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Foreign Ties That Bind: Cross-Border Firm Expansions and Fund Portfolio Allocation Around the World

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Abstract

We investigate whether international operations enhance information links between firms and foreign investors. Exploiting novel subsidiary-level data and within-location variations, we show that, after expanding into another country, a firm attracts greater investment allocation from funds from that country than from other foreign funds. This increase is economically significant, equivalent to one-fifth of the average firm weight in a country-specific portfolio. The observed effect cannot be attributed to funds' influence, persists even when funds are already familiar with the firm, and helps them generate superior risk-adjusted returns. Our results suggest that firms' cross-border economic activities contribute to global financial interconnectedness.

I. Introduction

After several decades of rapid globalization, the aggregate economic activities of firms within their national borders have now been eclipsed by what they

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do across borders.[1] Importantly, firms have not just expanded the scale of their global operations but also their geographic spread, resulting in a noticeable shift in their center of gravity toward new foreign markets.[2] These remarkable global trends have spawned a vast literature that seeks to explain the strategic and economic motives behind firms' cross-border expansions, but according to Foley and Manova (2015), the financial market implications of such actions remain surprisingly less understood. Among them, a particularly ambiguous issue is whether firms' international operations tangibly reduce their information frictions with foreign investors.

Such information dynamics are critical to resolving a paradox: international portfolio investors represent an increasingly large supply of capital,[3] yet their aggregate portfolios are still highly concentrated (Coeurdacier and Rey (2013), Choi, Fedenia, Skiba, and Sokolyk (2017)). In relation to this entrenched concentration, Van Nieuwerburgh and Veldkamp (2009) argue that it is optimal for investors to keep learning more about (and investing more in) assets for which they have some initial information advantages, rather than shifting their attention to other assets. The theory implies that it is mainly the actions initiated by firms, rather than those of investors, that can break down the persistent information segmentation in international portfolio investments. It is possible that a firm's operation in another country serves such a role by providing investors in that country with an information endowment that incentivizes them to focus their learning on the firm.

However, there are significant empirical challenges in establishing this information effect, stemming from the fact that investor learning is not directly observable and can only be inferred from portfolio allocation decisions. First, investors' holdings and firms' international activities may be jointly driven by underlying factors that are not necessarily related to information flows. For example, under Van Nieuwerburgh and Veldkamp's theory, portfolio concentration is partly determined by firm size and investor learning capacity – the same factors identified in other studies as driving the origins and destinations of firms' cross-border expansions.[4,5]

[1]According to the UN Conference on Trade and Development (UNCTAD (2017)), firms' exports and their foreign affiliates' sales reached 30% and 43% of world GDP in 2014, compared to 19% and 21% in 1990.

[2]Using 12 OECD countries with full historical FDI data, we calculate that the average share of the top five destinations in each country's outward FDI stock fell from 79% in 1987 to 39% in 2014. Similarly, data from the Bureau of Economic Analysis show that the relative revenue contributions of US firms' foreign affiliates in the top five host markets fell from 52% in 1983 to 30% in 2014. Using firm-level data from Belgium, Conconi, Sapir, and Zanardi (2016) report that the average number of export markets and FDI destinations of a firm increased from 12.2 and 2.8, respectively, in 1998 to 15.4 and 3.6 in 2008.

[3]Based on the IMF's Coordinated Portfolio Investment Survey (CPIS) data, cross-border equity portfolio investments reached $22 trillion in 2014, representing a third of the global stock market capitalization and a four-fold value increase from 2001.

[4]Melitz and Trefler (2012), Fillat and Garetto (2015), and Jang (2017) provide evidence that multinational firms tend to be large firms and that they have high productivity and financing capacity. These factors may also be related to firm characteristics demanded by institutional investors in general, as shown in Gompers and Metrick (2001) and Baik, Kang, Kim, and Lee (2013).

[5]Firms' foreign operations may concentrate in countries with more sophisticated institutional investors, given evidence from Braun and Raddatz (2008) and Kalemli-Ozcan, Papaioannou, and Peydro (2013) indicating that economic integration and financial sector development are closely intertwined.

Second, causality in any relationship between firms' actions and investors' holdings may run in the other direction: the collective ownership of some foreign investors may grow so large that they have the capacity to influence their portfolio firms' global expansion strategies. Third, investors may make portfolio allocation decisions based on their behavioral biases; for example, they may be more familiar with, and hence, more likely to invest in firms with international operations. Put together, all of these possibilities may create the appearance of an information effect where, in fact, there is none.

Our study's key contribution lies in disentangling the information effect of firms' foreign operations from these other confounding factors. To do this, we propose a novel empirical setting based on *changes* in a firm's operation *within* a specific home country of international portfolio investors – referred to as a source country. Specifically, we assemble a unique data set that captures both the *timing* of a firm's cross-border expansion and its *post-expansion activities* in a given location over a long sample period (1997–2014). The main advantage of our data set is its granular variations, particularly the fact that a single firm can expand into different countries at different times. Our analysis exploits this feature to address the above-mentioned challenges of identifying the information effect.

Our starting point is to separate the information effect from the common drivers of investors' holdings and firms' international activities. We do this by comparing how international investment funds respond differently to the same firm expansion event. Our key variable of interest is the weight of an expanding firm in the combined portfolio of all firms in the same (host) country held by funds from a given source country.[6] The following scenario provides an illustration of our approach. Consider firm i in host country H that in year t expands its operations (by establishing a subsidiary) into one of the source countries of international portfolio investments, S_1. If this action endows funds from S_1 with an initial information advantage that incentivizes them to learn more about firm i, as suggested by Van Nieuwerburgh and Veldkamp, then we should observe an increase in the portfolio preference for firm i (vis-à-vis other firms in country H) among S_1 funds after year t, but not among funds from other source countries, $S_2 \ldots S_N$.[7]

The central idea in the above scenario involves extracting the portfolio response of funds from S_1 to a new information endowment that they receive on

[6]Throughout this study, the term "source country" refers to the home country of a fund, and *not* that of a firm. We will use the term "location" and "destination country" to refer to a firm's specific expansion destination, which is among the set of source countries. The term "host country" refers to a specific foreign market where investors hold their investments, or equivalently, the headquarter country of a sample firm.

[7]Our expectations are also consistent with the patterns observed in the following real cases. In 2007, Las Vegas Sands (LVS), a US corporation, expanded into Singapore through the construction of the iconic Marina Bay Sands casino. The project, completed in 2010, delivered close to 20% of LVS's casino revenue. Our data show that Singaporean funds increased their holdings in LVS by 15 times during this period, whereas the total holdings of US funds and other foreign funds declined. Another example involves a cross-border acquisition. Zhejiang Geely Holdings is a Chinese car producer that was virtually unknown on the international stage before 2009, when it decided to aggressively expand by buying Volvo from Ford. Our data show that, during the acquisition period, there was a surge in new investment into Geely by foreign funds from EU countries, where Volvo's main operations are based. In particular, funds from Sweden declared their holdings in Geely for the first time (about $20 million) in 2009.

firm *i*, while holding other firm and fund characteristics constant. To implement the idea, we rely on the rich variations across firms, source countries, and time to estimate a baseline model that is fully saturated with pair-wise (interactive) fixed effects. Specifically, the firm × year fixed effects control for all cross-sectional and time variations in firm-level determinants of portfolio choice, some of which are unobservable (e.g., productivity, disclosure practices, governance, visibility, and index memberships). The firm × source-country fixed effects control for all time-invariant factors defining a firm-fund relationship (e.g., historical ties, distance, and common language). The source-country × year fixed effects control for the general characteristics of funds from a given country (e.g., size, sophistication, and extent of index investing). Apart from these fixed effects, we rely on the fact that our main measure reflects only portfolio allocation within a specific pair of source and host countries, which further sweeps out all known factors driving the aggregate bilateral investments between the two countries at any given time (e.g., withholding taxes and exchange rates fluctuations).

The estimates from our baseline model indicate that after a firm establishes its first subsidiary in another country, the extent to which the firm is over-weighted by foreign funds from that country ("treated" funds) significantly increases, relative to the contemporaneous portfolio weight changes observed for foreign funds from other countries ("control" funds). This relationship hereafter referred to as the *cross-border expansion effect*, is observed regardless of whether the subsidiary presence is gained through an acquisition or an organic investment. The magnitude of the effect is economically large. Following an expansion, the increase in allocation from destination-country funds is estimated to be equivalent to about one-fifth of the average firm weight in a host-country portfolio held by these funds.

We next address the possibility that firms' expansions may actually be driven by funds' strategic influence. Even with all the fixed effects in our baseline model, the estimated cross-border expansion effect can still be spuriously generated by the *time-varying confounders* within each firm and source-country pair. For example, funds from source country S_1 may, over time, be able to accumulate significant holdings in firm *i* for reasons completely unrelated to the firm's foreign expansion strategies, but this large ownership may induce firm *i* to cater for the funds' collective interest by expanding into S_1. In other words, the timing of such an expansion may not be completely exogeneous.

We address this issue by focusing on a special type of expansion that is unlikely to be influenced by destination-country funds – those created by M&A deals that occur in other countries. As an illustration, consider the scenario of firm *i* gaining an operational presence in country S_1 after it successfully acquires another firm (i'), which has a subsidiary in S_1 but is headquartered outside S_1. In some cases, such a deal may fail to get the required approvals, creating a counter-factual expansion. Similar to Bena and Li (2014), we argue that both the initiation and the eventual success/failure of the acquisition of i' by *i*, which occurs in another jurisdiction outside S_1, is highly unlikely to be influenced by funds from S_1. Our analysis nonetheless indicates that there is a significant increase in S_1 funds' portfolio allocations toward firm *i* if this deal is completed, but not if the deal fails.

We also examine shocks to firms' expansion incentives created by trade policy changes. Following Lileeva and Trefler (2010), we use changes in import tariffs

that S_1 imposes on firm i's products to create an instrument for the timing of firm i's expansion into S_1. Such tariff changes are plausibly exogenous since they are largely determined by a country's trade positions, and not by individual foreign firms and their fund investors. As an alternative approach, we follow Bustos (2011) and use the signing of a new free trade agreement (FTA) to set up a difference-in-differences analysis. This is a reasonably clean shock because FTA negotiations are often protracted and their outcomes are highly uncertain (Lileeva and Trefler (2010)). Both of these analyses confirm our baseline results.

The last issue that our study carefully addresses is the possibility that familiarity bias may be the dominant explanation for the cross-border expansion effect, and not information acquisition. Although both increased familiarity and information acquisition can explain the observed portfolio response to a firm's expansion, we argue that the two hypotheses can be disentangled because they point to different conditions where the effect should be concentrated. For instance, the familiarity hypothesis suggests that it should be more observable among certain investor groups (such as highly home-biased investors) and in unfamiliar investment environments. By contrast, according to Van Nieuwerburgh and Veldkamp's theory, investors *strategically* focus on particular information endowments that deliver the most gains from specialized learning. This implies that the cross-border expansion effect may vary dynamically across investment situations. It may actually be more observable in cases where the investor is already operating in a familiar investment environment, given that specialized learning can further differentiate this investor from the average investor.

As our data set captures the timing of each expansion, we can delve into how the baseline results differ across such *pre-expansion* conditions. This exercise reveals patterns of heterogeneity that are more closely characterized by the second set of predictions described above (information) rather than the first set (familiarity). Specifically, the portfolio effect of a cross-border expansion is not limited only to funds with strong home bias tendencies or only to obscure firms (e.g., those outside of the MSCI indices and with low media coverage). This effect is instead concentrated among industries and host countries where the funds have already developed a high level of specialization, and also increases with the size of the expanding firm and the scale of potential economic benefits associated with the expansion.

To demonstrate with even greater clarity that information plays a role, we analyze specific scenarios where funds and firms have already established a degree of familiarity between them. Motivated by Merton's (1987) theory on investors' attention constraints, we argue that the establishment of familiarity may be a salient event that creates a new investment relationship, but following this event, further variations in portfolio allocation should be predominantly driven by information acquisition. Taking this argument to our empirical context, we assume familiarity is indeed established after firm i expands into country S_1 (as predicted by the familiarity hypothesis), and proceed to investigate subsequent changes to the information endowment between firm i and S_1, in the form of i) additional expansions by firm i into other countries with which S_1 has strong information links and ii) increases in the scale of firm i's activities in country S_1 (as measured by its subsidiary sales). Both of these changes appear to induce funds from S_1 to allocate even more weight to firm i.

Continuing this line of investigation, we examine another scenario where the condition of preexisting familiarity holds even more strongly; that is, one that involves a given fund and only the *existing firms* in its portfolio. Given that the fund should be familiar with the firms it already owns, a systematic increase in portfolio weight in response to the expansion by one of these current portfolio firms into the fund's home country would indicate that such expansions indeed have an information effect. This is exactly what we find when our baseline model is reestimated on the sample of fund-firm pairs where the fund in a given pair has already invested in the firm. Thus, by controlling for preexisting familiarity, we obtain evidence that is strongly supportive of the information hypothesis.

Another key distinction between the information and the familiarity hypotheses is that they lead to unambiguously different predictions on investment returns: picking investment targets based on familiarity cues should not generate superior performance. As we know the timing of each expansion, we can examine whether funds' investment returns are related to their portfolio firms' subsidiary links with their home country. Our analysis indicates that the *post-expansion portfolio changes* of "linked" funds predict a firm's *subsequent* returns, but the same changes of "nonlinked" funds do not. The information advantages of linked funds appear to arise as soon as a link is established. Comparing cross-border expansion events, we find that the return in the year after each event is on average 1.5% higher when the expanding firm is relatively over-weighted by linked funds compared to nonlinked funds. The post-expansion increase in return predictability is observed even in scenarios where familiarity is already established, that is, among specific fund-firm pairs with preexisting investment relationships. Collectively, our return predictability evidence does not support the possibility that an expansion *only* triggers familiarity-driven fund purchases.

Our study contributes to the body of literature examining information frictions in international portfolio investments. Many studies, such as Chan, Covrig, and Ng (2005), Portes and Rey (2005), and Andrade and Chhaochharia (2010), attribute such frictions to geographical, cultural, and economic relationships between countries. For example, they find that the country-level allocation of international portfolio investors is correlated with distance, common language, and trade and FDI flows.[8] Other studies focus on firm-level transparency and visibility, and find that foreign investors prefer to invest in stocks of local firms with foreign sales (Kang and Stulz (1997), Dahlquist and Robertsson (2001), and Ferreira and Matos (2008)), foreign listings (Ammer, Holland, Smith, and Warnock (2012)), and strong disclosure practices (Covrig, Defond, and Hung (2007)).[9] Although these studies have identified many important determinants of global portfolio allocation, they rely on relatively coarse (country- and firm-level) proxies for information acquisition costs. By examining connections between investors and firms, instead of their broad characteristics, our study is able to provide new evidence in support of the information-based theories of international portfolio concentration (Van Nieuwerburgh and Veldkamp (2009), Dziuda and Mondria (2012)).

[8]Choi et al. (2017) find that portfolios tilted toward countries with similar characteristics to investors' home countries earn excess returns, suggesting that they generate information advantages.

[9]Lee, Naranjo, and Sirmans (2016) document that firms' connections to foreign jurisdictions with strong property rights lower their credit risk.

