The effect of double taxation treaties and territorial tax systems on foreign direct investment: evidence for Spain

Ángela Castillo-Murciego and Julio López-Laborda

Abstract

The paper evaluates the effect of Double Taxation Treaties (DTTs) on Spain's inward and outward Foreign Direct Investment (FDI) for the period 1993–2013. Estimates produce positive and statistically significant coefficients. However, there are some differences between the inbound and outbound samples, the type of DTT and the group of developed and developing FDI partner countries. Moreover, interpretation of results differs depending on the fixed or random effects estimation technique used. The paper also analyses the effect on FDI of the rules agreed in DTTs and applied by the investors' residence country in order to correct international double taxation. The authors conclude that the tax saving derived from the application by Spain of the territorial system is positively related to investment from this country to abroad. However, the tax saving provided by the application by the partner countries of the territorial system does not have a significant effect on the investment of these countries into Spain.

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1   Introduction

As Blonigen et al. (2014: 1) state, Foreign Direct Investment (FDI) "and related foreign affiliate activities by multinational firms play a primary role in the global economy" at present. While in the 90s the inward and outward worldwide FDI stock of countries accounted for around 9–10% of GDP, this percentage grew to reach 34% in 2015 (UNCTAD).[1] As Barrios and Benito (2010) noted, there was a similar rise in FDI in Spain during the same period. From the 90s Spain became a net capital exporter, in "the most advanced phases of the FDI development cycle" (López Duarte and García Canal, 2002: 31), Latin American countries being the most important destination countries at that time (Gordo et al., 2008). Today Spain has become a leading country in terms of FDI. According to Myro (2014), Spain's inward and outward investment represented around 2.8% of total worldwide FDI in 2014.

Double Taxation Treaties (DTTs) are bilateral Agreements between countries and are the main instrument for coordinating international taxation in the field of direct taxes. Worldwide, the number of DTTs has risen from 100 in the 60s (Egger et al., 2006) to approximately 3000 at present and Spain is a signatory to 86 of them, the first dating back to the 60s. As with FDI, the main increase took place in the 90s and 00s, and nowadays most FDI flows are covered by them (Radaelli, 1997). Despite these facts, there is still no consensus in the empirical literature about the effect of these Agreements on FDI. From a theoretical point of view, on the one hand, DTTs could foster FDI as they limit double taxation situations and offer legal certainty of the fiscal conditions for Multinational Enterprises (MNEs). On the other hand, they might affect investments negatively as they reduce their options for tax minimising strategies.

The limitation of double taxation of foreign income was the original function of DTTs as globalisation increased in the 60s and 70s. DTTs include several provisions devoted to this function. They allocate the taxing rights for each kind of income and capital between the residence and the source country; delimitate double taxation relief mechanisms; limit the withholding tax rates applied by the source country; and harmonise main fiscal definitions. Thanks to this function, DTTs should affect FDI positively, since MNEs would stop paying taxes to more than one jurisdiction. This is the main theoretical argument that predicts a positive effect of DTTs on FDI and it is the one referred to in the OECD Model Tax Convention. The reduction of uncertainty concerning the fiscal conditions of income and capital may also reinforce the MNEs' investments. DTTs do that by preventing double taxation, limiting the unilateral action of governments (Jones, 1996) and introducing mechanisms for solving fiscal conflicts (Gravelle, 1988).

DTTs lessen the tax evasion and avoidance schemes of MNEs by improving the exchange of information between the contracting states, helping them in the fulfilment of the *arm's length prices* principle, and more recently, limiting the treaty shopping strategy of corporations (Baker, 2014). This function might limit the possible extra profits MNEs attain, and thus might affect their investments negatively. Lawyers specialising in international taxation, such as Gravelle (1988), Radaelli (1997) or Dagan (2000), emphasise this last function of DTTs.

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[1] http://unctadstat.unctad.org/wds. Similarly, worldwide international trade of goods and services went from 18% of GDP in the 90s to 27% in 2015.

Taking into account all the above arguments, the average result of DTTs on FDI is not clear, as not all their functions impact investments in the same direction (Davies et al., 2010). Thus, the result has to be determined empirically. Finding a positive outcome is important given the high creation costs of these Agreements, which are similar to those originated by other international Agreements.[2]

The aim of this paper is to evaluate the effect of DTTs on the volume of FDI inflows and outflows between Spain and the corresponding contracting state for the period 1993–2013. Initially, we examine the effect of the mere existence of DTTs, as usually done in the empirical literature. We do this for the whole sample and the subsamples of developed and developing partner countries of Spain. Subsequently, the impact of some of the content of the Agreements together with the internal legislation of countries is evaluated: specifically, the effect of the tax saving derived from the investor's country of residence applying the Territorial Tax System for the taxation of foreign income. This is a topic that has not yet been addressed in Spanish economic literature.[3]

The remainder of the paper is structured as follows: Section 2 reviews the empirical literature on DTTs and FDI. Section 3 carries out the empirical analyses of the effect of the existence of DTTs on FDI. Section 4 develops an additional analysis of the effect of the tax saving arising from the application of the Territorial Tax System on FDI. Section 5 accomplishes a robustness check and conclusions are summarised in Section 6.

Results show that DTTs are positively correlated to Spain's inward and outward FDI, although there are some differences depending on the kind of DTT and partner country. For developed partners, the positive effect comes from both old and new DTTs, i.e. DTTs created before and after the beginning of the data sample, respectively. For developing partners, that effect comes entirely from new DTTs and only with regard to investments from Spain to these countries. Moreover, the tax saving provided to Spanish firms by the application by Spain of the Territorial Tax System to eliminate international double taxation is positively related to Spain's outward FDI. However, the tax saving provided by the application by the partner countries of the Territorial system does not have a significant effect on the investment of these countries into Spain.

2 Review of the empirical literature on the effect of double taxation treaties on foreign direct investment

The huge growth in FDI during the 90s together with governments' interest in attracting such flow has generated a great deal of empirical literature on the determinants of this type of investment. For government policies, much of the attention has focused on tax policies (Davies

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[2] The creation costs of DTTs are especially high for developing countries. An analysis about the effect of DTTs on FDI regarding Latin American countries can be seen in Peragón Lorenzo (2013).

[3] Indeed, economic literature on any international taxation topic is rather scarce in Spain. It is only possible to point to the papers of Domínguez and López-Laborda (2008) and Castillo-Murciego and López-Laborda (2017), both on the issue of profit shifting.

et al., 2010). De Mooij and Ederveen (2003) estimated an elasticity of –3.3 of FDI to tax rates from a meta-analysis of 25 empirical studies. There are also other kinds of policies which might have affected FDI, as might the institutional quality of governments (see, for instance, Garcimartín et al., 2011 or Goodspeed et al., 2011).

Within the tax policy area, DTTs are fairly new for the empirical economic examination of the determinants of FDI[4] and there are still no conclusive results on the relationship between the two variables. Blonigen and Davies (2000) were the first authors who examined the effect of these international Agreements on investments. Although these authors first found a positive effect of DTTs on FDI for a sample of US bilateral data from 1966 to 1992, later they obtained the opposite result for new DTTs for a sample of OECD countries (Blonigen and Davies, 2002) and a sample of the US (Blonigen and Davies, 2004). The results are also heterogeneous for the subsequent studies on DTTs and FDI. Table A1 in the Appendix summarises the empirical literature on this topic.

It is possible to point to several methodological reasons for these inconclusive results found in the literature: the model and sample used, or the selected indicators. There is no single model for the determinants of FDI. Specific studies investigating the effect of DTTs on FDI have usually used either the gravity model of Tinbergen (1962) and Poyhbnen (1963) or the knowledge-capital model of Markusen (1997, 2002). As to the sample used, Barthel et al. (2010) noticed that positive results of DTTs on FDI were obtained when authors had access to bigger samples, which were those constructed from aggregate data (di Giovanni, 2005 or Neumayer, 2007). However, authors who used smaller samples of bilateral data got negative results (Davies, 2003; Blonigen and Davies, 2004; Egger et al., 2006; or Coupé et al., 2009).

Several indicators have been used for measuring FDI, most frequently stock, flows or sales of foreign affiliates, while some authors employed others: mergers and acquisitions (di Giovanni, 2005) or rates of return on FDI (Louie and Rousslang, 2008).

From our point of view, the indicator used for measuring the effect of DTTs is more important than the above issues. This has usually been a binary variable representing the existence or non-existence of the Agreement. This simple indicator is useful for measuring the average effect of Agreements. However, it does not allow one to draw many conclusions about the origin of the results. For this, indicators are needed to measure the specific content of DTTs. Even though all DTTs accomplish the same functions and most governments take the OECD Model Tax Convention as a reference when drafting them, the specific content and clauses of DTTs can differ. Moreover, DTTs must be simultaneously interpreted together with countries' own laws. As Blonigen and Davies (2002) state "…treaties certainly differ from each other along many dimensions which are very difficult to quantify. In addition, the same treaty on paper can have vastly different consequences for different pairs of countries depending on the unilaterally-adopted tax practices of the countries before entering the treaty" (p. 11–12).

