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Product Market Competition and FDI Decisions

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Abstract

I examine whether competition from domestic industry rivals affects firms' proclivity to undertake foreign direct investment (FDI) and their country location choices. I find that competition affects foreign production decisions and the geography of international investments. While firms enduring stiffer competition are significantly less likely to undertake FDI, this effect is heterogeneous across firms. Competition deters FDI more strongly when costs are heavier, whereas it has weaker effects when efficiency is higher, growth opportunities are valuable, and cash reserves are higher. FDI location models suggest that when going abroad, firms facing stronger competition are more likely to pursue economies of productivity and taxation.

I. Introduction

The intensity of product market competition is an influential force affecting corporate behavior. An established research stream in the industrial economics literature postulates that market rivalry limits managerial slack, pushing firms toward more efficient financing and investment decisions (for instance, see Hart (1983), Nickell (1996), Schmidt (1997), Bertrand and Mullainathan (2003), and Raith (2003)). This proposition has been tested empirically by a growing body of research examining the relationship between competition and corporate investment (see, e.g., Akdoğu and MacKay (2008), Giroud and Mueller (2010), Frésard and Valta (2016), and Gu (2016)). The main insight from this literature is that competition exerts a first-order effect on firms' investment policies and on the interplay of investment decisions with managerial risk-taking incentives, governance structures, and strategic interactions with competitors. However, such studies focus mostly on domestic investments. Whether competition affects multinational enterprises' (MNEs) foreign direct investment (FDI) decisions (a highly risky type of investment) remains uncharted territory in the finance literature.

In this article, I expand this strand of research in two important ways. First, I study whether the product market rivalry that firms endure in the domestic market affects their proclivity to invest abroad by undertaking FDI. Second, for firms that decide to venture abroad by engaging in FDI, I examine whether and how competition

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affects the motivation to engage in FDI and the economic geography of investments by studying firms' FDI country location choices.

My empirical examination is particularly pertinent since competition can trigger theoretically ambiguous incentives that may result in a higher or lower proclivity to engage in FDI, as well as competing motivations to invest abroad. On the one hand, while FDI is a costly and risky activity, given the large capital commitment and the uncertainties involved, such as political risk (Desai, Foley, and Hines (2008)), competition disciplines firms to manage their cost structure more diligently (Raith (2003)) and to limit risk-taking to mitigate the risk of failure (Schmidt (1997)). Thus, competition may result in a lower proclivity to engage in FDI.

On the other hand, a central tenet of the "quiet life" hypothesis is that when competition is weak, managers put off hard choices that involve higher risk and require more complex decision-making (Bertrand and Mullainathan (2003)). The call to go abroad and venture into foreign markets is potentially one of these tough decisions that accommodated managers might prefer to skip if they can. Hence, competition may discipline managers to seize valuable investment opportunities abroad, despite the risk and the hassle. In fact, several reasons suggest that FDI might be valuable in alleviating competitive pressure. While competition naturally harms performance (Xu (2012)), FDI in new markets enables firms to diversify demand and reap financial and valuation gains (Doukas and Travlos (1988)). Moreover, while market rivalry pressures firms to improve their efficiency and competitiveness to survive (Nickell (1996)), by expanding abroad via FDI, firms can harness the value of their intangible assets, obtain productivity gains, lower production costs, and reap taxation economies (Morck and Yeung (1991), Helpman, Melitz, and Yeaple (2004)). Therefore, competition also creates economic incentives that may instead result in a higher proclivity to engage in FDI.

Furthermore, I investigate whether competitive forces affect the geography of firms' foreign investments. Tapping into the international economics literature, I identify the core motives for firms to go abroad and the main benefits, costs, and risks involved. Cheng and Kwan (2000) suggest that firms go abroad mainly to gain access to new markets, improve productivity and efficiency, acquire resources, and minimize taxation costs. I test whether product market competition intensity affects firms' preferences toward such country locational motivations.

My empirical analysis employs project-level data with about 3,500 greenfield industrial FDIs from a sample of U.S. MNEs investing in 78 economies globally between 2003 and 2019. First, I begin examining the effect of competition on the proclivity to undertake FDI, employing linear probability models (LPMs) to predict the likelihood of firms establishing a foreign plant. My LPM models are estimated via instrumental variables with firm fixed effects, thus helping to deal with potential endogeneity concerns and omitted variable bias. My preferred proxy for the competition is Fluidity, developed by Hoberg, Phillips, and Prabhala (2014), which is a firm-level text-based variable capturing the intensity of the product market threats that firms face from their close rivals.

My main identification strategy explores two state-level instruments predicting the intensity of localized competition: unemployment insurance benefits and real trade-weighted exchange rates. While unemployment insurance can exert relevant competitive effects by spurring entrepreneurial activity (Hombert, Schoar, Sraer, and Thesmar (2020)) and innovation (Griffith and Macartney (2014)), the

generosity of benefits is set by policy, being plausibly exogenous. Exchange rate appreciations can induce falls in barriers to entry for foreign products, causing exogenous changes in competition (Cuñat and Guadalupe (2005)). I probe the reliability of my models with several identification checks to test for the relevance, strength, and validity of the instruments. I further test with numerous instruments for competition, such as industry entry barriers and GMM-style instruments, and with alternative competition proxies, such as the Herfindahl–Hirschman index and industry import penetration.

I find that stronger competition is associated with a lower proclivity to undertake FDI. Exploring the interactions of competition and important predictors of investment, I uncover heterogeneous effects across firms. Competition exerts a stronger deterrent effect on FDI for firms with heavier costs, while it has weaker effects on firms with higher efficiency, stronger growth opportunities, and more financial slack. The negative effect of the competition is stronger (weaker) for firms with higher (lower) profitability, suggesting that firms experiencing profitability shortfalls are more likely to engage in FDI when domestic competition is intense.

Second, to examine the effect of competition on the geography of FDI, I employ McFadden's (1974) conditional logistic model, the standard model employed in FDI location studies (e.g., Nachum, Zaheer, and Gross (2008), Chen and Moore (2010), and Barrios, Huizinga, Laeven, and Nicodème (2012)), to estimate FDI location choice regressions. Fluidity is interacted with country attributes reflecting market attractiveness, total factor productivity, labor costs, the availability of natural resources, and corporate taxes. These interactions capture the moderating effect of competition on the sensitivity of FDI location choice to such country locational attributes, teasing out firms' underlying FDI motivations from their optimal location choices.

From my examination of FDI location choices, I learn that firms operating under stronger competition (that decide to go abroad) are significantly more likely to invest in economies characterized by stronger total factor productivity (TFP) and lower corporate taxes. However, competition weakens the sensitivity of FDI location choice to labor costs and natural resource rents. Such findings indicate that competition is more likely to stimulate productivity-enhancing and tax-saving FDI, as opposed to a purely efficiency-seeking strategy based on labor cost minimization and natural resource extraction. I corroborate this channel by showing that competition renders FDI location more sensitive to the quality of the labor force (human capital) and innovation output (patents) and that competition encourages colocation (agglomeration) with industry peers in countries with higher TFP and more qualified human capital. However, I do not find robust results when interacting competition with market size, which suggests that domestic competition does not seem to stimulate market-access FDI.

My contributions cut across the finance and international economics disciplines. I add new insights to the finance literature that examines the effects of competition on corporate investments. To the best of my knowledge, I am the first to explore the space of firms' international investments. Importantly, FDI is not an ordinary type of investment, given that the uncertainties it involves are typically higher compared to domestic investments. Further substantiating the relevance of outward FDI for the U.S. economy, estimates from the Bureau of Economic Analysis suggest that the cumulative FDI

by U.S. firms abroad totaled USD 6 trillion in 2019 (https://www.bea.gov/news/2020/direct-investment-country-and-industry-2019). I take an important step forward in understanding how competitive forces affect risky FDI decisions.

My research also relates to studies examining the effects of competition on financial structure, such as liquidity (Frésard (2010), Hoberg et al. (2014)), dividends (Hoberg et al. (2014)), leverage (Valta (2012), Xu (2012)), and equity prices and risk (Hou and Robinson (2006), Irvine and Pontiff (2008), Aguerrevere (2009), and Morellec and Zhdanov (2019)). On broad lines, an important insight from this literature is that stronger competition translates into higher equity risk, volatility, and expected returns, in turn rendering firms more cautious (conservative) in their financing policies. By showing that competition is associated with a lower proclivity to engage in FDI and with a more cautious approach when selecting the location of investments (minimizing tax exposure), I corroborate the notion that competition exacerbates the firm risk.

My article connects with the broader finance literature investigating FDI. MNEs prefer to invest in low tax jurisdictions to minimize the impact of taxation on cash (Foley, Hartzell, Titman, and Twite (2007)). Leveraged firms favor investment in countries with higher taxation to increase the marginal value of tax shields (Desai, Foley, and Hines (2004)). From an institutional perspective, a study by Desai et al. (2008) suggests that firms taking higher political risk exposure reduce their leverage to counter the risks, whereas Lin, Mihov, Sanz, and Stoyanova (2019) show that the host economy's property rights protection increases MNEs' valuations. I extend these studies, showing that competition is another relevant economic force affecting the sensitivity of FDI location choice to taxation regimes and economic environments.

My study strengthens the links between the international economics and the finance literatures. FDI location studies remain rare in finance research. An implication of such a lack of integration between these neighboring areas is that the role of financial drivers in explaining FDI choices remains little understood. Studies in the economics literature mostly examine the roles of firms' heterogeneous productivity levels, scale, and agglomeration economies in shaping the decision to undertake FDI and the subsequent location choices (e.g., Head, Ries, and Swenson (1995), Markusen and Venables (1998), Antras and Helpman (2004), Helpman et al. (2004), Helpman (2006), Tomiura (2007), Aw and Lee (2008), Yeaple (2009), and Chen and Moore (2010)). I contribute to this literature by highlighting the role of competition in affecting how firms locate FDI and agglomerate. By exploring the interactions of competition and finance variables, I show that costs, efficiency, profitability, growth opportunities, and cash holdings all affect firms' proclivity to engage in FDI through their interplay with market forces.

II. Theoretical Framework

A. The Effects of Product Market Competition on the Decision to Undertake FDI

Product market competition is an efficient mechanism for resolving governance issues through its disciplinary effect on management (Hart (1983),

Schmidt (1997)). Managers of firms in competitive industries have incentives to reduce managerial slack, or their firms may go out of business (Giroud and Mueller (2011)). Several channels convey such disciplinary effects. Intense competition renders principals more attentive to the actions of their agents (Hart (1983)). Competition by rivals increases failure (bankruptcy) risks (Schmidt (1997)). Increased competition from product substitutability provides managers with incentives to diligently keep firms' costs at a minimum (Raith (2003)).

Several works support these arguments. For example, Nickell (1996) provides evidence consistent with the view that competition makes investment decisions savvier and more efficient. Giroud and Mueller (2010) find that weak governance induces agency problems in capital expenditures and acquisitions unless firms are disciplined by competition. Such agency problems spill over negatively to valuation and productivity, especially for firms in noncompetitive industries. Akdoğu and MacKay (2008) find that investment is typically more sensitive to growth opportunities (Tobin's Q) in more competitive industries, a signal of more efficient capital allocation, since better growth opportunities carry a higher expected profitability of investments. Beyond investment, competition is also shown to reduce the riskiness of firms' financing structures. Competition leads firms to choose conservative cash holdings and dividends (Hoberg et al. (2014)), since conservatism strengthens the competitive position of firms should threats materialize (Hoberg et al. (2014)). Competition also lowers leverage (Xu (2012)) by reducing profitability and increasing the cost of debt (Valta (2012)).

Since competition is an influential force shaping firms' risk-taking attitudes and corporate investment policies, I argue that it could impact FDI decisions too. When firms decide to produce abroad, they incur new risks that are proportionately higher and more difficult to control compared to purely domestic investments. Given that capital committed to FDI typically goes in large sums, the exit costs are higher and often difficult to reverse (Rivoli and Salorio (1996), Azzimonti (2019)). Moreover, foreign firms receive differential treatment in courts of law than domestic companies and experience stronger negative market reactions upon legal suit announcements (Bhattacharya, Galpin, and Haslem (2007)), face significant risks of foreign governments taking arbitrary actions that may hurt their performance (Desai et al. (2008)), and must deal with the operational risks arising from their unfamiliarity with foreign business environments (Zaheer (1995)). Such factors compound FDI risk.

With competitive pressure pushing firms to make savvier and more rational investment decisions, I conjecture that competition may affect MNEs' exposure to foreign risk via FDI. Several reasons support this claim. Because firms operating under stiffer competition are perceived by investors as riskier investments (Irvine and Pontiff (2008)), such firms can try to minimize the riskiness of their expansion and to avoid being further discounted by investors. While competition pushes firms to manage costs more diligently (Raith (2003)) and to adopt more efficient practices in an effort to mitigate the risk of failure (Schmidt (1997)), risk-taking through FDI pulls in the other direction, exposing firms to higher cash flow risk (Bekaert, Harvey, Lundblad, and Siegel (2014)). Thus, through its disciplinary effect, I conjecture that competition may discourage firms' proclivity to undertake FDI.

Alternatively (to its disciplinary effect), it is also plausible that competition may instead induce risk exposure via FDI. Several reasons suggest that this could be the case. Scharfstein (1988) shows that competition may create managerial slack (instead of limiting it), depending on the incentives at play. Hence, instead of promoting a disciplinary effect, competition may lead to agency costs and inefficient investment decisions, such as underestimating FDI risks.