In this sense, our study expands a limited set of evidence that is also based on firm-investor links. Specifically, Schumacher (2017) and Karolyi, Ng, and Prasad (2020) show that funds' industry expertise and connections with foreign markets (through historical investment relationships and parent institutions) influence investment allocation. Other studies focus on connections created by the geography of firms' operations. Ke, Ng, and Wang (2010) examine a snapshot of US firms' subsidiary locations in the 2001–2002 period and find that foreign funds tend to overweight firms operating in the funds' home countries. Bernile, Kumar, and Sulaeman (2015) further show that, even within the USA, firms' exposure to local (state-level) factors explains the portfolio decisions of local funds. Overall, these studies only examine static connections between firms and investors, that is, whether they are somehow linked, but not *when* this link is established. By identifying the timing of an expansion and measuring post-expansion changes for each firm and investor country pair, our study can make more definitive statements about when an investor's information set in relation to a foreign firm changes. This empirical setup creates a large panel data set with enough power to accommodate multiple new empirical strategies that can disentangle the information effect of a cross-border expansion from other explanations.

Analyzing a long sample period (1997–2014) also allows us to offer new insights into the trends of international portfolio investments. While the literature contends that international funds' portfolios have persistently high levels of concentration, we identify some significant recent changes. Strikingly, we show that country-specific portfolios held by foreign funds have actually become more diversified to such an extent that, in many markets, they have started to resemble those held by domestic funds. Our analysis suggests that firms' foreign operations contribute to explaining this phenomenon. It arises because there have been *more firms* around the world that expanded across borders, and each firm to *more markets*, which increases the scale of information linkage between firms and new groups of investors.

In a broader context, our results corroborate the view that globalization involves two deeply intertwined processes: economic and financial integration (Antras and Caballero (2009). We expand the current set of country-level evidence (Braun and Raddatz (2008), Kalemli-Ozcan et al. (2013), and Akbari, Ng, and Solnik (2020)) by showing that such dependence intrinsically exists at the firm level. Our focus on firms' activities also generates important implications for policy actions on financial integration. Given that past studies have suggested that market-wide liberalization efforts have their limits (Bekaert, Harvey, Lundblad, and Siegel (2011), Carrieri, Chaieb, and Errunza (2013)), our evidence points to important, multi-faceted benefits of other policies aimed at encouraging domestic firms' cross-border expansions. In particular, as bilateral trade and investment agreements help firms capture economic opportunities abroad, a secondary but important consequence of this internalization effort is that firms also attract a more diverse investor base, which delivers the same type of benefits as those associated with operating in a globally integrated financial market.[10]

[10]For example, Lau, Ng, and Zhang (2010) and Bekaert et al. (2011) show that financial integration enhances global risk sharing and lowers firms' cost of capital.

II. Data and Variables Construction

A. Measuring Foreign Expansions Using Subsidiary Information

Our study captures firms' expansions into specific countries through their foreign subsidiaries establishment. The timing of an expansion is defined as the year in which a firm establishes the first subsidiary in a given country. This approach reflects the well-accepted view in the literature that subsidiary presence is a strong indicator of a country's strategic importance as a target market and/or production location.[11] The subsidiary's data are obtained from the Orbis and Osiris databases provided by Bureau van Dijk (BvD), now a division of Moody's Analytics. Because of their wide coverage of public firms' and private firms' information, primarily sourced from regulators and business registers, the BvD databases have been utilized to offer micro-level evidence on real economic activities.[12]

We use a comprehensive procedure to compile all the foreign subsidiaries of each sample (listed) firm and identify when the firm establishes the first subsidiary in another country. This is described in detail in Supplementary Material Appendix A-1 and summarized below. We use the annual historical versions of both the Orbis and Osiris databases, starting from 2001 for Osiris and 2005 for Orbis. We exclude subsidiaries owned by less than 20% and define their locations by their countries of incorporation. There are in total 883,221 foreign subsidiaries, and we determine whether each one is acquired or incorporated by the parent. To identify acquired subsidiaries, we match them with M&A deals in the Thomson Reuters SDC Platinum database. This detects both directly acquired subsidiaries (where they match to actual M&A targets) and indirectly acquired subsidiaries (where their parents are M&A targets). For each of these subsidiaries, the establishment year is the year that the acquisition is announced. For the remaining subsidiaries, we use a name-parsing algorithm to identify those that are likely to be set up (incorporated) by their parents. This step exploits a convention that multinational firms tend to follow to maintain and promote their corporate identities in foreign markets: naming a foreign subsidiary eponymously after the parent firm or the main brand of the firm. For these subsidiaries, we use the year of incorporation as the establishment year. The remaining gap in the data is filled through our own manual data collection effort to obtain information on the year that a firm establishes the first subsidiary in a foreign country. Finally, if our manual searches fail, we use the first year that a subsidiary is linked to its parent firm by BvD (referred to as BvD entry year) as the estimate of its establishment year. This last step only accounts for 8.9% of the observations associated with firm-country pairs that have subsidiary connections. In Section III.D and Supplementary Material Appendix A-1, we show that our results are not sensitive to any of the above steps.

[11]For example, Conconi et al. (2016) provide evidence that a new subsidiary tends to be established around a large increase in a firm's sales in the target country.

[12]For example, Gopinath, Kalemli-Ozcan, Karabarbounis, and Villegas-Sanchez (2017) show that Orbis firms in their sample countries account for about 75% of actual (census-based) aggregate economic activity.

B. Global Investment Funds Holdings Data

To capture the preferences of international portfolio investors, we use global firm-level holdings data of investment funds provided by the Thompson Reuters (TR) Global Ownership database, similar to Chan et al. (2005) and Lau et al. (2010). We extract from the database the dollar value of each reported holding (instead of the number of shares held) to minimize potential issues such as incorrect stock split adjustments.[13] To maximize our sample coverage in some countries with a small number of funds, we supplement the TR database with additional fund holdings obtained from the Factset database.[14] This creates, to the best of our knowledge, the most comprehensive data set of global equity holdings of investment funds to date, covering 78,798 investment funds from 1997 to 2014.

To classify the geographic origin of an investment fund, we use its registration/domicile country.[15] When this is not available, we manually identify the location of the fund's parent institution. The same process applies to offshore funds – those domiciled in well-known tax havens (e.g., Cayman Island), micro-states (e.g., Liechtenstein), and two major funds "offshoring centers" of Ireland and Luxembourg (Chan et al. (2005)). This allows us to trace the origins of offshore funds to countries with sizable economic activities. Overall, there are 32 countries in the sample whose funds invest internationally. They are referred to in this study as sample source countries and are listed in Supplementary Material Table A-I.

C. Final Sample and Coverage Statistics

The sample of listed firms used in our analysis is created by merging the fund holdings data set above with the Thomson Reuters Worldscope database. We exclude listed collective investment entities and firms with market capitalization of less than US$1 million. The final sample comprises 58,379 firms in 47 host countries from 1997 to 2014. For each sample firm, we define its host country based on the listing location of the firm's primary security. As the TR Global Ownership database reports holdings down to the security level, we consider only fund holdings in the primary securities and not the cross-listed securities of local firms. Nonetheless, we still control for firms' cross-listings in some specifications. Table 1 reports that the aggregate size of funds' holdings has increased over our sample period, both in terms of absolute value and as a proportion of market capitalization (columns 3–5).[16]

[13]It is possible that holding values are not free of stock-split related errors if such values are in fact inferred from funds' reported numbers of shares held. We find that there are 0.14% of the total number of firm-years in our original sample where the sum of the last reported holding values of all funds in a given firm exceeds the firm's year-end market capitalization. To resolve these potentially anomalous cases, we obtain from Datastream the split adjustment factors of the firms involved and correct the reported holding values if the relevant split factors in the TR database differ to those from Datastream. We then exclude any remaining firm-year instances where the above total ownership figure is still above 100%.

[14]We do this for markets with fewer than 150 domiciled funds (Argentina, Chile, Czech Republic, Greece, Hungary, Indonesia, Israel, Mexico, New Zealand, Philippines, Pakistan, Thailand, and Turkey).

[15]Chuprinin, Massa, and Schumacher (2015) document that 20% of international funds are "outsourced" to external managers. Some managers may be local. Later we also use the locations of fund managers as a robustness check.

[16]The data coverage for individual countries is reported in Supplementary Material Table A-I.

TABLE 1

Sample Coverage and Summary Statistics of Portfolio Preference Measures

For each year in the sample period, column 1 of Table 1 reports the total number of sample firms. Column 2 reports the world total market capitalization (in US$ billion). Columns 3 and 4 report the total equity holdings value (in US$ billion) of all foreign funds and domestic funds used in this study (sample funds). Column 5 reports the total equity holding value held by sample funds relative to the world total market capitalization. Columns 6 and 7 report the cross-country median of the country-specific interquartile range of the firm-level portfolio bias measures. These bias measures are $\overline{w}_{it}^{F} - w_{it}^{M}$ for foreign funds and $w_{it}^{D} - w_{it}^{M}$ for domestic funds. For each firm i in year t, $\overline{w}_{it}^{F}$ is the average of w_{iSt} (the weight of firm i in the host-country portfolio of funds from S in year t) across source countries, w_{it}^{D} is weight of firm i in the host-country portfolio of domestic funds in year t, and w_{it}^{M} is the market capitalization weight of firm i in year t.

			Aggregate Holdings Value of Funds in the Sample			Country-Specific Interquartile Range of Portfolio Bias	
	No. of Firms	Aggregate Market Capitalization	Foreign Funds	Domestic Funds	(3) + (4) as % of Market Capitalization	Foreign Funds	Domestic Funds
	1	2	3	4	5	6	7
1997	26,739	23,010.24	654.05	2,180.85	12.32	0.146	0.075
1998	27,758	26,585.18	885.02	2,852.87	14.06	0.151	0.070
1999	29,223	36,128.92	1,387.41	3,786.53	14.32	0.127	0.056
2000	30,101	31,521.17	1,485.68	3,930.63	17.18	0.110	0.072
2001	29,474	26,211.76	1,260.65	3,526.28	18.26	0.110	0.076
2002	29,330	21,342.46	1,072.00	2,879.65	18.52	0.111	0.076
2003	30,247	28,876.46	1,650.12	4,075.65	19.83	0.120	0.066
2004	31,561	33,748.23	1,957.92	4,636.75	19.54	0.135	0.076
2005	32,880	38,034.07	2,536.54	5,151.15	20.21	0.103	0.087
2006	34,345	46,394.78	3,473.91	6,081.34	20.60	0.089	0.075
2007	35,680	55,185.04	4,163.05	6,797.74	19.86	0.074	0.074
2008	34,277	29,347.54	2,122.81	3,882.57	20.46	0.076	0.058
2009	34,622	41,764.10	3,074.19	5,341.89	20.15	0.073	0.049
2010	35,179	48,273.49	3,504.01	6,035.76	19.76	0.075	0.049
2011	34,966	42,258.93	2,946.54	5,557.65	20.12	0.070	0.084
2012	34,336	48,098.33	3,921.26	6,455.36	21.57	0.073	0.071
2013	33,565	57,013.17	4,961.71	8,511.99	23.63	0.073	0.062
2014	33,132	58,912.83	4,748.53	8,742.40	22.90	0.087	0.067

III. Funds' Portfolio Responses to Firms' Cross-Border Expansions

A. Baseline Model

Our empirical analysis is motivated by the theoretical implications of Van Nieuwerburgh and Veldkamp (2009). Their model explains why some investors choose to learn more about the risks of certain assets, even when they have the capacity to acquire information about other assets. They argue that there is a feedback effect between learning and portfolio concentration because specialization delivers increasing returns to scale. When an investor is endowed with some information on specific assets, the investor initially holds more of these assets; and as a result, other information pertaining to the same assets becomes more valuable to acquire, leading to further concentration.

Van Nieuwerburgh and Veldkamp point to three factors that drive such specialization. First, investors with superior learning capacity are more likely to hold concentrated portfolios. Second, such investors tend to concentrate on large assets and those that the average investor is highly uncertain about since the profit from such specialization is greater. Third, investors should learn more about (and hold more) assets with respect to which they possess some endowed

information advantages.[17] Our study proposes and tests the possibility that a firm's operations in another country provide funds from that country with an information endowment, leading to a positive and persistent effect on the funds' portfolio allocation.

However, the Van Nieuwerburgh and Veldkamp model also raises a clear empirical challenge: to establish this information endowment effect, it is important to fully account for the firm and investor characteristics that influence portfolio concentration. These characteristics may also be correlated with the patterns of cross-border expansions.

To address this issue, our general approach is to examine variations in portfolio preferences across the three dimensions of firm, investor, and time. Specifically, our starting point is the following multidimensional panel data regression model (the baseline model):

$$w_{iSt} = \alpha L_{iSt} + \phi_{iS} + \eta_{it} + \delta_{St} + \varepsilon_{iSt}. \tag{1}$$

In the above model (and for the remainder of the article), i denotes a sample firm, S denotes a source country (or funds' home country), and t denotes a year within the sample period. The dependent variable (w_{iSt}) captures the allocation decisions faced by funds when they consider firms to invest in a foreign country. It is computed as the weight of firm i in the aggregate host-country portfolio held by all foreign funds from source country S:

$$w_{iSt} = \frac{\sum_{j \in S} \text{PI}_{ijt}}{\sum_{i \in H} \sum_{j \in S} \text{PI}_{ijt}}, \tag{2}$$

where PI_{ijt} denotes the investment holding value of foreign fund j in firm i in year t, and H (S) denotes the host (source) country of firm i (fund j).[18,19]

L_{iSt} is the economic activity link between firm i and source country S in year t. The main proxy that we use for L_{iSt} is an indicator variable (POST_EXPANSION) for whether the firm has already established a subsidiary in source country S by year t. The year in which POST_EXPANSION switches from zero to one indicates the timing of firm i's entry into S (or a significant operational expansion).

[17] A similar implication is provided by Cooper and Kaplanis (1986) in a model with no investor learning. They show that, when investors incur holding (including information) costs proportional to their holdings in specific assets, their optimal portfolio choice can be expressed as a linear function of three components: investor-specific and asset-specific costs, and the costs born by individual investors in holding specific assets.

[18] For each fund, we use the holdings in the December quarter, which appears with the highest frequency in the data. If this is not available, we use holdings from the quarter nearest to December.

[19] Most of our analysis focuses on a firm's weight in the *aggregate* portfolio of all funds in a source country, rather than that of individual funds, because the expansion destination data are also source-country specific. The aggregation also reduces noise arising from fund ownership reporting, and we exclude observations where there are fewer than three funds from S investing in H in year t. It is also important to emphasize that our portfolio weight measure already reduces the noise relative to a measure based on a firm's percentage ownership held by funds, which is directly correlated with any missing holdings.

The remaining terms, η_{it}, ϕ_{iS}, and δ_{St}, are firm × year, firm × source-country, and source-country × year fixed effects.[20]

Equation (1) is essentially a staggered difference-in-differences model estimated on the full set of firm and source country pairs. That is, the estimation sample includes both the source countries where firm i establishes operations and those without firm i's operations. The expansion of firm i into country S can therefore be viewed as a *treatment on funds from country S*. Such treatments can occur at different times for different source countries. The "control" group includes funds from source countries where firm i does not have a subsidiary. The coefficient α estimates the portfolio effect of an expansion by capturing the difference in portfolio weight *changes* between treated funds and control funds in response to a given expansion by firm i. The following stylized example illustrates more clearly the layout of our data and the working of the baseline model:

Year	Source Country	w_{iSt} (%)	POST_EXPANSION
2010	S_1	4	0
2011	S_1	6	1
2010	S_2	3	0
2011	S_2	4	0

The example involves a single firm (firm i) from host country H, two source countries, S_1 and S_2, observed over 2 years, 2010 and 2011. Firm i expands into S_1 in 2011, but not into S_2. Funds from S_1 (S_2) are therefore "treated" ("control") funds. In the model, the firm × source-country fixed effects term, ϕ_{iS}, ensures that the estimation extracts the increases in w_{iSt} for both S_1 and S_2, whereas firm × year fixed effects term, η_{it}, controls for the common component of the observed w_{iSt} changes. In this case, there appears to be some underlying reasons for both funds from S_1 and S_2 to increase their weights in firm i. However, the change is greater for S_1 funds, indicating that the expansion elicits a stronger portfolio response from these funds.

