

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

Export  
spillovers from  
FDI

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Received 17 July 2019  
Revised 5 October 2019  
Accepted 11 November 2019

## Abstract

**Purpose** – This paper analyzes the available literature on export spillovers from foreign direct investment (FDI) and their effects on domestic firms' export activities. The purpose of this paper is to advance our knowledge of whether export spillovers from FDI exist, and if so if they differ according to the institutional context of the targeted markets (developed vs emerging markets).

**Design/methodology/approach** – Drawing from the pioneering work of Aitken *et al.* (1997), the authors develop a meta-analysis using a selection of 73 studies for the period 1997–2018, including a wide range of developed and emerging markets.

**Findings** – The meta-analysis confirms a high probability of finding positive effects when studying the different types of spillovers. The authors also show that the type of export spillover depends on the institutional context. 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. In emerging markets, 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 processes of concentration are necessary to compete globally, and therefore, governments should promote this type of strategies.

**Originality/value** – The study offers an original classification of the different types of spillovers based on the different channels through which MNE help local firms to improve their export performance and shows which specific spillover is associated with the different level of country development. These results have important implications in terms of theory development and managerial and policy implications.

**Keywords** Emerging markets, Probit model, Meta-analysis, Multinational firms, Export spillovers

**Paper type** Literature review

## 1. Introduction

In recent years, with the globalization of the world economy, the flows of foreign direct investment (FDI) have grown significantly becoming the driver of the economic development in many economies. Some countries are using FDI 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 Peruffo, 2016). However, there is not much evidence when examining the secondary export effects of 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 on 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 affects domestic firms' export results (Chen *et al.*, 2013; 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 Sinani, 2009). These techniques are specifically designed to integrate the results of a broad 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 economies.

Our study contributes to the field in different ways. First, the literature offers contradictory findings of the direction and the intensity of the relation between FDI and export spillovers. On the one hand, there are studies showing a positive relation (Gorg and Greenaway, 2004; Kokko *et al.*, 2001; Wei and Liu, 2006). On the other hand, however, other works defend the existence of a negative relation (Beers and Panne, 2011; Bao *et al.*, 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.*, 1987) 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 prevalent, whereas in advanced economies, the presence of foreign MNEs exerts 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 (Gorg and Greenaway, 2004). Efficiency gains of local firms in the face of higher flows of FDI can produce significant secondary effects that increase domestic firms' productivity, thus favoring the possibility for these firms to insert themselves into international markets and widening the country's export offer.

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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 labor mobility.

*2.1.1 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).

*2.1.2 Competition effect.* Competition among domestic and multinational firms in both domestic and foreign markets can induce local firms to improve their export performance (Gorg 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 adverse 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.

*2.1.3 Labor mobility effect.* The skills and labor qualifications acquired by employees when they worked previously for multinational firms can be transferred to the local organizations (Meyer, 2003). A worker's movement from an 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 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.

*2.3.1 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.

*2.3.2 Firm heterogeneity effect.* One common restrictive assumption in spillovers studies considers 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 and Scott-Kennel, 2009). This effect represents a way to characterize 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 analyze 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 done by using both the ISI Web of Social Science Data Base and Google Scholar. We mainly 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. All the papers listed in ISI were also included in Google Scholar[1].

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 keywords "export spillovers" and identified 1,280 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 for 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 I 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,

(continued)

