent statistical significance at the 1%, 5% and 10% levels. The time periods covered in (1) and in the restricted services sample are 1983-2004 and 1986-2004, respectively.

Table 2: Dependent variable: Ln(Exports), FE specification

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				One period lag		Two periods lag	
	Goods	Serv	Goods	Serv	Goods	Serv	Goods
Ln(GDP)	0.61***	0.46***	0.65***	0.47***	0.65***	0.46***	0.63***
	[0.07]	[0.08]	[0.09]	[0.08]	[0.09]	[0.09]	[0.09]
Sales of Goods	0.10**		0.04				
	[0.04]		[0.09]				
Sales of Serv.		0.14***					
		[0.03]					
Sales of Serv. (t-1)				0.13***			
				[0.04]			
Sales of Goods (t-1)					0.02		
					[0.08]		
Sales of Serv. (t-2)						0.12***	
						[0.04]	
Sales of Goods (t-2)							0.05
							[0.05]
Constant	−7.57***	−5.02**	−8.35***	−5.15**	−8.37***	−5.09**	−7.92***
	[1.73]	[2.07]	[2.43]	[2.19]	[2.36]	[2.32]	[2.32]
Within R^2	0.832	0.873	0.778	0.871	0.778	0.868	0.779
No. of Partners	62	31	31	31	31	31	31
No. of obs	1116	426	426	426	426	426	426

Importing country fixed effects. Robust standard errors adjusted by partner country clusters are in brackets. All models include time dummies. ***, ** and * represent statistical significance at the 1%, 5% and 10% levels. The time periods covered in (1) and in the restricted services sample are 1983-2004 and 1986-2004, respectively.

respectively. Results in both tables are organized as follows: Columns 1 to 3 use contemporaneous sales as an explanatory variable. In Columns 4 and 5, sales variables are lagged by one year, and in Columns 6 and 7 by two years. Columns 1, 3, 5 and 7 present results using data on goods. In particular, column 1 includes all observations available for this sector. In the following goods regressions, goods samples are restricted to match the observations for which data on services sales are also available. Finally, columns 2, 4 and 6 present results for services. For the sake of completeness, gravity regressions without sales as an explanatory variable are reported in Table 7 in the annex.[24] Summary statistics of the regressors (Table 12) and the country coverage for the services sample (Table 11) are reported in the annex as well.

Before analyzing the coefficients on our variable of interest, a brief discussion of the coefficients on the gravity variables is worth mentioning. The coefficients on distance, common language and importing country's GDP have the expected sign and are significant at standard confidence levels, although their magnitude is somewhat smaller than in standard gravity regressions.[25] Comparing the results in Table 1 to those in Table 7 in the annex, it can be observed that the lower coefficients on the gravity variables might be due to the sample size rather than to the inclusion of sales variables as an explanatory variable. On the other hand, the coefficients on the landlocked variable are positive and significant for services, which contrasts with the negative sign generally found for manufacturing.[26] In particular, the positive coefficient on the landlocked variable in this analysis relates to Switzerland whose economy highly relies on services, and which is the only landlocked country in the services

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[24]They have been estimated using both all available observations and the restricted sample.

[25]In particular, the distance to trade elasticities are half of those found in gravity regressions Disdier and Head (2008).

[26]Similarly, using a sample of OECD countries to explain trade in "other commercial services", Lennon (2008) found a negative coefficient on the landlocked variable, which could reflect the fact that landlocked rich countries tend to specialize in services sectors.

sample.

Turning to our variables of interest, the coefficients on services sales are always positive and highly significant. In the case of goods, the positive relationship seems not to be robust to sample size. In fact, the coefficients on goods sales are only significant in regressions where all available observations are included (column 1 in Tables 1 and 2). Moreover, in both tables, the coefficients on services sales are always of a higher magnitude than those on sales of goods. Additionally, lagging services sales only reduces slightly the magnitude of the coefficients, but does not alter their significance. In contrast, changing from OLS to fixed effects estimations more than halves the coefficients on sales of both goods and services, implying that omitted variables positively bias the coefficients in OLS regressions.

Using the further classification of the data on sales, Table 3 presents regression results for sales by type of affiliation, and Table 4 for sales by geographical destination. Results displayed in both tables are based on fixed effects estimations[27] where the sales variables are lagged by one year.[28] In each table, the first group of regressions relates to the unrestricted goods sample, the second group to the services sample, and the third group to the goods sample for which data on services are also available. Within each group, the impact of individual types of sales on trade is first estimated separately, and then all types of sales are included in the same estimation.

For services, only unaffiliated sales and sales to local markets were shown to have a positive, significant and persistent impact on trade. For goods, similar to the results in Tables 1 and 2, the impact of sales on trade was shown not to be robust to the sample size; for the restricted goods sample, none of the coefficients on sales was significant. However,

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[27]OLS estimations have also been carried out, but are not reported. Similar to the previous regressions (Tables 1 and 2), they tend to overestimate the impact of sales on trade when compared to fixed effects estimations.