Furthermore, competition may encourage risk-taking to generate higher returns. For example, the "quiet life" hypothesis postulates that managers put off hard decisions when they are not pressured by competitive forces (Bertrand and Mullainathan (2003)). Hence, accommodated managers in noncompetitive industries may avoid FDI to limit their risk exposure, even if FDI could boost their returns, whereas with stiffer competition, managers are taken outside their comfort zone. For instance, intense competition reduces profit margins (Xu (2012)) and calls for efficiency improvements (Nickell (1996)). Thus, firms under competitive threats may see FDI as advantageous for exploring new opportunities in foreign markets. Evidence suggests that FDI enables firms to diversify consumer demand; enhance competitiveness, efficiency, and productivity; and improve financial performance (Doukas and Travlos (1988), Morck and Yeung (1991), Helpman et al. (2004), and Navaretti, Castellani, and Disdier (2010)). Thus, I also consider an alternative channel through which competition can stimulate FDI.

B. The Effects of Product Market Competition on FDI Location Decisions

MNEs decide where to locate FDI by evaluating the attractiveness of host countries based mostly on economic and institutional factors. Firms assess the benefits and costs of the candidate locations and invest in the country where the expected profitability of the foreign investment is maximized. Guided by the international economics literature, I discuss locational advantages, their benefits, costs, and risks, and if and how they potentially interact with competition.

1. Market Access

Gaining access to foreign markets is a core motive for undertaking FDI (Cheng and Kwan (2000)). Firms typically pursue market-seeking (horizontal) investments when foreign markets are large and when trade barriers (e.g., tariffs) are high enough to make exporting unprofitable (Helpman et al. (2004)). Market size is a strong signal of market attractiveness in terms of allowing firms to service a broader consumer base (Markusen and Venables (1998)), and diluting investment costs by gaining economies of scale (Markusen (2004)). Empirically, a positive sensitivity of location choice to foreign market size has been linked with horizontal integration strategies aimed at market-seeking FDI.

While foreign market access is a core FDI motive, how it might relate to domestic product market competition is theoretically ambiguous. On the one hand, the stiffer the degree of competition that firms face in their home market, the more important it may become to diversify product market risk by accessing new markets, thus alleviating the severe competitive pressure from home rivals, and gaining more product market flexibility as a strategic option. On the other hand, a larger market size, although a proven proxy for capturing firms' market access intentions,

could in principle allow for a better diversification potential regardless of whether firms face stiffer or softer competition in their domestic markets. Hence, the interaction of domestic competition with foreign market size seems an open empirical question to be explored, with no clear prediction ex ante.

2. Productivity and Efficiency Gains

Productivity in the host economy is another important driver of FDI. Evidence suggests that locations with higher productivity typically receive more FDI (Cheng and Kwan (2000)). Higher country productivity signals that firms can achieve higher output quantity and quality, enhancing foreign affiliates' performance (Braconier, Norback, and Urban (2005)). Highly productive host economies may be attractive locations, particularly for firms operating under higher product market competitive threats. To be able to thrive against competitive rivals, firms need to constantly improve their productivity levels (Nickell (1996)); therefore, the higher the productivity level achievable via foreign investment, the better the firms' prospects of superior performance and survival. Furthermore, firms can reap productivity and knowledge spillovers by colocating with peer firms in foreign economies (Head et al. (1995)), with the gains from FDI potentially feeding back as improvements in domestic operations (Desai and Dharmapala (2009)). Thus, I test whether firms operating in more competitive industries prefer locations with higher productivity where they can enhance the quantity and quality of the output and revenues of foreign affiliates as a conduit for organizational improvement.

Apart from productivity improvements, there are alternative ways in which firms can gain efficiency by investing abroad. Keeping output constant while lowering factor costs can also boost efficiency. Considering that competition incentivizes firms to rationalize costs (Raith (2003)), I explore the interactions of competition with two relevant production factors: labor and natural resources. Evidence indicates that MNEs are more likely to locate themselves in countries with cheaper labor costs (typically when conducting investments of a vertical nature), especially when pursuing unskilled labor for low value-added productive activities (Carr, Markusen, and Maskus (2001), Braconier et al. (2005)). Furthermore, obtaining natural resources at a lower cost is an important motivation for conducting FDI (Cheng and Kwan (2000)). Hence, I further test whether firms operating under stronger competitive pressure may favor locations where they can minimize the costs of labor and of natural resource extraction.

3. Taxation Economies

Taxation is another core source of the economic gains MNEs may achieve via FDI. For instance, Wheeler and Mody (1992) note that governments compete in global tournaments for FDI, with taxes being a pivotal incentive for foreign firms. When choosing locations, firms compare the post-tax profitability of investments (Devereux and Griffith (1998)). As a result, firms are increasingly locating themselves in low tax jurisdictions (Arulampalam, Devereux, and Liberini (2019)). The sensitivity of FDI to corporate taxation varies across firms. A growing body of literature emphasizes multinational firms' heterogeneous responses to taxation (Haufler and Stahler (2013)). Theoretical work by Krautheim and Schmidt-Eisenlohr (2011) suggests that international tax competition and the associated benefits

of tax shifting are stronger in economies with higher degrees of substitutability between goods in product markets. Thus, product market competition can work as a conduit for the sensitivity of FDI location to corporate taxes abroad.

Furthermore, Cai and Liu (2009) show that firms operating in more competitive industries are more likely to minimize their tax burdens by engaging in tax avoidance activities. As the authors argue, if managers' pay-off functions are increasing in firm value, competitive pressure forces managers to reduce tax exposure to compensate for the pressure competition places on profitability. I test another channel in which firms operating under stiffer market rivalry may favor locations with lower corporate taxes even more strongly.

III. FDI Proclivity Analyses

My analyses employ data in two formats. First, to examine the effects of competition on the proclivity to undertake FDI (Section III), I create a firm-level data set merging counterfactual firms that do not record FDI activity into my FDI database. The *FDI Proclivity* data set features firms' competition and financial data, allowing me to test how competition affects firms' decision to go abroad. Second, to examine how competition affects the location of FDI (Section IV), I build a project-level data set. Naturally, this data set includes only the firms that have decided, in the first stage, to undertake FDI since only firms that engage in FDI bother to make the decision of where to locate their investments. The *FDI Location* data set features firm-level competition measures and country-level variables, enabling me to test how product market competition affects the sensitivity of FDI location choice to country-level locational advantages and costs.

A. Data and Variables

I obtain my FDI data from fDi Markets: Cross-Border Investment Monitor. The fDi Markets database is a data service from *The Financial Times* that provides granular project-level FDI data covering cross-border greenfield announcements monitored in real time in all countries and industrial sectors. I can gauge detailed information from the data about announced FDIs, such as the identification of the investing firms and their industries, the year, and the geographic location of the investments. The database has been employed in several studies in the empirical FDI literature. For instance, the survey article by Nielsen, Asmussen, and Weatherall (2017) positions the fDi Markets database among the most used data sources in FDI research (see, e.g., Desbordes and Wei (2017), Castellani and Lavoratori (2020), Belderbos, Park, and Carree (2021), and Crescenzi, Ganau, and Storper (2022)). Furthermore, the database has also featured in relevant policy analysis. For instance, The United Nations uses data from fDi Markets to show announced greenfield FDI projects in prestigious publications such as *World Investment Report 2021.* Thus, my FDI data are from a highly trustworthy source.

Two features of my research design merit discussion. The first is my choice to work with manufacturing FDI. In the context of the risk-taking incentives created by competitive forces, industrial investments are more informative about the extent to which firms incur severe risks abroad, since manufacturing FDI requires sizable

investments (sunk costs), generating output in the host economy where local agents may exert stronger influences over production and cash flows. For instance, Janeba's (2002) findings suggest that industrial plants are quite sensitive to country risk, whereas investments carrying lower sunk costs are relatively more footloose. Furthermore, the underlying trade theory upon which the FDI literature builds applies largely to industrial investments (Guimaraes, Figueiredo, and Woodward (2004)). The second feature that merits discussion is working with greenfield FDI. Unfortunately, the fDi Markets data set does not record mergers and acquisitions. However, it is noteworthy that most papers in the empirical FDI literature have focused either on greenfield investments (e.g., see Duanmu (2014)) or on mergers and acquisitions (for instance, see Cao, Li, and Liu (2019)). Focusing on one or the other type of FDI has not limited the importance or contributions of these studies to the literature.

My analysis covers industrial (manufacturing) greenfield FDI projects located in 78 host economies between 2003 and 2019. In total, I collect data on 3,540 unique FDI projects.[1] Table 1 shows descriptive statistics for the *FDI Proclivity* data set (a summary with variable definitions is presented in the Appendix).[2] Following the merging of FDI doers with firms that do not record FDI activity, the data set boasts 3,867 firms, of which 485 (about 12% of firms) are FDI doers that record at least one instance of FDI in the sample period. This pattern is consistent with stylized evidence suggesting that only a limited number of firms become multinationals by shifting production abroad (Helpman et al. (2004)).

The dependent variable in my first analysis is FDI proclivity (abbreviated as FDI_{it}), which is equal to 1 if firms record at least one instance of FDI in any given year, and equal to 0 otherwise. The mean value of the variable FDI is 0.049, suggesting that slightly less than 5% of firms record at least one productive FDI project every year.

The main firm-level independent variable is product market Fluidity ($FLUIDITY_{it}$). FLUIDITY is calculated using text-based information extracted from firms' 10-K filings, capturing changes in rival firms' products relative to the firm's products by looking at overlaps in product description vocabularies (Hoberg et al. (2014)). Higher degrees of product market FLUIDITY signal that firms face stronger product market competitive threats from industry rivals, meaning they need to compete in a more dynamic, fast-changing product marketplace.

[1]My sampling process is as follows: I extract from the fDi Markets data set all the manufacturing FDI projects that originated in the United States. I then match the firms undertaking the FDI with their GVKEY codes for public companies in the COMPUSTAT database, which leaves me with about 4,200 FDI projects. I then match firms' GVKEYS with competition data from Hoberg et al. (2014), resulting in 3,540 matched projects, accounting for about 80% of all projects by U.S. listed firms.

[2]Industry-level summary statistics are reported in the Supplementary Material. The industries with the largest FDI numbers are Chemical Products (738), Transport Equipment (551), Industrial Machinery (418), Electronics (348), and Food (319). Industries where product market competitive threats seem more pronounced, reflected by higher Fluidity levels, include Chemical Products (10% on average), Oil and Gas (10% on average), Engineering Equipment (7% on average), and Measurement and Precision Equipment (8% on average). In certain industries, FDI is noticeably more frequent. For instance, 53% of firms in the Transportation Equipment industry record at least one instance of FDI in the sample period, about 32% of firms in the Industrial Machinery industry report FDI activity, and 72% of firms in the Tobacco industry also report substantial FDI activity.

TABLE 1

Summary Statistics: FDI Proclivity Data Set

Table 1 presents summary statistics for the full sample employed in the FDI Proclivity analyses (firm-level yearly data from 2003 to 2019). Refer to the Appendix for variable definitions, interpretations, and sources of data.

Variable	Mean	Std. Dev.	25th Percentile	50th Percentile	75th Percentile	*N*
FDI (0/1)	0.049	0.215	0.000	0.000	0.000	32,735
FLUIDITY	7.059	3.738	4.301	6.244	9.023	32,735
HHI_INDEX	0.296	0.278	0.096	0.181	0.406	32,734
EBIT_ASSETS	−0.055	0.409	−0.064	0.051	0.106	32,735
TOBINS_Q	2.009	2.174	0.897	1.387	2.352	32,735
ln(TOTAL_ASSETS)	6.031	2.181	4.421	5.946	7.556	32,735
SALES_PPE	12.707	26.022	2.388	5.723	11.833	32,735
COGS_ASSETS	0.616	0.586	0.218	0.464	0.824	32,735
LT_DEBT_MARKET_CAP	0.345	1.000	0.000	0.078	0.308	32,735
PPE_ASSETS	0.231	0.236	0.059	0.140	0.317	32,735
PPE_EMPLOYEES	403.171	1,384.602	18.966	41.218	106.032	32,735
TAXES_SALES	0.006	0.014	0.000	0.000	0.007	32,735
RD (0/1)	0.730	0.444	0.000	1.000	1.000	32,735
CASH_ASSETS	0.259	0.257	0.052	0.166	0.405	32,735
MAXBEN	455.015	131.172	378.000	450.000	493.500	32,735
Δ ln(MAXBEN)	0.018	0.033	0.000	0.000	0.032	30,447
RTWVD	103.026	10.673	96.365	104.199	111.017	32,735
ln(SALES_COGS) (UK 3-SIC)	1.307	0.701	0.699	1.162	1.980	29,305
IMPORT_PENETRATION	0.167	0.209	0.024	0.082	0.221	25,214

FLUIDITY uses the following word spaces in the calculations: the firm's own product vocabulary, and the change in the industry's vocabulary. The more the firm's product vocabulary overlaps with changes in the industry's vocabulary, reflecting rivals' actions, the higher the FLUIDITY. This variable has been employed in several recent empirical studies analyzing various dimensions of product market competition (e.g., Li, Lu, and Phillips (2019), Li and Zhan (2019), and Morellec and Zhdanov (2019)). A pertinent advantage of FLUIDITY over traditional competition measures (such as industry concentration ratios) is that it encapsulates firm-specific information, providing a more granular identification of the competitive threats faced by firms, as opposed to coarser industry aggregate information captured by concentration measures, such as the Herfindahl–Hirschman index (HHI).