No.	Authors/year of publication	Citations	Country	Period	Results (spillover effects)	Data	Type of spillover
1	Gorg and Greenaway (2004)	1,538	Mexico (EM), Uruguay (EM), UK (AE), India (EM), Spain (AE)	Mexico 1986/1989, Uruguay 1998, UK 1992–1996, India 1994–2000, Spain 1990–1998	+; Mexico, UK and India ?: Uruguay, Spain	Mexico, Uruguay cross-sectional-(CS)-UK, India, Spain (Panel)	Classic
2	Aitken <i>et al.</i> (1997)	1,448	Mexico (EM)	1986–1990	+	CS	Classic
3	Crespo and Fontoura (2007)	422	Meta-analysis				Classic
4	Barríos <i>et al.</i> (2003)	358	Spain (AE)	1990–1998	?	Panel	Classic
5	Greenaway <i>et al.</i> (2004)	352	UK (AE)	1992–1996	+	Panel	Classic
6	Wei and Liu (2006)	313	China (EM)	1998–2001	+	Panel	Classic
7	Kokko <i>et al.</i> (2001)	282	Uruguay (EM)	1998	+	CS	Classic
8	Kneller and Pisu (2007)	227	UK (AE)	1992–1999	+	Panel	Inter-intra sectorial
9	Koenig <i>et al.</i> (2010)	166	France (AE)	1998–2003	(+) export decision (ED) (-) exported volume (EV)	Panel	New approach
10	Girma <i>et al.</i> (2008)	156	UK (AE)	1992–1999	+	Panel	Inter-intra sectorial
11	Koenig (2009)	116	France (AE)	1986–1992	+	Panel	New approach
12	Ruane and Sutherland (2005)	78	Ireland (AE)	1991–1998	(+); ED (-); EV	CS	Classic
13	Álvarez and López (2008)	75	Chile (EM)	1990–1999	+	CS	Inter-intra sectorial
14	Álvarez (2007)	72	Chile (EM)	1990–92 and 1993–96	+	Panel	Classic
15	Anwar and Nguyen (2011)	50	Vietnam (EM)	2000	+	CS	Inter-intra sectorial
16	De Clercq <i>et al.</i> (2008)	48	34 countries	2002–2005		Panel	Classic
17	Sun (2009)	45	China (EM)	2000–2003	+	Panel	Classic
18	Ma (2006)	42	China (EM)	1993–2000	+	Panel	New approach
19	Sun (2010)	29	China (EM)	2000–2003	+	Panel	New approach
20	Buck <i>et al.</i> (2007)	28	China (EM)	1998–2001	+	Panel	Classic
21	Karpaty and Kneller (2010)	25	Sweden (AE)	1990–2001	+	Panel	New approach and Classic
22	Sousa <i>et al.</i> (2000)	23	UK (AE)	1992–1996	+	Panel	Classic
23	Franco (2009)	23	47 countries	1998–2005		Panel	New approach, inter-intra and classic
24	Franco (2013)	23	16 OECD countries (AE)	1990–2001	+	Panel	New approach, inter-intra and classic

Table I.  
Taxonomy of the 73  
selected studies

No.	Authors/year of publication	Citations	Country	Period	Results (spillover effects)	Data	Type of spillover
25	Franco and Sasidharan (2010)	22	India (EM)	1994–2006	(+): ED (-): EV	CS	Classic
26	Cheung (2010)	22	China (EM)	1995–2006	+	Panel	Classic
27	Anwar and Sun (2012)	20	Continental China (EM)	2003–2007	+	Panel	Inter-intra sectorial
28	Mayneris and Poncet (2015)	16	China (EM)	1997–2007	+	Panel	New approach
29	Sinani and Hobdari (2010)	14	Estonia (AE)	1994–1999	+	Panel	New approach
30	Mayneris and Poncet (2011a)	13	China (EM)	1997–2007	+	Panel	New approach
31	Beers and Panne (2011)	12	The Netherlands (AE)	2000–2002	-	CS	New approach
32	Sinani and Hobdari (2010)	11	Estonia (AE)	1994–1999	+	Panel	New approach
33	Lutz <i>et al.</i> (2003)	11	Ukraine (EM)	1996–2000	+	Panel	Inter-intra sectorial
34	Chen <i>et al.</i> (2011)	6	China (EM)	2000–2003	+	Panel	Inter-intra sectorial
35	Chen <i>et al.</i> (2013)	5	China (EM)	2000–2003	+	CS	Inter-intra sectorial
36	Nguyen and Sun (2012)	5	Vietnam (EM)	2003–2004	+	Panel	Inter-intra sectorial
37	Choquette and Meinen (2015)	5	Denmark (AE)	1995–2006	(?): ED (+): EV	Panel	New approach
38	Bao <i>et al.</i> (2014)	4	China (EM)	2000–2006	-	Panel	Inter-intra sectorial
39	Phillips and Ahmadi-Esfahani (2010)	4	Australia (AE)	2005	-	CS	New approach
40	Dias de Araujo, R. and Hiratuka, C. (2007)	4	Brazil (EM)	1997–2003	-	Panel	Classic
41	Domingo and Reig Lorenzi (2007)	4	Uruguay (EM)	1990–1996 and 1997–2000	-	Panel	Classic
42	Franco and Sasidharan (2009a)	3	India (EM)	1994–2006	(?): ED (+): EV	Panel	New approach
43	Narjoko (2009)	3	Indonesia (EM)	1996–2006	?	Panel	Classic
44	Mayneris and Poncet (2011b)	3	France (AE)	1998–2003	+	Panel	New approach
45	Choquette and Meinen (2011)	3	Denmark (AE)	1995–2006	+	Panel	Inter-intra sectorial and classic
46	Conti <i>et al.</i> (2014)	3	Italy (AE)	2001–2003	+	Panel	Inter-intra sectorial
47	Atici and Gursoy (2013)	2	Turkey (EM)	2003–2010	+	Panel	Classic
48	Dumont <i>et al.</i> (2010)	2	Belgium (AE)	1998–2005	+	Panel	New approach
49	Mayneris <i>et al.</i> (2013)	2	China (EM)	1997–2007	+	Panel	New approach
50	Cieslik and Hagemeyer (2014)	2	Poland (EM)	2000–2008	+	Panel	Classic
51	Joseph (2005)	2	India (EM)	2004	-	CS	Classic
52	Andersson and Weiss (2012)	2	Sweden (AE)	1997–2004	+	Panel	New approach
53	Duran and Ryan (2014)	2	Chile (EM)	2001–2004	?	Panel	Classic