[28]Regressions using contemporaneous sales yield similar results and are therefore not reported.

Table 3: Dependent variable: Ln(Exports), FE specification

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
					One period lag				
	Goods	Goods	Goods	Serv	Serv	Serv	Goods	Goods	Goods
Ln(GDP)	0.62***	0.62***	0.61***	0.50***	0.47***	0.49***	0.64***	0.66***	0.65***
	[0.07]	[0.06]	[0.07]	[0.07]	[0.08]	[0.08]	[0.09]	[0.09]	[0.09]
Aff. Sales Goods (t-1)	0.06**		0.05*				0.03		0.04
	[0.03]		[0.03]				[0.02]		[0.04]
Unaff. Sales Goods (t-1)		0.06*	0.02					0.01	−0.01
		[0.03]	[0.04]					[0.07]	[0.09]
Aff. Sales Serv. (t-1)				0.02		0.01			
				[0.02]		[0.02]			
Unaff. Sales Serv. (t-1)					0.12***	0.08***			
					[0.04]	[0.03]			
Constant	−7.50***	−7.47***	−7.30***	−6.04***	−5.31**	−5.65***	−8.09***	−8.46***	−8.21***
	[1.75]	[1.68]	[1.70]	[1.91]	[2.17]	[1.99]	[2.38]	[2.36]	[2.44]
Within R^2	0.838	0.836	0.839	0.865	0.869	0.870	0.789	0.785	0.789
No. of Partners	61	61	61	31	31	31	31	31	31
No. of obs	1018	1017	1014	418	423	418	418	423	418

Importing country fixed effects. Robust standard errors adjusted by partner country clusters are in brackets.
All models include time dummies. ***, ** and * represent statistical significance at the 1%, 5% and 10%
levels. The time periods covered in (1) and in the restricted services sample are 1984-2005 and 1987-2005,
respectively.

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Table 4: Dependent variable: Ln(Exports), FE specification

	(1) Goods	(2) Goods	(3) Goods	(4) Goods	(5) Serv	(6) Serv	(7) Serv	(8) Serv	(9) Goods	(10) Goods	(11) Goods	(12) Goods
Ln(GDP)	0.66***	0.61***	0.63***	0.62***	0.62***	0.55***	0.56***	0.62***	0.72***	0.63***	0.73***	0.71***
	[0.08]	[0.07]	[0.07]	[0.08]	[0.06]	[0.11]	[0.08]	[0.10]	[0.11]	[0.13]	[0.11]	[0.13]
Sales to the US, goods (t-1)	0.00			−0.01					0.03			−0.00
	[0.02]			[0.02]					[0.04]			[0.04]
Local sales, goods (t-1)		0.05*		0.05						0.09		0.02
		[0.03]		[0.05]						[0.08]		[0.09]
Other sales, goods (t-1)			0.03	0.01							−0.02	0.09
			[0.03]	[0.04]							[0.08]	[0.06]
Sales to the US, serv. (t-1)					0.05**			0.03				
					[0.02]			[0.02]				
Local sales, serv. (t-1)						0.16***		0.09*				
						[0.05]		[0.05]				
Other sales, serv. (t-1)							0.01	0.01				
							[0.01]	[0.02]				
Constant	−8.31***	−7.21***	−7.53***	−7.39***	−8.99***	−7.27**	−7.18***	−8.99***	−10.38***	−7.92**	−10.16***	−10.07***
	[2.05]	[1.91]	[1.96]	[2.13]	[1.66]	[2.95]	[2.15]	[2.59]	[2.78]	[3.40]	[2.95]	[3.37]
Within R^2	0.860	0.855	0.858	0.870	0.889	0.903	0.901	0.919	0.865	0.828	0.822	0.879
No. of Partners	59	60	59	57	30	30	30	30	30	30	30	30
No. of obs	807	790	832	694	290	289	295	254	290	289	295	254

Importing country fixed effects. Robust standard errors adjusted by partner country clusters are in brackets. All models include time dummies. ***, ** and * represent statistical significance at the 1%, 5% and 10% levels. The time periods covered in (1) and in the restricted services sample are 1984-2005 and 1987-2005, respectively.

when all goods observations were allowed, only affiliated sales of goods were shown to be robust to the inclusion of the other type of sales.

These results are in line with what was said in the stylized facts section. They show that the source of the positive relationship between trade and commercial presence in services might differ from that in goods. In the case of services, this relationship applies mainly to unaffiliated sales as well as sales to local markets (i.e. horizontal FDI). On the other hand, in the case of goods it is mainly associated with affiliated sales, though the relationship was shown not to be robust to the sample size.

