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Pimentel, Joao Albino; Dussauge, Pierre; El Nayal, Omar

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Intellectual property rights, non-market considerations and foreign R&D investments

João Albino-Pimentel [a,b,*], Pierre Dussauge [c], Omar El Nayal [d]

[a] University of South Carolina, Darla Moore School of Business, 1014 Greene Street, Columbia, SC 29208, United States
[b] Copenhagen Business School, Kilevej 14, Frederiksberg, Denmark
[c] HEC Paris, 1 rue de la Liberation, Jouy en Josas, France
[d] Universidade Católica Portuguesa, Católica Lisbon School of Business & Economics, Portugal, Palma de Cima, Lisboa 1649-023, Portugal

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ABSTRACT

Prior research has focused on how firms use a variety of organizational mechanisms to protect their R&D investments from misappropriation risks in foreign countries. Little is known, however, about how firms can rely on non-market factors to induce preferential treatment by host government authorities, thereby protecting their intellectual property overseas. In this paper, we investigate two such non-market factors, one at the country level, the other at the firm level, that are likely to influence the choice of where firms locate their innovation activities: host country inclination towards the firm's home country and the firm's political capabilities, respectively. We thus examine how IPR policies and non-market factors interact in protecting firm innovation from misappropriation and in making countries more attractive for innovation-related activities. We find support for our predictions in a sample of 1,341 foreign R&D investments made by 163 firms from 14 home countries over the period 2003–2016.

1. Introduction

In this paper, we examine how non-market factors influence firms' decisions to make R&D investments in foreign countries. We define as non-market factors all those factors in a firm's environment that cannot be controlled through market interactions (Doh et al., 2012; Dorobantu et al., 2017; Sun et al., 2021). These include all social, political, regulatory, and cultural factors that can directly or indirectly affect a firm but occur outside of its market environment. Strategies aimed at influencing and mobilizing such non-market factors in the firm's interests we define as non-market strategies (Doh et al., 2012; Dorobantu et al., 2017; Sun et al., 2021).

Through foreign R&D investments, firms may access lower cost or more suitable resources, enhance the adaptation of their products to local markets, as well as increase the diversity of backgrounds they can draw on in their innovation process (Chung and Alcácer, 2002; Govindarajan and Ramamurti, 2011; Zhao, 2006). On the other hand, carrying out R&D abroad may expose a firm's intellectual property to misappropriation concerns (Berry, 2017; Ushijima, 2013; Zhao, 2006). As a consequence, intellectual property rights (IPR) protection policies significantly influence multinational firms' international R&D location choices (Patel and Vega, 1999; Santangelo et al., 2016; Ushijima, 2013; Zhao, 2006). Yet, IPR policies do not affect all firms uniformly. Research has highlighted that some firms are better than others at protecting their intellectual property, notably by using a variety of organizational mechanisms, even in countries with weak IPR policies (Faria and Sofka, 2010; Zhao, 2006). Beyond these strategies, non-market factors can also affect how confidently a firm can expect to appropriate the benefits of its intellectual property, irrespective of the strength of the protection afforded by the IPR policies of a given country. Following prior research on foreign investment location choice, we distinguish and examine such non-market factors at the country and firm levels (Albino-Pimentel et al., 2018; Li et al., 2018). By focusing on foreign R&D investment location choices, we build on and extend this line of research and investigate how IPR policies and non-market factors interact in protecting firm innovation from misappropriation and in making countries more attractive for innovation-related activities.

Innovation is often a major source of competitive advantage and is associated with intangible assets, the protection of which is a major concern (Arrighetti et al., 2014; Kramer et al., 2011; Leitner, 2005; McGrath et al., 1996), particularly when firms make R&D investments abroad. The misappropriation of intangible assets, notably those that are

* Corresponding author.
E-mail addresses: joao.albino-pimentel@moore.sc.edu (J. Albino-Pimentel), dussauge@hec.fr (P. Dussauge), elnayal@ucp.pt (O. El Nayal).

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inputs and outputs of R&D operations, is less blatant than the outright expropriation of physical assets (Teece, 1998). Even with strong IPR regulations, infringements are more difficult to observe and open to interpretation. Because of this, firms will likely consider how their IPR will be upheld in a particular country, irrespective of the letter of the law in that country, when deciding whether to make an R&D investment there.

Because IPR regimes are heavily rooted in national legislation and regulation (Ginarte and Park, 1997; Peng et al., 2017), the implementation and enforcement of which is largely at the discretion of political and administrative authorities (Brander et al., 2017; Wang et al., 2020), non-market factors are likely to play a crucial role in how confident firms are that their IPR will be adequately upheld in a particular country. Such crucial non-market factors could affect particular groups of firms or be specific to an individual firm. In an international setting, firms originating from the same home country are likely to face a similar set of non-market factors when investing in a particular host country. At the same time, some non-market factors may affect each individual firm differently. We thus focus on both country and firm level non-market factors when examining how much a given firm relies on IPR regulations when deciding on the location of its foreign R&D investments.

At the country level, host country authorities may be more or less inclined to treat firms from a given home country favorably (Bertrand et al., 2016; Rangan and Sengul, 2009). This *host country inclination* may vary according to the general attitude in the host country vis-à-vis the home (Yiu et al., 2021). It might also be influenced by factors such as diplomatic ties (Albino-Pimentel et al., 2018; Rangan and Sengul, 2009), political affinity (Bertrand et al., 2016; Li et al., 2018) and economic interdependence (Duanmu, 2014; Fratianni and Oh, 2009) between the two countries. We argue that, when they consider making an R&D investment in a country with a favorable host country inclination, firms will be more confident that their IPR will be upheld, irrespective of the strength of the formal IPR regulations in that country. We thus expect firms to be less deterred by a weak IPR regime when making R&D investments in such countries.

At the firm level, some firms may expect their *political capabilities*, i.e. the "tacit and non-tacit knowledge and skills that enable firms to manage the public policy process and to achieve favorable legislative, executive, administrative, and judicial policy outcomes" (Bonardi et al., 2006, p. 1211), to elicit preferential treatment by the host government, irrespective of formal IPR regulations. We argue that political capabilities can allow firms to indirectly influence host governments, either explicitly by eliciting home government intervention or implicitly by possessing the perceived ability to elicit such intervention. We thus predict that firms with greater political capabilities will be more likely than others to make R&D investments in a given host country, irrespective of the strength of the IPR regulations.

We empirically test our predictions on a sample of 1341 foreign R&D investments carried out by 163 of the largest publicly-traded firms from 14 developed home countries during the 2003–2016 period. We rely on the Ginarte and Park index (Ginarte and Park, 1997; Park, 2008) to measure the strength of the IPR regulations in particular host countries. We measure *host country inclination* on the basis of the level of empathy and general sentiment of a particular host country vis-à-vis the home country as reflected in news articles and reported by the Global Database on Events, Location and Tone (GDELT). We identify firms' *political capabilities* through the membership of current or former politicians and senior government officials on a firm's board of directors (El Nayal et al., 2021). We follow prior location choice literature in relying on conditional logit models and use the interactions of host country inclination and political capabilities with the indicator of the strength of a host country IPR regulations to test our hypotheses. We find empirical support for our predictions.

This paper contributes to the literatures on foreign R&D investments, non-market strategies and innovation policy. First, we extend research on how political economy influences firm strategy decisions, notably when it comes to innovation offshoring. More specifically, we build on prior research on the role of non-market factors in determining FDI location choices (e.g. Albino-Pimentel et al., 2018; Georgallis et al., 2021; Li et al., 2018) and extend it to the particular context of foreign R&D investments. We also generalize prior findings to a much broader set of countries. Second, we theorize and show that non-market factors at the country and firm levels interact in driving firm innovation strategies. Third, we advance the understanding of how public policy interacts with non-market factors in attracting R&D investments, one of the major objectives of innovation policy.

2. Theory and hypotheses

Innovation is widely acknowledged as having become a major source of competitive advantage for firms (Barney, 1991; McGrath et al., 1996; Roberts, 1998). In order to sustain and enhance such competitive advantage, many firms choose to conduct some of their innovation activities overseas (Dunning and Lundan, 2009; Narula and Zanfei, 2005; Rosenbusch et al., 2019). According to extant literature, both demand-side and supply-side benefits can accrue to firms that engage in innovation offshoring (Belderbos, 2003; Belderbos et al., 2016; Kuemmerle, 1999; UNCTAD, 2005). Demand-side benefits derive from the exploitation and adaptation of a firm's existing technologies to local market needs and specificities (Patel and Vega, 1999). Supply-side benefits derive from the augmentation of a firm's existing portfolio of innovations with new knowledge that originates in the local market (Ambos, 2005; Chung and Alcácer, 2002). In addition, innovation generated through foreign investments can also draw on valuable, yet less costly, inputs, notably highly skilled labor, and on a more diverse set of backgrounds (Chung and Alcácer, 2002; Govindarajan and Ramamurti, 2011; Zhao, 2006).

Investing for innovation in foreign countries is, however, fraught with risks. How firms address the specific challenges they face when investing abroad has indeed been one of the main areas of research in international business. This research has essentially focused on the risk of expropriation of a firm's physical and financial assets in a given host country (Henisz, 2000). Yet, much of a firm's innovation capacity is based on intangible assets (Arrighetti et al., 2014; Kramer et al., 2011; Leitner, 2005). The misappropriation of such intangible assets is more difficult to observe and open to interpretation than the outright expropriation of physical or financial assets (Teece, 1998). In addition, the expropriation of physical or financial assets typically requires deliberate action by host government authorities, while the misappropriation of intangible assets may only require host government authorities to turn a blind eye on the actions of intellectual property rights infringers. Furthermore, the misappropriation of intangible assets, notably those that are inputs and outputs of R&D operations, has consequences that extend beyond the market of the country where the investment was made. Such misappropriation may prevent the firm from reaping the full benefits of its innovation in all markets where it operates (Teece, 1998; Zhao, 2006). Also, while foreign investments in physical assets are subject to the risk of expropriation of only those assets located in the considered country, investments in foreign innovation activities may expose the firm's broader knowledge base, including knowledge created or located outside a given host country (Berry, 2017). The protection of such intangible assets is thus a major concern for firms when making R&D investments abroad (Faria and Sofka, 2010; Santangelo et al., 2016; Veliyath and Sambharya, 2011).

IPR regulations and, therefore, the risks associated with foreign R&D investments, vary substantially across countries. In host countries with well-functioning formal institutions, such as a strong rule of law, efficient administrative bureaucracies, and an objective and independent judiciary, IPR regulations are designed to indiscriminately provide all firms – including foreign firms – with adequate legal protection against the risks of misappropriation (Faria and Sofka, 2010; Ginarte and Park,

1997; Peng et al., 2017). It is therefore no surprise that the strength of IPR regulations is one of the critical factors that firms consider when making foreign R&D investments (Branstetter et al., 2007; Veliyath and Sambharya, 2011).

Despite the aforementioned risks, many firms still decide to offshore their innovation activities to countries that do not afford adequate protection of IPR. Some of these firms may be willing to bear the risk because the benefits of locating innovation activities in particular countries are expected to be substantial (Zhao, 2006). For example, despite being considered a high-risk location for innovative activities for many years, China has received significant R&D investments from MNEs seeking to benefit from the country's growing markets and low-cost human capital (Peng et al., 2017). Indeed, some firms seem better able to deal with weak IPR environments than others. Prior research has shown that firms can implement specific knowledge protection measures to avoid potential misappropriation (Zhao, 2006). These knowledge protection measures increase the opacity of the innovation process, which can in turn reduce knowledge leakage as well as the ability of outside parties to engage in imitation (Anand and Galetovic, 2004; Keupp et al., 2010). For example, foreign firms can protect their IPR by shrouding their innovation activities with a layer of secrecy, restricting any knowledge transfers to pre-specified recipients, and confining knowledge-related activities within clearly identified organizational units like heavily secured labs (Liebeskind, 1997). Firms may also opt for shorter innovation cycles and lead-times such that rival imitations arrive too late on the market (Cohen et al., 2000). Further still, foreign firms can modularly configure their innovation processes such that the value of a specific technology only accrues when coupled with complementary knowledge and resources held elsewhere by the firm (Baldwin and Henkel, 2015; Gooris and Peeters, 2016).

