

# **A meta-analysis of export spillovers from FDI: advanced versus emerging markets**

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**Abstract:** Drawing from the pioneering work of Aitken et al. (1997), this paper analyzes the available literature on export spillovers from FDI and their effects on domestic firms' export activities in the host countries. Using a selection of 73 studies belonging to 29 economies for the period 1997-2018, our meta-analysis confirms a high probability of finding positive effects when studying the different types of spillovers. We also show that the type of export spillover depend on the institutional contex. Spillovers drive a complementary effect which generates more direct commercial links between domestic firms and foreign multinationals for advanced economies, whereas for emerging markets the nature of the spillover generates a competition/ imitation effect that pressures domestic firms to be better inserted into foreign markets.

**Keywords:**

Foreign Direct Investment (FDI), multinational firms, export spillovers, meta-analysis, emerging markets, probit model

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## **1. Introduction**

In recent years, with the globalisation of the world economy, the flows of Foreign Direct Investment (FDI) have grown significantly becoming the cause-effect of the economic development in many economies. Some countries are using FDI from multinational enterprises (MNEs) as a channel for boosting competitiveness in terms of acquiring new knowledge and technology, access to distribution networks, upgrade production processes, and improve managerial skills (UNCTAD, 2018). Available empirical evidence on the above positive effects is abundant in terms of the impacts of FDI on productivity (Crespo and Fontoura, 2007), technology transfer (Irosova and Havranek, 2013) and knowledge diffusion (Perri and Perruffo, 2014). However, there is not much evidence when examining the secondary export effects from FDI in host countries (Chen et al., 2013). It is thus necessary to advance our knowledge of whether export spillovers from FDI exist, and if so, if they differ according to the diverse circumstances and policies of countries that promote or obstruct spillovers. In this sense, the main purpose of this work is to improve our knowledge in this field of export spillovers. Do MNEs help local firms to participate in export markets? If so, are the consequences of this influence different depending of the targeted market of these investments?

Export spillovers from FDI are defined as positive or negative externalities derived from the presence of multinational firms in a country which affect domestic firms' export results (Narjoko, 2009). Particularly, we aim to contribute to the state of the art in research on export spillovers through the analysis of the available empirical evidence. In our methods we use a meta-analysis, which has been proven to be a powerful tool to identify the moderating effects of contextual variables and to advance scientific knowledge from context-specific knowledge to general theory (Meyer and Sinai, 2009). Although narrative reviews are widely used in the field of International Business (e.g. Rialp et al, 2005; Paul and Benito, 2018) and could have also been used for our purpose, meta-analysis apply objective formulas and statistical procedures. These techniques are specifically designed to integrate the results

of a wide sample of established empirical studies, providing research reviews with the systematization required to advance in the scientific knowledge (Cooper, 1989).

We developed our analysis by examining a sample of 73 studies since the pioneering work of Aitken et al. (1997) until 2018 including a wide range of emerging and advanced markets.

Our study contributes to the field in different ways. First, the literature offers contradictory findings about the direction and the intensity of the relation between FDI and export spillovers. On the one hand, there are studies that point to the existence of a positive relation (Görg and Greenaway, 2004; Kokko, Zejan and Tansini, 2001; Wei and Lui, 2006). On the other hand, however, other works defend the existence of a negative relation (Beers and Panne, 2011; Bao, Shao and Song, 2014). Lastly, still other studies show that no relation exists between both variables (Narjoko, 2009; Duran and Ryan, 2014). By employing a meta-analysis, considered a useful objective technique to shed light when the established literature offers contradictory results (Guzzo et al, 2004) we can report a high probability of finding positive effects independently of the nature of the export spillover and the level of development of the country.

Second, as spillovers could vary across geographies at different levels of economic development, some insightful studies in the field have proposed a curvilinear relation between the FDI spillovers and the level of development of the country (see Meyer and Sinani, 2009). Our meta-analysis, specifically applied to export spillovers, goes one step further as we have been able to disentangle which specific spillover is associated with the different level of country development. In the case of emerging markets the competition effect seems to be the prevalent, whereas in advanced economies the presence of foreign MNEs exert a significant influence through commercial links and co-location. Both contributions have important implications in terms of theory development and managerial and policy implications.

The remainder of the paper is organized as follows. First, we define the different types of export spillovers offering an original classification based on the different channels through which MNE help local firms to improve their export performance. Second, we examine the empirical evidence available and present an econometric model to calculate effective

probabilities by type of spillover and economy groups. Finally, we discuss our results and present the main conclusions of the study.

## **2. An original classification of export spillovers**

The establishment of foreign firms in local markets can be beneficial for domestic firms if these can profit from aspects such as technology transfer, knowledge diffusion or export platforms (Görg and Greenaway, 2004). Efficiency gains of local firms in the face of greater flows of FDI can produce important secondary effects that increase domestic firms' productivity, thus favouring the possibility for these firms to insert themselves into international markets and widening the country's export offer.

The literature shows many different transmission channels of the different types of export spillovers that can be generated in the local economies receiving FDI. According to these transmission channels, we have classified the export spillovers into three main groups: classic, intra-inter sectorial and new approaches.

### **2.1. Classic export spillovers**

Local firms can improve their capabilities to export through different classic channels for FDI spillovers that have been recurrently assessed in the empirical literature (Aitken et al., 1997; Greenaway et al., 2004) such as demonstration or imitation, competition effect and labour mobility.