We now discuss in detail how our baseline model addresses the empirical issue raised earlier, that is, controlling for other determinants of portfolio concentration.

1. Firm-Level Characteristics

As implied by the Van Nieuwerburgh and Veldkamp model, both treated and control funds may increase their holdings in an expanding firm if the expansion coincides with changes in generic firm characteristics (e.g., size, risk, and productivity) that make it valuable for all investors to learn more about the firm.[21] Outside this model, an expanding firm may also possess characteristics that influence the investment costs of all funds (such as governance structures, disclosure practices, index memberships, free-float shares, trading liquidity, etc.). Equation (1) therefore includes the fixed effects term η_{it}, which accounts for all firm-level variations that occur at the same time as an expansion, including those generated by *unobservable* firms' attributes. Here, the staggered nature of a firm's foreign expansion events is

[20]Similar models with full sets of interactive fixed effects have been recently employed in various contexts, for example, to examine the monitoring activities of venture capitalists (Bernstein, Giroud, and Townsend (2016)).

[21]Melitz (2003) provides a theory on the effect of firm productivity on the decision to export.

a key advantage of our setting. If instead, each firm in the sample expands to all foreign countries only at one point in time t^*, then we would not be able to distinguish whether the observed portfolio weight change is in response to the expansion decision or to other concurrent firm-level shocks.

2. Investor-Level Characteristics

One way that our baseline model accounts for these characteristics is by "benchmarking" funds from one country against their peers from other countries. The focus on foreign funds ensures that our results are derived from a group of representative portfolio investors whose decisions are governed by the shared (rather than private) benefits of investing in a given firm. When a firm expands into a new market, the decision generates cash flows attributable to all investing funds, but how individual funds value the cash flows can differ depending on their information sets. We further note that it is not necessary to adjust w_{iSt} by a common benchmark, such as the market capitalization weight of firm i (i.e., $w_{iSt} - w_{it}^M$, commonly referred to as investment bias). Incorporating w_{it}^M is redundant as it is fully absorbed by the firm × year fixed effects, η_{it}.

In addition, our model includes the source-country × year fixed effects term, δ_{St} to control for any remaining contemporaneous difference in portfolio preferences between treated and control funds that might be also correlated with cross-border expansions. For example, a regulation change in country S in year t may improve the efficiency of its financial sector, attracting firms' expansions into the country and increasing the learning capacity of its funds (and hence, their portfolio concentration). Outside the Van Nieuwerburgh and Veldkamp model, it is also possible that a source country's international portfolio allocation behavior may change when it experiences a substantial growth in passive funds and ETFs.

3. Other Links Between a Firm and a Source Country

These connections can drive both firm expansion and portfolio allocation. For example, the host country H of firm i and source country S may have geographic/cultural proximity and share a common language. Another possibility is that funds from S may specialize in industries that are salient in country S (Schumacher (2017)), and firm i happens to belong to one such industry. There may also be a large number of funds from S that are set up by parent institutions headquartered in country H, a type of link investigated in Karolyi et al. (2020). To the extent that such links are time-invariant, our baseline model controls for them through the firm × source-country fixed effects (ϕ_{iS}). In other words, the model only estimates the change in w_{iSt} in response to a firm's expansion. In addition, we note that our model's estimates are not driven by any variation over time in the relationships between a source country and a host country. These changes are accounted for in the construction of w_{iSt}, which reflects only *within-country-pair* portfolio allocations (i.e., the measure is scaled by the total value of fund investments from S into H in year t).[22]

[22]Consider a hypothetical example: the introduction of direct flights between countries H and S. Motivated by the findings of Bernstein et al. (2016), one could suggest that the reduction in travel time may improve bilateral information flows, encouraging firms from H to expand into S and funds from S to invest more in H. However, it is completely ambiguous how the event changes the preference of S funds

To our best knowledge, no study in the related literature has employed a similar model with the full set of fixed effects, ϕ_{iS}, η_{it}, and δ_{St}, to control for the above-mentioned variations that are unrelated to the information link between firm i and country S. The fact that our study can do this is not trivial: it is possible because our data set is highly granular and spans a large set of international firms and a long sample period.

4. Alternative Specifications

In addition to equation (1), we estimate three other models, where firm, year, and source country are combined into only two fixed effects terms, to test whether a correlation between L_{iSt} and w_{iSt} exists along each of the dimensions of our data:

$$w_{iSt} = \alpha L_{iSt} + \beta' \mathbf{X}_{it} + \delta_{St} + \gamma_i + \varepsilon_{iSt}, \tag{3}$$

$$w_{iSt} = \alpha L_{iSt} + \beta' \mathbf{X}_{it} + \phi_{iS} + \theta_t + \varepsilon_{iSt}, \tag{4}$$

$$w_{iSt} = \alpha L_{iSt} + \eta_{it} + \sigma_S + \varepsilon_{iSt}, \tag{5}$$

where γ_i, σ_S, and θ_t are firm, source-country, and year fixed effects. $\mathbf{X}_{it}$ is a vector of firm-level control variables in equations (3) and (4) (fully subsumed by the firm × year fixed effects in equation (5) and in the baseline model, equation (1)). Our choice of control variables is guided by prior studies showing that foreign investors have a preference for transparent and internationally visible firms.[23] $\mathbf{X}_{it}$ therefore includes different time-varying indicators for whether a firm is cross-listed, is a constituent of the MSCI All Country World Index, has analyst coverage, and has adopted the International Financial Reporting Standards. Other control variables capture the fact that funds' investment allocation can be dictated by investment styles, transaction costs, mandates, and regulations (see Gompers and Metrick (2001), Covrig, Lau, and Ng (2006), among others). These include firm size, book-to-market ratio, return momentum, dividend yield, leverage, and stock return volatility.

B. Aggregate Trends in Funds' Host-Country Portfolio Allocation

Columns 6 and 7 in Table 1 provide the country-level concentration statistics of funds' host-country portfolios. For ease of reporting, we take the average of w_{iSt} across source countries to compute one value for each firm-year ($\overline{w}_{it}^{\mathrm{F}}$), and then adjust it by the firm's market capitalization weight ($\overline{w}_{it}^{\mathrm{F}} - w_{it}^{\mathrm{M}}$). This gives a measure of the average portfolio bias of foreign funds with respect to each firm. To show the overall foreign funds' portfolio concentration in each country, we compute the inter-quartile range (IQR) of $\overline{w}_{it}^{\mathrm{F}} - w_{it}^{\mathrm{M}}$. For comparison, the same set of statistics is also reported for domestic funds. The IQR statistics in Table 1 are clearly larger for

for a particular firm relative to other firms in country H, as measured by w_{iSt}. The same rationale applies to other changes at the country-pair level, such as in exchange rates, withholding taxes, and bilateral treaties.

[23] Ammer et al. (2012) show that cross-listing can boost foreign investments in a firm's local securities.

TABLE 2

Summary Statistics of Cross-Border Expansions

In Table 2, for each year in the sample period, the reported statistics are first computed for each host country and then summarized as the median across all countries. Statistics in columns 1–3 are computed using only foreign subsidiaries located in one of the 32 source (home) countries of funds in our data set. A foreign location is a country (among these source countries) where a firm has established a subsidiary. Column 1 reports the percentage of firms with a foreign subsidiary among all firms (with subsidiary information) in the same country. Column 2 reports the average number of foreign locations for firms with subsidiary information in each country. Column 3 reports the same average, but only for firms with at least one foreign subsidiary. Column 4 reports the percentage of firms in each country that reports nonzero foreign sales (obtained from the Worldscope database). Column 5 reports the average fraction of foreign sales to total sales for firms with foreign sales information in each country. Column 6 reports the value of the exports of goods and services of each country scaled by its GDP (using country-level data from the World Bank).

		No. of Foreign Locations Per Firm				
	% of Firms With Foreign Subsidiaries	All Firms	Firms With Foreign Subsidiaries	% of Firms With Foreign Sales	Foreign Sales as % of Total Sales	Exports/ GDP
	1	2	3	4	5	6
1997	44.54	1.14	2.74	35.94	22.35	36.64
1998	42.51	1.18	2.63	37.04	21.91	38.21
1999	39.63	1.12	2.66	32.76	21.90	38.81
2000	39.36	1.14	2.67	34.73	21.95	42.26
2001	37.93	1.16	2.77	35.76	24.29	41.31
2002	39.13	1.26	2.84	39.04	25.85	40.98
2003	39.85	1.22	2.79	37.65	26.07	41.51
2004	41.19	1.24	2.77	36.94	26.82	43.96
2005	42.20	1.18	2.80	32.59	27.13	45.23
2006	43.16	1.19	2.87	31.97	26.67	46.82
2007	43.11	1.23	3.01	29.17	27.73	46.77
2008	45.90	1.26	3.20	31.22	24.31	47.69
2009	50.86	1.30	3.33	32.68	25.99	42.41
2010	51.74	1.40	3.31	32.78	27.65	45.38
2011	52.96	1.56	3.41	34.06	28.99	47.89
2012	54.63	1.68	3.50	41.18	27.26	47.86
2013	55.77	1.73	3.45	43.07	26.66	47.52
2014	58.04	1.85	3.43	41.67	34.79	47.40

foreign funds than for domestic funds.[24] However, this difference has narrowed over time. That is, foreign funds started out with concentrated portfolios but have increasingly spread out their investments within a country, to the extent that their aggregate portfolios have started to resemble those of local investors.

To the best of our knowledge, this convergence in investment behavior has not been explicitly documented nor explained. Our country-level data summary suggests that it may be related to the observed increase in the geographic spread of firms' global expansions. Table 2 reports that the average number of foreign locations of each firm nearly doubles from 1.1 in 1997 to 1.9 in 2014 (column 2). This reflects both the greater number of firms becoming multinational firms (column 1) and the expansion into more locations among firms that already have foreign operations (column 3). These trends obtained from our subsidiary data are also consistent with other foreign activity indicators, such as the percentage of listed firms in each country reporting international sales (column 4), the foreign revenue share of these firms (column 5), as well as a country's total exports scaled by GDP (column 6).

[24]We also report in Supplementary Material Table A-I substantial differences across host countries in the foreign-fund IQR statistics. The median IQR is three times larger for emerging markets than for developed markets, which is consistent with their stylized differences in corporate transparency. Akbari et al. (2020) also show that the gap between these markets in financial integration has narrowed, but slowly.

C. Baseline Results Using Expansion Timing

The results attained by using POST_EXPANSION as a proxy for L_{iSt} are reported in Table 3. The first three columns report the specifications with only one pair-wise fixed effects term. Column 1 shows that controlling for source-country × year fixed effects (equation (3)), funds from S over-weight firms with a subsidiary presence in S by a larger margin than other local firms. Column 2 shows that controlling for firm × source-country fixed effects (equation (4)), w_{iSt} increases after firm i establishes a subsidiary in S. Column 3 shows that

TABLE 3

Establishment of Foreign Subsidiaries and Firm Weights in Foreign Funds' Portfolios

Observations in Table 3 are firm, year, and source country combinations. The dependent variable is w_{iSt}, or the weight of firm i in the host-country portfolio held by funds from source country S in year t. POST_EXPANSION is the indicator variable for whether firm i owns a subsidiary in source country S in year t. POST_EXPANSION_ACQ (_INCORP) indicates whether POST_EXPANSION equals 1 and the presence is established through the acquisition of an existing firm/subsidiary (the incorporation of a new subsidiary). MSCI, FOREIGN_LISTING, IFRS, and ANALYST are the indicator variables for whether, in a given year, a firm is an MSCI All Country World Index constituent, has securities cross-listed in a foreign stock market, follows the International Financial Reporting Standards, and has analyst following, respectively. SIZE is the natural logarithm of total assets in US dollars. TURNOVER is the total trading volume in a year scaled by the number of issued shares. BOOK_TO_MARKET is the ratio of the book value of equity to market capitalization. MOMENTUM is the cumulative monthly stock return in a given year. DIVIDEND_YIELD is the sum of all cash dividends per share in a year divided by the stock price at the beginning of the fiscal year. LEVERAGE is the ratio of total debt to total assets. VOLATILITY is the standard deviation of monthly returns. Clustered standard errors are shown in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4	5
POST_EXPANSION	0.022***	0.019**	0.022***	0.031***	
	(0.005)	(0.009)	(0.005)	(0.009)	
POST_EXPANSION_ACQ					0.048***
					(0.014)
POST_EXPANSION_INCORP					0.021***
					(0.008)
MSCI	0.219***	0.219***			
	(0.027)	(0.027)			
FOREIGN_LISTING	0.035***	0.032***			
	(0.007)	(0.005)			
IFRS	0.071	0.063***			
	(0.063)	(0.026)			
ANALYST	−0.010***	−0.010***			
	(0.003)	(0.003)			
SIZE	0.063***	0.061***			
	(0.005)	(0.004)			
TURNOVER	−0.296***	−0.301***			
	(0.060)	(0.048)			
BOOK_TO_MARKET	0.002	0.002			
	(0.002)	(0.002)			
MOMENTUM	0.005***	0.005**			
	(0.001)	(0.002)			
DIVIDEND_YIELD	0.011	0.025			
	(0.147)	(0.081)			
LEVERAGE	0.015***	0.015***			
	(0.005)	(0.003)			
VOLATILITY	−0.024**	−0.021***			
	(0.010)	(0.007)			
Types of fixed effects:					
Firm + source × year	Yes				
Firm × source + year		Yes			
Firm × year + source			Yes		
Firm × year + firm × source + source × year				Yes	Yes
No. of obs.	9,739,793	9,739,793	9,953,553	9,953,553	9,953,553

controlling for firm × year fixed effects (equation (5)), the weight of firm i is larger in the host-country portfolios of funds from countries where i has subsidiaries than in those of other funds.

The estimates of our main specification incorporating all the pair-wise fixed effects (equation (1)) are reported in column 4. The positive coefficient for POST_EXPANSION indicates that, after firm i expands into S, the increase in w_{iSt} for S funds is greater than that of other foreign funds. In column 5, we split expansions into two types: those involving the acquisition of an existing local firm/subsidiary (POST_EXPANSION_ACQ) or the incorporation of a new subsidiary (POST_EXPANSION_INCORP). Both variables are significant, confirming that our baseline results are not sensitive to a particular mode of foreign-market entry (acquisition or greenfield investment). The significant result for acquisitions also alleviates the concern that some cross-border expansions may be protracted or largely expected.

It is important to emphasize that the economic magnitude of our estimates in Table 3 should be interpreted according to the scale of w_{iSt} as a *portfolio weight* measure. For example, the coefficient of POST_EXPANSION in column 4 indicates that holding other factors constant, a cross-border expansion has the effect of increasing the firm's weight in the aggregate host-country portfolio held by funds from that location by 0.031 percentage points, or equivalent to about *one-fifth* of the average weight (0.16%) in such a portfolio.