Underlying most research on such knowledge protection strategies, however, is the premise that a weak IPR regime is an inherent feature of the formal institutional environment and will uniformly apply to all firms, thus threatening the value they can appropriate from their innovations in a similar way. This view overlooks the possibility that some firms are at an advantage compared to others when seeking protection from whatever IPR regulations exist in a given country.

IPR regimes are heavily rooted in national legislation and regulation (Ginarte and Park, 1997; Peng et al., 2017), the implementation and enforcement of which is largely at the discretion of political and administrative authorities (Brander et al., 2017; Wang et al., 2020). Also, as mentioned earlier, infringements of property rights associated with intangible assets are difficult to observe and often fraught with ambiguity, thus increasing the discretion that accrues to such political and administrative authorities.

Because of this, non-market considerations are likely to play a crucial role in how confident firms are that their IPR will be adequately upheld in a particular country, irrespective of the letter of the law, when they decide whether or not to make an R&D investment in that country. If foreign firms expect local authorities to favor them, they will be less deterred by weak IPR regimes. Prior research in strategy and international business has indeed shown that firms are less reliant on the overall quality of the formal institutional environment when they can extract preferential treatment from poorly-functioning institutions (Dorobantu et al., 2017; Jandhyala, 2015, 2013).

Non-market factors can affect particular groups of firms or be specific to an individual firm. When considering international investments, firms from the same home country are likely to face a similar set of non-market factors when investing in a particular host country. In addition, some non-market factors may heterogeneously affect different firms. We thus theorize on two mechanisms, one at the country level and the other at the firm level, that are likely to affect a firm's anticipations on the more or less favorable treatment they will receive from local authorities in foreign countries regarding IPR protection. The first mechanism, host country inclination, captures the general attitude in the host country vis-à-vis a firm's home country, a proxy for the benevolence with which host country authorities will examine IPR issues involving firms from a given home country. The second captures a firm's political capabilities, a proxy for the firm's actual and perceived ability to mobilize diplomatic assistance when needed and for its knowledge on how to deal with governments. We detail our reasoning in the next two sections.

2.1. The influence of host country inclination

People in any country generally hold broad perceptions about particular other countries. These broad perceptions can stem from geographic proximity, a common cultural heritage, such as a shared language or religion, or specific ideals and values that transcend geographic borders. They may also be a product of historical legacies, such as prior periods of colonization, immigration or armed conflict (Makino and Tsang, 2011). They may be intentionally cultivated over time through carefully managed intergovernmental partnerships (e.g. military alliances and trade agreements) that aim to increase political, cultural and economic relationships (Oneal and Russett, 2015). We argue that these perceptions, which we refer to as host country inclination, are broadly shared by most individuals in the country. We further argue that this host country inclination has a substantial influence on the attitudes people in a given host country have towards firms originating in the home country, as well as towards the products and services of these firms.

Prior research has addressed this broad issue by examining how attitudes, opinions and affinity between countries affect firm international operations. Bertrand et al. (2016) show that the political affinity between a firm's home country government and the government of a country in which that firm is making an acquisition results in lower acquisition premia. Because the firm's home government is perceived by host government authorities as an ally rather than foe, acquirers anticipate lower host government resistance to their bid and, thus, a lower need to offer a high premium. Hasija et al. (2020) additionally show that the positive effects of political affinity persist over time; post-acquisition performance is higher under favorable home-host government relations, in part because of political stakeholders' lower legitimacy concerns in the post-acquisition integration phase. Political affinity, used to capture the strength of diplomatic ties between countries, has also been shown to affect firms' choice of foreign investment location (Li et al., 2018) and investment size (Duanmu, 2014).

It is interesting to note that all these studies measure the extent to which the relations between countries are amicable on the basis of United Nations General Assembly voting patterns (Gartzke, 1998), which captures political affinity at a very high level. IPR disputes are, however, typically handled by local bureaucrats and administrative authorities in charge of technical matters rather than by high-level government officials (which are in charge of diplomacy and UN voting). Because of this, we argue that more general attitudes and broadly distributed perceptions, i.e. host country inclination, are more likely to influence the outcome of such disputes than high-level government-to-government affinity. We further contend that foreign firms from countries towards which host country inclination is more positive are more likely to benefit from the benevolence of these local authorities, who are generally more tolerant and understanding of firms and people from countries toward which they hold a positive inclination, and secure their support in IPR-related issues. Host country inclination is likely to also be shared by the higher echelons of government, and thus influence policy decisions favorably for firms originating in countries toward which there exists a positive attitude. These effects are particularly salient when both high-ranking officials and lower-level bureaucrats have more discretion in IPR policy-making and implementation, as is typically the case with weaker IPR regimes (Wang et al., 2020).

Anticipating a more favorable treatment of IPR issues, managers of firms from home countries benefiting from a more positive host country inclination may downplay the appropriability risks associated with R&D

investments, even when the country's IPR regime is weak. In contrast, when host country inclination is relatively negative, the best that managers can hope for in the event of IPR-related disputes is the strict application of existing IPR regulations, which in weak IPR countries is likely to be insufficient to ensure adequate protection. Thus, we suggest that a firm's decision to make R&D investments in foreign countries having a less than favorable host country inclination will more significantly depend on the prevailing strength of the local IPR regime. We therefore hypothesize the following:

Hypothesis 1. The more positive a host country inclination toward a firm's home country, the weaker the deterring effect of IPR weakness on that firm's R&D investment location choice.

2.2. The influence of firm political capabilities

We argued above that more positive host country inclination drives firms to expect favorable treatment in all intellectual property protection issues arising in a particular country, and thus to downplay IPR weakness when considering an R&D investment there. We further argue that a firm's political capabilities are an alternative means through which firms can elicit preferential treatment by the host government, irrespective of formal IPR regulations.

Extant research on non-market strategy has shown that political capabilities may benefit firms in multiple ways. They can provide firms with preferential access to state-controlled resources, such as subsidies and government procurement contracts (Faccio et al., 2006; Goldman et al., 2013), help in impeding the passage of unfavorable regulations (Lux et al., 2012), and insulate firms from market competition by maintaining entry barriers (Capron and Chatain, 2008). We draw from this literature to argue that firms with greater political capabilities may be more likely to make R&D investments in host countries with weak IPR regimes.

First, firms with greater political capabilities can resort to diplomatic backchannels in which the home government serves as an intermediary in order to elicit favorable treatment by the host government (Albino-Pimentel et al., 2018; Meyer et al., 2009). Indeed, firms frequently lobby their home country authorities to obtain economic advantages overseas (Schuler et al., 2002), with such efforts oftentimes translating into direct home government pressure on host governments in the form of diplomatic nudges (Albino-Pimentel et al., 2018; Bucheli and Aguilera, 2010). When needed, such home government involvement may deal with IPR violations against a particular firm. Yet, home government authorities need to be selective regarding the grievances they raise and for which they actively seek to receive concessions. Firms with greater political capabilities may be better able to elevate the perceived salience of their IPR-related grievances in the eyes of home government authorities than other firms. In other words, firms with greater political capabilities are likely to outcompete other firms when home government support is finite.

Second, political capabilities can provide firms with direct influence over host government authorities. Specifically, firms with greater political capabilities have been shown to enjoy a superior understanding of how public policy is formulated, negotiated, and enforced (Fernández-Méndez et al., 2018; Lester et al., 2008). For such firms, this understanding is likely to translate into a better grasp of regulatory issues such as IPR protection, a heightened ability to identify and articulate the preferences of host government authorities who are instrumental in overseeing the enforcement of these regulations, and a greater likelihood to be perceived by host government authorities as competent (Fernández-Méndez et al., 2018; García-Canal and Guillén, 2008; Zhang et al., 2016). In contrast, firms lacking political capabilities are generally less adept at liaising with and influencing governmental authorities, and are thus less likely to elicit preferential treatment by host government authorities, notably regarding IPR protection. We, therefore, hypothesize:

Hypothesis 2. The greater a firm's political capabilities, the weaker the deterring effect of IPR weakness on that firm's R&D investment location choice.

3. Data and methods

We test our hypotheses on a sample of foreign R&D investments made during the 2003–2016 period by listed firms originating from developed countries. We focus on firms from 14 OECD countries[1] where disclosure requirements are stringent enough for us to reliably collect information on firms' board composition and the occupational backgrounds of their members, information which, as explained below, will be used to capture firm political capabilities. We limit our study to those firms that were among the top 50 market capitalizations in their home country at the time of the study. This resulted in an initial population of 1061 firms. We then identified those firms that had carried out at least one new overseas R&D greenfield investment during our period of study, thus obtaining a final sample of 163 firms, which collectively carried out 1341 such investments. We limit our sample to new investments because decisions to expand existing operations may follow a different logic than that of a new R&D investment. We focus on greenfield investments because the location of such investments is likely to be made on the basis of those factors that are central to our theorizing. In contrast, choosing the location of acquisitions and joint ventures is conditional on target availability as well as other financial and legal considerations (e.g. Albino-Pimentel et al., 2018; Alcacer and Chung, 2007). Our main data source on these foreign greenfield investments is the Financial Times *fDiMarkets* database, which provides detailed information on firms' foreign greenfield investments beginning in 2003. Given our research setting, which focuses on foreign investments aiming to produce innovation, we follow prior literature and focus on those investments labeled as "Research and Development" in the *fDiMarkets* database (Castellani and Lavoratori, 2020).

3.1. Dependent variable

Consistent with existing studies on location choice for foreign investments (Georgallis et al., 2021; Maggioni et al., 2019; Nachum et al., 2008), our dependent variable, *R&D investment*, is binary and assigns 1 to the foreign country where a firm makes an R&D investment and 0 to other potential host countries for such an investment. To build the investment choice sets, we consider a country as a potential target for an investment if IPR regulations data, as well as data on all other factors used in our models, were available. As a result, the choice sets in our sample include up to 79 countries[2] for which all the information used in our models is complete. Our final sample for analysis comprises 95,201 data points.

3.2. Explanatory variables

The independent variable is a measure of the weakness of a potential host country's IPR regulations. We follow prior research and use the index of patent protection across countries produced by Ginarte and Park (Ginarte and Park, 1997; Park, 2008). This index is widely used in the literature. It provides a comprehensive assessment of a country's protection of intellectual property based on five dimensions: coverage of protections, membership in international treaties, duration of

[1] Australia, Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

[2] It is important to note that not all countries in the choice sets for analysis have received at least one investment by the firms in our sample. Indeed, 65 of the 79 countries making up the choice sets for analysis received at least one of the 1,341 investments in our sample.

protection, enforcement mechanisms, and restrictions. This index is available in five-year intervals from 1960 to 2015. We used the 2000 index for investments carried out in the 2003–2005 period, the 2005 index for investments carried out in the 2006–2010 period, the 2010 index for investments carried out in the 2011–2015 period, and the 2015 index for investments carried out in 2016. This index varies from 0 to 5 with higher numbers indicating more stringent protection of IPR. We thus reversed each country's score to derive our measure of *IPR weakness*.

To test H1, we developed a measure of *host country inclination* toward a firm's home country, based on the Global Database on Events, Location and Tone (GDELT). The open-source and free GDELT database collects information about the interactions that a wide variety of actors all around the world have with other actors, as reported in the media (Odziemkowska and Henisz, 2020; Yiu et al., 2021). The information in GDELT is taken from published articles and is broken down into what they call "events". An event is a subject-verb-object sequence, which is machine-coded using textual analysis in order to assign it a grade, depending on the level of conflict/cooperation conveyed by the verb. This grade can vary from −10, such as with "military attack" and "clash", to +8, such as in "military assistance". GDELT classifies all events based on the nature of the involved actors, location, time, etc. (Goldstein, 1992). Because we theorize on how host government authorities at all levels may discretionarily protect the intellectual property of a foreign investor depending on the country of origin of that investor, we focus on those events involving any actors from the two countries (Yiu et al., 2021). We thus measured the level of *host country inclination* toward a firm's home country in a given year by computing the average of the level of conflict/cooperation of all events involving any actor in the host country as a subject and any actor from the home country as an object. Higher scores denote a more positive inclination of a host country toward a firm's home country.