Studies delving into the content of DTTs are scarce due to the difficulty of measuring these differences. Blonigen and Davies (2000) estimated the effect of the limitation of withholding tax

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[4] There are also some papers in the Spanish literature on the determinants of FDI. For instance, on Spanish inbound FDI, we can point to Bajo-Rubio and Sosvilla-Rivero (1994), Rodríguez and Pallás (2008), Villaverde and Maza (2012) or Gutiérrez-Portilla et al. (2016). As for Spanish outbound FDI, we can mention Barrios and Benito (2010), Gordo and Tello (2008), Martínez-Martín (2011) or Alguacil et al. (2017). However, none of them analyse the effect of DTTs.

rates by DTTs and concluded that this was not the only function of them that impacted FDI positively. More recently, Bösenberg et al. (2016) analysed the effect of DTTs regarding three specific dimensions of their content: complexity in the writing and structure, generosity depending on the double taxation relief method, and the exchange of information clause. They found that while DTTs' complexity and, to a lesser extent, information exchange seem to affect FDI negatively, DTTs' generosity seems to benefit FDI.

The literature also refers to a possible endogeneity problem between DTTs and FDI. As Blonigen and Davies (2002: 15) state, "If we get a positive correlation between our tax treaty variable and our dependent variable, FDI activity, it is not clear whether other unobservable characteristics of the tax treaty country pairings may be leading to both increased FDI activity and a tax treaty". In order to deal with this potential problem, these authors and some others subsequently, distinguish between the so-called old and new DTTs, or those created before and after the beginning of the data sample, respectively. Blonigen and Davies (2002: 15) argue that "'new' treaties afford a much better opportunity to measure the impact of a tax treaty, as we have data on FDI activity both before and after the treaty takes place".

More recently, Hearson (2018), focused on developing countries, claims that the positive expectation of inward FDI may influence the creation of DTTs. Additionally, some other authors have used alternative solutions to manage the possible endogeneity problem. For instance, Egger et al. (2006) and Davies et al. (2010) applied instrumental variables regressions.

In addition to the methodological issues, some authors have demonstrated that the effect of DTTs vary depending on certain circumstances, such as the level of investment of the contracting states (Kumas and Millimet, 2017), the composition of sales (Davies et al., 2010) or the economic sector involved (Blonigen et al., 2014). These last authors derived a higher positive effect of DTTs on FDI for firms using differentiated inputs and justified that such firms benefit from the Mutual Agreement Procedure once a DTT is in place. Table A1 of the Appendix completes this review.

3   Empirical analysis

3.1   Methodology and data

The econometric specification used to examine how the existence of a DTT affects Spain's FDI with the corresponding contracting state rests on the knowledge-capital model. This is a general equilibrium model which reconciles the two traditional motivations of FDI:[5] horizontal and vertical. Horizontal FDI originates in Markusen (1984) and is based on market access reasons, and vertical FDI originates in Helpman (1984) and is based on labour costs savings. There are other previous and subsequent models for the determinants of FDI. However, the knowledge-capital model captures the two traditional motives of cross-border investments and fits the data well. Besides, literature on the effect of DTTs on investments has generally used either the

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[5] First theories on MNEs and FDI go back to the 60s and are based on perfect competition models (Latorre, 2009). The denominated traditional FDI motivations originated from the 80s.

gravity model or the knowledge-capital model. Comparing both, while the gravity model captures the horizontal motive of cross-border direct investments only and has no theoretical foundation for FDI,[6] the knowledge-capital model covers these two issues.[7]

The newer FDI models are more sophisticated and complex than older ones, but are also based on the two traditional motivations of FDI. The main difference between older and newer models is that the former are based on bilateral FDI relations, while the latter take multilateral ones into account. As a consequence, both traditional motivations can underlie an FDI-only pattern. An example is export platform FDI (Ekholm et al., 2007), "where a MNE places FDI into a host country to serve as a production platform for exports to a group of (neighbouring) host countries" (Blonigen, 2005: 393). In this example, the vertical motivation underlies the decision of where to locate FDI and the horizontal one underlies the decision of which countries to serve from there.

Specifically, we estimate Equations (1.1) and (1.2) below, which are based on the reduced-form empirical framework of Carr et al. (2001) derived from the knowledge-capital model of Markusen. For the outbound sample:

$$Ln(fdi_{sjt}) = \alpha_0 + \alpha_1 \ln(sg_{sjt}) + \alpha_2 \ln(dg_{sjt}^2) + \alpha_3 dq_{sjt} + \alpha_4 \big(dq_{sjt} \ln(dg_{sjt})\big)$$
$$+ \alpha_5 (to_{jt} dq_{sjt}^2) + \alpha_6 to_{st} + \alpha_7 to_{jt} + \alpha_8 ib_{jt} + \alpha_9 \ln(dist_{sj}) + \rho dtt_{sjt} + \eta_{sj} + \partial_t + \varepsilon_{sjt} \tag{1.1}$$

And for the inbound sample:

$$Ln(fdi_{jst}) = \alpha_0 + \alpha_1 ln(sg_{sjt}) + \alpha_2 ln(dg_{sjt}^2) + \alpha_3 dq_{sjt} + \alpha_4 \big(dq_{sjt} ln(dg_{sjt})\big)$$
$$+ \alpha_5 (to_{st} dq_{sjt}^2) + \alpha_6 to_{jt} + \alpha_7 to_{st} + \alpha_8 ib_{st} + \alpha_9 ln(dist_{sj}) + \rho dtt_{sjt} + \eta_{sj} + \partial_t + \varepsilon_{sjt} \tag{1.2}$$

The dependent variable of Equations (1.1) and (1.2) is an indicator of the bilateral FDI between Spain, s, and a country j, and t is the time period. The estimate is made for two data samples: Spain's outward and inward FDI. Spain (the partner country) is the home (host) country of investment for the outbound sample and the host (home) country for the inbound sample. Each sample encompasses an unbalanced panel of FDI between Spain and the OECD,[8] the EU-28,[9] the BRIC[10] and some Latin American countries,[11] for the period 1993–2013. The aforementioned groups of countries comprise those countries which are the main partners for

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[6] The gravity model has a theoretical foundation from international trade. This is the reason why it has been used for examining the determinants of FDI, since FDI literature has traditionally taken trade literature as a reference.

[7] For further information about the theoretical and empirical motivations for FDI see, for example, Blonigen and Piger (2014), Helpman (2011) or Navaretti and Venables (2004).

[8] Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Latvia, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Sweden, Switzerland, South Korea, Turkey, United Kingdom and United States

[9] Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden and United Kingdom.

[10] Brazil, Russia, India and China

[11] Argentina, Bolivia, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Mexico, Panama, Paraguay, Peru, Uruguay and Venezuela

Spain in terms of FDI. A supplementary criterion is data availability. Moreover, the use of symmetric samples let us compare the results for each one of them.

From the knowledge-capital model variables of Equations (1.1) and (1.2), which are those multiplied by the coefficient α_i, we must distinguish between the knowledge-capital variables in the strict sense and the other explanatory variables. Knowledge-capital variables capturing the horizontal FDI are constructed from the GDP of countries: the logarithm of GDP sum ($\ln(sg_{sjt})$) and the logarithm of GDP difference squared ($\ln(dg_{sjt}^2)$). Those capturing the vertical FDI are constructed from the level of qualification of countries: level of qualification difference (dq_{sjt}) and level of qualification difference squared times the trade openness of the host country ($to_{jt}dq_{sjt}^2$; $to_{st}dq_{sjt}^2$). Additionally, non-linearity is captured by the interaction term of the level of qualification difference times the logarithm of the GDP difference: $\left(dq_{sjt}\ln(dg_{sjt})\right)$. Differences in the countries' GDP and qualification are calculated in absolute values, following Blonigen et al. (2003).

The other explanatory variables are the trade openness of the home and host countries (to_{st}, to_{jt}),[12] the investment barriers of the host country (ib_{jt}; ib_{st}) and the logarithm of the geographical distance between both countries ($\ln(dist_{sj})$). Note that the latter will not be identified in the presence of country-pair fixed effects. Additionally we add our variable of interest to the model: a binary variable for measuring the existence of a DTT between Spain and the other country (dtt_{sjt}). It takes the value of one for years when a DTT existed between Spain and the corresponding partner country and the value of zero for years when no DTT existed. Lastly, non-observable country-pair effects (η_{sj}) and yearly dummy variables (∂_t) are also incorporated into the model.