To more clearly show that the observed cross-border expansion effect is immediate and sharp, we plot the relationship between L_{iSt} and w_{iSt} (Figure 1). Specifically, we focus on the "eventually treated" (i, S) pairs – those with in-sample changes in L_{iSt} – and plot the average w_{iSt} around each expansion event, Year 0 (Graph A). This is compared to the average of the weights of firm i in the host-country portfolios of funds from other source countries where firm i has *no* subsidiary presence in year t ($\overline{w}_{it}^{\mathrm{NL}}$). As the averages of w_{iSt} and $\overline{w}_{it}^{\mathrm{NL}}$ can be driven by changing sample compositions, we also replicate the plot using a balanced sample, involving (i, S) pairs with data for at least 3 years before and after Year 0 (Graph B). In both cases, the gap between w_{iSt} and $\overline{w}_{it}^{\mathrm{NL}}$ starts to widen from Year 0. There is no deviation *before* Year 0, suggesting that the parallel trend assumption holds.

D. Robustness Checks on Baseline Results

1. Year-by-Year Differences

A potential critique of our approach is that the large sample size associated with a multidimensional panel data set may make it easier to reject the null hypothesis, even when the effect size is small. In Supplementary Material Table A-II, we focus on the "eventually treated" pairs and analyze them on a year-by-year basis. With this approach, our panel data set is sliced into relatively small subsamples, but we still observe the same cross-border expansion effect for each year after Year 0, but not before.

2. Firm-Level Estimation

We also analyze the aggregate portfolio response to firms' expansions exhibited by *all* foreign funds, and by domestic funds (Supplementary Material

FIGURE 1

Changes in Portfolio Weights Around a Cross-Border Expansion Event

The observations in Graphs A and B of Figure 1 are "eventually treated" firm and source country pairs, where for each pair, the firm establishes a subsidiary in the country for the first time *within* the sample period and after the firm's listing date. The expansion event year (Year 0) is the first subsidiary establishment year. The diamonds-marked line plots the average of w_{iSt} (the weight of firm *i* in the portfolio of funds from *S* in year *t*) for all firm-country pairs in a given event year relative to Year 0. The squares-marked line plots the average of $\overline{w}_{it}^{NL}$, which is itself the average of w_{iSt} for the set of source countries where firm *i* has *no* subsidiaries in year *t*.

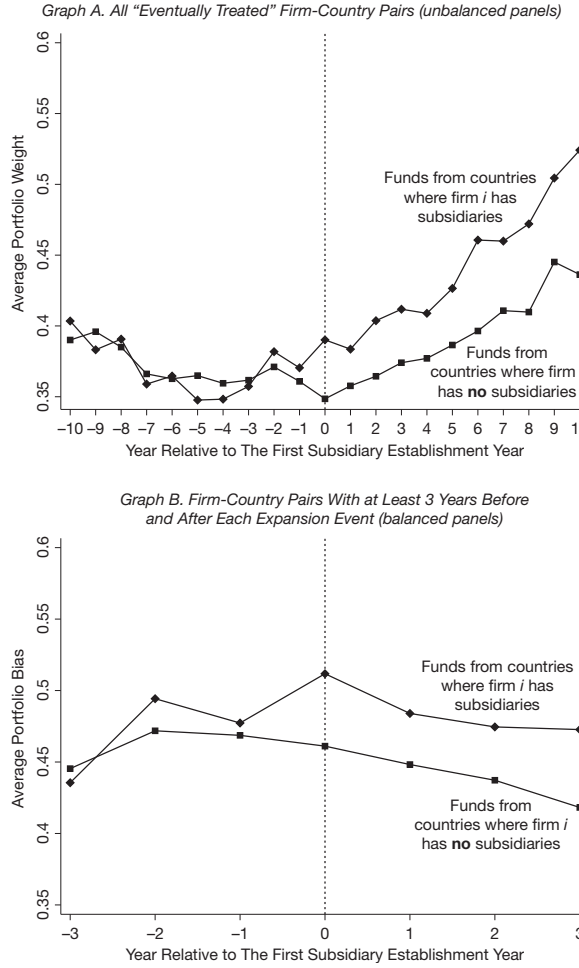

Table A-III). Specifically, we estimate a firm-year regression with $\overline{w}_{it}^{F}$ (the average of w_{iSt} across the source countries), w_{it}^{D} (the firm weight measure for domestic funds), or $\overline{w}_{it}^{F} - w_{it}^{D}$, as alternative dependent variables. The key explanatory variable is either the number of foreign locations scaled by total assets or the proportion of foreign sales (obtained from Worldscope, similar to Dahlquist and Robertsson (2001) and Ferreira and Matos (2008)). Both of these foreign operation indicators are positively related to $\overline{w}_{it}^{F}$. However, the same relationship is weaker for w_{it}^{D}, suggesting that domestic funds are less sensitive to firms' cross-

border expansions. These results further suggest that such expansions contribute to the convergence of foreign funds' and domestic funds' host-country portfolios documented in Table 2.

3. Alternative Constructions of w_{iSt}

In column 1 of Supplementary Material Table A-IV, we check whether our results are simply driven by large funds in a given source country by reconstructing w_{iSt} as the *simple average* of firm *i*'s weights in individual fund portfolios, instead of using the weighted average. In column 2, we consider the possibility that foreign funds may rely on local managers to manage investments (Chuprinin et al. (2015)), and re-construct w_{iSt} using *manager locations*. In columns 3 and 4, we check if the prevalence of zeros in w_{iSt} (due to under-reporting of small holdings) is a problem by replacing w_{iSt} with a fund holding indicator and by restricting the estimation to only observations with nonzero w_{iSt} values. In columns 5 and 6, we show that a cross-border expansion does not just increase w_{iSt}, but also the *number of funds* from the destination countries investing in the expanding firm. We then examine portfolio bias ($w_{iSt} - w_{it}^{M}$) as an alternative dependent variable. We do this by reestimating equation (4) (given that w_{it}^{M} is subsumed by the firm×year fixed effects (η_{it}) in equation (1)), and still find a significant coefficient for POST_EXPANSION (columns 7 and 8).

4. Other Interactive Fixed Effects

In column 1 of Supplementary Material Table A-V, we check whether the specific industry preferences of foreign funds from each source country may confound the baseline results by estimating an alternative model that directly controls for source-country × industry × year fixed effects. In column 2, we estimate a model that directly controls for country-pair shocks using host-country × source-country×year fixed effects (with w_{iSt} constructed using the aggregate global portfolio of funds from country *S*).

5. Cross Listings

In column 3 of Supplementary Material Table A-V, equation (1) is reestimated, adding an indicator for whether a firm cross-lists in a *specific country* in a given year. This variable is not significant and its inclusion does not change the estimate for POST_EXPANSION.

6. Alternative Constructions of POST_EXPANSION

It is possible that w_{iSt} may mechanically increase after an expansion executed through a cross-border stock merger, as funds previously investing the target firm may end up owning shares in the acquirer. However, listed targets make up a very small percentage (13%) of our sample, and our baseline results remain unchanged after these firms are excluded all current and previously listed subsidiaries from the construction of POST_EXPANSION (see column 5 of Supplementary Material Table A-V). In columns 6 to 8, we show that our baseline results are also not sensitive to any step in the procedure used to identify the timing of an expansion (discussed in Supplementary Material Appendix A-1).

7. Geographic Subsamples

Our data set classifies offshore funds based on the locations of their financial institution parents. To ensure that our baseline results are not sensitive to this empirical choice, we remove offshore funds from the analysis (see column 1 of Supplementary Material Table A-VI). We then remove Ireland, Hong Kong, the Netherlands, and Singapore from the sample source countries given that corporate subsidiaries may be concentrated in these locations for tax reasons (columns 2 and 3). Next, we remove the US, the UK, China, Germany, and Mexico from the sample source countries given that they are among our top 5 most popular firm expansion locations (columns 4 and 5). These subsample tests produce similar results to those reported in Table 3. The estimates are also significant when the sample is split into developed versus emerging markets, and intra-European-Union investments (given the high levels of product and financial markets integration in the EU) versus those involving non-EU countries (columns 6 to 9).

8. Fund Mandates

To compute w_{iSt}, we include all funds that report foreign holdings. However, some of these funds may not be representative international portfolio investors if they i) mostly invest in their home-country stocks (domestic-focused funds) or ii) focus on just one foreign market (country funds). The tests in columns 1 and 3 of Supplementary Material Table A-VII show that excluding these funds does not influence our baseline results.

9. Potential Reporting Issues

In Supplementary Material Table A-VIII, we show that our results are not driven by subsidiary reporting inconsistencies by excluding i) firms that only have domestic subsidiaries, or ii) firm and source country pairs where POST_EXPANSION is always equal to one or always equal to zero. To check against anomalous fund holding values that may arise due to data entry or stock-split adjustment issues, we then remove firm-year observations where the total percentage ownership of all (foreign and domestic) funds is larger than 50% (then reduced further to 20%). These restrictions do not change our baseline results.

10. Alternative Fund Holdings Data

Although our data set has a better coverage, in both the time and country dimensions, it is important to verify our results against the popularly employed Factset Lionshares (FS) database.[25] This is performed in Supplementary Material Table A-IX, using w_{iSt} constructed from FS fund holdings data. Our baseline results remain robust, but with smaller estimates for POST_EXPANSION, which possibly reflects the smaller coverage of the FS database (by about 15% compared to our current number of observations).

11. Alternative Firm Operations (Segments) Data

Finally, we explore another proxy for cross-border expansions – one based on firms' top geographic segment disclosure (see Lee et al. (2016)), which we obtain

[25]See Ferreira and Matos (2008), Ferreira, Massa, and Matos (2010), Chuprinin et al. (2015), and Choi et al. (2017).

from Worldscope and Osiris. Geographic segment data suffer from reporting inconsistencies,[26] but provide an alternative measure that incorporates a firm's own assessment of the importance of each of its foreign locations. Following this rationale, we use the indicator for whether source country S is a reported top geographic segment for firm i in year t as the alternative proxy for L_{iSt}, and show that this variable also has a positive and significant effect on w_{iSt} (see Supplementary Material Table A-X).

IV. Alternative Explanation: Funds' Influence

Our analysis thus far accounts for differences across firm-years, across source-country-years, and across firm-source-country pairs. However, we have not ruled out the possibility that certain unobservable, noninformation related changes *within each firm and source-country pair* can create a correlation between L_{iSt} and w_{iSt}. The clearest example is that a firm may cater for funds from a particular foreign country after they become a collectively large investor group (due to reasons unrelated to the firm's expansions). These funds' trading and activism can subsequently influence the firm's expansion decisions, raising a reverse causality concern.[27] We address this issue by focusing on several types of cross-border expansions that, we argue, are highly unlikely to be driven by funds in destination countries.

A. Cross-Border Expansions Resulting From Outside Acquisitions

We exploit the fact that many cross-border expansions are actually secondary outcomes of larger transactions occurring elsewhere: a firm (i) can gain a subsidiary presence in a country (S), not by a direct acquisition or greenfield investment, but by acquiring another firm (i') that is located elsewhere and already has a subsidiary in S. In this situation, we argue that funds from S have very limited influence over the decision to initiate the acquisition, as the economic rationales for such acquisitions should be primarily driven by the main operation of i', that is, its domestic market. If the objective of funds from S is to pressure firm i to expand into S, a direct acquisition/investment would be a more logical option.

In column 1 of Table 4, we reestimate equation (1) using POST_EXPANSION_COMP_OUTSIDE_ACQ to indicate the type of expansions in the scenario described above (see Step 2 in Supplementary Material Appendix A-1 for our data procedures to identify them). We find that, even when an expansion is the result of an outside acquisition, funds from the destination country still respond more positively than funds from other countries.

It is possible that the subsidiary presence in country S gained by firm i represents a very large foreign operation that may somehow drive the merger between i and i'. We address this possibility by further identifying relatively

[26]For example, segment disclosure can differ across firms in terms of how many segments to report (if at all) and whether to report sales to specific provinces, countries, and world regions (e.g, Europe and Asia).

[27]For example, Ferreira et al. (2010) show that the presence of foreign institutional investors in target firms can facilitate their acquisitions by reducing information asymmetry.

TABLE 4

Expansions Arising From Acquisition Deals That Occur Outside Destination Countries

Observations in Table 4 are firm, year, and source country combinations. The dependent variable is w_{iSt}, or the weight of firm i in the host-country portfolio held by funds from source country S in year t. In column 1, POST_EXPANSION_COMP_OUTSIDE_ACQ is the indicator variable for whether firm i has established a presence in source country S in year t because of a previous acquisition of another firm that is located outside of S but has a subsidiary presence in S. In column 2, POST_EXPANSION_COMP_OUTSIDE_ACQ_SMALL is constructed in the same way as POST_EXPANSION_COMP_OUTSIDE_ACQ, with an additional condition that firm i is from a large (above-median GDP) economy and S is a small (below-median GDP) economy. POST_EXPANSION_COMP_OUTSIDE_ACQ_LARGE is the difference between POST_EXPANSION_COMP_OUTSIDE_ACQ and POST_EXPANSION_COMP_OUTSIDE_ACQ_SMALL. In columns 1 and 2, the estimation excludes all observations where firm i has established a subsidiary presence in S through other means, that is, direct acquisition or incorporation. In column 3, POST_EXPANSION_FAIL_OUTSIDE_ACQ is the indicator variable for an equivalent counter-factual expansion: the years where firm i could already have a subsidiary presence in country S if a previous failed acquisition/merger with another firm located outside of S had been successful. In column 3, the estimation excludes all observations where firm i has actually established a subsidiary presence in S through any means. In column 4, (A) + (B) is the combined indicator variable for both actual and counter-factual expansions through outside acquisition deals, constructed as the sum of POST_EXPANSION_COMP_OUTSIDE_ACQ and POST_EXPANSION_FAIL_OUTSIDE_ACQ. Column 4 uses the same subsample as columns 1 and 2. Clustered standard errors are shown in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4
POST_EXPANSION_COMP_OUTSIDE_ACQ (A)	0.097***			
	(0.035)			
POST_EXPANSION_COMP_OUTSIDE_ACQ_SMALL		0.222***		
		(0.081)		
POST_EXPANSION_COMP_OUTSIDE_ACQ_LARGE		0.060*		
		(0.035)		
POST_EXPANSION_FAIL_OUTSIDE_ACQ (B)			0.019	−0.118**
			(0.049)	(0.057)
(A) + (B)				0.097***
				(0.035)
Types of fixed effects:Firm × year + firm × source + source × year	Yes	Yes	Yes	Yes
No. of obs.	8,979,628	8,979,628	8,959,215	8,979,628

small-scale expansions among those triggered by outside acquisitions. That is, in each case, the expanding firm is from a large economy and the newly gained subsidiary is located in a small economy. We still find that the treatment effect is significant even for such small-scale expansions (column 2).