To test H2, which investigates the impact of *IPR weakness* on the location choice of R&D investments depending on a firm's political capabilities, we follow prior research and operationalize a firm's political capabilities through the presence of individuals with a background in politics or top civil service on its board of directors (Hillman, 2005; Tihanyi et al., 2019). We note that some studies have operationalized political capabilities in other ways, including through the aggregation of a firm's campaign donations to elected politicians (e.g. Albino-Pimentel et al., 2021; Werner, 2017), or lobbying expenditures (e.g. Ridge et al., 2017) in a given year. We opted to operationalize political capabilities through the presence of senior decision makers with a political background instead because the employment of current or former politicians and senior government officials on corporate boards is a legal and institutionally-accepted practice in most countries (Faccio, 2006). Our measure therefore allows us to capture the political capabilities of a large sample of firms across multiple countries. In contrast, other operationalizations of political capabilities cannot be derived in many home countries either due to national restrictions prohibiting certain corporate political activities (such as corporate financial contributions) ,[3] or because national disclosure requirements do not oblige firms to report their political expenditures (on lobbying, for example).[4]

We used *BoardEx* and company annual reports to track the board composition of each firm in our sample over the focal period. We then researched the occupational backgrounds of all board members to identify those with a background in government. Following El Nayal et al. (2021), we focused only on board members holding or having held senior political positions, or having been high-level civil servants. This classification has the advantage of covering most functions associated with high degrees of political influence in a country, while being parsimonious enough to be applicable to different political systems. Examples of board members with a political background thus include current or former ministers (secretaries), members of parliament, senators, ambassadors, regional legislators and governors. We compute our *political capabilities* variable using the proportion of current or former politicians and government officials on a firm's board.

3.3. Control variables

We controlled for other factors that have been shown to influence the choice of location for foreign R&D investments or that could affect the main relationships we investigate.

Following prior literature, we controlled for three factors capturing the political and economic relations between home and host country. First, we included a measure of *IGO connections* (Alcacer and Ingram, 2013; Jandhyala and Phene, 2015; Rangan and Sengul, 2009) using the moving average of the number of intergovernmental organizations in which both home and host country governments are members at the same time. This variable captures the extent and strength of the diplomatic ties between the two countries and was calculated using data from the Correlates of War project (Pevehouse et al., 2004). Second, we added a measure of *bilateral trade,* using the sum of exports and imports in dollars taking place between the firm's home and a potential host country (Duanmu, 2014). We calculated this variable as a moving average of bilateral trade from year minus 3 to minus 1. We gathered trade data from the Correlates of War project (Barbieri et al., 2009; Barbieri and Keshk, 2012). Finally, we accounted for the *political affinity* between home and host countries (Bertrand et al., 2016; Li et al., 2018), i.e. the similarity in views on global affairs held by high level government officials on both sides. This variable was measured using UN General Assembly voting patterns (Gartzke, 1998; Voeten, 2000) in the year prior to the focal investment.

We also controlled for several dimensions of cross-national distance between a firm's home country and the potential host country (Berry et al., 2010; Ghemawat, 2007). We captured *geographic distance* with a measure of the great circle distance – in thousand kilometers – between the largest city in the firm's home country and the largest city in a potential host country. We controlled for *administrative distance* and for *cultural distance* using two binary variables, indicating whether a colonial relationship existed between the firm's home country and a potential host country at any time in the past, and whether a common spoken or official language is shared between the two countries, respectively. We obtained data for these variables from the *center d'Etudes Prospectives et d'Informations Internationales* (CEPII). We controlled for *economic distance* with a measure based on how different home and host country are with regards to income, inflation and foreign trade. We rely on data provided by Berry et al. (2010) to measure this variable. These four measures cover the main dimensions of cross-national distance as in the CAGE framework (Ghemawat, 2007). Because our aim is to investigate the influence of non-market factors on innovation-related investments, we also controlled for two additional distance measures. We accounted for the *political distance* between home and host country, a measure based on intercountry differences related to policy-making uncertainty, democracy, size of the state and membership in global and regional agreements. Finally, we controlled for *knowledge distance* using a measure based on countries' production of patents and scientific articles. Both measures are also provided by Berry et al. (2010).

Besides intercountry relations and cross-national distance, the literature on location choice also emphasizes the importance of several host country features, which we also included as controls. We added four variables to capture the quality of the institutional environment in a potential host country. First, we added a dummy variable capturing whether the host country has an *independent judiciary*, using data from

[3] As in France and Belgium (http://www.europarl.europa.eu/RegData/etudes/STUD/2015/519217/IPOL_STU(2015)519217_EN.pdf)

[4] As in Belgium, Germany and Sweden (http://www.europarl.europa.eu/EPRS/Transparency_of_lobbying_in_Member_States.pdf; https://www.loc.gov/law/help/lobbying-disclosure/germany.php)

Table 1
Descriptive statistics and pairwise correlations.

	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(1)	R&D investment	1.00																			
(2)	IPR weakness	−0.06	1.00																		
(3)	Host country inclination	0.00	0.01	1.00																	
(4)	Political capabilities	0.00	0.01	−0.04	1.00																
(5)	IGO connections	0.05	−0.68	−0.07	0.03	1.00															
(6)	Bilateral trade	0.10	−0.30	−0.04	−0.03	0.38	1.00														
(7)	Political affinity	0.00	−0.39	−0.03	−0.05	0.52	0.04	1.00													
(8)	Geographic distance	0.00	0.24	0.06	−0.04	−0.51	−0.22	−0.33	1.00												
(9)	Administrative distance	0.00	0.06	−0.05	0.06	−0.05	−0.03	−0.01	−0.02	1.00											
(10)	Cultural distance	0.00	0.09	−0.03	0.05	−0.11	0.13	−0.39	0.03	0.18	1.00										
(11)	Economic distance	0.01	0.33	0.09	−0.05	−0.53	−0.16	−0.38	0.25	0.03	0.11	1.00									
(12)	Political distance	0.02	0.10	−0.04	−0.01	−0.07	−0.05	0.21	−0.05	0.07	−0.17	−0.03	1.00								
(13)	Knowledge distance	−0.01	−0.01	0.02	−0.20	−0.20	−0.02	−0.25	0.25	−0.11	0.10	0.21	−0.18	1.00							
(14)	Independent judiciary	0.03	−0.60	−0.03	0.00	0.50	0.15	0.37	−0.21	−0.08	−0.14	−0.36	−0.11	0.01	1.00						
(15)	Political constraints	0.01	−0.61	−0.02	−0.01	0.55	0.18	0.37	−0.19	−0.09	−0.09	−0.42	−0.15	0.03	0.79	1.00					
(16)	Control of corruption	0.03	−0.70	0.02	0.00	0.56	0.18	0.34	−0.12	−0.09	−0.05	−0.30	−0.04	0.00	0.64	0.58	1.00				
(17)	Trade freedom	−0.02	−0.62	−0.04	−0.05	0.40	0.17	0.38	−0.16	−0.08	−0.08	−0.18	−0.03	0.12	0.46	0.48	0.58	1.00			
(18)	GDP	0.17	−0.35	−0.03	−0.01	0.33	0.45	0.07	−0.03	−0.05	−0.10	−0.24	0.04	−0.01	0.19	0.19	0.20	0.12	1.00		
(19)	Population	0.22	0.01	0.00	0.00	0.04	0.20	−0.10	0.09	0.01	−0.04	0.03	0.08	0.00	−0.06	−0.11	−0.19	−0.30	0.41	1.00	
(20)	GDP per capita	0.03	−0.69	−0.03	−0.01	0.64	0.25	0.36	−0.22	−0.10	−0.10	−0.36	−0.01	0.02	0.62	0.56	0.86	0.56	0.27	−0.17	1.00
(21)	GDP growth	0.03	0.36	0.08	0.02	−0.38	−0.08	−0.25	0.19	0.05	0.10	0.28	0.07	−0.10	−0.33	−0.33	−0.32	−0.31	−0.09	0.22	−0.36
(22)	Technological intensity	0.15	−0.24	−0.01	−0.01	0.17	0.36	0.02	0.06	−0.02	−0.07	−0.12	0.07	−0.02	0.10	0.04	0.09	0.04	0.82	0.47	0.13
(23)	Trade openness	0.00	−0.17	0.08	−0.01	−0.11	−0.04	0.06	−0.03	0.02	−0.04	0.61	0.02	0.02	0.14	0.01	0.28	0.28	−0.22	−0.20	0.20
(24)	FDI specialization	−0.01	−0.07	0.02	−0.01	0.00	−0.02	0.07	−0.06	−0.01	−0.04	0.04	0.25	0.02	0.11	0.08	0.15	0.12	−0.06	−0.06	0.11
(25)	R&D industry specialization	0.12	−0.11	−0.01	−0.05	0.08	0.15	−0.04	0.04	−0.01	0.06	0.02	0.00	0.07	0.09	0.07	0.01	−0.06	0.19	0.49	0.00
(26)	R&D specialization	0.18	−0.23	−0.02	−0.03	0.19	0.28	0.05	−0.01	−0.01	−0.01	−0.01	0.05	0.07	0.15	0.10	0.07	0.03	0.46	0.75	0.07
(27)	Emerging country	0.00	0.17	0.00	0.00	−0.21	−0.13	−0.11	0.11	0.07	−0.04	0.17	−0.08	−0.02	−0.26	−0.19	−0.48	−0.32	−0.15	0.20	−0.53
(28)	India	0.11	0.01	0.02	0.00	0.02	0.00	−0.05	0.04	0.02	0.07	0.03	−0.05	0.00	0.12	0.10	−0.08	−0.26	0.06	0.65	−0.10
(29)	China	0.19	−0.04	0.00	0.00	0.03	0.21	−0.05	0.03	−0.02	−0.07	0.03	0.14	0.00	−0.12	−0.22	−0.09	−0.10	0.32	0.71	−0.08
(30)	United States	0.10	−0.13	−0.03	0.00	0.08	0.22	−0.01	−0.01	−0.01	−0.02	−0.08	0.00	0.00	0.08	0.10	0.09	0.07	0.75	0.09	0.13
(31)	Prior investment	0.12	−0.21	0.00	−0.08	0.12	0.25	−0.06	0.04	−0.03	0.05	0.02	−0.02	0.11	0.13	0.11	0.12	0.08	0.28	0.29	0.13
	Mean	0.01	1.41	1.87	5.29	50.02	11.02	0.58	7.50	0.03	0.28	9.39	9.03	22.48	0.50	0.54	0.29	74.35	706.41	77.76	18.38
	Std. Dev.	0.12	0.83	1.60	7.02	14.55	26.89	0.25	4.13	0.17	0.45	7.87	11.01	17.29	0.50	0.28	1.06	12.48	1591.59	206.80	20.16
	Min	0.00	0.00	−10.00	0.00	21.00	0.00	0.11	0.17	0.00	0.00	0.00	0.04	0.00	0.00	0.00	−1.50	0.00	3.42	0.98	0.34
	Max	1.00	3.94	8.00	38.46	104.25	348.01	1.00	19.59	1.00	1.00	72.69	304.66	97.47	1.00	0.89	2.47	90.00	16,254.30	1364.27	91.57
		(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)									
(21)	GDP growth	1.00																			
(22)	Technological intensity	0.01	1.00																		
(23)	Trade openness	0.03	−0.16	1.00																	
(24)	FDI specialization	−0.06	−0.05	0.23	1.00																
(25)	R&D industry specialization	0.06	0.19	−0.02	−0.01	1.00															
(26)	R&D specialization	0.06	0.48	0.00	−0.02	0.57	1.00														
(27)	Emerging country	0.14	−0.04	−0.12	−0.14	0.04	0.02	1.00													
(28)	India	0.10	0.02	−0.08	−0.03	0.49	0.59	0.11	1.00												
(29)	China	0.20	0.51	−0.07	−0.01	0.21	0.44	0.11	−0.01	1.00											
(30)	United States	−0.05	0.47	−0.09	−0.02	0.03	0.13	−0.09	−0.01	−0.01	1.00										
(31)	Prior investment	−0.02	0.25	0.05	−0.02	0.29	0.40	−0.02	0.19	0.19	0.10	1.00									
	Mean	3.91	20.52	82.07	5.33	7.03	54.83	0.54	0.01	0.01	0.01	0.11									
	Std. Dev.	3.59	78.61	51.58	15.92	34.24	145.79	0.50	0.12	0.12	0.08	0.31									
	Min	−14.84	0.00	20.69	−15.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
	Max	25.16	928.18	437.33	280.13	888.00	1653.00	1.00	1.00	1.00	1.00	1.00									

$N = 95{,}201$.

the World Bank's Database of Political Institutions. Second, we controlled for how difficult it is for individual policy makers to discretionarily change policy in a potential host country, using the measure of *political constraints*, based on data from POLCONV (Henisz, 2000). Third, because the incidence of corruption in particular countries can substantially affect firms' ability to protect their property (Cuervo-Cazurra, 2006; Veracierto, 2008), we also included a measure to capture the *control of corruption* in a host country, using data from the World Governance Indicators (Kaufmann et al., 2011). Finally, we included a measure to capture the *easiness to trade* in a particular country, using data from The Heritage Foundation.