(continued)

No.	Authors/year of publication	Citations	Country	Period	Results (spillover effects)	Data	Type of spillover
54	Kneller and Pisu (2004)	2	UK (AE)	1988–1996	+	Panel	Inter-intra sectorial
55	Atici and Gursoy (2012)	2	Turkey (EM)	1993–2009	+	Panel	Classic
56	Bannò <i>et al.</i> (2015)	1	Italy (AE)	2004–2008	+	Panel	New approach
57	Stewart (2007)	–	Canada (AE)		+	CS	Classic
58	Hu and Tan (2016)	–	China (EM)	2000–2006	+	Panel	New approach
59	Sun (2007)	–	China (EM)	2003	–	CS	Classic
60	Bao <i>et al.</i> (2016)	–	China (EM)	2000–2007	+	Panel	New approach
61	Yang and Tsou (2014)	–	China (EM)	2004–2006	–	Panel	Classic
62	Franco and Sasidharan (2009b)	–	India (EM)	1994–2006	+	Panel	Classic
63	Keshari (2015)	–	India (EM)	2004–2011	+	Panel	Classic
64	Jung and Lee (2014)	–	South Korea (AE)	1988–1999	+	Panel	New approach
65	Harasztosi (2016)	–	Hungary (EM)	1993–2003	+	Panel	New approach
66	Kim (2013)	–	South Korea (AE)	2006–2009	–	Panel	Inter-intra sectorial
67	Duran (2010)	–	Chile (EM)	2001–2004	+	Panel	Classic
68	Kinuthia (2013)	–	Kenya, Malaysia (EM)	2000–2005	(+): Malaysia (?); Kenya	Panel	Classic
69	Cole <i>et al.</i> (2015)	–	Thailand (EM)	2001–2004	+	Panel	Inter-intra sectorial
70	Dalgıç <i>et al.</i> (2015)	–	Turkey (EM)	2006–2010	+	Panel	Inter-intra sectorial
71	Shi and Zhang (2013)	–	China (EM)	2003–2011	+	Panel	Classic
72	Iwasaki <i>et al.</i> (2010)	–	Hungary (EM)	2002–2005	+	Panel	Classic
73	Albornoz and Kugler (2008)	–	Argentina (EM)	1992–1996; 1998–2001	+	Panel	Classic

**Notes:** 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 March 2018

**Source:** Compiled by the authors

Table I.

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 and 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.

#### 4. Data analysis

##### 4.1 Descriptive analysis

Table II shows the evolution of the literature on FDI export spillovers by year of publication. As we can observe, there is a high volume of publications, especially in the last decade (32), related to two 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, 2018). 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 \$681,000m in 2014, equivalent to 55 percent of total world inflows, with China being the world's leading FDI destination (UNCTAD, 2015). Additionally, we can observe that Classic spillovers have been by far the type of spillover most studied in the different studies (34). In Table II, the Pearson  $\chi^2$  test (0.012) shows a high degree of association between the types of spillovers and the period of publication. Earlier studies (period 1997–2006) analyzed mainly Classic effects (ASR: 2.2) while studies from the last decade (2011–2018) focused on Inter-intra sectorial effects (ASR: 2.0) or New approach spillovers (ASR: 1.7).