Following Bena and Li (2014), we also use failed outside acquisitions to provide a counterfactual analysis. Consider again the scenario above, but this time, the proposed acquisition of firm i' by firm i fails, so that firm i *does not* gain a subsidiary presence in country S (which it would have gained if the deal was successful). We use this scenario to form a group of "placebo" expansions. We argue that because the merger process between i and i' happens in a jurisdiction outside of S, its success or failure is plausibly exogenous with respect to funds from S. In column 3, equation (1) is reestimated using POST_EXPANSION_FAILED_OUTSIDE_ACQ to indicate the above placebo treatment scenario. As expected, w_{iSt} does not appear to respond to an (counterfactual) expansion that could have arisen but never did. Column 4 provides a direct comparison of the actual and counterfactual expansion scenarios. Specifically, we reestimate equation (1) using both POST_EXPANSION_FAILED_OUTSIDE_ACQ and another indicator variable that pools these two types of (completed and failed) expansions together. The coefficient of the first variable is significant and negative, indicating that the post-expansion increase in w_{iSt} is significantly larger following an actual expansion than an equivalent counterfactual expansion.

B. Source-Country Tariff Changes as Instruments for Firms' Foreign Expansions

Our next identification strategy is adopted from Lileeva and Trefler (2010), who utilize the changes in US import tariffs on specific Canadian products to form an instrument for the export decisions of Canadian firms. To apply the same methodology, we reestimate equation (1) using the import tariff rates imposed by a source country on a firm's products to construct our instrument for the timing of a cross-border expansion.

There is a strong case to be made for why such tariff changes meet the two standard conditions for a good instrument. In terms of the relevance condition, reducing tariffs should make the products of affected firms more competitive and provide them with incentives to expand into the tariff-cutting country (see Melitz and Trefler (2012) for a summary of the rationales). While the impact of tariffs on exports is direct, the decision to set up subsidiaries is also affected, given that these two decisions are highly correlated (Conconi et al. (2016)).

To satisfy the exclusion condition, an instrument should not be correlated with the dependent variable, *conditional on other covariates.* In our setting, the IV estimation of equation (1) retains all the pair-wise fixed effects (ϕ_{iS}, η_{it}, and δ_{St}) as covariates, so the only role of our tariff instrument is to generate exogenous variations *within a firm and source country pair* over time. We argue that the instrument indeed plays this role because the tariffs are decided by policy-makers in one country (country S) whereas w_{iSt} reflects the portfolio allocation changes with respect to firm i in another country (country H). This separation makes it very unlikely for the two decisions to be linked in any way other than through the cross-border expansion channel. In other words, although a tariff change may not happen in isolation, it is difficult to come up with other related changes occuring at the same time that would somehow influence how investors from S would allocate their portfolios *within* H, or those that would not be captured by the pair-wise fixed effects (ϕ_{iS}, η_{it}, and δ_{St}).[28]

The reverse causality concern raised above is also unlikely to be relevant as it is difficult for individual firms to lobby for tariff changes in a foreign country (Bustos (2011)). In our empirical context, it is even more implausible that individual funds have sufficient incentives to influence tariffs on behalf of their investee firms given their diversified portfolios.[29]

To construct the instrument, we obtain the product segments for each firm from Worldscope and industry-level tariff data from the UNCTAD World Integrated Trade Solution platform, and compute the following tariff rate for each firm and source country pair:

[28]For example, when country S reduces tariffs on firm i's industry, the host country H of firm i may reciprocate with tariff reductions for other industries. Firm i may thus become a relatively attractive investment simply because these other industries in country H are now subject to more foreign competition. However, such changes in the relative appeal of firm i are fully accounted for by the firm × year fixed effects.

[29]Other studies have also used tariff changes to mark an exogenous increase in competition (Fresard (2010)), arguing that it is difficult for individual firms to influence tariff changes in their own countries. By examining tariffs imposed by foreign countries, this assumption is arguably even stronger in our setting.

$$\tau_{i,S,t} = \sum_{k \in K_{i,t-1}} \omega_{i,k,t-1} T_{H,S,k,t}, \quad (6)$$

where k denotes one of the 4-digit SIC product segments of firm i in year $t-1$ (of set $K_{i,t-1}$), $\omega_{i,k,t-1}$ is the sales volume weight that segment k contributes to the set $K_{i,t-1}$, and $T_{S,H,k,t}$ is the import tariff rate in year t imposed by country S on products within segment k coming from the host country H (of firm i). If product segments data for a firm are missing, we use its primary SIC code instead. Then, following Lileeva and Trefler (2010), we create four mutually orthogonal binary variables based on the quartiles of $\tau_{i,S,t}$ ($\tau^q_{i,S,t}$, with $q = 1,\ldots,4$).[30]

We re-estimate equation (1) as an IV regression, using the above binary tariff variables (excluding one, $\tau^1_{i,S,t}$) as the instruments. The results are reported in Table 5. The first-stage estimates (column 1) confirm that the tariff instruments meet the

TABLE 5

Instrumental Variable Regressions Using Source-Country Tariff Changes

Observations in Table 5 are firm, year, and source country combinations. Only firms that have industry segments subject to tariffs are included. The dependent variable is w_{iSt}, the weight of firm i in the host-country portfolio held by funds from source country S in year t. POST_EXPANSION is an indicator variable for whether firm i has a subsidiary in source country S in year t. The instruments in the main model (columns 1 and 2) are the indicator variables τ^q_{iSt} ($q = 2,3,$and4), each of which takes the value of one if τ_{iSt} (the tariff rates imposed by country S on firm i's products) is in the qth quartile of its distribution, and zero otherwise. As an alternative, the model reported in columns 3 and 4 uses only one instrument: the indicator for whether τ_{iSt} is above the median ($= \tau^3_{iSt} + \tau^4_{iSt}$). For observations where firm i reports its industry segments (as 4-digit SIC codes), τ_{iSt} is computed as the average of the tariff rates imposed by S on the reported product segments, weighted by the sales volume of each segment. For observations with no product segments data, the tariff rate applicable to the firm's primary 4-digit SIC code is used. This last step is skipped in the model reported in columns 5 and 6, which is estimated on the subsample of only firms with product segments data. Clustered standard errors are shown in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Main Model		Model With One Instrument		Model Using Only Firms With Product Segments Data	
	1st Stage	2nd Stage	1st Stage	2nd Stage	1st Stage	2nd Stage
	1	2	3	4	5	6
POST_EXPANSION		4.989**		6.398**		4.219**
		(2.235)		(3.256)		(2.138)
τ^2_{iSt}	−0.002**				−0.002*	
	(0.001)				(0.001)	
τ^3_{iSt}	−0.003**				−0.003***	
	(0.001)				(0.001)	
τ^4_{iSt}	−0.002*				−0.002*	
	(0.001)				(0.001)	
$\tau^3_{iSt} + \tau^4_{iSt}$			−0.002***			
			(0.001)			
Cragg–Donald statistic	21.680		38.021		22.479	
Hansen J statistic	0.721		NA		1.162	
p-value	0.697		NA		0.559	
Types of fixed effects: Firm × year + firm × source + source × year	Yes		Yes		Yes	
No. of obs.	4,180,716		4,180,716		3,671,258	

[30]Lileeva and Trefler (2010) suggest that using quartiles lessens the outsized influence of very high tariff rates designed to choke off imports. We also note that their study is based on firms' product sales at the 6-digit HS code level whereas our segments data are based on 4-digit SIC codes. Our instrument is therefore a less precise measure of firm-level tariffs and may not meet the relevance condition. We test this in the first stage of our IV estimation.

relevance condition. In the second stage (column 2), the coefficient of POST_ EXPANSION remains positive and significant. In other words, funds from country S increase the weight of firm i in their portfolios by a greater margin than other funds when firm i is induced by a tariff reduction to expand into S. As in Lileeva and Trefler, the treatment effect can be computed as the product of the cumulative probability increase in the first stage and the estimated coefficient of POST_ EXPANSION in the second stage ($0.007 \times 5.0 = 0.035\%$, equivalent to one-quarter of the average portfolio weight of the estimation sample). In columns 3 and 4, the estimation uses a single indicator variable for above-median $\tau_{i,S,t}$ (equivalent to $\tau^3_{i,S,t} + \tau^4_{i,S,t}$) as the instrument. In columns 5 and 6, the estimation uses only firms for which we can obtain product segments data to compute $\tau_{i,S,t}$. With both iterations, our results are unchanged.

C. Free Trade Agreements

In addition to the above IV estimation, we follow Bustos (2011) and utilize the conclusions of FTA negotiations to perform a difference-in-differences analysis. These events provide suitable exogenous shocks as the applied tariff rates are often completely abolished or substantially reduced. Importantly, the tariff changes do not apply equally across firms, as pre-FTA tariff levels are historically determined and vary significantly within each country (Bustos (2011)), thereby creating suitable "treated" and "control" cohorts for analysis.[31] Another appealing aspect is that the conclusion of an FTA is typically difficult to predict ahead of time due to the protracted and often tense negotiations involved (Lileeva and Trefler (2010)). FTAs often have significant domestic political economy implications, meaning that such an agreement must accommodate many diverse interests groups (Levy (1997)), rather than being driven by the lobbying effort of *individual* firms and their investors.

We collect information on FTAs signed within the sample period.[32] We use the signing year (rather than the effective year) of an FTA to capture the conclusion of its negotiation process.[33] Following Bustos (2011), who exploits the fact that heavily tariffed industries benefit more from an FTA and are more likely to expand, we estimate the following model:

$$(7)\quad w_{iSt} = \alpha_0 \text{POST\_FTA}_{HSt} + \alpha_1 \text{POST\_FTA}_{HSt} \times \text{TREATED}_{iS} + \phi_{iS} + \eta_{it} + \delta_{St} + \varepsilon_{iSt},$$

where POST_FTA_{HSt} is an indicator variable for the period after an FTA is signed. TREATED_{iS} is the treatment indicator, proxied by an indicator variable (HIGH_ TARIFF) for whether firm i faced high tariffs set by country S before the FTA ($\tau_{i,S,t}$ is above the median).

[31] In most cases, these pre-FTA tariffs are based on most-favored nation (MFN) rates that are nondiscriminatory across all trading partners as long as they are World Trade Organization (WTO) members.

[32] See Supplementary Material Appendix A-2 for the information sources and descriptions of FTA events.

[33] The negotiation tension and uncertainty are evident in the 87 FTAs that we consider. The median negotiation period is 2 years, and 29 FTAs took 4 years or longer to conclude. In addition, 30 proposed FTAs that "failed" to conclude altogether.

TABLE 6

Analysis Using Free Trade Agreement Events

Observations in Table 6 are firm, year, source country combinations. Only firms that have industry segments subject to tariffs are included. The sample used in columns 1 to 5 is based on country pairs with FTAs that are currently in force and signed during the sample period. In column 6, the sample is based on country pairs with "failed FTAs": these countries initiate but later suspend (or cancel) their FTA negotiation during the sample period. The dependent variable in columns 1, 2, 3, 4, and 6 is w_{iSt}, the weight of firm i in the host-country portfolio held by funds from source country S in year t. In column 5, the dependent variable is $\overline{w}_{it}^{NA}$, the average (across source countries) of the weight of firm i in the portfolio of funds from source countries that do not have an FTA with the host country of firm i in year t. In columns 1, 2, 4, and 5, POST_FTA is computed for each in-force FTA as the indicator variable for whether year t is after the signing year of the agreement. In column 3, POST_FTA excludes the negotiation period (POST_FTA = 0 if year $t \leq$ the negotiation start year and POST_FTA = 1 if year $t >$ the signing year). For the "failed FTAs" sample (column 6), POST_FTA is determined based on a hypothetical signing event, defined as 2 years (the median negotiation period for all in-force FTAs) after the start of the negotiation process of each failed FTA. HIGH_TARIFF is the indicator variable for whether the weighted average tariff rate imposed by source country S on firm i's 4-digit SIC industry segments in the signing year of each in-force FTA (or the hypothetical signing year for each failed FTA) is above the median. Column 4 considers an alternative definition of HIGH_TARIFF, imposing another condition that the type of tariff imposed on the primary 4-digit SIC industry of firm i switches from the "most-favored nation" to the "preferential" status after the relevant FTA event. The specification in column 2 controls for but does not report the coefficients of the following variables. MSCI, FOREIGN_LISTING, IFRS, and ANALYST are the indicator variables for whether, in a given year, a firm is an MSCI All Country World Index constituent, has securities cross-listed in a foreign stock market, follows the International Financial Reporting Standards, and has analyst following, respectively. SIZE is the natural logarithm of total assets in US dollars. TURNOVER is the total trading volume in a year scaled by the number of issued shares. BOOK_TO_MARKET is the ratio of the book value of equity to market capitalization. MOMENTUM is the cumulative monthly stock return in a given year. DIVIDEND_YIELD is the sum of all cash dividends per share in a year divided by the stock price at the beginning of the fiscal year. LEVERAGE is the ratio of total debt to total assets. VOLATILITY is the standard deviation of monthly returns. Clustered standard errors are shown in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Country Pairs With In-Force FTAs				Funds Not Linked by FTAs as Placebo	Failed FTAs as Placebo
	1	2	3	4	5	6
POST_FTA	0.001 (0.020)	0.029* (0.015)	0.007 (0.044)	−0.001 (0.024)	0.050*** (0.014)	0.006 (0.007)
POST_FTA × HIGH_TARIFF	0.064*** (0.022)	0.044*** (0.013)	0.080*** (0.027)	0.050** (0.025)	0.010 (0.009)	−0.041** (0.020)
Firm-level controls		Yes			Yes	
Types of fixed effects:		Yes			Yes	
Firm × source + year						
Firm × year + firm × source + source × year	Yes		Yes	Yes		Yes
No. of obs.	570,139	564,443	459,083	452,891	562,050	341,480

The results are reported in Table 6. The estimates of equation (7) (column 1) suggest that, following an FTA, "treated" firms in industries with high pre-FTA tariffs get greater portfolio allocations among funds from the counter-party country to the FTA, more so than "control" firms in other industries. In column 2, we use an alternative specification with only firm × source-country fixed effects and time fixed effects. In column 3, we remove the negotiation years from the construction of POST_FTA_{HSt} to exclude any possibility that funds may be able to predict the negotiation outcome of an FTA during this period. In column 4, we use an alternative construction of HIGH_TARIFF, imposing another condition that the tariff status of the subject firm's industry (as reported in WITS) indeed switches from "most favored nation" to "preferential" after the FTA – to further strengthen their identification as treated firms. The results are largely unchanged in these alternative tests.

The FTA setting also allows us to conduct two informative placebo tests. First, for each firm i whose host country H signs an FTA with source country S, we examine the average portfolio response of foreign funds from other source countries that *do not* have any FTA with country H. As expected, we cannot replicate the same

treatment effect reported in columns 1 to 4 in this test (column 5). Second, we repeat the analysis for "failed" FTAs – those with trade negotiations suspended or canceled (see Supplementary Material Appendix A-2). We set the hypothetical signing year for these FTAs to be 2 years (the median FTA negotiation period) after the first negotiation year. Again, we do not find the same results as those documented for successfully negotiated FTAs (column 6).

V. Alternative Explanation: Familiarity Bias

This section addresses the possibility that the observed cross-border expansion effect predominantly reflects a familiarity bias (Huberman (2001), Pool, Stoffman, and Yonker (2012)). It is possible that having operations in a foreign country enhances a firm's familiarity with local investors. With limited attention, such investors may over-weight firms that they tend to "see" at home (e.g., through marketing and media coverage), which may not be firms that they "know" (Keloharju, Knupfer, and Linnainmaa (2012), Fang, Peress, and Zheng (2014)). Doing so may also allow investors to derive some utility from (indirectly) investing in their home economies, similar to the loyalty effect documented in Cohen (2009).