4.1.1   Robustness

The robustness of the complementary relationship between trade and commercial presence is investigated through two exercises. First, Silva and Tenreyro (2006) showed that standard log-linear specifications in the presence of heteroskedasticity can bias OLS and fixed effects estimators, and that, in log-linear gravity specifications, heteroskedasticity is indeed a severe problem. As an alternative to the log-linear specification for gravity estimations they proposed a pseudo-maximum-likelihood (PML) estimation technique, in particular, they propose the poisson estimation. This technique, besides being consistent in the presence of heteroskedasticity, also provides a natural way to deal with zero values of the dependent variable. Following their recommendation, the complementary relationship is estimated using Poisson estimating techniques and the results are presented in Table 8. Second, since the specifications in the previous section do not fully account for time-varying unobservable factors in the importing country, they can suffer from a bias in their parameters. Moreover, since variables tend to vary more over long periods than short periods, this bias might worsen as the period of analysis increases. Therefore, for the second robustness check the comple-

mentary relationship is estimated using a reduced number of years. In particular, the period considered is from 1994 to the last year of the dataset, which is 2005. The choice of 1994 as first year of the sample relates to two important events which might bias the results: the signature of NAFTA and the mass use of internet. The results are presented in Table 9.

Both robustness tables display results for total sales lagged by one year for both goods and services. The first two columns do not account for fixed effects in the importing country; therefore, they can be compared to columns 4 and 5 in Table 1. In the second two columns, importer fixed effects have been included so that the results can be compared to those in columns 4 and 5 in Table 2. The results indicate that Poisson estimation techniques yield similar results to those reported in Tables 1 and 2: the coefficients on sales of services are equally significant and only slightly reduced. By contrast, for the restricted sample of years (Table 9), the coefficients on sales of services were considerably increased. More precisely, the coefficient increased by 19% in the OLS estimations and by 38% in the fixed effects estimations.[29] This implies that the complementary relationship between trade and commercial presence in services has been increasing over time, which gives little support to the idea that new communication technologies, by exempting services from the need for physical presence, are allowing services originally provided through commercial presence to be provided through cross-border trade.

4.2 Cross-price elasticity

This section analyzes the relationship between commercial presence and trade using a cross-price elasticity approach where trade is explained by the cost of investing abroad.[30] The

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[29]Note that for goods, there was no increase in the size of the coefficients in the fixed effects estimations.

[30]This approach has been already carried out for the manufacturing sector by Amiti and Wakelin (2003) and Clausing (2000).

complementary relationship is found when increases in the cost of investing reduce cross-border trade. As in Amiti and Wakelin (2003), indicators of restrictions to FDI are used to describe the cost of investing abroad.[31]

One of the disadvantages of this approach relates to the small number of observations on restrictions to FDI in services.[32] To account for this, results are presented using two different types of restrictions to FDI: an assessment of the country's offers and commitments under GATS negotiations elaborated by Langhammer (2005), and an index of FDI regulatory restrictions prepared by Koyama and Golub (2006).[33]

Regarding the first measure, the indicator assesses countries' offers submitted as part of the Doha negotiations and commitments under the Uruguay Round by country and mode of supply. This paper uses the assessment on mode 3 (commercial presence in services) in order to account for the costs faced by US multinationals when investing abroad. Assessment values range from 0 to 100. A value of 100 for a given mode of supply and a given country implies that there is full commitment to liberalization in all services sectors ("none" in GATS terminology). Therefore, a positive coefficient on the assessment on mode 3 will indicate a complementary relationship between trade and FDI. One advantage of using the database is that it also provides information on offers and commitments made in mode 1 (cross-border trade). This allows us not only to control for the cost of exporting, but also, through the use of interaction terms between assessments on mode 1 and 3, to investigate the interdependence between modes of supply using an alternative approach. If mode 1 and 3 are interdependent, the

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[31]Amiti and Wakelin (2003) use impediments to investment such as government restrictions on foreign companies acquiring domestic assets, immigration rules covering hiring and firing practices, restrictions on raising capital and anti-trust laws reported by the World Competitiveness Report of the World Economic Forum. The lack of sectoral disaggregation of these data does not allow us to distinguish manufacturing from services; therefore, they are not suitable for this analysis.

[32]In terms of both country and time coverage.

[33]In Golub (2003), an early estimation of FDI regulatory restrictions for a reduced number of countries was elaborated. However, as indicated in Koyama and Golub (2006), because of changes in the sources of information these two datasets are not fully comparable.

impact of liberalizing one mode of supply must be subordinated to the stage of liberalization of the other mode. Therefore, if both modes are complements, the benefit of liberalizing one mode of supply must be lower than expected when the other mode of supply remains highly restricted. In such a case a positive coefficient on the interaction term is expected. A negative coefficient is expected when they are substitutes, and a zero coefficient when they are independent.