The sample mean of FLUIDITY is 7.06 (a statistic very close to the 6.93 mean reported by Hoberg et al. (2014) in the study where the authors first developed the metric)). This mean value of FLUIDITY suggests that there is an average overlap of 7% in the vocabulary of firms with respect to changes in the vocabulary of industry rivals. FLUIDITY is around 4.3 for firms facing lower levels of product market competition (within the 25th percentile), whereas FLUIDITY goes up to 9.0 for firms exposed to higher levels of competition (75th percentile).

The remaining variables in Table 1 are the controls. Following the corporate investment literature, I include several control variables known to affect how firms allocate capital. I also control for firm characteristics that may affect firms' proclivity to engage in FDI. I control for operating profits (EBIT_ASSETS) (Huson, Malatesta, and Parrino (2004)), as the investment may show a positive sensitivity to internal funds (Lang, Ofek, and Stulz (1996)) and more profitable firms can also be more likely to engage in FDI (Dunning (1980)). I also control for growth opportunities (TOBINS_Q), given the positive effect of growth opportunities on corporate investment decisions (Ahn, Denis, and Denis (2006)). I include firm size (ln

(TOTAL_ASSETS)) to account for a potentially higher proclivity of larger firms to engage in FDI (Markusen (2004)) and for output efficiency (ln(SALES_ PPE)) (Laeven (2003)), as firms with higher output invest more and are also more likely to undertake FDI (Yeaple (2009)). Given that the potential for cost reduction can be a motive to go abroad (Helpman et al. (2004), Braconier et al. (2005)) and that competition can also affect the incentives to minimize costs (Raith (2003)), I control for firms' costs too (ln(COGS_ASSETS)) (Roychowdhury (2006)).

I control for the effect of debt on investment (Lang et al. (1996)) by using leverage (LT_DEBT_MARKET_CAP) (Agrawal and Matsa (2013)). Firms with a higher proportion of fixed assets can be more prone to engage in FDI; hence, I control for asset tangibility (PPE_ASSETS). Furthermore, the reliance of firms' production function on more capital or labor may also affect the motivation to produce abroad (Tomiura (2007)); therefore, I control for capital–labor ratios (ln (PPE_EMPLOYEES)). To account for the role of tax savings in propelling firms to undertake FDI (Morck and Yeung (1991)), I control for firms' taxation costs (TAXES_SALES). As firms with a stronger base of intangible assets are more prone to engage in FDI (Dunning (1980)), I control for research and development expenditures (RD), defined as a dummy equal to 1 if firms conduct research and development in any given year, and equal to 0 otherwise.

Table 2 reports comparative descriptive statistics between firms that do not engage in FDI (nondoers, for which FDI proclivity = 0) and firms that do engage in FDI (FDI doers, for which FDI proclivity = 1). FLUIDITY is significantly lower for firms that undertake FDI (5.3) than for firms that do not engage in FDI (7.1). Along the same lines, I see that FDI doers typically operate in more concentrated industries (based on the HHI concentration index), compared to nondoers. Such differences may provide an early indication that firms exposed to stiffer competition are less likely to go abroad. Furthermore, the analysis suggests that FDI doers and nondoers have systematically different characteristics. For instance, firms that engage in FDI, when compared to their counterparts that do not, are typically more profitable, larger, use more leverage, have higher asset tangibility, and are more likely to invest in research and development. With such pronounced observable differences

TABLE 2

Comparative Descriptive Statistics Based on FDI Activity

Table 2 shows comparative descriptive statistics based on FDI activity. For each variable, the table reports the mean for FDI doers (FDI = 1) and for nondoers (FDI = 0), the difference in means across the two groups, the *t*-test, and the *p*-value of the test.

Variables	FDI = 0	FDI = 1	Difference	*t*-Statistic	*p*-Value
FLUIDITY	7.145	5.375	1.770	25.016	0.000
HHI_INDEX	0.294	0.338	−0.044	−6.4879	0.000
EBIT_ASSETS	−0.062	0.095	−0.158	−47.029	0.000
TOBINS_Q	2.033	1.535	0.498	15.749	0.000
ln(TOTAL_ASSETS)	5.897	8.647	−2.749	−58.325	0.000
SALES_PPE	13.084	5.342	7.742	41.033	0.000
COGS_ASSETS	0.612	0.693	−0.081	−6.501	0.000
LT_DEBT_MARKET_CAP	0.339	0.446	−0.106	−3.811	0.000
PPE_ASSETS	0.229	0.250	−0.020	−5.463	0.000
PPE_EMPLOYEES	415.451	163.891	251.559	18.597	0.000
TAXES_SALES	0.005	0.010	−0.004	−11.130	0.000
RD (0/1)	0.721	0.889	−0.167	−20.334	0.000
CASH_ASSETS	0.265	0.132	0.133	39.827	0.000

between FDI doers and nondoers, it seems plausible to assume that unobservable differences may also play a role in FDI decisions. Therefore, absorbing unobserved heterogeneous effects is of paramount importance in my empirical examination, which is why I employ firm fixed effects when estimating my regression models.

B. Empirical Model

To examine the effect of competition on firms' proclivity to engage in FDI, I employ a LPM to predict the likelihood that firms will undertake FDI. The dependent variable is the proclivity to conduct FDI (FDI_{it}), whereas the main explanatory variable is competition ($FLUIDITY_{it}$). The model includes a vector of control variables (X'_{it}), as specified in Section III.A, plus firm (α_i) and year (τ) fixed effects. Following guidance from the international economics literature examining the firm-level determinants of FDI decisions (e.g., Chen and Moore (2010)), I cluster standard errors at the firm level.

My choice of the LPM is grounded in the literature. For instance, Fan, Lin, and Tang (2018) employ an LPM to investigate Chinese firms' FDI decisions. Furthermore, my choice reflects the econometric challenges posed by my specific empirical setup. As previously discussed, in addition to observable differences between FDI doers and nondoers (which are absorbed by the controls), unobserved firm heterogeneity may also affect FDI decisions; thus, my analysis requires firm fixed effects to mitigate omitted variable bias. Among the many discrete choice models that could fit my setup, the LPM is mostly suitable since unobserved heterogeneity is likely to present (Angrist and Pischke (2009)). Moreover, since I rely on interactions to tease out heterogeneous effects across firms, the LPM provides a clearer reading of the resulting marginal effects when compared to nonlinear models (such as logit or probit).

While controlling for observable and unobservable effects effectively mitigates estimation problems induced by omitted variables, causality issues may persist given that FDI decisions and competition are potentially endogenously determined. For instance, it is plausible to conjecture that, as firms engage in FDI, this process might affect their industries' prevailing competitive structures. To address causality issues, I estimate my models via instrumental variables. In my baseline models, I develop two instrumental variables at the state level. For robustness, later in the article, I employ a variety of additional instruments measured at different levels.

First, I employ state-level unemployment insurance benefits as an instrument. When governments provide insurance to workers, they absorb downside risk on behalf of firms, which in turn stimulates corporate risk-taking (Vannoorenberghe (2014)). Indeed, evidence confirms that more generous unemployment insurance benefits can trigger riskier policies, such as stronger entrepreneurial activity (Hombert et al. (2020)), higher financial leverage (Agrawal and Matsa (2013)), higher innovation activity (Griffith and Macartney (2014)), and shifts in labor supply toward riskier and more entrepreneurial firms (Doornik, Fazio, Schoenherr, and Skrastins (2021)). With firms keen to take on more risk given that lay-off costs are buffered by governments, competition likely intensifies, in principle satisfying the relevance condition. Since unemployment benefits are set at the policy level, the

instrument is plausibly exogenous to firms' product market strategies and FDI decisions. I employ the variable $\Delta \ln(\text{MAXBEN})_{st}$, which captures increases in the maximum unemployment insurance benefits (UIB) payments prevailing in the state where the firms are headquartered, as an instrumental variable for FLUIDITY. The data are from the Department of Labor. I expect that increases in the maximum UIB payments should lead to intensification in local competition, which is reflected in higher FLUIDITY.

My second instrument follows the literature on competition and exchange rates. This literature suggests that exchange rate appreciation affects the competitive structure of local markets (Baldwin and Krugman (1989), Dixit (1989), Silva and Leichenko (2004), and Cuñat and Guadalupe (2005)). In principle, there could be two effects on competition. First, Cuñat and Guadalupe (2005) suggest that as the local currency appreciates, this gives foreign firms an edge, as they become relatively more competitive than local firms, since their products become relatively cheaper. Such appreciation induces a fall in barriers to entry, thus enhancing competition from foreign imported products. Second, a stronger local currency makes exports by local firms to foreign markets less competitive as the relative price of exported goods increases (Silva and Leichenko (2004)). A plausible potential consequence is that firms sell more of their products locally, crowding the local market, thus increasing competition. Hence, local currency appreciation may exert pro-competitive effects through both channels.[3]

The reasoning I apply to my case is that when the dollar value appreciates in a firm's state, this causes a sudden change in the relative prices between U.S. manufacturers producing in the state and foreign producers. This argument is in line with Silva and Leichenko (2004), who employ state exchange rates to study the competitive effects of currency values on regional inequalities. Empirically, I further instrument FLUIDITY with the variable $\ln(\text{RTWVD})_{st}$, which is the natural log of the indexes measuring the Real Trade-Weighted Value of the Dollar by state, obtained from the Federal Reserve (FRED). These indexes calculate the inflation-adjusted value of the U.S. dollar against the currencies of countries with which the state trades. Since exchange rates are determined by the outcome of decentralized trading that is barely affected by the actions of individual firms, their appreciation causes an exogenous change in product market competition (Cuñat and Guadalupe (2005)). I anticipate that increases in RTWVD (i.e., an appreciation in the value of states' trade-weighted dollar) should render product market competition fiercer, which in turn is reflected in higher FLUIDITY.[4]

The equations (1) and (2) shown next specify my instrumental variables model, estimated via 2-stage least squares (2SLS). In the first stage, I regress FLUIDITY_{it} against the instruments. In the second stage, I employ $\widehat{\text{FLUIDITY}}_{it}$ instrumented by $\Delta \ln(\text{MAXBEN})_{st}$ and by $\ln(\text{RTWVD})_{st}$ (both collected in vector Z'_{st}) as the explanatory variable in an equation in which FDI_{it} is the dependent variable

[3]Logically, products not exported can also be sold in other U.S. states, so theoretically the imports channel could possibly be stronger.

[4]The competitive effects of exchange rates have been examined both at the state (e.g., Silva and Leichenko (2004)) and at the industry (e.g., Cuñat and Guadalupe (2005)) levels. Given the closer link of my paper with the economic geography literature, I decide to focus on the spatial dimension and choose state-level exchange rates as my preferred instrument for the intensity of local competition.

$$\text{FLUIDITY}_{it} = \pi' Z'_{st} + \delta' X'_{it} + \alpha_i + \tau + v_{it}, \tag{1}$$

$$\text{FDI}_{it} = \beta \widehat{\text{FLUIDITY}}_{it} + \gamma' X'_{it} + \alpha_i + \tau + \epsilon_{it}. \tag{2}$$

To probe the correct specification and reliability of my model, I conduct several tests. First, whether competition and FDI proclivity are indeed endogenous to merit instrumentation is a conjecture that requires testing, since the 2SLS estimator is less efficient than OLS when the explanatory variable of interest is rather exogenous. To this end, I employ the endogeneity test proposed by Hausman (1978). The null hypothesis of the test is that the suspected endogenous variables can be treated as exogenous. Thus, rejecting the null hypothesis provides evidence that the OLS estimates are inconsistent and, therefore, that the 2SLS estimator is appropriate.

Second, I scrutinize the relevance and strength of the instruments using two tests proposed by Kleibergen and Paap (2006). The under-identification test assesses whether the excluded instruments are relevant (i.e., whether they explain the suspected endogenous variable). The null hypothesis of the test is that the equation is under-identified; thus, rejecting the null hypothesis provides evidence in support of the relevance of the instruments. The weak-identification test has a null hypothesis of weak instruments (i.e., the instruments are poorly correlated with the suspected endogenous variable). Hence, rejecting the null hypothesis of the test provides support for strong identification. Third, I test for over-identifying restrictions by employing Hansen's *J* test (Cameron and Trivedi (2010)). The null hypothesis of the test is that the over-identifying restrictions are valid. Thus, accepting the null hypothesis provides evidence of suitable specification and validity of the instrumental variables model.

C. Instrumental Variables Results

The instrumental variables estimation results are reported in Table 3. Column 1 shows the first-stage results, in which FLUIDITY is the dependent variable and the state instruments (Δln(MAXBEN) and ln(RTWVD)) are the main explanatory variables.[5] Both state instruments exert strongly significant and positive effects on FLUIDITY. Thus, more generous unemployment insurance benefits and appreciations of the dollar are both associated with intensification in product market competition, in line with my expectations.

The second-stage results are shown in column 2 of Table 3. FLUIDITY (instrumented by the IVs) exerts a strongly significant and negative effect on the proclivity to conduct FDI (p-value < 0.01). The regression coefficient capturing the effect of FLUIDITY is equal to -0.045, indicating that a 1-unit increase in FLUIDITY is associated with a reduction of about 4.5 percentage points in the probability of firms undertaking FDI, which seems an economically meaningful effect.

Panel B of Table 3 reports the identification tests. I reject the null hypothesis of the Hausman test. Thus, the IV model is consistent and more suitable than OLS (which is inconsistent). I reject the null hypotheses of the Kleibergen–Paap

[5]I show summary statistics (per state) for the state instruments in the Supplementary Material.