In the international portfolio investment literature, some studies document evidence leaning toward the information hypothesis (Schumacher (2017), Karolyi et al. (2020)), while others favor the familiarity hypothesis (Ke et al. (2010)). Given their findings, the objective of our analysis is not to completely rule out any of these explanations. Rather, we will attempt to identify whether a cross-border expansion generates information advantages for the relevant foreign funds, over and above any other possible familiarity-driven portfolio responses.

To do so, we conduct three sets of analyses. The first set relies on the predictions of the information and familiarity hypotheses with respect to the conditions in which each hypothesis is more applicable. We then explore whether these conditions match our data. The second set of analyses is based on the return predictability of portfolio changes, under the argument that it is information, and not familiarity, that should generate superior returns for investors. The richness of our data then enables the construction of a third type of test not previously performed in related studies. Specifically, we can focus on cases where investors are already familiar with a given firm and investigate whether an expansion by the firm would still elicit a significant portfolio response. We discuss these tests in detail below.

A. Heterogeneity in Cross-Border Expansion Effects

Although both the information and familiarity hypotheses explain the observed increase w_{iSt} following an expansion, they diverge in prescribing the conditions under which this relationship intensifies. Prior empirical studies have relied on such heterogeneity in the cross section to link their findings to a particular hypothesis. Schumacher (2017) notes that, because familiarity bias is an investor-level trait, it should be concentrated among certain investors, who *consistently* display the same bias across different investment scenarios. Ke et al. (2010) further argue that the portfolio effect of a familiarity cue should be stronger in situations

where investors are initially unfamiliar with their investment targets. This interpretation is consistent with Merton's (1987) theory suggesting that attention-constrained investors may completely exclude unfamiliar, low-visibility assets from their portfolios.

In contrast, Schumacher (2017) argues that, under the Van Nieuwerburgh and Veldkamp information hypothesis, investors would *strategically* choose to focus on assets for which they already hold information advantages, in order to differentiate themselves from the average investor. Similarly, Karolyi et al. (2020) argue that the value of a given information endowment is larger in situations involving investors currently holding concentrated portfolios. In addition, both studies rely on a specific prediction in Van Nieuwerburgh and Veldkamp (2009) that investors' specialized learning intensifies with large and risky assets, because the scale of payoffs from differentiation increases in these instances.

Drawing from the above discussion, we also offer two diverging predictions in relation to our empirical setting. We argue that, if the familiarity hypothesis holds, then the cross-border expansion effect should be concentrated among: i) funds with a strong home-bias tendency (given that the effect represents a bias toward a home-country connection when investing abroad), and ii) funds that operate in unfamiliar investment environments. On the other hand, the information hypothesis accommodates a very different set of observations: that is, the cross-border expansion effect may actually intensify in situations where funds already hold specialized and concentrated investments, and in large and risky firms.

To check which of the above scenarios is dominant, we analyze how the magnitude of the cross-border expansion effect varies across *preexpansion* conditions (see Table 7). That is, when firm i expands into country S in year t, we analyze the characteristics of the (i, S) pair in year $t-1$. First, we focus on the home-bias tendency of country S's funds, measured by either i) the extent to which these funds over-weight their home equity market (S) relative to its global market capitalization weight (bias toward the home stock market), or ii) the extent to which they over-weight firms in other countries that have operations in S (bias toward home-connected foreign firms). For each of these bias measures, the variable POST_EXPANSION is then split into a pair of indicator variables according to whether the value for country S in year $t-1$ is above the median. We then re-estimate equation (1) using these post-expansion indicator pairs (see columns 1 and 2 in Panel A of Table 7) and compare their coefficients using the Wald test. Our results indicate that the cross-border expansion effect does *not* intensify among highly home-biased funds.[34]

Second, we examine whether country S already has close investment and economic ties with the host country H of firm i, before i expands into S. A close investment tie is defined by whether the investment bias displayed by country S's funds toward country H is larger than its cross-country median. A close economic tie is defined by whether the proportion of firms from H that have already

[34]Pool et al. (2012) show that inexperienced fund managers tend to display more pronounced behavioral biases. Given this evidence, we compare newly established funds to mature funds (columns 5 and 6 of Supplementary Material Table A-VII), and find that the cross-border expansion effect is actually concentrated among the latter group. This again casts doubt on the role of behavioral biases in explaining the effect.

TABLE 7

Heterogeneity in the Effect of a Cross-Border Expansion

Observations in Table 7 are firm, year, and source country combinations. The dependent variable is w_{iSt}, or the weight of firm i in the host-country portfolio held by funds from source country S in year t. Observations where there are fewer than 3 foreign funds from a given source country investing in the host country (of firm i) are excluded. POST_EXPANSION_HI and POST_EXPANSION_LO are two expansion indicator variables, each of which is equal to one if firm i has expanded by establishing a subsidiary into source country S by year t, and the suffix _HI (_LO) indicates whether *another condition* as described below is met (not met) in year $t-1$. In column 1, the additional (_HI) condition is whether funds from S are highly home-biased – that is, they over-weight firms listed in country S by a larger margin than the median for all the source countries. In column 2, the additional (_HI) condition is whether funds from S are highly biased toward home-connected foreign firms (i.e., they over-weight firms with operations in country S by a larger margin than the median for all the source countries). In column 3, the additional (_HI) condition is whether source country S has a close investment tie with the host country, as indicated by whether the aggregate global portfolio of funds from S is biased toward this host country by a larger margin than the median for all the source countries. In column 4, the additional (_HI) condition is whether source country S has a close economic tie with the host country – that is, the proportion of other firms from this host country that have expanded into S is larger than the median for all the host countries. In column 5, the additional (_HI) condition is whether funds from S hold a highly concentrated portfolio in the host country (i.e., the interquartile range of the firm-level portfolio bias measure of funds from S with respect to this host country is above the median for all the source countries). In column 6, the additional (_HI) condition is whether funds from S hold a highly concentrated portfolio in the industry of firm i (i.e., the interquartile range of the firm-level portfolio bias measure of funds from S with respect to this industry (computed using only the funds' foreign holdings) is above the median for all the source countries). of the MSCI All Country World Index. In column 8, the additional (HI) condition is whether, within the host country, firm i has above-median media coverage intensity. This is computed as the number of unique news articles in the RavenPack database covering a firm (these data are only available from 2000) scaled by its total assets. In column 9, the additional (HI) condition is whether, within the host country, firm i has above-median market capitalization. In column 10, the additional (HI) condition is whether firm i operates in an industry with above-median average stock volatility. In column 11, the additional (HI) condition is whether source country S is a relatively new expansion destination for firm i's industry; that is, the proportion of other local firms in the same industry as firm i that have expanded into country S is below the median for all the source countries. In column 12, the additional (HI) condition is whether the host country specializes in firm i's industry but country S does not specialize in the same industry. For each industry, specialization is defined by whether a country accounts for an above-average share of the global output (sales) of the industry. In columns 10, 11, and 12, industries are defined using their 4-digit SIC codes. Clustered standard errors are shown in parentheses. Clustered standard errors are shown in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Expansions Split by Characteristics of Funds From Source Country S

	High (_HI) = Strong Home (S) Bias in Global Portfolio	High (_HI): Strong Bias Toward Firms With Presence in S	High (_HI): Close Investment Tie Between S and Firm i's Country	High (_HI): Close Economic Tie Between S and Firm i's Country	High (_HI): Holding Concentrated Portfolio in Firm i's Country	High (_HI): Holding Concentrated Portfolio in Firm i's Industry
	1	2	3	4	5	6
POST_EXPANSION_HI	0.028**	0.036***	0.057***	0.032***	0.052***	0.050***
	(0.011)	(0.014)	(0.020)	(0.013)	(0.010)	(0.013)
POST_EXPANSION_LO	0.034***	0.029**	0.021***	0.029	0.015**	0.012
	(0.010)	(0.010)	(0.008)	(0.023)	(0.008)	(0.008)
Wald statistic (H_0: coefficients are equal)	0.192	0.224	2.753*	0.006	5.003**	6.884***
Types of fixed effects: Firm × year + firm × source + source × year	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	9,320,303	8,946,923	9,320,303	9,320,303	9,320,303	9,320,303

Panel B. Expansions Split by Firm and Industry Characteristics of Firm i

	High (_HI): MSCI ACWI Constituent	High (_HI): Having High Media Coverage	High (_HI): Relatively Large Firm in Host Country	High (_HI): High Volatility Industry	High (_HI): Expansion Into New Geographic Market	High (_HI): Expansion Exploiting Industry Specialization
	7	8	9	10	11	12
POST_EXPANSION_HI	0.106***	0.037***	0.038***	0.030***	0.065***	0.048***
	(0.034)	(0.011)	(0.010)	(0.009)	(0.016)	(0.017)
POST_EXPANSION_LO	0.012**	0.023**	0.006	0.032**	0.024***	0.024***
	(0.005)	(0.011)	(0.007)	(0.014)	(0.008)	(0.008)
Wald statistic (H_0: coefficients are equal)	8.003***	1.011	6.816***	0.022	3.846**	1.264
Types of fixed effects: Firm × year + firm × source + source × year	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	9,320,303	8,089,596	9,320,303	9,320,303	9,258,015	9,320,303

established operations in S exceeds the cross-country median.[35] We do not find that the cross-border effect is weaker when the two countries have strong ties (see columns 3 and 4), as predicted by the familiarity hypothesis. In fact, the effect is

[35]Prior studies have also examined other indicators such as geographic proximity, common language, and other historical relationships. We argue that our measures already capture these relationships and are more direct proxies for current investment and economic ties.

significantly larger when the investment tie between the two countries is strong. This evidence leans toward the information hypothesis, suggesting that, when *S* and *H* are ex ante very close, a cross-border expansion improves the return from specialized learning for country *S*'s funds, because they can further differentiate from other foreign funds.

Third, similar to Karolyi et al. (2020), we examine whether country *S*'s funds are already specialized international portfolio investors before firm *i* expands into *S*. Specifically, we compute i) the portfolio concentration of *S* funds' holdings in *H* and ii) the portfolio concentration of their (foreign) holdings in firm *i*'s industry. After splitting up POST_EXPANSION into two indicators based on each of these measures (see columns 5 and 6), we find that the cross-border expansion effect is indeed larger when these portfolios are ex ante more concentrated, again in line with the information hypothesis.

Fourth, we examine firm characteristics. Under the familiarity hypothesis, the cross-border expansion effect should be stronger for relatively obscure firms. We explore two proxies for firm visibility: i) whether a firm is a constituent of the MSCI All Country World Index (ACWI, a commonly used benchmark in international asset allocation) and ii) whether a firm receives intense media coverage (using data obtained from the Raven-Pack database). We find that the cross-border expansion effect continues to be present in firms that already receive a lot of investor attention before their expansion events (see columns 7 and 8 in Panel B of Table 7). Next, we focus on two firm characteristics explicitly considered in Van Nieuwerburgh and Veldkamp's model: size and riskiness. Similar to Schumacher (2017) and Karolyi et al. (2020), we find that the magnitude of the cross-border expansion effect increases with firm size (column 9). This evidence is inconsistent with the familiarity hypothesis because large firms should be more familiar to investors. It is instead consistent with the Van Nieuwerburgh and Veldkamp's model, which suggests that firm size increases the return from specialized learning. We do not find that the cross-border effect differs in magnitude across the risk dimension (column 10).

Finally, we consider the possibility that some cross-border expansions generate more economic value than others. Under the information hypothesis, high-value expansions should lead to a greater increase in w_{iSt}. Following the evidence from Fresard, Hege, and Phillips (2017), we focus on expansions motivated by differences in country-level industry specialization. Because industry-related expertise is segmented across international funds (Schumacher (2017)), such expansions may create information value unique to funds in the expansion locations. We classify the scope of value generated by the expansion of firm *i* into country *S* in two ways. One criterion is whether *S* is a relatively new geographic market for firm *i*'s products, and the other is whether firm *i* is from a specialized industry within *H* and *S* does *not* specialize in the same industry.[36] The results reported in columns 11 and 12 show that the cross-border expansion effect is indeed larger in cases where industry specialization is a primary motive.

[36]Similar to Fresard et al. (2017), we compute industry specialization using the share of global industry sales of a particular country.

Overall, the observed heterogeneity in the cross-border expansion effect closely aligns with the predictions of Van Nieuwerburgh and Veldkamp's model. However, a caveat of this analysis is that differentiating the observed expansions based on funds' and firms' characteristics is a noisy way to identify the conditions in which a particular hypothesis may or may not apply. In the next set of analyses, we seek to more clinically disentangle the information effect by examining specific firm expansion scenarios where funds in the destination location are already familiar with the expanding firm.

B. Variations in Portfolio Weights After a Cross-Border Expansion

In the tests that follow, we exploit variations in the time dimension to distinguish the familiarity and information hypotheses. We argue that the familiarity hypothesis mainly applies to the difference in portfolio weight (w_{iSt}) from before to after firm i expands into country S. Once the expansion makes country S's funds familiar with firm i, any subsequent changes in portfolio weight should now mainly reflect the effect of the funds incorporating information about the firm's activities into their investment decisions.

First, we focus on the persistence of the cross-border expansion effect over time. Under the familiarity hypothesis, the effect should not persist because the high costs of international investing would make it difficult for foreign funds to generate sufficient compensation from simply pursuing familiar firms. In contrast, Van Nieuwerburgh and Veldkamp's theory explains persistence because specialized learning can continually deliver high returns. To show evidence on persistence, we split the post-expansion period into the expansion year, each of the next 3 years, and year 4 and beyond. In column 1 of Table 8, we show that the coefficients of these indicator variables are all significant and have similar magnitudes.

Second, we examine how w_{iSt} varies with the scale of subsidiary activities of firm i in country S, *after* it has expanded into S. Specifically, we use private firms' data in Orbis and compute the proportion of firm i's total revenue accounted for by its subsidiaries in country S in year t (SUB_SALES_SOURCE_COUNTRY) to capture the relative value of information advantages accrued to S funds. This analysis is subject to several additional sample restrictions. Subsidiary sales data are only available from 2005 in Orbis, mainly for subsidiaries located in certain European countries.[37] We also exclude subsidiaries that are owned by another subsidiary in the same country (to avoid double-counting due to consolidation of accounts) and those with less than 5 years of financial data.

Equation (1) is re-estimated using SUB_SALES_SOURCE_COUNTRY to represent L_{iSt}. This variable is positive and significant, indicating that, after expanding into source country S, firm i becomes even more attractive to country S funds when the relative importance of firm i's subsidiary activities in this location

[37]See Gopinath et al. (2017) for a discussion of European private firms' reporting requirements. With the exception of Switzerland, where such requirements are limited, the average number of foreign subsidiaries in our sample that file their annual accounts is 84%, ranging from 69% for Greece to 92% for Belgium.