#### ***Demonstration/imitation effect***

This effect is considered the most common transmission channel of FDI spillovers. It is associated with the possibility that domestic firms could develop new products and processes by adopting better technologies established by multinationals due to a process of imitation. Barrios *et al.* (2003) argue that this demonstration effect reflected through R&D spillovers of foreign firms enable local firms to improve their position in domestic and international markets via efficiency and product quality. Additionally, foreign firms may pave the way for local firms to enter the same markets, because they either create transport infrastructure or disseminate information about foreign markets that can be used by local firms (Wei and Liu, 2006).

Earlier studies demonstrate that some information spillovers become platforms for local firms in terms of distribution networks, investment in advertisement or market

intelligence. Similarly, trade associations, of which multinationals are important members, constitute other channels of information diffusion on foreign market conditions (Aitken et al. 1997; Sousa et al. 2000; Greenaway et al., 2004).

### ***Competition effect***

Competition among domestic and multinational firms in both domestic and foreign markets can induce local firms to improve their export performance (Görg and Greenaway, 2004). Foreign firms increase local competition by infusing new technologies into the domestic market. These pressures force domestic firms to speed up the adoption of new technology and to increase their managerial efforts to improve their efficiency levels under this negative scenario of the internal market (Crespo et al., 2009). This higher productivity at the local level is needed to survive in export markets and can be used to widening the geographic horizon of domestic firms' export activities.

### ***Labour mobility effect***

The skills and labour qualifications acquired by employees when they worked previously for multinational firms can then be transferred to the local organisations (Meyer, 2003). A worker's movement from a MNE to a local firm, especially from those which are oriented to world markets, can be extremely relevant when a non-exporting firm hires employees who have international experience. Such experiential knowledge can be a valuable capability to apply in the domestic firm and boost international sales.

## **2.2. Inter-intra sectorial spillovers**

This type of spillovers is generated through the commercial links between domestic and foreign firms in the same sector (horizontal links) or different sectors (vertical links) as suppliers to MNEs (backward linkages) or customers of intermediate inputs produced by them (forward linkages). Regarding the first one, successful international export companies can signal market opportunities among local companies in the same industry becoming the role model for local firms through imitation of some of their processes or successful strategies. Regarding backward linkages through commercial links between MNE and local suppliers, there could be a positive effect in terms of technical support, preferential access to

new technological and design capabilities or new knowledge on the international market conditions as well as support at the organizational and management levels (De Clercq et al., 2008). In practice, this channel usually could work through outsourcing practices (e.g. the allocation of engineers from MNEs to domestic firms to supervise the production of the outsourced products, etc.) (Narjoko, 2009).

### **2.3. New approach spillovers**

Under this umbrella, we include recent literature highlighting the importance of agglomeration and the heterogeneity of multinational firms.

#### ***Agglomeration and geographic proximity effect***

From a geographic perspective (Koenig et al., 2010; Beers and Panne, 2011) the existence of local exporters (neighbors) from the same region in the same industry and the proximity between domestic and multinational firms can generate positive indirect export effects associated with information exchange among firms and cost distribution (Ma, 2006; Mayneris and Poncet, 2013). Foreign companies can provide specific information on export markets which can help domestic firms reduce their fixed export costs in terms of information. Additionally, foreign export spillovers can also be linked to the mutualization of some fixed and variable export costs such as participation in international fares or marketing and transportation costs.

#### ***Firm heterogeneity effect***

One common restrictive assumption in spillovers studies consider that firms are homogenous in terms of their roles within the multinational network and their technological capabilities. However, recent studies refute the homogeneity assumption and investigate the influence of firms' heterogeneity on spillovers (Giroud, 2011). This effect represents a way to characterise multinational firms and its various impacts on domestic firms' export performance. Franco and Sasidharan (2009a) highlight five types of heterogeneity or characteristics of the MNE that could have different effects on the export performance of the local firms: the degree of involvement in the multinational network, the level of embeddedness inside the innovation system of the host country, the technological intensity, the type and amount of inputs sourced from abroad and the percentage of the foreign equity stake in the host country.

### 3. Literature Review Methodology

We analyse the empirical evidence available in this field between 1997 and 2018, taking as a starting reference the work of Aitken *et al.* (1997). The literature review was made by using both the ISI Web of Science Data Base and Google Scholar. We especially focused on the latter because of its wide dissemination within the academic community, and its broad and diverse information source which turns it into a searcher of searchers<sup>1</sup>. We wanted to keep our methodology as simple as possible in light of the exploratory nature of our analysis and the high degree of heterogeneity in our data. This process involved several choices, which we outline below.

We conducted our search using the specific key words “export spillovers” and identified 1280 bibliographical references, of which 73 studies were selected based on the examination of their titles, keywords, and a review of their introductions and conclusions.

In order the study to be retained, the reading had to satisfy two main criteria. First, it had to give an indication of empirical analysis, such as a mention of sample size, time periods, specific tests or analytic techniques. Second, the study had to use “export spillover” as the substantive theme of its contribution. Therefore, we include in this research only those papers which had FDI export spillovers as the core analysis, but not the ones which directly or indirectly relates FDI with any other types of externalities.

Table 1 registers the classification of the studies ordered by the number of citations. We have selected the following variables: authors and number of citations, year of publication, country, the period of the studies, results, data, and type of spillover according to our previous classification (Classic, Inter-intra sectorial, New approach). Each country is classified according to the IMF categorization typology: AE indicates Advanced Economy; EM indicates Emerging Market. The results column indicates spillover effects in each study: (+) positive, (-) negative and (?) mixed (uncertain). NC is the number of citations in Google Scholar up to 2018.