An objective of this study is to study 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 III, we performed a Crosstab procedure to determine the level of association between the two economy groups (advanced/emerging) and the types of spillover defined in our review. The Pearson  $\chi^2$  ( $p = 0.001$ ) shows a degree of association between both categorical variables. For instance, studies which deal with Classic spillovers are mainly

Type of spillover/period	1997–2006	2007–2010	2011–2018	Total
<i>Classic</i>				
<i>n</i>	9	17	8	34
% spillover	26.5	50.0	23.5	46.6
ASR	2.2	1.7	-3.3	
<i>Inter-intra sectorial</i>				
<i>n</i>	2	3	10	15
% spillover	13.3	20.0	66.7	20.5
ASR	-0.4	-1.8	2.0	
<i>New approach</i>				
<i>n</i>	1	9	14	24
% spillover	4.2	37.5	58.3	32.9
ASR	-2.0	-0.3	1.7	
<i>Total</i>				
<i>n</i>	12	29	32	73
% spillover	100	100	100	100

**Table II.** Crosstab of the studies by type of spillover and period of publication: 1997–2018

**Notes:** ASR, adjusted standardized residuals. Pearson  $\chi^2 = 12,904$  ( $p = 0.012$ ); Log  $L = 14,088$  ( $p = 0.007$ )  
**Source:** Own elaboration



Type of spillover/economy	Advanced economies	Emerging markets	Total
<i>Classic</i>			
<i>n</i>	8	32	40
% spillover	20.0	80.0	
ASR	-3.6	3.6	
<i>Inter-intra sectorial</i>			
<i>n</i>	8	7	15
% spillover	53.33	46.67	
ASR	1.3	-1.3	
<i>New approach</i>			
<i>n</i>	12	6	18
% spillover	66.7	33.3	
ASR	2.8	-2.8	
<i>Total</i>			
<i>n</i>	28	45	73
% spillovers	38.4	61.6	100

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spillovers from  
FDI

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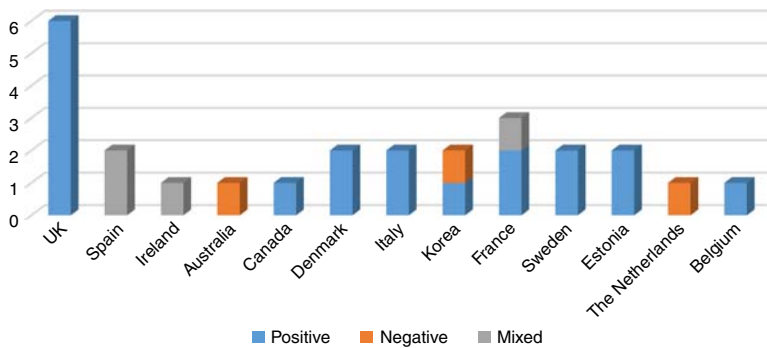
**Table III.**

Crosstabs of the studies by type of spillover and economy group: 1997–2018

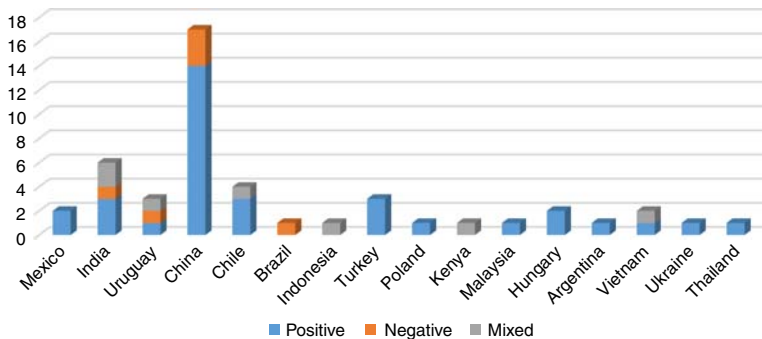
**Notes:** ASR, adjusted standardized residuals, Pearson  $\chi^2 = 13.225$  ( $p = 0.001$ ); Log L = 13,530 ( $p = 0.001$ )  
**Source:** Own elaboration

focused on emerging countries (ASR: 3.6) while studies analyzing the “New approach spillovers” are based in advanced economies (ASR: 2.8).

Regarding the type of effect, as we can observe in Figures 1 and 2, studies report mostly a positive effect of FDI export spillovers in both advanced economies and emerging markets.