TABLE 3

Competition and FDI Proclivity: Instrumental Variables Estimates

Panel A of Table 3 reports the results of instrumental variables regressions estimated via linear probability models (LPM). FDI (a variable equal to 1 if firms undertake FDI in year *t*, and equal to 0 otherwise) is modeled as a function of FLUIDITY (competition) instrumented by ΔIn(MAXBEN) (state-level unemployment insurance benefits) and by In(RTWVD) (the natural log of Real Trade-Weighted Dollar Value). Column 1 reports first-stage results, whereas column 2 shows second-stage results. All models include a vector of control variables: EBIT_ASSETS (operating profits), TOBINS_Q (growth opportunities), In(TOTAL_ASSETS) (size), In(SALES_PPE) (output efficiency), In(COGS_ASSETS) (cost structure), LT_DEBT_MARKET_CAP (leverage), PPE_ASSETS (tangibility), In(PPE_EMPLOYEES) (capital-labor ratio), TAXES_SALES (taxation), and RD (innovation). The models include firm and year fixed effects. Panel B reports identification tests (endogeneity, under-identification, weak-identification, and over-identifying restrictions). Robust standard errors clustered at the firm-level are shown in parenthesis below the coefficients. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Instrumental Variables Estimation

	Dependent Variable	
	FLUIDITY	FDI (0/1)
Stage	First	Second
	1	2
ΔIn(MAXBEN)	1.405***	
	(0.339)	
In(RTWVD)	3.325***	
	(0.888)	
FLUIDITY (instrumented)		−0.045***
		(0.017)
EBIT_ASSETS	−0.205***	−0.016***
	(0.079)	(0.006)
TOBINS_Q	−0.005	−0.000
	(0.009)	(0.001)
In(TOTAL_ASSETS)	0.193***	0.025***
	(0.043)	(0.005)
In(SALES_PPE)	−0.179***	−0.004
	(0.032)	(0.003)
In(COGS_ASSETS)	0.077**	0.008***
	(0.037)	(0.002)
LT_DEBT_MARKET_CAP	0.094***	0.005**
	(0.022)	(0.002)
PPE_ASSETS	−0.049	0.035
	(0.312)	(0.025)
In(PPE_EMPLOYEES)	−0.011	−0.004
	(0.046)	(0.004)
TAXES_SALES	0.140	0.282**
	(1.296)	(0.128)
RD (0/1)	0.224*	0.009
	(0.134)	(0.010)
Firm and year fixed effects	Yes	Yes
Model significance (*F*-test) (*p*-Value)	0.000	0.000
N	30,211	30,211

Panel B. Identification Tests

	Null Hypothesis	Test Statistic (*p*-Value)
Endogeneity (Hausman)	H0: FLUIDITY is exogenous	Chi-sq = 9.584 (0.002)
Under-identification (Kleibergen–Paap)	H0: Instruments are irrelevant	Chi-sq = 27.342 (0.000)
Weak-identification (Kleibergen–Paap)	H0: Instruments are weak	*F* = 13.138 (0.000)
Over-identifying restrictions (Hansen's *J*)	H0: Instruments are valid	Chi-sq = 1.473 (0.224)

under-identification and weak-identification tests. Hence, the instruments are relevant, and identification is strong. I accept the null hypothesis of Hansen's *J* over-identifying restrictions test, corroborating the validity of the instruments.

Next, I briefly comment on the coefficients of the control variables. I find that the variable EBIT_ASSETS (operating profit) has a significant and negative association with FDI proclivity, suggesting that less profitable firms are more likely to

engage in FDI (I revisit this relationship in Section III.D, in which I test if competition exerts heterogeneous effects). Although I do not find any significant effect of TOBINS_Q (growth), I see a positive effect of ln(TOTAL_ASSETS), indicating that larger firms are significantly more likely to conduct FDI, in line with the extant trade literature (Markusen (2004)). I find no initial evidence that ln(SALES_PPE) (output efficiency) affects FDI proclivity, which is at odds with evidence in the literature suggesting otherwise (I also revisit this result in Section III.D).

Consistent with the view that firms may envisage cost reduction when undertaking FDI (Helpman (2006)), I find a significant and positive association between ln(COGS_ASSETS) (costs) and FDI proclivity (I also reexamine this relationship shortly after). I find a significant and positive effect of LT_DEBT_MARKET_CAP (leverage) on the proclivity to undertake FDI, suggesting that access to debt finance enables firms to conduct FDI. Consistent with the view that firms envisage tax savings when engaging with FDI (Wheeler and Mody (1992)), I find a positive effect of TAXES_SALES, suggesting that firms incurring higher taxation show higher FDI proclivity. However, I do not find any significant effects of PPE_ASSETS (asset tangibility), ln(PPE_EMPLOYEES) (capital–labor), or RD (research and development).

D. Heterogeneous Effects: Exploring Potential Channels

The findings in Table 4 explore several channels potentially conveying the effects of competition on FDI proclivity via interactions. To obtain consistent inferences from the interaction models, I extrapolate the estimates from my IV model. I save the fitted values of FLUIDITY obtained in the first-stage and bring them forward in the second-stage in which FLUIDITY (instrumented by the IVs) is interacted with firm characteristics (the solution I adopt follows a concept similar to the approach proposed by Aivazian, Ge, and Qiu (2005)).[6]

The findings in column 1 of Table 4 explore the interaction of FLUIDITY with ln(COGS_ASSETS) (costs). One channel through which competition exerts managerial discipline is cost diligence (Raith (2003)). Given the costly and irreversible nature of FDI, one could expect competition to exert a particularly stronger deterrent effect on FDI when firms bear a more costly operational structure. On the other hand, as FDI is also a potential channel for cost reductions, the interaction could also go the other way. I find a significantly negative interaction, suggesting that competition has a stronger negative impact on FDI proclivity the higher firms' costs are. This evidence indicates that as firms strive to minimize costs to survive competition, such disciplinary effects reduce firms' proclivity to commit resources to important investments like FDI.

In column 2 of Table 4, I interact FLUIDITY with TOBINS_Q (growth). Akdoğu and MacKay (2008) show that competition makes investment more sensitive to growth opportunities, so I test whether this is also the case with FDI. On the other hand, it could also be that firms enjoying lower growth may be those more

[6]I choose this indirect approach because I have multiple instruments for FLUIDITY. Another possible solution that typically produces similar results is to instrument both the candidate endogenous variable and its interactions directly.

TABLE 4

Heterogeneous Effects: Theoretical Channels

Table 4 reports the results of linear probability models with interactions between FLUIDITY AND 1 ln(COGS_ASSETS), 2 TOBINS_Q, 3 HIGH_SALES_PPE (Q3 of the distribution), 4 EBIT_ASSETS, and 5 CASH_ASSETS. FLUIDITY is predicted (instrumented) by Δln(MAXBEN) and by ln(RTWVD). The interacting covariates are lagged by one period to tease out the transmission channels. All models include the same vector of control variables as reported in Table 3, firm, and year fixed effects. Robust standard errors clustered at the firm level are shown in parenthesis below the coefficients. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable: FDI (0/1)				
	1	2	3	4	5
FLUIDITY (predicted by the IVs)	−0.051*** (0.015)	−0.047*** (0.015)	−0.050*** (0.015)	−0.041*** (0.014)	−0.050*** (0.015)
FLUIDITY × ln(COGS_ASSETS) [$t-1$]	−0.011*** (0.003)				
FLUIDITY × TOBINS_Q [$t-1$]		0.003** (0.001)			
FLUIDITY × HIGH_SALES_PPE [$t-1$]			0.039*** (0.008)		
FLUIDITY × EBIT_ASSETS [$t-1$]				−0.028*** (0.006)	
FLUIDITY × CASH_ASSETS [$t-1$]					0.056*** (0.014)
ln(COGS_ASSETS) [$t-1$]	0.082*** (0.023)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)
TOBINS_Q [$t-1$]	0.000 (0.000)	−0.019** (0.008)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
HIGH_SALES_PPE [$t-1$]	0.003 (0.004)	0.003 (0.004)	−0.271*** (0.060)	0.003 (0.004)	0.003 (0.004)
EBIT_ASSETS [$t-1$]	−0.007*** (0.003)	−0.008*** (0.003)	−0.008*** (0.003)	0.193*** (0.044)	−0.007*** (0.003)
CASH_ASSETS [$t-1$]					−0.403*** (0.100)
Additional control variables	Yes	Yes	Yes	Yes	Yes
Firm and year fixed effects	Yes	Yes	Yes	Yes	Yes
Model significance (p-value)	0.000	0.000	0.000	0.000	0.000
N	28,397	28,397	28,397	28,397	28,397

likely to expand abroad when competition at home is intense to escape from rivals. Although the coefficient of FLUIDITY remains significantly negative, I find a significantly positive interaction with TOBINS_Q, whereas the coefficient of TOBINS_Q turns significantly negative as I account for the interaction. These coefficients suggest that competition and growth opportunities moderate each other's effects. The negative effect of competition on FDI proclivity seems weaker for firms with stronger growth opportunities, whereas growth opportunities seem to have a negative impact on FDI proclivity when competition is low but, as competition intensifies, high-growth firms become more likely to go abroad. These findings may indicate that exploring new markets abroad is a viable option for high-growth firms when local competition is intense.

In column 3 of Table 4, I interact FLUIDITY with the variable HIGH_SALES_PPE (a dummy = 1 for firms at the third quartile of SALES_PPE's distribution, and equals 0 if below). I find a significantly positive interaction, indicating that the negative effect of competition on FDI proclivity is weaker (stronger) for more (less) efficient firms. This interaction uncovers an interesting channel in which, as predicted by trade studies, more efficient firms are more likely to engage in FDI (Yeaple (2009)), however, this effect kicks in when firms face

stronger competition. Since competition stimulates organizational improvement (Nickell (1996)), such findings suggest that firms undergoing stronger competition see FDI as an opportunity for productive gains (I revisit this when examining FDI location choices (Section IV)).

Next, I investigate the role of profitability. On the one hand, competition may exert a negative effect on FDI proclivity through a profitability channel, since firms earn lower margins in more competitive markets, and this in turn may affect risk-taking and the resources available for further investment. On the other hand, firms with poorer profitability may be exactly those in greater need of exploring opportunities abroad to improve their financial performance. Empirically, in column 4 of Table 4, I find a significantly negative interaction of FLUIDITY and EBIT_ASSETS, which indicates that competition has a stronger (weaker) deterrent effect on FDI proclivity when firm profitability is higher (lower). Interestingly, as I account for the interaction, the coefficient of EBIT_ASSETS turns significantly positive, in line with the well-known positive sensitivity of investment to internal funds. These findings suggest that if competition is weak, then FDI shows a positive response to profitability but, as competition intensifies, it is low-profitability firms that look more into venturing abroad, potentially to improve their returns and financial position. This seems aligned with the notion that financially troubled firms may be more willing to take risks (Bowman (1982)).

Finally, I examine the role of CASH_ASSETS (financial slack). Evidence suggests that when firms face intense competition, they adopt more conservative financing policies, such as holding more cash as a cushion to safeguard investments in case competitive threats materialize (Frésard (2010), Hoberg et al. (2014)). I test whether financial slack helps firms preserve their foreign investments when the competition escalates. In column 5 of Table 4, I find a significantly positive interaction of FLUIDITY and CASH_ASSETS, suggesting that the negative effect of competition on FDI proclivity is weaker for firms with more financial slack. Thus, when firms face stiffer competition, those in healthier financial conditions seem more likely to go abroad than those with scant cash reserves.

E. Dynamic LPM (GMM)

I estimate a Dynamic LPM (DLPM) via Generalized Method of Moments (GMM). This alternative estimation is important to confer reliability on my estimations because it is motivated by several factors. FDI decisions may be affected by prior experience abroad. For instance, evidence suggests that firms acquire knowledge about how to deal with foreign risks as they gain more FDI experience (Oetzel and Oh (2014)). Furthermore, firms may incur sizable sunk costs when going abroad (Turco and Maggioni (2013), Aeberhardt, Buono, and Fadinger (2014)). Consistent with this logic, DLPM has been employed in the international economics literature to capture persistence in internationalization decisions (e.g., Aeberhardt et al. (2014)). Thus, it seems appropriate to test models in which I can control for past FDI proclivity. Since my LPM model also requires firm fixed effects, the most suitable model is the GMM DLPM, since it can accommodate both the lagged dependent variable and the firm fixed effects.

I estimate the DLPM using two proxies for competition. First, I use the variable HHI_INDEX (the Herfindahl–Hirschman index) as a proxy for industry market share concentration (which is negatively associated with competition). Second, I test the DLPM with FLUIDITY as well. I employ the Arellano–Bond GMM model (Arellano and Bond (1991), Greene (2012)) to estimate the following equation:

$$\text{FDI}_{it} = \delta \text{FDI}_{it-1} + \beta \text{COMPETITION}_{it} + \gamma' X'_{it} + \alpha_i + \tau + \epsilon_{it}. \quad (3)$$

Akin to the GMM procedure, equation (3) is estimated in first differences, which deals with the firm fixed effects. Both lagged FDI proclivity and the competition variables are modeled as endogenous variables in the GMM procedure, thus entering the model instrumentalized by GMM-style instruments (lagged levels).[7] Table 5 shows the results.

The results in column 1 of Table 5 report a model in which competition is proxied by the HHI_INDEX. I find a significantly positive effect on FDI proclivity. That is, firms seem more likely to conduct FDI when they operate in industries where the market share concentration is higher. Next, in column 2, I test the model with FLUIDITY as my competition proxy. I find a (weakly) significant and negative effect, in line with previous results. I also report a significantly positive effect of lagged FDI proclivity on current FDI proclivity, which validates the persistent structure of the model.[8] I accept the null hypothesis of Sargan's over-identifying restrictions test, indicating that the instruments are valid. I also accept the null hypothesis of the Arellano–Bond AR (2) test, suggesting that there is no evidence of second-order serial correlation in the error term.