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<sup>1</sup> Google Scholar is used in meta-analysis exercises by authors such: Demena and Bergeijk (2016), Perri and Peruffo (2014), Irsova and Havranek (2013), Meyer and Sinani (2009) and Rialp *et al.* (2005).

**Table 1: Taxonomy of the 73 studies selected**

	<b>Author</b>	<b>Country</b>	<b>Period</b>	<b>Results</b>	<b>Data</b>	<b>Type of spillover</b>
1	Görg and Greenaway (2004). NC: 1.538	Mexico, Uruguay, United Kingdom, India, Spain	Mexico 1986/1989. Uruguay 1998. United Kingdom 1992-1996. India 1994-2000. Spain 1990-1998	+ (México, United Kingdom and India)  ? (Uruguay, Spain)	Panel	Classic
2	Aitken, Hanson and Harrison (1997). NC: 1.448	Mexico (EM)	1986-1990	+	Cross-sectional	Classic
3	Crespo and Fontoura (2007). NC: 422					Classic
4	Barrios, Görg and Strob (2003). NC: 358	Spain (AE)	1990-1998	?	Panel	Classic
5	Greenaway, Sousa and Wakelin (2004). NC: 352	United Kingdom (AE)	1992-1996	+	Panel	Classic
6	Wei and Liu - (2006). NC: 313	China (EM)	1998-2001	+	Panel	Classic
7	Kokko, Zejan and Tansini (2001). NC: 282	Uruguay (EM)	1998	+	Cross-sectional	Classic
8	Kneller and Pisu (2007). NC: 227	United Kingdom (AE)	1992-1999	+	Panel	Inter-intra sectorial
9	Koenig, Mayneris and Poncet (2010). NC: 166	France (AE)	1998-2003	?	Panel	New approach
10	Girma, Görg and Pisu (2008). NC: 156	United Kingdom (AE)	1992-1999	+	Panel	Inter-intra sectorial
11	Koenig (2009). NC: 116	France (AE)	1986 -1992	+	Panel	New approach
12	Ruane and Sutherland (2005). NC: 78	Ireland (AE)	1991-1998	?	Cross-sectional	Classic
13	Álvarez and López (2008). NC: 75	Chile (EM)	1990-1999	+	Cross-sectional	Inter-intra sectorial
14	Álvarez (2007). NC: 72	Chile (EM)	1990-92 and 1993-96.	+	Panel	Classic

15	Anwar and Nguyen (2011). NC: 50	Vietnam (EM)	2000	+	Cross-sectional	Inter-intra sectorial
16	De Clercq, Hessels and Stel (2008). NC: 48	34 countries	2002-2005	?	Cross-sectional	Classic
17	Sun (2009). NC: 45	China (EM)	2000-2003	+	Panel	Classic
18	Ma (2006). NC: 42	China (EM)	1993-2000	+	Panel	New approach
19	Sun (2010). NC: 29	China (EM)	2000-2003	+	Panel	New approach
20	Buck, Liu, Wei and Liu (2007). NC: 28	China (EM)	1998-2001	+	Panel	Classic
21	Karpaty and Kneller (2010). NC: 25	Sweden (AE)	1990-2001	+	Panel	New approach and Classic
22	Sousa, Greenaway and Wakelin (2000). NC: 23	United Kingdom (AE)	1992-1996	+	Panel	Classic
23	Franco (2009). NC: 23	47 countries	1998-2005	?	Panel	New approach, inter-intra and classic
24	Franco (2013). NC: 23	16 countries from the OECD	1990-2001	+	Panel	New approach, inter-intra and classic
25	Franco and Sasidharan (2010). NC: 22	India (EM)	1994-2006	?		Classic
26	Cheung (2010). NC: 22	China (EM)	1995-2006	+	Panel	Classic
27	Anwar and Sun (2012). NC: 20	Continental China (EM)	2003-2007	+	Panel	Inter-intra sectorial
28	Mayneris and Poncet (2015). NC: 16	China (EM)	1997-2007	+	Panel	New approach
29	Sinani and Hobdari (2010). NC: 14	Estonia (AE)	1994-1999	+	Panel	New approach
30	Mayneris and Poncet (2011a). NC: 13	China (EM)	1997-2007	+	Panel	New approach
31	Beers and Panne (2011). NC: 12	The Netherlands (AE)	2000-2002	-	Cross-sectional	New approach
32	Sinani y Hobdari (2010). NC: 11	Estonia (AE)	1994-1999	+	Panel	New approach
33	Lutz, Talavera and Park (2003). NC: 11	Ukraine (EM)	1996-2000	+	Panel	Inter-intra sectorial