We also control for the economic attractiveness of particular countries through multiple factors. To account for a potential host country's market size, we used variables measuring its *GDP* (in millions of constant 2005 US$), *population* (in millions of inhabitants), and *GDP per capita* (in thousands of constant 2005 US$). We controlled for the market potential of a host country using *GDP growth* (%, annual). We controlled for a potential host country's *trade openness* using the ratio of total trade (exports plus imports) to GDP. We used data from the World Bank World Development Indicators (WDI) to create these variables. We also controlled for a potential host country's *technological intensity* based on patenting; we measured this with the number of patent applications filed by residents using data from PATSTAT.

We used three variables to account for potential cluster and bandwagon effects (Belderbos et al., 2011). First, we controlled for a potential host country's *FDI specialization* with the ratio between the total inflow of FDI in that country and the country's GDP. We also controlled for a potential host country's *R&D industry specialization* with a count variable capturing the number of prior inward foreign R&D investments made in that potential host country in the same industry as the focal R&D investment. Finally, we controlled for a potential host country's *R&D specialization* with a count variable capturing the number of prior R&D investments made by foreign firms in that potential host country. We used data from WDI to create the first variable and from fDiMarkets to create the latter two variables. All control variables are measured one year prior to the focal investments, unless otherwise specified.

Due to the particular status of some countries as destinations for foreign R&D investments, we included separate dummy variables identifying those investments made in *China, India, the United States* and *emerging countries*. We classified a country as emerging if it is included in the list of emerging countries considered in Hoskisson et al. (2000). Finally, we also included the variable *prior investment*, which denotes whether the focal firm had previously invested in a potential host country prior to the focal R&D investment.

3.4. Econometric approach

We followed the literature on location choice and used conditional logit models (Alcacer and Chung, 2007; Li et al., 2018; Maggioni et al., 2019; McFadden, 1973). The conditional logit approach assumes that firms choose locations in order to maximize expected profit subject to some error. Expected profit is, in turn, determined by the attributes of a potential host country. Our unit of analysis is the investment, so that each investment made by a firm in a given year is compared to all host country options that the firm could have chosen instead. The conditional logit model looks within this investment decision and uses variance across the potential choices in order to derive estimates. As such, it only makes it possible to include host country attributes as determinants of location choice. Investment (and firm) features are accounted for through investment fixed effects. In the results we present, we clustered standard errors by firm to recognize that investments made by the same firm may not be independent. In order to test H1 and H2, we interact the measure of *IPR weakness* with *host country inclination* and *political capabilities*, respectively.

4. Results

Table 1 presents descriptive statistics and correlations. It reveals that in our sample the *IPR weakness* of potential host countries for R&D investments varies from 0 to 3.94. The low average *IPR weakness* of 1.41 suggests that most firms have a preference for investing in countries with stronger IPR regulations. Despite this, some firms still choose to invest in countries with very weak IPR protection, as suggested by the 3.94 maximum value. Our data shows substantial variance in *host country inclination*, which ranges from −10 to 8.00, with an average of 1.87. Our data also reveals substantial variance in firms' *political capabilities:* for the firms in our sample, the proportion of politically-connected board members varies from 0 to 38.46%, with an average of 5.29%.

Some of the variables are highly correlated. Many of these correlations were to be expected. For example, *population* is highly correlated with the dummy variables denoting investments in China and in India. All the variables capturing features of a host country's institutional environment are correlated with each other.[5] These features of the host country institutional environment are also correlated with GDP per capita. Overall, the pattern of correlations in our data does not appear to raise particular concerns about multicollinearity: the VIF measures are all well below the accepted cutoff value of 10, with the average at 2.59.

Our sample includes investments in 65 host countries made by firms originating in 14 home countries. The largest contingent of investments was made by firms from the United States, followed by Japan and Germany. The host countries receiving the most R&D investments were China, India and the United States. It is noteworthy that our sample of investments is evenly distributed across emerging (55.26%) and developed countries (44.74%). The distributions of R&D investments by home and host country are presented in the Appendix (see Appendix Tables AI and AII).

Table 2 presents the results of the conditional logit models we ran to test our hypotheses. Model 1 includes only control variables. Model 2 adds the *IPR weakness* variable. Consistent with prior findings, our results confirm that *IPR weakness* deters firms from making R&D investments in a given host country (β=−0.285; *p-value*=0.006). In model 3, we add the *host country inclination* variable, as well as its interaction with *IPR weakness*. Consistent with H1, the interaction has a positive and significant coefficient (β=+0.055; *p-value*=0.051), while the coefficient of *IPR weakness* remains negative and significant (β=−0.409; *p-value*=0.002). In model 4, we add the interaction between *IPR weakness* and *political capabilities*. Consistent with H2, the interaction has a positive and significant coefficient (β=+0.017; *p-value*=0.007), while the coefficient of *IPR weakness* remains negative and significant (β=−0.388; *p-value*=0.000).[6]

Prior work in econometrics has established that the effect of interaction terms in non-linear models should not be interpreted on the basis of coefficients and standard errors, but based on the examination of marginal effects (Hoetker, 2007; Train, 2009; Zelner, 2009). We thus refer to Figs. 1 and 2, which plot the marginal effects of *IPR weakness* at various levels of *host country inclination* and *firm political capabilities*, respectively. These figures also plot the confidence intervals associated with such marginal effects. Fig. 1 shows that the marginal effect of *IPR weakness* on location choice becomes less negative as *host country inclination* becomes more favorable. While the marginal effects of *IPR*

[5] We conducted tests in which we removed some of these variables to avoid multicollinearity concerns but found no substantial changes in our results.

[6] Because *political capabilities* is a firm-level variable that does not vary across potential host countries for a given investment choice, its main effect is not included in Model 4, testing H2. In contrast, *host country inclination*, a host country feature, varies across potential host countries and, thus, its main effect is included in Model 3. We ran models excluding the main effect of host country inclination in order to make the specifications of Model 3 and 4 consistent and found no material differences in the results.

Table 2
Conditional logit models predicting R&D investment location choices.

VARIABLES		(1)	(2)	(3)	(4)	(5)
IPR weakness			−0.285	−0.409	−0.388	−0.523
			(0.103)	(0.130)	(0.110)	(0.138)
			[0.006]	[0.002]	[0.000]	[0.000]
Host country inclination				−0.030		−0.033
				(0.041)		(0.040)
				[0.457]		[0.411]
IPR weakness X Host country inclination	H1			0.055		0.058
				(0.028)		(0.028)
				[0.051]		[0.038]
IPR weakness X Political capabilities	H2				0.017	0.017
					(0.006)	(0.006)
					[0.007]	[0.005]
IGO connections		0.003	−0.001	−0.001	−0.001	−0.001
		(0.005)	(0.006)	(0.006)	(0.006)	(0.006)
		[0.633]	[0.900]	[0.877]	[0.931]	[0.907]
Bilateral trade		0.003	0.003	0.003	0.003	0.003
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
		[0.034]	[0.021]	[0.018]	[0.014]	[0.011]
Political affinity		1.675	1.588	1.564	1.637	1.613
		(0.466)	(0.470)	(0.473)	(0.467)	(0.470)
		[0.000]	[0.001]	[0.001]	[0.000]	[0.001]
Geographic distance		0.002	0.001	0.000	−0.001	−0.001
		(0.014)	(0.015)	(0.014)	(0.015)	(0.015)
		[0.881]	[0.969]	[0.977]	[0.969]	[0.960]
Administrative distance		0.214	0.181	0.202	0.153	0.174
		(0.254)	(0.247)	(0.248)	(0.255)	(0.257)
		[0.401]	[0.462]	[0.416]	[0.549]	[0.497]
Cultural distance		0.408	0.416	0.423	0.415	0.423
		(0.098)	(0.099)	(0.099)	(0.099)	(0.099)
		[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Economic distance		0.014	0.016	0.016	0.017	0.017
		(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
		[0.085]	[0.053]	[0.052]	[0.041]	[0.039]
Political distance		−0.002	−0.003	−0.002	−0.003	−0.003
		(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
		[0.539]	[0.529]	[0.560]	[0.501]	[0.531]
Knowledge distance		−0.003	−0.003	−0.003	−0.003	−0.003
		(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
		[0.345]	[0.305]	[0.291]	[0.394]	[0.380]
Independent judiciary		−0.153	−0.154	−0.142	−0.157	−0.143
		(0.156)	(0.155)	(0.157)	(0.155)	(0.157)
		[0.327]	[0.319]	[0.369]	[0.310]	[0.363]
Political constraints		0.981	0.899	0.876	0.900	0.875
		(0.282)	(0.284)	(0.288)	(0.285)	(0.289)
		[0.001]	[0.002]	[0.002]	[0.002]	[0.002]
Control of corruption		0.479	0.440	0.439	0.446	0.446
		(0.079)	(0.080)	(0.080)	(0.079)	(0.079)
		[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Trade freedom		−0.016	−0.021	−0.020	−0.020	−0.020
		(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
		[0.001]	[0.000]	[0.000]	[0.000]	[0.000]
GDP		0.001	0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
		[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Population		0.006	0.007	0.007	0.007	0.007
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
		[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
GDP per capita		0.000	−0.001	−0.001	−0.001	−0.001
		(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
		[0.928]	[0.832]	[0.823]	[0.743]	[0.729]
GDP growth		0.014	0.018	0.016	0.018	0.017
		(0.015)	(0.015)	(0.015)	(0.014)	(0.014)
		[0.327]	[0.225]	[0.261]	[0.202]	[0.237]
Technological intensity		−0.004	−0.004	−0.004	−0.004	−0.004
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
		[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Trade openness		0.006	0.006	0.006	0.006	0.006
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
		[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
FDI specialization		−0.008	−0.008	−0.008	−0.008	−0.008
		(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
		[0.171]	[0.182]	[0.178]	[0.183]	[0.179]
R&D industry specialization		0.000	0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
		[0.666]	[0.721]	[0.682]	[0.663]	[0.620]
R&D specialization		−0.001	−0.001	−0.001	−0.001	−0.001
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
		[0.001]	[0.000]	[0.000]	[0.000]	[0.000]
Emerging country		0.416	0.339	0.336	0.336	0.332
		(0.169)	(0.173)	(0.172)	(0.174)	(0.173)
		[0.014]	[0.050]	[0.051]	[0.053]	[0.055]
India		−4.659	−5.204	−5.448	−5.376	−5.644
		(1.051)	(1.088)	(1.095)	(1.114)	(1.127)
		[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
China		−4.568	−5.141	−5.377	−5.332	−5.592
		(1.097)	(1.133)	(1.135)	(1.159)	(1.165)
		[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
United States		−3.638	−3.408	−3.367	−3.368	−3.325
		(0.540)	(0.547)	(0.550)	(0.556)	(0.559)
		[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Prior investment		0.649	0.634	0.632	0.626	0.624
		(0.112)	(0.114)	(0.114)	(0.113)	(0.113)
		[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations		95,201	95,201	95,201	95,201	95,201
Firms		163	163	163	163	163
Investments		1341	1341	1341	1341	1341
Pseudo R2		0.234	0.235	0.235	0.235	0.236
Log-likelihood		−4372	−4368	−4366	−4364	−4362
Chi-square		3090	3537	3488	3618	3567
P-value		0.000	0.000	0.000	0.000	0.000

Standard errors in parentheses, p-values in square parentheses.

weakness are statistically significant for most levels of *host country inclination*, at the higher levels of this inclination, they are no longer significant. In other words, the deterring effect of weak IPR regulations decreases as host country inclination becomes more favorable, and fades away (i.e. becomes insignificant) at the higher levels of host country inclination. This provides support for H1.