TABLE 8

Persistence of the Effects of Firms' Cross-Border Expansions

Observations in Table 8 are firm, year, and source country combinations. The dependent variable is w_{iSt}, or the weight of firm i in the host-country portfolio held by funds from source country S in year t. POST_EXPANSION is an indicator variable for whether firm i has expanded into source country S by year t. In column 1, POST_EXPANSION_YEAR_N indicates the years after the expansion year ($N = 0$). In column 2, SUB_SALES_SOURCE_COUNTRY is the aggregate sales volume of the subsidiaries of firm i in source country S in year t, scaled by the total sales of firm i. This variable is constructed for the 2005–2014 period using subsidiaries with at least 5 years of sales data and located in European countries (excluding Switzerland). The variable can only be constructed for observations where a firm has a subsidiary in a country in a given year. In columns 3 and 4, EXPANSIONS_LINKED_COUNTRIES counts the number of other countries (other than S) that firm i has expanded into by year t that are closely linked with S. A third country, S^*, is defined to be closely linked to country S in two ways: i) by whether countries S^* and S have a close investment tie – that is, the aggregate country-level portfolio bias displayed by funds from S toward country S^* is greater than the median of this measure (column 3), or ii) by whether country S has a close economic tie with country S^* – that is, the proportion of firms from S^* that have expanded into S is greater than the median of this measure (column 4). Observations where there are fewer than 3 foreign funds from a given source country investing in the host country are excluded. Clustered standard errors are shown in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

			Expansions Into Countries Closely Linked to S	
	Years After Expansion	Scale of Subsidiary Activities After Expansion	As Defined by Investment Tie	As Defined by Economic Tie
	1	2	3	4
POST_EXPANSION_YEAR_0	0.034***			
	(0.008)			
POST_EXPANSION_YEAR_1	0.021**			
	(0.009)			
POST_EXPANSION_YEAR_2	0.029***			
	(0.010)			
POST_EXPANSION_YEAR_3	0.036***			
	(0.011)			
POST_EXPANSION_YEAR_4+	0.035***			
	(0.011)			
SUB_SALES_SOURCE_COUNTRY		0.168**		
		(0.067)		
POST_EXPANSION (A)			0.015*	0.014*
			(0.008)	(0.008)
EXPANSIONS_LINKED_COUNTRIES (B)			0.003*	0.001
			(0.002)	(0.003)
(A) × (B)			0.005**	0.003**
			(0.002)	(0.001)
Types of fixed effects: Firm × year + firm × source + source × year	Yes	Yes	Yes	Yes
No. of obs.	9,953,553	190,862	8,644,704	8,644,704

increases. In Supplementary Material Table A-VII, we test several alternative constructions of SUB_SALES_SOURCE_COUNTRY that remove the strict sample selection requirements mentioned above, and the results remain unchanged.

Third, we examine variations in other links between firm i and country S's funds that are established *after* firm i expands into S. This exploits the fact that, in our data, individual firms do not just expand into one country, but also have operations in other (third-party) countries, creating additional pathways to link firms and funds. We measure these additional links (outside their direct connection) by counting the number of foreign locations of firm i that have close ties with source country S. This variable is labeled EXPANSIONS_LINKED_COUNTRIES, and is constructed in two alternative ways. A close tie between S and another source country, denoted S^*, is defined either by i) whether the country-level investment bias toward S^* exhibited by country S's funds is larger than its cross-country median (indicating a strong investment tie), or ii) whether the proportion of firms

from S^* that have already established operations in country S exceeds the cross-country median for this measure (indicating a strong economic tie).

We argue that, in the post-expansion period where firm i has become a familiar firm to country S's funds, variations in the above measures mainly reflect information-related changes created by firm i's subsequent expansions: S funds should gain more information advantages if firm i expands into a country that has a close relationship with S than one that has a weak relationship. We test this argument by interacting POST_EXPANSION with EXPANSIONS_LINKED_COUNTRIES. The results presented in columns 3 and 4 of Table 8 show that the effect of the second variable on w_{iSt} is positive, and significantly increases after firm i expands into S. Overall, the evidence in this section supports the interpretation that country S's funds rely on the information emanating from firm i's foreign operations to make portfolio decisions even after they have become familiar with firm i.

C. Post-Expansion Portfolio Changes and Subsequent Stock Returns

Another type of analysis to contrast the information- and cognitive bias-based explanations that have been frequently adopted in many related past studies (Coval and Moskowitz (2001), Ke et al. (2010), Keloharju et al. (2012), Pool et al. (2012), Fang et al. (2014), and Bernile et al. (2015)) is to examine whether certain portfolio preferences of investors can predict stock returns. Building on this approach, we conduct two return predictability tests.

With the first test, we argue that the familiarity hypothesis can only explain the portfolio response to an expansion, but not why *post-expansion variations* in portfolio allocation predict future returns. To conduct the test, we compute a firm's returns adjusted by the returns of one of 27 ($3 \times 3 \times 3$) characteristics-based benchmark portfolios, constructed for each country by triple-sorting firms into their size (market capitalization), book-to-market, and momentum terciles.[38] The main explanatory variables are the average foreign fund and domestic fund portfolio weights of firm i in year t, $\overline{w}_{it}^{\mathrm{F}}$ and w_{it}^{D}. The measure $\overline{w}_{it}^{\mathrm{F}}$ is further decomposed into funds from "linked" source countries, where firm i has subsidiaries ($\overline{w}_{it}^{\mathrm{L}}$), and "nonlinked" source countries, where firm i has no subsidiaries ($\overline{w}_{it}^{\mathrm{NL}}$). The results reported in Table 9 show that the extent to which a firm is over-weighted in the host-country portfolio of foreign funds positively predicts subsequent returns (see column 1). Importantly, this relationship is driven only by funds originating from linked countries, as indicated by the variable $\overline{w}_{it}^{\mathrm{L}}$ being significant in column 2, whereas $\overline{w}_{it}^{\mathrm{NL}}$ is not significant.[39]

Can the observed predictability still be explained by funds' behavioral biases because it reflects the price pressure of their familiarity-driven purchases? We argue

[38] A typical US study uses up to 125 ($5 \times 5 \times 5$) benchmark portfolios. Our empirical design choice is necessitated by a smaller number of firms in many international stock markets outside the US. We use 125 benchmark portfolios in a robustness check (see columns 1–3 of Supplementary Material Table A-VIII).

[39] Several robustness checks are provided in Supplementary Material Table A-VIII, showing that the same results are obtained when we use the Fama and MacBeth procedure (Columns 5–7), and when we replace $\overline{w}_{it}^{\mathrm{L}}$ and $\overline{w}_{it}^{\mathrm{NL}}$ with their equivalent portfolio bias measures.

TABLE 9

Cross-Border Expansions, Portfolio Preferences, and Return Predictability

Each observation in Table 9 is a firm and year combination. The dependent variable is the subsequent-year return ($r_{i,t+1}$) of firm i adjusted by the corresponding return of its benchmark portfolio (constructed by triple-sorting firms in the same host country, excluding firm i, into $3 \times 3 \times 3$ (27) portfolios based on their size, book-to-market, and momentum terciles). The following portfolio measures are also computed at the firm level: $\overline{w}_{it}^{F}$ is the cross-country average of the weight of firm i in the host-country portfolio of foreign funds, w_{it}^{D} is the weight of firm i in the host-country portfolio of domestic funds, $\overline{w}_{it}^{L}$ ($\overline{w}_{it}^{NL}$) is computed in the same way as $\overline{w}_{it}^{F}$, but separately for foreign funds from countries with which firm i is linked (not linked) through a subsidiary presence. In columns 4 and 5, $\Delta\overline{w}_{it}^{L}$, $\Delta\overline{w}_{it}^{NL}$, and Δw_{it}^{D} are the change in $\overline{w}_{it}^{L}$, $\overline{w}_{it}^{NL}$, and w_{it}^{D}, respectively, from year $t-1$ to year t. In these two models, the 1-year lag levels of $\overline{w}_{it}^{L}$, $\overline{w}_{it}^{NL}$, and w_{it}^{D} are included but not reported. In columns 3 and 5, the linked countries in the construction of $\overline{w}_{it}^{L}$ excludes those where firm i has established a subsidiary presence for less than 3 years. In column 6, there are 3 indicator variables which collectively represent firms that have a foreign subsidiary (multinational firms). $\text{EXPANSION}_{\overline{w}_{it}^{L} > \overline{w}_{it}^{NL}}$ ($\text{EXPANSION}_{\overline{w}_{it}^{L} \le \overline{w}_{it}^{NL}}$) indicates whether firm i makes a cross-border expansion in year t and is over-weighted by foreign funds from "linked" countries by a larger (smaller or equal) margin than by foreign funds from "nonlinked" countries; and NO_EXPANSION is the indicator variable for the remaining multinational firms that do not have an expansion event in year t. All regression specifications include but do not report the following control variables. MSCI, FOREIGN_LISTING, IFRS, and ANALYST are the indicator variables for whether, in a given year, a firm is an MSCI All Country World Index constituent, has securities cross-listed in a foreign stock market, follows the International Financial Reporting Standards, and has analyst following, respectively. SIZE is the natural logarithm of total assets in US dollars. TURNOVER is the total trading volume in a year scaled by the number of issued shares. BOOK_TO_MARKET is the ratio of the book value of equity to market capitalization. MOMENTUM is the cumulative monthly stock return in a given year. DIVIDEND_YIELD is the sum of all cash dividends per share in a year divided by the stock price at the beginning of the fiscal year. LEVERAGE is the ratio of total debt to total assets. VOLATILITY is the standard deviation of monthly returns. All models are estimated using OLS on the pooled data, with standard errors (reported in parentheses) clustered by firm and year. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4	5	6
$\overline{w}_{it}^{F}$	0.299**					0.298**
	(0.132)					(0.134)
$\overline{w}_{it}^{L}$		0.223*	0.351**			
		(0.121)	(0.166)			
$\Delta\overline{w}_{it}^{L}$				0.418***	0.465*	
				(0.147)	(0.239)	
$\overline{w}_{it}^{NL}$		0.0853	−0.140			
		(0.127)	(0.107)			
$\Delta\overline{w}_{it}^{NL}$				0.174	−0.032	
				(0.219)	(0.179)	
w_{it}^{D}	0.025	−0.185	−0.149			0.033
	(0.167)	(0.177)	(0.139)			(0.178)
Δw_{it}^{D}				−0.271	−0.203	
				(0.257)	(0.269)	
$\text{EXPANSION}_{\overline{w}_{it}^{L} > \overline{w}_{it}^{NL}}$						0.038***
						(0.008)
$\text{EXPANSION}_{\overline{w}_{it}^{L} \le \overline{w}_{it}^{NL}}$						0.023***
						(0.007)
NO_EXPANSION						0.030***
						(0.005)
Other control variables	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	343,449	184,563	154,214	178,561	136,470	333,008

that this is unlikely because we examine returns measured over a whole year after each portfolio allocation snapshot. To further rule out the price pressure explanation, we also examine *yearly changes* in $\overline{w}_{it}^{L}$ and $\overline{w}_{it}^{NL}$, instead of their levels. The pressure of portfolio changes in year t should mainly impact contemporaneous returns, and not returns in year $t+1$. However, we still find that $\Delta\overline{w}_{it}^{L}$ (and not $\Delta\overline{w}_{it}^{NL}$) significantly predict $r_{i,t+1}$ (column 4). We also remove from the computation of $\overline{w}_{it}^{L}$ all linked funds from countries where firm i has established subsidiary presence for 3 years or less. This alternative measure is less likely to be influenced by portfolio changes that may be driven by local funds becoming familiar with the firm for the first time (following the firm's expansion), but we still find that both the levels and yearly changes of $\overline{w}_{it}^{L}$ positively predict subsequent returns (columns 3 and 5).

Our second return predictability test focuses on different responses of foreign funds to a given cross-border expansion. The underlying premise of this test is the theoretical prediction by Fillat and Garetto (2015) that investors of multinational firms demand high returns because cross-border expansions are long-term irreversible investments that expose the firms to local demand fluctuations. We further argue that, if (linked) funds from expansion locations know this local risk better than (nonlinked) funds from other countries, the deviation between the two groups in terms of portfolio responses to an expansion can conceivably predict returns. In contrast, the attention/familiarity explanation only predicts that $\overline{w}_{it}^{\mathrm{L}}$ increases (relative to $\overline{w}_{it}^{\mathrm{NL}}$) after an expansion, and since these changes are not information signals, they should not predict subsequent returns.

To show which prediction applies, we separate multinational firms into three groups: firms that do not expand in year t (Group 1), firms that expand in year t and are concurrently over-weighted by funds from linked countries by a greater margin than funds from other nonlinked countries, that is, $\overline{w}_{it}^{\mathrm{L}} > \overline{w}_{it}^{\mathrm{NL}}$ (Group 2), and firms that also expand in year t but with $\overline{w}_{it}^{\mathrm{L}} \leq \overline{w}_{it}^{\mathrm{NL}}$ (Group 3). The difference in return predictability between Group 2 and Group 3 is our main focus. The OLS results in column 7 show that the estimated subsequent-year return premium is much larger for Group 2 firms than for Group 3 firms (e.g., 3.8% vs. 2.3%). The Wald test statistic (not tabulated) is 3.76, with a p-value of 0.07. This result again indicates that funds in expansion locations possess information advantages.

It is important to clarify how the above results add to those from two related studies that also examine funds' returns conditional upon the geographic exposure of their portfolio firms. Ke et al. (2010) briefly examine (in Table 8) the returns of US firms with an international presence during the 2001–2002 period. They report a positive (but not significant) difference between the returns that foreign funds and domestic investors earn on these firms, but their study does not investigate the return predictability of portfolio changes of foreign funds conditional on a firm's expansion actions. In contrast, with our ability to identify the exact timing of each expansion, we can show that the return predictability of certain foreign funds' portfolio allocation only emerges after they become "linked" to the firm through its cross-border expansions. Our return-based evidence is thus more aligned with the evidence from Bernile et al. (2015) that a US firm's return increases with the ownership of institutional investors from US states where the firm has the highest exposure. Their study, however, does not focus on the precise moment when a firm becomes exposed to a new location-based risk. Given that our study observes the timing of each cross-border expansion, we can establish the information effect with greater certainty by documenting the return predictability of portfolio changes around an expansion event.