34	Chen, Sheng and Findlay (2011). NC: 6	China (EM)	2000-2003	+	Cross-sectional	Inter-intra sectorial
35	Chen, Sheng and Findlay (2013). NC: 5	China (EM)	2000-2003	+	Cross-sectional	Inter-intra sectorial
36	Nguyen and Sun (2012). NC: 5	Vietnam (EM)	2003-2004	+	Panel	New approach
37	Choquette and Meinen (2015). NC: 5	Denmark (AE)	1995-2006	+	Panel	Inter-intra sectorial
38	Bao, Shao and Song (2014). NC: 4	China (EM)	2000-2006	-	Panel	New approach
39	Phillips and Esfahani (2010). NC: 4	Australia (AE)	2005	-	Cross-sectional	Classic
40	Dias de Araujo, R. and Hiratuka, C. (2007). NC: 4	Brazil (EM)	1997-2003	-	Panel	Classic
41	Domingo and Reig (2007). NC: 4	Uruguay (EM)	1990-1996 and 1997-2000	-	Panel	Classic
42	Franco and Sasidharan (2009a). NC: 3	India (EM)	1994-2006	?	Panel	New approach
43	Narjoko (2009). NC: 3	Indonesia (EM)	1996-2006	?	Panel	Classic
44	Mayneris and Poncet (2011b). NC: 3	France (AE)	1998-2003	+	Panel	New approach
45	Choquette and Meinen (2011). NC: 3	Denmark (AE)	1995-2006	+	Panel	Inter-intra sectorial and classic
46	Conti, Lo Turco and Maggioni (2014). NC: 3	Italy (AE)	2001-2003	+	Panel	Inter-intra sectorial
47	Atici and Gursoy (2013). NC: 2	Turkey (EM)	2003-2010	+	Panel	Classic
48	Dumont, Merlevede and Piette (2010). NC: 2	Belgium (AE)	1998-2005	+	Panel	New approach
49	Mayneris, Poncet and Beugelsdijk (2013). NC: 2	China (EM)	1997-2007	+	Panel	New approach
50	Cieslik and Hagemeyer (2014). NC: 2	Poland (EM)	2000-2008	+	Panel	Classic
51	Joseph (2005). NC: 2	India (EM)	2004	-	Cross-sectional	Classic

52	Andersson and Weiss (2012). NC: 2	Sweden (AE)	1997-2004	+	Panel	New approach
53	Duran and Ryan (2014). NC: 2	Chile (EM)	2001-2004	?	Panel	Classic
54	Kneller and Pisu (2004). NC: 2	United Kingdom (AE)	1988-1996	+	Panel	Inter-intra sectorial
55	Atici and Gursoy (2012). NC: 2	Turkey (EM)	1993-2009	+	Cross-sectional	Classic
56	Bannò, Giuliani and Zaninotto (2015). NC: 1	Italy (AE)	2004-2008	+	Panel	New approach
57	Stewart (2007). NC: 0	Canada (AE)		+	Cross-sectional	Classic
58	Hu and Tan (2016). NC: 0	China (EM)	2000-2006	+	Panel	New approach
59	Sun (2007). NC: 0	China (EM)	2003	-	Cross-sectional	Classic
60	Bao, Ye, and Song (2016). NC: 0	China (EM)	2000-2007	+	Panel	New approach
61	Yang and Tsou (2014). NC: 0	China (EM)	2004-2006	-	Panel	Classic
62	Franco and Sashidaran (2009b). NC: 0	India (EM)	1994-2006	+	Cross-sectional	Classic
63	Keshari (2015). NC: 0	India (EM)	2004-2011	+	Panel	Classic
64	Jung and Lee (2014). NC: 0	South Korea (AE)	1988-1999	+	Panel	New approach
65	Harasztosi (2016). NC: 0	Hungary (EM)	1993-2003	+	Panel	New approach
66	Kim (2013). NC: 0	South Korea (AE)	2006-2009	-	Panel	Inter-intra sectorial
67	Duran (2010). NC: 0	Chile (EM)	2001-2004	+	Panel	Classic
68	Kinuthia (2013). NC: 0	Kenya and Malaysia (EM)	2000-2005	+	Panel	Classic
69	Cole, Elliott and Virakul (2015). NC: 0	Thailand (EM)	2001-2004	+	Panel	Inter-intra sectorial
70	Dalgıç, Fazlıoğlu and Gasiorek (2015). NC: 0	Turkey (EM)	2006-2010	+	Panel	Inter-intra sectorial
71	Shi and Zhang (2013). NC: 0	China (EM)	2003-2011	+	Panel	Classic

72	Iwasaki, Csizmadia, Illesy, Mako and Szanyi (2010). NC: 0	Hungary (EM)	2002-2005	+	Panel	Classic
73	Albornoz and Kugler (2008). NC: 0	Argentina (EM)	1992-1996 and 1998-2001	+	Panel	Classic

Source: Own elaboration

## 4. Data analysis

### 4.1. Descriptive analysis

Table 2 shows the evolution of the literature on FDI export spillovers by year of publication. As we can observe, there is a great volume of publications, especially in the last decade, related to two important trends in the context of emerging economies. On the one hand, the introduction in most emerging countries of public policies to promote and generate incentives to attract FDI (UNCTAD, 2017). On the other hand, related to the former, there has been an important dynamism of FDI inflows in the different world economy groups. Significantly, for the case of emerging economies, these capital flows registered a growing trend since 2003, reaching an unprecedented level of US\$ 681,000 million in 2014, equivalent to 55% of total world inflows, with China being the world's main FDI destination (UNCTAD, 2015).

**Table 2. Studies classification and participation by year of publication. 1997-2018**

Type of spillover	1997-2006	2007-2010	2011-2018	Total	Type of spillover (%)
Classic	9	17	8	34	46.6%
Inter-intra Sectorial	2	3	10	15	20.5%
New approach	1	9	14	24	32.9%
<b>Total</b>	12	29	32	73	100%

Source: Own elaboration

An objective of this study is to analyse if there are differences in the type and nature of the export spillovers from FDI according to the different nature of the targeted economies.

