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BOARD DIVERSITY AND OUTWARD FDI: EVIDENCE FROM EUROPE

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Abstract
Employing firm-level panel data from 2011 to 2015, we investigate the relationship between board diversity and outward foreign direct investment (OFDI) among firms headquartered in Europe. Previous studies suggest that best-performing firms self-select into OFDI and that board diversity affects firm performance and strategic decisions. Our focus is on board diversity in terms of gender and nationality as determinants of OFDI. After controlling for endogeneity using instrumental variables and control function methods, we find that board diversity positively affects OFDI by increasing firm performance; however, firms with more diverse boards are less likely to open foreign subsidiaries. Our findings also reveal that the negative effect of board diversity on OFDI is stronger in more productive firms.

Keywords: Board diversity, Outward Foreign Direct Investment (OFDI), Foreign Direct Investment (FDI), Firm performance, Europe

JEL codes: F23; G30; J16

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1. Introduction

During the last few decades, European countries have experienced remarkable changes in board diversity, which are not observed elsewhere (Ferreira and Kirchmaier 2013). Female directors accounted for no more than 10% of board members in large companies across Italy, France, Germany, Spain, and the United Kingdom in the early 2000s; however, this figure more than doubled by the end of 2016. Similarly, the percentage of foreign directors on the boards of major listed companies showed a 100% increase in most European countries from 2010 to 2016 (Ciavarella 2017).

The effect of board diversity on firm performance and strategic decision-making has been extensively investigated.[1] However, little attention has been directed to the effect of board diversity on firm internationalisation decisions and there is no evidence on the effect of board diversity on outward foreign direct investment (OFDI).[2] This is somewhat surprising, as OFDI is a strategic decision that requires board approval, in which board composition plays a role (Levi, Li and Zhang 2014). It is even more surprising for Europe, which features prominently on the OFDI stage. In 2019, outflows from European countries accounted for 35% of total OFDI flows, and 50% of those originated from developed economies; in the same year, outstocks from European countries amounted to 36% of total OFDI stocks, and 48% of those originated from developed economies (UNCTAD 2020).

This study explores the relationship between OFDI and board diversity at the firm-level.[3] Specifically, we estimate the effect of board diversity, in terms of gender and nationality, on OFDI that is measured as the probability of opening a foreign subsidiary by firms headquartered in Europe.[4] To this end, we employ firm-level longitudinal data from Orbis, an administrative database issued by Bureau van Dijk. Our sample comprises 1,283 listed industrial companies from 21 European countries, belonging to 15 NACE 1-digit industries and continuously operating from 2011 to 2015.[5]

The conceptual framework behind our research question is derived from two strands of literature: one addresses the relationship between OFDI and performance and the other investigates the relationship between board diversity, performance, and strategic decisions.

[1] See Section 2 for a literature review.

[2] According to the IMF (1993), OFDI is an investment in a foreign company by which the investor owns at least 10% of the ordinary shares and it is undertaken with the objective of establishing a lasting interest in the country and significant influence on the firm's management.

[3] The choice to study OFDI at the firm-level has both theoretical and empirical motivations. See Section 2 for a literature review and Section 4 for a discussion of our empirical methodology.

[4] In this paper, we use 'opening a foreign subsidiary' and 'initiating OFDI' as synonymous.

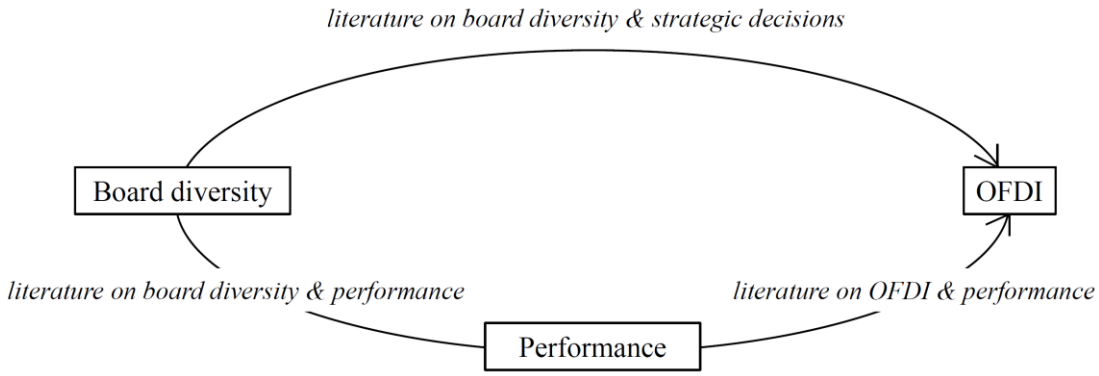
[5] Lack of data prevents us from considering a longer time span; although data on subsidiaries reference the period spanning 2007 to 2015 in our database, data on boards are only available from 2011 to 2015.

Starting with Melitz's (2003) seminal work, the first strand of literature shows that firms self-select into internationalisation. As long as fixed costs are incurred in serving foreign markets, only the most productive firms, which command a large market share, can successfully enter foreign markets through exports or OFDI (Helpman, Melitz and Yeaple 2004). Empirical analyses largely support this theory and confirm that firm performance has a positive and statistically significant effect on OFDI (Barba Navaretti, Castellani and Disdier 2010; Borin and Mancini 2016). We refer to these contributions as 'literature on OFDI and performance'.

In the second strand, boards act as monitors and advisors for management. If a board's composition affects its effectiveness in either role, board diversity has an impact on firm performance and strategic decisions (Adams and Ferreira 2007). Empirical analyses show that diversity affects the board's effectiveness as a monitor and advisor through its members' skills and expertise (Kim and Starks 2016; Masulis, Wang and Xie 2012), their independence (Adams and Ferreira 2009), industry and political connections (Ferreira 2010; Sherman, Kashlak and Joshi 1998), and risk-taking attitude (Bernile, Bhagwat and Yonker 2018). In addition, diversity can affect the deliberation process through increased communication and coordination difficulties (Hahn and Lasfer 2016). We refer to these contributions as 'literature on board diversity, performance, and strategic decisions'.

Drawing on previous studies, we expect board diversity to influence OFDI (Figure 1). The reason is twofold. First, OFDI is a strategic decision requiring board-level approval and reflects the board's effectiveness as a monitor and advisor for the management. Shaping the board's effectiveness in either role, diversity may affect OFDI decisions. Second, we expect board diversity to impact firm performance and, through it, OFDI. As most productive firms self-select into OFDI, the magnitude of board diversity's effect on OFDI may differ according to firm performance, the latter acting as a 'modifier' of the board diversity-OFDI relationship. Moreover, firm performance may play an even subtler role, acting as a 'mediator' of the board diversity-OFDI relationship.

Figure 1: Conceptual framework and research question



To the best of our knowledge, this is the first study to explore firms' self-selection into OFDI based on board diversity. Using a linear model, we show that the effect of board diversity on OFDI is stronger for the most productive firms. We proceed to disentangle the nexus between board composition, firm performance, and internationalisation by following the *causal steps strategy* outlined by Preachers and Hayes (2008) and MacKinnon and Dwyer (1993). We face two econometric challenges related to endogeneity issues. The first relates to the potential reverse causality between OFDI and performance due to a learning-by-OFDI mechanism that raises firm-level productivity through foreign exposure. The second concerns the potential endogeneity in board diversity, as directors may self-select into boards according to firm performance and internationalisation strategies. The first issue is addressed by a convenient definition of our dependent variable such that the learning-by-OFDI mechanism is excluded from our model. The second source of endogeneity is addressed through suitable instruments and instrumental variables/two-stage least-squares (IV/2SLS) and control function (CF) estimation methods. The latter is not often employed to address endogeneity issues in the literature on firm internationalisation.[6]

Our findings reveal that board diversity exerts a *direct* negative effect on OFDI and that such negative effect is attenuated by a *mediated* effect of opposite sign, in which firm performance is the mediating variable. Although a small percentage of firms started to engage in OFDI during our survey period, our results are robust for different econometric models and specifications and are completely original to our study. Better performing firms are known to self-select into OFDI, and board diversity is known to influence firm performance. The literature has failed to provide a convincing model encompassing board

[6] See Section 4 for a discussion of these techniques' suitability in our context.

composition, firm performance, and OFDI. Our results suggest that board diversity is the missing piece in this puzzle, affecting OFDI decisions both *per se* and through firm performance.

On the one hand, our study contributes to the literature on OFDI and performance as the first to recognise board diversity as a determinant of OFDI decisions, thus targeting the already established OFDI-performance nexus. We unveil board diversity as a primitive of performance by showing that board diversity affects performance, which affects OFDI, and providing a more comprehensive empirical framework to estimate the firm-level determinants of OFDI. On the other hand, our study contributes to the literature on board diversity, performance, and strategic decisions, as it is the first to examine the effect of board diversity on OFDI, which is a strategic decision that has never been analysed. Proving that board diversity shapes OFDI, this paper complements the findings on the influence of ethnic diversity in the workforce (Parrotta, Pozzoli and Sala 2016; Moriconi, Peri and Pozzoli 2018), the intensity of female ownership and management (Marques 2015), and board composition (Dou et al. 2019; Pisani, Muller and Bogăţan 2018; Rivas 2012) on foreign sales.

The remainder of this paper is organised as follows. Section 2 reviews two strands of literature that motivate our research question. Section 3 introduces the data employed for empirical purposes and descriptive statistics. Section 4 discusses our econometric models and results. Section 5 concludes, by discussing the main limitations of the analysis and providing policy implications.

2. Literature review

This section briefly reviews two strands of literature that inspired our research question.

2.1 OFDI and performance

Following Bernard and Jensen's (1995) seminal work, many studies have investigated the relationship between internationalisation and firm performance. Regardless of the year and country of analysis, empirical evidence suggests that internationalised firms outperform domestic enterprises based on several economic, innovation-related, and financial variables. As comprehensively reviewed in the surveys by Lopez (2005), Wagner (2007, 2012, 2016), Greenaway and Kneller (2007), Singh (2010), and Hayakawa, Kimura and Machikita (2012), this result is robust for different internationalisation strategies and performance measures.

For this study, our focus is on papers investigating the relationship between OFDI and firm performance. Castellani and Zanfei (2007), Castellani and Giovannetti (2010), Wagner (2006), Arnold and Hussinger (2010), Engel and Procher (2012), Girma (2005), and Casaburi, Gattai and Minerva (2007) present basic correlations. In these studies, performance variables are regressed on a dummy for OFDI status or vice

versa. Empirical evidence largely supports the existence of a positive, statistically significant correlation between OFDI and performance. Firms with at least one subsidiary abroad are larger, more productive, more capital-intensive, and more innovative than domestic enterprises. However, causality is not addressed econometrically, which is a major disadvantage of these studies.

From a theoretical perspective, the existence of a positive correlation between OFDI and performance can be explained in terms of self-selection. If fixed costs are incurred in serving foreign markets, only the most productive firms that command a large market share can successfully enter foreign markets through exports or OFDI. The theoretical foundation of the self-selection mechanism can be traced back to Helpman, Melitz and Yeaple (2004), Head and Ries (2003), and Grossman, Helpman and Szeidl (2006). These studies extend Melitz's (2003) benchmark framework to analyse the intra-industry effects of foreign direct investment.