Before turning to the results, it is worth mentioning that as indicated by Hoekman (2006) and Gootiiz and Mattoo (2009), commitments and offers under GATS have not provided greater access to markets but a weak assurance that access will not get worse. In other words, they do not reflect new episodes of trade liberalization but rather the liberalization that has already taken place. More precisely, Gootiiz and Mattoo (2009) found that Uruguay Round commitments are on average 2.3 times more restrictive than actual policies. Even though offers submitted as part of the Doha negotiations improve on Uruguay Round commitments, they remain on average 1.9 times more restrictive than actual policies. However, the lowest gap is found for OECD countries (offers of which are 1.3 times more restrictive than their actual policies). Since the gap with actual policies is lower for offers than for commitments and for richer countries than for less developed countries, this analysis uses data on offers under GATS negotiations for a set of European countries for which data on cross-border trade are also available.[34]

Table 5 reports the results of regressions where services exports are explained by offers in mode 1 and mode 3.[35] To account for the fact that the indicator could be reflecting the

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[34]The countries included in this analysis are the following: Germany, Spain, France, United Kingdom, Italy, Netherlands and Sweden. Additionally, it is worth noting that as indicated by Langhammer (2005), "while the EU is a customs union in merchandise trade, it has not yet reached this stage of integration in services trade". This, in turn, allows for variation on the indicator of services liberalization among European countries.

[35]Inferences in this table are based on heteroskedasticity robust errors, since cluster-robust standard inferences behave poorly for a small number of clusters in OLS estimations, and due to the reduced number of

Table 5: Cross-price elasticity analysis, Dependent variable: Ln(Exports), OLS

	(1) Serv	(2) Serv	(3) Serv	(4) Serv	(5) Serv	(6) Serv	(7) Serv	(8) Serv
		Complete sample				From 2003 to 2005		
Ln(Distance)	−1.037*	−0.339	0.201	−4.409***	−0.285	1.139	1.442	−12.602***
	[0.60]	[0.55]	[0.61]	[0.55]	[2.23]	[2.08]	[2.43]	[1.34]
Common lang.	0.728***	0.557***	0.565***	−2.886***	1.040***	0.772**	0.798**	−13.232***
	[0.08]	[0.08]	[0.08]	[0.34]	[0.26]	[0.28]	[0.29]	[1.55]
Ln(GDP)	0.504***	0.767***	0.648***	2.241***	0.478***	0.797***	0.697***	7.434***
	[0.03]	[0.02]	[0.03]	[0.17]	[0.12]	[0.28]	[0.13]	[0.76]
Offers in Mode 3	0.060***		0.044***	−14.236***	0.047*	0.027	0.027	−53.861***
	[0.01]		[0.01]	[1.51]	[0.02]	[0.05]	[0.03]	[6.14]
Offers in Mode 1		0.083***	0.061***	−19.768***		0.096**	0.081**	−74.542***
		[0.01]	[0.01]	[2.10]		[0.03]	[0.04]	[8.50]
Interaction term				0.245***				0.922***
				[0.03]				[0.11]
Adj. R^2	0.836	0.837	0.860	0.929	0.709	0.742	0.734	0.976
No. of obs	128	128	128	128	21	21	21	21

Robust standard errors in brackets. Constant term estimated but not reported. All estimations regressed using time dummies. ***, ** and * represent statistical significance at the 1%, 5% and 10% levels. The time period for the complete sample is from 1986 to 2005.

Table 6: Cross-price elasticity. Dependent variable: Ln(Exports), OLS

	(1) Bus. Prof. Tech.	(2) Legal	(3) Insurance	(4) Bank	(5) Telecom	(6) Transport
Ln(Distance)	−0.398***	−0.454***	−0.893***	−0.575***	−0.638***	−0.476***
	[0.10]	[0.14]	[0.27]	[0.19]	[0.12]	[0.13]
Common lang.	0.584***	0.605*	1.007**	0.289	0.663**	0.148
	[0.19]	[0.33]	[0.44]	[0.37]	[0.26]	[0.31]
Landlocked	0.733***	1.834***	0.434	0.871***	0.528***	−0.137
	[0.14]	[0.19]	[0.27]	[0.13]	[0.17]	[0.18]
Ln(GDP)	0.775***	1.047***	0.841***	0.717***	0.530***	0.741***
	[0.07]	[0.14]	[0.17]	[0.12]	[0.07]	[0.12]
FDI Reg. Restr. Business services	−0.945**					
	[0.34]					
FDI Reg. Restr. Legal		−1.524**				
		[0.67]				
FDI Reg. Restr. Insurance			−4.800**			
			[2.09]			
FDI Reg. Restr. Banking				−1.755*		
				[0.85]		
FDI Reg. Restr. Telecoms					−0.009	
					[0.62]	
FDI Reg. Restr. Transport						2.151*
						[1.06]
Adj. R^2	0.840	0.774	0.649	0.733	0.721	0.690
No. of obs	65	65	65	65	65	65

Robust standard errors adjusted by partner country clusters are in brackets. Constant term estimated but not reported. All estimations regressed using time dummies. ***, ** and * represent statistical significance at the 1%, 5% and 10% levels. The sample covers the period from 2003 to 2005.

liberalization that has already taken place in US trading partners, the first four estimations in Table 5 use the complete set of years for which data on trade in services are available. In the next columns the estimations are repeated, this time restricting the sample to the years following the year of the latest offer in the dataset, which drastically reduces the number of observations to 21.