In table 3, we performed a Pearson chi-square test to determine the level of association between the two economy groups (advanced/emerging) and the spillover types defined in our review. According to our results, there is a high dependence between the prevalence of some types of spillovers and the economy group analysed. For instance, studies which use *Classic* spillovers are mainly focused on emerging countries while the other two (the Inter-intra sectorial and New approach spillover) are associate mainly to advanced economies.

**Table 3. Classification of the studies by type of spillover and economy group. 1997-2017. Pearson chi-square test**

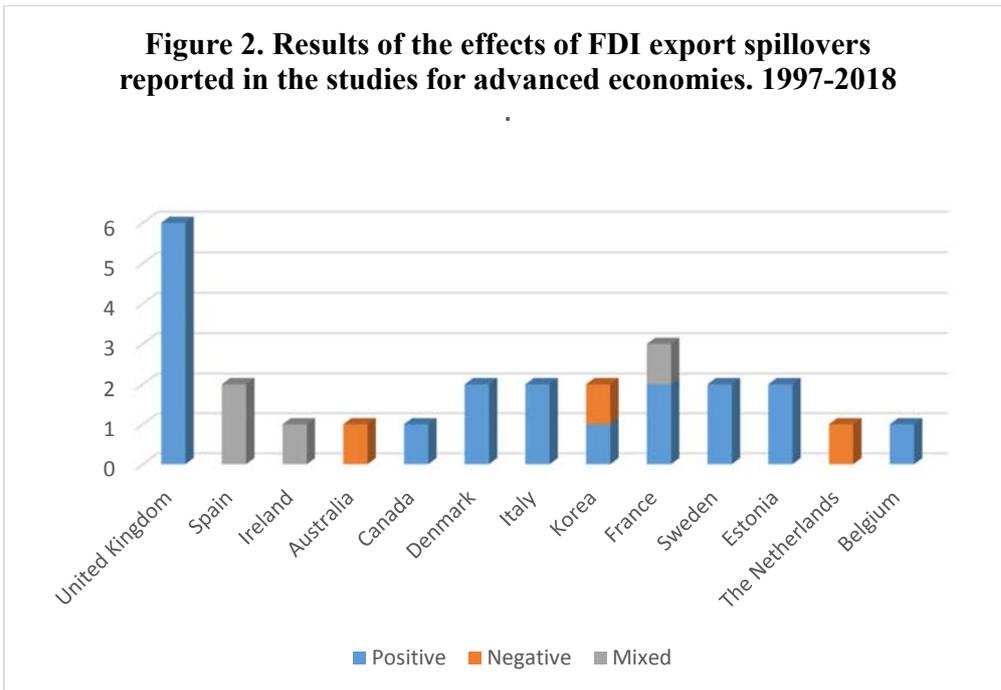
<b>Type of spillover</b>	<b>Advanced Economies</b>	<b>Emerging Markets</b>	<b>Total</b>
Classic	8 (20)	32 (80)	40 (100)
Inter-intra sectorial	8 (53.33)	7 (46.67)	15 (100)
New approach	12 (66.66)	6 (33.33)	18 (100)
Total	28 (38.35)	45 (61.64)	73 (100)

Pearson chi-square (2) = 5.2987 Pr = 0.071

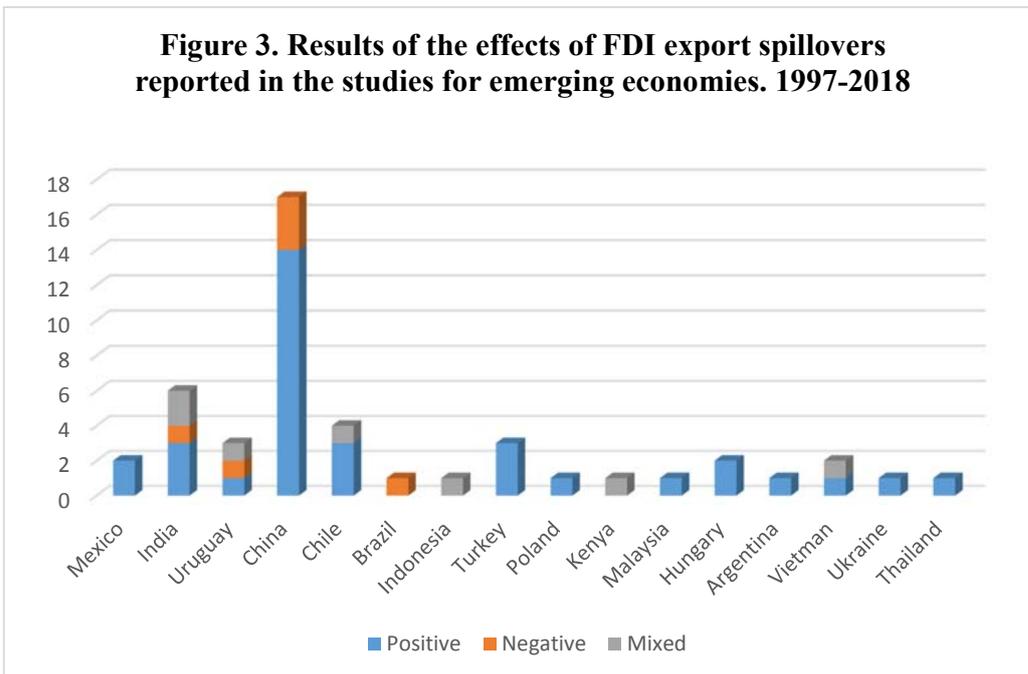
Source: Own elaboration from the results of the Pearson chi-square test, calculated under Stata.