D. Analysis at the Individual Fund Level

Our final set of analyses delves into variations within individual funds' portfolios. By doing this, we can clearly differentiate the cross-border expansion effect across two separate situations: when a fund has (or has not) previously invested in the firm. Invoking Merton's (1987) theory on investors' attention constraints, we argue that a familiarity bias primarily explains the inclusion of certain firms into a

fund's set of feasible investments. Once a firm has been covered by a fund's portfolio – henceforth a familiar firm – any further changes in its portfolio weight should mostly be dictated by the fund's information acquisition. We re-estimate equation (1) in the following form (with f denoting an individual fund):

$$w_{ift} = \alpha L_{ift} + \phi_{if} + \eta_{it} + \delta_{ft} + \varepsilon_{ift}. \quad (8)$$

The model in equation (8) is first estimated on firm-fund-year observations where the fund has already started investing in the firm, referred to as the "Already Invested Sample."[40] The results of the estimation reported in column 1 of Table 10 indicate that a cross-border expansion on average leads to a 0.13% increase in the expanding firm's weight in a treated fund's portfolio, relative to that of a control

TABLE 10

Analysis at the Individual Fund Level

Each observation in Table 10 is a firm (denoted *i*), fund (denoted *f*), and year (denoted *t*) combination. In a given year, only funds that are active international investors (reporting at least 10 foreign investment holdings) are included. In columns 1, 2, 4, and 5, the model is estimated on the "Already Invested Sample." This includes firm-fund-year observations, where for each observation, the fund has already invested in the firm by year *t*. In column 3, the model is estimated on the "Not Yet Invested Sample." For each observation in this sample, the fund has not yet invested into the firm before year *t*. The table contains two sets of regression analyses. In columns 1, 2, and 3, the dependent variable is w_{ift}, or the weight of firm *i* in the host-country portfolio held by fund *f* in year *t*. The explanatory variable is POST_EXPANSION, which indicates whether firm *i* expands into the home (source) country of fund *f* in year *t*. POST_EXPANSION_LARGE_FIRM (POST_EXPANSION_SMALL_FIRM) indicates whether, before an expansion into fund *f*'s country, the expanding firm is larger (smaller) than the median foreign firm in fund *f*'s portfolio in terms of market capitalization. In columns 4 and 5, the dependent variable is the subsequent-year return ($r_{i,t+1}$) of firm *i* adjusted by the corresponding return of its benchmark portfolio (constructed by triple-sorting firms in the same host country, excluding firm *i*, into $3 \times 3 \times 3$ (27) portfolios based on their size, book-to-market, and momentum terciles). The key explanatory variable in the regression model in column 4 (column 5) is w_{ift} (Δw_{ift}) and its interaction with POST_EXPANSION. Δw_{ift} is the change w_{ift} from year $t-1$ to year *t*. The regressions in these two columns cannot include firm × year fixed effects given that the dependent variable $r_{i,t+1}$ only varies across firm-years. Instead, these regressions include firm-level control variables that are the same as those used in the regression analysis in Table 9. Their coefficients are not reported. Clustered standard errors are shown in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Var: w_{ift}			Dependent Var: $r_{i,t+1}$	
	Already Invested Sample		Not Yet Invested Sample	Already Invested Sample	
	1	2	3	4	5
POST_EXPANSION	0.127** (0.050)		0.081** (0.040)	−0.016 (0.011)	−0.008 (0.009)
POST_EXPANSION_LARGE_FIRM		0.178*** (0.058)			
POST_EXPANSION_SMALL_FIRM		0.010 (0.009)			
w_{ift}				−0.002 (0.005)	
POST_EXPANSION × w_{ift}				0.032*** (0.009)	
Δw_{ift}					−0.003 (0.005)
POST_EXPANSION × Δw_{ift}					0.018*** (0.008)
Firm-level control variables				Yes	Yes
Types of fixed effects: Firm × year + firm × fund + fund × year	Yes	Yes	Yes		
Firm × fund + fund × year				Yes	Yes
No. of obs.	11,870,011	11,870,011	10,230,802	10,372,567	6,581,896

[40]In this analysis, we only consider funds with at least 10 reported foreign holdings in a given year.

fund, even under the common condition that both funds are currently investing in the firm and therefore already familiar with it. The magnitude of the increase is again economically large, equivalent to about 7% of the average w_{ift}. To further ensure that this familiarity condition is met, for each fund f, we split the portfolio firms that expand into fund f's country into two categories: those with preexpansion market capitalization larger (smaller) than the median capitalization computed using the foreign firms being held by fund f. In column 2, we show that the cross-border expansion effect is concentrated among large existing portfolio firms rather than small ones. This helps us rule out the possibility that funds may not be familiar with some small firms in their own portfolios.

As an additional test, we also estimate the effect of POST_EXPANSION on the weight that fund f allocates to firm i when it invests in firm i for the first time. We do this by again estimating equation (8) on the "Not Yet Invested Sample," which only includes firm-fund-year observations where the fund has not invested in the firm up until the previous year. The results reported in column 3 indicate that an expansion leads to an estimated first-time portfolio allocation by fund f to firm i equivalent to 0.08%. Given the condition that fund f has not invested in firm i before, this change can be driven by both an increase in familiarity or by information. Overall, the combined results from columns 1 and 3 indicate that an expansion may generate both information and familiarity effects, but a simple comparison of the magnitudes of the two estimates (0.13% vs. 0.08%) further suggests that the information effect is likely to be just as important as the familiarity effect, if not more.

Finally, we investigate how individual funds' portfolio changes are associated with subsequent returns. This is similar to the tests reported in Table 9, but using fund-level data and only the "Already Invested Sample," so that we can set up the conditions where funds are already familiar with certain firms. Specifically, we regress firm i's excess return in the next period ($r_{i,t+1}$) on the current portfolio weight of firm i in fund f (w_{ift}) and its interaction with POST_EXPANSION. The results reported in column 3 of Table 10 indicate that w_{ift} is positively related to $r_{i,t+1}$ only in the period after firm i has expanded into fund f, and not in the preexpansion period. The same results are obtained when we replace w_{ift} with the measure of year-on-year portfolio weight changes (Δw_{ift}). Both sets of evidence thus provide further support for the information hypothesis, as funds appear to utilize the information endowments provided by portfolio firms' operations to generate superior returns.

VI. Conclusion

This study examines whether cross-border economic activities facilitate information links between firms and foreign investors. We utilize a novel data set that captures variations in firms' operations within individual foreign locations, especially the timing of a firm's cross-border expansion. This setting enables a rich set of new empirical strategies for disentangling the information effect of a cross-border expansion from other noninformation explanations.

Our analysis provides unambiguous evidence showing that a firm becomes significantly more attractive to foreign funds after expanding into its home

countries. Other foreign and domestic funds do not respond to the expansion in the same way. This effect is consistently observed across a variety of foreign activity measures and remains robust in tests focusing on expansions that are unlikely to be driven by funds' influence. Importantly, we show that the cross-border expansion effect cannot be entirely explained by funds' familiarity biases. Such expansions generate valuable information advantages for destination-country funds.

Several important implications emerge from our findings. First, for international portfolio investors, firm-level economic connections with their home countries appear to be an important source of information advantages that should be exploited. Second, while market-wide financial liberalization policies may not be fully effective, firms can attract foreign investors through their own efforts to expand their global presence. On this point, our analysis links two emerging trends in international investments: as local firms establish more foreign operations, the aggregate stock portfolio held by foreign funds in each country has become increasingly less concentrated, converging with that held by domestic funds. Finally, there may be a side benefit of policies aimed at encouraging firms to enter new geographic markets, such as bilateral trade and investment agreements, in terms of creating a broader foreign investor base for the local stock market. Fostering greater economic integration at the firm level can thus have an important cost of capital consequence.

Supplementary Material

To view supplementary material for this article, please visit http://doi.org/10.1017/S0022109022000941.

References

Akbari, A.; L. Ng; and B. Solnik. "Emerging Markets Are Catching Up: Economic or Financial Integration?" *Journal of Financial and Quantitative Analysis*, 55 (2020), 2270–2303.

Ammer, J.; S. B. Holland; D. C. Smith; and F. Warnock. "U.S. International Equity Investment." *Journal of Accounting Research*, 50 (2012), 1109–1139.

Andrade, S. C., and V. Chhaochharia. "Information Immobility and Foreign Portfolio Investment." *Review of Financial Studies*, 23 (2010), 2429–2463.

Antras, P., and R. Caballero. "Trade and Capital Flows: A Financial Frictions Perspective." *Journal of Political Economy*, 117 (2009), 701–744.

Baik, B.; J.-K. Kang; J.-M. Kim; and J. Lee. "The Liability of Foreignness in International Equity Investments: Evidence from the US Stock Market." *Journal of International Business Studies*, 44 (2013), 391–411.

Bekaert, G.; C. R. Harvey; C. T. Lundblad; and S. Siegel. "What Segments Equity Markets?" *Review of Financial Studies*, 24 (2011), 3841–3890.

Bena, J., and K. Li. "Corporate Innovations and Mergers and Acquisitions." *Journal of Finance*, 69 (2014), 1923–1960.

Bernile, G.; A. Kumar; and J. Sulaeman. "Home Away from Home: Geography of Information and Local Investors." *Review of Financial Studies*, 28 (2015), 2009–2049.

Bernstein, S.; X. Giroud; and R. R. Townsend. "The Impact of Venture Capital Monitoring." *Journal of Finance*, 71 (2016), 1591–1622.

Braun, M., and C. Raddatz. "The Politics of Financial Development: Evidence from Trade Liberalization." *Journal of Finance*, 63 (2008), 1469–1508.

Bustos, P. "Trade Liberalization, Exports, and Technology Upgrading: Evidence on the Impact of MERCOSUR on Argentinian Firms." *American Economic Review*, 101 (2011), 304–40.

Carrieri, F.; I. Chaieb; and V. Errunza. "Do Implicit Barriers Matter for Globalization?" *Review of Financial Studies*, 26 (2013), 1694–1739.
Chan, K.; V. Covrig; and L. Ng. "What Determines the Domestic Bias and Foreign Bias? Evidence from Mutual Fund Equity Allocations Worldwide." *Journal of Finance*, 60 (2005), 1495–1534.
Choi, N.; M. Fedenia; H. Skiba; and T. Sokolyk. "Portfolio Concentration and Performance of Institutional Investors Worldwide." *Journal of Financial Economics*, 123 (2017), 189–208.
Chuprinin, O.; M. Massa; and D. Schumacher. "Outsourcing in the International Mutual Fund Industry: An Equilibrium View." *Journal of Finance*, 70 (2015), 2275–2308.
Coeurdacier, N., and H. Rey. "Home Bias in Open Economy Financial Macroeconomics." *Journal of Economic Literature*, 51 (2013), 63–115.
Cohen, L. "Loyalty-Based Portfolio Choice." *Review of Financial Studies*, 22 (2009), 1213–1245.
Conconi, P.; A. Sapir; and M. Zanardi. "The Internationalization Process of Firms: From Exports to FDI." *Journal of International Economics*, 99 (2016), 16–30.
Cooper, I., and E. Kaplanis, "Costs to Cross Border Investment and International Equity Market Equilibrium." In *Recent Developments in Corporate Finance*, Vol. 4, C. M. J. Edwards, J. Franks, and S. Schaefer, eds. Cambridge: Cambridge University Press (1986), 209–240.
Coval, J. D., and T. J. Moskowitz. "The Geography of Investment: Informed Trading and Asset Prices." *Journal of Political Economy*, 109 (2001), 811–841.
Covrig, V. M.; M. L. Defond; and M. Hung. "Home Bias, Foreign Mutual Fund Holdings, and the Voluntary Adoption of International Accounting Standards." *Journal of Accounting Research*, 45 (2007), 41–70.
Covrig, V.; S. T. Lau; and L. Ng. "Do Domestic and Foreign Fund Managers Have Similar Preferences for Stock Characteristics? A Cross-Country Analysis." *Journal of International Business Studies*, 37 (2006), 407–429.
Dahlquist, M., and G. Robertsson. "Direct Foreign Ownership, Institutional Investors, and Firm Characteristics." *Journal of Financial Economics*, 59 (2001), 413–440.
Dziuda, W., and J. Mondria. "Asymmetric Information, Portfolio Managers, and Home Bias." *Review of Financial Studies*, 25 (2012), 2109–2154.
Fang, L. H.; J. Peress; and L. Zheng. "Does Media Coverage of Stocks Affect Mutual Funds' Trading and Performance?" *Review of Financial Studies*, 27 (2014), 3441–3466.
Ferreira, M.; M. Massa; and P. Matos. "Shareholders at the Gate? Institutional Investors and Cross-Border Mergers and Acquisitions." *Review of Financial Studies*, 23 (2010), 601–644.
Ferreira, M., and P. Matos. "The Colors of Investors' Money: The Role of Institutional Investors Around the World." *Journal of Financial Economics*, 88 (2008), 499–533.
Fillat, J., and S. Garetto. "Risk, Returns, and Multinational Production." *Quarterly Journal of Economics*, 130 (2015), 2027–2073.
Foley, C. F., and K. Manova. "International Trade, Multinational Activity, and Corporate Finance." *Annual Review of Economics*, 7 (2015), 119–146.
Fresard, L. "Financial Strength and Product Market Behavior: The Real Effects of Corporate Cash Holdings." *Journal of Finance*, 65 (2010), 1097–1122.
Fresard, L.; U. Hege; and G. Phillips. "Extending Industry Specialization Through Cross-Border Acquisitions." *Review of Financial Studies*, 30 (2017), 1539–1582.
Gompers, P. A., and A. Metrick. "Institutional Investors and Equity Prices." *Quarterly Journal of Economics*, 116 (2001), 229–259.
Gopinath, G.; S. Kalemli-Ozcan; L. Karabarbounis; and C. Villegas-Sanchez. "Capital Allocation and Productivity in South Europe." *Quarterly Journal of Economics*, 132 (2017), 1915–1967.
Huberman, G. "Familiarity Breeds Investment." *Review of Financial Studies*, 14 (2001), 659–680.
Jang, Y. "International Corporate Diversification and Financial Flexibility." *Review of Financial Studies*, 30 (2017), 4133–4178.
Kalemli-Ozcan, S.; E. Papaioannou; and J.-L. Peydro. "Financial Regulation, Financial Globalization, and the Synchronization of Economic Activity." *Journal of Finance*, 68 (2013), 1179–1228.
Kang, J.-K., and R. Stulz. "Why is There a Home Bias? An Analysis of Foreign Portfolio Equity Ownership in Japan." *Journal of Financial Economics*, 46 (1997), 3–28.
Karolyi, G. A.; D. T. Ng; and E. Prasad. "The Coming Wave: Where Do Emerging Market Investors Put Their Money?" *Journal of Financial and Quantitative Analysis*, 55 (2020), 1369–1414.
Ke, D.; L. Ng; and Q. Wang. "Home Bias in Foreign Investment Decisions." *Journal of International Business Studies*, 41 (2010), 960–979.
Keloharju, M.; S. Knupfer; and J. Linnainmaa. "Do Investors Buy What They Know? Product Market Choices and Investment Decisions." *Review of Financial Studies*, 25 (2012), 2921–2958.
Lau, S. T.; L. Ng; and B. Zhang. "The world price of home bias." *Journal of Financial Economics*, 97 (2010), 191–217.

Lee, J.; A. Naranjo; and S. Sirmans. "Exodus from Sovereign Risk: Global Asset and Information Networks in the Pricing of Corporate Credit Risk." *Journal of Finance*, 71 (2016), 1813–1856.
Levy, P. "A Political-Economic Analysis of Free-Trade Agreements." *American Economic Review*, 87 (1997), 506–519.
Lileeva, A., and D. Trefler. "Improved Access to Foreign Markets Raises Plant-level Productivity … for Some Plants." *Quarterly Journal of Economics*, 125 (2010), 1051–1099.
Melitz, M. "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity." *Econometrica*, 71 (2003), 1695–1725.
Melitz, M., and D. Trefler. "Gains from Trade When Firms Matter." *Journal of Economic Perspectives*, 26 (2012), 91–118.
Merton, R. C. "A Simple Model of Capital Market Equilibrium with Incomplete Information." *Journal of Finance*, 42 (1987), 483–510.
Pool, V. K.; N. Stoffman; and S. E. Yonker. "No Place Like Home: Familiarity in Mutual Fund Manager Portfolio Choice." *Review of Financial Studies*, 25 (2012), 2563–2599.
Portes, R., and H. Rey. "The Determinants of Cross-Border Equity Flows." *Journal of International Economics*, 65 (2005), 269–296.
Schumacher, D. "Home Bias Abroad: Domestic Industries and Foreign Portfolio Choice." *Review of Financial Studies*, 31 (2017), 1654–1706.
UNCTAD, "World Investment Report: Investment and the Digital Economy." (2017).
Van Nieuwerburgh, S., and L. Veldkamp. "Information Immobility and the Home Bias Puzzle." *Journal of Finance*, 64 (2009), 1187–1215.