Consistent with this theoretical framework, Kimura and Kiyota (2006), Barba Navaretti and Castellani (2004), Barba Navaretti, Castellani and Disdier (2010), and Borin and Mancini (2016) use panel data and regress past performance on a dummy for future OFDI starters to observe that firm performance has a positive and statistically significant effect on OFDI.[7] This methodology allows us to identify the performance differentials between firms engaged and not engaged in OFDI before their first involvement in OFDI. Wagner (2007) explains that this is the proper econometric approach to address endogeneity and to provide conclusive evidence of self-selection. Considering a dummy for future OFDI firms—rather than starters—would not exclude a learning-by-OFDI mechanism, by which previous OFDI experience positively affects performance. The literature provides evidence of this learning-by-OFDI effect (Barba Navaretti, Castellani and Disdier 2010; Barba Navaretti and Castellani 2004; Castellani, Mariotti and Piscitello 2008; Borin and Mancini 2016; Huang and Zhang 2017; Baiardi, Gattai and Natale 2021).

Refinements of these simple analyses investigate the mapping of heterogeneous firms into different sourcing strategies, including OFDI (Tomiura 2007; Federico 2010; Kohler and Smolka 2011, 2012; Gattai and Trovato 2016), and dissecting OFDI according to the destination and ownership structure (Aw and Lee 2008; Damijan, Polanec and Prasnikar 2007; Raff, Ryan and Stahler 2012).

[7] OFDI firms are those engaged in OFDI in a certain year, OFDI starters are those engaged in OFDI for the first time in that year.

2.2 Board diversity, performance, and strategic decisions

Spurred by changes in board composition due to the global debate on the roles of women and ethnic minorities (Adams and Ferreira 2009), a growing body of literature examines the impact of board diversity on firm performance and, to a lesser extent, on strategic decisions.

2.2.1 Board diversity and performance

As comprehensively reviewed by Adams, Hermalin and Weisbach (2010), Ferreira (2010), Rhode and Packel (2014), and Kirsch (2018), the relationship between board diversity and firm performance is the subject of vast empirical economics and management literature, comprising an array of countries, institutional settings, and demographic characteristics.

For our study, it is particularly compelling to provide a systematised view of the relevant evidence from European countries on the impacts of gender and nationality diversity on performance.

Correlation analyses performed on large samples of European firms reveal a positive, strong association between accounting measures of firm profitability and the proportion of female directors (Christiansen et al. 2016; Ferreira and Kirchmaier 2013). This association persists, albeit not as strongly, when the endogeneity of board appointments is addressed and alternative measures of firm performance are considered. Relying on the IV identification strategy, Green and Homroy (2018) report that gender diversity has a positive but modest effect on the profitability of large European firms. Similar econometric techniques have been adopted, and similar results have been obtained for French (Sabatier 2015; Dang et al. 2018), Spanish (Campbell and Minguez-Vera 2010), and Italian (Amore, Garofalo and Minichilli 2014) firms. Conversely, Gregory-Smith, Main and O'Reilly (2014) find that gender diversity has no effect on the profitability of large British firms.

Joecks, Pull and Vetter (2013) suggest that overlooked non-linearities can account for conflicting evidence regarding the effect of gender-diverse boards on firm performance. According to critical mass theory (Kanter 1977), when there are relatively few female directors, they are perceived as representatives of their gender rather than effective board members. Joecks, Pull and Vetter (2013) sample 151 German listed firms for the period between 2000 and 2005 to observe that gender diversity positively affects performance but only for boards with at least one-third female directors. Similar results have been reported for Norway (Torchia, Calabrò and Huse 2011) and Italy (Bruno, Ciavarella and Linciano 2018).

Led by Norway in 2003, many European countries introduced a mandatory gender quota to address the inadequate female presence on boards. Such quotas provide quasi-natural experimental settings, in which changes in board diversity can be considered exogenous. Literature relying on the gender quotas in their

identification strategy highlights that gender diversity has a negative or zero effect on firm performance. Ahern and Dittmar (2012) and Matsa and Miller (2013) note that increased gender diversity negatively influences profitability among Norwegian firms, whereas Dale-Olson, Schone and Verner (2014) and Eckbo, Nygaard and Thorburn (2016) find no such effect. Comi et al. (2020) report that gender diversity has a negative or zero effect on an array of performance measures in Belgium, Spain, and France. However, these findings should not be considered conclusive, as mandatory changes in board diversity could induce an inefficient selection of board members that results in the negative impact of gender diversity on firm outcomes (Schmid and Urban 2016).

As mentioned in Section 1, nationality is an increasingly important source of heterogeneity in European boards. However, empirical evidence on the effect of nationality diversity on firm performance is scarce. Green and Homroy (2018) and Estelyi and Nisar (2016) report that firms with more nationality-diverse boards are more profitable, whereas Garcia-Meca, Garcia-Sanchez and Martinez-Ferrero (2015), Frjins, Dodd and Cimerova (2016), and Hahn and Lasfer (2016) note that diverse nationalities negatively affect firm performance.

2.2.2 Board diversity and strategic decisions

The literature on board diversity and strategic decisions investigates the impact of board composition on several corporate strategy components. For this study, we consider contributions on the relationship between board diversity and a firm's acquisition policy, along with contributions on board diversity and internationalisation.

Ahern and Dittmar (2012) show that changes in board composition following the adoption of the mandatory gender quota led to more acquisitions among Norwegian firms. In contrast, based on large samples of the U.S. firms, Levi, Li and Zhang (2014) and Chen, Crossland and Huang (2016) report that gender-diverse boards are less likely to undertake acquisitions, and when they do so, they select smaller targets and pay lower bid premiums. Similarly, Huang and Kisegen (2013) show that female executives undertake fewer acquisitions than male executives, and the market reacts more favourably to acquisitions initiated by female executives.

As for internationalisation, there is little evidence on the role of gender diversity in shaping a firm's strategy. Employing World Bank survey data from developing countries, Marques (2015) reports that firms' export propensity and intensity vary with the gender of top managers and entrepreneurs.

Conversely, the relationship between board nationality diversity and firms' internationalisation strategies has been investigated extensively. Employing data from the U.S., Masulis, Wang and Xie (2012) show that foreign directors offer valuable advice such that firms make better cross-border acquisitions when

operating in the directors' country of origin. Stroup (2017) reports that the presence of directors with international experience increases the likelihood of a firm's first cross-border acquisition and its success. Pisani, Muller and Bogăţan (2018) extend our understanding of firm internationalisation by showing that foreign members in top management teams have a significant and positive effect on firm internationalisation.[8] In contrast, Hahn and Lasfer (2016) and Frjins, Dodd and Cimerova (2016) report that internationally diverse boards face communication and coordination problems and may fail to impose managerial discipline.

3. Data and descriptive statistics

The present research employs firm-level longitudinal information from Orbis, an administrative dataset issued by Bureau van Dijk.[9]

Our dataset is the result of thorough data mining and cleaning processes. As most subsidiary and board information was not readily available for download from the Orbis website, we retrieved it from Bureau van Dijk under a special research agreement. Moreover, the retrieved information was not suitable for use and required processing to build consistent measures for OFDI and board diversity.

Ultimately, our balanced panel covers 1,283 industrial companies listed on the stock market that were continuously headquartered in the European Union from 2011 to 2015. We focus on industrial companies to study the behaviour of heterogeneous firms within a relatively homogeneous class, which includes all the available NACE two-digit industries.[10] Although Orbis collects information on both listed and unlisted companies, we restrict our focus to the former for which more detailed information is available. Finally, we consider a large set of European countries to exploit country-level heterogeneity. As mentioned in Section 1, Europe is the ideal locus to study board diversity's effect on OFDI because it is a leading actor on the OFDI stage and board diversity has significantly increased across European countries over the last two decades.

From a geographical perspective, Table 1 reveals that most of our (pooled) sample firms are from Great Britain (24%), France (19%), Germany (17%), and Sweden (8%). Spain, Finland, Poland, Belgium, and Denmark are equally represented, each accounting for 4% of the total. Portugal, Ireland, Luxembourg,

[8] As for alternative determinants of internationalisation, Rivas (2012) investigates the effects of diversity in age, tenure, and functional background of the board and top management team members in a sample of the U.S. and European firms. Diversity in functional background only has a positive and significant effect on internationalisation.

[9] Kalemli-Ozcan et al. (2015) and Ribeiro, Menghinello and De Backer (2010) provide additional information on the Orbis database.

[10] The Statistical Classification of Economic Activities in the European Community, commonly referred to as NACE (for the French term 'nomenclature statistique des activités économiques dans la Communauté Européenne'), is the industry standard classification system used in the European Union. The current version is revision 2 and was established by Regulation (EC) No 1893/2006.

Romania, Lithuania, Bulgaria, Slovenia, Estonia, Slovakia, the Czech Republic, and Latvia have lower shares, while a few countries are not represented in our data because the firms headquartered there lack information regarding either their subsidiaries or board composition.

As for industry, manufacturing (55%) and information and communication technologies (13%) industries account for the largest share. Construction, transportation, and professional activities each constitute 5% of the sample, followed by administrative activities (4%), mining (3%), electricity (3%), accommodation activities (2%), arts (2%), and agriculture (1%). Although various other industries are represented, their share is negligible (Table 2).

OFDI involvement in our sample is remarkable, as 84% of the firms have at least one subsidiary abroad during the study period. This evidence is robust when switching to a country-wise analysis. As shown in Table 1, the percentage of OFDI firms surpasses 50% in all countries with Lithuania, Latvia, and Romania as the only exceptions.

Table 1: Sample of firms, OFDI firms and noOFDI firms by country

	firms		**OFDI firms**		**noOFDI firms**	
country	number	%	number	%	number	%
Austria	180	3%	174	97%	6	3%
Belgium	250	4%	232	93%	18	7%
Bulgaria	40	1%	21	53%	19	48%
Czech Republic	20	0%	19	95%	1	5%
Denmark	225	4%	197	88%	28	12%
Estonia	25	0%	20	80%	5	20%
Finland	305	5%	290	95%	15	5%
France	1195	19%	1071	90%	124	10%
Germany	1060	17%	925	87%	135	13%
Great Britain	1560	24%	1169	75%	391	25%
Ireland	100	2%	92	92%	8	8%
Latvia	15	0%	6	40%	9	60%
Lithuania	45	1%	21	47%	24	53%
Luxembourg	70	1%	65	93%	5	7%
Poland	255	4%	169	66%	86	34%
Portugal	125	2%	108	86%	17	14%
Romania	45	1%	15	33%	30	67%
Slovakia	20	0%	14	70%	6	30%
Slovenia	35	1%	35	100%	0	0%
Spain	330	5%	296	90%	34	10%
Sweden	515	8%	472	92%	43	8%
total	6415	100%	5411	84%	1004	16%

Source: Authors' elaboration from Orbis (2017)

OFDI involvement remains notable when controlling for industry. Generally, more than 50% of the firms had at least one subsidiary abroad from 2011 to 2015 except for the financial activities industry. As Table 2 reveals, OFDI firms are particularly relevant in the manufacturing (89%), administrative activities (91%), and education (100%) industries, whereas the financial activities, accommodation activities, healthcare, and arts industries have the fewest firms with at least one subsidiary abroad between 2011 and 2015.