The expected sign of most of the variables depends on the underlying kind of FDI motivation. However, this paper concentrates on examining the effect of DTTs. This effect is a priori uncertain as deduced from Section 2: DTTs could foster FDI by reducing the double taxation problem and creating a greater level of legal security for investors, or on the contrary, they might affect it negatively by preventing the tax evasion and avoidance strategies of MNEs and thus, the tax minimising possibilities for them.

The data source of the model variables is the following. FDI data are taken from DataInvex,[13] from the Spanish Ministry of Industry, Trade and Tourism. They are measured as gross inflows and outflows and are converted into real 2005 USD. They include all economic sectors and exclude holding company operations and are selected according to the immediate holder criterion, which does not reflect the last origin of investment to Spain, nor the last destination of investment from Spain.

The real GDP and the trade openness of the contracting states is gathered from the World Bank Development Indicators database;[14] the level of qualification of the countries, from Barro and Lee (2013); the investment barriers of the host country, from the Economic Freedom

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[12] We use the trade openness of countries instead of trade costs to avoid losing observations when applying logarithms to the negative values of the variables, as Blonigen and Davies (2002) did.

[13] http://datainvex.comercio.es/

[14] http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=world-development-indicators#

Network;[15] and the geographical distance, from the website http://es.distance.to/. Table A2 of the Appendix summarises the descriptive statistics on the data series of the variables. Lastly, the data on DTTs come from the Spanish Tax Agency[16] and the Ministry of Finance and Public Function.[17] We take the year of publication in the Official State Bulletin as the first year of the existence of the Agreements.[18] Table 1 displays DTTs contracted before 2013 between Spain and the FDI partner countries of the sample. Hence, it also includes DTTs signed before the beginning of the sample period.

As can be seen from Table 1, there are some partner countries which did not contract a DTT with Spain during the entire sample period. They are Cyprus, Dominican Republic, Guatemala, Panama, Paraguay and Peru. Despite this, the Spanish network of DTTs is wide and similar to that of other developed countries.

3.2   Estimates and results

Table 2 below displays the results of the direct effect of DTTs on FDI flows for the two samples. The first column shows the result for the sample of Spanish outbound FDI and the second one for the sample of Spanish inbound FDI. Following the Hausman test, fixed effects apply for the outbound sample and random effects for the inbound one. When fixed effects apply, time constant variables are captured by the country-pair effects and cannot be estimated because of the within transformation of the model. This applies to the variable distance and to the DTT variable for some countries in the sample. With regard to the variable distance, we remove it from Equation 1.1 (first column). For DTTs, when fixed effects apply, country-pair observations with a time constant value are eliminated from the estimates. These are country-pair observations for which a DTT always exists (the DTT variable always takes the value of one) or country-pair observations for which a DTT never exists (the DTT variable always takes the value of zero).

Thus, the estimate in the first column considers only those DTTs created during the sample period whose value changes from zero to one (all new DTTs except Ecuador, whose DTT was created in 1993) and the Danish DTT (an old DTT revoked in 2009), whose value changes from one to zero. Meanwhile, the estimate of the inbound sample (second column) takes into account all the country-pair observations in the sample, which encompasses both old and new DTTs as well as countries without a DTT throughout the sample period.

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[15] http://www.freetheworld.com/

[16] http://www.agenciatributaria.es/AEAT.internet/Inicio/La_Agencia_Tributaria/Normativa/Fiscalidad_Internacional/Convenios_de_doble_imposicion_firmados_por_Espana/Convenios_de_doble_imposicion_firmados_por_Espana.shtml

[17] http://www.minhafp.gob.es/es-ES/Normativa%20y%20doctrina/Normativa/CDI/Paginas/cdi.aspx

[18] There is no unanimous rule regarding the starting date of the existence of DTTs in the empirical literature, either. Some authors "take the year of signature (e.g., Neumayer, 2007), while others take the year of ratification (e.g., Coupé, Orlova and Skiba, 2009)" (Barthel, Busse and Neumayer, 2010: 7). Barthel, Busse and Neumayer (2010) take the year when DTTs came into force, instead.

Table 1: Spanish Double Taxation Treaties: 1964–2013

Signature	Country
1964	France*, Norway*
1967	Switzerland
1968	Austria, Finland, Germany*, Portugal*
1972	Belgium*, Netherlands
1974	Denmark**, Japan
1975	Brazil
1976	United Kingdom
1977	Sweden
1980	Italy, Romania
1981	Canada, Czech Republic, Slovakia
1982	Poland
1987	Hungary, Luxembourg
1990	U.S.
1991	Bulgaria
1992	Australia, China
1993	Ecuador
1994	Argentina**, Ireland, Mexico, South Korea
1995	India
1998	Bolivia
2000	Russia
2001	Israel
2002	Iceland, Greece, Slovenia
2004	Chile, Lithuania, Turkey, Venezuela
2005	Estonia, Latvia
2006	Croatia, Malta, New Zealand
2008	Colombia
2011	Costa Rica, Panama, Uruguay

Note: (*) Renegotiations: Portugal (1995), France (1997), Norway (2001), Belgium (2003) and Germany (2012); (**) Denounced DTT: Denmark (2008) and Argentina (2013).

Source: Compiled by the authors based on information from the Tax Agency: http://www.agenciatributaria.es/AEAT.internet/Inicio_es_ES/La_Agencia_Tributaria/Normativa/Fiscalidad_Internacional/Convenios_de_doble_imposicion_firmados_por_Espana/Convenios_de_doble_imposicion_firmados_por_Espana.shtml; and the Ministry of Finance and Public Function: http://www.minhafp.gob.es/es-ES/Normativa%20y%20doctrina/Normativa/CDI/Paginas/CDI_Alfa.aspx.

As Table 2 shows, the existence of a DTT seems to be positively correlated to the volume of Spanish inbound and outbound FDI. Hence, DTTs functions affecting FDI positively, i.e. the limitation of double taxation and the increase in legal certainty, would have had, on average, a greater impact on investments than the function affecting FDI negatively, i.e. the limitation of tax avoidance and evasion.

Table 2: Effect of DTTs on Spanish inbound and outbound FDI: Overall results

	Spanish outbound FDI **(1)**	**Spanish inbound FDI** **(2)**
$\ln(sg_{sjt})$	2.87**(1.24)	4.23***(0.52)
$\ln(dg_{sjt}^2)$	-0.07(0.09)	-0.084(0.14)
dq_{sjt}	-0.09(0.24)	2.96(2.71)
$dq_{sjt}\ln(dg_{sjt})$	0.16(0.21)	-0.11(0.09)
$to_{jt}dq_{sjt}^2$	0.0005(0.0006)	X
$to_{st}dq_{sjt}^2$	X	0.0001(0.0005)
to_{st}	0.04(0.03)	0.16(0.12)
to_{jt}	0.005(0.005)	0.007*(0.004)
ib_{jt}	-0.25***(0.07)	X
ib_{st}	X	-0.38**(0.16)
$\ln(dist_{sj})$	X	-0.94***(0.33)
dtt_{sjt}	0.87**(0.34)	0.57***(0.20)
N	862	1,015
R^2	0.21	0.35
Bilateral FE	Yes	
Bilateral RE		Yes
Year dummies	Yes	Yes

When fixed effects apply, estimates are made by corrected least squares; ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. Standard errors are in parentheses.

Despite the fact that our focus is on DTTs, here we briefly refer to the results regarding the other model variables. Some of them are common to both samples. The sum of the countries' GDP, as proxy for the market size, affects FDI positively, which is in line with the high corporate profits at this scenario. Investment barriers act in the opposite direction and the same happens to distance for the inbound sample. The latter result could mean that transport and other trade related costs have a negative impact on FDI, which matches the vertical FDI motivation. Additionally, it might be indicating that a lower control over FDI discourages this activity. Of the remaining variables, only the coefficient of the trade openness of the home country is significant and positive, and only for the sample of Spanish inbound FDI, a result consistent with a vertical FDI motivation.

Next, following the empirical literature, we disentangle the above results by separately estimating the different kinds of DTTs that originate them. For the outbound sample, we distinguish between the effect of new DTTs ($ndtt_{sjt}$) and that of the Danish DTT ($danish_{sjt}$). And for the inbound sample, we distinguish between the effect of new DTTs ($ndtt_{sjt}$) and old DTTs ($odtt_{sjt}$). The new DTT variable takes the value of one those years when there is a new DTT in place between Spain and the corresponding partner country, i.e. a DTT created from 1993 on, and the value of zero otherwise. The Danish DTT variable takes the value of one the years of the existence of the Danish DTT and the value of zero otherwise. And the old DTT variable takes the value of one in the years when an old DTT exists, i.e. a DTT created before

1993, and the value of zero otherwise. Regardless of the possible endogeneity problem, effects of old and new DTTs could differ because the effect of the Agreements could evolve over time.