**Figure 1.**  
Type of effect for advanced economies (1997–2018).  
A color version of this figure is available online



**Figure 2.**  
Type of effect for emerging economies (1997–2018).  
A color version of this figure is available online

Finally, taking into account the type of effect, if we analyze only those papers showing a positive effect, the picture becomes richer. Table IV classifies the papers by type of spillover and economy groups, considering only those papers indicating a positive effect. The Pearson  $\chi^2$  test (0.021) shows a high degree of association between the types of spillovers and the economy groups. Regarding emerging countries, the prevalence of the positive effect is verified for the Classic spillovers (ASR: 2.7). In the case of advanced economies, there is a prevalence of the positive effect for Inter-intra sectorial (ASR:1) and New approach spillovers (ASR: 2.1).

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

In this part, we focus on calculating the probabilities of finding positive effects of FDI export spillovers by type of spillover and economy group (as was partially 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:

- Type of spillover: Classic (CLAS), Inter-intra sectorial spillovers (INTER-INTRAS) and New approach Spillovers (NAS).
- Economy group: Advanced (AE) or Emerging (EM).
- Year of study publication: (YP).
- Type of empirical model used in each study: (TM: panel or cross-sectional).

4.2.1 *Estimation methodology: a two-stage probit model.* The dependent variable to determine the probabilistic behavior pattern is whether or not positive effects are found in the literature. In this case of a dichotomous variable, it is ideal to use a probit model. Our independent variables are 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 could cause some problems of multicollinearity.

Type of spillover/economy	Advanced economies	Emerging markets	Total
<i>Classic</i>			
<i>n</i>	4	21	25
% spillover	16.0	84.0	
ASR	-2.7	2.7	
<i>Inter-intra sectorial</i>			
<i>n</i>	6	7	13
% spillover	46.2	53.8	
ASR	1.0	-1.0	
<i>New approach</i>			
<i>n</i>	8	6	14
%	57.1	42.9	
ASR	2.1	-2.1	
<i>Total</i>			
<i>n</i>	18	34	52
% spillover	34.6	65.4	100

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

**Notes:** ASR, adjusted standardized residuals. Pearson  $\chi^2 = 7.732$  ( $p = 0.021$ ); Log  $L = 8.034$  ( $p = 0.018$ )  
**Source:** Own elaboration

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 variables, and the economy group (AE or EM), the year of paper publication (YP) and the type of model (TM) as independent variables. The functional representation is expressed as follows:

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

where 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:

$$\begin{aligned} \text{INTER} - \text{INTRAS} (1: \text{if Intra} - \text{inter sectorial}, 0: \text{if any other approach}) &= \beta_0 \\ &+ \beta_1 \text{EM} + \beta_2 \text{YP} + \beta_3 \text{TM} (0: \text{if CS}; 1: \text{if panel}), \end{aligned} \quad (1)$$

$$\begin{aligned} \text{CLAS} (1: \text{if Classic}, 0: \text{if any other approach}) &= \alpha_0 + \alpha_1 \text{EM} + \alpha_2 \text{YP} \\ &+ \alpha_3 \text{TM} (0: \text{if CS}; 1: \text{if panel}), \end{aligned} \quad (2)$$

$$\begin{aligned} \text{NAS} (1: \text{if New approach}, 0: \text{if any other approach}) &= \delta_0 + \delta_1 \text{EM} + \delta_2 \text{YP} \\ &+ \delta_3 \text{TM} (0: \text{if CS}; 1: \text{if panel}). \end{aligned} \quad (3)$$

For advanced economies:

$$\begin{aligned} \text{INTER} - \text{INTRAS} (1: \text{if Intra} - \text{inter sectorial}, 0: \text{if any other approach}) &= \beta_0 + \beta_1 \text{AE} \\ &+ \beta_2 \text{YP} + \beta_3 \text{TM} (0: \text{if CS}; 1: \text{if panel}), \end{aligned} \quad (4)$$

$$\begin{aligned} \text{CLAS} (1: \text{if Classic}, 0: \text{if any other approach}) &= \alpha_0 + \alpha_1 \text{AE} + \alpha_2 \text{YP} \\ &+ \alpha_3 \text{TM} (0: \text{if CS}; 1: \text{if panel}), \end{aligned} \quad (5)$$

$$\begin{aligned} \text{NAS} (1: \text{if New approach}, 0: \text{if any other approach}) &= \delta_0 + \delta_1 \text{AE} \\ &+ \delta_2 \text{YP} + \delta_3 \text{TM} (0: \text{if CS}; 1: \text{if panel}). \end{aligned} \quad (6)$$