Table 2: Sample of firms, OFDI firms and noOFDI firms by industry

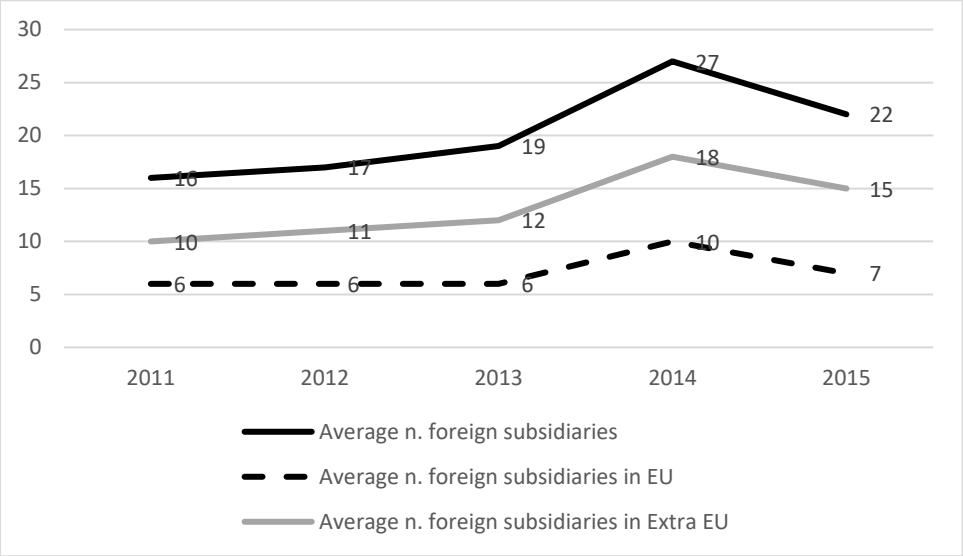
	firms		**OFDI**		**noOFDI**	
industry	number	%	number	%	number	%
accommodation activities	120	2%	66	55%	54	45%
administrative activities	235	4%	213	91%	22	9%
agriculture	65	1%	46	71%	19	29%
arts	95	2%	60	63%	35	37%
construction	295	5%	219	74%	76	26%
education	5	0%	5	100%	0	0%
electricity	190	3%	166	87%	24	13%
financial activities	10	0%	3	30%	7	70%
health	25	0%	15	60%	10	40%
ICT	765	13%	659	86%	106	14%
manufacturing	3160	55%	2806	89%	354	11%
mining	195	3%	170	87%	25	13%
other service activities	20	0%	13	65%	7	35%
professional activities	260	5%	228	88%	32	12%
transportation	270	5%	218	81%	52	19%
total	5710	100%	4887	86%	823	14%

Source: Authors' elaboration from Orbis (2017)

Figure 2 demonstrates that our sample firms' foreign subsidiaries are spread worldwide, and most are concentrated outside the European Union. Moreover, the number of firms with at least one subsidiary inside the European Union (*OFDI_ EU firms*) and those with at least one subsidiary outside the European Union (*OFDI_ Extra EU firms*) tend to be quite balanced (Figure 3). Contrary to the general notion that European countries are open to each other (Baldwin and Wyplosz 2019), our evidence suggests that European firms' OFDI is not restricted to the European Union where legislation is harmonised; rather, it crosses European borders despite the higher degree of complexity implied by opening subsidiaries in less familiar regions.[11]

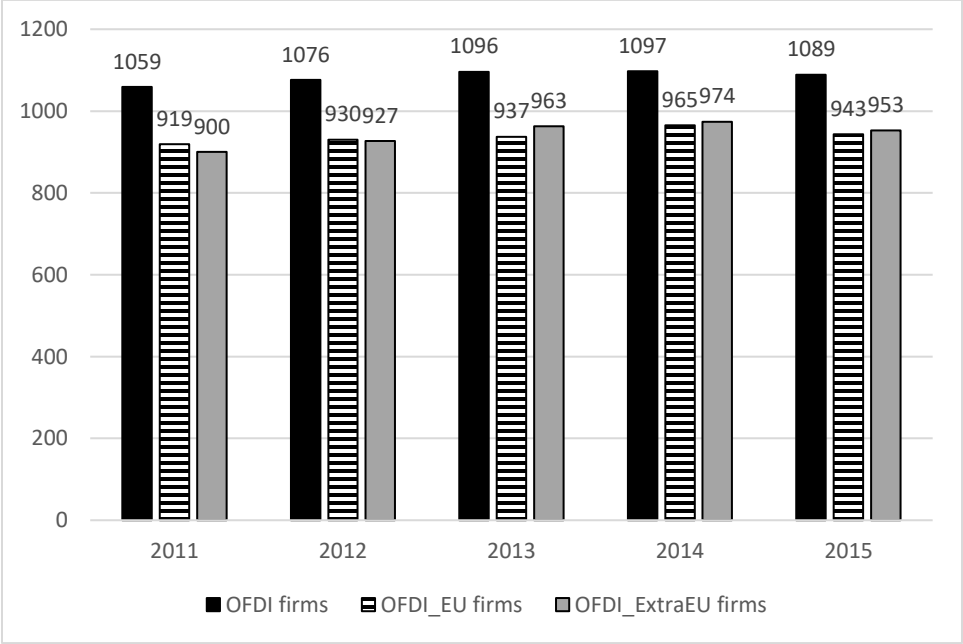
[11] We thank an anonymous reviewer for this remark.

Figure 2: Average number of foreign subsidiaries by destination



Source: Authors' elaboration from Orbis (2017)

Figure 3: The OFDI firms by destination



Source: Authors' elaboration from Orbis (2017)

It should be noted that despite European enterprises' deep involvement in OFDI, only 5.2% of our sample firms undertook OFDI for the first time during the study period. Specifically, although we have a large share of OFDI firms, our sample comprises only a small percentage of OFDI starters. This poses certain constraints in the empirical analysis, addressed in Section 4.

Board diversity is relevant in terms of both gender and nationality: 81% of our firms have at least one female director and 48% have at least one foreign director. As displayed in Table 3, the results are consistent after controlling for country. Slovenia has the maximum share of firms with at least one female director (100%), whereas Slovakia has the minimum share (45%). Controlling for industry does not deliver any remarkable differences; most firms in all countries have at least one female director, with the maximum (100%) in the financial activities industry and the minimum (63%) in the agricultural industry (Table 4).

Table 3: Firms with at least one female director and firms with at least one foreign director by country

	at least 1 female director		**no female directors**		**at least 1 foreign director**		**no foreign directors**	
country	number	%	number	%	number	%	number	%
Austria	126	70%	54	30%	104	58%	76	42%
Belgium	200	80%	50	20%	135	54%	115	46%
Bulgaria	23	58%	17	43%	18	45%	22	55%
Czech Republic	12	60%	8	40%	14	70%	6	30%
Germany	685	65%	375	35%	477	45%	583	55%
Denmark	191	85%	34	15%	113	50%	112	50%
Estonia	15	60%	10	40%	6	24%	19	76%
Spain	238	72%	92	28%	151	46%	179	54%
Finland	299	98%	6	2%	158	52%	147	48%
France	1150	96%	45	4%	557	47%	638	53%
Great Britain	1239	79%	321	21%	774	50%	786	50%
Ireland	91	91%	9	9%	58	58%	42	42%
Lithuania	28	62%	17	38%	6	13%	39	87%
Luxembourg	38	54%	32	46%	51	73%	19	27%
Latvia	12	80%	3	20%	6	40%	9	60%
Poland	166	65%	89	35%	114	45%	141	55%
Portugal	106	85%	19	15%	67	54%	58	46%
Romania	23	51%	22	49%	12	27%	33	73%
Sweden	488	95%	27	5%	260	50%	255	50%
Slovenia	35	100%	0	0%	22	63%	13	37%
Slovakia	9	45%	11	55%	12	60%	8	40%
total	5174	81%	1241	19%	3115	49%	3300	51%

Source: Authors' elaboration from Orbis (2017)

Table 4: Firms with at least one female director and firms with at least one foreign director by industry

	at least 1 female director		**no female directors**		**at least 1 foreign director**		**no foreign directors**	
industry	number	%	number	%	number	%	number	%
accommodation act.	105	88%	15	13%	58	48%	62	52%
administrative act.	192	82%	43	18%	111	47%	124	53%
agriculture	41	63%	24	37%	24	37%	41	63%
arts	78	82%	17	18%	36	38%	59	62%
construction	229	78%	66	22%	136	46%	159	54%
education	5	100%	0	0%	1	20%	4	80%
electricity	168	88%	22	12%	113	59%	77	41%
financial act.	10	100%	0	0%	2	20%	8	80%
health	21	84%	4	16%	18	72%	7	28%
ICT	655	86%	110	14%	360	47%	405	53%
manufacturing	2489	79%	671	21%	1527	48%	1633	52%
mining	171	88%	24	12%	131	67%	64	33%
other service act.	19	95%	1	5%	4	20%	16	80%
professional act.	212	82%	48	18%	113	43%	147	57%
transportation	211	78%	59	22%	142	53%	128	47%
total	4606	81%	1104	19%	2776	49%	2934	51%

Source: Authors' elaboration from Orbis (2017)

Tables 3 and 4 compare the percentage of firms with at least one foreign director by country and industry, respectively. As for country, Luxembourg has the highest share (73%), whereas Lithuania has the lowest (13%). Regarding industry, a high percentage of firms have at least one foreign director in the health (72%), mining (67%), and transportation (53%) industries, while the percentages are particularly low in the agriculture (37%), financial activities (20%), and other service (20%) industries.

4. Econometric analysis

This section presents our results on the effect of board diversity on OFDI. OFDI is a strategic decision that requires board-level approval and reflects the effectiveness of the board in its dual role as monitor and advisor to the management (Adams and Ferreira 2007). As long as diversity shapes the board's effectiveness in either role, we expect it to affect OFDI decisions.

The empirical literature on board diversity and strategic decisions shows that diverse boards are tough management monitors (Adams and Ferreira 2009; Green and Homroy 2018). In light of this, we expect more severe scrutiny of international investment projects by diverse boards, and ultimately, a negative effect of board diversity on OFDI. Managers may exploit their superior information on the profitability

of OFDI to increase the number of assets they control (Hannan and Mavinga 1980; Lewellen et al. 1989). Diverse boards impose discipline on the management and curb 'empire building' through OFDI by rigorously monitoring managerial activities and projects.

However, the same literature also shows that diversity affects a board's skills and expertise (Kim and Starks 2016; Ferreira 2010; Sherman, Kashlak and Joshi 1998) and improves its effectiveness as an advisor to management. Stroup (2017) reports that having directors who are knowledgeable about foreign markets increases the likelihood of cross-border acquisition. As long as more diverse boards rely on greater international experience (Dou et al. 2019; Masulis, Wang and Xie 2012), we expect diversity to positively affect a firm's OFDI. Finally, both the negative and positive effects of board diversity can be tempered by communication and coordination problems that diverse boards incur (Hahn and Lasfer 2016; Frijns, Dodd and Cimerova 2016). Due to the opposite sign of expected effects, the impact of board diversity on OFDI is an empirical matter, and we address it using econometric analysis.

We investigate the role of firm performance as 'modifier' and 'mediator' of the relationship between board diversity and OFDI. Opening subsidiaries abroad entails fixed costs that only the most productive firms, which can command a large market share, find profitable to incur. The literature on OFDI and performance documents that firm performance has a positive and statistically significant effect on OFDI.[12] Therefore, we suggest that the magnitude of the effect of board diversity on OFDI may differ according to firm performance. Furthermore, we expect firm performance to act as a mediator of board diversity in the relationship between board diversity and OFDI. Shaping the board's effectiveness as a monitor and advisor for management, board diversity affects firm performance, which is confirmed in the literature on board diversity and performance.[13] Thus, we expect board diversity to impact firm performance and, through it, OFDI.