Although the Arellano–Bond test does not detect serial correlation in the models, because the *p*-values are not too high, I see it as a close call and thus decide to conduct further testing. I test two additional models in columns 3 and 4 of Table 5, where I include both the first and second lagged values of the dependent variable (FDI proclivity) and lag all explanatory variables (the competition variables and the controls) by one period. Both the first and second lagged values of FDI proclivity are significant and positive, which corroborates my hunch that FDI decisions are more strongly persistent. The effects of both competition variables remain significant after lagging them by one period. The negative effect of FLUIDITY grows statistically stronger (p-value < 0.01). Importantly, the model tests now support the

[7]The additional controls are instrumented by their first differences as per the standard GMM procedure. The exception is TOBINS_Q, which, following the literature, is included as a predetermined variable (Blundell, Bond, Devereux, and Schiantarelli (1992)), thus instrumented by GMM-style instruments (predetermined variables are correlated with past errors but not with future errors). This choice is also backed empirically by Sargan's test of over-identifying restrictions, since when TOBINS_Q is assumed to be strictly exogenous, instrumentation by first-differences leads to instrument invalidity, whereas when the variable is treated as predetermined, the instruments are then fully valid. At any rate, the effect of TOBINS_Q is insignificant, while the coefficients of the competition variables remain significant when TOBINS_Q is also treated as strictly exogenous (treating TOBINS_Q as predetermined improves the model specification without driving the results).

[8]In the interest of space and focus, I do not tabulate the coefficients of the control variables. For completeness, I find a significantly positive effect of ln(TOTAL_ASSETS), ln(SALES_PPE), and of ln(COGS_ASSETS). The remaining controls are insignificant.

TABLE 5

Dynamic Linear Probability Models: GMM Estimation

Panel A of Table 5 reports the results of dynamic linear probability models (DLPM) estimated via the two-step Arellano–Bond GMM model. The dependent variable is FDI. In columns 1 and 4, competition is proxied by HHI_INDEX (the Herfindahl Hirschman index, based on the tnic3hhi variable from Hoberg and Phillips (2016)). In columns 2 and 3, competition is proxied by FLUIDITY. In all models, the competition variables, and the lagged dependent variable (FDI [$t-1$] and FDI [$t-2$]) are specified as endogenous variables, entering the first-differenced equation instrumented by GMM instruments (lagged levels). All models include the same vector of controls as reported in Table 3. All controls are instrumented by standard instruments (first-differences), except for TOBINS_Q which is modeled as a predetermined variable, thus instrumented by GMM instruments. The models include firm and year fixed effects. Panel B reports model tests [Sargan's over-identifying restrictions test and Arellano–Bond AR2 (second-order serial correlation) test]. Robust standard errors (Windmeijer WC) clustered at the firm level are shown in parenthesis below the coefficients. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4
Panel A. Arellano–Bond GMM Dynamic LPM				
HHI_INDEX	0.007**			
	(0.003)			
FLUIDITY		−0.001*		
		(0.001)		
FLUIDITY [$t-1$]			−0.002***	
			(0.001)	
HHI_INDEX [$t-1$]				0.009**
				(0.004)
FDI [$t-1$]	0.053***	0.055***	0.088***	0.081***
	(0.019)	(0.019)	(0.020)	(0.020)
FDI [$t-2$]			0.064***	0.052***
			(0.019)	(0.019)
Control variables	Yes	Yes	Yes	Yes
Firm and year fixed effects	Yes	Yes	Yes	Yes
Model significance (Chi-sq test) (*p*-Value)	0.007	0.004	0.000	0.000
N	30,478	30,374	28,187	28,373
Panel B. Model Tests				
Sargan's OVERID (*p*-Value)	0.770	0.318	0.731	0.633
Arellano–Bond AR (2) (*p*-Value)	0.117	0.102	0.675	0.857

specifications even more strongly. For both models, I once again accept the null hypothesis of Sargan's test, while now accepting the null hypothesis of the Arellano–Bond test with much stronger confidence (the *p*-values of the AR (2) tests are now higher)).

These findings show that my results remain robust to a different empirical setup, with different assumptions regarding FDI decisions than in my initial model, as I allow for persistence in FDI proclivity. Also, my findings hold robust to an alternative (well-established) proxy for competition, measured as the HHI index. Overall, GMM estimation produces results that are in line with those from my baseline IV model, with stronger competition being associated with a lower likelihood to undertake FDI.

F. Testing Additional Instrumental Variables

I now further probe the robustness of my findings by expanding my instrumental variables model to include additional instruments, this time at the industry level. I explore plausibly exogenous variation in competition arising from cross-industry heterogeneity in market power as a source of market imperfections deterring the entry of rival firms, thus weakening competition (Table 6).

TABLE 6

Testing Additional Instruments

Panel A of Table 6 reports the results of additional Instrumental variables regressions estimated via linear probability models (LPM). FLUIDITY is now instrumented by ln(MARKUP) (UK SIC3) (the markup in the corresponding UK SIC3 industries, measured as ln(SALES_COGS)), and by ΔIn(MAXBEN) and ln(RTWVD) (the same state instruments previously employed). Column 1 reports first-stage results, whereas column 2 shows second-stage results. All models include the same vector of control variables as reported in Table 3. The models include firm and year fixed effects. Panel B reports identification tests (endogeneity, under-identification, weak-identification, and over-identifying restrictions). Robust standard errors clustered at the firm level are shown in parenthesis below the coefficients. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Instrumental Variables Estimation

	Dependent Variable	
	FLUIDITY	FDI (0/1)
Stage	First	Second
	1	2
ln(MARKUP) (UK SIC3)	−0.132***	
	(0.039)	
ΔIn(MAXBEN)	1.610***	
	(0.368)	
ln(RTWVD)	3.863***	
	(0.896)	
FLUIDITY (instrumented)		−0.034***
		(0.012)
Control variables	Yes	Yes
Firm and year fixed effects	Yes	Yes
Model significance (*F*-test) (*p*-Value)	0.000	0.000
N	27,107	27,107

Panel B. Identification Tests

	Null Hypothesis	Test Statistic (*p*-Value)
Endogeneity (Hausman)	H0: FLUIDITY is exogenous	Chi-sq = 8.530 (0.003)
Under-identification (Kleibergen–Paap)	H0: Instruments are irrelevant	Chi-sq = 43.036 (0.000)
Weak-identification (Kleibergen–Paap)	H0: Instruments are weak	*F* = 14.124 (0.000)
Over-identifying restrictions (Hansen's *J*)	H0: Instruments are valid	Chi-sq = 1.342 (0.511)

However, industry barriers to entry in the United States may also affect U.S. firms' FDI decisions, so I require the variation in entry deterrence to occur exogenously from the domestic competitive environment where U.S. firms operate. To this end, I follow the industrial economics literature and use measures of market power prevailing in industries of jurisdictions other than the United States as instrumental variables. For instance, Alexeev and Song (2013) use entry barriers in U.S. industries as an instrumental variable for the strictness of barriers to entry prevailing in industries in other countries. I choose the U.K. as the foreign country to mirror the industry competitive structure prevailing in the U.S., given the similarities between the two economies. Pricing power and higher markups are well-known characteristics of weakly competitive industries due to barriers to entry, economies of scale, product differentiation, and cost advantages (Khalilzadeh-Shirazi (1974)).

I use the variable ln(MARKUP) to gauge the extent to which product market competition weakens as a result of market power in industries, measured as ln(SALES_COGS) (Karabarbounis and Neiman (2019)). I calculate the ratios prevailing in corresponding UK industries (SIC 3-digit) with data from Osiris (Bureau Van Dijke). My expectation is that higher ln(MARKUP) values should

translate into weaker competition and thus lower FLUIDITY (with the effect of the instrument being plausibly transmitted to FLUIDITY via the similarities across the structures of industries in the United States and United Kingdom).

In column 1 of Table 6, I show my reestimation of the first-stage results, this time augmenting the set of IVs with ln(MARKUP). Increases in markups in the UK are associated with strongly significant reductions in the FLUIDITY levels of U.S. firms (p-value < 0.01). The state-level instruments (Δln(MAXBEN) and ln(RTWVD)) remain strongly and significantly positive, as in my base model.

The second-stage results show that, once again, increases in FLUIDITY (as instrumented by the IVs) are associated with strongly significant reductions in FDI proclivity (p-value < 0.01).[9] The identification tests suggest that, by adding the third instrument, identification is now stronger and more reliable, as the test statistics for the under- and weak-identification tests are now both larger than in my base model (thus I more strongly reject under- and weak-identification). Hansen's J test of over-identifying restrictions also suggests more strongly accepting the null hypothesis of instrument validity when compared to my base model (the p-value increases to 0.51 from 0.22).[10]

G. Evidence from Import Penetration

I run another sensitivity check, examining import penetration (at industry level) as a signal of competitive pressure from foreign products.[11] I obtain industry imports data (NAICS 6-digit) from the USA Trade Online database (a service from the U.S. Census Bureau) and measure the variable IMPORT_PENETRATION as the value of imports divided by industry sales plus the value of imports (Becerra, Markarian, and Santalo (2020)). In line with the view that import penetration exerts stronger competitive effects in more concentrated industries where existing competition is weaker (Valta (2012)), I create subsamples based on the distribution of the HHI index: Low Competition (75th percentile of the HHI

[9]I consider the case of U.S. firms that target the UK market for investment and whether this could affect identification. I carefully inspect my location data set to figure out whether this could pose a problem, learning that only about 5% of FDIs recorded in my data set are made in the UK. Therefore, it is implausible that such a marginal number of investments could affect my estimates. At any rate, I estimate the IV models fully excluding all U.S. firms recording FDIs in the UK, and the results (unreported for brevity) are robust.

[10]The shortcoming of this additional IV model is that my sample is now marginally smaller compared to my base model, due to limited data in some UK industries. At any rate, I am still able to estimate my models with a large and representative sample.

[11]An alternative variable that has been employed in the finance literature as a proxy for competition is tariffs. However, in my context, which is specific to FDI, this approach produces confounding effects, thus being less suitable. Taking both competition and FDI decisions into consideration, a country's tariff schedule exerts two distinct effects. First, tariff reductions exert a pro-competition effect through higher import penetration. Second, tariff cuts also exert a direct and positive effect on the outward FDI proclivity of domestic firms (Globerman and Shapiro (1999), Lommerud, Meland, and Sørgard (2003)), because lower tariffs render advantageous shifting production to countries with cheaper costs (e.g., lower wages), with firms serving their domestic (home) market via exports from foreign plants (the influx of U.S. FDI to Mexico following the NAFTA agreement is an example of this logic). Therefore, tariff cuts also affect FDI directly from a channel that is not related to increased competitive pressure. Thus, I run the test with import penetration as it is a more direct and effective proxy for the pro-competitive effects of foreign imported products.

TABLE 7

Import Penetration and FDI Proclivity

Table 7 reports linear probability models. FDI is modeled as a function of IMPORT_PENETRATION (industry-level). Model 1 is estimated for the sample of firms operating in Low Competition (high concentration) industries [75th percentile of the HHI index], whereas model 2 is for the sample of firms operating in High Competition (low concentration) industries [25th percentile]. Model 3 is estimated for all firms, with import penetration interacted with the HHI index. All models include the same vector of control variables as reported in Table 3, firm, and year fixed effects. Robust standard errors clustered at the firm level are shown in parenthesis below the coefficients. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable: FDI (0/1)		
Competition (HHI_INDEX)	Low (75th Percentile)	High (25th Percentile)	All Firms
	1	2	3
IMPORT_PENETRATION [$t-1$]	−0.024**	0.002	−0.023**
	(0.011)	(0.009)	(0.010)
IMPORT_PENETRATION [$t-1$] × HHI_INDEX			−0.011**
			(0.005)
HHI_INDEX			0.002
			(0.003)
Control variables	Yes	Yes	Yes
Firm and year fixed effects	Yes	Yes	Yes
R^2	0.432	0.209	0.371
N	5,016	4,983	21,333

index), and High Competition (25th percentile). Then, I estimate the effect of import penetration on FDI proclivity in these two subsamples. Table 7 shows the results.

The results reported in column 1 of Table 7 show that in low competition industries, an increase in the penetration of imports is associated with a significant reduction in FDI proclivity. The findings shown in column 2 suggest that in high competition industries, an increase in the penetration of imports has no significant effect whatsoever on FDI proclivity. In column 3, I reestimate the model for all firms, this time interacting import penetration with the HHI index directly, which allows me to test for the statistical significance of the heterogenous effects of imported products across firms exposed to varying levels of concentration (competition). The effect of the penetration of imports remains significantly negative, whereas its interaction with industry concentration is also significantly negative, corroborating the proposition that the entry of imports exerts a significantly stronger competitive effect in more concentrated (less competitive) industries. These results suggest that increases in competition from foreign products are associated with lower FDI proclivity; thus, my findings remain robust to another proxy for competition intensity.

IV. FDI Location Analyses

A. Data and Variables

To examine the effect of product market competition on FDI location, I build a project-level data set. I keep the FDI data for the firms that undertake FDI, and merge country-level data into it. Country economic and institutional data are gathered from various sources: PWT – Penn World Table 10.0 (Feenstra, Inklaar, and Timmer (2015)), the World Bank, PRS Group (International Country Risk

TABLE 8

Summary Statistics: FDI Location Data Set

Table 8 presents summary statistics for the full sample employed in the FDI Location analyses (country-level yearly data from 2003 to 2019). Refer to the Appendix for variable definitions, interpretations, and sources of data.