The results tend to confirm the complementary relationship between modes of supply. The coefficients on the interaction terms between *offers in mode 3* and *offers in mode 1* are always positive and significant, implying that the benefit from liberalizing commercial presence depends on the extent of liberalization of cross-border trade in services. In addition, the *offers in mode 3* variable always has a positive impact on services exports and is significant in most cases, except in estimation (7), in which the *offers in mode 1* variable is also included for the reduced sample.

The last set of estimations use the FDI regulatory restrictions as a proxy of the costs of investing abroad. This indicator aims primarily to measure deviations from national treatment; that is, it primarily assesses discrimination against foreign investment rather than the institutional environment.[36] Specifically, it accounts for limitations on foreign ownership, special screening procedures which only apply to foreign investors, as well as post-entry management and operational restrictions. Restrictiveness is measured on a 0 to 1 scale, with 0 representing full openness. Therefore, a negative coefficient on this variable would imply a complementary relationship between trade and FDI. With respect to the previous indicator,

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countries (clusters) in the regression sample. However, for the sake of completeness, the models were also estimated using inference based on clusters errors, in which only the interaction terms turned out to be consistently significant.

[36]Fillat-Castejon et al. (2008) use the OECD Product Market Regulation (PMR) indicator. However, the PMR indicator was constructed from the perspective of regulations that create barriers to entrepreneurship and restrict competition in domestic markets. That is, it assesses market competition of the country, which is highly likely to have a direct impact on both trade and FDI.

the FDI restriction index has a number of advantages. First, it improves the country coverage. Second, since it has been constructed by services sector, each of which may present a different type of relationship between trade and FDI, it takes account of sectoral heterogeneity.[37]

The results are reported in Table 6 where unaffiliated services exports by sector are explained by restrictions on FDI by sector. The regression sample covers 22 countries[38] and 6 service sectors. Since the index was constructed using data on countries' restrictions to FDI for the period from 2003 to 2005, the sample is restricted to those years. Before turning to the results, it is worth noting that US unaffiliated exports are used as the dependent variable; consequently, the results describe the relationship between trade and FDI of horizontally integrated firms.

The results show that the magnitude of this complementarity differs across services sectors. The complementarity between trade and FDI is found in 5 out of 6 services sectors and is statistically significant in 4 of them. Taking standardized coefficients, the highest complementary relationship is found for the insurance sector, for which increases of one standard deviation in the restrictions to FDI decreases cross-border trade of insurance services by 0.41 standard deviations. The only sector presenting a substitutive relationship is the transport sector.[39]

It is worth noting that in 2005, the US exports of the services sectors included in this analysis amounted to US\$ 191 billion, of which the services presenting a significant complementary relationship (bank; insurance; business, professional and technical; and legal)

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[37]The original dataset covers 42 countries and 8 service sectors. However, the estimation sample was restricted to the countries for which data on cross-border trade were available, and to the sectors for which concordance with the balance of payments classification was possible. In 2005, US exports of these sectors represented 62% of total services exports.

[38]Countries are listed in Table 11 in the annex.

[39]This sector is generally characterized as highly concentrated and monopolized. Such factors are not accounted for in the FDI regulatory restrictiveness index.

accounted for 65% and transport services for 33%. Moreover, over the past 10 years, the exports of those services presenting a complementary relationship have grown twice as fast as those of transport services: at an annual average rate of 11% versus 5%. Therefore, the complementary relationship is found not only for the bulk of exports of services included in this analysis, but also for the most dynamic exporting services sectors.

5   Conclusion

Using bilateral data on US foreign affiliates' sales and trade as well as data on barriers to FDI this paper investigated empirically the relationship between trade and FDI in services through the use of different panel techniques, including fixed effects and pseudo-maximum-likelihood. As a first step, bilateral exports were explained by foreign affiliates' sales. Then, in order to control for endogeneity, a cross-price elasticity approach was used, in which exports were explained by the cost of investing abroad. Employing comparable data for services and goods, and clearly distinguishing between the multinational's motivations for FDI, the paper additionally investigated whether the relationship between trade and FDI in services differs from that in goods, and whether it depends on the motivations for FDI. Finally, using data by services category the paper explored to what extent the relationship varies across services.