Similarly, Fig. 2 shows that the marginal effect of *IPR weakness* on location choice becomes less negative as firm *political capabilities* increase. The marginal effect of *IPR weakness* is no longer significant for those firms with greater *political capabilities*. This provides support for H2.

The marginal effects of our estimations are also economically significant. A firm's probability to invest in a host country with average *IPR weakness* is 4.3% higher if *host country inclination* is equal to 3.470 (i.e. the mean plus one standard deviation) than if it is equal to 0.276 (i.e. the mean minus one standard deviation). This difference increases to 9.4% if *IPR weakness* is one standard deviation higher, and is not significant for very low levels of *IPR weakness*. Similarly, a firm's probability to invest in a host country with average *IPR weakness* is 7.9% higher if the firm has higher political capabilities (mean plus one standard deviation) than when the firm has no political capabilities. This increase in probability is even higher, i.e. 13.9%, for countries with greater *IPR weakness* (mean plus one standard deviation), and lower, i.e. 2.9%, for countries with lower *IPR weakness* (mean minus one standard deviation). We believe these results demonstrate both the statistical and the economic significance of our findings.

We also find some interesting results regarding the control variables. *Political affinity* has a consistently positive and significant effect on R&D

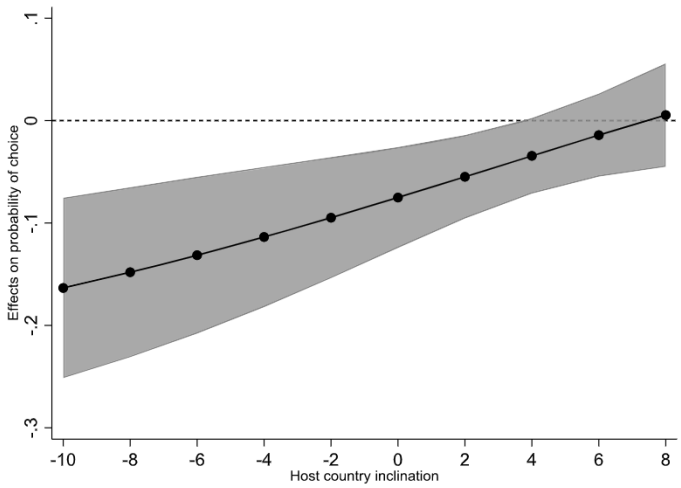

Fig. 1. Average marginal effects of IPR weakness by host country inclination. This graph is based on Model 3 (Table 2). The middle line represents the average marginal effect of IPR weakness on the linear probability of host country choice (Y axis) for different levels of host country inclination (X axis). The upper-bound and the lower-bound lines represent the confidence interval (at 90% level) for the represented marginal effects. The dashed line represents 0, i.e. the zone where marginal effects are not statistically significant at 10% p-value.

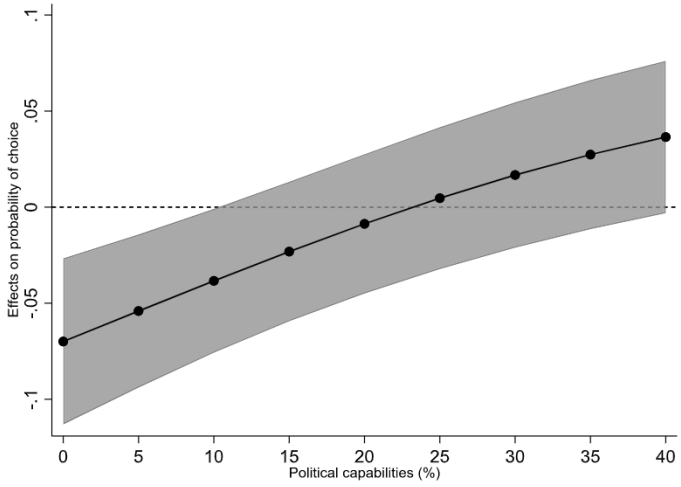

Fig. 2. Average marginal effects of IPR weakness by political capabilities. This graph is based on Model 4 (Table 2). The middle line represents the average marginal effect of IPR weakness on the linear probability of host country choice (Y axis) for different levels of firm political capabilities (X axis). The upper-bound and the lower-bound lines represent the confidence interval (at 90% level) for the represented marginal effects. The dashed line represents 0, i.e. the zone where marginal effects are not statistically significant at 10% p-value.

investment location choices. Similarly, consistent with prior literature on foreign investment location choice, the quality of the local institutional environment, particularly *political constraints* and *control of corruption,* also helps attract foreign R&D investments. In contrast, the presence of an *independent judiciary* does not seem to affect firms' location choice. Somewhat counterintuitively, *trade freedom* has a negative effect on location choice, suggesting that some of the R&D investments we examine are aimed at penetrating the local market, which is made less necessary at high levels of trade freedom. Finally, having *prior investments* in a potential host country has a consistently positive effect on subsequently choosing that country for R&D investments.

4.1. Robustness analyses

We conducted several tests to probe the robustness of our findings. The detailed results associated with these tests are available in the appendix. First, the general attitude held in a potential host country regarding a firm's home country (i.e. *host country inclination*) may be reflected in a host of alternative measures. In particular, network theory has long argued that attitudes may derive from structural ties between actors. At the country level, this has led researchers to investigate the impact of intergovernmental ties and other economic relationships on countries' tendency to cooperate with one another (Ingram et al., 2005; Jandhyala and Phene, 2015; Rangan and Sengul, 2009). In particular, trade relations between countries have been argued and shown to be associated with an overall better quality of bilateral relations (e.g. Baldwin and Kay, 1975; Mansfield and Pevehouse, 2000). Because our theorizing refers to attitudes held at all levels in the host country, not only at the highest level in the government, we tested the robustness of our findings using alternative measures that capture relationships at various levels in society. We thus focus on four alternative measures: (i) bilateral trade between the firm's home country and the potential host country, (ii) the number of IGO connections between the two countries, (iii) the GDELT measure based on attitudes of the host government (at all levels of the government and its agencies) towards the home country government, and (iv) the political affinity (i.e. based on UN voting) between home and host country (Gartzke, 1998). All our results are robust to using any of these alternative measures (see Appendix Table AIII).

Second, although firm political capabilities can be operationalized in several ways, we noted earlier that many of these operationalizations do not allow for cross-country comparison due to the idiosyncratic nature of national restrictions on corporate political engagement. As an alternative to politicians on the board, however, we used majority state ownership, a measure that some prior studies have used as a proxy for a firm's ability to deal with political authorities (e.g. Li et al., 2018; Tihanyi et al., 2019). We operationalize state ownership with a dummy variable that takes the value of 1 if the state holds more than 50% of the investing firm's equity and 0 otherwise. Our results are robust to using this alternative measure of firm political capabilities (see Appendix Table AIV).

Third, a large body of literature studies the different patterns of search and innovation protection carried out in high-technology versus low-technology industries (Grimpe and Sofka, 2009; d'Agostino et al., 2013). In particular, R&D investments in high-technology industries are likely to create a greater concern about intellectual property infringements. In low-technology industries, foreign R&D investments are likely to essentially target the local market (Grimpe and Sofka, 2009). We thus tested our hypotheses on investments carried out in high-technology and low-technology industries separately. We relied on the classification developed by d'Agostino et al. (2013) to split our sample into high-technology investments (those included in high-technology and medium-high-technology industries in d'Agostino et al.) and low-technology investments (low-technology and medium-low-technology). We find that, indeed, IPR weakness is no longer a significant antecedent of location choice when considering R&D investments in low-technology industries (see Appendix Table AV). R&D investments in high-technology industries, on the other hand, lead to results consistent with our theorizing. In other words, our theory appears to apply primarily to firms choosing the location of their high-technology R&D investments.

Fourth, the fDiMarkets database further distinguishes new R&D investments from expansion R&D investments. We believe some of our arguments primarily apply to new investments and, therefore, used only those investments in our main analyses. However, firms may not use different processes when deciding on the location of expansion versus new investments. For example, very large expansion investments probably go through the same type of scrutiny as new investments. We thus

carried out a robustness test in which we include expansion investments in our sample (see Appendix Table AVI). We find that our results remain unchanged when considering both new and expansion R&D investments.

Finally, we followed prior location choice literature and relied on conditional logit modeling to test our hypotheses. The conditional logit model relies on the assumption of independence of irrelevant alternatives (IIA). That is, including countries that firms do not seriously consider as potential locations should not affect our findings. Nevertheless, we assessed the robustness of our results to using unconditional logit (Holburn and Zelner, 2010) and mixed logit (Alcacer and Chung, 2007; Castellani et al., 2021; Castellani and Lavoratori, 2020) models (see Appendix Tables AVII and AVIII, respectively), which relax the IIA assumption of conditional logit analysis. Our results using these alternative methodologies are consistent with our main analysis.

5. Discussion

We build on the idea that, when making R&D investments abroad, firms are wary of threats to their intellectual property stemming from weak IPR regimes in potential host countries (Berry, 2017; Zhao, 2006). Our study suggests that, in addition to the well-documented organizational mechanisms and knowledge protection strategies that firms can unilaterally implement (Keupp et al., 2010; Zhao, 2006), firms can benefit from non-market factors to alleviate appropriability concerns associated with investing in countries with weak IPR regimes. First, we focused on the country level non-market environment and found that the negative impact of weak IPR regimes on a firm's willingness to make R&D investments is offset by a more favorable host country inclination toward the firm's home country. Second, we moved our focus to the firm-specific non-market environment and found that political capabilities reduce the negative impact of weak IPR regimes, suggesting that such capabilities can help firms mitigate some of the risks associated with innovating under weak IPR regulations.

These findings support our theorizing that non-market factors shape firms' beliefs regarding how dependent they are on formal IPR regulations to protect their innovations from misappropriation in foreign countries. This has implications for both firm strategy and government innovation policy. Firms that would normally shy away from investing in certain countries due to the weakness of the local IPR regulations can instead be more open to investing in such countries if host country inclination is high enough, or if the firm enjoys strong political capabilities. In doing so, firms could enjoy the demand and supply side benefits of investing for innovation in those countries other firms shy away from, thus enjoying reduced competition, without jeopardizing the value of their intellectual property. Regarding government innovation policy, our study suggests that countries may be able to attract foreign R&D investments irrespective of the level of formal IPR protection they provide. However, they should be aware that low levels of IPR protection might (inadvertently) limit inward investments to particular countries—namely, those towards which they have a positive inclination– and particular firms—namely, those with strong political capabilities. There may be an economic or political price to pay for this. For example, by restricting inward R&D investments to firms originating from a subset of countries, a host country may inadvertently hamper the development of certain technology fields, which may in turn reduce spillovers, distort the allocation of human capital, and, ultimately, harm economic development. In a similar vein, promoting investments, albeit unwillingly, by firms with political capabilities may increase the amount of political and diplomatic influence a country is subject to (e.g. Bucheli and Salvaj, 2013). From the perspective of the home country, our results suggest that improving host country inclination, notably through soft diplomacy endeavors, may be beneficial to local companies and even to the home country economy as a whole.

Our study advances research on the role of political economy on the location of innovation activities across countries. Our findings suggest that when choosing the location of their innovation activities firms use a different logic than when they choose the location of their other foreign investments. When deciding on the location of international investments, firms typically rely on the overall quality of the local institutional environment to offset the risk that their local assets might be expropriated (Henisz, 2000; Li et al., 2018; Xu et al., 2021). Because investments for innovation are associated with intangible assets, misappropriation is difficult to observe and open to interpretation. Above and beyond the overall quality of the local institutional environment, the intricacies of local IPR regulations are thus of critical importance. The results of our analyses contrasting high-technology and low-technology investments support this conclusion. Indeed, while indicators of the overall quality of the institutional environment are meaningful for both high-technology and low-technology investments, the strength of IPR regulations appears to only matter for high-technology investments. These investments are precisely those most likely to face misappropriation while also being a major source of competitive advantage (Buckley and Casson, 1976).

