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ABSTRACT

This paper evaluates the influence of host-country financial development on the global operations of multinational firms. Using detailed U.S. data, we provide evidence that host-country financial development increases entry by multinational affiliates, while also decreasing affiliate sales in the local market relative to the parent country and third-country destinations. These effects are more pronounced in industries that depend more on external sources of financing. The patterns are consistent with the combination of two effects of financial development: 1) a competition effect that reduces individual affiliates' revenues in the host market due to increased entry by domestic firms, and 2) a financing effect that raises affiliate entry and aggregate sales due to affiliates' improved access to external finance in the host country.

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1 Introduction

Multinational firms (MNCs) account for two-thirds of international trade and provide a key channel through which capital and technology flow across borders. These firms manage increasingly complex operations, basing offshore affiliates in multiple countries and serving multiple markets from each location. But, to an often surprising extent, affiliate operations are financed by external entities located in the host country: among affiliates of U.S.-based multinationals, nearly two-thirds of affiliate debt is raised in the host country, while U.S. headquarters hold only one-sixth of affiliate debt.[1] This observation strongly suggests that multinational firms may be responsive to changes in capital market conditions abroad, and importantly, raises the question of whether countries seeking to attract multinational activity can expect financial market reforms to influence the local activity of foreign firms.

This paper provides evidence that financial development in the affiliate host country indeed impacts multinational activity. Using detailed data from the Bureau of Economic Analysis (BEA) on U.S.-based multinational firms during 1989-2009, we establish three sets of empirical regularities. First, countries with high levels of financial development attract more subsidiaries from the United States. Second, financial development influences the distribution of affiliate sales across destination markets. Stronger financial institutions in the host country raise *aggregate* affiliate sales to the local market, to the United States, and to third-country destinations. At the level of the *individual* affiliate, by contrast, exports to the United States and other markets increase, but local sales decline. Third, the share of affiliates' local sales in total sales declines with host-country financial development, while the shares of return sales to the United States and export-platform sales to other countries rise; these patterns hold at both the aggregate and affiliate levels.

To guide our thinking on these findings, we develop a three-country model of international trade and multinational activity that builds on Helpman et al. (2004) and Grossman et al. (2006), in which heterogeneous firms face imperfect capital markets in the FDI recipient country. This model demonstrates how two effects of host-country financial development can account for the empirical regularities in the data. The first is the *competition effect*: In the presence of credit market frictions, an improvement in host-country financial conditions stimulates entry by domestic firms and intensifies local competition for the affiliates of foreign multinationals. This discourages affiliate presence, and conditional on survival, induces affiliates to sell less in the local market and instead export more to the home and third-country markets. The second is the *financing effect*: Host-country financial development facilitates affiliates' use of host-country external finance. This increases entry by multinational affiliates and raises the aggregate volume of their sales. Together, these two effects can jointly explain why aggregate measures of affiliate activity can rise with host-country financial development (as would be the case when the financing effect is sufficiently strong), even while surviving affiliates reduce sales to the host market.

The data reveal economically significant impacts of host-country financial development on multinational activity. The empirical results imply that improving a country's financial conditions by one

[1] Based on Feinberg and Phillips (2004), as well as authors' own calculations; see also Section 3.2 for related evidence.

standard deviation is on average associated with a 10.6% increase in the number of foreign affiliates and a 17.4% expansion in aggregate affiliate sales. Sales adjust differentially across markets, however, so that the share of affiliate sales to the host market falls by 2.5 percentage points, while the shares of exports to the United States and to third-country destinations rise by 1 and 1.5 percentage points respectively.

These estimates result from specifications that control for other determinants of multinational activity as prescribed by the model. This includes various host-country characteristics (such as market size, export-platform potential, factor costs, economic development, broad institutional quality), as well as the costs of domestic entry, trade and FDI. Our primary measure of financial development is the amount of bank credit available to the private sector relative to host-country GDP, a standard measure in the literature which reflects the strength of underlying financial institutions and their ability to support financial contracting. This measure of private credit to GDP is moreover consistent with the theory, as we show that it moves monotonically in the model with the key parameter that governs financial frictions. For corroboration, we nevertheless report similar empirical results using alternative measures related to stock market capitalization and financial reforms.

To address potential endogeneity in our measure of financial development, we use variation in external finance dependence across sectors, similar to Rajan and Zingales (1998). The premise of this identification strategy is that technologically-determined reliance on outside capital defines firms' sensitivity to credit availability, but less so to general institutional or economic conditions. We show that host-country financial development indeed exerts stronger effects on MNC activity in financially more sensitive industries. For example, we find that in response to the above one standard deviation improvement in private credit, the number of foreign affiliates and aggregate affiliate sales grow respectively 4.3% and 10.2% more in the industry at the 75^{th} percentile by external finance dependence relative to that at the 25^{th} percentile. Additional robustness checks confirm that these results are not driven by other sector characteristics that may be correlated with financial vulnerability. As a further test, we also allow for unobserved country or firm characteristics by introducing country, country-year, or firm fixed effects in the sales-shares specifications. The results show that host-country financial conditions contribute to the observed variation in multinational activity across sectors and time within countries, as well as across countries and sectors within firms.

This paper advances a growing literature studying the impact of financial frictions on firm operations. Existing evidence indicates that financial development improves aggregate growth by increasing entry by credit-constrained firms, as well as by encouraging technology adoption and expansion along the intensive margin (King and Levine 1993, Rajan and Zingales 1998, Beck 2003, Beck et al. 2005, Aghion et al. 2007, Hsu et al. 2014). Financial reforms also raise firms' export participation and aggregate export volumes, with effects concentrated among small firms and in sectors relatively reliant on external capital (Manova 2008, Amiti and Weinstein 2011, Manova 2013).[2] We incorporate these insights into our analysis of financial market imperfections, and consider their implications for the competitive environment and

[2]Credit and collateral conditions moreover affect the outward FDI decisions of firms, as seen for example from the experience of Japanese firms in the 1990s (Raff et al. 2016).

multinational firms' activity across countries at different levels of financial development.

We also extend a separate line of research on the role of host-country financial conditions for FDI. MNC affiliates tend to be less constrained and thus more responsive to growth opportunities than domestic firms (Desai et al. 2008, Manova et al. 2015), but they nevertheless do react to changes in local financial conditions. Multinationals are known to use financial markets opportunistically: They raise external finance in the host economy when possible, and access capital markets abroad or obtain direct financing from the parent company otherwise. Parent funding, however, does not fully compensate for the shortfall in local financing in host countries with weak financial systems (Desai et al. 2004).[3] We build on these earlier papers by considering not only MNCs' financing practices, but also their entry and sales decisions. We suggest that credit conditions can forestall the entry of a margin of prospective multinationals who fall just shy of the productivity cutoff to undertake FDI. Active multinationals, on the other hand, need not be constrained in their access to local financing, since they are productive enough to credibly commit to repay their liabilities to host-country financial institutions.[4]

Our paper is also related to recent studies examining multinational firms' complex global strategies. For example, Ramondo et al. (2016) analyze the importance of horizontal, vertical and export-platform motives for U.S. multinationals. This literature has developed models that accommodate these hybrid activities and deliver empirically testable predictions for trade flows and multinational operations (Yeaple 2003a,b, Markusen and Venables 2007, Arkolakis et al. 2012, Ramondo and Rodriguez-Clare 2013, Irarrazabal et al. 2013, Tintelnot 2016).[5] Our work indirectly speaks to the relative importance of these three FDI motives: One interpretation of our findings is that, *ceteris paribus*, stronger financial institutions in the host nation reduce the incentives to pursue FDI for horizontal motives, and instead favor vertical and export-platform motives.[6]

Finally, the competition effect we highlight relates to prior work on the interaction between foreign affiliates and domestic firms in FDI host countries. Multinationals may crowd out local producers by raising competition (Aitken and Harrison 1999, De Backer and Sleuwaegen 2003), but they can also generate productivity spillovers and nudge indigenous companies to remove X-inefficiencies, especially when local financial markets are strong (Alfaro et al. 2004, Haskel et al. 2007). The literature has identified several specific channels for this, including knowledge spillovers through labor turnover (Poole 2013) and

[3]Firms with the capacity to do so may in fact vertically integrate their suppliers located in financially less-developed countries, to alleviate the constraints that these suppliers face (Bustos 2007, Antràs et al. 2009, Carluccio and Fally 2012). See also Buch et al. (2009) who argue that financially-constrained firms are less likely to choose horizontal FDI over direct exporting because of the higher associated fixed costs.

[4]Our analysis also contributes to research on the impact of broader institutional frictions on FDI. While we focus on financial institutions, other recent studies have emphasized the effects of contractual imperfections, investor protection laws, and intellectual property rights on multinational activity (Antràs 2003, Branstetter et al. 2006, Bénassy-Quéré et al. 2007, Bernard et al. 2010, Antràs and Chor 2013, Bilir 2014). Similar to Antràs and Caballero (2009), our approach emphasizes the equilibrium interaction between FDI and trade flows in the presence of financial frictions.

[5]Yeaple (2013), Chapter 3, provides a review of the growing literature on hybrid models of FDI. It is conceptually challenging to write down a tractable multi-country model that accommodates horizontal, vertical and export-platform motives for FDI simultaneously, given the large number of combinatorial possibilities that a multinational firm would face in such a general setting: In a world with N countries, there would be 2^N location combinations to be considered.

[6]See also Fillat et al. (2015) who demonstrate that the spatial dimension of U.S. MNC affiliate activity is consistent with risk diversification motives.

improvements in the provision of intermediate inputs (Javorcik 2004, Javorcik and Spatareanu 2009, Arnold et al. 2011).[7] Consistent with the idea that multinational affiliates generate positive spillovers for the local economy, there is suggestive evidence that host countries that saw a larger increase in U.S. MNC affiliate sales between 1989 and 2009 also recorded higher growth in GDP per capita during that period (see Appendix Figure 1).[8] While the literature has primarily emphasized the implications of FDI for the host economy, we also highlight how local financial development and increased competition by domestic firms can affect the activity of foreign multinationals.

The rest of the paper proceeds as follows. Section 2 develops our theoretical framework, while Section 3 introduces the competition and financing effects of host-country financial development on multinational activity. Sections 4 and 5 outline the estimation strategy and the data used. Sections 6 and 7 report the main empirical findings and a series of sensitivity analyses. The last section concludes. Detailed proofs for the model and several extensions are presented in the Appendix.

2 Baseline Model

We develop a model of FDI with heterogeneous firms which formally demonstrates how host-country financial development affects the entry and sales decisions of multinational affiliates through two mechanisms. We refer to these two mechanisms as the competition effect and the financing effect. We adopt a stylized three-country setup in order to illustrate the effects on affiliate entry and on the distribution of affiliate sales across markets in a parsimonious setting. This stylized model nevertheless delivers clear predictions which will guide how we design the empirical analysis and interpret our findings. As we discuss in Section 3.3 and the Appendix, the key predictions related to the competition and financing effects continue to hold in richer model setups.

2.1 Economic environment

Consider a world with three countries, West, East, and South. There are two sectors in each country, one producing a homogeneous good and the other featuring a continuum of differentiated varieties. Labor is the only factor. The homogeneous good is manufactured under constant returns to scale. This good is freely tradable across borders, and thus serves as the global numeraire. In each country, the labor force is sufficiently large so that a strictly positive amount of the homogeneous good is produced in equilibrium. We assume for simplicity that West and East are symmetric in their underlying economic structure. However, South is less productive in the homogeneous good sector than West and East: While $1/\omega$ workers are needed to make each unit of the numeraire in South (where $\omega < 1$), only one worker is

[7] See also Alviarez (2015), who indicates that multinational entry can directly increase aggregate productivity even in the absence of technological spillovers to domestic firms, as the former are on average more productive than the latter.

[8] As we document in Appendix Table 1, this positive association holds too in a regression setting, even when controlling for initial GDP per capita (Column 1) or when considering non-overlapping five-year intervals (Column 3). Of interest, the composition of affiliate sales also appears to be correlated with economic growth. Host countries exhibit greater GDP per capita growth when there is a larger rise in the share of U.S. MNC affiliate sales destined for the local market (Columns 2 and 4); this holds when controlling for the concurrent growth in aggregate affiliate sales.

required in West and East. The nominal wage in West and East is thus 1, while the wage in South is ω. Firms manufacturing in South therefore face lower production costs.[9]

The utility function of a representative consumer in West and East (subscript $n = w, e$) is given by:

$$U_n = y_n^{1-\mu} \left(\sum_{j \in \{e,w\}} \int_{\Omega_{nj}} x_{nj}(a)^{\alpha} \, dG_j(a) \right)^{\frac{\mu}{\alpha}}, \tag{2.1}$$

while the utility function for Southern consumers (subscript s) is:

$$U_s = y_s^{1-\mu} \left(\sum_{j \in \{e,w,s\}} \int_{\Omega_{sj}} x_{sj}(a)^{\alpha} \, dG_j(a) \right)^{\frac{\mu}{\alpha}}, \quad 0 < \alpha, \, \mu < 1. \tag{2.2}$$

Utility in country i ($i \in \{w, e, s\}$) is thus a Cobb-Douglas aggregate over consumption of the homogeneous good (y_i) and differentiated varieties ($x_{ij}(a)$), where the expenditure share of the latter equals μ. The sub-utility derived from differentiated varieties is a Dixit-Stiglitz aggregate with a constant elasticity of substitution $\varepsilon = \frac{1}{1-\alpha} > 1$; note that varieties from different countries of origin are viewed as differentiated in the eyes of consumers.

We let $x_{ij}(a)$ denote the quantity of a country-j differentiated variety that is consumed in country i, and label the set of such varieties Ω_{ij}. When $i \neq j$, this set consists of all varieties exported by country j's firms to i, as well as any varieties produced and sold locally by country j's multinational affiliates in i. Analogously, when $i = j$, Ω_{ii} represents all indigenous varieties produced domestically, and all varieties produced by country i's multinational affiliates abroad that are then exported back to the home market. Notice that South demands varieties from all three countries, while Southern varieties do not enter the utility function of West and East. This assumption simplifies our analysis but does not detract from our main results below. (The case where South can export its varieties to West and East is briefly discussed in Section 3.3.)

Consumer preferences (2.1) and (2.2) imply that demand in country i for each country-j variety is $x_{ij}(a) = A_{ij} p_{ij}(a)^{-\varepsilon}$, where $p_{ij}(a)$ denotes the price of that variety in i. Given the symmetry between West and East, aggregate demand levels, A_{ij}, in country i for varieties from j are:

$$A_{ww} = A_{ee} = A_{ew} = A_{we} = \frac{\mu E_n}{P_{ww}^{1-\varepsilon} + P_{we}^{1-\varepsilon}}, \quad \text{and} \tag{2.3}$$

$$A_{sw} = A_{se} = A_{ss} = \frac{\mu E_s}{P_{ss}^{1-\varepsilon} + 2P_{sw}^{1-\varepsilon}}, \tag{2.4}$$

where $P_{ij}^{1-\varepsilon} = \int_{\Omega_{ij}} p_{ij}(a)^{1-\varepsilon} dG_j(a)$ is the ideal price index for country-j varieties in i; since West and East are symmetric, this guarantees that $P_{ww}^{1-\varepsilon} = P_{ee}^{1-\varepsilon}$, $P_{ew}^{1-\varepsilon} = P_{we}^{1-\varepsilon}$ and $P_{sw}^{1-\varepsilon} = P_{se}^{1-\varepsilon}$. Here, E_i is the total expenditure of consumers in i and $E_w = E_e = E_n$. These expenditure levels are exogenous and equal to aggregate labor income in each country.

[9] It is known that many factors influence the relative profitability of manufacturing across locations (e.g., Caves 2007), including not only factor prices, but also institutions, trade costs, and coordination costs. We focus on a model with wage differences for simplicity, and assume that these differences are exogenous. However, in the Appendix we formally model and numerically evaluate a more general setting in which the homogeneous good sector is absent and ω is endogenously determined; the competition effect we emphasize remains active.

There is a continuum of firms in each country's differentiated varieties sector. Upon paying a sunk entry cost, each firm in country j draws a unit labor requirement a for producing its distinct variety from a distribution $G_j(a)$ that represents the technological possibilities in j. The productivity level of firm a is therefore $1/a$.