The results indicated a robust complementary relationship between trade and FDI for the case of services, which was shown to increase over the period of analysis. By contrast, for the case of goods, this relation was found not to be robust to sample size. Using information on the motivations for FDI, the paper additionally found that the source of the positive relationship in services differs from that in goods. In the case of services, this relationship relates mainly to unaffiliated sales as well as sales to the local market (i.e. horizontal FDI).

On the other hand, for goods, it was mainly associated with affiliated sales (i.e. vertical FDI). Finally, the results showed that the sign and the magnitude of the relationship differs across services categories. However, the services categories for which a significant complementary relationship was found not only accounted for the bulk of services exports included in the analysis, but have also been the most dynamic in terms of exports over the last decade. In particular, a significant complementarity was found for the case of bank; insurance; business, professional and technical; and legal services.

These results have both policy and theoretical implications; they suggest that further trade liberalization in services will not meet its expectations unless restrictions in commercial presence remain low. On the other hand, the results do not confirm the predictions of the literature on the organization of multinationals for the case of services, as the complementary relationship in services is found to be mainly related to the horizontal type of FDI. Moreover, as the world is experiencing a shift of FDI towards services, with the services sector now accounting for the bulk of total FDI outflows, more research on this area would improve not only our understanding of the services sector, but also that of multinational corporations as a whole.

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Annex

Figure 4: World exports of services and goods (BoP statistics)
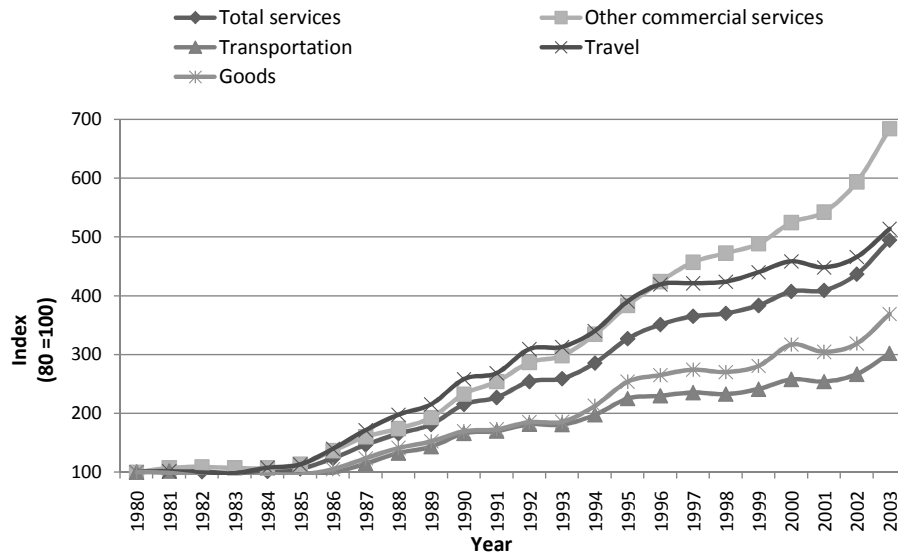
Source: World Trade Organization (WTO). *Note:* From this figure we can observe that measured by balance of payments (BOP) statistics, over the past two decades, growth of trade in services has surpassed growth of trade in goods: trade in goods increased by a factor of 3.5 while trade in services increased by a factor of 5. Moreover, trade in 'Other Commercial Services', which consists mainly of services supplied by mode 1, has experienced a seven-fold increase in value terms over the same period.

Figure 5: Estimated world inward FDI stock, by sector and industry

(a) 1990

(b) 2005

■ Primary   ■ Manufacturing   ■ Services
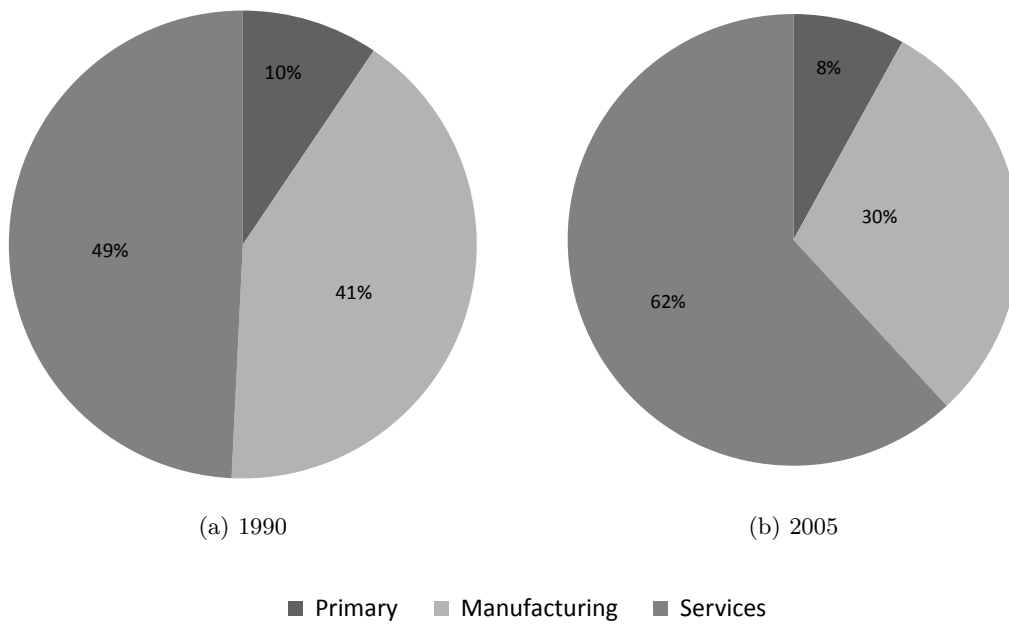
Source: World Investment Report 2007.