Additionally, we construct the variable renegotiated DTTs ($reneg_{sjt}$) for identifying the effect of the five renegotiated DTTs. This variable takes the value of one in the years from which a DTT is renegotiated on and the value of zero otherwise. See Table 1 above for identifying the DTTs included in each group of DTTs.

The equations incorporating the different kinds of DTTs for the outbound and inbound FDI samples are, respectively, the following:

$$Ln(fdi_{sjt}) = \alpha_0 + \alpha_1 \ln(sg_{sjt}) + \alpha_2 \ln(dg^2_{sjt}) + \alpha_3 dq_{sjt} + \alpha_4 \left(dq_{sjt} \ln(dg_{sjt}) \right)$$
$$+ \alpha_5 (to_{jt} dq^2_{sjt}) + \alpha_6 to_{st} + \alpha_7 to_{jt} + \alpha_8 ib_{jt} + \rho_1 ndtt_{sjt} + \rho_2 reneg_{sjt} + \rho_3 danish_{sjt} + \eta_{sj} + \partial_t \quad (2.1)$$
$$+ \varepsilon_{sjt}$$

$$Ln(fdi_{jst}) = \alpha_0 + \alpha_1 \ln(sg_{sjt}) + \alpha_2 \ln(dg^2_{sjt}) + \alpha_3 dq_{sjt} + \alpha_4 \left(dq_{sjt} \ln(dg_{sjt}) \right)$$
$$+ \alpha_5 (to_{st} dq^2_{sjt}) + \alpha_6 to_{jt} + \alpha_7 to_{st} + \alpha_8 ib_{st} + \alpha_9 \ln(dist_{sj}) + \rho_1 ndtt_{sjt} + \rho_2 reneg_{sjt}$$
$$+ \rho_3 odtt_{sjt} + \eta_{sj} + \partial_t + \varepsilon_{sjt} \quad (2.2)$$

As Table 3 shows, results regarding the specific DTT variables differ between Spanish inbound and outbound FDI. Moreover, both samples must be interpreted differently due to the aforementioned issue regarding the time constant variables and the fixed effects. Starting with the new DTT variable, its coefficient is significant and positive only for the sample of Spanish inbound FDI. This result should be read as follows: new DTTs are positively related to FDI compared to other options, i.e. having no DTT in place or having an old DTT in place.[19] With regard to old DTTs, there is also a positive relation to investments from abroad to Spain, its coefficient being higher than that of the new DTTs. For the outbound FDI sample the analysis of old DTTs is limited to the effect of the Danish DTT. We find a very high positive and significant result arising from its existence. Lastly, renegotiations seem not to be related to FDI: neither their existence compared to the previous non-renegotiated Agreement (as can be seen in column 1 of Table 3) nor their existence compared to the rest of the options has any effect on FDI (as can be seen in column 2 of Table 3). These results could be affected by the endogeneity problem referred to in Section 2.

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[19] When fixed effects apply, for the outbound FDI sample, the result is limited to country-pairs with a new DTT in place because the rest of the country-pair observations are always zero and thus, are eliminated from the estimates. For this group of countries, it compares the existence and non-existence of new DTTs.

Table 3: Effect of DTTs on Spanish inbound and outbound FDI: Types of DTTs

	Spanish outbound FDI (1)	Spanish inbound FDI (2)
$\ln(sg_{sjt})$	2.66**(1.24)	4.02***(0.57)
$\ln(dg_{sjt}^2)$	-0.06(0.09)	-0.07(0.14)
dq_{sjt}	-0.13(0.24)	2.96(2.71)
$dq_{sjt}\ln(dg_{sjt})$	0.15(0.20)	-0.11(0.09)
$to_{jt}dq_{sjt}^2$	0.0005(0.0006)	X
$to_{st}dq_{sjt}^2$	X	0.0002(0.0005)
to_{st}	0.05(0.03)	0.16(0.12)
to_{jt}	0.004(0.005)	0.006(0.004)
ib_{jt}	-0.24***(0.07)	X
ib_{st}	X	-0.35**(0.16)
$\ln(dist_{sj})$	X	-0.84**(0.36)
$ndtt_{sjt}$	0.53(0.34)	0.50**(0.21)
$reneg_{sjt}$	0.14(0.46)	-0.27(0.45)
$odtt_{sjt}$	X	1.02*(0.54)
$danish_{sjt}$	3.14***(1.18)	X
N	862	1,015
R^2	0.22	0.35
Bilateral FE	Yes	
Bilateral RE		Yes
Year dummies	Yes	Yes

When fixed effects apply, estimates are made by corrected least squares; ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. Standard errors are in parentheses.

3.3   The economic development of the contracting states

In this sub-section, we analyse the results found in the previous section in more depth by differentiating two groups of Spanish partner countries – developed and developing.[20] While the OECD and most of the EU members are developed countries, Latin American and the BRIC countries are usually less developed.

In general terms, the internal law of economically developed countries provides companies with mechanisms for solving international taxation conflicts, i.e., double taxation and tax evasion (Baker, 2014). Thus, for these countries, the role of DTTs would be restricted to modifying these specific unilateral mechanisms. For instance, DTTs might modify the double

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[20] Information on the classification of countries by their level of economic development comes from the World Bank. Developed countries are Australia, Austria, Belgium, Canada, Chile, Czech Republic, Croatia, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Iceland, Israel, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, New Zealand, Poland, Portugal, Slovenia, South Korea, United Kingdom, United States, Russia, Sweden, Switzerland, Slovakia and Uruguay. Developing countries are Argentina, Bolivia, Brazil, Bulgaria, China, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Hungary, India, Mexico, Panama, Paraguay, Peru, Romania, Turkey and Venezuela.

taxation relief mechanism established by the internal legislation of countries or reduce the withholding tax rates of the source country. Additionally, DTTs could strengthen the legal certainty of the fiscal conditions for investors by limiting the unilateral performance of countries or by reinforcing the rules of the game. Therefore, for these countries, DTTs and the internal law complement each other.

Meanwhile, the internal law of poorer countries is usually less developed than that of the richer ones. Hence, the importance of DTTs might be higher when one of the contracting states is a developing country. Particularly, legal certainty in the fiscal conditions which DTTs provide for investors could be a key positive determinant of FDI from developed to less developed countries. According to Edmiston et al. (2003) uncertainty is an important barrier for investments. Therefore, for these countries, sometimes DTTs could perform functions not accomplished by the internal law and sometimes they complement with such internal law.

Table 4 shows the results for the outbound and inbound subsamples of developed partner countries and Table 5 for the subsamples of developing ones.[21] Additionally, taking advantage of this categorization of countries, the effect of another kind of international bilateral Agreement on FDI is estimated for the group of less developed countries: Bilateral Investment Treaties (BIT). These Agreements are usually signed between developed and less developed countries to encourage investments from the first to the second group. Similarly to DTTs, a binary variable is created (bit_{sht}). It takes the value of one when a BIT exists between a pair of countries and the value of zero otherwise. Information on Spanish BITs can be seen in Table A3 of the Appendix.

It can be seen from Table 4 that DTTs results for developed countries are similar to those estimated for the whole sample (Table 3). The main difference is the higher estimated coefficient for old DTTs for the inbound sample (second column of Table 4). According to the reasoning above, as Spain and the contracting states are developed countries with unilateral mechanisms for solving international taxation problems, a deeper analysis of the content of DTTs and that of the internal law of countries is needed for interpreting the particular reasons behind these results. Results may, for instance, derive from a favourable double tax relief mechanism granted by the corresponding DTT or from the higher legal security standards provided by the Agreement. As stated before, DTTs limit the tax sovereignty of countries, set the allocation of taxing rights, harmonise tax definitions and introduce mechanisms for solving conflicting situations derived from international taxation.

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[21] For the developing countries samples, renegotiated DTTs are eliminated from the estimates because they do not exist for this group of countries. The same applies to the Danish DTT for this group of developing countries.