In the second stage, we choose the estimated probability for each economy group (from the estimation carried out in the first stage) to find 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. In this analysis, we use 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:

$$\begin{aligned} & \text{CLAS}(+)(1: \text{if positive}; 0: \text{if negative or mixed}) \\ & = \beta_1 \text{Pr}(\text{CLA})(1: \text{if Classic}; 0: \text{if any other approach}), \end{aligned} \quad (7)$$

$$\begin{aligned} & \text{NAS}(+)(1: \text{if positive}; 0: \text{if negative or mixed}) \\ & = \delta_1 \text{Pr}(\text{NA})(1: \text{if New approach}; 0: \text{if any other approach}), \end{aligned} \quad (8)$$

$$\begin{aligned} & \text{INT - INTRAS}(+)(1: \text{if positive}; 0: \text{if negative or mixed}) \\ & = \alpha_1 \text{Pr}(\text{INTER-INTRA})(1: \text{if INTER - INTRA}; 0: \text{if any other approach}). \end{aligned} \quad (9)$$

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

4.2.2 Results. Tables V and VI present the estimation results. Table V 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 VI verifies the contrary effects, showing the importance and significance of Inter-Intra sectorial and New approach spillovers for developed economies. In both models, the year of publication is negatively associated with classic spillovers and positively to Inter-Intra and New Approaches spillovers. Earlier studies in the field were

**Table V.**  
Results of the first-stage probit model (emerging economies)

Variables	Classic spillovers	Inter-Intra sectorial spillovers	New approach spillovers
Emerging markets	1.150*** (0.387)	-0.627* (0.359)	-0.626* (0.370)
Year of publication	-0.189*** (0.047)	0.075* (0.044)	0.153*** (0.051)
Type of model	-0.177 (0.504)	-0.629 (0.485)	-
Constant	380.021*** (94.961)	-150.027* (89.049)	-307.381*** (103.426)
Observations	73	73	73

**Notes:** Standard errors in parentheses. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$   
**Source:** Own elaboration

**Table VI.**  
Results of the first-stage probit model (developed economies)

Variables	Classic spillovers	Inter-intra sectorial spillovers	New approach spillovers
Advanced economies	-1.150*** (0.387)	0.627* (0.359)	0.626* (0.370)
Year of publication	-0.189*** (0.047)	0.075* (0.044)	0.153*** (0.051)
Type of model	-0.177 (0.504)	-0.629 (0.485)	-
Constant	381.171*** (95.097)	-150.653* (89.109)	-308.007*** (103.507)
Observations	73	73	73

**Notes:** Standard errors in parentheses. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$   
**Source:** Own elaboration

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.

Findings reported in Table VII shows the high probability 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 on 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.

Finally, Table VIII yields the probabilities that the effect is positive for each type of spillover depending on each economy. The highest probabilities, whose values are 83.6 and 78.9 percent, are associated to New approaches and Inter-Intra sectorial effects in advanced economies; whereas the next to highest probability, which is 71.3 percent, 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.

These results confirm that for emerging economies FDI spillovers exert influence over local firms' export behavior via Classic spillovers. These types 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, labor mobility and learnings effects in the same sector or different sectors, according to the type established value chain. Contrary to what happens in

Variables	Classic spillovers	New approach spillovers	Inter-Intra sectorial spillovers
Pr (Classic)	0.838*** (0.261)		
Pr (New approach)		1.923*** (0.499)	
Pr (Inter-intra sectorial)			2.678*** (0.716)
Observations	73	73	73

**Notes:** Standard errors in parentheses. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$   
**Source:** Own elaboration

**Table VII.**  
Results of the second-stage probit model estimations (positive effect)

Spillover type	Economy group	Probability of a positive effect	Percentage
Classic	Advanced	0.6869479	68.7
	Emerging	0.7130165	71.3
Inter-intra sectorial	Advanced	0.7898663	79
	Emerging	0.7129447	71.3
New approaches	Advanced	0.8360356	83.6
	Emerging	0.7468153	74.7

**Source:** Results obtained from the estimations calculated under Stata

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

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.

## 5. 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 and Peruffo, 2016), we report a high probability of finding positive effects when studying FDI export spillovers in both emerging and advanced economies. This fact justifies the favorable 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 advanced European economies and Asian emerging markets, especially in the period 2007–2018, in which 83.6 percent of the total of selected works are concentrated. Second, our results support the view that the specific institutional context influences FDI export spillovers. We have found a higher 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 and Peruffo, 2016) 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 *et al.*, 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 crucial 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.

## Note

1. Google Scholar is used in meta-analysis exercises by authors such as: Demena and van Bergeijk (2016), Perri and Peruffo (2016), Irsová and Havranek (2013) and Meyer and Sinani (2009).

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