Table 7: Gravity regressions. Dependent variable: Ln(Exports).

	(1) Goods	(2) Serv	(3) Goods	(4) Serv
Ln(Distance)	−1.18***	−0.50***	−0.52**	−0.50***
	[0.13]	[0.12]	[0.21]	[0.12]
Common lang.	0.75***	0.42**	0.42	0.42**
	[0.15]	[0.20]	[0.28]	[0.20]
Landlocked	−1.00***	0.59***	−0.13	0.54***
	[0.18]	[0.09]	[0.19]	[0.09]
Ln(GDP)	0.94***	0.68***	0.64***	0.68***
	[0.03]	[0.08]	[0.10]	[0.08]
Constant	−5.61***	−5.67**	−3.31	−6.04**
	[1.36]	[2.61]	[3.21]	[2.57]
Adj. R^2	0.801	0.779	0.595	0.777
No. of obs	4109	454	426	426

OLS estimations. Robust standard errors adjusted by partner country clusters in brackets. All models include time dummies. ***, ** and * represent statistical significance at the 1%, 5% and 10% levels. The period of years in the sample ranges from 1980 to 2005 in estimation (1) and from 1986 to 2004 in estimations (3) and (4).

Table 8: Robustness test. Dependent variable: Ln(Exports).

	(1)	(2)	(3)	(4)
		One period lag		
	Serv	Goods	Serv	Goods
Ln(GDP)	0.76***	0.54***	0.59***	0.67***
	[0.07]	[0.12]	[0.10]	[0.13]
Ln(Distance)	−0.43***	−0.80***		
	[0.07]	[0.12]		
Common lang.	0.52***	0.24		
	[0.14]	[0.33]		
Landlocked	0.50***	−0.59**		
	[0.13]	[0.28]		
Sales of Serv. (t-1)	0.30***		0.11***	
	[0.06]		[0.03]	
Sales of Goods (t-1)		0.13		0.11
		[0.14]		[0.11]
Constant	−9.03***	1.93	−6.87***	−9.08***
	[2.07]	[3.94]	[1.99]	[2.75]
Importing country FE	.	.	YES	YES
log psuedo-likelihood	−107259	−1251197	−11792	−60159
No. of obs	426	426	426	426

Poisson estimations. Robust standard errors adjusted by partner country clusters in brackets. All models include time dummies. ***, ** and * represent statistical significance at the 1%, 5% and 10% levels. The sample includes data from 1987 to 2005.

Table 9: Robustness test. Dependent variable: Ln(Exports). Restricted sample from 1994 to 2005

	(1)	(2)	(3)	(4)
		One period lag		
	Serv	Goods	Serv	Goods
Ln(Distance)	−0.45***	−0.48**		
	[0.10]	[0.23]		
Common lang.	0.62***	0.58**		
	[0.15]	[0.28]		
Landlocked	0.53***	−0.24		
	[0.09]	[0.22]		
Ln(GDP)	0.77***	0.68***	0.51***	0.63***
	[0.04]	[0.10]	[0.11]	[0.10]
Sales of Serv. (t-1)	0.37***		0.18***	
	[0.06]		[0.05]	
Sales of Goods (t-1)		0.26*		0.02
		[0.14]		[0.13]
Constant	−8.74***	−4.81	−5.56*	−7.57***
	[1.65]	[3.61]	[2.87]	[2.56]
No. of obs	286	286	286	286
Adj. R^2	0.868	0.601	0.697	0.452
Within R^2			0.708	0.473
No. of Partners			31	31

Robust standard errors adjusted by partner country
clusters in brackets. All models include time dummies.
***, ** and * represent statistical significance at the
1%, 5% and 10% levels.