Table 4: Effect of DTTs on Spanish inbound and outbound FDI: Types of DTTs. Developed countries

	Developed countries	
	Spanish outbound FDI	**Spanish inbound FDI**
	(1)	**(2)**
$\ln(sg_{sjt})$	7.28***(2.84)	3.45***(0.58)
$\ln(dg^2_{sjt})$	0.01(0.12)	-0.17(0.17)
dq_{sjt}	0.36(0.29)	-1.16(4.17)
$dq_{sjt}\ln(dg_{sjt})$	0.06(0.30)	0.05(0.15)
$to_{jt}dq^2_{sjt}$	0.0009(0.0008)	X
$to_{st}dq^2_{sjt}$	X	-0.002(0.001)
to_{st}	0.003(0.05)	0.01(0.16)
to_{jt}	0.003(0.006)	0.004(0.004)
ib_{jt}	-0.11(0.10)	X
ib_{st}	X	-0.14(0.22)
$\ln(dist_{sj})$	X	-1.09***(0.34)
$ndtt_{sjt}$	0.44(0.43)	0.55**(0.28)
$reneg_{sjt}$	-0.19(0.43)	-0.09(0.47)
$odtt_{sjt}$	X	2.12***(0.52)
$danish_{sjt}$	3.15***(1.09)	X
N	554	662
R²	0.33	0.44
Bilateral FE	Yes	
Bilateral RE		Yes
Year dummies	Yes	Yes

When fixed effects apply, estimates are made by corrected least squares; ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. Standard errors are in parentheses.

In the developing countries sub-sample, a positive correlation between the existence of new DTTs and the outbound FDI is estimated compared to a situation without this type of DTT (first column of Table 5). We associate this result with a reinforcement of the fiscal conditions provided by DTTs for investors in developing countries. DTTs might additionally modify the internal mechanisms of Spain for the correction of double taxation or reduce the level of withholding tax rates of the developing countries. For the effect of DTTs on FDI from developing countries to Spain, results are less clear (second column of Table 5). On the one hand, the non-significant effect of new DTTs might mean that for investments by developing countries abroad, non-fiscal related FDI motivations of MNEs could precede fiscal ones. Traditionally investments go from developed countries to either developing or developed ones. On the other hand, the negative effect from old DTTs refers to a small number of DTTs: those signed with Brazil, Romania, Hungary, Bulgaria and China.

Lastly, and contrary to our expectations, a significant and negative effect of the coefficient of BIT is found for FDI from Spain to developing countries and a null effect is found for FDI in the opposite direction.

Table 5: Effect of DTTs on Spanish inbound and outbound FDI: Types of DTTs. Developing countries

	Developing countries	
	Spanish outbound FDI	**Spanish inbound FDI**
	(1)	**(2)**
$\ln(sg_{sjt})$	2.74**(1.35)	5.11***(1.15)
$\ln(dg_{sjt}^2)$	0.05(0.13)	-0.44(0.36)
dq_{sjt}	-1.24***(0.47)	-0.03(5.24)
$dq_{sjt}\ln(dg_{sjt})$	0.40(0.30)	-0.02(0.19)
$to_{jt}dq_{sjt}^2$	0.001**(0.0007)	X
$to_{st}dq_{sjt}^2$	X	0.0007(0.0006)
to_{st}	0.09*(0.04)	0.39**(0.18)
to_{jt}	0.004(0.01)	0.01(0.007)
ib_{jt}	-0.42***(0.09)	X
ib_{st}	X	-0.64**(0.26)
$\ln(dist_{sj})$	X	-0.78(1.09)
$ndtt_{sjt}$	1.07***(0.39)	0.29(0.36)
$reneg_{sjt}$	X	X
$odtt_{sjt}$	X	-2.71**(1.34)
$danish_{jt}$	X	X
bit_{sjt}	-0.99**(0.40)	-0.03(0.31)
N	308	353
R²	0.26	0.23
Bilateral FE	Yes	
Bilateral RE		Yes
Year dummies	Yes	Yes

When fixed effects apply, estimates are made by corrected least squares; ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. Standard errors are in parentheses.

4 The International Tax System applied by countries

This section examines the clauses of DTTs defining the International Tax System agreed by countries, i.e., the clauses of DTTs defining the rules that countries must apply to correct international double taxation of foreign dividends. Although most DTTs take as a reference the OECD Model Tax Convention, their specific content varies along different dimensions. Our stand is that it is probably not possible to obtain an unambiguous result on FDI for the existence of a DTT, but it is probably possible to obtain some common results for specific provisions of their content. Furthermore, exploring the content of DTTs becomes very intriguing at a time when international taxation rules are being rethought and redesigned. Particularly, this analysis is more interesting than the simple use of a binary variable for countries like Spain which already have an extensive network of DTTs.

In the field of foreign direct investments, the International Tax System refers to the tax treatment given by the residence country[22] of the investor to foreign dividends when repatriated, i.e. that given by Spain, regarding the Spanish outbound FDI sample, and that other given by the corresponding partner country, regarding the Spanish inbound FDI sample. There are two kinds of systems. The Territorial Tax System applies the exemption method for the correction of double taxation and the Worldwide Tax System, the credit method. Thus, the first one can produce tax saving for MNEs because it allows them to benefit from a possible lower foreign tax burden in comparison to the credit method, which requires MNEs to pay the difference between the domestic and the foreign tax burden, if positive. This tax saving can affect FDI positively.

To test this hypothesis, two important assumptions must be made. The first is that, sooner or later, profits are repatriated. This assumption ensures that the possible tax saving will be realised. But even if at the end of the day it is not realised because profits are not repatriated,[23] the Territorial tax system can induce a positive effect on investments due to the initial expected tax saving. The second assumption is that dividends are repatriated as qualified dividends. This assumption allows for the classification of the International Tax System applied by countries into pure Territorial or Worldwide Systems, since the former usually applies for dividends that meet certain participation requirements.[24]

They are the DTTs which declare either the exemption or the credit method for the relief of double taxation of dividends. At the same time, companies can apply the internal legislation of the corresponding residence country when it is more beneficial, that is, when it declares the exemption method (Falcón y Tella and Pulido, 2010). As a result, both norms, DTT and the internal law of the residence country, have to be simultaneously examined for defining the International Tax System applied by a country.

The analysis of the International Tax System has to be made bilaterally for each year in the sample because of the bilateral nature of DTT and the specific requirements of the internal law of countries. That is, norms have to be examined with reference to a particular country and year. For instance, if one wants to analyse the effect of the International Tax System applied by Spain on investments from Spain to France, one has to identify that System from the content of the DTT between France and Spain and the internal law of Spain with reference to France. And if one wants to analyse the effect of the International Tax System applied by France on investments from France to Spain, one has to identify that System from the content of the DTT between France and Spain and the internal law of France with reference to Spain. Figure 1 summarises this procedure.

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[22] The residence country, in terms of taxation, is the home country of investments, and the source country, in terms of taxation, is the host country of investments.

[23] There are some studies that examined the effect of the Territorial Tax System on repatriated profits (see, for instance, Hasegawa and Kiyota, 2017).

[24] The classification between pure Worldwide and Territorial systems does not actually always exist as such. Sometimes Territorial Tax Systems do not exempt foreign dividends completely, but they exempt a large part of them, instead. Moreover, not all Worldwide Tax Systems set the same type of tax credit. They can establish direct credits for eliminating juridical double taxation or direct and indirect credits for correcting economic as well as juridical double taxation.

Figure 1: Norms for the definition of the International Tax System applied by the residence country
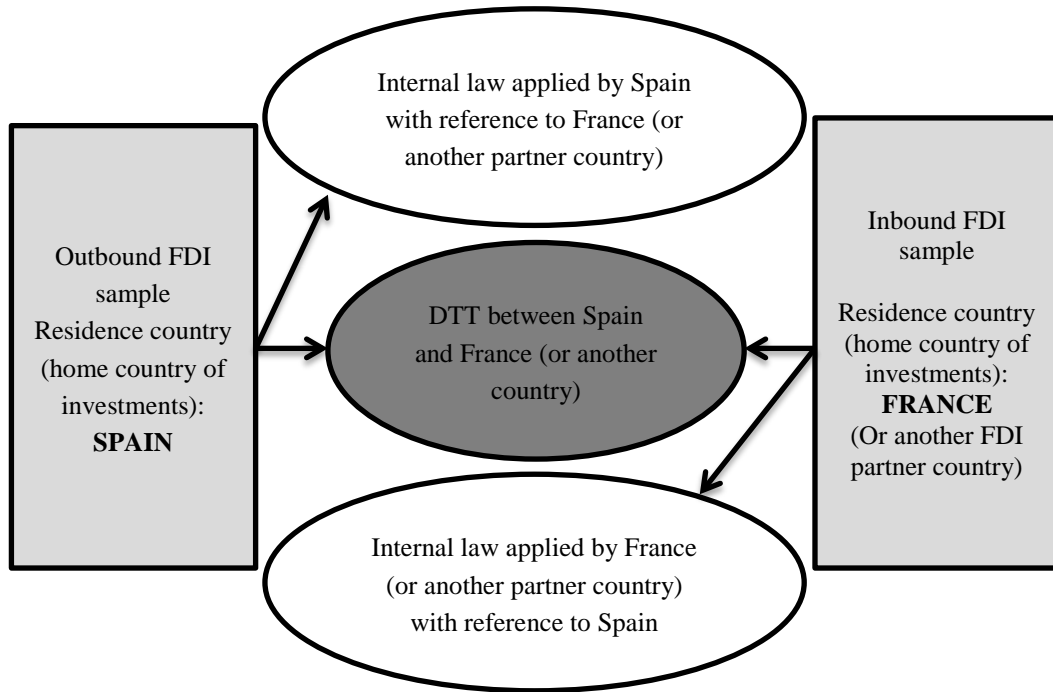
Source: By the authors.