Each firm then chooses whether to produce for their home market, as well as whether to export or pursue FDI. However, each of these activities is associated with additional fixed costs which must be incurred before sales revenue can be generated. We will assume that all firms require external capital to cover these fixed costs upfront. Such a need may arise even among established firms when corporate governance frictions imply that management has limited control rights over revenues, cannot retain sufficient earnings to fund future operations, and must instead distribute them as dividends or profits to stakeholders.

To highlight the role of host-country credit market frictions, we will suppose that West and East have efficient capital markets and no credit constraints. However, Western and Eastern financiers may or may not be willing to fund multinational affiliate operations abroad. The financing effect we propose will emerge precisely from comparing these two scenarios. By contrast, we will assume that external financing in South is subject to credit market frictions. These frictions will make Southern firms differentially more credit constrained than their Western and Eastern competitors, and thereby generate the competition effect we identify.[10]

2.2 Financially unconstrained firms in West and East

Consider the differentiated varieties sector in West; conditions are symmetric in East.[11] After observing its unit cost draw a, each entrant firm in West decides whether to commence production or exit. Should the firm choose to stay in, production for the home economy incurs a per-period fixed cost of f_D units of Western labor. One can interpret this as the recurring cost of operating an establishment in West. Firms need to pay f_D upfront at the beginning of each period, but they cannot use retained earnings from previous periods as discussed above. Firms therefore raise external finance by borrowing at a gross interest rate of $R > 1$, which is set exogenously in an international capital market. However, there are no financial frictions and hence no credit rationing in West and East.

Firms charge a constant markup over marginal costs, so that the home price for a Western variety is $p_{ww}(a) = \frac{a}{\alpha}$. Individual producers take the aggregate demand levels in each country as given. Profits from domestic sales in West thus equal:

$$\pi_D(a) = (1-\alpha)A_{ww}\left(\frac{a}{\alpha}\right)^{1-\varepsilon} - Rf_D. \tag{2.5}$$

The export decision: Western firms may export to East, South or both. Exporting to a foreign

[10] Note that the financing and competition effects will remain operative under alternative assumptions about the micro-foundations of financial market imperfections or the degree of such imperfections across countries. For instance, they will obtain as long as financial frictions are more severe in the FDI host country than in the multinationals' home country, even if the latter too has an inefficient financial system. It is also not crucial whether credit under-provision is due to endogenous default risk, asymmetric information between borrowers and lenders, or some other form of credit market failure.

[11] The corresponding equations for East can be obtained by replacing the subscript 'w' with 'e', and vice versa.

market incurs a per-period fixed cost of f_X units of Western labor (for maintaining an overseas distribution network) and a variable iceberg transport cost, $\tau > 1$. Profits from exporting to East and South are thus respectively:

$$\pi_{XN}(a) = (1-\alpha)A_{ew}\left(\frac{\tau a}{\alpha}\right)^{1-\varepsilon} - Rf_X, \quad \text{and} \tag{2.6}$$

$$\pi_{XS}(a) = (1-\alpha)A_{sw}\left(\frac{\tau a}{\alpha}\right)^{1-\varepsilon} - Rf_X. \tag{2.7}$$

The FDI decision: Western firms may also choose to become multinationals by locating production abroad. A multinational firm would save on shipping costs on sales in its host-country market, and would moreover lower its wage bill if it locates an affiliate in South. Such a firm could use its foreign subsidiary not only to supply the host economy, but also to export back to its parent country (West) or to the third-country market; we refer to these as local, return and export platform sales, respectively. An affiliate exporting to either market incurs the fixed and variable trade costs, f_X and τ, as above.

Establishing a foreign subsidiary requires an upfront per-period fixed cost of f_I units of Western labor, in order to set up and maintain production facilities, as well as to manage operations remotely. While financial conditions are identical in West and East, there are financial frictions in South and the implied cost of capital there (weakly) exceeds R, in the sense that not all firms that seek financing in South will successfully obtain it. A multinational company thus has no incentive to raise capital abroad as long as Western financiers are willing to fully fund f_I. We adopt this assumption for now, but will relax it later when we introduce the financing effect in Section 3.2.

A Western multinational faces a wide array of options for its export-versus-FDI decision over the three markets. For this reason, multi-country models of FDI with export platforms are analytically complex (Yeaple 2003a,b, 2013, Antràs et al. 2014). To illustrate the competition effect as transparently as possible, we therefore focus here on the case where: (i) Western multinationals locate affiliates only in South; and (ii) Western multinationals use the Southern plant as a production center to serve all three markets. For this case, we can derive testable implications with a clear mapping from theoretical expressions to observable data. We show in the Appendix that two conditions on parameters are sufficient to guarantee that this FDI pattern will indeed be the optimal strategy for Western multinationals: $\tau\omega < 1$ and $f_X < f_D < f_I$. Intuitively, the fixed export cost (f_X) and the Southern wage after adjusting for transport costs ($\tau\omega$) must both be low for MNCs to optimally use South as their global production center.

Under these parameter assumptions, and taking into account revenues from all three markets, profits from FDI in South for a firm with productivity $1/a$ are therefore:

$$\pi_I(a) = (1-\alpha)A_{sw}\left(\frac{a\omega}{\alpha}\right)^{1-\varepsilon} + (1-\alpha)(A_{ww}+A_{ew})\left(\frac{\tau a\omega}{\alpha}\right)^{1-\varepsilon} - R(f_I + 2f_X). \tag{2.8}$$

Patterns of production: Each firm's productivity level determines where it manufactures and in which markets it sells its goods. Firms produce at home for the domestic market if profits from (2.5) are positive. Solving $\pi_D(a) = 0$ pins down a_D, the maximum labor input requirement at which domestic production is profitable. Similarly, setting $\pi_{XN}(a) = 0$ yields a cutoff level, a_{XN}, below which exporting

to East is profitable. Solving $\pi_{XS}(a) = 0$ delivers the analogous cutoff, a_{XS}, for exporting to South. These three thresholds are given by:

$$a_D^{1-\varepsilon} = \frac{Rf_D}{(1-\alpha)A_{ww}(1/\alpha)^{1-\varepsilon}}, \tag{2.9}$$

$$a_{XN}^{1-\varepsilon} = \frac{Rf_X}{(1-\alpha)A_{ew}(\tau/\alpha)^{1-\varepsilon}}, \quad \text{and} \tag{2.10}$$

$$a_{XS}^{1-\varepsilon} = \frac{Rf_X}{(1-\alpha)A_{sw}(\tau/\alpha)^{1-\varepsilon}}. \tag{2.11}$$

A fourth cutoff, a_I, delineates when FDI is feasible. Becoming a multinational is more profitable than basing production in West when $\pi_I(a) > \pi_D(a) + \pi_{XN}(a) + \pi_{XS}(a)$. Solving this as an equality delivers the following expression for a_I:

$$a_I^{1-\varepsilon} = \frac{R(f_I - f_D)}{(1-\alpha)[A_{ww}((\frac{\tau\omega}{\alpha})^{1-\varepsilon} - (\frac{1}{\alpha})^{1-\varepsilon}) + A_{ew}((\frac{\tau\omega}{\alpha})^{1-\varepsilon} - (\frac{\tau}{\alpha})^{1-\varepsilon}) + A_{sw}((\frac{\omega}{\alpha})^{1-\varepsilon} - (\frac{\tau}{\alpha})^{1-\varepsilon})]}. \tag{2.12}$$

Note that the conditions $f_I > f_D$, $\tau\omega < 1$, $\omega < 1 < \tau$ and $\varepsilon > 1$ ensure that $a_I > 0$.

Following common practice in the literature, we consider the industry equilibrium in which $0 < a_D^{1-\varepsilon} < a_{XN}^{1-\varepsilon} < a_{XS}^{1-\varepsilon} < a_I^{1-\varepsilon}$, using $a^{1-\varepsilon}$ as a proxy for firm productivity. This describes a sorting of Western firms across production modes that is in line with prior evidence that exporting firms tend to be more productive than non-exporters, while multinationals are on average more productive than either (e.g., Helpman et al. 2004). The least efficient firms with $a^{1-\varepsilon} < a_D^{1-\varepsilon}$ have labor input requirements that are too high and exit the industry upon observing their productivity draw. Firms with productivity levels between $a_D^{1-\varepsilon}$ and $a_{XN}^{1-\varepsilon}$ supply only the domestic Western market. Using (2.9) and (2.10), the assumption that $a_D^{1-\varepsilon} < a_{XN}^{1-\varepsilon}$ reduces to $\tau^{\varepsilon-1} f_X > f_D$, so that export costs must be sufficiently bigger than the fixed cost of domestic production.[12] Next, those firms that are even more productive, with $a_{XN}^{1-\varepsilon} < a^{1-\varepsilon} < a_{XS}^{1-\varepsilon}$, are able to overcome the additional costs of exporting to East, but not to South; based on (2.10) and (2.11), this simply requires that market demand for Western varieties be greater in East than in South, $A_{ew} > A_{sw}$. Firms with $a_{XS}^{1-\varepsilon} < a^{1-\varepsilon} < a_I^{1-\varepsilon}$ can further export to the smaller Southern market.[13] Finally, the most productive firms with $a^{1-\varepsilon} > a_I^{1-\varepsilon}$ conduct FDI in South. Figure 1 provides an illustration of this industry structure that focuses on the economic relations in our three-country world. Firms with $a^{1-\varepsilon} < a_I^{1-\varepsilon}$ base their production activity in West, and export to East and possibly also to South if they are productive enough (upper panel). On the other hand, the most efficient firms with $a^{1-\varepsilon} > a_I^{1-\varepsilon}$ become multinationals. While these firms are still headquartered in West, their production is located in South, from where they service all three markets (lower panel).

2.3 Credit-constrained firms in South

The structure of South's differentiated varieties sector is simpler, with Southern firms producing only for domestic consumption in this baseline model. The fixed cost of domestic production is f_S units of

[12] We derive this condition $\tau^{\varepsilon-1} f_X > f_D$ by making use of the fact that $A_{ww} = A_{ew}$. Note too that this condition is not inconsistent with the earlier requirement that $f_X < f_D$.

[13] The parameter restriction that guarantees that $a_{XS}^{1-\varepsilon} < a_I^{1-\varepsilon}$ does not simplify neatly. Intuitively, it requires that the fixed cost of FDI, f_I, be sufficiently large so that FDI is only considered by the most productive firms.

Southern labor, and we assume as above that Southern firms borrow at the start of each period to finance these fixed costs.

However, Southern firms face credit constraints, arising from institutional weaknesses that lead to imperfect protection for lenders against default risk. Following Aghion et al. (2005), we model this moral hazard problem by assuming that firms lose a fraction $\eta \in [0,1]$ of their appropriable profits if they choose to default. For simplicity, we take these appropriable profits to be the revenues of the firm less the variable costs that it must pay to its production workers. Thus, while it is tempting to default to avoid loan repayment, this is a costly option. The parameter η can be viewed as the pecuniary cost of actions taken to hide the firm's financial resources from lenders. We therefore interpret η as capturing the degree of financial development in South: When credit institutions are stronger, η is higher and it is more costly for firms to hide their profits and assets. A Southern firm with input coefficient a would default if and only if the associated profit loss is smaller than the cost of repaying the loan:

$$\eta(1-\alpha)A_{ss}\left(\frac{a\omega}{\alpha}\right)^{1-\varepsilon} < Rf_S\omega.$$

This condition yields a productivity threshold above which firms have access to credit:

$$a_S^{1-\varepsilon} = \frac{1}{\eta}\frac{Rf_S\omega}{(1-\alpha)A_{ss}(\omega/\alpha)^{1-\varepsilon}}. \tag{2.13}$$

We assume that lenders can observe a, and hence only Southern firms with $a^{1-\varepsilon} > a_S^{1-\varepsilon}$ are able to commence production. When $\eta = 1$, $a_S^{1-\varepsilon}$ is the cutoff for domestic entry that would prevail in the absence of credit market imperfections. When $\eta < 1$, however, the productivity cutoff is higher, as some firms with productivity below $a_S^{1-\varepsilon}$ would earn positive profits following entry, but are prevented from doing so because they are unable to credibly commit to repay their loans. As η increases toward 1, this distortion from credit constraints vanishes.[14]

2.4 Industry equilibrium

We now close the model by specifying the conditions that govern firm entry in each country. For this, it is convenient to define $V_i(a) = \int_0^a \tilde{a}^{1-\varepsilon} dG_i(\tilde{a})$, since this expression will show up repeatedly.

Prospective entrants in country i's differentiated varieties sector incur an upfront entry cost equal to f_{Ei} units of country i labor. This is a once-off cost that firms pay before they can obtain their productivity draw.[15] On the exit side, firms face an exogenous probability, $\delta \in (0,1)$, of "dying" and leaving the industry in each period. For an equilibrium with a constant measure of firms in each country, the cost of entry must equal expected profits. Using the profit functions (2.5)-(2.8) and the cutoffs (2.9)-(2.12), and integrating the expressions for expected profits over the distribution $G_i(a)$, one can write down the free-entry conditions for Western/Eastern ($n = w, e$) and Southern firms as:

[14] This is consistent with evidence that smaller firms generally have less access to external finance than larger companies (Guiso et al. 2004).

[15] Our results are robust to subjecting the fixed cost of entry in South, f_{Es}, to borrowing constraints too. Intuitively, an improvement in financial development in South would still spur more entry by Southern firms, which works in the same direction as the effects in our baseline model.

$$\begin{aligned}
\delta f_{En} &= (1-\alpha)A_{ww}\left(\frac{1}{\alpha}\right)^{1-\varepsilon}(V_n(a_D)-V_n(a_I)) - Rf_D(G_n(a_D)-G_n(a_I)) \qquad (2.14)\\
&\quad +(1-\alpha)A_{ew}\left(\frac{\tau}{\alpha}\right)^{1-\varepsilon}(V_n(a_{XN})-V_n(a_I)) - Rf_X(G_n(a_{XN})-G_n(a_I))\\
&\quad +(1-\alpha)A_{sw}\left(\frac{\tau}{\alpha}\right)^{1-\varepsilon}(V_n(a_{XS})-V_n(a_I)) - Rf_X(G_n(a_{XS})-G_n(a_I))\\
&\quad +(1-\alpha)\left(A_{ww}\left(\frac{\tau\omega}{\alpha}\right)^{1-\varepsilon}+A_{ew}\left(\frac{\tau\omega}{\alpha}\right)^{1-\varepsilon}+A_{sw}\left(\frac{\omega}{\alpha}\right)^{1-\varepsilon}\right)V_n(a_I) - R(f_I+2f_X)G_n(a_I), \quad \text{and}\\
\delta f_{Es\omega} &= (1-\alpha)A_{ss}\left(\frac{\omega}{\alpha}\right)^{1-\varepsilon}V_s(a_S) - Rf_S\omega G_s(a_S). \qquad (2.15)
\end{aligned}$$

Finally, we denote the measure of firms in country i's differentiated varieties sector by N_i.[16] The definition of the ideal price index then implies:

$$\begin{aligned}
P_{ww}^{1-\varepsilon} &= N_n\left[\left(\frac{1}{\alpha}\right)^{1-\varepsilon}(V_n(a_D)-V_n(a_I)) + \left(\frac{\tau\omega}{\alpha}\right)^{1-\varepsilon}V_n(a_I)\right], \qquad (2.16)\\
P_{ew}^{1-\varepsilon} &= N_n\left[\left(\frac{\tau}{\alpha}\right)^{1-\varepsilon}(V_n(a_{XN})-V_n(a_I)) + \left(\frac{\tau\omega}{\alpha}\right)^{1-\varepsilon}V_n(a_I)\right], \qquad (2.17)\\
P_{sw}^{1-\varepsilon} &= N_n\left[\left(\frac{\tau}{\alpha}\right)^{1-\varepsilon}(V_n(a_{XS})-V_n(a_I)) + \left(\frac{\omega}{\alpha}\right)^{1-\varepsilon}V_n(a_I)\right], \quad \text{and} \qquad (2.18)\\
P_{ss}^{1-\varepsilon} &= N_s\left[\left(\frac{\omega}{\alpha}\right)^{1-\varepsilon}V_s(a_S)\right]. \qquad (2.19)
\end{aligned}$$

The equilibrium of the model is thus pinned down by the system of equations (2.3)-(2.4) and (2.9)-(2.19) in the 15 unknowns, A_{ww}, A_{ew}, A_{sw}, A_{ss}, a_D, a_{XN}, a_{XS}, a_I, a_S, N_n, N_s, P_{ww}, P_{ew}, P_{sw} and P_{ss}. While we cannot solve for all of these variables in closed form, we are able to derive comparative statics results that directly inform our empirical analysis. For convenience, we will explicitly parameterize the technology distribution in the differentiated varieties sector, but this parameterization is not material to our qualitiative results. As is common in this literature, we assume that productivity $1/a$ follows a Pareto distribution with shape parameter k and support $[1/\bar{a}_i, \infty)$ for each country i.[17] The associated expressions for G_i and V_i are thus: $G_i(a) = \left(\frac{a}{\bar{a}_i}\right)^k$ and $V_i(a) = \frac{k}{k-\varepsilon+1}\left(\frac{a^{k-\varepsilon+1}}{\bar{a}_i^k}\right)$. We adopt the standard assumption that $k > \varepsilon - 1$, which ensures that the distribution of firm sales has a finite variance.