Table 10: Sales by US Affiliates, 2004 (Billions of dollars)

		Sales of goods and services by destination and affiliation				
	Total	Affiliated persons	Unaffiliated persons	The USA	Local	Other foreign countries
Total	**3,144**	**875**	**2,269**	**321**	**1,979**	**844**
Goods	2,618	796	1,822	285	1,568	765
Services	525	78	447	36	411	78
Acrross Sectors	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Goods	83%	91%	80%	89%	79%	91%
Services	17%	9%	20%	11%	21%	9%
Across destinations	**100%**	**28%**	**72%**	**10%**	**63%**	**27%**
Goods	100%	30%	70%	11%	60%	29%
Services	100%	15%	85%	7%	78%	15%

Table 11: Country coverage

	Tables 1 and 2			Table 6	
Region	**Country**		**Region**	**Country**	
America	ARG	Argentina	America	ARG	Argentina
	BMU	Bermuda		BRA	Brazil
	BRA	Brazil		CAN	Canada
	CAN	Canada		CHL	Chile
	CHL	Chile		MEX	Mexico
	MEX	Mexico	Europe	CHE	Switzerland
	VEN	Venezuela		DEU	Germany
Europe	CHE	Switzerland		ESP	Spain
	DEU	Germany		FRA	France
	ESP	Spain		GBR	United Kingdom
	FRA	France		ITA	Italy
	GBR	United Kingdom		NLD	Netherlands
	ITA	Italy		NOR	Norway
	NLD	Netherlands		SWE	Sweden
	NOR	Norway	Asia	CHN	China
	SWE	Sweden		IND	India
Asia	CHN	China		ISR	Israel
	HKG	Hong Kong		JPN	Japan
	IDN	Indonesia		KOR	Korea, Republic of
	IND	India	Africa	ZAF	South Africa
	ISR	Israel	Pacific	AUS	Australia
	JPN	Japan		NZL	New Zealand
	KOR	Korea, Republic of			
	MYS	Malaysia			
	PHL	Philippines			
	SAU	Saudi Arabia			
	SGP	Singapore			
	THA	Thailand			
Africa	ZAF	South Africa			
Pacific	AUS	Australia			
	NZL	New Zealand			

Table 12: **Summary statistics**

variable	N	mean	sd	p50	max	min
Ln(Exports),Goods	426	9.15	1.16	9.07	12.15	5.49
Ln(Exports),Serv.	426	7.80	1.07	7.75	10.35	5.54
Ln(Distance)	426	8.93	0.71	9	9.70	6.60
Common lang.	426	0.35	0.48	0	1	0
Landlocked	426	0.02	0.15	0	1	0
Ln(GDP)	426	26.44	1.29	26.45	29.29	21.24
Sales of Goods	426	0.18	1.02	0.34	2.48	-3.80
Sales of Serv.	426	0.33	1.02	0.58	3.39	-4.35
Aff. Sales Goods	421	0.23	1.54	0.35	3.24	-6.59
Unaff. Sales Goods	421	0.17	0.92	0.29	2.22	-3.51
Aff. Sales Serv.	421	0.30	1.45	0.40	3.99	-3.74
Unaff. Sales Serv.	421	0.31	1	0.52	3.10	-4.51
Sales to the US, goods	306	0.34	1.38	0.43	3.84	-4.04
Local sales, goods	306	0.15	0.76	0.22	1.90	-3.58
Other sales, goods	306	0.24	1.53	0.41	3.03	-4.87
Sales to the US, serv.	306	0.33	1.52	0.63	3.03	-5.02
Local sales, serv.	306	0.26	0.85	0.39	1.85	-3.56
Other sales, serv.	306	0.31	1.77	0.49	5	-4.71

Note: residuals from gravity regressions are reported as sales by affiliates

Table 13: **Summary statistics, restrictions to trade in services**

variable	N	mean	sd	p50	max	min
FDI Reg. Restr.						
Business	22	0.15	0.18	0.12	0.86	0.01
Legal	22	0.22	0.23	0.14	1	0.01
Insurance	22	0.16	0.13	0.12	0.45	0.03
Banking	22	0.18	0.15	0.12	0.55	0.03
Telecoms	22	0.25	0.19	0.21	0.64	0.01
Transport	22	0.32	0.11	0.31	0.49	0.17
Offers in Mode 3	7	82.44	4.10	82.50	86.70	74.60
Offers in Mode 1	7	56.06	3.58	57.10	60	49.80
Interaction term	7	4,625.95	438.84	4,676	5,202	4,043.76

Table 14: **Summary statistics, Ln(exports) by services sectors**

variable	N	mean	sd	p50	max	min
Bus. Prof. Tech., unaff.	324	6.06	1	6.07	8.53	3.71
Legal, unaff.	324	3.53	1.49	3.51	6.63	0
Insurance, unaff.	324	3.40	1.59	3.31	7.42	0
Financial except insurance, unaff.	324	5.17	1.23	5.25	8.66	1.95
Telecoms, unaff.	324	4.41	0.89	4.36	6.95	2.08
Transport, unaff.	324	6.84	1.02	6.76	9.14	4.34

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