Regarding the internal law of partner countries applied with reference to Spain, sources of information are PWC (2010, 2013a, 2013b), ZEW (2012) and diverse Web sites.[25] Most countries had a Territorial system with Spain at sometime within the period. Spain applied it during the whole sample period with Brazil as defined by the DTT signed with this country and, according to its domestic legislation, with some other sample countries (basically those countries with which a DTT had been signed by that date) from 1996 on and with all countries from 2000 on, subject to the fulfilment of some requirements.

Unlike the variable DTT, it is necessary to construct two tax saving variables: the tax saving variable for Spain, for the outbound sample ($taxsaving_{sjt}$), and the tax saving variable for the corresponding residence country, for the inbound sample ($taxsaving_{jst}$). Each variable takes the value of zero when there is not tax saving, i.e. when the residence country applies a Worldwide Tax System, or when it applies a Territorial one but the foreign tax burden is higher than the domestic tax burden. It takes a positive value calculated from the difference between the domestic and the foreign tax burden when the country applies the Territorial Tax System and the foreign tax burden is lower than the domestic tax burden. For the sample of Spanish outbound FDI, the domestic tax burden of Spain and the foreign tax burden of the partner countries are calculated. And for the sample of Spanish inbound FDI, the domestic tax burden

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[25] Information on the aforementioned classification of countries can be provided on request.

of the partner countries and the foreign tax burden of Spain are calculated. Formulas for the calculation of the tax burdens are the following.

For the foreign tax burden, FTB:

$$FTB_{it} = CITr_{it} + WHTr_{it} * (1 - CITr_{it}) \tag{3.1}$$

$$FTB_{st} = CITr_{st} + WHTr_{st} * (1 - CITr_{st}) \tag{3.2}$$

Equations (3.1) and (3.2) assume that Worldwide Tax Systems allow for the application of both a direct and an indirect tax credit of foreign taxes. $CITr_{jt}$ and $CITr_{st}$ are the standard corporate income tax rate of the source country in year t and $WHTr_{jt}$ and $WHTr_{st}$ are the withholding tax rate on foreign dividends applied by the same country in year t.

For the domestic tax burden, DTB:

$$DTB_{st} = CITr_{st} \tag{3.3}$$

$$DTB_{jt} = CITr_{jt} \tag{3.4}$$

In Equations (3.3) and (3.4), $CITr_{st}$ and $CITr_{jt}$ are the standard corporate income tax rate of the residence country in year t.

The variable tax saving is constructed as follows:

- If the residence country applies the Worldwide Tax System:

$taxsaving_{sjt} = 0$ or $taxsaving_{jst} = 0$

- If the residence country applies the Territorial Tax System and FTB>DTB:

$taxsaving_{sjt} = 0$ or $taxsaving_{jst} = 0$

- If the residence country applies the Territorial Tax System and FTB<DTB:

$taxsaving_{sjt} = DTB_{st} - FTB_{jt}$ or $taxsaving_{jst} = DTB_{jt} - FTB_{st}$

Information on corporate income tax rates and withholding tax rates comes from the following data sources. Corporate income tax rates come, basically, from the KPMG Website.[26] When necessary, it is completed with information from the Ernst and Young guides (2004–2013), Coopers and Lybrand (1994, 1995, 1998), TAXUD (2016) and the websites of the Centro Interamericano de Administraciones Tributarias[27] and the OECD.[28] Bilateral information on withholding tax rates comes from DTTs and the internal law of countries, in the

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[26] https://home.kpmg/kh/en/home/services/tax/tax-tools-and-resources/tax-rates-online/corporate-tax-rates-table.html

[27] http://www.ciat.org/index.php/es/productos-y-servicios/ciatdata/alicuotas.html and Coopers and Lybrand (1994, 1995, 1998)

[28] http://www.oecd.org/tax/tax-policy/tax-database.htm#C_CorporateCaptial

same way as information on International Tax Systems.[29] For partner countries, information on their internal law comes from Ernst and Young (2004–2013), Coopers and Lybrand (1994, 1995, 1998) and the EUR-Lex database regarding the date of application of the parent-subsidiary directive 90/435/EEC.[30]

The complete equations for the outbound and inbound FDI samples are thus, respectively, the following:

$$Ln(fdi_{sjt}) = \alpha_0 + \alpha_1 ln(sg_{sjt}) + \alpha_2 ln(dg_{sjt}^2) + \alpha_3 dq_{sjt} + \alpha_4\big(dq_{sjt}\ln(dg_{sjt})\big)$$
$$+\alpha_5(to_{jt}dq_{sjt}^2) + \alpha_6 to_{st} + \alpha_7 to_{jt} + \alpha_8 ib_{jt} + \rho_1 ndtt_{sjt} \tag{4.1}$$
$$+\rho_2 reneg_{sjt}+\rho_3 danish_{sjt} + \rho_4 taxsaving_{sjt} + \eta_{sj} + \partial_t + \varepsilon_{sjt}$$

$$Ln(fdi_{jst}) = \alpha_0 + \alpha_1\ln(sg_{sjt}) + \alpha_2\ln(dg_{sjt}^2) + \alpha_3 dq_{sjt} + \alpha_4\big(dq_{sjt}\ln(dg_{sjt})\big)$$
$$+\alpha_5(to_{st}dq_{sjt}^2) + \alpha_6 to_{jt} + \alpha_7 to_{st} + \alpha_8 ib_{st} + \alpha_9\ln(dist_{sj}) + \rho_1 ndtt_{sjt} \tag{4.2}$$
$$+\rho_2 reneg_{sjt} + \rho_3 odtt_{sjt} + \rho_4 taxsaving_{jst} + \eta_{sj} + \partial_t + \varepsilon_{sjt}$$

In Equations (4.1) and (4.2), we maintain the binary variables measuring the average effect of the existence of DTTs in order to analyse the remaining effect of DTTs once a part of their content (tax saving derived from applying the Territorial Tax System) is controlled for. Results can be seen in Table 6 for the whole samples and in Table 7 for the subsamples of developed and developing partner countries.

As shown in Table 6, the tax saving for companies resident in Spain, derived from the application of the Territorial Tax System, is very positively related to Spanish outbound FDI. The relation is also positive but not statistically significant regarding the tax saving for foreign companies and investments from their residence countries to Spain. This last result is consistent with the fact that the foreign tax burden, i.e. that of Spain, is rarely lower than the domestic tax burden, i.e. that of the corresponding partner country, given the high Spanish Corporate Income Tax rate in force in the period analysed in this paper.

Additionally, results for the different kinds of DTT variables do not vary from those estimated before introducing the new tax saving variable (Table 3), which is consistent with the content of DTT. The tax saving does not originate in DTTs, since most of them declare the tax credit method for the correction of double taxation, i.e. it is the internal legislation of Spain which declares the exemption method.[31]

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[29] As we made for identifying the International Tax System applicable, we compared DTT and internal law and took the more beneficial withholding tax rate for companies, i.e. the lower one.

[30] The parent-subsidiary directive set a zero withholding tax rate for dividends distributed from EU subsidiaries to their EU parent companies, subject to the fulfilment of some requirements.

[31] In an additional analysis, we estimate an interaction term between the variable dtt_{sjt} and the variables $taxsaving_{sjt}$ and $taxsaving_{jst}$, instead of estimating each of the above fiscal variables separately. The coefficients of these variables are not significant for any sample. As stated above, although the International Tax System applied by countries is part of the content of DTT, the latter may become irrelevant in this matter when such internal law declares the exemption method for the correction of double taxation. In that case, the Territorial Tax System is applicable regardless of whether the DTT declares the credit method.