Variable	Mean	Std. Dev.	25th Percentile	50th Percentile	75th Percentile	*N*
LOCATION (0/1)	0.012	0.108	0.000	0.000	0.000	264,732
ln(GDP) (USD)	12.518	1.546	11.303	12.592	13.591	264,732
TFP	0.666	0.192	0.537	0.686	0.813	264,732
LABOR_GDP	0.504	0.108	0.447	0.523	0.576	264,732
NAT_GDP	0.058	0.103	0.003	0.015	0.067	264,732
CORPORATE_TAXES	0.263	0.078	0.200	0.275	0.314	264,732
POLITICAL_RISK	0.277	0.110	0.200	0.272	0.357	264,732
GDP_GROWTH	0.038	0.042	0.018	0.038	0.062	264,732
GDP_PC (USD 000)	27.427	22.440	10.577	22.028	40.208	264,732
IMPORTS_GDP	0.415	0.326	0.199	0.332	0.518	264,732
GEOGRAPHICAL_DISTANCE (km 000)	8.329	3.540	6.235	7.381	10.907	264,732
EXCHANGE_RATE (Δ)	−0.005	0.089	−0.050	−0.002	0.034	264,732
AGGLOMERATION	0.218	0.894	0.000	0.000	0.000	264,732
COMMON_LAW (0/1)	0.167	0.373	0.000	0.000	0.000	264,732
HCI	2.830	0.551	2.451	2.899	3.257	264,732
ln(PATENTS)	3.458	2.044	2.031	3.764	5.045	219,188
ULC	94.902	16.265	86.564	97.537	104.104	107,692
EATR	0.234	0.062	0.180	0.239	0.280	129,367

Guide), and the corporate taxation database from the auditing company KPMG. I keep in the data set the FDIs for which I can get country data covering the entire sampling period (dropping the projects located in countries with missing economic and institutional variables). My final location data set boasts 3,394 projects located in 78 countries globally. Table 8 shows summary statistics, whereas Table 9 reports the FDI data and the main summary statistics per country.

Guided by the economics literature, I include in the model important country factors affecting the attractiveness of locating FDI. I am primarily interested (based on my theoretical framework) in five main variables: market size, productivity, labor costs, natural resource rents, and taxation. I proxy for market size with the variable ln(GDP) (the natural log of Real Gross Domestic Product) (Markusen and Venables (1998)), sourced from Penn World Table (PWT). In line with Feenstra et al. (2015), I employ TFP (total factor productivity),[12] also sourced from PWT, as my proxy for country productivity. The productivity level of countries is normalized with respect to the U.S. economy (=1), with higher scores associated with higher relative productivity. Following Feenstra et al. (2015), my labor cost proxy is LABOR_GDP (the labor income scaled by GDP), which is factored from the share of national income going to compensate workers, again sourced from PWT. My proxy for the availability of natural resources is NAT_GDP (the natural resource rents scaled by GDP) (Auty (2007)), sourced from the World Bank. I proxy for taxation costs with the variable CORPORATE_TAXES, measured as statutory corporate tax rates (Wheeler and Mody (1992), Arulampalam et al. (2019)), sourced from KPMG.

[12]Following Feenstra et al. (2015), I use the welfare-relevant measure of TFP (CWTFP), which is a productivity metric based on relative real domestic absorption. CWTFP is estimated with more realistic assumptions regarding production functions and the competitive structure of markets than more simplistic productivity measures. For a more technical discussion, see Feenstra et al. (2015).

TABLE 9

Summary Statistics by Countries

Table 9 shows the country's main summary statistics: FDIs per country (sourced from fDi Markets), the average FLUIDITY of U.S. firms investing in the country, ln(GDP) (market size), TFP (productivity), LABOR_GDP (labor costs), NAT_GDP (natural resource rents), and CORPORATE_TAXES (taxation).

Country	No. of FDIs	FLUIDITY	ln(GDP)	TFP	LABOR_GDP	NAT_GDP	CORPORATE_TAXES
Angola	5.00	3.48	11.64	0.23	0.28	0.37	0.35
Argentina	42.00	4.67	13.46	0.71	0.42	0.04	0.35
Australia	42.00	4.89	13.80	0.81	0.59	0.07	0.30
Austria	15.00	6.87	12.85	0.83	0.57	0.00	0.27
Bahrain	6.00	3.63	10.80	0.77	0.31	0.07	0.00
Belgium	64.00	6.20	13.04	0.94	0.61	0.00	0.34
Botswana	2.00	6.08	10.23	0.63	0.28	0.05	0.24
Brazil	190.00	5.13	14.69	0.56	0.55	0.05	0.34
Bulgaria	4.00	4.70	11.61	0.80	0.48	0.02	0.13
Canada	131.00	5.71	14.22	0.83	0.64	0.03	0.32
Chile	12.00	5.45	12.63	0.69	0.44	0.16	0.18
China	662.00	5.17	16.28	0.37	0.56	0.05	0.28
Colombia	14.00	4.86	13.05	0.56	0.47	0.07	0.33
Costa Rica	28.00	7.80	11.01	0.63	0.58	0.01	0.31
Croatia	1.00	9.71	11.42	0.65	0.63	0.01	0.20
Czech Republic	42.00	4.43	12.65	0.55	0.52	0.01	0.23
Denmark	1.00	3.71	12.41	0.84	0.64	0.01	0.26
Dominican Rep.	3.00	4.94	11.59	0.68	0.47	0.01	0.27
Ecuador	1.00	3.20	11.79	0.39	0.60	0.14	0.24
Egypt	11.00	5.05	13.39	1.03	0.36	0.11	0.25
Estonia	2.00	4.37	10.38	0.60	0.57	0.01	0.22
Finland	3.00	4.02	12.32	0.82	0.58	0.00	0.26
France	128.00	5.95	14.73	0.97	0.62	0.00	0.34
Germany	126.00	5.56	15.06	0.84	0.62	0.00	0.33
Greece	3.00	4.12	12.73	0.74	0.54	0.00	0.27
Guatemala	2.00	3.91	11.42	0.73	0.51	0.02	0.30
Hong Kong	1.00	10.37	12.78	0.75	0.51	0.00	0.17
Honduras	7.00	4.33	10.36	0.46	0.60	0.02	0.29
Hungary	59.00	5.32	12.37	0.71	0.59	0.01	0.17
Iceland	3.00	4.94	9.60	0.94	0.60	0.00	0.18
India	262.00	4.82	15.32	0.37	0.51	0.04	0.34
Indonesia	24.00	5.93	14.28	0.41	0.46	0.08	0.28
Ireland	78.00	7.98	12.32	0.87	0.47	0.00	0.12
Israel	12.00	6.96	12.40	0.76	0.56	0.00	0.29
Italy	27.00	5.07	14.63	0.80	0.52	0.00	0.34
Jamaica	1.00	4.32	9.97	0.47	0.58	0.02	0.32
Japan	31.00	5.56	15.41	0.63	0.56	0.00	0.40
Jordan	5.00	5.55	10.86	0.75	0.47	0.01	0.21
Kazakhstan	14.00	5.91	12.49	0.41	0.42	0.25	0.25
Kuwait	2.00	6.17	12.19	0.67	0.23	0.51	0.35
Latvia	1.00	4.52	10.65	0.59	0.51	0.01	0.16
Lithuania	1.00	4.97	11.15	0.75	0.50	0.01	0.15
Luxembourg	4.00	2.94	10.72	0.87	0.56	0.00	0.29
Malaysia	70.00	5.74	13.23	0.50	0.34	0.11	0.26
Malta	1.00	3.83	9.43	0.88	0.53	0.00	0.35
Mexico	251.00	4.72	14.43	0.66	0.37	0.05	0.30
Mozambique	3.00	1.70	10.14	0.52	0.41	0.11	0.32
Netherlands	33.00	5.38	13.59	0.90	0.60	0.01	0.28
New Zealand	6.00	5.06	11.89	0.80	0.55	0.02	0.31
Nigeria	12.00	4.37	13.29	0.35	0.60	0.16	0.30
Norway	3.00	4.73	12.56	0.83	0.49	0.10	0.28
Panama	2.00	3.78	10.91	0.86	0.37	0.00	0.28
Paraguay	2.00	4.43	10.88	0.51	0.45	0.02	0.15
Peru	10.00	4.33	12.45	0.46	0.44	0.09	0.30
Philippines	40.00	5.47	13.11	0.45	0.44	0.02	0.32
Poland	47.00	4.17	13.60	0.80	0.57	0.01	0.20
Portugal	5.00	5.48	12.62	0.79	0.62	0.00	0.25
Qatar	10.00	5.17	12.04	0.61	0.18	0.35	0.25
Romania	47.00	4.94	12.70	0.66	0.48	0.02	0.18
Russia	124.00	5.41	14.90	0.42	0.53	0.17	0.22
Saudi Arabia	51.00	5.66	13.94	0.59	0.27	0.44	0.23
Singapore	87.00	6.43	12.72	0.63	0.44	0.00	0.19
Slovakia	37.00	5.29	11.81	0.71	0.52	0.00	0.20
Slovenia	1.00	9.99	11.05	0.69	0.65	0.00	0.23
South Africa	25.00	5.46	13.33	0.65	0.53	0.07	0.35
South Korea	64.00	5.40	14.31	0.60	0.51	0.00	0.26
Spain	74.00	5.36	14.28	0.90	0.60	0.00	0.32

(continued on next page)

TABLE 9 (continued)
Summary Statistics by Countries

Country	No. of FDIs	FLUIDITY	ln(GDP)	TFP	LABOR_GDP	NAT_GDP	CORPORATE_TAXES
Sri Lanka	1.00	5.90	11.95	0.73	0.38	0.00	0.31
Sweden	17.00	6.14	12.96	0.77	0.54	0.01	0.26
Switzerland	9.00	8.20	13.01	0.76	0.67	0.00	0.20
Thailand	54.00	4.92	13.64	0.37	0.66	0.03	0.28
Tunisia	3.00	3.33	11.59	0.66	0.49	0.05	0.31
Turkey	31.00	4.99	14.04	0.95	0.40	0.00	0.23
Ukraine	14.00	4.58	12.96	0.37	0.56	0.07	0.24
United Kingdom	184.00	6.21	14.74	0.88	0.60	0.01	0.27
Uruguay	1.00	4.18	10.82	0.68	0.47	0.01	0.28
Zambia	1.00	2.57	10.43	0.29	0.43	0.21	0.35
Zimbabwe	2.00	4.03	10.16	0.31	0.53	0.10	0.29

I also include a vector of controls known to influence inward FDI. Political risk is a first-order foreign agency cost of increasing concern for MNEs' top management (Giambona, Graham, and Harvey (2017)) and is usually associated with lower FDI location likelihood for several reasons. With higher political risk, MNEs are in danger of expropriation by foreign governments (e.g., Henisz (2000), Desai et al. (2008), Kesternich and Schnitzer (2010), and Azzimonti (2018)), of violation of property rights on brands, products, and technologies (Lin et al. (2019)), and of court discrimination (Bhattacharya et al. (2007)). I control for the variable POLITICAL_RISK, measured by the ICRG Political Risk Index (Henisz (2000), Desai et al. (2008)). The index has 12 components affecting countries' political outlook (government stability, socioeconomic conditions, investment profile, internal conflict, external conflict, corruption, the presence of the military in politics, religious tensions, ethnic tensions, law and order, democratic accountability, and bureaucratic quality). The index sums up to 100, with higher scores associated with lower political risk. I invert the scale (computing 100 minus the countries' score) to measure political risk on an increasing basis (with higher values indicating greater political risk).[13]

Since low-income economies may receive more efficiency-seeking FDI, whereas high-income economies receive more market-seeking FDI (Markusen (2004)), I control for income levels with GDP_PC (GDP per capita), sourced from PWT, and for GDP_GROWTH (the growth rate of GDP), with data from the World Bank. I control for import penetration with the variable IMPORTS_GDP (imports scaled by GDP), sourced from PWT, since trade frictions can either stimulate horizontal FDI (Helpman et al. (2004)) or deter other types of investments such as export platforms or efficiency-seeking investments.[14] I include the variable GEOGRAPHICAL_DISTANCE (the distance between the home and host countries), since distance increases trade costs (Anderson and Van Wincoop (2004)). To account for agglomeration economies, I follow Head et al. (1995) and employ the

[13]To maintain consistency with the other variables in the model, I normalize the Political Risk Index to a [0,1] interval by dividing the score by 100. I compute: (100 − ICRG_Political_Risk)/100. For more information on the ICRG Political risk index, please visit: https://www.prsgroup.com/wp-content/uploads/2012/11/icrgmethodology.pdf.

[14]An alternative to imports is tariffs. However, my preferred proxy is imports because tariff data is patchy for several countries in my data set. At any rate, both variables are strongly negatively correlated, as expected.

variable AGGLOMERATION, measured as the number of industry peers (3-digit SIC) colocating in the same country as the investing firm. I also control for the variable COMMON_LAW (a dummy equal to 1 if the host country follows a common law legal regime, and equal to 0 otherwise), as firms tend to locate themselves in host countries with regulatory environments similar to that of their home country (Arulampalam et al. (2019)). I also control for the role of exchange rate fluctuations as an important factor affecting FDI decisions (Blonigen (2005)). I include the variable EXCHANGE_RATE, calculated as the yearly rate of return on the exchange rate of the domestic currency relative to the U.S. dollar, with data from PWT.