2.5 Key MNC outcomes

We are interested in characterizing the effects of host-country financial development on five dimensions of multinational activity: affiliate entry, affiliate-level sales and their breakdown by destination market, as well as aggregate sales and their breakdown by destination market. These will later serve as the dependent variables in our empirical analysis. We introduce here the model counterparts of each of these variables.

[16] Following Melitz (2003), for N_i to be constant, the expected mass of successful entrants, N_i^{ent}, needs to equal the mass of firms that dies exogenously in each period, namely: $N_i^{ent} = \delta N_i$, for $i = w, e, s$.

[17] We require that $\bar{a}_s$ and $\bar{a}_n$ both be sufficiently large, so that all relevant cutoffs lie within the interior of the support of the distributions that they are drawn from. Also, our proofs do not require the same shape parameter in West and South, but we have assumed this to simplify notation.

The measure of Western multinational firms (with $a^{1-\varepsilon} > a_I^{1-\varepsilon}$) is given simply by: $N_n \int_0^{a_I} dG_n(a) = N_n G_n(a_I)$. For a given MNC affiliate in South with productivity $1/a$, sales to the local market are: $HOR(a) \equiv A_{sw} \left(\frac{a\omega}{\alpha}\right)^{1-\varepsilon}$. We refer to these as horizontal sales, since they allow the multinational to avoid transport costs while servicing the Southern market. Export-platform sales to third-country destinations (in our case, East) are defined as: $PLA(a) \equiv A_{ew} \left(\frac{\tau a\omega}{\alpha}\right)^{1-\varepsilon}$. Finally, return sales back to the Western home market are: $RET(a) \equiv A_{ww} \left(\frac{\tau a\omega}{\alpha}\right)^{1-\varepsilon}$. The affiliate's total sales are: $TOT(a) \equiv HOR(a) + PLA(a) + RET(a)$.

Integrating these firm-level sales over all Western multinationals delivers the following expressions for the aggregate levels of horizontal, platform and return sales ($n = w, e$):

$$HOR \equiv N_n \int_0^{a_I} HOR(a) dG_n(a) = N_n A_{sw} \left(\frac{\omega}{\alpha}\right)^{1-\varepsilon} V_n(a_I), \tag{2.20}$$

$$PLA \equiv N_n \int_0^{a_I} PLA(a) dG_n(a) = N_n A_{ew} \left(\frac{\tau\omega}{\alpha}\right)^{1-\varepsilon} V_n(a_I), \quad \text{and} \tag{2.21}$$

$$RET \equiv N_n \int_0^{a_I} RET(a) dG_n(a) = N_n A_{ww} \left(\frac{\tau\omega}{\alpha}\right)^{1-\varepsilon} V_n(a_I). \tag{2.22}$$

Using these definitions, three sales shares describe the breakdown of affiliate sales by destination:

$$\frac{HOR(a)}{TOT(a)} = \frac{HOR}{TOT} = \left(1 + \tau^{1-\varepsilon} \frac{A_{ew}}{A_{sw}} + \tau^{1-\varepsilon} \frac{A_{ww}}{A_{sw}}\right)^{-1}, \tag{2.23}$$

$$\frac{PLA(a)}{TOT(a)} = \frac{PLA}{TOT} = \left(1 + \tau^{\varepsilon-1} \frac{A_{sw}}{A_{ew}} + \frac{A_{ww}}{A_{ew}}\right)^{-1}, \quad \text{and} \tag{2.24}$$

$$\frac{RET(a)}{TOT(a)} = \frac{RET}{TOT} = \left(1 + \tau^{\varepsilon-1} \frac{A_{sw}}{A_{ww}} + \frac{A_{ew}}{A_{ww}}\right)^{-1}. \tag{2.25}$$

These sales shares depend crucially on the pairwise ratios of aggregate demand for Western varieties across the three different markets. We turn next to examine how improvements in host-country financial development, as captured by η, influence multinational activity along each of the above outcome measures.

3 Two effects of host-country financial development on MNCs

3.1 The competition effect

Consider first the baseline case in which we maintain the assumption that MNC affiliates do not require financing from host-country sources. This will serve to isolate the competition effect of interest.

We proceed by analyzing how an increase in η would systematically shift the productivity cutoffs and aggregate demand levels in each market. Note that equations (2.13) and (2.15) pin down A_{ss} and a_S for the industry equilibrium in South. By totally differentiating these two equations, we obtain:

Lemma 1: *(i)* $\frac{da_S}{d\eta} > 0$; *and (ii)* $\frac{dA_{ss}}{d\eta} < 0$.

We relegate all detailed proofs to the Appendix, and focus instead on conveying the intuition here. When η rises, the higher cost of default in South helps to alleviate the moral hazard problem, and hence

more Southern firms gain access to credit. This lowers the productivity cutoff, $a_S^{1-\varepsilon}$, for entry into the Southern differentiated varieties sector, as illustrated in the bottom panel of Figure 2. However, the free-entry condition (2.15) requires that the expected profitability of a Southern firm remain constant. Average demand for each Southern product, A_{ss}, must subsequently fall.

Since Western, Eastern and Southern varieties are substitutes in consumption in South, the entry of more domestic firms in South will affect the differentiated varieties sector in West and East. The consequent effects on the productivity cutoffs and demand levels relevant to Western firms are described in the following lemma; by symmetry, these comparative statics also apply to the Eastern industry:

Lemma 2: *When MNCs do not require host-country financing, (i)* $\frac{1}{a_{XS}}\frac{da_{XS}}{d\eta} < \frac{1}{a_I}\frac{da_I}{d\eta} < 0$*; (ii)* $\frac{1}{a_{XN}}\frac{da_{XN}}{d\eta} = \frac{1}{a_D}\frac{da_D}{d\eta} > 0$*; (iii)* $\frac{1}{A_{sw}}\frac{dA_{sw}}{d\eta} < 0$*; and (iv)* $\frac{1}{A_{ew}}\frac{dA_{ew}}{d\eta} = \frac{1}{A_{ww}}\frac{dA_{ww}}{d\eta} > 0$.

The key shifts in Lemma 2 are illustrated in the upper panel of Figure 2. An improvement in host-country financial development leads to the entry of more Southern varieties, and the resulting tougher competition decreases South's demand for each Western variety, A_{sw}. This raises the productivity cutoffs, $a_{XS}^{1-\varepsilon}$ and $a_I^{1-\varepsilon}$, for Western firms seeking to penetrate the Southern market either through exports or FDI. However, since the fixed cost of entry, f_{En}, remains constant, the free-entry condition (2.14) implies that total profits from sales in West and East must increase. This tilts Western firms toward serving those markets: The productivity cutoffs, $a_D^{1-\varepsilon}$ and $a_{XN}^{1-\varepsilon}$, both fall, while aggregate demand levels in West and East, A_{ww} and A_{ew}, both rise.

These shifts in the productivity cutoffs and aggregate demand levels in turn determine the impact of host-country financial development on affiliate entry and sales, as stated in the following proposition. This rich set of predictions is also summarized in the first column of Table 1, under the "Competition Effect with No/Weak Financing Effect" heading.

Proposition 1 *When MNCs do not require host-country financing, in response to a small improvement in financial development, η, in South:*

(i) $HOR(a)$ *decreases, while both* $PLA(a)$ *and* $RET(a)$ *increase;*

(ii) $\frac{HOR(a)}{TOT(a)} = \frac{HOR}{TOT}$ *decreases, while both* $\frac{PLA(a)}{TOT(a)} = \frac{PLA}{TOT}$ *and* $\frac{RET(a)}{TOT(a)} = \frac{RET}{TOT}$ *increase; and*

(iii) N_n, $N_nG_n(a_I)$, HOR, PLA, RET *and* TOT *all decrease.*

Proposition 1 builds directly on the logic of Lemma 2. When credit constraints are eased, the demand in South for Western goods drops due to the competition effect following the entry of more local firms. For each surviving affiliate, this leads horizontal sales to South, as well as their share in total sales, to both decline. At the same time, demand levels in East and West rise in equilibrium, so that each affiliate re-directs its sales toward those markets. This prompts an increase in platform and return sales, both in absolute levels and relative to total sales.

The competition effect also reduces the *ex ante* expected profits of Western firms. This leads to a decrease in both the measure of these firms, N_n, and the measure of multinationals, $N_n G_n(a_I)$. To see how this in turn affects aggregate sales levels, we refer back to equations (2.20)-(2.22). On the extensive margin, a higher η lowers HOR, PLA and RET, by reducing N_n and raising the productivity cutoff for FDI so that $V_N(a_I)$ drops; both of these shifts reflect the exit of Western MNCs from South. In the case of horizontal sales, this negative effect is reinforced by the reduction in A_{sw}, and HOR clearly falls. As for platform and return sales, we show in the Appendix that the decline on the extensive margin dominates the increases on the intensive margin from A_{ew} and A_{ww}, so that both PLA and RET unambiguously fall as well.

3.2 The financing effect

We next consider how host-country financial development can affect MNC activity not only through the competition effect, but also through a direct financing channel. We first present both anecdotal and systematic evidence that access to external finance in the host country is important to the operations of MNC affiliates in practice. We then incorporate this insight into our model by examining what happens when Western and Eastern firms are unable to secure all the outside capital they need from their home country, and thus require some Southern financing to cover their FDI costs.

3.2.1 Motivation for the financing effect

There is ample anecdotal evidence indicating that low levels of financial development in a host economy can pose a significant obstacle to firms seeking to establish a local affiliate. For example, a recent report highlights the challenges Japanese firms face in funding would-be profitable operations in emerging markets in Asia, especially when they are small or medium-sized enterprises (Oba 2012). Firms prefer local financing because home-country financing exposes them to exchange rate risk, and ties up liquid funds and collateralizable assets that could be otherwise deployed. However, accessing external capital in the host country is often difficult and costly, especially when local financial institutions are underdeveloped and the prospective MNCs have no pre-existing business relationships. Japanese firms lament that they face strict collateral requirements from local banks, who also insist on supporting guarantees from Japanese banks. These firms face similar difficulties in raising capital through alternative means such as local bond or equity markets. This experience of Japanese firms has been echoed elsewhere. Financing by local banks in emerging economies is often insufficient, expensive, and of shorter duration. This can altogether deter entry, as was the case for one U.S. telecommunications firm interested in the post-Soviet Russian market (Gordin 2011). Indeed, countries have implemented financial sector reforms in part to stimulate FDI inflows, such as measures to tighten accounting standards, strengthen financial contract enforcement, or relax restrictions on foreign bank entry and cross-border bank alliances.

The recent academic literature has likewise found formal empirical evidence that host-country conditions affect MNCs' financing practices.[18] A broad message from this work is that multinational firms

[18] See Foley and Manova (2015) for a detailed review.

use internal and external capital markets opportunistically to minimize their overall cost of capital, in the presence of frictions that prevent them from perfectly arbitraging differences in the costs of external capital across countries. As a result, MNC affiliates often obtain significant amounts of external finance in their host country and are responsive to local financing conditions. For example, Feinberg and Phillips (2004) report that during 1983-1996, close to two-thirds of the debt of U.S. multinational subsidiaries abroad was raised locally, while funding from the parent company accounted for an additional 16%. These numbers have remained stable over time: using BEA data corresponding to more recent years, we find that the average share of host-country affiliate debt was 0.64 in 1999 and 0.66 in 2004, with a standard deviation of about 0.30 in both years (see Table 2).[19]

In addition, this use of local financing is known to adjust when host-country financial institutions are more developed. Desai et al. (2004) and Antràs et al. (2009) show that U.S. MNC affiliates use less external debt in host economies with lower levels of private credit and weaker creditor rights protection. Conversely, in such host countries, U.S. MNC parents finance a bigger share of affiliate assets and hold a higher share of affiliate equity. Local financial conditions moreover appear to influence the scale of MNC operations, suggesting that subsidiaries do not perfectly compensate for limited access to capital in their host country with alternative sources of funding. For U.S. affiliates abroad, Desai et al. (2004) estimate that greater borrowing from the parent substitutes for only three-quarters of the shortfall in external borrowing induced by weak local credit markets.[20] Along similar lines, Feinberg and Phillips (2004) argue that MNCs operating in countries with less developed capital markets and greater restrictions on FDI are less able to reallocate activity across their affiliates in response to differential growth shocks.

In sum, this body of evidence suggests that various margins of multinational activity and sales would be responsive to changes in host-country financing conditions.[21]

3.2.2 Analysis of the financing effect

Motivated by this evidence, we consider the implications of host-country financial conditions when multinationals respond not only to competition from domestic firms, but also to the availability of local finance. Toward this end, we assume that Western financiers are willing to fully fund the domestic and export activities of Western firms, but only a fraction f_D/f_I of their fixed FDI costs.[22] MNCs will thus optimally

[19]Detailed information on affiliate financing practices was not collected by the BEA after the 2004 benchmark survey.

[20]The headline figures cited from Feinberg and Phillips (2004) and Desai et al. (2004) are not inconsistent with each other. The two-thirds figure from Feinberg and Phillips (2004) is a raw unconditional mean of the share of affiliate financing obtained from unaffiliated host-country sources. In contrast, Desai et al. (2004)'s three-quarters figure is based on a multivariate regression that estimates the causal effect of a reduction of affiliate financing from non-parent sources on financing from the parent, where the former is instrumented by host-country credit conditions.

[21]Bear in mind that while host-country financing is important for multinational firms, it is nevertheless still the case that multinational subsidiaries would be less resource-constrained than domestic firms. Unlike MNCs, domestic producers rely on internal finance and external finance raised in their domestic capital market, as imperfect contractibility and asymmetric information across borders make it difficult for them to access capital markets abroad. Domestic firms are thus more financially constrained, more dependent on the availability of local financing, and less responsive to growth opportunities than MNC subsidiaries (Desai et al. 2008, Manova et al. 2015).

[22]This could be due to institutional frictions: Affiliate assets might not be fully collateralizable, due to expropriation risk or difficulties in enforcing cross-border claims; there might be asymmetric information when lenders do not observe how firms manage operations or customize production processes to local conditions; and local creditors could have an advantage

raise the maximum possible amount of external finance f_D in West, and borrow the shortfall $f_I - f_D$ in South's imperfect capital markets. Note that what is important is that the multinational must raise funding for part of f_I from South; that this amount equals $f_I - f_D$ is analytically convenient, but not material for the financing effect to operate.[23]

In this environment, multinational affiliates can obtain sufficient credit in South to operate only if they are productive and profitable enough to commit to repay their local debts. As above, defaulting on Southern loans costs a fraction $\eta \in [0,1]$ of appropriable profits. Since the firm's outside option is to move production back to West, we assume appropriable profits from the perspective of Southern lenders are operating profits from FDI less operating profits from producing in West.[24] A multinational with productivity $a^{1-\varepsilon}$ would therefore default on its Southern loan if:

$$\eta(1-\alpha)\left[A_{ww}\left(\left(\frac{\tau a\omega}{\alpha}\right)^{1-\varepsilon}-\left(\frac{a}{\alpha}\right)^{1-\varepsilon}\right)+A_{ew}\left(\left(\frac{\tau a\omega}{\alpha}\right)^{1-\varepsilon}-\left(\frac{\tau a}{\alpha}\right)^{1-\varepsilon}\right)+A_{sw}\left(\left(\frac{a\omega}{\alpha}\right)^{1-\varepsilon}-\left(\frac{\tau a}{\alpha}\right)^{1-\varepsilon}\right)\right]<R(f_I-f_D),$$

when the cost of default on the left-hand side is less than the cost of repaying creditors. Setting the above as an equality and rearranging, one obtains a modified FDI cutoff, $\tilde{a}_I^{1-\varepsilon}$, given by:

$$\tilde{a}_I^{1-\varepsilon}=\frac{1}{\eta}a_I^{1-\varepsilon}, \tag{3.1}$$

where $a_I^{1-\varepsilon}$ is the first-best FDI threshold from (2.12) above.