Regarding the type of effect, as we can observe in figures 2 and 3, in general studies report mostly a positive effect of FDI export spillover in both advanced and emerging economies.

**Figure 2. Results of the effects of FDI export spillovers reported in the studies for advanced economies. 1997-2018**



**Figure 3. Results of the effects of FDI export spillovers reported in the studies for emerging economies. 1997-2018**



However, if we analyse only the positive effect by type of spillover, the picture becomes richer as we find a different pattern according to geography. Table 4 classifies the papers by type of spillover and economy groups, considering only those papers indicating a

positive effect. The chi-square test (0.065) shows a similar behaviour pattern between the types of spillovers and the economy groups. Regarding emerging countries, the prevalence of the positive effect is verified for the *Classic* spillovers (55.2%), which maintain a probability that exceeds by 11 points the mean registered by this economy group, that is, 44.6%. In the case of advanced economies, the results are similar; there is a prevalence of the positive effects of *Inter-intra sectorial* and *New approach* spillovers, with probabilities of 33.3% and 44.4%, respectively, which comparatively exceed their mean values equivalent to 25% and 30.3%,

**Table 4. Classification of the studies by type of spillover and economy group (only positive effect)**

Economy group	Type of spillover			Total
	Classic	Inter-intra sectorial	New approach	
Advanced economies	4	6	8	18
	22.22	33.33	44.44	100
Emerging economies	21	8	9	38
	55.26	21.05	23.68	100
Total	25	14	17	56
	44.64	25	30.36	100

Pearson chi-square (2) = 5.4578 Pr = 0.065

Source: Own elaboration from the results of the Person chi-square test, calculated under Stata.

#### 4.2. A probabilistic model of FDI export spillovers

In this part, we focus on calculating the effective probabilities of finding positive effects of FDI export spillovers by type of spillover and economy group as was initially evidenced in the results of the previous part. Our objective is to find conditioned probabilities to assess the relationship between the types of FDI export spillovers and their effects in terms of the results yielded in the review of empirical literature in emerging and advanced economies. From the information obtained in the review of the 73 studies, the following group of variables form the database structure for the estimation process:

- Country
- Type of spillover

- Economy group: Emerging (EM) or Advanced (AE)
- Year of study publication (YP)
- Type of empirical model used in each study (TM: panel or cross-sectional)

The data classification order was established according to the highest citation number for each study. As some studies deal with several countries and different reference periods, the sample registered an order equivalent to a total of 76 countries classified by economy group (emerging or advanced) and for three types of export spillovers.

### ***Estimation methodology***

The dependent variable to determine the probabilistic behaviour pattern is whether or not a positive effects is found in the literature. For this purpose, it is ideal to use a probabilistic model taking as independent variables the year of paper publication, the economy group, the type of spillover, and the type of empirical model used in each study. However, the dependent relationship between the economy group and the type of spillover used when including both variables as regressors causes some problems of multicollinearity. To avoid this problem we use a two-stage Probit model. This method enables us to directly test the relationship between the economy group analyzed and the spillover type, to then estimate the conditioned probability of finding a positive effect. In the first stage for each economy group, we used the three types of spillovers as dependent variable as a function of the economy group, whether it be emerging (EM) or advanced (AE); the year of paper publication (YP); and the type of model (TM). The functional representation is expressed as follows:

$$\text{Type of Spillover (i)} = f(\text{EM, AE, YP, TM})$$

where (i): *Classic* Spillovers (CLAS), *Inter-intra sectorial* spillovers (INTER-INTRAS) and *New approach* Spillovers (NAS)

In this stage, the aim is to verify if the dominance of each of the spillover types over the economy group is met. In other words, we are interested in demonstrating a positive relationship between the type of spillover and the economy group. A positive sign would indicate that the probability of using some type of spillover is higher in some of the

economies (emerging or advanced); whereas a negative sign would show a low probability of using some type of spillover in some of the economies. The equations to be estimated are formalized through the following probabilistic model for the two economy groups:

For emerging markets:

$$(1) \text{ INTER-INTRAS (1: if Intra-inter sectorial, 0: if any other approach)} = \beta_0 + \beta_1EM + \beta_2YP + \beta_3TM \text{ (0: if CS; 1: if panel)}$$

$$(2) \text{ CLAS (1: if Classic, 0: if any other approach)} = \alpha_0 + \alpha_1EM + \alpha_2YP + \alpha_3TM \text{ (0: if CS; 1: if panel)}$$

$$(3) \text{ NAS (1: if New approach, 0: if any other approach)} = \delta_0 + \delta_1EM + \delta_2YP + \delta_3TM \text{ (0: if CS; 1: if panel)}$$

For advanced economies:

$$(4) \text{ INTER-INTRAS (1: if Intra-inter sectorial, 0: if any other approach)} = \beta_0 + \beta_1AE + \beta_2YP + \beta_3TM \text{ (0: if CS; 1: if panel)}$$

$$(5) \text{ CLAS (1: if Classic, 0: if any other approach)} = \alpha_0 + \alpha_1AE + \alpha_2YP + \alpha_3TM \text{ (0: if CS; 1: if panel)}$$

$$(6) \text{ NAS (1: if New approach, 0: if any other approach)} = \delta_0 + \delta_1AE + \delta_2YP + \delta_3TM \text{ (0: if CS; 1: if panel)}$$