Table 6: Effect of DTTs and the Territorial Tax System on Spanish inbound and outbound FDI: Types of DTTs

	Spanish outbound FDI (1)	Spanish inbound FDI (2)
$\ln(sg_{sit})$	1.85(1.25)	4.05***(0.58)
$\ln(dg_{sit}^2)$	-0.037(0.09)	-0.11(0.14)
dq_{sjt}	-0.24(0.22)	2.54(2.78)
$dq_{sjt}\ln(dg_{sit})$	0.19(0.20)	-0.10(0.10)
$to_{jt}dq_{sjt}^2$	0.001***(0.0005)	X
$to_{st}dq_{sit}^2$	X	0.0004(0.0006)
to_{st}	0.04(0.03)	0.32(0.93)
to_{jt}	0.003(0.005)	0.007*(0.004)
ib_{jt}	-0.21***(0.07)	X
ib_{st}	X	-2.20(10.85)
$\ln(dist_{sj})$	X	-0.83**(0.37)
$ndtt_{sjt}$	0.44(0.33)	0.48**(0.22)
$reneg_{sjt}$	0.29(0.43)	-0.27(0.45)
$odtt_{sjt}$	X	1.01*(0.55)
$danish_{sjt}$	3.24***(1.17)	X
$taxsaving_{sjt}$	14.02***(2.48)	X
$taxsaving_{jst}$	X	1.93
N	814	1,001
R^2	0.26	0.35
Bilateral FE	Yes	
Bilateral RE		Yes
Year dummies	Yes	Yes

When fixed effects apply, estimates are made by corrected least squares; ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. Standard errors are in parentheses.

As can be seen in Table 7, the tax saving variable is also positively related to FDI from Spain to both developed and developing countries, the magnitude of the coefficient being particularly high for the latter. Likewise, the coefficient of this variable is not statistically significant for the inbound sub-samples and the results for the variables of the average effect of DTTs remain unchanged from those estimated previously (see Table 4 for developed countries and Table 5 for developing countries).

Table 7: Effect of DTTs and the Territorial Tax System on Spanish inbound and outbound FDI: Types of DTTs. Developed and developing countries

	Developed countries		Developing countries	
	Spanish outbound FDI	Spanish inbound FDI	Spanish outbound FDI	Spanish inbound FDI
	(1)	(2)	(3)	(4)
$\ln(sg_{sjt})$	6.42**(2.86)	3.38***(0.60)	2.67**(1.30)	4.66***(0.95)
$\ln(dg_{sjt}^2)$	-0.03(0.12)	-0.24(0.17)	0.05(0.12)	-0.55*(0.33)
dq_{sjt}	0.35(0.29)	-2.76(4.25)	-0.43(0.42)	-0.31(4.82)
$dq_{sjt}\ln(dg_{sjt})$	-0.02(0.30)	0.11(0.15)	0.56*(0.29)	0.02(0.17)
$to_{jt}dq_{sjt}^2$	0.001(0.0009)	X	0.001***(0.0007)	X
$to_{st}dq_{sjt}^2$	X	-0.001(0.001)	X	0.0007(0.0006)
to_{st}	0.01(0.05)	-0.02(1.25)	0.04(0.04)	1.26(1.46)
to_{jt}	0.003(0.006)	0.005(0.004)	0.003(0.01)	0.01** (0.007)
ib_{jt}	-0.12(0.10)	X	-0.39***(0.10)	X
ib_{st}	X	0.30(14.74)	X	-10.66(16.97)
$\ln(dist_{sj})$	X	-1.09***(0.35)	X	-0.49(0.79)
$ndtt_{sjt}$	0.42(0.44)	0.50*(0.28)	0.94**(0.41)	0.14(0.35)
$reneg_{sjt}$	-0.06(0.43)	-0.10(0.48)	X	X
$odtt_{sjt}$	X	2.08***(0.54)	X	-2.51**(0.99)
$danish_{sjt}$	3.14***(1.10)	X	X	X
$taxsaving_{sjt}$	5.64*(3.36)	X	25.40***(3.79)	X
$taxsaving_{jst}$	X	3.32(3.77)	X	-0.68(14.43)
bit_{sjt}	X	X	-0.95**(0.39)	0.05(0.32)
N	541	650	273	351
R^2	0.34	0.44	0.36	0.26
Bilateral FE	Yes		Yes	
Bilateral RE		Yes		Yes
Year dummies	Yes	Yes	Yes	Yes

When fixed effects apply, estimates are made by corrected least squares; ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. Standard errors are in parentheses.

5 Robustness test: alternative data series on investments

The robustness test conducted here is based on Equations (4.1) and (4.2) and consists of using alternative data series on FDI. It is performed for the overall sample and the subsamples of developed and developing countries.

Immediate investor countries might be used more frequently than ultimate investor countries for accomplishing tax minimising strategies by MNEs. Indeed, a reduction of the tax burden could be the reason for the use of immediate investor countries. For this reason it is possible that the anti-tax evasion and avoidance function of DTTs has a more negative impact on investments when countries perform as immediate holders and thus, that the average effect of DTTs may be

different depending on the immediate or ultimate FDI data. The differentiation of FDI data according to this criterion is only available for the Spanish inbound FDI in DataInvex. For the samples in this direction, we replicate the estimates of Equations (4.1) and (4.2) using the ultimate owner investor criterion for measuring the dependent variable.

Results can be seen in Table 8. They do not differ substantially from those estimated in Table 6 and Table 7 for the overall sample and the subsamples of developed and developing countries, respectively. Therefore, it seems that there are no differences depending on the indicator used for measuring the dependent variable.

6   Concluding remarks

Nowadays, international taxation is a central issue on the agendas of international institutions due to the tax avoidance and evasion strategies of MNEs, which erode tax bases and tax collection worldwide. In this scenario, changes are being proposed to the rules governing its functioning. Our study focuses on DTTs, and analyses their impact on Spanish inbound and outbound FDI for the period 1993–2013. The paper tries to better understand the role of DTTs in fostering the cross-border economic activities of MNEs and contributes to filling the gap in the Spanish economic literature regarding international taxation issues.

In general terms, we found that the existence of a DTT between Spain and another contracting state is positively related to the volume of FDI between them compared to a situation without a DTT. This positive result could have compensated, at least partially, the high costs of concluding international Agreements and it is in line with the main theoretical argument, which emphasises the traditional function of double taxation relief of DTTs. However, this general result should be viewed with caution. It depends on the sample examined, the kind of DTT and the level of development of Spain's partner countries, which helps us to understand the conflicting results found in the empirical literature. Moreover, results have to be interpreted carefully because of an identification problem when fixed effects apply.

For the group of developed partner countries, the positive relation between DTTs and FDI comes from the Danish DTT as to the outbound sample and from old and new DTTs concerning the inbound sample. For a better understanding of these results, a further investigation of the content of DTTs and that of the internal law of countries is needed. Also, the endogeneity problem may be playing a role.

For the group of developing partner countries, new DTTs are positively related to Spain's outbound FDI. We associate this positive result with a higher level of certainty of the fiscal conditions of developing countries for investors in the presence of DTTs: unlike developed countries, the internal law of developing countries may not be enough for solving international taxation situations. However, no positive result is found regarding investments from developing countries to Spain. Conversely, a negative coefficient is estimated for the small number of old DTTs existent between these countries and Spain. We think that for these investments it is possible that tax-related factors are less important than other factors for motivating FDI, since developing countries are not usually FDI exporter countries.

Table 8: Effect of DTTs and the Territorial Tax System on Spanish inbound FDI: Types of DTTs.
Ultimate owner investor sample and sub-samples

	Overall Sample (1)	Developed Countries (2)	Developing Countries (3)
$\ln(sg_{sjt})$	4.32***(0.55)	3.90***(0.59)	5.12***(0.95)
$\ln(dg_{sjt}^2)$	-0.16(0.14)	-0.22**(0.17)	-0.51(0.33)
dq_{sjt}	2.54(2.77)	1.32(4.13)	-2.78(4.88)
$dq_{sjt}\ln(dg_{sjt})$	-0.09(0.10)	-0.02(0.15)	0.08(0.17)
$to_{st}dq_{ijt}^2$	0.0001(0.0006)	-0.003**(0.001)	0.0007(0.0007)
to_{st}	0.41(0.93)	-0.97(1.22)	2.92*(1.51)
to_{jt}	0.006(0.004)	0.003(0.004)	0.01**(0.007)
ib_{st}	-3.28(10.91)	11.87(14.30)	-30.71*(17.60)
$\ln(dist_{sj})$	-0.68**(0.34)	-0.88**(0.35)	-0.63(0.77)
$ndtt_{sjt}$	0.56***(0.22)	0.66**(0.28)	0.08(0.36)
$reneg_{sjt}$	0.02(0.45)	0.15(0.47)	X
$odtt_{sjt}$	0.87*(0.52)	1.91***(0.53)	-2.91***(0.97)
$taxsaving_{jst}$	3.12(3.35)	3.49(3.67)	2.72(14.95)
bit_{sjt}	X	X	-0.22(0.33)
N	1,001	650	351
R^2	0.37	0.47	0.29
Bilateral FE			
Bilateral RE	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes

When fixed effects apply, estimates are made by corrected least squares; ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively. Standard errors are in parentheses.