Table 9 shows that the main recipients of U.S. FDI projects are China (662), India (262), Mexico (251), Brazil (190), the United Kingdom (184), Canada (131), France (128), Germany (126), Russia (124), and Singapore (87). Therefore, U.S. firms mix investments in industrialized and emerging economies, though more investments seem to be flowing to emerging markets. Countries like China, Germany, France, and the UK lead in terms of market size, whereas more developed economies post higher TFP levels (as one would expect). Regarding statutory corporate taxes, I see substantial heterogeneity in taxation, with some countries charging above 30%–35% (e.g., Argentina, Brazil, India, France, and Germany), whereas other countries levy between 15% and 25% (for instance, Ireland, Hungary, Russia, and Taiwan). Interestingly, there are no clear patterns in corporate taxation to suggest that specific groups of countries might systematically charge higher or lower taxes, since taxation shows a fair degree of variation within and across regions and across economic development levels. Regarding competition, I can spot some tendency of firms competing in more fluid industries to locate themselves in more developed (industrialized/technological) economies, whereas firms operating in relatively less competitive industries seem more likely to enter developing (emerging) economies.

B. FDI Location Choice Model

To examine how competition affects location choice, I employ McFadden's (1974) conditional logistic regression model, which is the standard model for estimating interactions between country- and firm-level drivers in FDI location studies (e.g., Nachum et al. (2008), Chen and Moore (2010)). Consider a firm i faced with $c, \ldots, J$ location alternatives to establish a foreign plant. According to the model's property of random utility maximization, the firm chooses the alternative to locate the FDI yielding the greatest profits (utility): firm i chooses alternative c *if* $\pi_{ict} > \pi_{ijt}, \forall c \neq j$.

The dependent variable is LOCATION (abbreviated as L_{ict}), measured as an indicator function taking the value of 1 if alternative (country) c is chosen, and taking the value of 0 otherwise. As previously indicated, my main country-level explanatory variables are $\ln(\text{GDP})_{ct}$, TFP_{ct}, LABOR_GDP_{ct}, NAT_GDP_{ct}, and $\text{CORPORATE\_TAXES}_{ct}$. These variables are collected in vector C'_{ct}. Competition (FLUIDITY_{it}) is the main firm-level driver affecting location sensitivity to the country attributes. I further include in the model a vector of control variables Z'_{ct}, with the country controls that were specified in Section IV.A. My empirical FDI location choice model reads as

$$\text{Prob}[L_{ict}=1]=\frac{e^{\alpha+\beta'\text{FLUIDITY}_{it}\times C'_{ct}+\delta' C'_{ct}+\gamma' Z'_{ct}}}{\sum_j e^{\alpha+\beta'\text{FLUIDITY}_{it}\times C'_{jt}+\delta' C'_{jt}+\gamma' Z'_{jt}}}. \tag{4}$$

The conditional logistic model (clogit) is fitted via maximum likelihood, employing a data structure grouped at the project level (imposing a conditional group fixed effect at the FDI project level by default). Every project appears in the data set as many times as the number of alternatives (J). For each project, location takes the value of 1 only once, and takes the value of 0 in $J-1$ instances. The location choice decision is modeled by a series of pair-wise comparisons (alternative to alternative) of countries' locational attributes and their interactions with firms' FLUIDITY. It is noteworthy that the clogit model does not feature the same pooled/panel data structure typically found in corporate finance studies. Although the data set spans firms and years (and countries), each project has a unique occurrence, which happens in a particular year, with no repetition (differently from longitudinal data). For every project, I match firm and country variables relative to the year in which the investment is recorded. With 3,394 projects and a location choice set with 78 alternative countries, the total number of observations in the clogit model is 264,732 (3,394 $\times$ 78).

The effect of the country's locational attributes on FDI location (unconditional on FLUIDITY) is captured by the vector of coefficients δ'. My main test parameters are in the vector of coefficients β' multiplying the interactions of FLUIDITY with the vector of country locational attributes (C'_{ct}). The coefficients in β' capture the moderating effect of FLUIDITY (competition) on the sensitivity of FDI location likelihood with respect to the country attributes.

It is important to point out that FLUIDITY does not exhibit an independent coefficient in the clogit model and that firm control variables do not appear in the model. As explained well by Nachum et al. (2008), who explore an empirical setup comparable to ours,[15] the clogit model does not allow for the inclusion of firm main effects. As the authors note, in the clogit model, only country-level variables can have a direct effect on location choice. Thus, the characteristics of the decision-makers (firms) can only be modeled through interactions with country characteristics, thus exerting a moderating effect on country attributes. Technically, this occurs because FLUIDITY (and the same is true for firm controls) is a firm variable that does not exhibit variation across the countries in the alternatives' choice set (i.e., the value of FLUIDITY does not vary as the firm evaluates locating the FDI in country a, b, or c); hence, its independent (direct) coefficient is subsumed from the estimation when the clogit group fixed effect is applied. Firm variables exhibit variability, allowing me to identify their effects, only if interacted with country locational attributes.

[15]Nachum et al. (2008) study how proximity to knowledge (captured by country variables) affects firms' FDI location choices. They test for heterogeneous effects across firms based on size and sales per employee by interacting country variables with these firm variables. In their paper, they explain in detail why firm main effects do not appear in multinomial FDI location models (such as clogit).

While the clogit is a well-validated model for studying FDI location choices, being strongly backed by extant research as fit for purpose (e.g., in addition to Nachum et al. (2008), see Head et al. (1995), Chen and Moore (2010), Barrios et al. (2012), Duanmu (2012), Nielsen et al. (2017), and Gao, Wang, and Che (2018) for a few additional examples of studies that also relied on clogit to study location)), its inability to accommodate firm main effects and controls potentially raises concerns regarding omitted variable bias. I address this issue later in the article (Section IV.D) by estimating my location model via LPMs (the LPM, by not imposing the group fixed effect, allows FLUIDITY and firm controls to float freely, and thus these variables can be controlled for).

C. Location Choice Results

The location choice results are reported in Table 10. I begin by examining the interaction between FLUIDITY and ln(GDP) (market size). The estimates reported in column 1 uncover a significantly negative interaction, indicating that firms facing stronger competition are marginally less attracted to larger foreign markets than firms that operate in relatively less competitive industries. My interpretation is that firms are, on average, attracted to larger markets (since the coefficient of ln(GDP) is significantly positive)), in line with the predictions from trade models, but that competition renders this effect marginally weaker. These findings indicate that firms in less competitive industries may seek market access more actively, which is consistent with the idea that market power and product differentiation are more closely linked with horizontal FDI strategies (Markusen (2004)).

The findings presented in column 2 of Table 10 examine the interaction of FLUIDITY and TFP (total factor productivity). While the base effect of TFP is significantly negative, I find a significant and positive interaction with FLUIDITY, indicating that stronger competition renders FDI location choice positively responsive to productivity. These estimates suggest that as competition intensifies, location choice sensitivity to productivity increases. The findings reported in column 3 show that while the variable LABOR_GDP exerts a significant and negative effect on FDI location likelihood, its interaction with FLUIDITY is significant and positive, which indicates that competition renders FDI location choice less sensitive to lower labor costs. While the trade literature typically argues that exploring cheaper labor is more often associated with vertically integrated MNEs (Helpman (2006)), my evidence suggests that intense competition marginally reduces the benefits of verticalization. Such a conjecture seems consistent with the evidence presented by McGowan (2017), who shows that product market competition, by driving market prices downward, reduces the incentives to conduct vertical investments. The results reported in column 4 suggest that the interaction of FLUIDITY and NAT_GDP (natural resource rents) is significant and negative.

These findings indicate that, to some extent, firms enduring stiffer competition pursue production improvements. However, a trade-off seems to exist in firms' location choices, whereby productivity gains seem to take precedence over cost reductions. Since countries that offer cheaper labor and extract larger rents from natural resources (typically developing economies) usually post relatively weaker productivity levels, firms are unlikely to gain productivity and cut costs at the same

TABLE 10

Competition and FDI Location Choices: Conditional Logit Estimates

Table 10 reports the results of conditional logit models. LOCATION is modeled as a function of FLUIDITY interacted with the following country attributes: 1 ln(GDP) (market size), 2 TFP (productivity), 3 LABOR_GDP (labor costs), 4 NAT_GDP (natural resource rents), and 5 CORPORATE_TAXES (taxation). All models include a vector of country controls: POLITICAL_RISK (expropriation risk), GDP_PC (income levels), GDP_GROWTH (economic growth), IMPORTS_GDP (trade barriers), GEOGRAPHICAL_DISTANCE (trade costs), AGGLOMERATION (FDIs by industry peers), COMMON_LAW (regulatory quality similarity), and EXCHANGE_RATE (currency returns). Robust standard errors clustered at the firm level are shown in parenthesis below the coefficients. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable: LOCATION (0/1)				
	1	2	3	4	5
FLUIDITY × ln(GDP)	−0.015**				
	(0.006)				
FLUIDITY × TFP		0.179***			
		(0.042)			
FLUIDITY × LABOR_GDP			0.229**		
			(0.103)		
FLUIDITY × NAT_GDP				−0.360**	
				(0.180)	
FLUIDITY × CORPORATE_TAXES					−0.433***
					(0.157)
ln(GDP)	0.989***	0.908***	0.908***	0.908***	0.908***
	(0.049)	(0.030)	(0.030)	(0.030)	(0.030)
TFP	−0.790***	−1.777***	−0.790***	−0.798***	−0.796***
	(0.217)	(0.322)	(0.217)	(0.218)	(0.218)
LABOR_GDP	−2.530***	−2.547***	−3.746***	−2.521***	−2.506***
	(0.393)	(0.392)	(0.626)	(0.392)	(0.388)
NAT_GDP	−1.423**	−1.419**	−1.426**	0.436	−1.425**
	(0.574)	(0.578)	(0.576)	(1.041)	(0.571)
CORPORATE_TAXES	−2.208***	−2.200***	−2.241***	−2.231***	0.156
	(0.508)	(0.509)	(0.509)	(0.508)	(0.927)
POLITICAL_RISK	−1.005**	−1.032**	−1.010**	−1.013**	−0.982**
	(0.471)	(0.468)	(0.473)	(0.472)	(0.471)
GDP_PC	−0.009**	−0.009**	−0.009**	−0.010**	−0.009**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
GDP_GROWTH	1.530*	1.536*	1.459*	1.497*	1.521*
	(0.820)	(0.827)	(0.820)	(0.829)	(0.819)
IMPORTS_GDP	0.730***	0.731***	0.730***	0.730***	0.730***
	(0.089)	(0.089)	(0.089)	(0.089)	(0.088)
GEOGRAPHICAL_DISTANCE	−0.101***	−0.101***	−0.100***	−0.101***	−0.101***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
AGGLOMERATION	0.136***	0.135***	0.138***	0.137***	0.137***
	(0.011)	(0.011)	(0.012)	(0.012)	(0.012)
COMMON_LAW (0/1)	0.581***	0.581***	0.581***	0.582***	0.581***
	(0.061)	(0.060)	(0.061)	(0.061)	(0.061)
EXCHANGE_RATE	−0.496*	−0.537*	−0.501*	−0.503*	−0.496*
	(0.298)	(0.303)	(0.296)	(0.299)	(0.296)
Pseudo-R^2	0.218	0.219	0.218	0.218	0.218
Model significance (Chi-sq) (*p*-Value)	0.000	0.000	0.000	0.000	0.000
N	264,732	264,732	264,732	264,732	264,732

time. I infer from my findings that firms seem to favor quality output and revenues (e.g., high TFP) to the detriment of lower costs in production and natural resource extraction (for robustness, I revisit these relationships in additional tests, discussed in Section IV.E, which look at labor force quality and innovation).

The findings reported in column 5 of Table 10 show that, consistent with the extant literature, the variable CORPORATE_TAXES is significantly associated with reduced FDI location likelihood (Barrios et al. (2012), Arulampalam et al.

(2019)). I find a significant and negative interaction between FLUIDITY and CORPORATE_TAXES, indicating that stronger competition renders FDI more responsive to lower taxation. This finding indicates that as domestic competition intensifies, firms seek taxation economies abroad via FDI.

To comment briefly on the control variables, higher political risk is associated with lower FDI location likelihood, mostly in line with the extant literature. Firms seem to favor investment in economies with lower GDP per capita (e.g., developing markets) and prefer economies with faster growth (which, on average, also tend to be developing markets). Firms are more likely to invest in countries with higher import openness, which signals that value chain considerations and the ability to move inputs at cheaper trade costs seem, on average, more important to them than the trade cost jumping motive for undertaking FDI. I find that location likelihood is significantly lower in more distant countries, suggesting that distance and the associated trade costs obstruct FDI. My estimates also suggest that firms are more likely to locate FDIs in countries where their industry peers are also located, which is fully in line with the notion of agglomeration economies. I also report that U.S. firms prefer to invest in foreign economies that also have a common law legal regime, which concurs with the view that firms seek investment in economies with similar regulatory frameworks. I find a negative effect of exchange rate increases on FDI location likelihood, signaling that as local currencies lose value relative to the U.S. dollar, preference for investing in these countries declines.

D. LPM Location Models

I now probe the robustness of my location choice results by estimating LPMs. As I previously argued, one shortcoming of clogit is that it does not allow controlling for firm main effects. Another is that clogit captures nonlinear effects, rendering the interpretation of the interactions of FLUIDITY with country locational attributes quite challenging. The LPM model, by relaxing the group fixed effect, allows controlling for firm main effects. Furthermore, it provides a more direct reading of the marginal effects. Table 11 reports the results.