To test the role of firm performance as a modifier (moderator or amplifier) of board diversity, we rely on suitable interaction terms.[14] To assess the role of firm performance as a mediator, we follow the empirical methodology of the *causal steps strategy* outlined by Preachers and Hayes (2008).[15] In addition, we adopt the approach outlined by Mackinnon and Dewyer (1993) to quantify board diversity's direct and indirect (i.e. mediated by performance) effects on OFDI.

[12] See Section 2.1.
[13] See Section 2.2.1.
[14] See Bosea, Mallick and Tsoukasc (2020) and Bosea, Filomeni and Mallick (2021).
[15] See Colombo, Rotondi and Stanca (2018) and Li, Cai and Li (2021).

To address the effect of board diversity on OFDI we start by estimating Equation 1:

$$P(StartOFDI_{it} = 1) = \alpha_0 + \alpha_1 diversity_{it-1} + \alpha_2 \log(tangible\ fixed\ assets_{it-1}) + \alpha_3 controls_{it-1} + \varepsilon_{it} \quad (1)$$

On the left-hand side of Equation 1, our dependent variable, $StartOFDI$, is a dummy that equals one if firm *i* has no subsidiary abroad in years (*t* – 2) and (*t* – 1) and has at least one subsidiary in year *t*, and zero otherwise.[16] Wagner (2007) indicates that this is a suitable dependent variable to develop causal inferences when analysing self-selection mechanisms, as this removes reverse causality arising from the learning-by-OFDI effect. Considering either a dummy for OFDI status or the actual number of OFDI rather than an OFDI-start variable, would not exclude the learning-by-OFDI mechanism by which previous OFDI experience positively affects firm-level variables.[17] Thus, the estimates would be biased due to endogeneity issues.[18]

Our main variable of interest, *diversity*, measures the proportion of female and foreign directors on firm *i*'s board in year *t* and captures overall board diversity. We also account for distinct gender and nationality effects on OFDI by considering two additional independent variables, *gender diversity* and *nationality diversity*, which capture the proportion of female and foreign directors on firm *i*'s board in year *t*, respectively. We note that consistent with empirical evidence presented in Section 1, board heterogeneity in our sample increases over the period between 2011 and 2015. On average, across the sample firms, the proportion of female directors is approximately 0.043 in 2011 and increases to 0.101 in 2015. The proportion of foreign directors increases from 0.0006 to 0.082.

In addition to our measures of board diversity, on the right-hand side of Equation 1 we include a proxy for firm size (*tangible fixed assets*) in year (*t* – 1) and additional controls, such as a dummy for the corporate governance regime, which is either a dual- or unitary-board system; a measure for board size

[16] Our panel's five-year span prevents us from adopting longer time spans in constructing $StartOFDI$.

[17] Borin and Mancini (2016) and Baiardi, Gattai and Natale (2021) adopt the same approach to investigate the productivity differentials among Italian firms before they invest abroad.

[18] It is also noteworthy that we replicated our analysis by imposing an additional restriction, in which a firm without subsidiaries is removed from the sample after subsidiaries are gained, i.e. after the switch from $StartOFDI = 0$ to $StartOFDI = 1$. The resulting sample is an unbalanced panel dataset with significantly fewer observations. Inference based on this restricted sample exhibits inflated standard errors, and therefore, the results (available upon request) are not particularly informative. Given the above, we opted to retain the advantages of a larger dataset compared to those implied by the previously mentioned stricter definition of *StartOFDI.*

at (t – 1); and industry-, country-, and year-fixed effects. [19] At this stage, it is worth mentioning that we do not include firm fixed effects in our model, as it would pose incidental parameter problems in light of our limited time span. Table 5 displays the summary statistics of the independent variables used in our analysis, while their definitions and pairwise correlations are reported in the Appendix.

Table 5: Summary statistics of the independent variables

Variable	**Obs.**	**Mean**	**Std. Dev.**	**Min**	**Max**
gender diversity	6371	0.0776	0.0790	0	1
nationality diversity	6371	0.0540	0.0934	0	0.8571
diversity	6371	0.1316	0.1303	0	1
labour productivity °	5739	4.5863	0.7997	0	11.2693
tangible fixed assets°	6300	11.9936	2.3517	3.7825	18.9311
TFP°	5724	5.1983	0.7391	-0.3326	10.0427
board size	6415	27.6689	16.1448	0	344
dual regime	6415	0.3256	0.4687	0	1
OFDI memory	6415	0.8536	0.3531	0	1
IFDI memory	6415	0.9641	0.1859	0	1
OFDI Extra EU	6415	0.7415	0.4378	0	1
High_labour productivity	6415	0.3291	0.4699	0	1
Low_labour productivity	6415	0.2237	0.4167	0	1
High_TFP	6415	0.3308	0.4705	0	1
Low_TFP	6415	0.2231	0.4163	0	1

Variables with superscript ° are in logarithm.

Based on the literature on board diversity, performance, and strategic decisions, we expect *diversity*, *gender diversity*, and *national diversity* to be endogenous (Adams, Hermalin and Weisbach 2010); thus, we estimate Equation 1 with a probit specification using a CF method.[20]

The CF method is suitable for estimating a nonlinear model with a binary dependent variable in the presence of continuous endogenous regressors (Rivers and Vuong 1988). Generally, CF-based techniques rely on the same types of identification conditions as IV/2SLS, and are used to obtain consistent estimates in nonlinear models, given the presence of endogenous independent variables. In summary, in its simplest formulation for our setup, the two-step CF technique involves residuals from a

[19] Depending on national regulations, European firms are governed by a unitary system with a single board, or by a dual system with two separate boards. In the unitary system, the single board is comprised of executive and non-executive directors and performs both advisory and monitoring functions. The monitoring role in the dual system is assigned to a supervisory board, while the management board is only comprised of executives and addresses management issues (Fedorets, Gibert and Burow 2019; Ferreira and Kirchmaier 2013). We compute the board size in dual-board companies as by the union between supervisory and management boards as in Ferreira and Kirchmaier (2013) and Green and Homroy (2018).

[20] Corresponding results for a linear specification of Equation 1 obtained by IV/2SLS are available from the authors upon request.

first-stage linear model entered as a regressor in a second stage nonlinear regression of the binary outcome *StartOFDI* on our measure of diversity. Therefore, the first stage includes a linear regression of our endogenous variable(s) on the available instruments, similar to the first stage of a standard 2SLS procedure, to obtain the corresponding residuals. The second step includes these residuals as an additional regressor in our main nonlinear model of interest.

The literature on board diversity and strategic decisions does not commonly employ CF methods, although they have been suggested by Dang et al. (2020), to address endogeneity when assessing board diversity's impact on firm performance. Specifically, Dang et al. (2020) use CFs to address endogeneity concerns in the context of a correlated random-effects method, whereas our model requires CFs to account for endogenous regressors in a nonlinear (probit) model with a binary dependent variable. Although the fixed-effects and within-group estimations of Equation 1 are, in principle, an obvious course of action to mitigate endogeneity due to, for instance, omitted time-invariant variables, the resulting estimates may not be particularly informative. This is because the main variables of interest, the variables capturing diversity, do not vary sufficiently over time across our time dimension.

We construct our instrument for *diversity* as the sum of male and native directors serving on other boards, within the same country, that contain at least one female or foreign director. Similarly, the instrument for *gender* (*nationality*) *diversity* is defined as the number of male (native) directors of firm *i* in year *t* serving on other boards, within the same country, that contain at least one female (foreign) director.[21] Our choice of instruments relies on Adams and Ferreira's (2009) methodology and subsequent works by Levi, Li and Zhang (2014), Green and Homroy (2018), and Estelyi and Nisar (2016). The rationale behind the proposed instruments is that board members are recruited from directors' professional and social networks. Thus, the broader the directors' connections with heterogeneous peers, the more likely the appointment of diverse board members.

We satisfy the exclusion restriction by ensuring that our instrument correlates with the probability of opening a foreign subsidiary only through exogenous variables that are already included in the regression model. We might expect the degree of connections among directors with heterogeneous peers, which forms the basis of our instruments, to relate to performance and/or the probability of opening a foreign subsidiary through industry- or country-specific effects. By controlling for both industry- and country-fixed effects in all models, we expect that our instruments will satisfy the exclusion restriction, while the results of the first-stage regression confirm that our instruments also satisfy the relevance condition.[22]

[21] Standard tests for exogeneity as reported in each table confirm the need for IV regressions.
[22] Results are available from the authors upon request.

Table 6 reports coefficient estimates, standard errors (first figure in round brackets) and the Variance Inflation Factor (VIF) coefficient (second figure in round brackets) to evaluate whether multicollinearity among regressors casts doubts on the reliability of our results.[23] We apply the rule of thumb, which states that multicollinearity is not an issue as long as VIF < 10. For the nonlinear binary model, we report the average marginal effects of each variable, while presenting estimation coefficients (see in square brackets).

The results in Table 6 reveal a strong effect of board diversity on OFDI. After controlling for firm and board size, the existence of dual-board systems, industry, country, and year, *diversity*, *gender diversity*, and *nationality diversity* are found to be negative and statistically significant. Thus, European firms with diverse boards are less likely to initiate OFDI. Specifically, an increase of one percentage point in *diversity* is associated with an average decrease of 0.0036 in the probability of initiating OFDI. Furthermore, column 2 in Table 6 reveals that, on average, female directors have larger-magnitude, negative impacts than foreign directors.

[23] VIF coefficients are reported in all tables.

Table 6: Estimates of the effect of board diversity on the probability of initiating outward foreign direct investment (Equation 1)

StartOFDI	(1)	(2)
gender diversity	—	-0.2220
	(—)	(1.7736/1.26)
	[—]	[-5.7428] ***
nationality diversity	—	-0.1282
	(—)	(1.3505/1.32)
	[—]	[-3.3154]**
diversity	-0.3606	—
	(1.4291/1.33)	(—)
	[-6.6807] ***	[—]
tangible fixed assets°	0.0048	0.0009
	(0.0372/1.91)	(0.0244/1.91)
	[0.0891] **	[0.0239]
board size	-0.0014	-0.0009
	(0.0052/2.05)	(0.0064/ 2.08)
	[-0.0265] ***	[-0.0226] ***
dual regime	0.0104	0.0129
	(0.2323/3.48)	(0.1915/ 3.49)
	[0.1927]	[0.3341] *
country-controls	yes	yes
year-controls	yes	yes
industry-controls	yes	yes
observations	3098	3098
correct classifications	98.52%	96.00%
Wald test of exogeneity	5.96**	20.66**
log-likelihood	-211.62	-221.25

Average marginal effects are displayed. Robust, firm-clustered standard errors/VIF coefficients are in round brackets.
Estimation coefficients are in square brackets.
$*p < 0.1$; $**p < 0.05$; $***p < 0.01$.
Variables with superscript ° are in logarithm

Then, we investigate whether the observed relationship between OFDI and board diversity is sensitive to firm performance. First, we assess whether the magnitude of the effect of board diversity on OFDI differs according to firm performance. Thus, firm performance acts as a modifier, either moderating or amplifying the effect of board diversity on OFDI. Second, we investigate whether board diversity affects firm performance and firm performance affects OFDI. That is, we study whether firm performance acts as a mediator of board diversity.