One important insight derived from our theorizing and findings relative to prior research on how intercountry relationships and political engagement influence firm international location choice is that this influence may vary depending on particular home country attributes. Several studies focusing on investments by firms originating from China have regarded favorable home-host ties as prerequisites to the 'activation' of a firm's political capabilities (e.g. Duanmu, 2014; Li et al., 2018). According to this view, a firm's political capabilities will only create value in host countries with which the firm's home country maintains favorable relations. In contrast, we advance a different view in which intercountry relations and political capabilities serve as *alternative* mechanisms through which firms can offset the risks of investing in countries with a weaker institutional environment (e.g. Albino-Pimentel et al., 2018). In other words, political capabilities make it possible for firms to invest in a particular host country even when home-host country relations are not favorable.

We interpret these contrasting perspectives and empirical results as reflecting fundamental differences in firm-government relationships in different home countries. On the one hand, firms from countries where political agendas dominate economic interests, or with more autocratic policy-making, may become instruments of their home country's foreign policy and thus align their investment patterns with that policy. This is consistent with the observation that politically-engaged firms from such countries predominantly favor host countries with higher political affinity to the home country when making foreign investments (e.g. Duanmu, 2014; Li et al., 2018). On the other hand, firms from countries where the government is more constrained by checks and balances in policy-making are more likely to resort to their political capabilities to lobby for and successfully obtain home country support under less favorable home-host relations, or to be able to bypass the home government entirely and obtain preferential treatment directly from host government authorities.

Because of our empirical setting, firms from OECD countries, we believe that our results are less susceptible to an interpretation in which firms are used as instruments of foreign policy. Actually, large firms from Western countries have been rumored to even shape foreign policy in ways that favor their own interests (Bucheli and Salvaj, 2013). Two well-documented cases are those of ITT and United Fruit driving the US government to overthrow the governments of Chile and Guatemala, respectively, because they were threatening their interests in these countries. Indeed, extrapolating from all these results could suggest that countries with weak IPR regimes are likely to attract investments from firms based in friendly countries, firms with political connections in their home country, or even firms with political capabilities originating from friendly countries (Bucheli and Salvaj, 2013). Future research could attempt to better disentangle the role of foreign policy and firm political capabilities in shaping the patterns of foreign investments, particularly R&D investments. The extent to which foreign policy drives

firm strategy or firm interests shape foreign policy is of critical importance for the understanding of firm international strategy, government policy and their interplay.

Overall, our study contributes to the innovation offshoring, non-market strategy and R&D policy literatures. First, our findings demonstrate that, when making foreign R&D investments, firms can rely on non-market factors as an alternative to formal institutions, such as a strong IPR regime, that are presumed necessary for mitigating the risks associated with such investments (Holburn and Zelner, 2010; Wan and Hoskisson, 2003). Relative to previously examined IPR risk-mitigation mechanisms, such as the careful design of internal innovation procedures and routines, we show that non-market factors at both the country and firm levels are particularly fitting to the regulatory nature of IPR policy-making and enforcement. Indeed, our study adds to this body of research by showing that, while firms may have little influence on a host country's IPR regulations, they may be able to alleviate appropriability concerns by relying on the favorable treatment from host country authorities, which is shaped by non-market factors, namely host country inclination and political capabilities. Second, our findings advance a multilevel conceptualization of appropriability risk mitigation, whose effectiveness within the context of a given IPR regime rests not only on firm-specific strategies and capabilities, but also on the supranational environment in which these strategies and capabilities are implemented.

Our study additionally makes several contributions to the literature on non-market strategy and on the interplay of government policy and firm decisions. First, while prior studies have uncovered multiple channels through which non-market factors can create firm value (e.g. Capron and Chatain, 2008; Faccio et al., 2006; Goldman et al., 2013), we highlight an overlooked mechanism—namely, the fact that non-market factors may reduce the appropriability risks that are inherent to overseas innovation activities. Second, against the backdrop of the non-market strategy literature's predominant focus on the interplay between a firm's political capabilities and *domestic* policy-makers, we add to a nascent body of research suggesting that non-market factors, including firms' political capabilities, can similarly have an influence *overseas* (e.g. Albino-Pimentel et al., 2018; Li et al., 2018). Finally, we show that less than perfect IPR regulations not only limit the amount of innovation related investments a country will receive from abroad, but could also distort the flow of such investments. Firms from countries that benefit from a favorable inclination in the host country or firms with political capabilities will likely be disproportionately represented among investors while others might be under-represented. This could create concerns regarding the industry or technology distributions of R&D investments in the host country.

Naturally, our study has a number of limitations. First, due to data availability, and consistent with prior non-market strategy studies that employ cross-country research designs, we operationalized firm political capabilities solely through the presence of politicians and senior government officials on the firm's board. This measure, however, does not encompass the full range of resources that firms could leverage to exercise influence over government authorities. Second, also due to data availability, we only consider that firms have political capabilities when current or former politicians and government officials are present on the board of the parent company in the home country. We do not account for such board membership in local subsidiaries, which arguably might have an even greater effect in obtaining favorable treatment of the considered firm with regards to the implementation of IPR regulations in the host country. Third, similar to much research on firm political capabilities (e.g. Holburn and Zelner, 2010), the design of our study does not allow us to directly observe the process through which political capabilities lead to benefits for the firm. In particular, we are not able to disentangle how political capabilities translate into either political influence or political knowledge. Nonetheless, we interpret the empirical support that our hypothesis receives to be consistent with the presence of at least one of these two mechanisms. Finally, we rely on a measure of host country inclination based on media reports. How much the actual attitudes of individual actors are observable through such media reports is open to discussion. Nevertheless, the robustness tests we conducted using co-membership in IGOs suggest that this measure indeed captures some of the underlying factors we emphasize in our theorizing.

Credit author statement

Joao Albino-Pimentel: Conceptualization, Methodology, Software, Writing

Pierre Dussauge: Conceptualization, Methodology, Software, Writing

Omar El Nayal: Conceptualization, Methodology, Software, Writing

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.respol.2021.104442.

Appendix

This appendix includes the tables associated with additional descriptive statistics of our data as well as with the results of robustness analyses described in the paper. The tables are presented in the following order:

1) Distribution of investments by home country
2) Distribution of investments by host country
3) Robustness test 1: alternative measures of host country inclination
4) Robustness test 2: alternative measure of political capabilities
5) Robustness test 3: high-technology vs. low-technology investments
6) Robustness test 4: including expansion investments
7) Robustness test 5a: alternative empirical approach (unconditional logit)
8) Robustness test 5b: alternative empirical approach (mixed logit)

Table AI,AII,AIII,AIV,AV,AVI,AVII,AVIII

Table AI
Distribution of investments by home country.

Home country	Number	Percent
Australia	4	0.3
Belgium	13	0.97
Canada	23	1.72
France	139	10.37
Germany	156	11.63
Italy	5	0.37
Japan	178	13.27
Netherlands	8	0.6
Norway	6	0.45
Spain	17	1.27
Sweden	27	2.01
Switzerland	73	5.44
United Kingdom	76	5.67
United States	616	45.94
Total	1341	100

Table AII
Distribution of investments by host country.

Host country	Number	Percent
Algeria	2	0.15
Angola	1	0.07
Argentina	6	0.45
Australia	37	2.76
Austria	11	0.82
Bangladesh	1	0.07
Belgium	18	1.34
Brazil	42	3.13
Bulgaria	1	0.07
Canada	30	2.24
Chile	9	0.67
China	261	19.46
Colombia	7	0.52
Costa Rica	3	0.22
Cyprus	2	0.15
Czech Republic	7	0.52
Cote d'Ivoire	1	0.07
Denmark	14	1.04
Egypt	2	0.15
Finland	9	0.67
France	35	2.61
Germany	46	3.43
Ghana	1	0.07
Greece	2	0.15
Hungary	10	0.75
India	160	11.93
Indonesia	6	0.45
Ireland	15	1.12
Israel	28	2.09
Italy	13	0.97
Japan	26	1.94
Kenya	3	0.22
Korea	34	2.54
Malaysia	11	0.82
Mexico	24	1.79
Morocco	2	0.15
Mozambique	1	0.07
Netherlands	2	0.15
New Zealand	3	0.22
Nigeria	2	0.15
Norway	3	0.22
Pakistan	4	0.3
Panama	3	0.22
Paraguay	1	0.07
Peru	2	0.15
Philippines	9	0.67
Poland	23	1.72
Portugal	2	0.15
Russia	25	1.86
Saudi Arabia	9	0.67
Singapore	85	6.34
Slovakia	1	0.07
South Africa	10	0.75
Spain	56	4.18
Sri Lanka	2	0.15
Sweden	11	0.82
Switzerland	6	0.45
Thailand	16	1.19
Tunisia	3	0.22
Turkey	12	0.89
Ukraine	2	0.15
United Kingdom	50	3.73
United States	101	7.53
Venezuela	1	0.07
Vietnam	16	1.19
Total	1341	100

Table AIII
Robustness test 1: alternative measures of host country inclination.

VARIABLES	(1)	(2)	(3)
IPR weakness	−2.560	−0.337	−0.411
	(0.425)	(0.103)	(0.127)
	[0.000]	[0.001]	[0.001]
Host country inclination	0.037	0.044	0.001
	(0.022)	(0.022)	(0.022)
	[0.102]	[0.046]	[0.975]
IGO connections	−0.029	−0.001	−0.001
	(0.007)	(0.006)	(0.006)
	[0.000]	[0.831]	[0.809]
Bilateral trade	0.004	−0.002	0.003
	(0.001)	(0.002)	(0.001)
	[0.001]	[0.212]	[0.016]
IPR weakness X IGO connections	0.049		
	(0.009)		
	[0.000]		
IPR weakness X Bilateral trade		0.008	
		(0.002)	
		[0.000]	
IPR weakness X Host country inclination*			0.030
			(0.018)
			[0.089]
Political affinity	1.529	1.852	1.626
	(0.498)	(0.461)	(0.465)
	[0.002]	[0.000]	[0.000]
Geographic distance	0.014	0.009	0.003
	(0.014)	(0.014)	(0.014)
	[0.321]	[0.522]	[0.859]
Administrative distance	0.053	0.245	0.153
	(0.248)	(0.248)	(0.246)
	[0.831]	[0.325]	[0.535]
Cultural distance	0.347	0.362	0.409
	(0.102)	(0.099)	(0.098)
	[0.001]	[0.000]	[0.000]
Economic distance	0.012	0.017	0.015
	(0.008)	(0.008)	(0.008)
	[0.159]	[0.041]	[0.061]
Political distance	−0.004	−0.005	−0.002
	(0.004)	(0.004)	(0.004)
	[0.314]	[0.218]	[0.670]
Knowledge distance	−0.004	−0.006	−0.003
	(0.003)	(0.003)	(0.003)
	[0.165]	[0.075]	[0.291]
Independent judiciary	0.106	−0.043	−0.196
	(0.160)	(0.159)	(0.156)
	[0.508]	[0.789]	[0.208]
Political constraints	0.392	0.756	0.971
	(0.287)	(0.294)	(0.285)
	[0.172]	[0.010]	[0.001]
Control of corruption	0.392	0.412	0.438
	(0.080)	(0.080)	(0.080)
	[0.000]	[0.000]	[0.000]
Trade freedom	−0.025	−0.023	−0.021
	(0.005)	(0.005)	(0.005)
	[0.000]	[0.000]	[0.000]

(continued on next page)

Table AIII (*continued*)

VARIABLES	(1)	(2)	(3)
GDP	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
	[0.000]	[0.000]	[0.000]
Population	0.006	0.006	0.007
	(0.001)	(0.001)	(0.001)
	[0.000]	[0.000]	[0.000]
GDP per capita	−0.007	−0.001	−0.001
	(0.005)	(0.004)	(0.004)
	[0.135]	[0.785]	[0.835]
GDP growth	0.020	0.020	0.016
	(0.014)	(0.014)	(0.014)
	[0.163]	[0.176]	[0.282]
Technological intensity	−0.004	−0.004	−0.004
	(0.001)	(0.001)	(0.001)
	[0.000]	[0.000]	[0.000]
Trade openness	0.006	0.005	0.006
	(0.001)	(0.001)	(0.001)
	[0.000]	[0.000]	[0.000]
FDI specialization	−0.009	−0.007	−0.008
	(0.006)	(0.006)	(0.006)
	[0.125]	[0.215]	[0.185]
R&D industry specialization	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
	[0.573]	[0.664]	[0.668]
R&D specialization	−0.001	−0.001	−0.001
	(0.000)	(0.000)	(0.000)
	[0.035]	[0.002]	[0.001]
Emerging country	−0.116	0.212	0.329
	(0.207)	(0.173)	(0.173)
	[0.577]	[0.220]	[0.057]
India	−5.222	−5.053	−4.939
	(1.088)	(1.105)	(1.072)
	[0.000]	[0.000]	[0.000]
China	−5.018	−4.992	−4.821
	(1.140)	(1.144)	(1.117)
	[0.000]	[0.000]	[0.000]
United States	−2.995	−2.975	−3.333
	(0.580)	(0.549)	(0.548)
	[0.000]	[0.000]	[0.000]
Prior investment	0.601	0.624	0.631
	(0.113)	(0.115)	(0.113)
	[0.000]	[0.000]	[0.000]
Observations	95,201	95,201	95,201
Firms	163	163	163
Investments	1341	1341	1341
Pseudo R2	0.241	0.237	0.235
Log-likelihood	−4334	−4356	−4364
Chi-square	3214	3528	3546
P-value	0.000	0.000	0.000

Standard errors in parentheses, p-values in square parentheses.
*In model 3, host country inclination refers to government-to-government attitudes.