In the second stage, we choose the estimated probability for each economy group from the estimation carried out in the first stage, with the purpose of finding the probability that the effect is positive, given the high probability that it will correspond to some type of spillover. The estimated probabilities were used as explanatory variables in this second stage. Let us define the following variables:

CLAS (+): positive effect of the *Classic* spillovers

NAS (+): positive effect of the *New approach* spillovers

INT-INTRAS (+): positive effect of the *Inter-intra sectorial* spillovers

Pr (CLA): the estimated probability of the *Classic* spillovers

Pr (NA): the estimated probability of the *New approach* spillovers

Pr (INTER-INTRA): the estimated probability of the *Inter-intra sectorial* spillovers

We formalize the following equations:

(7) *CLAS (+)* (1: if positive; 0: if negative or mixed) =  $\beta_1 Pr (CLA)$  (1: if *Classic*, 0: if any other approach)

(8) *NAS (+)* (1: if positive; 0: if negative or mixed) =  $\delta_1 Pr (NA)$  (1: if *New approach*; 0: if any other approach)

(9) *INT-INTRAS (+)* (1: if positive; 0: if negative or mixed) =  $\alpha_1 Pr (INTER-INTRA)$  (1: if *INTER-INTRA*; 0: if any other approach)

From the above, we can derive the effective probabilities that the effect is positive for each type of spillover depending on each economy.

### **Results**

Tables 5 and 6 present the estimation results. Table 5 shows the relevance of the *Classic* spillover in emerging economies concerning the low probability of using in the studies for these economies the *Inter-intra sectorial* and *new approach* spillovers. Table 6 verifies the contrary effects, showing the importance and significance of *Intra-inter sectorial* and *New approach* spillovers for developed economies. In both models, the year of publication is negatively associated to classic spillovers and positively to inter-intra and new approaches spillovers. Earlier studies in the field were more oriented to test the classic effects mainly in emerging economies whereas the most recent studies deal with the new export spillovers in developed economies. However, the results are not affected by the type of study (cross-sectional or panel data) as this variable is not significant in any of the models.

**Table 5. Results of the first-stage Probit model (emerging economies)**

VARIABLES	(1) Inter-intra sectorial spillovers	(2) Classic spillovers	(3) New approach spillovers
Emerging markets	-0.627* (0.359)	1.150*** (0.387)	-0.626* (0.370)
Year of publication	0.075* (0.044)	-0.189*** (0.047)	0.153*** (0.051)
Type of model	-0.629 (0.485)	-0.177 (0.504)	-
Constant	-150.027* (89.049)	380.021*** (94.961)	-307.381*** (103.426)
<b>Observations</b>	76	76	65

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 6. Results of the first-stage Probit model (developed economies)**

VARIABLES	(1) Classic spillovers	(2) New approach spillovers	(3) Inter-intra sectorial spillovers
Advanced economies	-1.150*** (0.387)	0.626* (0.370)	0.627* (0.359)
Year of publication	-0.189*** (0.047)	0.153*** (0.051)	0.075* (0.044)
Type of model	-0.177 (0.504)	-	-0.629 (0.485)
Constant	381.171*** (95.097)	-308.007*** (103.507)	-150.653* (89.109)
<b>Observations</b>	76	65	76

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Findings reported in table 7 shows the high probability of finding of finding positive effects in both emerging and advanced markets, taking into account the different types of FDI export spillovers. Coefficients with 1.923 and 2.678 values indicate a high probability to find positive effects in FDI export spillovers for advanced economies when *Inter-intra sectorial* and *New approach* spillovers are used, in comparison with the positive effect of the studies that propose *Classic* spillovers in emerging economies, whose coefficient is 0.838.

**Table 7. Results of the second-stage probit model estimations**

VARIABLES	(1) Classic spillovers positive effect	(2) New approach spillovers positive effect	(3) Inter-intra sectorial spillovers positive effect
Pr(Classic)	0.838*** (0.261)		
Pr(New approach)		1.923*** (0.499)	
Pr(Inter-intra sectorial)			2.678*** (0.716)
<b>Observations</b>	76	65	76

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Finally, table 8 yields the effective probabilities that the effect is positive for each type of spillover depending on each economy. It can be observed that the highest probabilities, whose values are 83.6% and 78,9%, are associated to *New approaches* and *Inter-intra sectorial* effects in advanced economies; whereas the next to highest probability, which is 71.3%, corresponds to the positive effects of the *Classic* spillovers in emerging economies. In sum, these probabilities would indicate, according to the literature review, the influence of FDI on the host countries' export capacity, considering the different types of spillovers which result from the presence of multinational firms in host economies.

**Table 8. Effective probabilities by spillover type and economy group**

Spillover type	Economy group	Probability of a positive effect	In percentage
Classic	Advanced	0.6869479	68.7%
Classic	<b>Emerging</b>	<b>0.7130165</b>	<b>71.3%</b>
Inter-intra sectorial	<b>Advanced</b>	<b>0.7898663</b>	<b>79%</b>
Inter-intra sectorial	Emerging	0.7129447	71.3%
New approaches	<b>Advanced</b>	<b>0.8360356</b>	<b>83.6%</b>
New approaches	Emerging	0.7468153	74.7%

Source: Results obtained from the estimations calculated under Stata

These results confirm that for emerging economies FDI spillovers exert influence over local firms' export behaviour via Classic spillovers. These type of spillovers generate pressure mechanisms for the local firms, which are translated into a competition effect that induces them to raise both their export probability and their export intensity. In some cases, this pressure functions as a survival mechanism for local firms; in others, it is a strategy to seek new markets or to obtain the maturity needed to advance in new forms of international inception different from exports.