To assess whether firm performance modifies the effect of board diversity on OFDI, we estimate Equation 2:

$$P(StartOFDI_{it} = 1) = \beta_0 + \beta_1 diversity_{it-1} + \beta_2 \log(labour\ productivity_{it-1}) + \beta_3 diversity_{it-1} * High\_labour\ productivity_{it-1} + \beta_4 diversity_{it-1} * Low\_labour\ productivity_{it-1} + \beta_5 \log(tangible\ fixed\ assets_{it-1}) + \beta_6 controls_{it-1} + \varepsilon_{it} \quad (2)$$

As in Equation 1, the dependent variable is the dummy $StartOFDI$. The regressors in Equation 2 include measures of board diversity and firm performance. We measure performance by means of $labour\ productivty$ computed as the ratio of value added to employees. An alternative measure of performance is explored in Section 5. We note that, as discussed above, the choice of the dummy variable $StartOFDI$ as the dependent variable ensures that $labour\ productivty$ remains exogenous in Equation 2.

In addition to measures of board diversity and performance, the right-hand side of Equation 2 contains the interactions of *diversity* with the binary variables $High\_labour\ productivity$ and $Low\_labour\ productivity$, which take the value of one for observations in the fourth and first quartiles, respectively, of the spectrum of $labour\ productivity$ and zero elsewhere. Finally, the proxies for firm size and controls are the same as those in Equation 1.

As we expect *diversity*, *gender diversity*, and *national diversity* to be endogenous, we estimate Equation 2 using the IV/2SLS methodology. We construct our instrument for *diversity, gender diversity*, and *national diversity* as described above. Table 7 reports the coefficient estimates of the parameters in Equation 2, standard errors (first figure in round brackets), and the VIF coefficient (second figure in round brackets). The exogeneity test confirms that IV/2SLS is needed, as opposed to the standard ordinary least squares approach.

The results in Table 7 reveal strong negative effect of board *diversity* on OFDI, as opposed to a significant positive impact of *labour productivity*. The first column of Table 7 shows that the negative marginal effect of *diversity* is stronger for firms in the fourth quartile of our performance measure distribution. Specifically, controlling for *labour productivity*, when *diversity* increases by 0.1, the probability of initiating OFDI decreases by 0.023 when a firm is in the top quartile in the productivity spectrum, compared to a decrease of approximately 0.020 for firms with lower productivity. The figures in column

(2) of Table 7 confirm the overall pattern of column (1), even though the interaction term involving *nationality diversity* and *High_labour productivity* is not statistically significant.

In brief, the effect of board diversity on OFDI is sensitive to firm performance, such that OFDI by the most productive firms responds the most to changes in board diversity. Thus, firm performance can be considered a modifier (amplifier) of the effect of board diversity on OFDI for top-performing firms.

Table 7: The effect of board diversity on the probability of initiating outward foreign direct investment with performance as a modifier (Equation 2)

StartOFDI	(1)	(2)
gender diversity	—	-0.1616**
	(—)	(0.0681/2.02)
nationality diversity	—	-0.0716**
	(—)	(0.0288/2.53)
diversity	-0.1946**	—
	(0.0764/2.04)	(—)
labour productivity°	0.0067*	0.0050*
	(0.0037/1.62)	(0.0029/1.63)
*diversity*High_labour productivity*	-0.0330***	—
	(0.0111/1.72)	(—)
*gender diversity*High_labour productivity*	—	-0.0395*
	(—)	(0.0229/1.91)
nationality diversity High_labour productivity*	—	-0.0622
	(—)	(0.0447/2.15)
*diversity*Low_labour productivity*	0.0090	—
	(0.0335/1.57)	(—)
*gender diversity*Low_labour productivity*	—	-0.0370
	(—)	(0.0750/1.75)
nationality diversity Low_labour productivity*	—	0.0355
	(—)	(0.0799/1.97)
tangible fixed assets°	0.0018*	0.0004
	(0.0011/1.98)	(0.0008/1.98)
board size	-0.0007***	-0.0005**
	(0.0002/2.06)	(0.0002/2.10)
dual regime	0.0068*	0.0081**
	(0.0041/3.60)	(0.0038/3.61)
country-controls	Yes	Yes
year-controls	Yes	Yes
industry-controls	Yes	Yes
observations	4071	4071
root MSE	0.9997	0.0985
test of exogeneity	2.69*	5.95***

Estimation coefficients are displayed. Robust, firm-clustered standard errors/VIF coefficients are in round brackets.
$*p < 0.1$; $**p < 0.05$; $***p < 0.01$.
Variables with superscript ° are in logarithm.

Having established that firm performance acts as a modifier of the effect of board diversity on OFDI, we assess whether it acts as a mediator of board diversity. We identify the direct and mediated (by performance) effect of board diversity on OFDI by the *causal steps strategy* (Preacher and Hayes 2008) and quantify it following the procedure described by Mackinnon and Dewyer (1993).

Firm performance (*labour productivity* in our analysis) can be defined as a mediator of board diversity if: i) board diversity is a significant determinant of OFDI; ii) board diversity significantly accounts for variability in performance; iii) performance is a significant determinant of OFDI and remains significant when controlling for board diversity; and iv) the effect of board diversity on OFDI is different in magnitude when performance and board diversity enter the model. The approach is therefore based on Equations 1, and 3-5, in which, as previously discussed, the definition of $StartOFDI$ ensures the exogeneity of l$abour\ productivity$:

$$\log(labour\ productivity_{it}) = \gamma_0 + \gamma_1 diversity_{it} + \gamma_2 \log(tangible\ fixed\ assets_{it}) + \gamma_3 controls_{it} + \varepsilon_{it} \quad (3)$$

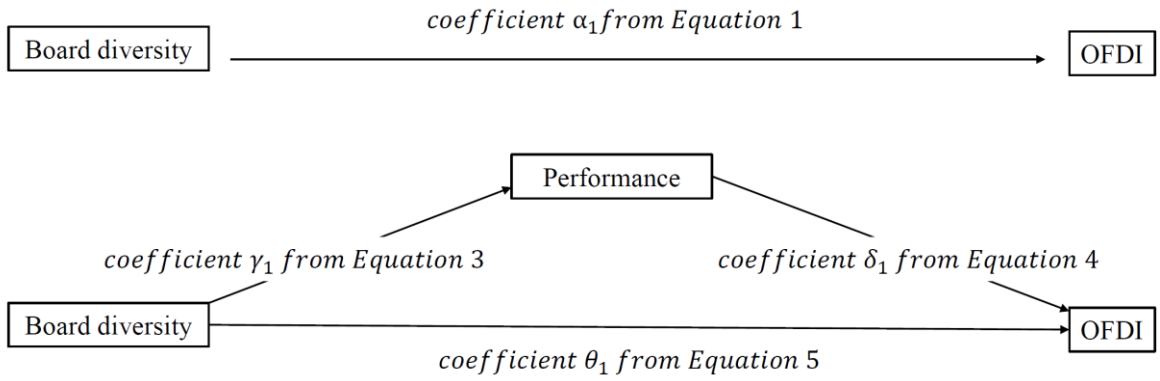
$$P(StartOFDI_{it} = 1) = \delta_0 + \delta_1 \log(labour\ productivity_{it-1}) + \delta_2 \log(tangible\ fixed\ assets_{it-1}) + \delta_3 controls_{it-1} + \varepsilon_{it} \quad (4)$$

$$P(StartOFDI_{it} = 1) = \theta_0 + \theta_1\ diversity_{it-1} + \theta_2 \log(labour\ productivity_{it-1}) + \theta_3 \log(tangible\ fixed\ assets_{it-1}) + \theta_4 controls_{it-1} + \varepsilon_{it} \quad (5)$$

As for Equation 1, since *StartOFDI* has a likely nonlinear dependence on the various covariates, we opt for a probit specification to obtain the estimates of Equations 4 and 5.[24] To identify the mediated effect, we require the statistical significance of coefficient α_1 in Equation 1, coefficient γ_1 in Equation 3, coefficient δ_1 in Equation 4, and coefficient θ_1 in Equation 5. Moreover, we require the magnitudes of coefficients α_1 and θ_1 to be substantially different. Figure 4 graphically summarises the *causal steps strategy*.

[24] A standard linear probability model has also been estimated and results are available from the authors upon request.

Figure 4: Illustration of the causal step strategy applied to our context



Alternative identification strategies for direct and mediated effects have been suggested in the literature, such as a joint estimation of Equations 3 and 5 by the seemingly unrelated regression estimator (SURE).[25] However, SURE would not allow a probit specification for Equation 5 together with the linear model in Equation 3 and, crucially, it would not be consistent as board diversity is endogenous. Instead, the *causal steps strategy* allows us to adopt alternative methods to separately estimate each equation and quantify the direct and mediated effects *ex-post*. After estimating the parameters of Equations 3-5 and testing their significance, the quantification of direct and mediated effects follows the procedure described by Mackinnon and Dewyer (1993) to accommodate the nonlinear and binary nature of Equations 2, 4, and 5.[26] Specifically, we estimate Equation 3 using standard IV/2SLS and maximum likelihood estimators, while adopting a CF technique to estimate Equations 2 and 5.[27]

Table 8 reports the estimates of the mediating variable model in Equation 3. We address endogeneity of board diversity by relying on the same instruments for *diversity*, *gender diversity*, and *nationality diversity* introduced above. Our results confirm that board diversity strongly and positively affects firm performance. An increase of one percentage point in *diversity* is associated with a 1.99% increase in performance when controlling for firm characteristics and industry-, country- and year-fixed effects.

[25] For a literature review of the available strategies, see Preacher and Hayes (2008).
[26] In Mackinnon and Dewyer (1993), the estimation of direct and mediated effects in models with a binary dependent variable is derived in the context of prevention studies.
[27] Given our definition of the dependent variable, Equation 4 is free from endogeneity and parameters can be estimated by maximum likelihood, as it is customary for standard probit models.

Table 8: The effect of board diversity on performance (Equation 3)

labour productivity°	(1)	(2)
gender diversity	—	2.5047**
	(—)	(1.1995/1.30)
nationality diversity		1.0081*
	(—)	(0.5979/1.29)
diversity	1.9995**	—
	(0.8897/1.34)	(—)
tangible fixed assets°	0.0181	0.0242*
	(1.10/1.86)	(0.0136/1.86)
board size	0.0069***	0.0068***
	(0.0020/1.82)	(0.0020/1.84)
dual regime	-0.0147	-0.0141
	(0.0471/3.73)	(0.0472/3.73)
country-controls	yes	yes
year-controls	yes	yes
industry-controls	yes	yes
observations	5085	5085
R^2	0.1878	0.2050
root MSE	0.7250	0.7173
Robust score test for endogeneity	4.5141**	4.6159*

Estimation coefficients are displayed. Robust standard errors/VIF coefficients are in round brackets.
$*p < 0.1$; $**p < 0.05$; $***p < 0.01$.
Variables with superscript ° are in logarithm

Table 9 reports the estimates of Equations 4 and 5, and our results confirm the statistical significance of δ_1 and, crucially, of θ_2, that is, performance remains significant when controlling for board diversity.