I begin by estimating the LPM, including the main effects of competition. The coefficient of FLUIDITY shows significance in some models (2–5). Although it has no direct interpretation or economic meaning as a location factor (only the interactions with country variables convey firm heterogeneous effects on location choice), controlling for the main effect of FLUIDITY attenuates omitted variable bias. More importantly, the interactions of FLUIDITY with TFP, LABOR_GDP, NAT_GDP, and CORPORATE_TAXES all remain statistically significant, with no changes in the directions of their effects. The exception is the interaction FLUIDITY $\times$ ln(GDP), which is now insignificant. In Table 12, I test another specification in which, in addition to controlling for the main effects of FLUIDITY, I also include firm controls (the same control variables affecting FDI proclivity in my initial analysis). Despite controlling for firm covariates, the results remain robust.

E. Additional Robustness Checks

In this section, I provide a summary of additional tests (the full results and discussions are reported in the Supplementary Material). I test another version of

TABLE 11

Competition and FDI Location Choices: LPM Estimates

Table 11 reports the results of linear probability models. LOCATION is modeled as a function of FLUIDITY plus its interactions with the following country-level locational attributes: 1 ln(GDP) (market size), 2 TFP (productivity), 3 LABOR_GDP (labor costs), 4 NAT_GDP (natural resource rents), and 5 CORPORATE_TAXES (taxation). All models include the same vector of country control variables as reported in Table 10. Robust standard errors clustered at the firm level are shown in parenthesis below the coefficients. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable: LOCATION (0/1)				
	1	2	3	4	5
FLUIDITY × ln(GDP)	−0.000				
	(0.000)				
FLUIDITY × TFP		0.003***			
		(0.001)			
FLUIDITY × LABOR_GDP			0.002**		
			(0.001)		
FLUIDITY × NAT_GDP				−0.002**	
				(0.001)	
FLUIDITY × CORPORATE_TAXES					−0.003***
					(0.001)
FLUIDITY	0.001	−0.002***	−0.001*	0.000***	0.001***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
ln(GDP)	0.008***	0.008***	0.008***	0.008***	0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
TFP	−0.025***	−0.040***	−0.025***	−0.025***	−0.025***
	(0.002)	(0.004)	(0.002)	(0.002)	(0.002)
LABOR_GDP	−0.017***	−0.017***	−0.027***	−0.017***	−0.017***
	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)
NAT_GDP	−0.027***	−0.027***	−0.027***	−0.018***	−0.027***
	(0.004)	(0.004)	(0.004)	(0.006)	(0.004)
CORPORATE_TAXES	−0.004	−0.004	−0.004	−0.004	0.011*
	(0.003)	(0.003)	(0.003)	(0.003)	(0.006)
Country controls	Yes	Yes	Yes	Yes	Yes
R^2	0.042	0.042	0.042	0.042	0.042
Model significance (F) (p-Value)	0.000	0.000	0.000	0.000	0.000
N	264,732	264,732	264,732	264,732	264,732

the LPM model with firm and year fixed effects, thus absorbing firm and temporal unobserved heterogeneity, and observe robust results. Furthermore, to attenuate the possibility of a feedback loop between FDI location choices and competition, I also reestimate the interactions between competition, productivity, and taxation (the country attributes that are related to my main findings) by lagging FLUIDITY by one, two, three, four, and five periods. I find robust results with all the time lags.

I investigate the roles of human capital development and innovation. The quality of the labor force can enhance productivity (Noorbakhsh, Paloni, and Youssef (2001)), in particular for FDIs that require knowledge creation (Siedschlag, Smith, Turcu, and Zhang (2013)). I estimate interactions between competition and measures of labor force qualification (HCI, which is the human capital development index, sourced from PWT) and innovation output (ln(PATENTS), sourced from the World Bank)). The results show that competition renders FDI location significantly more sensitive to the quality of the labor force and to innovation output in the host economy. These findings corroborate the notion that competition encourages FDI as a source of productivity and technological gains.

TABLE 12

Competition and FDI Location Choices: LPM Estimates (with firm controls)

Table 12 reports the results of linear probability models. We reestimate the models as reported in Table 11, now adding a vector of firm controls. Robust standard errors clustered at the firm level are shown in parenthesis below the coefficients. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable: LOCATION (0/1)				
	1	2	3	4	5
FLUIDITY × ln(GDP)	−0.000				
	(0.000)				
FLUIDITY × TFP		0.003***			
		(0.001)			
FLUIDITY × LABOR_GDP			0.002**		
			(0.001)		
FLUIDITY × NAT_GDP				−0.001*	
				(0.001)	
FLUIDITY × CORPORATE_TAXES					−0.003**
					(0.001)
FLUIDITY	0.001	−0.002***	−0.001**	0.000**	0.001**
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
ln(GDP)	0.008***	0.008***	0.008***	0.008***	0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
TFP	−0.025***	−0.040***	−0.025***	−0.025***	−0.025***
	(0.002)	(0.004)	(0.002)	(0.002)	(0.002)
LABOR_GDP	−0.016***	−0.016***	−0.026***	−0.016***	−0.016***
	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)
NAT_GDP	−0.026***	−0.026***	−0.026***	−0.018***	−0.026***
	(0.004)	(0.004)	(0.004)	(0.006)	(0.004)
CORPORATE_TAXES	−0.005	−0.005	−0.005	−0.005	0.009
	(0.003)	(0.003)	(0.003)	(0.003)	(0.006)
EBIT_ASSETS	−0.003**	−0.003**	−0.003**	−0.003**	−0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
TOBINS_Q	0.000**	0.000**	0.000**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ln(TOTAL_ASSETS)	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ln(SALES_PPE)	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ln(COGS_ASSETS)	−0.001***	−0.001***	−0.001***	−0.001***	−0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LT_DEBT_MARKET_CAP	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PPE_ASSETS	0.004	0.004	0.004	0.004	0.004
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
ln(PPE_EMPLOYEES)	−0.001***	−0.001***	−0.001***	−0.001***	−0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
TAXES_SALES	−0.002	−0.002	−0.002	−0.002	−0.002
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
RD (0/1)	−0.002***	−0.002***	−0.002***	−0.002***	−0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Country controls	Yes	Yes	Yes	Yes	Yes
R^2	0.043	0.043	0.043	0.043	0.043
Model significance (F) (p-Value)	0.000	0.000	0.000	0.000	0.000
N	254,436	254,436	254,436	254,436	254,436

I run batteries of sensitivity checks, relaxing the way labor costs and taxation are measured. I reestimate the models using unit labor costs (ULC) as an alternative proxy for the cost of labor (with data from The Conference Board) and effective average tax rates (EATR) as an alternative proxy for taxation costs (with data from

the Oxford Centre for Business Taxation). The results remain robust to these alternative measures.

I test for the role of competition in spurring agglomeration economies in foreign countries and whether reaping productivity and knowledge spillovers (Head et al. (1995)) are reasons for firms operating under stiffer competition to colocate. I find that firms operating under stiffer competition are more likely to colocate with peers in countries where productivity is higher and local human capital is more qualified. These findings suggest that competition encourages firms to go abroad to benefit from productivity and knowledge spillovers. This evidence is theoretically coherent for several reasons. First, the U.S. economy is highly productive, so productivity-seeking FDI by U.S. firms enduring stiffer competition is more logical if, by doing so, U.S. firms can gain something that is not readily available at home and that could feed back into their organizational routines (e.g., further improving domestic operations) (Desai and Dharmapala (2009)). Spillovers are benefits that firms can seize mostly by venturing abroad through conducting FDI (Head et al. (1995)).

V. Conclusions

I examine the effects of competition on FDI decisions by U.S. multinational firms. I find that competition affects firms' proclivity to undertake FDI and their subsequent country location choices. My results show that firms enduring stiffer product market competition are significantly less likely to undertake FDI. The effect of competition on FDI proclivity is heterogeneous across firms, being stronger when cost structure is burdensome but weaker when growth opportunities are more valuable, when productive efficiency is higher, and when firms have financial slack. However, when firms face profitability shortfalls, competition seems to encourage FDI. The insights from my FDI location choice model suggest that competition renders location choice more strongly sensitive to total factor productivity. Competition intensity also stimulates rational investment location toward countries with lower corporate taxes, suggesting that market forces encourage tax savings.

My article has important academic, managerial, and policy implications. Although a voluminous literature has examined the relationship between competition and investment, little is known about how market forces affect firms' expansion into foreign markets. My study shows that competition plays an important role in affecting the extent to which firms take risks to venture abroad and the geography of FDI. Since FDI is among the most important strategic decisions made by firms, I present important evidence on how market forces and the interactions between rival firms in product markets affect firms' managerial decision-making in a globalized marketplace.

My results also inform policy. While many see competition as an effective mechanism for resolving agency issues and improving allocation efficiency, my results suggest that as competition intensifies at the industry level, foreign activities of firms diminish at the margin. Given the known economic benefits of FDI for investing firms and the positive spillovers it exerts, my findings point to a potential adverse side effect of competitive forces. From the perspective of policymakers in candidate host economies bidding to attract new investments, my findings suggest that interventions aimed at enhancing FDI attractiveness (e.g., labor force

qualification, regulation, and taxation) may need to consider the degree of product market competition that MNEs face in their industries.

However, my article has some limitations. There is an important nuance to be considered, which is that I do not empirically observe the ultimate purpose of the investment (other than that all investments are industrial plants). Thus, some investments will require higher TFP in the host economy, or cheaper labor and natural resources, or demand other attributes that might suit the purpose of the investment. What I can capture in my models is the median/average preferences of the investing firms regarding these locational attributes. This is a limitation in my empirical analysis of FDI location choices. Furthermore, while I employ proxies for competition reflecting competitive threats faced by U.S. firms from U.S. rivals, I lack a measure like Fluidity that is specific to each foreign market. Neither do I examine mergers and acquisitions or joint ventures, which I leave as a fruitful avenue for further research. I also encourage researchers to extend my work to other types of FDI beyond manufacturing, such as innovation investments, which may be affected differently by product market competition and country locational attributes.

Appendix. Variables Summary

Variables	Operationalization	Interpretation	Source
FDI Proclivity Analyses			
FDI (0/1)	1 if firm records FDI in year *t*; =0 otherwise	FDI proclivity	fDi Markets
FLUIDITY	Overlap between firm's and industry's (Δ) product vocabulary	Competition	Hoberg et al. (2014)
EBIT_ASSETS	EBIT (earnings before interest and taxes) scaled by total assets	Operating profitability	Compustat
TOBINS_Q	Market value of equity plus total debt scaled by total assets	Growth opportunities	Compustat
ln(TOTAL_ASSETS)	The natural log of total assets	Size	Compustat
ln(SALES_PPE)	The natural log of sales scaled by PPE (net property, plant, and equipment)	Output efficiency	Compustat
ln(COGS_ASSETS)	The natural log of COGS (cost of goods sold) scaled by total assets	Operating cost	Compustat
LT_DEBT_MARKET_CAP	Long term debt scaled by market capitalization	Leverage	Compustat
PPE_ASSETS	PPE scaled by total assets	Tangibility	Compustat
ln(PPE_EMPLOYEES)	The natural log of PPE scaled by the number of employees	Capital-labor ratio	Compustat
TAXES_SALES	Taxes payable scaled by sales	Taxation costs	Compustat
RD	=1 if firm records research and development in year *t*; =0 otherwise	Innovation	Compustat
HHI_INDEX	The Herfindahl–Hirschman index	Industry concentration	Hoberg and Phillips (2016)
CASH_HOLDINGS	Cash and equivalents scaled by total assets	Financial slack	Compustat
MAXBEN	State maximum unemployment insurance benefits (UIB) weekly payments ($)	Insurance generosity	Dept of Labor
Δln(MAXBEN)	Increase (growth) in maximum state UIB (yoy)	IV for competition	Dept of Labor
ln(RTWVD)	The natural log of state Real Trade-Weighted Dollar Value (1988 = 100)	IV for competition	FRED
ln(MARKUP) (UK SIC3)	The natural log of sales divided by COGS in UK SIC3 industries	IV for competition	Osiris
IMPORT_PENETRATION	Imports divided by imports plus industry sales [NAICS 6-digit]	Foreign competition	USA Trade Online

(continued on next page)

Variables	Operationalization	Interpretation	Source
FDI Location Analyses			
LOCATION (0/1)	=1 if firm locates FDI in country c; =0 otherwise	FDI location choice	fDi Markets
ln(GDP)	The natural log of Real GDP (USD)	Market size	PWT
TFP	Total factor productivity (welfare-relevant)	Productivity	PWT
LABOR_GDP	Labor income scaled by GDP	Labor costs	PWT
NAT_GDP	Natural resource rents scaled by GDP	Natural resource rents	WBK
CORPORATE_TAXES	Taxes on commercial profits	Taxation costs	KPMG
POLITICAL_RISK	ICRG Political Risk index	Expropriation risks	PRS
GDP_GROWTH	The growth rate of GDP	Economic growth	WBK
GDP_PC	GDP per capita (USD 000)	Income levels	PWT
IMPORTS_GDP	Imports scaled by GDP	Trade barriers	PWT
GEOGRAPHICAL_DISTANCE	Total distance (KM 000)	Trade costs	Calculated
EXCHANGE_RATE	Exchange rate increase (growth) (yoy)	Currency returns	PWT
AGGLOMERATION	Number of FDIs by industry peers in the same country	Colocation	fDi Markets
COMMON_LAW	=1 if country follows rule of law; =0 otherwise	Regulatory similarity	Calculated
HCI	Human capital index	Labor force quality	PWT
(ln)PATENTS	The natural log of patent applications per capita	Innovation	WBK
ULC	Unit labor costs	Cost of labor	Conference Board
EATR	Effective average tax rate	Taxation costs	Oxford CBT

Supplementary Material

To view supplementary material for this article, please visit http://doi.org/10.1017/S0022109022000679.

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