Since $\eta \in [0,1]$, capital market imperfections in the host country (weakly) raise the productivity cutoff that Western firms need to clear before FDI becomes feasible. Western firms with $a^{1-\varepsilon} > \tilde{a}_I^{1-\varepsilon}$ are able to obtain local financing, and hence undertake FDI. But there is a margin of smaller, less productive prospective MNCs ($a_I^{1-\varepsilon} < a^{1-\varepsilon} < \tilde{a}_I^{1-\varepsilon}$) who find the credit constraints to be binding. Note that while there are other ways of modeling the microfoundations of these credit constraints, what ultimately matters is that improvements in host-country financial development would help ease MNC affiliates' overall access to credit. For example, even if MNC affiliates do not borrow directly in the host economy, improvements in financial contractibility and the enforceability of collateral claims there could lead their home-country creditors to reduce the interest rates they charge on MNC operations.

In this setting, host-country financial development facilitates entry by both more Southern firms and more foreign subsidiaries, with further implications for the Western industry:

Lemma 3: *When MNC affiliates require host-country financing, (i)* $\frac{1}{\tilde{a}_I}\frac{d\tilde{a}_I}{d\eta}>0$*; (ii)* $\frac{1}{a_{XS}}\frac{da_{XS}}{d\eta}<0$*; (iii)* $\frac{1}{a_{XN}}\frac{da_{XN}}{d\eta}=\frac{1}{a_D}\frac{da_D}{d\eta}>\frac{1}{a_{XS}}\frac{da_{XS}}{d\eta}$*; (iv)* $\frac{1}{A_{sw}}\frac{dA_{sw}}{d\eta}<0$*; and (v)* $\frac{1}{A_{ew}}\frac{dA_{ew}}{d\eta}=\frac{1}{A_{ww}}\frac{dA_{ww}}{d\eta}>\frac{1}{A_{sw}}\frac{dA_{sw}}{d\eta}$.

Compared with Lemma 2, a key difference is that an increase in η now triggers a financing effect that makes credit accessible and FDI feasible for a larger margin of Western firms. This results in a leftward

in monitoring debtors' activity relative to home-country financiers. As a result, parent-country financiers would either not fully supply the funding needs of MNC affiliates or would charge higher interest rates for MNC activities abroad than for their operations at home.

[23] Our results would be reinforced if the fraction of financing raised in South, f_D/f_I, were to plausibly increase with the level of Southern financial development.

[24] While there are alternative ways of defining what constitutes appropriable profits, our general insights would hold so long as the productivity cutoff for FDI by Western firms is higher the more severe financial constraints in South are.

shift in the FDI cutoff, $\tilde{a}_I^{1-\varepsilon}$, as illustrated in Figure 3. The competition effect nevertheless remains active and is in fact amplified, such that $\frac{da_{XS}}{d\eta} < 0$ and $\frac{dA_{sw}}{d\eta} < 0$: The Southern market becomes more competitive not only because of the entry of more local firms, but also because there are now more MNC affiliates present there. The productivity cutoff for Western firms exporting to South, $a_{XS}^{1-\varepsilon}$, thus shifts to the right, while the market demand level faced by each Western firm in South falls. While the direction of change for $a_D^{1-\varepsilon}$ and $a_{XN}^{1-\varepsilon}$ depends on parameter values, it can be shown that the impact on a_D and a_{XN} is less negative than that on a_{XS}.[25] This in turn allows us to compare the proportional changes in A_{ww}, A_{ew} and A_{sw}. Intuitively, the response of the $a_D^{1-\varepsilon}$ and $a_{XN}^{1-\varepsilon}$ cutoffs is muted compared to that of $a_{XS}^{1-\varepsilon}$, as the former two correspond to Western firms that are less directly affected by the degree of competition in South.

These adjustments have implications for the pattern of affiliate sales. By inspecting (2.23)-(2.25) and applying Lemma 3, one can see that an improvement in η once again induces a reduction in the horizontal sales of individual affliates, both in levels, $HOR(a)$, and as a share of total sales, $\frac{HOR(a)}{TOT(a)}$. This correspondingly implies a rise in the platform and return sales shares, $\frac{PLA(a)}{TOT(a)}$ and $\frac{RET(a)}{TOT(a)}$. However, the direction of change for the levels of $PLA(a)$, $RET(a)$, and hence $TOT(a)$, cannot be determined as precisely, since this depends on the extent to which the entry of more MNC affliates raises competition back in the home- and third-country markets.

Importantly, the financing effect alters the behavior of aggregate multinational sales relative to the setup in Section 3.1. The expansion in MNC activity along the extensive margin can now be strong enough to dominate any contractions along the intensive margin of individual affiliate sales. As we show in the Appendix, the aggregate sales levels to any market, HOR, PLA, RET and TOT, can therefore all rise. In particular, this will be the case when the initial level of financial development in the host country is sufficiently high. This stands in direct contrast to the earlier predictions in part (iii) of Proposition 1; there, with only the competition effect operative, an increase in η results instead in the exit of Western MNCs on the extensive margin and hence a decline in the aggregate level of multinational activity. At the same time, the overall composition of aggregate MNC sales is still governed by the competition effect even when the financing effect is present, so that $\frac{HOR}{TOT}$ falls, while $\frac{RET}{TOT}$ and $\frac{PLA}{TOT}$ both increase.

Proposition 2 summarizes our results for the case of host-country borrowing:

Proposition 2 *When MNC affiliates require host-country financing, in response to a small improvement in financial development, η, in South:*

(i) $HOR(a)$ decreases, while the effects on both $PLA(a)$ and $RET(a)$ are ambiguous;

(ii) $\frac{HOR(a)}{TOT(a)} = \frac{HOR}{TOT}$ decreases, while both $\frac{PLA(a)}{TOT(a)} = \frac{PLA}{TOT}$ and $\frac{RET(a)}{TOT(a)} = \frac{RET}{TOT}$ increase; and

[25] It is straightforward to provide numerical examples to demonstrate that $a_D^{1-\varepsilon}$ and $a_{XN}^{1-\varepsilon}$ can shift either rightward or leftward in Figure 3. For example, setting $R = 1.07$, $\varepsilon = 3.8$, $L_n = L_s = 1$, $f_D = 0.2$, $f_X = 0.15$, $f_I = 4$, $f_S = 0.1$, $f_{En} = f_{Es} = 1$, $\tau = 1.4$, $\omega = 0.6$, $\bar{a}_N = \bar{a}_S = 25$, $k = 4$, $\delta = 0.1$, $\mu = 0.5$ and $\eta = 0.5$ delivers an equilibrium with the desired sorting pattern of the productivity cutoffs ($a_D = 13.42$, $a_{XN} = 10.62$, $a_{XS} = 6.30$ and $\tilde{a}_I = 5.25$), in which: $\frac{1}{a_D}\frac{da_D}{d\eta} = \frac{1}{a_{XN}}\frac{da_{XN}}{d\eta} = -4.34 < 0$. However, when we raise ω to 0.8 and lower τ to 1.2 (holding the other parameter values constant), we obtain $a_D = 13.57$, $a_{XN} = 12.53$, $a_{XS} = 10.87$, $\tilde{a}_I = 4.27$, and $\frac{1}{a_D}\frac{da_D}{d\eta} = \frac{1}{a_{XN}}\frac{da_{XN}}{d\eta} = 0.83 > 0$. The Matlab code for computing the equilibrium is available on request.

(iii) $N_n G_n(\tilde{a}_I)$, *HOR, PLA, RET and TOT all increase, if the initial level of host-country financial development is sufficiently high.*

The sufficient condition specified in part (iii) of this proposition warrants some discussion. Intuitively, when the initial level of η is high, improvements in host-country financial development generate a modest amount of entry by Southern firms, as the initial distortion imposed by financial frictions is small. The decline in Southern demand for Western varieties, A_{sw}, is in turn too small to counteract the tendency for more Western multinationals to locate in South as credit there becomes more accessible. The competition effect will then be dominated by the financing effect, so that aggregate levels of multinational activity increase. Note that this sufficient condition is very mild in practice. In footnote 25, we have already provided an example of a valid parametrization of the model with $\eta = 0.5$ (much below the upper bound of 1), in which $N_n G_n(\tilde{a}_I)$, HOR, PLA and RET all rise with small increases in η.[26] Our extensive quantitative explorations indicate that η needs to be even lower *and* one of the other parameters has to lie far outside of conventional ranges in order to generate a numerical counter-example in which part (iii) of Proposition 2 does not hold (see the Appendix for a more detailed discussion).

We summarize the implications of Proposition 2 in the second column of Table 1, under the "Competition Effect with Strong Financing Effect" heading, for the full set of outcome measures of MNC activity. This column lists the combined impact of these two forces when the financing effect is sufficiently powerful to overturn the competition effect on the number of affiliates and aggregate affiliate sales. Should the financing effect be present but relatively weak, the patterns would instead follow those in the first column. Moving forward, the predictions listed in Table 1 for the two cases – namely, with a "weak" versus "strong" financing effect – will guide how we interpret our empirical findings.

3.3 Discussion and Some Extensions

Before proceeding further, it is helpful to describe three extensions of the model, that demonstrate how the basic mechanisms that generate the competition and financing effects would continue to operate in richer economic environments. We sketch out these extensions here, while providing a more detailed treatment in the Appendix.

Home bias. In the baseline model, platform and return sales respond identically to host-country financial development. This feature is one that can be relaxed by introducing a notion of home-bias in consumption, so that varieties with the same country-of-origin are perceived as closer substitutes than varieties from different countries. In the Appendix, we incorporate this by modifying the utility function to be a nested-CES, with different elasticities of substitution over the consumption of varieties from the same country as opposed to from different countries. With this specification, an improvement in Southern financial development would once again spur entry by domestic firms and increase competition for Western varieties in South. However, in equilibrium, demand for Western products would now increase proportionally more in East than in West; this is because other Western varieties are closer substitutes in

[26] For the first parametrization in footnote 25, we get: $\frac{d}{d\eta} N_n G_n(\tilde{a}_I) = 0.57$, $\frac{d}{d\eta} HOR = 0.72$ and $\frac{d}{d\eta} PLA = \frac{d}{d\eta} RET = 2.06$.

consumption than Eastern varieties, and a margin of Western firms sell only at home but not in East. As a result, the increase in affiliates' export-platform sales would exceed that of their return sales to West. Apart from this, all the other implications of the competition and financing effects remain unchanged.

Southern exports. The model has thus far abstracted away from foreign demand for Southern varieties. If Western and Eastern consumers demand Southern varieties, however, Southern firms would exert competitive pressure on Western and Eastern producers in all three markets. Maintaining the assumption that all firms require external financing for their domestic and foreign activities, financial development in South would then both increase domestic firm entry and enable more Southern firms to export to West and East. This would raise competition in the goods markets in all three countries, but to different degrees. We have nevertheless found through computational examples that the competition effect on affiliate-level sales and sales shares continues to persist. On the other hand, while the financing effect on MNC entry would remain active, the net impact of the competition and financing effects on the measure of affiliates and on their aggregate sales levels would be less likely to be positive than in our baseline model. This occurs because the measure of Western and Eastern firms N_n could decline if Southern firms face sufficiently low trade costs to exert a large enough impact on competition in West and East.

Multiple host countries. Our baseline model has considered the implications of improvements in financial conditions on multinational activity within a host country over time. One can show that the qualitative predictions of Propositions 1 and 2 also extend to the variation in MNC patterns across countries at different levels of financial development. Imagine for example that there are two Southern host countries ($s1$ and $s2$) which are identical in all respects, except that $s1$ is more financially developed than $s2$ ($0 < \eta_{s2} < \eta_{s1} < 1$). We can examine the impact of the competition and financing effects on affiliate outcomes in $s1$ versus $s2$, once some additional structure is introduced that allows firms with the same productivity level to potentially undertake FDI in either host economy. Intuitively, $s1$ would feature more local firms than $s2$, and attract more MNC affiliates if they require local financing. However, the degree of product market competition in host $s1$ would be more intense. Due to the competition effect, MNCs' horizontal sales share in $s1$ would be smaller than that in $s2$, while their return and platform sales shares would be larger.

4 Empirical Strategy

The theoretical framework above delivers specific predictions for the effects of host-country financial development on multinational activity. This section describes the estimation framework we use to evaluate these, in data on the global operations of U.S. MNCs. The empirical findings we obtain in Section 6 below are summarized in the "Data" column of Table 1, in order to facilitate a close comparison with how these results line up with the earlier model predictions.

4.1 First estimating equation

We examine the influence of host-country financial institutions on multinational activity using the following baseline specification:

$$MNC_{ikt} = \alpha + \beta\, FD_{it} + \Gamma X_{it} + \varphi_k + \varphi_t + \epsilon_{ikt}, \tag{4.1}$$

where MNC_{ikt} characterizes the activity of U.S.-based multinational firms in host country i and industry k in year t, and FD_{it} is the financial development of country i in year t. The main coefficient of interest, β, captures the impact of host-country financial conditions on multinational activity.

We estimate equation (4.1) with three sets of outcome variables, MNC_{ikt}: 1) the number of foreign affiliates, N_{ikt}; 2) aggregate affiliate sales to each destination market, HOR_{ikt}, PLA_{ikt} and RET_{ikt}, and across all markets, TOT_{ikt}; and 3) the share of aggregate affiliate sales to each destination, $\frac{HOR_{ikt}}{TOT_{ikt}}$, $\frac{PLA_{ikt}}{TOT_{ikt}}$ and $\frac{RET_{ikt}}{TOT_{ikt}}$. We assess the implications for individual firms with an affiliate-level version of (4.1) using two additional sets of outcomes: 4) affiliate-level sales by destination, $HOR_{ikt}(a)$, $PLA_{ikt}(a)$ and $RET_{ikt}(a)$, and across all markets, $TOT_{ikt}(a)$; and 5) the share of affiliate-level sales to each destination, $\frac{HOR_{ikt}(a)}{TOT_{ikt}(a)}$, $\frac{PLA_{ikt}(a)}{TOT_{ikt}(a)}$ and $\frac{RET_{ikt}(a)}{TOT_{ikt}(a)}$.

Based on Propositions 1 and 2, we expect host-country financial development to have distinct effects across the different dimensions of MNC activity. These depend on the presence and relative strength of the competition and financing effects. For clarity in the discussion below, we label the coefficient β for regressions involving multinationals' horizontal, platform and return sales as β_{HOR}, β_{PLA} and β_{RET}, respectively.