Table 9: The effect of performance and board diversity on the probability of initiating outward foreign direct investment (Equations 4 [columns 1] and 5 [columns 2 and 3])

StartOFDI	(1)	(2)	(3)
gender diversity		—	-0.2544
		(—)	(1.3219/1.28)
		[—]	[-6.9154] ***
nationality diversity		—	-0.0862
		(—)	(1.7041/1.31)
		[—]	[-2.3422]
diversity		-0.4089	—
		(1.2029/1.33)	(—)
		[-7.2920] ***	[—]
labour productivity°	0.0044	0.0061	0.0049
	(0.0654/1.34)	(0.0567/1.34)	(0.0591/1.34)
	[0.1328] **	[0.1085] *	[0.1340] **
tangible fixed assets°	-0.0021	0.0056	0.0006
	(0.0302/1.85)	(0.0220/1.97)	(0.0237/1.97)
	[-0.0632] ***	[0.0996] ***	[0.0172]
board size	-0.0004	-0.0015	-0.0008
	(0.0068/2.00)	(0.0050/2.06)	(0.0062/2.10)
	[-0.0113] **	[-0.0268] ***	[-0.0229] ***
dual regime	0.0151	0.0111	0.0123
	(0.2275/3.53)	(0.1551/3.60)	(0.1409/3.60)
	[0.4539] **	[0.198]	[0.3344] **
country-controls	yes	yes	Yes
year-controls	yes	yes	Yes
industry-controls	yes	yes	Yes
observations	2739	2732	2732
correct classifications	98.54%	98.54%	98.52%
Wald test of exogeneity	—	7.78**	13.34***
log-likelihood	-183.2	-180.44	-180.57

Average marginal effects are displayed. Robust, firm-clustered standard errors/VIF coefficients are in round brackets.
Estimation coefficients are in square brackets.
$*p < 0.1$; $**p < 0.05$; $***p < 0.01$.
Variables with superscript ° are in logarithm.

Consistent with the results in Table 6, Table 9 confirms that performance and diversity variables sort effects of opposite sign on the probability of initiating OFDI even though column (3) of Table 9 shows that *nationality diversity* does not produce a statistically significant effect. From column (2) in Table 9, an increase of one percentage point in *diversity* is associated with an average decrease of 0.0041 in the probability of initiating OFDI, and this effect is strongly significant. In addition, the estimates of α_1 in

Equation 1 and θ_1 in Equation 5 differ in the expected direction. This implies that the effect of board diversity is larger in absolute value when we control for performance, as opposed to the corresponding coefficients in Table 8, in which the (positive) mediating effect of performance is not controlled for.

We outline that the VIF coefficients (second digit in round brackets) confirm that multicollinearity among independent variables does not cast doubt on the reliability of the regression estimates in Equation 5.

In view of the estimates of Equations 3 and 5, we quantify the direct and mediated effects of our variable of interest, *diversity* (*gender diversity/nationality diversity*), following MacKinnon and Dwyer (1993). First, we scale the estimates of Equation 5 by the standard deviation of the predicted probabilities to account for the fact that the scale in probit regressions depends on the extent of the prediction, which in turn depends on the variables in the model. The estimates of Equation 3 do not require scaling since they are a standard linear model. We then define the mediated (by performance) effect of board diversity on OFDI as the product of γ_1 in Equation 3 and the standard-deviation-scaled θ_2 in Equation 5. The standard deviation scaled θ_1 in Equation 5 captures the direct (not mediated by performance) effect of diversity on OFDI. Quantitatively, the standard deviation of the predicted probabilities in Equation 3 is 0.0982. Hence, the magnitude of the direct impact of *diversity* on OFDI is -7.292/0.0982 = -74.18, while the mediated effect is 1.999*0.1085/0.0982 = 1.61. The magnitudes of the latter figures are difficult to interpret in the context of a nonlinear model. Intuitively, we can conclude that variations in performance explain (in absolute value) about 2% {[91.61/(1.61-74.18)]*100%} of the effect of *diversity* on OFDI, and that direct and mediated effects have opposite signs, as expected. Similarly, we find that variation in performance explains about 5% and 6% of the effect of board diversity on OFDI due to gender and nationality, respectively, with direct and mediated effects of opposite signs.

It is worth mentioning that our result on the direct effect of gender-diverse boards on initiating OFDI is consistent with previous evidence on the relationship between board gender diversity and mergers and acquisition (M&A) activities. Huang and Kisegen (2013), Levi, Li and Zhang (2014), and Chen, Crossland and Huang (2016) report that gender-diverse boards are less likely to undertake acquisitions; and when they do, they select smaller targets and pay lower bid premiums. Attitudes toward risk could explain the behaviour of gender-diverse boards engaging in M&A activities (Bernile, Bhagwat and Yonker 2018). However, evidence shows that gender-driven differences in risk preference observed in laboratory experiments disappear in professional populations (Croson and Gneezy 2009). In addition, gender-diverse boards are more likely to impose high dividend payouts (Pucheta-Martinez and Bel-Oms 2016; Chen, Leung and Goergen 2017) and undertake share buybacks (Evgeniou and Vermaelen 2017)

to reduce the agency costs of free cash and curb 'empire building' by the management. Thus, the reluctance of diverse boards to approve OFDI can be ascribed to the intent to impose managerial discipline. Our results on the effect of gender diversity on firm performance agree with the evidence of increased managerial discipline by gender-diverse boards.

Considering the negative direct impact of nationality-diverse boards on OFDI decisions, evidence (Hahn and Lasfer 2016) reveals that such boards face coordination problems and fail to impose managerial discipline. However, Masulis, Wang and Xie (2012) show that the local knowledge provided by foreign directors allows boards to make better cross-border acquisitions. In the next section, we investigate the role of knowledge and experience in international markets to explain the fewer OFDI decisions by nationality-diverse boards.[28]

5. Robustness checks

In Section 4, we establish a case for the negative effect of board diversity on OFDI and firm performance as a modifier and mediator of this effect. This section explores the robustness along several dimensions of the results, on which our case rests.[29]

Our first extension addresses the issue that firms initiating OFDI between 2011 and 2015 may retain some OFDI experience from foreign subsidiaries that have been opened and closed before our time window.[30] Thus, we explore whether OFDI experience plays a role in our model by including a control variable to capture such an experience. We define a new binary variable, *OFDI memory*, which takes the value of one if firm *i* had foreign subsidiaries from 2007 to 2010 and zero otherwise.[31] Overall, 34 firms in our sample initiated OFDI from 2011 to 2015, and did not have any foreign subsidiaries from 2007 to 2010.[32] Table 10 reports the probit estimates of Equations 1 (columns 1 and 2), 4 (column 3), and 5 (columns 4 and 5) with the *OFDI memory* included among the controls.

[28] Lack of detailed individual data on board members prevents us from investigating alternative mechanisms determining board diversity's effect on OFDI. More diverse boards tend to engage in lengthier deliberations (Levi, Li and Zhang 2014) and exhibit greater persistence in adhering to adopted policies (Bernile, Bhagwat and Yonker 2018). Cultural and language barriers among board members (Frjins, Dodd and Cimerova 2016; Piekkari, Oxelheim and Randöy 2015) increase the costs of deliberation, and thus, may explain the reluctance of diverse boards to initiate OFDI.

[29] We thank the associate editor and an anonymous reviewer for their valuable suggestions.

[30] By definition, OFDI starters have no foreign subsidiaries in the two previous years; Section 4 provides further information.

[31] Note that our panel does not cover the entire period spanning 2007 to 2015 because board data were only available from 2011 to 2015.

[32] We emphasise that restricting our sample to 34 firms would decrease the number of relevant observations drastically, and thus, impact our results' reliability.

Table 10: The effect of board diversity and performance on the probability of initiating outward foreign direct investment, controlling for OFDI memory
(Equations 1 [columns 1 and 2], 4 [column 3] and 5 [columns 4 and 5])

StartOFDI	(1)	(2)	(3)	(4)	(5)
gender diversity	—	-0.1775	—	—	-0.2232
	(—)	(1.5931/1.26)	(—)	(—)	(1.2968/1.28)
	[—]	[-5.1753] ***	[—]	[—]	[-6.8717] ***
nationality diversity	—	-0.0839	—	—	-0.0427
	(—)	(1.6250/1.32)	(—)	(—)	(2.2116/1.32)
	[—]	[-2.4462]	[—]	[—]	[-1.3157]
diversity	-0.2872	—	—	-0.3668	—
	(1.6376/1.34)	(—)	(—)	(1.2173/1.33)	(—)
	[-6.2099] ***	[—]	[—]	[-7.1946] ***	[—]
labour productivity°	—	—	0.0039	0.0058	0.0043
	(—)	(—)	(0.0612/1.34)	(0.0528/1.34)	(0.0646/1.34)
	[—]	[—]	[0.1293] **	[0.1144] **	[0.1334] **
tangible fixed assets°	0.0041	0.0009	-0.0012	0.0055	0.0008
	(0.0365/1.92)	(0.0202/1.92)	(0.0289/1.86)	(0.0181/1.98)	(0.0238/1.98)
	[0.0898] **	[0.0279]	[-0.0404]	[0.1081] ***	[0.0249]
board size	-0.0010	-0.0005	-0.0001	-0.0012	-0.0005
	(0.0041/2.08)	(0.0052/2.11)	(0.0052/2.03)	(0.0033/2.10)	(0.0050/2.13)
	[-0.0224] ***	[-0.0162] ***	[-0.0038]	[-0.0231] ***	[-0.0152] ***
dual regime	0.0092	0.0119	0.0131	0.0092	0.0107
	(0.2415/3.49)	(0.2010/3.49)	(0.1628/3.54)	(0.1537/3.60)	(0.1564/3.60)
	[0.1987]	[0.3466]	[0.4298] ***	[0.1817]	[0.3301] **
OFDI memory	-0.0232	-0.0283	-0.0314	-0.0213	-0.0303
	(0.4087/1.23)	(0.3320/1.23)	(0.4013/1.21)	(0.4501/1.21)	(0.4652/1.21)
	[-0.5009]	[-0.8252] **	[-1.0301]***	[-0.4174]	[-0.9319] **
country-controls	Yes	Yes	Yes	Yes	Yes
year-controls	Yes	Yes	Yes	Yes	Yes
industry-controls	Yes	Yes	Yes	Yes	Yes
observations	3098	3098	2739	2732	2732
correct classifications	97.97%	98.55%	98.54%	98.54%	98.50%
Wald test of exogeneity	5.00**	17.45***	—	8.93***	23.68***
log-likelihood	-192.75	-191.42	-164.15	-162.11	-161.31

Average marginal effects are displayed. Robust, firm-clustered standard errors/VIF coefficients are in round brackets.
Estimation coefficients are in square brackets.
*p < 0.1; **p < 0.05; ***p < 0.01.
Variables with superscript ° are in logarithm.

We acknowledge that having foreign subsidiaries has a negative effect on the probability of initiating OFDI. This is as anticipated, as most firms that had past foreign subsidiaries simply retained them in the present; therefore, they are less likely to initiate OFDI within our timeframe than firms with no past foreign subsidiaries. Importantly, comparing the estimates displayed in Tables 6 and 9, including *OFDI*

memory does not affect our overall results concerning board diversity's impacts on OFDI. Additional information can be obtained when considering gender and nationality diversity. OFDI experience does not affect the sign, relative magnitude, and significance of the coefficients associated with *gender diversity*, while *nationality diversity* remains insignificant. In summary, controlling for OFDI experience does not modify the effect of gender diversity but reduces the effect of nationality diversity on the probability of opening a foreign subsidiary. This suggests that OFDI experience absorbs the nationality diversity effect, which is consistent with the results of Estelyi and Nisar (2016), Masulis, Wang and Xie (2012) and Pisani, Muller and Bogăţan (2018).