In the case of advanced economies, the prevailing spillover transfer mechanisms, Inter-intra sectorial and New approach, strengthen the commercial links between domestic and multinational firms as well as the benefits of geographic proximity. These links facilitate knowledge diffusion, labour mobility and learnings effects in the same sector or different sectors, according to the type established value chain. Contrary to what happens in emerging countries, rather than a pressure mechanism, FDI spillovers in advanced economies have a moderating effect that complements export results in terms of whether or not they affect the export probability and intensity of consolidated domestic firms.

## **Conclusions**

This work aimed at demonstrating state of the art in empirical research on export spillovers from FDI. We have highlighted the importance of this subject of study given the rising wave of FDI in the world over the past two decades and its effects on host countries' export activity.

This meta-analysis confirms the active role that FDI has played in the export development of the economies receiving these capital flows. The high probability of finding positive effects in the studies that measure the different types of FDI export spillovers evidences the necessity to establish incentives and mechanism to attract productive international capital via the presence of multinationals in many regions of the world. In the same vein, these results validate the importance of value chains coordinated by multinationals firms which, in general, drive positive effects on domestic economies' export activities (Gereffi et al, 2005) Value chains have transformed the economic interdependencies and ways of competing of companies and countries. Foreign multinationals and local companies move in a territory defined by two coordinates, both relevant: the need to compete with their peers and the importance of cooperating with other companies as a way to improve the joint competitiveness.

From our results, we derive two important contributions to the literature available in this field. First, contrary to some research suggesting that the positive effects are likely to increase with the level of local development (Perri et al., 2013), we report a high probability of finding positive effects when studying FDI export spillovers in both emerging and advanced economies. This fact justifies the favourable impacts of the changes in regulatory regimes to offer incentives to FDI in many economies of the world. It also validates the positive activity of value chains at the world and regional level in most of the the European advanced economies and Asian emerging markets, especially in the period 2007-2018, in which 83.6% of the total of selected works is concentrated. Second, our results support the view that FDI export spillovers are influenced by the specific institutional context. We have found a greater prevalence of the *Classic* spillovers in emerging markets' economies, unlike advanced economies, where studies measuring *New approach* and *Inter-intra sectorial* spillovers prevail.

The above results have implications not only for theory development but also for managerial and economic policy. In terms of theory, the existence of a technology gap

between domestic and foreign firms has been shown to have different implications in advanced (Perri et al., 2013) and emerging markets (Zhang et al., 2010). The literature has highlighted the importance of minimizing knowledge gaps, as well as the role of a region's absorptive capacity as preconditions for fully internalizing the benefits of FDI externalities (Criscuolo and Narula, 2008; Crespo and Fontoura, 2007). We show that export spillovers from MNEs in emerging markets, especially in the form of information about foreign markets, can trigger the managerial learning processes required for expansion (Cuervo-Cazurra, 2016) as long as local firms have firm-specific advantages or capabilities that enable them to integrate such inputs. As firms from emerging-markets show lower levels of absorptive capacity and higher technology gaps than in developed countries (Cuervo-Cazurra and Rui, 2017), firms from these countries need to assimilate new knowledge on international markets through indirect channels (competition and imitation) making a more intense use of internal mechanisms to recombine this knowledge (Rui, Cuervo-Cazurra, and Un, 2016). In the case of advanced economies, in which the technology gap between foreign firms and domestic firms is not extremely wide (Zhang et al., 2010), direct channels through transactional and collaborative relationship that involves external contact with foreign partners in the form of vertical linkages in the value chain or co-location (Giroud and Scott-Kennel, 2009) could generate a complementary effect to strength capabilities for international competition.

Regarding managerial and policy implications we can differentiate between emerging and developed economies. In emerging markets, the relationships of these local companies as clients, suppliers or competitors of the MNE can generate processes of competitive upgrading to the extent that allows them to improve their organizational, technological and managerial skills through learning and imitation. As we have seen, these new capabilities can generate processes of improvement for competing at the international level. In these cases, local governments play a fundamental role in accompanying the local industry, not only with investments in infrastructure and training of human capital, but also in the configuration of an institutional environment that favors this type of indirect linkages.

In developed countries, two business strategies are particularly important as catalytic axes of competitive upgrading at the international level: cooperation agreements between

domestic and foreign firms and integration. These agreements can take a variety of forms, from those that involve a greater degree of commitment and almost vertical integration, such as joint ventures or acquisitions, to agreements based on mutual trust between partners without any contractual specification. In both cases there are competitive improvements in efficiency, service provision and market power. In many industries these processes of concentration are necessary to compete globally and therefore governments should promote this type of strategies.

An important limitation of this study lies in the fact that the methodology used does not allow to demonstrate the link between secondary export effects and the design of corporate strategies that drive local firms' export development. The fact that we have focused on the classification of spillovers and their effects on firms' export decisions by economy groups at world level did not permit to reveal how domestic firms absorb learning processes from these spillovers. However, a future research agenda considering FDI export spillovers and their connection with domestic firms' international inception processes would permit to broaden the offer of studies on this field.

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