First, the competition effect arises as host-country financial development induces entry by domestic firms. The resulting increase in local competition then reduces affiliate-level sales revenues in the host country $HOR_{ikt}(a)$, consistent with $\beta_{HOR} < 0$. Furthermore, the shares of affiliate-level and aggregate sales to the host market, $\frac{HOR_{ikt}(a)}{TOT_{ikt}(a)}$ and $\frac{HOR_{ikt}}{TOT_{ikt}}$, both decline, while the shares of export sales to the parent country and to third-country destinations, $\frac{RET_{ikt}(a)}{TOT_{ikt}(a)}$, $\frac{RET_{ikt}}{TOT_{ikt}}$, $\frac{PLA_{ikt}(a)}{TOT_{ikt}(a)}$ and $\frac{PLA_{ikt}}{TOT_{ikt}}$ all rise. These latter effects would be consistent with $\beta_{HOR} < 0$, $\beta_{PLA} > 0$ and $\beta_{RET} > 0$ for the regressions involving affiliate-level and aggregate sales shares.[27]

Second, if active and dominant, the financing effect implies that host-country financial development raises the aggregate level of MNC activity, as more multinational firms can access capital in the host country when the financing environment there improves. The number of offshore affiliates, N_{ikt}, and aggregate affiliate sales to each destination, HOR_{ikt}, PLA_{ikt}, RET_{ikt} and TOT_{ikt}, would then all grow with financial development in i. Finding $\beta > 0$ for each of these outcome variables would thus be consistent with the presence of the financing effect, while $\beta < 0$ would indicate that it is either moot or small relative to the competition effect.

[27] The affiliate-level and aggregate sales shares sum to 1 by definition. Accordingly, the coefficients on any given right-hand side variable sum to 0 across the specifications for the three sales shares. However, each regression still delivers independent information, namely whether the effect of financial development on each outcome is significantly different from 0. Note that there are no efficiency gains from estimating the three equations simultaneously as seemingly unrelated regressions, since each includes the same set of explanatory variables and is run on the same set of observations.

The baseline specification (4.1) incorporates a number of important controls. Host-country covariates X_{it} reflect local characteristics other than FD_{it} that affect multinational activity. In the model, these include aggregate expenditure, E_s; factor costs, ω; fixed entry, production and FDI costs, f_{Es}, f_S and f_I; and trade costs, f_X and τ. Since our empirical analysis focuses on the global activity of U.S.-based firms, all relevant characteristics of the parent country are subsumed by year fixed effects, φ_t; these also account for temporal changes in global macroeconomic conditions. Finally, industry fixed effects, φ_k, absorb cross-sector differences in parameters such as aggregate expenditure shares, μ, demand elasticities, ε and ϕ, and production, exporting and FDI costs. The error term ϵ_{ikt} captures any residual factors that shape MNC operations. We cluster standard errors by host country, to allow for correlated shocks across observations at the country level.

4.2 Second estimating equation

In equation (4.1), β is identified from the variation in financial institutions across host countries and over time. The X_{it} controls absorb the role of country characteristics that affect multinational activity and that may be correlated with financial development. If all such covariates are included in X_{it}, β isolates the independent effect of FD_{it} on MNC_{ikt} and is not subject to omitted variable bias. Separately, reverse causality is less likely to be an empirical concern given the range of dependent variables MNC_{ikt} we consider: Even should FD_{it} respond to aggregate MNC activity (N_{ikt} and TOT_{ikt}), it is less clear how the shares of affiliate sales by destination market would affect FD_{it}. Moreover, host-country financial development is plausibly exogenous from the perspective of an individual multinational affiliate. Nevertheless, a realistic concern is that countries strengthen financial institutions while implementing broader institutional or economic reforms that also affect multinational firms. If the latter changes are unobserved, the estimates of β may reflect the influence of both financial development and these omitted country characteristics.[28]

To more convincingly establish the causal effect of financial development on MNC activity, we therefore introduce a second estimating equation that incorporates cross-industry variation in sensitivity to financial development:

$$MNC_{ikt} = \alpha + \beta\, FD_{it} + \gamma\, FD_{it} \times EFD_k + \Gamma X_{it} + \varphi_k + \varphi_t + \epsilon_{ikt}. \tag{4.2}$$

Here, EFD_k identifies the external finance dependence of industry k, and the coefficients β and γ jointly capture the impact of FD_{it} on MNC_{ikt}. Following Rajan and Zingales (1998), this approach builds on the premise that technological differences across industries generate differential requirements for outside capital. Firms in sectors with high external finance dependence tend to face high upfront costs, which impose liquidity constraints and raise the need for outside funding. Our earlier model can be readily extended to reflect this dimension of industry heterogeneity, by featuring $K > 1$ differentiated-varieties sectors with different fixed entry costs for Southern firms, f_{Sk}. This can be done by generalizing the

[28] Note however that X_{it} will include GDP per capita and rule of law, alleviating concerns that β captures the effect of overall economic development and broader institutional reforms rather than that of financial development.

utility functions in (2.1) and (2.2) to be Cobb-Douglas over the consumption of the homogeneous good and CES aggregates for the K differentiated sectors. We show in the Appendix that host-country financial development would trigger systematically larger competition and financing effects on multinational companies active in financially more sensitive industries, as reflected in a higher f_{Sk}.

We thus anticipate that the coefficients β and γ would share the same sign for each respective outcome variable. Importantly, γ has a clear interpretation even in the presence of omitted country characteristics. In addition, in Section 7.5, we report results from estimating (4.2) with country-year fixed effects φ_{it}, in which γ isolates the impact of financial development separately from that of both observed and unobserved country-year covariates.

We view equations (4.1) and (4.2) as providing complementary evidence. Specification (4.1) estimates the effect of FD_{it} on the average industry in an economy. This is relevant for aggregate welfare, but potentially subject to estimation biases. Specification (4.2) by contrast offers cleaner identification in view of potential omitted variables and reverse causality, but is less relevant to aggregate outcomes since it reflects only differential (i.e., reallocation) effects across sectors.

5 Data Description

Implementing the empirical framework in Section 4 requires measures of multinational activity, host-country financial institutions, and industries' external finance dependence. The data and measurement approaches are described below.

5.1 U.S. multinational activity

We construct the dependent variables, MNC_{ikt}, in specifications (4.1) and (4.2) using firm-level data on the global operations of U.S.-based multinationals from the Bureau of Economic Analysis (BEA). The BEA Survey of U.S. Direct Investment Abroad provides information on U.S. parent firms and their foreign affiliates on an annual basis during our sample period, 1989-2009. The data are most comprehensive in scope and coverage in benchmark years, namely 1989, 1994, 1999, 2004 and 2009.[29,30] We therefore compute aggregate outcome variables for benchmark years only, but study the entire panel in affiliate-level regressions.[31]

An important element of this dataset is its detailed record of U.S. multinationals' affiliate sales. In addition to each subsidiary's total revenues, $TOT(a)$, the BEA reports: local sales in the host country,

[29] In a typical benchmark year, the survey covers over 99% of affiliate activity by total assets, total sales, and total U.S. FDI. In case of missing survey responses, the BEA may report imputed values; these are flagged and we exclude them from the analysis.

[30] Any U.S. person having direct or indirect ownership or control of ten percent or more of the voting securities of an incorporated foreign business enterprise or an equivalent interest in an unincorporated foreign business enterprise at any time during a benchmark fiscal year is considered to have a foreign affiliate. However, for very small affiliates that do not own another affiliate, parents are exempt from reporting with the standard survey form. Foreign affiliates are required to report separately unless they are in both the same country and three-digit industry. Each affiliate is considered to be incorporated where its physical assets are located.

[31] We have verified that the affiliate-level results also hold in the subsample restricted to benchmark years.

$HOR(a)$, exports to the United States, $RET(a)$, and exports to other destinations, $PLA(a)$.[32] We use these as direct measures of horizontal, return and export-platform sales, as well as to calculate sales shares. Because we observe the primary industry affiliation of each parent company, we are also able to compute aggregate outcomes MNC_{ikt} by host country and year for 220 NAICS 4-digit industries.

Table 2 summarizes the pattern of affiliate sales as observed in this BEA data. In aggregate, the total revenues of U.S. multinational affiliates amount to $561 million in the average country-industry-year triplet. The typical affiliate sells primarily to its local market (75%), while earning a smaller share of revenues from exports to the United States (7%) and to third countries (18%). This composition varies substantially across affiliates and years: The standard deviations around these three means are 36%, 20% and 31%, respectively. As illustrated in Figure 4, subsidiaries selling in only one of the three destinations capture 22% of U.S. multinationals' global sales, while affiliates serving all three destinations contribute over 52%. Multinational firms also locate production facilities across a broad set of countries. In 2009 for example, 1,892 parent companies operated 14,804 affiliates in 142 countries. In an average year, there are 1,465 U.S. parents, each managing 4.18 foreign affiliates, with some large corporations maintaining many more subsidiaries (standard deviation: 9.78).

5.2 Host-country financial development

In the model, financial development in South attracts entry by new domestic firms, as well as by multinational affiliates if they borrow locally. We formally establish in the Appendix that the ratio of aggregate credit-financed fixed costs to GDP in South is increasing in the parameter η. A model-consistent proxy for η is therefore the total amount of bank credit extended to the private sector as a share of GDP in the host country. We use this variable from Beck et al. (2009) as our primary measure of financial development. This is an outcome-based measure that captures the actual availability of external capital in an economy, and also implicitly reflects the extent to which local institutions support formal lending activity and enforce financial contracts. It is the most commonly-used indicator for this purpose in the trade, growth and finance literatures. We demonstrate the robustness of our results to several alternative measures of financial development in Section 7.1.

Financial development varies significantly across the 95 host countries and 21 years in our sample (Table 2, Appendix Table 2). The mean value of FD_{it} in the panel is 0.51, with a standard deviation of 0.44. Notice that the cross-sectional dispersion of FD_{it} exceeds its time-series variation: While the standard deviation of private credit across countries was 0.62 in 2009, it was only 0.15 for the average economy over the 1989-2009 period.

[32] Affiliate sales by destination are observed only for majority-owned affiliates. We therefore restrict the sample to affiliates for which the U.S. parent firm has direct or indirect ownership or control of more than 50 percent of the voting securities. There are changes over time in the affiliate size thresholds above which sales by destination need to be reported, but we have checked that our findings hold when we run our analysis restricting to observations from each single benchmark year. The sum of the reported local, U.S. and third-country sales falls short of the total sales recorded for a handful of affiliates. To ensure that the sales shares described below sum to 1 across sales destinations, we calculate total sales by summing the three sales components and use this sum in our analysis. All results are robust to instead using the raw data.

5.3 Industries' external finance dependence

Industries' external finance dependence, EFD_k, is measured following Rajan and Zingales (1998). We calculate EFD_k as the share of capital expenditures not financed with internal cash flows from operations using data on all publicly-listed U.S. companies in sector k from Compustat North America.[33] This aims to capture industries' inherent need for outside capital given technologically-determined cash flow and investment structures. There is significant variation in observed external finance dependence across the 220 industries in the sample (mean: 0.42, standard deviation: 2.74).

Constructing EFD_k with U.S. data has three distinct advantages. First, the United States has a well-developed financial system; companies' observed behavior thus plausibly approximates optimal financing practices. Second, industries' financial sensitivity is not measured endogenously with respect to host-country financial conditions. Finally, estimating γ in (4.2) requires only that the true rank ordering of external finance dependence remains relatively stable across countries. The level of EFD_k may therefore differ across countries without impacting the interpretation of γ, although measurement error could bias our results downwards.

5.4 An Illustrative Example

As a first step towards examining the effects of host-country financial conditions on MNC activity, we provide an illustrative example in Figure 5. We compare the pattern of U.S. multinational operations in three host countries whose levels of financial development correspond approximately to the 50th, 60th and 75th percentiles in our 1989-2009 panel: Brazil in 1999, Chile in 1994, and Norway in 1989.

Figure 5 reveals two patterns. First, the value of aggregate MNC affiliate sales (scaled by host-country market size) increases with host-country financial development. Second, the share of MNC affiliate sales going to the local economy declines steadily with host-country financial development, while the shares of MNC affiliate sales to the MNC parent country (the U.S.) and to third-country destinations both rise. While only suggestive, this example indicates that host-country credit conditions might indeed influence the level and composition of FDI, and anticipates the results of our formal analysis below.

6 Main Results

6.1 Affiliate presence and number of multinational affiliates

We first examine how the financial environment of the host country affects the number of U.S. multinational affiliates. Columns 1 and 6 of Table 3 provide estimates of equations (4.1) and (4.2), in which MNC_{ikt} is an indicator equal to one if at least one foreign subsidiary is active in country i and sector k during year t.[34] Economies with strong financial institutions are significantly more likely to attract multi-

[33] We first compute the external finance dependence ratio for each firm over the 1996-2005 period. We calculate EFD_k as the median such ratio across all firms in sector k; sectors with fewer than ten firms are dropped.

[34] The regression sample in Columns 1 and 6 includes all country-sector-year triplets that host at least one MNC affiliate in at least one year in the panel. In all other columns, the sample includes all country-sector-year triplets with a positive number of MNC affiliates.

national activity. Moreover, the effect of financial development is systematically stronger in industries more reliant on external finance. We report OLS regressions, but the results are nearly identical if we instead adopt a probit specification (available on request). We observe similar patterns in Columns 2 and 7, where the dependent variable is the log number of affiliates in country i, industry k and year t. Conditional on multinational presence, financially advanced countries thus host more affiliates, particularly in financially more dependent sectors.

In light of Propositions 1 and 2, these results are consistent with the presence of a financing effect that is strong enough to overturn the competition effect on the extensive margin of multinational activity. Our findings are also statistically and economically significant. On average, a one standard deviation increase in private credit generates a 10.6% increase in the number of MNC subsidiaries. This impact is 4.3% higher in the industry at the 75^{th} percentile by external finance dependence relative to the industry at the 25^{th} percentile.

In our stylized framework, all foreign affiliates serve all three markets of interest (host, home and third countries). This need not be the case in practice due to the presence of other economic forces outside our model. That said, Columns 3-5 and 8-10 in Table 1 confirm empirically that FD_{it} and its interaction with EFD_k both have a similar positive association with the number of subsidiaries that sell to each of the three destinations.

6.2 Level of aggregate affiliate sales

We next evaluate the impact of host-country credit conditions on the scale of MNC operations at the aggregate level. In Table 4, we estimate (4.1) and (4.2) defining MNC_{ikt} to be the combined log revenues TOT_{ikt} of all foreign affiliates in country i and industry k during year t. We also consider log aggregate sales separately by destination, HOR_{ikt}, PLA_{ikt} and RET_{ikt}.

The patterns found once again fall in line with the strong financing effect case in Table 1: Aggregate MNC sales increase with local financial development, both in total and to each market. The economic magnitudes of these relationships are substantial. A one-standard-deviation improvement in FD_{it} expands total affiliate revenues by 17.4% in the average industry (Column 4). These effects are magnified in financially dependent sectors, with an additional differential increase of 10.2% between the 75^{th} and 25^{th} percentile industries based on EFD_k (Column 8). Breaking down these aggregate revenues by destination, we also observe positive coefficients for local sales, third-country platform sales and return sales to the United States. While the level effect of FD_{it} is precisely estimated only for return and total sales, the interaction terms are highly significant across all four aggregate sales measures (Columns 5-8).

6.3 Composition of aggregate affiliate sales

We also assess the influence of host-country financial development on the composition of aggregate MNC sales across destinations. Should the competition effect be present, subsidiaries would become more export-oriented following improvements in host-country financial development and sell a smaller share of their output to the local market as competition there intensifies. Importantly, this result is independent

of the financing effect and holds whether or not multinationals rely on local credit for their operations.

Table 5 provides the corresponding estimates. The three dependent variables in Table 5 capture the fraction of aggregate affiliate sales destined for the local market $\frac{HOR_{ikt}}{TOT_{ikt}}$, the United States $\frac{RET_{ikt}}{TOT_{ikt}}$, and third countries $\frac{PLA_{ikt}}{TOT_{ikt}}$. We find evidence strongly consistent with the competition channel: MNC subsidiaries direct a smaller share of their sales to the local economy when it has mature credit markets, while sending a larger share to the United States and to third countries. These patterns are more pronounced in financially more vulnerable sectors. As for the magnitude of these effects, consider a host nation where access to capital improves from the 10^{th} to the 90^{th} percentile in the sample. Based on the point estimates from Columns 4-6, this change would be associated with a decline in the share of horizontal sales by 5.5 percentage points in the typical industry, with the impact 1.9 percentage points bigger for the industry at the 90^{th} percentile by external finance dependence relative to that at the 10^{th} percentile. The corresponding increase in the shares of platform and return sales to the U.S. would be 3.5 and 2.0 percentage points, with the effects being 1.4 and 0.4 percentage points larger when comparing the 90^{th} percentile industry by EFD_k relative to the 10^{th} percentile industry.