After exploring our results' robustness for the OFDI experience, we replicate our econometric analysis by controlling for the past presence of foreign shareholders. The latter might influence the propensity for future investments abroad through an accumulation of knowledge about international markets. To this end, we create a new binary variable, *IFDI memory,* which takes the value of one if firm *i* had some foreign shareholders from 2007 to 2010 and zero otherwise.[33] Only five firms initiating OFDI within our timeframe did not have any foreign shareholders from 2007 to 2010, which suggests that almost all firms in our sample have some IFDI experience. Table 11 reports the probit estimates of Equations 1 (columns 1 and 2), 4 (column 3), and 5 (columns 4 and 5) with the *IFDI memory* included among the controls. Our findings indicate that additional *IFDI memory* control has no direct impact on the probability of opening a foreign subsidiary from 2011 to 2015, and our main results discussed in the context of Tables 6 and 9 are robust for the inclusion of *IFDI memory*.

[33] Note that IFDI stands for inward foreign direct investment.

Table 11: The effect of board diversity and performance on the probability of initiating outward foreign direct investment, controlling for IFDI memory
(Equations 1 [columns 1 and 2], 4 [column 3] and 5 [columns 4 and 5])

StartOFDI	(1)	(2)	(3)	(4)	(5)
gender diversity	—	-0.2180	—	—	-0.2473
	(—)	(1.7064/1.26)	(—)	(—)	(1.2927/1.28)
	[—]	[-5.6675] ***	[—]	[—]	[-6.7891] ***
nationality diversity	—	-0.1255	—	—	-0.0811
	(—)	(1.4090/1.32)	(—)	(—)	(1.7808/1.32)
	[—]	[-3.2630**]	[—]	[—]	[-2.2258]
diversity	-0.3592	—	—	-0.4056	—
	(1.4665/1.34)	(—)	(—)	(1.2445/1.33)	(—)
	[-6.6760] ***	[—]	[—]	[-7.2852] ***	[—]
labour productivity°	—	—	0.0043	0.0060	0.0048
	(—)	(—)	(0.0702/1.34)	(0.0561/1.34)	(0.0703/1.34)
	[—]	[—]	[0.1299] *	[0.1091] *	[0.1333] *
tangible fixed assets°	0.0048	0.0009	-0.0019	0.0055	0.0006
	(0.0374/1.91)	(0.0243/1.91)	(0.0238/1.86)	(0.0222/1.98)	(0.0243/1.98)
	[0.0886] **	[0.0240]	[-0.0587] **	[0.0992] ***	[0.0175]
board size	-0.0014	-0.0009	-0.0003	-0.0015	-0.0008
	(0.0051/2.06)	(0.0064/2.10)	(0.0053/2.01)	(0.0048/2.08)	(0.0062/2.11)
	[-0.0266] ***	[-0.0225] ***	[-0.0110] **	[-0.0270] ***	[-0.0226] ***
dual regime	0.0104	0.0133	0.0157	0.0111	0.0128
	(0.2370/3.49)	(0.1921/3.50)	(0.1497/3.54)	(0.1605/3.60)	(0.1451/3.61)
	[0.1938]	[0.3450] *	[0.4729] ***	[0.2007]	[0.3506] **
IFDI memory	0.0077	-0.0020	-0.0099	0.0080	-0.0047
	(0.1255/1.08)	(0.1464/1.09)	(0.1851/1.09)	(0.1327/1.09)	(0.1560/1.09)
	[0.1439]	[-0.0528]	[-0.2970]	[0.1432]	[-0.1299]
country-controls	Yes	Yes	Yes	Yes	Yes
year-controls	Yes	Yes	Yes	Yes	Yes
industry-controls	Yes	Yes	Yes	Yes	Yes
observations	3098	3098	2739	2732	2732
correct classifications	96.68%	98.52%	98.54%	95.35%	98.50%
Wald test of exogeneity	5.82**	14.71***	—	7.52***	14.08***
log-likelihood	-211.30	-210.50	-182.6102	-180.04	-180.10

Average marginal effects are displayed. Robust, firm-clustered standard errors/VIF coefficients are in round brackets.
Estimation coefficients are in square brackets.
*p < 0.1; **p < 0.05; ***p < 0.01.
Variables with superscript ° are in logarithm.

As discussed in Section 3, the firms in our sample have a balanced composition of foreign subsidiaries inside and outside the European Union. However, we argue that investing outside the European Union is more complex than investing internally, as legislation in the latter is harmonised and business practices are familiar. Thus, we determine whether the OFDI destination affects our previous findings regarding board diversity's effect on the probability of opening a foreign subsidiary by defining an additional

control, *OFDI Extra_EU*, which takes a value of one if firm *i* has at least one subsidiary outside the European Union and zero otherwise.[34] Table 12 reports the probit estimates of Equations 1 (columns 1 and 2), 4 (column 3), and 5 (columns 4 and 5) with *OFDI Extra_EU* included among the controls. Results indicate that the coefficient associated with *OFDI Extra_EU* is never significant, revealing that the OFDI destination is irrelevant to the probability of initiating OFDI. The comparison of Tables 6, 9 and 12 shows that the impacts of *diversity*, *gender diversity*, *nationality diversity*, and *labour productivity* are almost unchanged.

[34] Due to our panel's limited number of observations, we could not define a *StartOFDI* variable by destination.

Table 12: The effect of board diversity and performance on the probability of initiating outward foreign direct investment, controlling for the presence of OFDI Extra_EU
(Equations 1[(columns 1 and 2], 4 [column 3] and 5 [columns 4 and 5])

StartOFDI	(1)	(2)	(3)	(4)	(5)
gender diversity	—	-0.2144	—	—	-0.2499
	(—)	(1.6821/1.26)	(—)	(—)	(1.3053/1.28)
	[—]	[-5.6671] ***	[—]	[—]	[-6.8600] ***
nationality diversity	—	-0.1173	—	—	-0.0830
	(—)	(1.5965/1.32)	(—)	(—)	(1.9676/1.32)
	[—]	[-3.1014] *	[—]	[—]	[-2.2622]
diversity	-0.3621	—	—	-0.4159	—
	(1.3991/1.34)	(—)	(—)	(1.2217/1.34)	(—)
	[-6.7089] ***	[—]	[—]	[-7.3427] ***	[—]
labour productivity°	—	—	0.0042	0.0062	0.0047
	(—)	(—)	(0.0673/1.35)	(0.0615/1.34)	(0.0695/1.34)
	[—]	[—]	[0.1253] *	[0.1097] *	[0.1291] *
tangible fixed assets°	0.0050	0.0010	-0.0019	0.0057	0.0007
	(0.0311/1.92)	(0.0256/1.92)	(0.0282/1.87)	(0.0192/1.98)	(0.0269/1.98)
	[0.0925] ***	[0.0264]	[-0.0585] **	[0.0994] ***	[0.0184]
board size	-0.0014	-0.0008	-0.0003	-0.0015	-0.0008
	(0.0043/2.08)	(0.0056/2.12)	(0.0047/2.03)	(0.0039/2.10)	(0.0049/2.13)
	[-0.0256] ***	[-0.0203] ***	[-0.0098] **	[-0.0268] ***	[-0.0216] ***
dual regime	0.0104	0.0133	0.0155	0.0111	0.0127
	(0.2330/3.48)	(0.2013/3.49)	(0.1519/3.53)	(0.1639/3.60)	(0.1491/3.60)
	[0.1920]	[0.3527] *	[0.4673] ***	[0.1958]	[0.3478] **
OFDI extra EU	-0.0027	-0.0088	-0.0070	0.0035	-0.0048
	(0.2446/1.21)	(0.2296/1.21)	(0.2287/1.18)	(0.2492/1.19)	(0.2787/1.19)
	[-0.0496]	[-0.2323]	[-0.2121]	[0.0623]	[-0.1324]
country-controls	Yes	Yes	Yes	Yes	Yes
year-controls	Yes	Yes	Yes	Yes	Yes
industry-controls	Yes	Yes	Yes	Yes	Yes
observations	3098	3098	2739	2732	2732
correct classifications	98.48%	98.48%	98.54%	98.54%	98.54%
Wald test of exogeneity	6.74***	11.94***	—	8.37***	12.66***
log-likelihood	-209.02	-208.13	-182.32	-179.66	-179.72

Average marginal effects are displayed. Robust, firm-clustered standard errors/VIF coefficients are in round brackets.
Estimation coefficients are in square brackets.
*p < 0.1; **p < 0.05; ***p < 0.01.
Variables with superscript ° are in logarithm.

The last robustness check that we consider differs in spirit and addresses an alternative measure of performance. Our results in Tables 7-12 have been obtained using labour productivity as a measure of performance. In Tables 13-15, we replicate our econometric analysis with the total factor productivity

(*TFP*) used as a measure of performance. Specifically, we assume the Cobb-Douglas production function of firm *i* at time *t* as

$$Y_i = \delta + w_L L_i + w_K K_i + w_M M_i + w_i + \varepsilon_i \quad (5)$$

where Y_i is the logarithm of firm *i*'s output measured by the value added; L_i and M_i are the logarithms of the free variable labour and intermediate inputs approximated by the number of employees and the cost of raw materials, respectively; and K_i denotes the logarithm of the state variable capital, which is directly available in our dataset. The *TFP* has been obtained according to the Levinsohn and Petrin (2003) methodology, by implementing the standard 'levpet' routine available in STATA for our balanced panel of 1,283 firms.[35]

In Table 13, we replicate the results reported in Table 7 using *TFP* as a measure of performance. Again, we define *High_TFP* and *Low_TFP* as binary variables taking a value of one if the firm is collocated in the fourth and first quantiles of the spectrum of TFP values, respectively, and zero otherwise. The results in the first column of Table 13 are very similar to those of our main specification in Table 7; and in the second column, we notice that the interaction variables preserve the same sign as the corresponding values in Table 7 but are no longer significant.

[35] Intermediate estimates of labour and capital from the levpet routine amount to 0.6861 (0.0289) and 0.1870 (0.0377), respectively, where the standard errors are reported in brackets.

Table 13: The effect of board diversity on the probability of initiating outward foreign direct investment with performance measured by TFP as a modifier (Equation 2)

StartOFDI	(1)	(2)
gender diversity	—	-0.1541***
	(—)	(0.0584/1.85)
nationality diversity	—	-0.0406
	(—)	(0.0492/2.46)
diversity	-0.1751**	—
	(0.0757/2.05)	(—)
TFP°	0.0009**	0.0009**
	(0.0005/1.48)	(0.0004/1.38)
*diversity*High_TFP*	-0.0495**	—
	(0.0205/1.74)	(—)
*gender diversity*High_TFP*	—	-0.0623
	(—)	(0.0427/1.96)
nationality diversity High_TFP*	—	-0.0385
	(—)	(0.0667/2.20)
*diversity*Low_TFP*	-0.0425	—
	(0.0322/1.51)	(—)
*gender diversity*Low_TFP*	—	-0.0743
	(—)	(0.0975/1.62)
nationality diversity Low_TFP*	—	-0.0439
	(—)	(0.0808/1.93)
tangible fixed assets°	0.0013	-0.0001
	(0.0011/2.06)	(0.0004/2.08)
board size	-0.0005***	-0.0005**
	(0.0002/2.07)	(0.0002/2.10)
dual regime	0.0111**	0.0115**
	(0.0057/3.60)	(0.0050/3.71)
country-controls	Yes	Yes
year-controls	Yes	Yes
industry-controls	Yes	Yes
observations	4050	4050
root MSE	0.1014	0.1001
test of exogeneity	5.57***	7.34***

Estimation coefficients are displayed. Robust, firm-clustered standard errors/VIF coefficients are in round brackets.
$*p < 0.1$; $**p < 0.05$; $***p < 0.01$.
Variables with superscript ° are in logarithm.