Table AIV
Robustness test 2: alternative measure of political capabilities.

VARIABLES	(1)
IPR weakness	−0.287
	(0.103)
	[0.005]
IPR weakness X Majority state ownership	0.512
	(0.087)
	[0.000]
Host country inclination	0.037
	(0.022)
	[0.090]
IGO connections	−0.000
	(0.006)
	[0.941]
Bilateral trade	0.003
	(0.001)
	[0.020]
Political affinity	1.603
	(0.472)
	[0.001]
Geographic distance	0.001
	(0.015)
	[0.941]
Administrative distance	0.192
	(0.247)
	[0.437]
Cultural distance	0.420
	(0.099)
	[0.000]
Economic distance	0.016
	(0.008)
	[0.054]
Political distance	−0.002
	(0.004)
	[0.591]
Knowledge distance	−0.003
	(0.003)
	[0.310]
Independent judiciary	−0.152
	(0.156)
	[0.332]
Political constraints	0.891
	(0.286)
	[0.002]
Control of corruption	0.433
	(0.080)
	[0.000]
Trade freedom	−0.020
	(0.005)
	[0.000]
GDP	0.000
	(0.000)
	[0.000]
Population	0.007
	(0.001)
	[0.000]
GDP per capita	−0.001
	(0.004)
	[0.893]
GDP growth	0.017
	(0.015)
	[0.253]
Technological intensity	−0.004
	(0.001)
	[0.000]
Trade openness	0.006
	(0.001)
	[0.000]
FDI specialization	−0.008
	(0.006)
	[0.182]
R&D industry specialization	0.000
	(0.000)
	[0.694]
R&D specialization	−0.001
	(0.000)
	[0.001]
Emerging country	0.338
	(0.173)
	[0.051]
India	−5.198
	(1.090)
	[0.000]
China	−5.113
	(1.133)
	[0.000]
United States	−3.334
	(0.551)
	[0.000]
Prior investment	0.631
	(0.114)
	[0.000]
Observations	95,201

(*continued on next page*)

Table AIV (*continued*)

VARIABLES	(1)
Firms	163
Investments	1341
Pseudo R2	0.235
Log-likelihood	−4366
Chi-square	3584
P-value	0.000

Standard errors in parentheses, p-values in square parentheses.

Table AV
Robustness test 3: high-technology vs. low-technology investments.

VARIABLES	(1) High-tech	(2) Low-tech	(3) High-tech	(4) Low-tech
IPR weakness	−0.379	−0.168	−0.644	−0.407
	(0.148)	(0.129)	(0.182)	(0.211)
	[0.010]	[0.194]	[0.000]	[0.054]
Host country inclination			−0.007	−0.072
			(0.048)	(0.066)
			[0.879]	[0.271]
IPR weakness X Host country inclination			0.053	0.073
			(0.029)	(0.055)
			[0.066]	[0.183]
IPR weakness X Political capabilities			0.022	0.014
			(0.009)	(0.009)
			[0.018]	[0.123]
IGO connections	−0.008	0.011	−0.008	0.011
	(0.007)	(0.010)	(0.007)	(0.010)
	[0.300]	[0.273]	[0.257]	[0.265]
Bilateral trade	0.001	0.005	0.002	0.005
	(0.002)	(0.001)	(0.002)	(0.001)
	[0.461]	[0.000]	[0.349]	[0.000]
Political affinity	1.469	1.681	1.528	1.662
	(0.598)	(0.653)	(0.598)	(0.657)
	[0.014]	[0.010]	[0.011]	[0.011]
Geographic distance	−0.015	0.021	−0.017	0.020
	(0.017)	(0.023)	(0.017)	(0.023)
	[0.388]	[0.359]	[0.335]	[0.392]
Administrative distance	0.058	0.372	0.083	0.334
	(0.297)	(0.366)	(0.301)	(0.380)
	[0.844]	[0.311]	[0.784]	[0.379]
Cultural distance	0.529	0.250	0.535	0.257
	(0.160)	(0.113)	(0.162)	(0.113)
	[0.001]	[0.027]	[0.001]	[0.022]
Economic distance	0.016	0.015	0.016	0.017
	(0.010)	(0.012)	(0.010)	(0.012)
	[0.130]	[0.207]	[0.119]	[0.152]
Political distance	−0.003	−0.001	−0.003	−0.001
	(0.006)	(0.006)	(0.006)	(0.006)
	[0.551]	[0.879]	[0.543]	[0.864]
Knowledge distance	−0.007	0.002	−0.007	0.003
	(0.004)	(0.005)	(0.004)	(0.005)
	[0.064]	[0.643]	[0.088]	[0.606]
Independent judiciary	−0.048	−0.223	−0.034	−0.213
	(0.224)	(0.230)	(0.227)	(0.233)
	[0.831]	[0.334]	[0.880]	[0.360]
Political constraints	0.475	1.346	0.439	1.335
	(0.308)	(0.486)	(0.313)	(0.492)
	[0.123]	[0.006]	[0.162]	[0.007]
Control of corruption	0.543	0.347	0.548	0.354
	(0.104)	(0.118)	(0.106)	(0.118)
	[0.000]	[0.003]	[0.000]	[0.003]
Trade freedom	−0.025	−0.017	−0.025	−0.016
	(0.007)	(0.007)	(0.007)	(0.007)
	[0.000]	[0.010]	[0.000]	[0.016]
GDP	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
	[0.000]	[0.000]	[0.000]	[0.000]
Population	0.008	0.006	0.008	0.006
	(0.001)	(0.002)	(0.001)	(0.002)
	[0.000]	[0.000]	[0.000]	[0.000]
GDP per capita	0.007	−0.011	0.006	−0.012
	(0.004)	(0.006)	(0.005)	(0.006)
	[0.142]	[0.087]	[0.156]	[0.067]
GDP growth	0.021	0.015	0.019	0.015
	(0.019)	(0.025)	(0.019)	(0.024)
	[0.274]	[0.545]	[0.310]	[0.542]
Technological intensity	−0.004	−0.003	−0.004	−0.003
	(0.001)	(0.001)	(0.001)	(0.001)
	[0.000]	[0.000]	[0.000]	[0.000]
Trade openness	0.006	0.006	0.006	0.006
	(0.002)	(0.002)	(0.002)	(0.002)
	[0.001]	[0.003]	[0.001]	[0.004]
FDI specialization	−0.016	−0.003	−0.017	−0.003
	(0.006)	(0.007)	(0.006)	(0.007)
	[0.005]	[0.659]	[0.004]	[0.659]
R&D industry specialization	0.010	0.001	0.010	0.001
	(0.003)	(0.001)	(0.003)	(0.001)
	[0.001]	[0.316]	[0.001]	[0.284]
R&D specialization	−0.001	−0.001	−0.001	−0.001
	(0.000)	(0.000)	(0.000)	(0.000)
	[0.001]	[0.009]	[0.001]	[0.005]
Emerging country	0.568	0.125	0.573	0.106
	(0.238)	(0.205)	(0.239)	(0.208)
	[0.017]	[0.542]	[0.017]	[0.609]
India	−6.333	−4.092	−6.776	−4.581
	(1.365)	(1.725)	(1.385)	(1.816)
	[0.000]	[0.018]	[0.000]	[0.012]
China	−6.483	−3.779	−6.924	−4.293
	(1.390)	(1.796)	(1.389)	(1.893)
	[0.000]	[0.035]	[0.000]	[0.023]
United States	−4.009	−2.720	−3.937	−2.664
	(0.723)	(0.796)	(0.737)	(0.812)
	[0.000]	[0.001]	[0.000]	[0.001]
Prior investment	0.624	0.586	0.612	0.575
	(0.135)	(0.185)	(0.133)	(0.188)
	[0.000]	[0.002]	[0.000]	[0.002]
Observations	54,292	40,909	54,292	40,909
Firms	116	104	116	104
Investments	773	568	773	568
Pseudo R2	0.272	0.196	0.273	0.197
Log-likelihood	−2389	−1951	−2384	−1949
Chi-square	3557	3079	4062	3266
P-value	0.000	0.000	0.000	0.000

Standard errors in parentheses, p-values in square parentheses.

Table AVI
Robustness test 4: including expansion investments.

VARIABLES	(1)	(2)
IPR weakness	−0.286	−0.513
	(0.095)	(0.124)
	[0.003]	[0.000]
Host country inclination		−0.053
		(0.037)
		[0.148]
IPR weakness X Host country inclination		0.061
		(0.026)
		[0.018]
IPR weakness X Political capabilities		0.015
		(0.006)
		[0.008]
IGO connections	−0.001	−0.001
	(0.005)	(0.005)
	[0.776]	[0.786]
Bilateral trade	0.001	0.001
	(0.001)	(0.001)
	[0.510]	[0.432]
Political affinity	1.715	1.715
	(0.373)	(0.371)
	[0.000]	[0.000]
Geographic distance	−0.009	−0.011
	(0.012)	(0.013)
	[0.448]	[0.402]

(*continued on next page*)

Table AVI (*continued*)

VARIABLES	(1)	(2)
Administrative distance	0.100	0.098
	(0.175)	(0.180)
	[0.567]	[0.585]
Cultural distance	0.536	0.534
	(0.081)	(0.081)
	[0.000]	[0.000]
Economic distance	0.004	0.006
	(0.007)	(0.007)
	[0.520]	[0.411]
Political distance	−0.001	−0.001
	(0.003)	(0.003)
	[0.824]	[0.801]
Knowledge distance	−0.002	−0.001
	(0.003)	(0.003)
	[0.521]	[0.637]
Independent judiciary	−0.165	−0.164
	(0.140)	(0.142)
	[0.237]	[0.248]
Political constraints	1.131	1.143
	(0.249)	(0.257)
	[0.000]	[0.000]
Control of corruption	0.373	0.384
	(0.064)	(0.064)
	[0.000]	[0.000]
Trade freedom	−0.027	−0.026
	(0.004)	(0.004)
	[0.000]	[0.000]
GDP	0.000	0.000
	(0.000)	(0.000)
	[0.000]	[0.000]
Population	0.005	0.006
	(0.001)	(0.001)
	[0.000]	[0.000]
GDP per capita	−0.000	−0.001
	(0.004)	(0.004)
	[0.984]	[0.854]
GDP growth	0.004	0.005
	(0.010)	(0.010)
	[0.675]	[0.614]
Technological intensity	−0.005	−0.005
	(0.001)	(0.001)
	[0.000]	[0.000]
Trade openness	0.007	0.007
	(0.001)	(0.001)
	[0.000]	[0.000]
FDI specialization	−0.009	−0.009
	(0.004)	(0.004)
	[0.040]	[0.040]
R&D industry specialization	0.001	0.001
	(0.000)	(0.000)
	[0.027]	[0.016]
R&D specialization	−0.000	−0.000
	(0.000)	(0.000)
	[0.262]	[0.219]
Emerging country	0.200	0.204
	(0.137)	(0.136)
	[0.145]	[0.133]
India	−4.409	−4.756
	(1.090)	(1.139)
	[0.000]	[0.000]
China	−3.676	−4.031
	(1.124)	(1.174)
	[0.001]	[0.001]
United States	−3.324	−3.283
	(0.519)	(0.533)
	[0.000]	[0.000]
Prior investment	0.921	0.921
	(0.095)	(0.095)
	[0.000]	[0.000]
Observations	137,634	137,634
Firms	177	177
Investments	1938	1938
Pseudo R2	0.245	0.246
Log-likelihood	−6245	−6219
Chi-square	4753	4766
P-value	0.000	0.000

Standard errors in parentheses, p-values in square parentheses.