6.4 Level of individual affiliate sales

We next examine the implications of host-country financial development at the level of the individual affiliate. We expect subsidiaries in financially more advanced hosts to sell less locally due to the competition mechanism. In the absence of the financing effect, such subsidiaries would also sell more to the United States and to third countries. With local financing, however, the latter two export flows would move in the same direction, although they may either expand or decline (c.f. Table 1).

Table 6 shows that at the affiliate level, log local sales, $HOR_{ikt}(a)$, indeed decrease significantly in host-country financial development (Columns 1 and 4). By contrast, log sales to the United States, $RET_{ikt}(a)$, and to third-country destinations, $PLA_{ikt}(a)$, both rise with FD_{it}, such that the overall impact on log total sales, $TOT_{ikt}(a)$, is indistinguishable from zero. These effects appear to be more intense in financially more sensitive industries.

It is instructive to compare the pattern of response in affiliate-level sales in Table 6 against that for aggregate sales in Table 4. Host-country financial development is associated with a decline in horizontal sales and an insignificant effect on total sales at the intensive margin of affiliate level activity, which is consistent with the competition effect. At the aggregate level, however, Table 4 instead reveals a strong positive effect on both horizontal and total sales. These two sets of findings can be jointly rationalized if financial development has a positive effect on the extensive margin of FDI in the host country, as would be the case if the financing effect on MNC entry were strong. This would moreover be in line with the earlier evidence in Table 3 pointing to the positive effect of financial development on the number of affiliates present in the host country. Taken together, these results are therefore consistent with the presence of both the competition effect and a strong financing effect on multinational activity.

6.5 Composition of individual affiliate sales

Finally, we study the composition of affiliate-level sales across destinations. In Table 7, we estimate (4.1) and (4.2) setting the dependent variable to be the share of subsidiary revenues earned in the host country $\frac{HOR_{ikt}(a)}{TOT_{ikt}(a)}$, in the United States $\frac{RET_{ikt}(a)}{TOT_{ikt}(a)}$, and in third markets $\frac{PLA_{ikt}(a)}{TOT_{ikt}(a)}$. In line with the findings in Table 5 for aggregate sales shares, the results point to the relevance of the competition effect: Affiliates based in financially more advanced countries sell a smaller fraction of output locally compared with affiliates in financially less developed economies. By contrast, affiliates export a higher proportion of output to third-country destinations and to the United States, with platform sales responding slightly more than return sales. These patterns are amplified in sectors with higher requirements for external capital.

The regressions also indicate that host-country financial development exerts a similar marginal effect on aggregate MNC sales shares as on the sales shares of individual affiliates: The point estimates on FD_{it} in Table 7 are slightly smaller than those in Table 5, but the difference is typically not statistically significant. In unreported results, we have confirmed that the effect of financial development is in fact invariant across the firm size and productivity distributions. In other words, while MNC sales shares might vary across affiliates in a given host country for reasons unrelated to financial frictions, they exhibit the same sensitivity to financial conditions.

6.6 Control variables

The results above obtain in the presence of an extensive set of controls, X_{it}. We briefly discuss now the estimated effects that we find for these controls.

Across Tables 3-7, we document a pervasive role for host-country aggregate demand, E_{it} in the model, as measured by log GDP from the Penn World Tables (PWT) Version 7.0. Large economies attract more multinational activity (Tables 3, 4 and 6) and capture a bigger share of foreign affiliates' sales (Tables 5 and 7). This is consistent with a market-size effect that raises the propensity for horizontal FDI. The size of all third-country markets potentially served by an affiliate in country i, E_{-it}, is indirectly covered by the combination of i's own GDP and year fixed effects that subsume global and U.S. GDP.

We proxy for factor costs ω_{it} in the recipient country with its log GDP per capita from the PWT, as well as its stocks of physical and human capital per worker.[35] We record positive coefficients for income per capita in the sales level regressions (Table 4), but little role for factor endowments. Of note, controlling for GDP per capita helps ensure that we identify the impact of financial development separately from that of overall economic development.

We take into consideration the role of different fixed costs of firm entry, exporting and FDI that might impact MNC activity in general equilibrium. Year fixed effects implicitly account for the fixed costs of firm entry in the United States, f_{Ent}, that indirectly influences the number of U.S. multinationals. To

[35] We construct these covariates following the methodology of Hall and Jones (1999). For physical capital, we apply the perpetual inventory method to data from the PWT, setting the initial capital stock equal to $I_0/(g+d)$, where I_0 is investment in the initial year, g is the average growth rate of investment over the first ten years, and $d = 0.06$ is the assumed depreciation rate. For human capital, this is calculated as the average years of schooling from Barro and Lee (2010), weighted by the Mincerian returns to education function adopted by Hall and Jones (1999).

the extent that the fixed costs of domestic firm entry and production in a host country, f_{ESit} and f_{Sit}, are a function of its factor costs and market size, these fixed costs are also controlled for.

We recognize that fixed and variable trade costs, f_{Xit} and τ_{it}, might impact the choice between exporting and FDI. We control for the distance between host country i and the U.S. with i's log bilateral distance to the United States (from CEPII) and a set of 11 time-varying dummy variables for regional trade agreements (RTAs) between the U.S. and i, such as NAFTA.[36] We proxy trade costs between the host country and potential third-country markets with indicators for i's membership in 8 major multilateral agreements, such as the E.U.[37] The estimates suggest that distance to the United States deters the level of multinational activity (Tables 3 and 4), but has only a limited impact on the composition of MNC sales (Table 5). Although we do not report these in full, the RTA coefficients tend to conform to expected patterns. For example, we find a positive and significant effect of E.U. membership on the export-platform share of affiliate revenues, with a consequent decrease in the shares of both horizontal and return sales.[38] By contrast, affiliates located in NAFTA member countries report a significantly higher share of return sales to the U.S.

Finally, we capture the role of FDI costs, f_{Iit}, with two proxies at the host-country level: the average corporate tax rate faced by foreign firms, computed using BEA data on observed tax incidence, and a rule of law index from the *International Country Risk Guide* which gauges the security of foreign direct investments. Consistent with profit-shifting motives, multinationals appear more likely to direct sales away from host countries with high corporate taxes towards the United States instead. Similarly, rule of law tends to be positively correlated with the share of local sales, but negatively associated with export sales shares. Of note, controlling for rule of law allows us to isolate the effect of financial institutions from that of the broader institutional context.

7 Alternative Specifications and Robustness

The results described in Section 6 are robust to a wide set of alternative specifications. In the interest of space, we present in this section additional evidence using the aggregate and affiliate-level sales shares only, as our theoretical framework has the sharpest predictions for these outcomes. Corresponding sensitivity analyses for affiliate presence and sales levels are available upon request.

[36]The United States participates in 11 RTAs: US-Israel, NAFTA, US-Jordan, US-Singapore, US-Chile, US-Australia, US-Morocco, CAFTA-DR (Dominican Republic-Central America), US-Bahrain, US-Peru, US-Oman.

[37]The multilateral trade agreements included are: GATT/WTO, EU = European Union, EFTA = European Free Trade Area, CARICOM = Caribbean Community, CACM = Central American Common Market, ASEAN = Association of Southeast Asian Nations, ASEAN-China, Mercosur. All information on membership in trade agreements is from Rose (2004), augmented with direct reference to the World Trade Organization's website.

[38]Given the distinctiveness of the E.U. as an integrated economic region with low trade barriers, a natural concern is that the E.U. host countries might be driving our results for the effect of host-country financial development on affiliates' export-platform sales. Appendix Table 7 however confirms that this is not the case: Our findings continue to hold when the sales-shares regressions are run using only the sub-sample of non-E.U. host countries.

7.1 Alternative measures and specifications

We first demonstrate in Table 8 that the findings are robust to alternative measures of host-country financial development. As a broader indicator of access to debt financing, we use credit extended by banks and other financial institutions as a share of GDP (from Beck et al. 2009). Since equity financing provides an alternative source of capital, we also study stock market capitalization, defined as the total value of publicly-listed shares normalized by GDP (from Beck et al. 2009). Finally, we exploit a binary variable equal to one in all years after a country has undergone various financial reforms deemed necessary for a well-functioning financial system, such as removing excessively high reserve requirements, interest controls, and entry barriers in the banking sector (from Abiad et al. 2010). We find reassuringly similar results with each measure.

In Appendix Table 3, we address the fact that many affiliates report zero activity in one of the three sales categories. Specifically, we verify that our results hold under tobit estimation. We also confirm that our findings are not driven by the behavior of small firms contributing little to overall multinational activity: we record comparable coefficients in Appendix Table 4 when we adopt weighted least squares estimation with log total affiliate sales as weights.

7.2 Additional Controls

Table 9 further shows the results to be robust to introducing three country-level controls that augment the set of variables in X_{it}. To capture the export-platform potential of country i, we construct the log average GDP of all destinations excluding i and the United States, weighted by their inverse bilateral distance from i (à la Blonigen et al. 2007). In terms of our model, this measure of export-platform potential combines elements of both the size of third-country markets (E_{-it}) and the cost of serving them from an affiliate in i (f_{Xit} and τ_{it}). We find that affiliates in hosts with greater export-platform potential indeed sell a smaller share of output locally and a larger share to third countries, with no corresponding effect on the share of return sales to the United States.

We also exploit information on barriers to firm entry in host nation i from the World Bank *Doing Business Report*. We use the first principal component of the log nominal cost (scaled by GDP per capita), the log number of procedures and the log number of days required to establish a new business in i as an additional control.[39] These directly measure the cost of domestic firm entry in the FDI recipient country (f_{Sit}), and are plausibly also correlated with the fixed cost of FDI activity there (f_{Iit}). Similarly, we include the first principal component of the log nominal cost per shipping container, the log number of procedures and the log number of days involved in exporting from country i.[40] This provides another proxy for the trade costs incurred by MNC affiliates located in i when selling to other markets (f_{Xit} and τ_{it}). We find no evidence that these bureaucratic barriers shape the composition of MNC sales. Importantly, controlling for these three additional country variables does not affect our main results for

[39]These data are available for a subset of the countries in our sample starting in 2003. We use the average 2003-2009 value for each country in our regressions for the full 1989-2009 panel of BEA data.

[40]These data are available for a subset of the countries in our sample starting in 2006. We use the average 2006-2009 value for each country in our regressions for the full 1989-2009 panel of BEA data.

host-country financial development; the estimated effects on the sales shares to each destination market in fact remain relatively stable when comparing Table 9 against Table 5.

In principle, the external finance dependence interactions help us to isolate the channel through which financial development influences the pattern of multinational sales, but this interpretation can be compromised if EFD_k instead picked up the effect of other pertinent sector characteristics. To allay this concern, we show in Appendix Table 5 that the findings from regression specification (4.2) are robust to including a further interaction term between FD_{it} and the capital or skill intensity of industry k.[41] Along similar lines, using firm-level regressions based on (4.2), Appendix Table 6 verifies that the main findings are intact even after controlling for the interaction between FD_{it} and the log total sales of the parent firm, the ratio of parent R&D expenditures to sales, or the affiliate average wage.[42] In other words, the results we have uncovered are robust to the possibility that larger, more research-intensive, or more skill-intensive multinationals might also require more external financing.

7.3 Alternative explanations: entry barriers and export finance

Economies with advanced financial markets tend also to have low barriers to firm entry. The composition of multinationals' affiliate sales across destinations may therefore respond to the degree of competition that affiliates face from domestic producers due to these low entry costs. While still consistent with the idea that competition in the host-country consumer market determines the nature of FDI activity, such an effect would be unrelated to credit conditions. The results in Table 9 above indicate that this alternative mechanism is unlikely to explain our findings, since we control directly for entry costs with measures of the cost of doing business.[43]

Separately, the prior literature has documented that firms' export activity is more dependent on external capital than is production for the domestic market (Manova 2013). Moreover, our estimates above (as well as Desai et al. 2004) suggest that multinationals rely in part on host-country capital to finance foreign operations. Should financial development in the host improve access to capital, affiliates may be not only more likely to enter, but also more export-intensive conditional on entry. Importantly, this would result from the higher sensitivity of exporting to financial frictions, rather than from the competition effect *per se*.

Beyond the robust evidence we presented in Table 9 when conditioning on export costs from each host country, we further consider the export-finance mechanism by controlling for multinational affiliates' financing practices in equations (4.1) and (4.2). The BEA records each subsidiary's total current liabilities and long-term debt, as well as the fraction of this debt held by the U.S. parent firm, by host-country lenders, or by other entities. Should the credit environment in the host country determine affiliates' export intensity purely through the export-finance mechanism, controlling for affiliates' financing structure would

[41] We compute capital and skill intensity from the NBER CES Manufacturing Dataset, as the log real capital stock divided by total employment and log number of nonproduction workers divided by total employment respectively.

[42] Each of these control variables is calculated directly from the BEA data, for each multinational parent or affiliate.

[43] This is in the spirit of Nunn and Trefler (2013) who advocate for distinguishing between the effects of entry costs and financial development in explaining country export patterns.

turn the β and γ coefficients insignificant, particularly when the dependent variable is the share of sales exported to the U.S. or to third-country markets. Contrary to this, the effect of financial development on the market composition of affiliate sales remains qualitatively the same when we control for the fraction of local borrowing in their debt in Table 10.[44]

7.4 Unobserved firm heterogeneity

A potentially important category of omitted variables pertains to unobserved parent-firm characteristics. Multinational companies might differ in their productivity, and along other dimensions that affect production and sales decisions such as managerial practices, labor skill, R&D intensity or financial health. Such unobserved firm characteristics, as well as variation in a firm's product appeal across countries, may influence the composition of affiliate sales across destinations.

To accommodate this possibility, Table 11 adds parent-firm fixed effects to our baseline specifications. The role of financial development is now identified from the variation in credit conditions across the affiliates of the same multinational that are based in different countries and/or in different years. We continue to observe coefficients for the main effect of FD_{it} that are consistent with the earlier Table 7 results, although only the effect on the local sales share is significant at the 10% level, while that for the platform and return sales shares is marginally insignificant (Columns 1-3). We obtain strongly significant results for all three sales shares when examining the differential effect across industries with different degrees of external financing needs (Columns 4-6).[45] In other words, a given multinational tends to orient its affiliates in financially advanced economies towards return sales and export-platform activities. By contrast, it uses subsidiaries in financially less developed host countries to serve the local market to a greater degree.

7.5 Cross-section vs time-series variation

We conclude by exploring the relative importance of the cross-country and time-series variation in financial development for observed FDI patterns. In Table 12, we add host-country fixed effects to baseline specifications (4.1) and (4.2). For the average industry, we find that this leads to imprecise estimates for the effects on the local and third-country sales shares, while the effect on the U.S. sales share remains significant (Columns 1-3). When we take into account the cross-industry variation in external finance dependence, we document large and significant impacts of FD_{it} on all three sales shares that are in line with the competition effect (Columns 4-6). Moreover, the interaction terms retain their sign and significance when we include both industry dummies and country-year fixed effects (Columns 7-9), where the latter subsume the main effect of FD_{it}.[46]

[44] Specifically, we control for the share of affiliate financing obtained from non-affiliated entities in the host country, using a one-year lag. We have verified that these results are robust to controlling instead for affiliates' total leverage (scaled by total assets) or the share of loans provided by the parent company. The sample size in Table 10 is substantially reduced because only affiliates above a minimum size threshold report their financing practices.

[45] We obtain similar results when restricting the sample to parent firms with five or more affiliates.

[46] We have also verified that consistent patterns obtain in the cross-section of countries within a given benchmark year, as well as if we isolate the pure time-series dimension with country fixed effects but no time dummies.

These findings suggest that financial market imperfections explain the pattern of multinational activity across countries and industries, as well as across industries within a country over time or within a country-year pair. Improvements in host-country financial development are thus associated with reallocations in the composition of affiliate sales across industries, with the direct effect on the average industry being more moderate. The latter may, however, also be substantial if financial reforms are more dramatic than those typically seen in the data. This caveat is warranted since our identification power hinges on the much larger variance in FD_{it} across countries, compared to the average within-country experience (Appendix Table 2).