Table 14 presents the IV/2SLS estimates for Equation 3. The general pattern of the results agrees with that shown in Table 8.

Table 14: The effects of board diversity on performance, with performance measured by TFP (Equation 3)

TFP°	(1)	(2)
gender diversity	—	5.5408***
	(—)	(1.4873)
nationality diversity		1.9535**
	(—)	(0.8990)
diversity	4.3289***	—
	(1.0789)	(—)
tangible fixed assets°	0.0485*	0.0630***
	(0.0269)	(0.0198)
board size	0.0138***	0.0137***
	(0.0028)	(0.0033)
dual regime	0.0280	0.0293
	(0.0658)	(0.0736)
country-controls	yes	Yes
year-controls	yes	Yes
industry-controls	yes	Yes
observations	5085	5076
R^2	0.1278	0.1059
root MSE	0.7482	0.7127
Robust score test for endogeneity	4.5141**	11.392***

Estimation coefficients are displayed. Robust standard errors are in round brackets.
$*p < 0.1$; $**p < 0.05$; $***p < 0.01$.
Variables with superscript ° are in logarithm

Finally, Table 15 reports the probit estimates of Equations 1 (columns 1 and 2), 4 (column 3), and 5 (columns 4 and 5) using *TFP* as a measure of performance. The results are largely in line with those displayed in Tables 6 and 9. Similar to the discussion at the end of Section 4, when performance is measured by *TFP*, we can calculate that variations in performance explain (in absolute value) about 0.5% of the total board diversity effect on OFDI, where direct and mediated effects have opposite signs. We also find that variation in performance explains about 0.6% and 0.5% of the effect of board diversity on OFDI due to gender and nationality, respectively, again with direct and mediated effects of opposite signs. Thus, when performance is measured by *TFP*, the indirect effect of *diversity* is smaller in percentage terms compared to its counterpart when performance is measured by *labour productivity*.

Table 15: The effect of board diversity and performance on the probability of initiating outward foreign direct investment, with performance measured by TFP
(Equations 1 [columns 1 and 2], 4 [column 3] and 5 [columns 4 and 5])

StartOFDI	(1)	(2)	(3)	(4)	(5)
gender diversity	—	-0.2221	—	—	-0.2630
	(—)	(1.7736)	(—)	(—)	(1.2795)
	[—]	[-5.7428] ***	[—]	[—]	[-7.0390] ***
nationality diversity	—	-0.1282	—	—	-0.1017
	(—)	(1.3505)	(—)	(—)	(1.9233)
	[—]	[-3.3154] **	[—]	[—]	[-2.7235]
diversity	-0.3606	—	—	-0.4588	—
	(1.4291)	(—)	(—)	(1.2251)	(—)
	[-6.6807] ***	[—]	[—]	[-7.5397] ***	[—]
TFP°	—	—	0.0002	0.0003	0.0002
	(—)	(—)	(0.0030/1.21)	(0.0039)	(0.0040)
	[—]	[—]	[0.0070] **	[0.0079] **	[0.0079] **
tangible fixed assets°	0.0048	0.0009	-0.0019	0.0068	0.0011
	(0.0373)	(0.0244)	(0.0207/1.82)	(0.0195)	(0.0205)
	[0.0891] **	[0.0239]	[-0.0572] ***	[0.1114] ***	[0.0291]
board size	-0.0014	-0.0009	-0.0004	-0.0017	-0.0009
	(0.0052)	(0.0064)	(0.0054/2.00)	(0.0051)	(0.0060)
	[-0.0265] ***	[-0.0226] ***	[-0.0113] **	[-0.0273] ***	[-0.0234] ***
dual regime	0.0104	0.0129	0.0151	0.0108	0.0122
	(0.1927)	(0.1916)	(0.1487/3.53)	(0.1596)	(0.1461)
	[0.1927]	[0.3341] *	[0.4548] ***	[0.1772]	[0.3256] **
country-controls	yes	yes	Yes	Yes	Yes
year-controls	yes	yes	Yes	Yes	Yes
industry-controls	yes	yes	Yes	Yes	Yes
observations	3098	3098	2733	2726	2726
correct classifications	98.52%	98.52%	98.50%	98.50%	98.50%
Wald test of exogeneity	5.96**	14.80**	—	7.42***	14.85***
log-likelihood	-211.62	-210.83	-183.17	-182.15	-180.43

Average marginal effects are displayed. Robust, firm-clustered standard errors/VIF coefficients are in round brackets.
Estimation coefficients are in square brackets.
*p < 0.1; **p < 0.05; ***p < 0.01.
Variables with superscript ° are in logarithm.

6. Conclusions

This study examines a panel of firms in European countries to discuss the effect of board diversity on OFDI. We adopt a nonlinear specification to model the probability of opening a foreign subsidiary and use IV/CF methods to address endogeneity in board diversity.

We find that board diversity affects OFDI directly and through the modifying and mediating roles of firm performance. Although board diversity positively affects OFDI through firm performance, firms with more female directors and foreign directors are less likely to open foreign subsidiaries. The negative effect of board heterogeneity on OFDI decisions is stronger for more productive firms and firms with gender-diverse boards. These results are robust for several alternative specifications and econometric models.

In our sample, boards that are more diverse lead to better firm performance and fewer OFDI decisions. A tougher and more informed monitoring of managerial activities can explain these effects. Our results are in line with the literature that suggests that gender-diverse boards are better monitors, whereas foreign directors contribute local knowledge and expertise to foreign market operations.

To the best of our knowledge, this is the first study to explore firms' self-selection into OFDI based on board diversity while disentangling the complex nexus between board composition, firm performance, and internationalisation. On the one hand, our results explain the determinants of OFDI. On the other hand, they reveal the channels through which board diversity affects OFDI, thus, contributing to the literature on OFDI and performance and to the literature on board diversity, performance, and strategic decisions.

However, we acknowledge the limitations of our study. Due to data constraints, our panel extends over a relatively short time span. In addition, our period of observation, from 2011 to 2015, coincides with years of great economic uncertainty in Europe due to the sovereign debt crisis suffered by Union members. The observation period may account for the relatively small number of firms initiating OFDI in our sample. Furthermore, we are unable to observe the effect of board diversity on OFDI in less volatile environments and, thus, cannot assess any interaction between board diversity and economic volatility in shaping a firm's OFDI strategy.[36]

Despite these limitations, our results provide interesting policy implications. A large fraction of the remarkable changes in board diversity observed across Europe is the outcome of legislative interventions aimed at promoting gender equality (Ferreira and Kirchmaier 2013). However, in recent years a lively

[36] Data limitations also prevent us from investigating board diversity's impact on the intensive margin of OFDI and export.

debate has developed around the notion of a ‘business case’ for board diversity. This case rests on the positive impact of board diversity on a firm’s performance. Our study demonstrates that board diversity improves firm performance; however, it also proves that board diversity directly impacts internationalisation choices and has effects not mediated by performance. This suggests that caution should be exercised in adopting measures that promote board diversity solely based on their impact on firm performance. Policymakers and shareholders must also consider the impact of board diversity on the multifaceted strategy selection process, especially when strategy selection has long-term economic consequences as in the case of internationalisation choices.

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Appendix

This appendix describes our variables (Table A1) and presents pairwise correlations (Table A2) for the independent variables used in our econometric analysis.

Table A1: Description of firm-level variables

Variable	Description
StartOFDI	Dummy variable; 1 if firm *i* had no subsidiary abroad in the years $t-2$ and $t-1$ and has at least one in year t; 0 if the firm has no subsidiary abroad in the years $t-2$, $t-1$ and t.
dual regime	Dummy variable; 1 if firm *i* is governed by a dual system, with a supervisory board and a management board; 0 if firm *i* is governed by a unitary system, with a board of directors.
board size	Number of members of the board of directors for firms in unitary systems; sum of the numbers of members of supervisory and management boards for firms in dual systems.
diversity	Proportion of female and foreign directors in the board of firm *i* in year *t*.
gender diversity	Proportion of female directors in the board of firm *i* in year *t*.
nationality diversity	Proportion of foreign directors in the board of firm *i* in year *t*.
labour productivity	Firm *i*'s value added divided by employees.
High_labour productivity	Dummy variable; 1 if firm *i* belongs to fourth quartile of the spectrum of *labour productivity*; 0 otherwise
Low_labour productivity	Dummy variable; 1 if firm *i* belongs to first quartile of the spectrum of *labour productivity*; 0 otherwise
tangible fixed assets	Firm *i*'s tangible fixed assets.
TFP	Total factor productivity, Levinsohn and Petrin (2003) estimates.
High_TFP	Dummy variable; 1 if firm *i* belongs to fourth quartile of the spectrum of *TFP*; 0 otherwise
Low_TFP	Dummy variable; 1 if firm *i* belongs to first quartile of the spectrum of *TFP*; 0 otherwise
OFDI memory	Dummy variable; 1 if firm *i* had at least one foreign subsidiary from 2007 to 2010; 0 otherwise.
IFDI memory	Dummy variable; 1 if firm *i* had at least one foreign shareholder from 2007 to 2010; 0 otherwise.
OFDI Extra EU	Dummy variable; 1 if firm *i* has at least one subsidiary outside the European Union; 0 otherwise.

Table A2: Pairwise correlations of the independent variables

	labour productivity°	*board size*	*tangible fixed assets°*	*gender diversity*	*nationality diversity*	*diversity*	*TFP°*	*dual regime*	*OFDI memory*	*IFDI memory*	*OFDI Extra EU*
labour productivity°	1.0000										
board size	0.1770	1.0000									
tangible fixed assets°	0.1891	0.4548	1.0000								
gender diversity	0.0089	-0.2036	0.0271	1.0000							
nationality diversity	0.0464	-0.0475	0.1839	0.1528	1.0000						
diversity	0.0384	-0.1563	0.1472	0.7105	0.8040	1.0000					
TFP°	0.8476	0.3350	0.3806	0.0348	0.0677	0.0692	1.0000				
dual regime	-0.0522	-0.2935	0.0605	0.0258	0.0976	0.0850	-0.0547	1.0000			
OFDI memory	0.0430	0.1738	0.1578	0.0014	0.0793	0.0573	-0.0043	0.0258	1.0000		
IFDI memory	0.0031	0.1620	0.1056	-0.0221	0.0514	0.0233	-0.0147	-0.1426	0.0738	1.0000	
OFDI Extra EU	0.0283	0.1602	0.1446	0.0335	0.1041	0.0943	0.0096	0.0130	0.5294	0.1254	1.0000

Variables with superscript ° are in logarithm.