With regard to the content of DTT, we obtained a positive relation between the tax saving derived from the application by Spain of the Territorial Tax System and Spain's outbound investments. This result is found for all samples, the overall sample, the sample of developed countries and the sample of developing countries, with an especially high coefficient estimated for the last. This result confirms the heterogeneous impact of the content of the DTT itself. However, the International Tax System represents only a part of the DTT content, which complements the internal legislation of countries. Additionally, the estimated coefficient for the tax saving variable is not significant for any Spanish inbound sample. This is in line with the fact that when Spain acts as the host country of investments there are hardly any tax savings for the investing countries because of the high Spanish Corporate Income Tax rate in force in the period analysed.

In line with the heterogeneous content of DTTs, there is a great deal of supplementary work to do in the future. An interesting line of research could consist of analysing the evolution of those DTT provisions relating to the anti-tax avoidance and evasion function of DTTs and their interaction with the results reached in this paper. A reinforcement of the anti-tax avoidance and evasion function of DTTs may have impacted FDI negatively.

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Appendix

Table A1: Review of the empirical literature on the effect of Double Taxation Treaties
on Foreign Direct Investment

	Sample	Empirical model and econometric technique	Variables		Results
			FDI indicators	**DTT indicators**	
Blonigen and Davies (2000)	U.S.; 1966–1992	Gravity model and Markusen model; OLS	Bilateral inbound and outbound FDI: Stock, flows, sales and number of foreign affiliates	DTT; Number of years of DTT (also squared)	Positive (at least some time after the DTT signature)
Blonigen and Davies (2002)	OECD; 1982–1992	Markusen model; Pool, FE	Bilateral FDI: Stock, flows	DTT; New DTT Old DTT	Negative or null from new DTT
Davies (2003)	U.S.; 1996–2000	Markusen model; OLS	Bilateral inbound and outbound FDI: Stock and sales	DTT Renegotiated DTT	Null
Blonigen and Davies (2004)	U.S.; 1980–1999	Markusen model; FE	Bilateral inbound and outbound FDI: Stock	DTT; New DTT Old DTT	Negative or null from new DTT
di Giovanni (2005)	193 countries; 1990–1999	Gravity model; FE	Aggregate data on cross-border Merger and Acquisitions: Flows	DTT	Positive
Egger et al. (2006)	OECD; 1985–2001	Model similar to Markusen model; Differences in Differences	Bilateral outbound FDI: Stock	New endogenous DTT	Negative
Neumayer (2007)	Developing countries; 1970–2001	Alternative model; FE	U.S. bilateral FDI: Stock and aggregate data on OECD FDI (flows and stock); in relative terms to developing countries total	DTT	Positive, but only on investments received by middle-income developing countries

				inbound FDI	
Stein and Daude (2007)	OECD; 1997–1999 (average).	Gravity model and Markusen model; OLS, Tobit	FDI from 17 OECD countries to 58 countries: Stock	DTT	Positive
Louie and Rousslang (2008)	U.S.; 1992, 1994 and 1996	Alternative model	Rates of return on FDI	DTT	Null from old and new DTT
Coupé et al. (2009)	Transition countries; 1990–2001	Gravity model; OLS, RE, FE	Bilateral FDI from OECD countries to transition countries: Flows	DTT Old and new DTT Temporal effects	Null (positive and negative effects are compensated)
Barthel et al. (2010)	30 FDI home countries (10 developing countries) and 105 FDI host countries (84 developing countries); 1978–2004	Model based on the typical determinants of FDI; FE, GMM	Bilateral FDI: Stock	DTT; Years of DTT	Positive
Davies et al., (2010)	Sweden; 1965–1998	Gravity model; OLS, Probit	Affiliate level FDI data: Sales, composition of sales	New DTT	Heterogeneous on the composition of sales: Null on the margin and positive on the establishment of a new affiliate
Ohno (2010)	Japan; 1981–2003	Gravity model; GMM	Outbound FDI to 13 Asian countries: Flows	New DTT (short, medium and long term) Reviewed DTT New DTT (indirect effect) Reviewed DTT (indirect effect)	Positive in the long term from new DTT
Baker (2014)	Transition countries; 1991–2006	Markusen model; Differences in Differences	Outbound FDI from OECD countries to developing countries: Flows	New DTT contracted between developed and less developed countries	Null: DTT do not exert any effect on FDI

Blonigen et al. (2014)	U.S.; 1987–2007	Markusen model; FE	Affiliate level FDI data: Sales, number of affiliates	New DTT	Positive
Bösenberg et al. (2016)	187 signatory countries; 1900–2013	The most important observable non-DTT (economic and political) determinants; Exponential-family generalised-linear models	Number of affiliates held by headquarters bilaterally	Content of three dimensions of 3.300 DTT and 11 OECD model Tax Treaties	Heterogeneous: Specific content of DTT
Hong (2017)	70 countries; 2012	Five bilateral variables to describe the relationship between a pair of countries (a shared border, a common official language, a common legal origin, a colonial relationship and distance), Corporate Income Tax and GDP	Bilateral FDI: Stock	Tax rate matrix from a network of DTT between 70 countries	A tax-minimising direct route is positively related to FDI via the direct route
Kumas and Millimet (2017)	Sample of Blonigen and Davies (2004)	Model similar to Markusen model; OLS, panel data	Bilateral inbound and outbound FDI: Stock, flows, sales	New DTT; Temporal effects	Heterogeneous: Positive effects of DTTs at lower quantiles of the distribution of FDI, but negative effects in the upper quantiles

Source: own elaboration.

Table A2: Descriptive statistics

Variable	Obs	Mean	Std.Dev	Min	Max
fdi_{ijt} (outbound), real 2005 USD	1023	7.14e+08	2.52e+09	33.2671	3.76e+10
fdi_{ijt} (inbound), real 2005 USD	1134	3.06e+08	1.30e+09	52.0294	2.17e+10
fdi_{ijt} (inbound, ultimate owner), real 2005 USD	1134	2.96e+08	1.25e+09	52.0294	2.23e+10
sg_{ijt}, real 2005 USD	1167	1.72e+12	1.78e+12	7.52e+11	1.56e+13
dg_{ijt}^2, real 2005 USD	1167	3.18e+24	1.70e+25	7.33e+17	1.78e+26
dq_{ijt}, difference of average years of schooling for people over 25	1176	1.758355	1.322271	0	6.7825
$dq_{ijt}dg_{ijt}$	1167	2.12e+12	5.36e+12	0	4.42e+13
to_{it} , to_{jt} (Spain), percentage of GDP	1176	54.94553	7.286469	36.961	65.8384
to_{jt} , to_{jt} (partner country), percentage of GDP	1152	81.91036	46.78701	14.9328	333.532
$to_{jt}dq_{ijt}^2$ (Spain)	1176	262.9192	383.5762	0	3028.72
$to_{jt}dq_{ijt}^2$ (partner country)	1152	317.396	409.7919	0	2697.6
ib_{jt} (Spain), score on a scale of 0 to 10	1064	2.380526	1.072705	0.89	4.01
ib_{jt} (partner country), score on a scale of 0 to 10	972	2.866564	1.530049	0	7.82
$dist_{ij}$, Kilometres	1176	5120.625	4198.43	503	19853
dtt_{ijt}, Kilometres	1176	0.7117347	0.4531479	0	1
$odtt_{ijt}$	1176	0.460034	0.4986122	0	1
$ndtt_{ijt}$	1176	0.2517007	0.4341748	0	1
$reneg_{ijt}$	1176	0.0527211	0.2235712	0	1
$danish_{ijt}$	1176	0.0136054	0.1158955	0	1
bit_{ijt}	1176	0.4005102	0.4902103	0	1
$taxsaving_{ijt}$ (Spain), difference of tax rates on a per unit basis	1066	0.0347517	0.0532051	0	0.25
$taxsaving_{ijt}$ (partner country), difference of tax rates on a per unit basis	1144	0.0050636	0.0238041	0	0.2467

Table A3: Spanish Bilateral Investment Treaties: 1992–2013

Signature	Country
1992	Argentina, Czech Republic, Hungary, Russia, Slovakia
1993	Poland
1994	South Korea, Uruguay
1995	Romania
1996	Dominican Republic, Lithuania, Peru
1997	Latvia, Paraguay, Venezuela
1998	Bulgaria, Croatia, Ecuador, Estonia, Panama, Turkey
1999	Costa Rica, India
2000	Slovenia
2002	Bolivia
2004	Guatemala
2007	Colombia
2008	China, Mexico

Source: Own elaboration from the Ministry of Trade: http://www.comercio.es/acuerdos.

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