8 Conclusion

This paper contributes to the literature examining how conditions in recipient countries affect multinational activity. Using comprehensive data on U.S. multinational activity abroad, we uncover several novel effects of financial development in the host economy. Financially advanced countries attract more MNC subsidiaries. Strong financial institutions in the host country also raise aggregate affiliate sales to the local market, to the United States, and to third-country destinations. For individual affiliates, however, exports to the United States and to other markets are increased, but local sales are reduced. Yet both in the aggregate and at the affiliate levels, the share of local sales in total affiliate sales falls with host-country financial development, while the shares of U.S. and third-country sales increase. This suggests that financial development in the host country is a key institutional characteristic that dampens the horizontal motive for FDI and favors vertical and export-platform forms of multinational activity.

We propose that these empirical regularities are consistent with two effects of financial development on multinational activity in the presence of capital market imperfections: 1) a *competition effect* that reduces individual affiliates' revenues in the local market due to increased entry by domestic firms; and 2) a *financing effect* that encourages MNC entry and aggregate activity in the host country due to improved access to external financing for MNC affiliates. These effects point to important factors governing MNCs' global operations, and have policy implications for developing countries seeking to attract FDI as a means to technology transfer and foreign capital inflows.

There remains much scope for further research. While we have focused on the effects of local credit conditions on FDI patterns, more work is needed to understand how foreign affiliates and domestic firms interact in capital markets. Our findings also suggest that the state of the financial system in different countries might affect the organizational and operational structure of global supply chains. A promising direction for future work is to examine the effects of local economic conditions and financial policy on multinational firm behavior, taking into account these firms' global affiliate network.

9 References

Abiad, Abdul, Enrica Detragiache, and Thierry Tressel, (2010), "A New Database of Financial Reforms," *IMF Staff Papers* 57(2): 281-302.

Aghion, Philippe, Thibault Fally, and Stefano Scarpetta, (2007), "Credit Constraints as a Barrier to the Entry and Post-Entry Growth of Firms," *Economic Policy* 22(52): 731-779.

Aghion, Philippe, Peter Howitt, and David Mayer-Foulkes, (2005), "The Effect of Financial Development on Convergence: Theory and Evidence," *Quarterly Journal of Economics* 120(1): 173-222.

Aitken, Brian J., and Ann E. Harrison, (1999), "Do Domestic Firms Benefit from Foreign Direct Investment? Evidence from Venezuela," *American Economic Review* 89(3): 605-618.

Alfaro, Laura, Areendam Chanda, Sebnem Kalemli-Ozcan, and Selin Sayek, (2004),"FDI and Economic Growth: The Role of Local Financial Markets," *Journal of International Economics* 64(1): 89-112.

Amiti, Mary, and David Weinstein, (2011), "Exports and Financial Shocks," *Quarterly Journal of Economics* 126(4): 1841-1877.

Antràs, Pol, (2003), "Firms, Contracts, and Trade Structure," *Quarterly Journal of Economics* 118(4): 1375-1418.

Antràs, Pol, and Ricardo Caballero, (2009), "Trade and Capital Flows: A Financial Frictions Perspective," *Journal of Political Economy* 117(4): 701-744.

Antràs, Pol, and Davin Chor, (2013), "Organizing the Global Value Chain," *Econometrica* 81(6): 2127-2204.

Antràs, Pol, Mihir Desai, and C. Fritz Foley, (2009), "Multinational Firms, FDI Flows and Imperfect Capital Markets," *Quarterly Journal of Economics* 124(3): 1171-1219.

Arkolakis, Costas, Natalia Ramondo, Andrés Rodríguez-Clare, and Stephen Yeaple, (2013), "Innovation and Production in the Global Economy," NBER Working Paper #18972.

Arnold, Jens M., Beata S. Javorcik, and Aaditya Mattoo, (2011), "Does Services Liberalization Benefit Manufacturing Firms? Evidence from the Czech Republic," *Journal of International Economics* 85(1): 136-146.

Barro, Robert, and Jong-Wha Lee, (2010), "A New Data Set of Educational Attainment in the World, 1950-2010," NBER Working Paper #15902.

Beck, Thorsten, (2003), "Financial Dependence and International Trade," *Review of International Economics* 11(2): 296-316.

Beck, Thorsten, Asli Demirgüç-Kunt, and Ross Levine, (2009), "Financial Institutions and Markets across Countries and over Time – Data and Analysis," World Bank Policy Research Working Paper #4943.

Beck, Thorsten, Asli Demirgüç-Kunt, and Vojislav Maksimovic, (2005), "Financial and Legal Constraints to Firm Growth: Does Size Matter?" *Journal of Finance* 60(1): 137-177.

Bénassy-Quéré, Agnès, Maylis Coupet, Thierry Mayer, (2007), "Institutional Determinants of Foreign Direct Investment," *World Economy* 30(5): 764-782.

Bernard, Andrew, J. Bradford Jensen, Stephen J. Redding, and Peter K. Schott, (2010), "Intrafirm Trade and Product Contractibility," *American Economic Review: Papers and Proceedings* 100(2): 444-448.

Bilir, L. Kamran, (2014), "Patent Laws, Product Lifecycle Lengths, and Multinational Activity," *American Economic Review* 104(7): 1979-2013.

Blonigen, Bruce A., (2005), "A Review of the Empirical Literature on FDI Determinants," *Atlantic Economic Journal* 33(4): 383-403.

Blonigen, Bruce A., Ronald B. Davies, Glen R. Waddell, and Helen Naughton, (2007), "FDI in Space: Spatial Autoregressive Relationships in Foreign Direct Investment," *European Economic Review* 51(5): 1303-1325.

Branstetter, Lee, Raymond Fisman, and C. Fritz Foley, (2006), "Do Stronger Intellectual Property Rights Increase International Technology Transfer? Empirical Evidence from U.S. Firm-Level Panel Data," *Quarterly Journal of Economics* 121(1): 321-349.

Buch, Claudia, Iris Kesternich, Alexander Lipponer, and Monika Schnitzer, (2009), "Financial Constraints and the Margins of FDI," CEPR Discussion Paper 7444.

Bustos, Paula, (2007), "FDI as a Source of Finance in Imperfect Capital Markets: Firm-Level Evidence from Argentina," Pompeu Fabra University - CREI mimeo.

Carluccio, Juan, and Thibault Fally, (2012), "Global Sourcing under Imperfect Capital Markets," *Review of Economics and Statistics* 94(3): 740-763.

De Backer, Koen, and Leo Sleuwaegen, (2003), "Does Foreign Direct Investment Crowd Out Domestic Entrepreneurship?" *Review of Industrial Organization* 22(1): 67-84.

Desai, Mihir A., C. Fritz Foley, and Kristin J. Forbes, (2008), "Financial Constraints and Growth: Multinational and Local Firm Responses to Currency Depreciations," *Review of Financial Studies* 21(6): 2857-2888.

Desai, Mihir A., C. Fritz Foley, and James R. Hines Jr., (2004), "A Multinational Perspective on Capital Structure Choice and Internal Capital Markets," *Journal of Finance* 59(6): 2451-2487.

Feinberg, Susan, and Gordon Phillips, (2004), "Growth, Capital Market Development and Competition for Resources within MNCs," NBER Working Paper #9252.

Fillat, Jose L., Stefania Garetto, and Lindsay Oldenski, (2015), "Diversification, Cost Structure, and the Risk Premium of Multinational Corporations," *Journal of International Economics* 96(1): 37-54.

Gordin, Alexander, (2011), "How to Find Financing for an Overseas Venture," *Business Finance*, businessfinancemag.com.

Grossman, Gene, Elhanan Helpman, and Adam Szeidl, (2006), "Optimal Integration Strategies for the Multinational Firm," *Journal of International Economics* 70(1): 216-238.

Guiso, Luigi, Paola Sapienza, and Luigi Zingales, (2004), "Does Local Financial Development Matter?" *Quarterly Journal of Economics* 119(3): 929â€"969.

Hall, Robert, and Charles Jones, (1999), "Why Do Some Countries Produce So Much More Output Per Worker Than Others?" *Quarterly Journal of Economics* 114(1): 83-116.

Helpman, Elhanan, Marc J. Melitz, and Stephen R. Yeaple, (2004), "Exports Versus FDI with Heterogeneous Firms," *American Economic Review* 94(1): 300-316.

Hsu, Po-Hsuan, Xuan Tian, and Yan Xu, (2014), "Financial Development and Innovation: Cross-Country Evidence," *Journal of Financial Economics* 112(1): 116-135.

Irarrazabal, Alfonso, Andreas Moxnes, and Luca David Opromolla, (2013), "The Margins of Multinational Production and the Role of Intra-firm Trade," *Journal of Political Economy* 121(1): 74-126.

Javorcik, Beata S., and Mariana Spatareanu, (2009), "Tough Love: Do Czech Suppliers Learn from Their Relationships with Multinationals?" *Scandinavian Journal of Economics* 111(4): 811-833.

King, Robert, and Ross Levine, (1993), "Finance and Growth: Schumpeter Might Be Right," *Quarterly Journal of Economics* 108(3): 717-737.

Manova, Kalina, (2008), "Credit Constraints, Equity Market Liberalizations and International Trade," *Journal of International Economics* 76(1): 33-47.

Manova, Kalina, (2013), "Credit Constraints, Heterogeneous Firms, and International Trade", *Review of Economic Studies* 80(2): 711-744.

Manova, Kalina, Shang-Jin Wei, and Zhiwei Zhang (2015), "Firms Exports and Multinational Activity under Credit Constraints," *Review of Economics and Statistics* 97(3): 574-588.

Markusen, James R., and Anthony Venables, (2007), "Interacting Factor Endowments and Trade Costs: A Multi-Country, Multi-Good Approach to Trade Theory," *Journal of International Economics* 73(2): 333-354.

Nunn, Nathan and Daniel Trefler (2013), "Domestic Institutions as a Source of Comparative Advan-

tage." NBER Working Paper #18851.

Oba, Yoshiyuki, (2012), "Japanese SMEs' Asian Dreams: The Bottleneck is Financing," *Japan Business Press*, jbpress.ismedia.jp/articles/-/36011.

Poole, Jennifer P., (2013), "Knowledge Transfers from Multinational to Domestic Firms: Evidence from Worker Mobility," *Review of Economics and Statistics* 95(2): 393-406.

Raff, Horst, Michael Ryan, and Frank Stahler, (2016), "Financial Frictions and Foreign Direct Investment: Evidence from Japanese Microdata," mimeo.

Rajan, Raghuram, and Luigi Zingales, (1998), "Financial Dependence and Growth," *American Economic Review* 88(3): 559-586.

Ramondo, Natalia, Veronica Rappoport, and Kim Ruhl, (2016), "Intra-firm Trade and Vertical Fragmentation in U.S. Multinational Corporations" *Journal of International Economics* 98(1): 51-59.

Ramondo, Natalia, and Andrés Rodríguez-Clare, (2013), "Trade, Multinational Production, and the Gains from Openness," *Journal of Political Economy* 121(2): 273-322.

Rose, Andrew, (2004), "Do We Really Know that the WTO Increases Trade?" *American Economic Review* 94(1): 98-114.

Tintelnot, Felix, (2016), "Global Production with Export Platforms," *Quarterly Journal of Economics*, forthcoming.

Yeaple, Stephen R., (2003a), "The Role of Skill Endowments in the Structure of U.S. Outward Foreign Direct Investment," *Review of Economics and Statistics* 85(3): 726-734.

Yeaple, Stephen R., (2003b), "The Complex Integration Strategies of Multinationals and Cross Country Dependencies in the Structure of Foreign Direct Investment," *Journal of International Economics* 60(2): 293-314.

Yeaple, Stephen R., (2013), "The Multinational Firm," *Annual Review of Economics* 5: 193-217.

Table 1. Empirical Hypotheses and Results Overview

	Competition Effect + No/Weak Financing Effect	Competition Effect + Strong Financing Effect	Data
Aggregate Affiliate Activity			
Number of MNC Affiliates, *N*	−	+	+
Total Sales, *TOT*	?	+	+
Local Sales, *HOR*	−	+	+
US Sales, *RET*	?	+	+
3rd Country Sales, *PLA*	?	+	+
Local Sales / Total Sales, *HOR/TOT*	−	−	−
US Sales / Total Sales, *RET/TOT*	+	+	+
3rd Country Sales / Total Sales, *PLA/TOT*	+	+	+
Individual Affiliates			
Total Sales, *TOT(a)*	?	?	0
Local Sales, *HOR(a)*	−	−	−
US Sales, *RET(a)*	+	?	+
3rd Country Sales, *PLA(a)*	+	?	+
Local Sales / Total Sales, *HOR(a)/TOT(a)*	−	−	−
US Sales / Total Sales, *RET(a)/TOT(a)*	+	+	+
3rd Country Sales / Total Sales, *PLA(a)/TOT(a)*	+	+	+

Notes: This table summarizes the hypothesized and observed effects of host-country financial development on multinational activity there. Column 1 presents the empirical hypotheses for the case where the financing effect is either absent or weak (so that the competition effect dominates), while Column 2 presents the analogous hypotheses for the case where the financing effect is sufficiently strong. For comparison, Column 3 reports the sign of the effects actually obtained in our empirical analysis.

Table 2: Summary Statistics

	N	Mean	Standard Deviation
Country-Industry-Year Level			
Total Affiliate Sales (thousand USD)	17,811	561,256	2,450,158
Local Affiliate Sales (thousand USD)	17,811	363,112	1,502,995
3rd country Affiliate Sales (thousand USD)	17,811	147,074	1,009,672
US Affiliate Sales (thousand USD)	17,811	51,070	626,707
Local / Total sales	17,811	0.78	0.32
3rd country / Total sales	17,811	0.16	0.27
US / Total sales	17,811	0.06	0.17
Number of Affiliates	17,811	4.08	6.56
Affiliate-Year Level			
Total Affiliate Sales (thousand USD)	227,089	192,812	845,844
Local Affiliate Sales (thousand USD)	227,089	121,663	532,596
3rd country Affiliate Sales (thousand USD)	227,089	52,490	421,167
US Affiliate Sales (thousand USD)	227,089	18,659	228,768
Local / Total sales	227,089	0.75	0.36
3rd country / Total sales	227,089	0.18	0.31
US / Total sales	227,089	0.07	0.20
Debt from parent / Total Debt	195,949	0.16	0.24
Debt from host country source / Total Debt	195,949	0.65	0.30
Industry Level			
External Finance Dependence	220	0.42	2.74
Country-Year Level			
Private Credit / GDP	1,794	0.51	0.44
Private Credit (bank & other) / GDP	1,800	0.55	0.46
Stock Market Capitalization / GDP	1,442	0.56	0.68
Financial Reform Indicator	1,114	14.56	4.66
Log GDP	1,923	25.27	1.63
Log GDP per Capita	1,923	8.98	1.19
Log Distance	1,923	8.90	0.53
Corporate Tax Rate	1,923	0.18	0.15
Log K/L	1,855	10.73	1.25
Log H/L	1,882	0.84	0.25
General			
Number of Parent Companies per Year	21	1,465	304
Number of Affiliates per Parent-Year	4,724	4.18	9.78

Notes: This table summarizes multinational activity, host-country institutions, and industry characteristics across 95 countries and 220 industries for 1989-2009. External finance dependence follows the methodology of Rajan and Zingales (1998). Financial development measures are from Beck et al. (2009) and Abiad et al. (2010). GDP and GDP per capita are from the Penn World Tables, Version 7.0. Log distance between the United States and each host country is from CEPII and is time invariant. Log physical and human capital per worker (K/L and H/L) are based on the Penn World Tables and Barro and Lee (2010). All other variables are from the Bureau of Economic Analysis Survey of U.S. Direct Investment Abroad. The corporate tax rate is constructed using information on the actual tax incidence of US multinational affiliates observed in the BEA data.