Table AVII
Robustness test 5a: alternative empirical approach (unconditional logit).

VARIABLES	(1)	(2)	(3)	(4)
IPR weakness	−0.211	−0.348	−0.309	−0.456
	(0.101)	(0.133)	(0.111)	(0.143)
	[0.038]	[0.009]	[0.005]	[0.001]
Host country inclination		−0.044		−0.047
		(0.040)		(0.039)
		[0.263]		[0.228]
IPR weakness X Host country inclination		0.061		0.064
		(0.028)		(0.028)
		[0.031]		[0.022]
Political capabilities			−0.013	−0.013
			(0.006)	(0.006)
			[0.044]	[0.037]
IPR weakness X Political capabilities			0.015	0.016
			(0.006)	(0.006)
			[0.008]	[0.006]
IGO connections	0.003	0.003	0.003	0.003
	(0.006)	(0.006)	(0.006)	(0.006)
	[0.612]	[0.629]	[0.599]	[0.617]
Bilateral trade	0.003	0.003	0.003	0.003
	(0.001)	(0.001)	(0.001)	(0.001)
	[0.001]	[0.001]	[0.001]	[0.001]
Political affinity	0.780	0.765	0.794	0.781
	(0.172)	(0.173)	(0.170)	(0.170)
	[0.000]	[0.000]	[0.000]	[0.000]
Geographic distance	0.004	0.004	0.003	0.003
	(0.014)	(0.014)	(0.014)	(0.014)
	[0.747]	[0.767]	[0.806]	[0.827]
Administrative distance	0.061	0.087	0.026	0.052
	(0.229)	(0.231)	(0.240)	(0.241)
	[0.789]	[0.707]	[0.913]	[0.828]
Cultural distance	0.448	0.453	0.447	0.452
	(0.094)	(0.094)	(0.095)	(0.095)
	[0.000]	[0.000]	[0.000]	[0.000]
Economic distance	0.014	0.014	0.015	0.015
	(0.006)	(0.006)	(0.006)	(0.006)
	[0.020]	[0.021]	[0.016]	[0.016]
Political distance	−0.003	−0.003	−0.003	−0.003
	(0.004)	(0.004)	(0.004)	(0.004)
	[0.487]	[0.504]	[0.470]	[0.487]
Knowledge distance	−0.002	−0.002	−0.002	−0.002
	(0.002)	(0.002)	(0.002)	(0.002)
	[0.319]	[0.308]	[0.408]	[0.395]
Independent judiciary	−0.079	−0.070	−0.080	−0.071
	(0.156)	(0.158)	(0.155)	(0.158)
	[0.613]	[0.657]	[0.605]	[0.653]
Political constraints	0.902	0.880	0.897	0.873
	(0.274)	(0.279)	(0.276)	(0.281)
	[0.001]	[0.002]	[0.001]	[0.002]
Control of corruption	0.450	0.449	0.454	0.453
	(0.075)	(0.075)	(0.075)	(0.076)
	[0.000]	[0.000]	[0.000]	[0.000]
Trade freedom	−0.020	−0.019	−0.019	−0.019
	(0.005)	(0.005)	(0.005)	(0.005)
	[0.000]	[0.000]	[0.000]	[0.000]
GDP	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
	[0.000]	[0.000]	[0.000]	[0.000]
Population	0.006	0.006	0.006	0.007
	(0.001)	(0.001)	(0.001)	(0.001)
	[0.000]	[0.000]	[0.000]	[0.000]
GDP per capita	0.000	−0.000	−0.000	−0.000
	(0.004)	(0.004)	(0.004)	(0.004)
	[0.987]	[0.989]	[0.938]	[0.910]
GDP growth	0.005	0.005	0.006	0.005
	(0.010)	(0.010)	(0.010)	(0.010)
	[0.635]	[0.667]	[0.575]	[0.606]
Technological intensity	−0.004	−0.004	−0.004	−0.004
	(0.001)	(0.001)	(0.001)	(0.001)
	[0.000]	[0.000]	[0.000]	[0.000]
Trade openness	0.006	0.006	0.006	0.006
	(0.001)	(0.001)	(0.001)	(0.001)
	[0.000]	[0.000]	[0.000]	[0.000]
FDI specialization	−0.009	−0.009	−0.009	−0.009

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Table AVII (*continued*)

VARIABLES	(1)	(2)	(3)	(4)
	(0.007)	(0.007)	(0.007)	(0.007)
	[0.188]	[0.183]	[0.190]	[0.184]
R&D industry specialization	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
	[0.804]	[0.776]	[0.731]	[0.699]
R&D specialization	−0.001	−0.001	−0.001	−0.001
	(0.000)	(0.000)	(0.000)	(0.000)
	[0.002]	[0.001]	[0.001]	[0.001]
Emerging country	0.403	0.400	0.399	0.395
	(0.180)	(0.180)	(0.181)	(0.181)
	[0.025]	[0.027]	[0.028]	[0.029]
India	−4.642	−4.908	−4.805	−5.096
	(1.090)	(1.097)	(1.118)	(1.129)
	[0.000]	[0.000]	[0.000]	[0.000]
China	−4.258	−4.534	−4.449	−4.749
	(1.128)	(1.134)	(1.157)	(1.167)
	[0.000]	[0.000]	[0.000]	[0.000]
United States	−3.787	−3.763	−3.754	−3.726
	(0.521)	(0.521)	(0.527)	(0.527)
	[0.000]	[0.000]	[0.000]	[0.000]
Prior investment	0.511	0.509	0.505	0.503
	(0.097)	(0.097)	(0.096)	(0.096)
	[0.000]	[0.000]	[0.000]	[0.000]
Constant	−6.028	−5.936	−5.973	−5.870
	(0.593)	(0.618)	(0.598)	(0.624)
	[0.000]	[0.000]	[0.000]	[0.000]
Observations	95,201	95,201	95,201	95,201
Firms	163	163	163	163
Investments	1341	1341	1341	1341
Pseudo R2	0.195	0.196	0.196	0.196
Log-likelihood	−5671	−5668	−5667	−5665
Chi-square	3789	3685	3920	3802
P-value	0.000	0.000	0.000	0.000

Standard errors in parentheses, p-values in square parentheses.

Table AVIII
Robustness test 5b: alternative empirical approach (mixed logit).

VARIABLES	(1)	(2)	(3)	(4)
IPR weakness	−0.211	−0.348	−0.309	−0.456
	(0.101)	(0.133)	(0.111)	(0.143)
	[0.038]	[0.009]	[0.005]	[0.001]
Host country inclination		−0.044		−0.047
		(0.040)		(0.039)
		[0.263]		[0.228]
IPR weakness X Host country inclination		0.061		0.064
		(0.028)		(0.028)
		[0.031]		[0.022]
IPR weakness X Political capabilities			0.013	0.013
			(0.006)	(0.006)
			[0.044]	[0.037]
IGO connections	0.003	0.003	0.003	0.003
	(0.006)	(0.006)	(0.006)	(0.006)
	[0.612]	[0.629]	[0.599]	[0.617]
Bilateral trade	0.003	0.003	0.003	0.003
	(0.001)	(0.001)	(0.001)	(0.001)
	[0.001]	[0.001]	[0.001]	[0.001]
Political affinity	0.780	0.765	0.794	0.781
	(0.172)	(0.173)	(0.170)	(0.170)
	[0.000]	[0.000]	[0.000]	[0.000]
Geographic distance	0.004	0.004	0.003	0.003
	(0.014)	(0.014)	(0.014)	(0.014)
	[0.747]	[0.767]	[0.806]	[0.827]
Administrative distance	0.061	0.087	0.026	0.052
	(0.229)	(0.231)	(0.240)	(0.241)
	[0.789]	[0.707]	[0.913]	[0.828]
Cultural distance	0.448	0.453	0.447	0.452
	(0.094)	(0.094)	(0.095)	(0.095)
	[0.000]	[0.000]	[0.000]	[0.000]

Table AVIII (*continued*)

VARIABLES	(1)	(2)	(3)	(4)
Economic distance	0.014	0.014	0.015	0.015
	(0.006)	(0.006)	(0.006)	(0.006)
	[0.020]	[0.021]	[0.016]	[0.016]
Political distance	−0.003	−0.003	−0.003	−0.003
	(0.004)	(0.004)	(0.004)	(0.004)
	[0.487]	[0.504]	[0.470]	[0.487]
Knowledge distance	−0.002	−0.002	−0.002	−0.002
	(0.002)	(0.002)	(0.002)	(0.002)
	[0.319]	[0.308]	[0.408]	[0.395]
Independent judiciary	−0.079	−0.070	−0.080	−0.071
	(0.156)	(0.158)	(0.155)	(0.158)
	[0.613]	[0.657]	[0.605]	[0.653]
Political constraints	0.902	0.880	0.897	0.873
	(0.274)	(0.279)	(0.276)	(0.281)
	[0.001]	[0.002]	[0.001]	[0.002]
Control of corruption	0.450	0.449	0.454	0.453
	(0.075)	(0.075)	(0.075)	(0.076)
	[0.000]	[0.000]	[0.000]	[0.000]
Trade freedom	−0.020	−0.019	−0.019	−0.019
	(0.005)	(0.005)	(0.005)	(0.005)
	[0.000]	[0.000]	[0.000]	[0.000]
GDP	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
	[0.000]	[0.000]	[0.000]	[0.000]
Population	0.006	0.006	0.006	0.007
	(0.001)	(0.001)	(0.001)	(0.001)
	[0.000]	[0.000]	[0.000]	[0.000]
GDP per capita	0.000	−0.000	−0.000	−0.000
	(0.004)	(0.004)	(0.004)	(0.004)
	[0.987]	[0.989]	[0.938]	[0.910]
GDP growth	0.005	0.005	0.006	0.005
	(0.010)	(0.010)	(0.010)	(0.010)
	[0.635]	[0.667]	[0.575]	[0.606]
Technological intensity	−0.004	−0.004	−0.004	−0.004
	(0.001)	(0.001)	(0.001)	(0.001)
	[0.000]	[0.000]	[0.000]	[0.000]
Trade openness	0.006	0.006	0.006	0.006
	(0.001)	(0.001)	(0.001)	(0.001)
	[0.000]	[0.000]	[0.000]	[0.000]
FDI specialization	−0.009	−0.009	−0.009	−0.009
	(0.007)	(0.007)	(0.007)	(0.007)
	[0.188]	[0.183]	[0.190]	[0.184]
R&D industry specialization	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
	[0.804]	[0.776]	[0.731]	[0.699]
R&D specialization	−0.001	−0.001	−0.001	−0.001
	(0.000)	(0.000)	(0.000)	(0.000)
	[0.002]	[0.001]	[0.001]	[0.001]
Emerging country	0.403	0.400	0.399	0.395
	(0.180)	(0.180)	(0.181)	(0.181)
	[0.025]	[0.027]	[0.028]	[0.029]
India	−4.642	−4.908	−4.805	−5.096
	(1.090)	(1.097)	(1.118)	(1.129)
	[0.000]	[0.000]	[0.000]	[0.000]
China	−4.258	−4.534	−4.449	−4.749
	(1.128)	(1.134)	(1.157)	(1.167)
	[0.000]	[0.000]	[0.000]	[0.000]
United States	−3.787	−3.763	−3.754	−3.726
	(0.521)	(0.521)	(0.527)	(0.527)
	[0.000]	[0.000]	[0.000]	[0.000]
Prior investment	0.511	0.509	0.505	0.503
	(0.097)	(0.097)	(0.096)	(0.096)
	[0.000]	[0.000]	[0.000]	[0.000]
Constant	−6.028	−5.936	−5.973	−5.870
	(0.593)	(0.618)	(0.598)	(0.624)
	[0.000]	[0.000]	[0.000]	[0.000]
Observations	95,201	95,201	95,201	95,201
Firms	163	163	163	163
Investments	1341	1341	1341	1341
Chi-square	3789	3685	3920	3802
P-value	0.000	0.000	0.000	0.000

Standard errors in parentheses, p-values in square parentheses.

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