Table 3: Number of Multinational Affiliates

Dependent variable:	Indicator N > 0	Log N	Log N, local sales	Log N, 3rd ctry sales	Log N, US sales	Indicator N > 0	Log N	Log N, local sales	Log N, 3rd ctry sales	Log N, US sales
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Fin Development	0.101	0.220	0.191	0.130	0.149	0.122	0.223	0.191	0.117	0.129
	(3.11)***	(2.28)**	(2.01)**	(1.53)	(2.00)**	(3.19)***	(2.19)**	(1.90)*	(1.23)	(1.51)
Fin Development × Ext Fin Dependence						0.007	0.039	0.033	0.036	0.038
						(2.62)**	(3.90)***	(2.92)***	(3.09)***	(4.23)***
Log GDP	0.073	0.272	0.279	0.227	0.214	0.093	0.306	0.314	0.260	0.258
	(7.93)***	(7.37)***	(7.64)***	(6.29)***	(6.07)***	(8.93)***	(7.67)***	(7.84)***	(6.54)***	(6.55)***
Log GDP per capita	0.080	0.589	0.605	0.599	0.512	0.090	0.620	0.653	0.615	0.547
	(1.69)*	(2.89)***	(2.94)***	(2.92)***	(2.30)**	(1.60)	(2.69)***	(2.82)***	(2.58)**	(2.02)**
Log Distance to US	-0.090	-0.125	-0.127	-0.024	-0.153	-0.102	-0.121	-0.128	-0.043	-0.186
	(-2.63)***	(-2.33)**	(-2.40)**	(-0.60)	(-3.38)***	(-2.61)**	(-2.14)*	(-2.37)**	(-1.00)	(-3.63)***
Controls	Log K/L, Log H/L, Rule of Law, Tax Rate, RTA Dummies, Industry FE, Year FE									
# Obs	78,916	15,531	14,991	8,845	6,896	41,630	10,435	10,109	6,565	5,049
R^2	0.44	0.53	0.53	0.47	0.44	0.48	0.56	0.56	0.50	0.47

Notes: * p<0.10, ** p<0.05, *** p<0.01; t-statistics based on robust standard errors clustered by country appear in parentheses. OLS estimates of equations (4.1) and (4.2) are reported. The unit of observation is the country-industry-year triplet and the sample includes all benchmark years during 1989-2009. The dependent variable in columns 1 and 6 is a binary indicator equal to 1 if there is at least one US multinational affiliate present. The dependent variables in columns 2-5 and 7-10 are the log number of US multinational affiliates that are present, selling locally, exporting to third countries, or exporting to the United States respectively. Financial Development is measured by the ratio of private credit to GDP. All regressions control for log(K/L), log(H/L), Rule of Law, corporate Tax Rate, and Regional Trade Agreement (RTA) dummies. Rule of Law is from the International Country Risk Guide. The RTA dummies are from Rose (2004) and WTO. All other variables are as described in the notes to Table 2. All regressions also include industry and year fixed effects.

Table 4: Level of Multinational Affiliate Sales, Aggregate Level

Dependent variable:	Local sales	3rd ctry sales	US sales	Total sales	Local sales	3rd ctry sales	US sales	Total sales
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fin Development	0.233	0.376	0.756	0.350	0.148	0.403	0.684	0.298
	(1.49)	(1.51)	(3.20)***	(2.30)**	(0.95)	(1.50)	(2.61)**	(1.92)*
Fin Development × Ext Fin Dependence					0.058	0.103	0.188	0.089
					(2.70)***	(4.16)***	(6.47)***	(4.78)***
Log GDP	0.716	0.337	0.324	0.601	0.769	0.387	0.419	0.646
	(10.33)***	(3.58)***	(3.54)***	(9.02)***	(11.18)***	(3.99)***	(4.46)***	(9.69)***
Log GDP per capita	1.120	1.520	1.240	1.046	1.275	1.335	1.116	1.058
	(2.96)***	(3.16)***	(2.41)**	(2.87)***	(3.03)***	(2.57)**	(2.01)**	(2.60)**
Log Distance	-0.265	0.169	-0.508	-0.259	-0.278	0.152	-0.531	-0.233
	(-2.71)***	(1.22)	(-3.34)***	(-2.93)***	(-2.90)***	(1.14)	(-2.90)***	(-2.52)**
Controls	Log K/L, Log H/L, Rule of Law, Tax Rate, RTA Dummies, Industry FE, Year FE							
# Obs	14,991	8,845	6,896	15,531	10,109	6,565	5,049	10,435
R^2	0.44	0.33	0.26	0.42	0.47	0.35	0.28	0.45

Notes: * p<0.10, ** p<0.05, *** p<0.01; t-statistics based on robust standard errors clustered by country appear in parentheses. OLS estimates of equations (4.1) and (4.2) are reported. The unit of observation is the country-industry-year triplet and the sample includes all benchmark years during 1989-2009. The dependent variables are the log of local sales, 3rd-country sales, US sales, and total sales by all US multinational affiliates. All regressions include the full set of controls described in Table 3, as well as industry and year fixed effects.

Table 5: Composition of Multinational Affiliate Sales, Aggregate Level

Dependent variable:	Local sales / Total sales	3rd ctry sales / Total sales	US sales / Total sales	Local sales / Total sales	3rd ctry sales / Total sales	US sales / Total sales
	(1)	(2)	(3)	(4)	(5)	(6)
Fin Development	-0.057 (-2.81)***	0.033 (1.88)*	0.023 (3.53)***	-0.058 (-2.87)***	0.037 (1.99)**	0.021 (3.27)***
Fin Development × Ext Fin Dependence				-0.013 (-3.67)***	0.010 (3.02)***	0.003 (2.28)**
Log GDP	0.033 (4.50)***	-0.027 (-4.31)***	-0.007 (-2.97)***	0.035 (4.15)***	-0.030 (-4.27)***	-0.005 (-2.05)**
Log GDP per capita	-0.005 (-0.14)	0.012 (0.37)	-0.008 (-0.58)	0.028 (0.70)	-0.011 (-0.31)	-0.017 (-1.28)
Log Distance	-0.011 (-0.70)	0.020 (1.98)*	-0.009 (-0.95)	-0.017 (-1.05)	0.025 (2.10)**	-0.008 (-0.96)
Controls	Log K/L, Log H/L, Rule of Law, Tax Rate, RTA Dummies, Industry FE, Year FE					
# Obs	15,531	15,531	15,531	10,435	10,435	10,435
R^2	0.22	0.23	0.13	0.24	0.24	0.15

Notes: * p<0.10, ** p<0.05, *** p<0.01; t-statistics based on robust standard errors clustered by country appear in parentheses. OLS estimates of equations (4.1) and (4.2) are reported. The unit of observation is the country-industry-year triplet and the sample includes all benchmark years during 1989-2009. The dependent variables are the ratio of local sales, 3rd-country sales and US sales to total sales, after the numerator and the denominator have been summed across all US multinational affiliates. All regressions include the full set of controls described in Table 3, as well as industry and year fixed effects.

Table 6: Level of Multinational Affiliate Sales, Affiliate Level

Dependent variable:	Local sales	3rd ctry sales	US sales	Total sales	Local sales	3rd ctry sales	US sales	Total sales
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fin Development	-0.153	0.237	0.470	-0.033	-0.231	0.215	0.419	-0.092
	(-2.27)**	(1.84)*	(2.95)***	(-0.64)	(-3.13)***	(1.58)	(2.51)**	(-1.69)*
Fin Development × Ext Fin Dependence					-0.001	0.044	0.126	0.014
					(-0.07)	(2.69)***	(4.35)***	(1.38)
Log GDP	0.301	-0.088	-0.080	0.143	0.363	-0.100	-0.073	0.181
	(7.66)***	(-1.46)	(-1.21)	(4.96)***	(9.45)***	(-1.67)*	(-1.07)	(7.51)***
Log GDP per capita	0.048	0.520	0.421	-0.017	0.122	0.445	0.180	-0.014
	(0.29)	(1.86)*	(1.41)	(-0.11)	(0.78)	(1.56)	(0.58)	(-0.11)
Log Distance	-0.149	0.189	-0.184	-0.087	-0.141	0.144	-0.224	-0.077
	(-3.73)***	(1.71)*	(-1.56)	(-2.35)**	(-3.42)***	(1.21)	(-1.63)	(-2.65)***
Controls	Log K/L, Log H/L, Rule of Law, Tax Rate, RTA Dummies, Industry FE, Year FE							
# Obs	198,154	103,908	71,160	215,173	148,575	85,349	58,439	161,423
R^2	0.12	0.18	0.16	0.11	0.13	0.18	0.16	0.11

Notes: * p<0.10, ** p<0.05, *** p<0.01; t-statistics based on robust standard errors clustered by country appear in parentheses. OLS estimates of equations (4.1) and (4.2) are reported. The unit of observation is the affiliate-year and the sample includes all years during 1989-2009. The dependent variables are the log of local sales, 3rd-country sales, US sales, and total sales of each US multinational affiliate. All regressions include the full set of controls described in Table 3, as well as industry and year fixed effects.

Table 7: Composition of Multinational Affiliate Sales, Affiliate Level

Dependent variable:	Local sales / Total sales	3rd ctry sales / Total sales	US sales / Total sales	Local sales / Total sales	3rd ctry sales / Total sales	US sales / Total sales
	(1)	(2)	(3)	(4)	(5)	(6)
Fin Development	-0.047 (-2.46)**	0.030 (1.86)*	0.018 (2.20)**	-0.040 (-1.90)*	0.030 (1.69)*	0.010 (1.10)
Fin Development × Ext Fin Dependence				-0.007 (-3.87)***	0.004 (2.39)**	0.003 (1.98)*
Log GDP	0.048 (5.35)***	-0.041 (-5.78)***	-0.008 (-2.52)**	0.050 (5.13)***	-0.044 (-5.68)***	-0.006 (-2.03)**
Log GDP per capita	-0.013 (-0.35)	0.001 (0.03)	0.013 (1.11)	0.007 (0.17)	-0.011 (-0.31)	0.004 (0.39)
Log Distance	-0.021 (-1.38)	0.015 (1.45)	0.006 (0.56)	-0.014 (-0.82)	0.010 (0.77)	0.004 (0.32)
Controls	Log K/L, Log H/L, Rule of Law, Tax Rate, RTA Dummies, Industry FE, Year FE					
# Obs	215,178	215,178	215,178	161,427	161,427	161,427
R^2	0.14	0.16	0.08	0.15	0.17	0.10

Notes: * p<0.10, ** p<0.05, *** p<0.01; t-statistics based on robust standard errors clustered by country appear in parentheses. OLS estimates of equations (4.1) and (4.2) are reported. The unit of observation is the affiliate-year and the sample includes all years during 1989-2009. The dependent variables are the ratio of local sales, 3rd-country sales and US sales to total sales for each US multinational affiliate. All regressions include the full set of controls described in Table 3, as well as industry and year fixed effects.

Table 8: Alternative Measures of Financial Development, Aggregate Level

Dependent variable:	Local sales	3rd ctry sales	US sales	Local sales	3rd ctry sales	US sales
	Total sales	Total sales	Total sales	Total sales	Total sales	Total sales
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Private credit by banks and other financial institutions / GDP						
Fin Development	-0.056	0.036	0.020	-0.059	0.041	0.018
	(-2.63)***	(1.94)*	(2.80)***	(-2.71)***	(2.09)**	(2.49)**
Fin Development × Ext Fin Dependence				-0.013	0.010	0.003
				(-3.65)***	(3.01)***	(2.13)**
Controls	Log GDP, Log GDP per capita, Log Distance, Log K/L, Log H/L, Rule of Law, Tax Rate, RTA Dummies, Industry FE, Year FE					
# Obs	15,673	15,673	15,673	10,530	10,530	10,530
R^2	0.22	0.23	0.13	0.24	0.24	0.15
Panel B: Stock market capitalization / GDP						
Fin Development	-0.038	0.024	0.014	-0.037	0.027	0.011
	(-2.64)***	(2.02)**	(3.17)***	(-2.67)***	(2.29)**	(2.61)**
Fin Development × Ext Fin Dependence				-0.009	0.008	0.002
				(-5.41)***	(4.04)***	(2.45)**
Controls	Log GDP, Log GDP per capita, Log Distance, Log K/L, Log H/L, Rule of Law, Tax Rate, RTA Dummies, Industry FE, Year FE					
# Obs	15,480	15,480	15,480	10,476	10,476	10,476
R^2	0.22	0.24	0.13	0.24	0.25	0.16
Panel C: Financial reform indicator						
Fin Development	-0.006	0.006	0.001	-0.006	0.006	-0.000
	(-2.10)**	(2.41)**	(0.42)	(-1.95)*	(2.31)**	(-0.11)
Fin Development × Ext Fin Dependence				-0.001	0.001	0.001
				(-3.24)***	(2.02)**	(3.46)***
Controls	Log GDP, Log GDP per capita, Log Distance, Log K/L, Log H/L, Rule of Law, Tax Rate, RTA Dummies, Industry FE, Year FE					
# Obs	13,323	13,323	13,323	8,985	8,985	8,985
R^2	0.22	0.23	0.14	0.23	0.24	0.15

Notes: * p<0.10, ** p<0.05, *** p<0.01; t-statistics based on robust standard errors clustered by country appear in parentheses. The regressions replicate Table 5 using three alternative measures of financial development: the ratio of private credit by banks and other financial institutions to GDP, the ratio of stock market capitalization to GDP from Beck et al. (2009), and an indicator variable equal to 1 in all years after a country undergoes financial reform from Abiad et al. (2010). All regressions include the full set of controls described in Table 3, as well as industry and year fixed effects.

Table 9: Cost of Entry, Cost of Exporting and Export Platform Potential in Host Country, Aggregate Level

Dependent variable:	Local sales	3rd ctry sales	US sales	Local sales	3rd ctry sales	US sales
	Total sales	Total sales	Total sales	Total sales	Total sales	Total sales
	(1)	(2)	(3)	(4)	(5)	(6)
Fin Development	-0.056	0.031	0.025	-0.060	0.036	0.024
	(-3.50)***	(2.28)**	(3.99)***	(-4.04)***	(2.90)***	(3.75)***
Fin Development × Ext Fin Dependence				-0.014	0.010	0.003
				(-3.73)***	(3.15)***	(2.19)**
Entry Cost	0.006	-0.004	-0.002	0.010	-0.007	-0.004
	(0.62)	(-0.51)	(-0.69)	(0.99)	(-0.76)	(-1.40)
Export Cost	-0.022	0.031	-0.008	-0.035	0.041	-0.006
	(-0.81)	(1.25)	(-0.95)	(-1.24)	(1.69)	(-0.62)
Export Platform Potential	-0.111	0.112	-0.000	-0.120	0.126	-0.006
	(-4.16)***	(5.49)***	(-0.02)	(-4.47)***	(6.17)***	(-0.59)
Controls	Log GDP, Log GDP per capita, Log Distance, Log K/L, Log H/L, Rule of Law, Tax Rate, RTA Dummies, Industry FE, Year FE					
# Obs	15,182	15,182	15,182	10,190	10,190	10,190
R^2	0.23	0.25	0.13	0.26	0.27	0.15

Notes: * p<0.10, ** p<0.05, *** p<0.01; t-statistics based on robust standard errors clustered by country appear in parentheses. The regressions replicate Table 5 adding three more controls: measures of the cost of firm entry in the host country and for the cost of exporting from the host country constructed from the World Bank Doing Business Report, as well as a measure of the host country's export-platform potential calculated using GDP and bilateral distance data from the Penn World Table and CEPII respectively. All regressions include the full set of controls described in Table 3, as well as industry and year fixed effects.

Table 10: Use of Host-Country Financing, Affiliate Level

Dependent variable:	Local sales	3rd ctry sales	US sales	Local sales	3rd ctry sales	US sales
	Total sales	Total sales	Total sales	Total sales	Total sales	Total sales
	(1)	(2)	(3)	(4)	(5)	(6)
Fin Development	-0.061	0.039	0.022	-0.054	0.038	0.017
	(-2.63)**	(1.82)*	(2.81)***	(-2.13)**	(1.56)	(2.27)**
Fin Development × Ext Fin Dependence				-0.008	0.005	0.002
				(-3.13)***	(2.23)**	(1.37)
Lagged Share of Local Financing	0.103	-0.084	-0.019	0.084	-0.073	-0.010
	(4.42)***	(-4.11)***	(-2.71)***	(3.78)***	(-3.69)***	(-1.46)
Controls	Log GDP, Log GDP per capita, Log Distance, Log K/L, Log H/L, Rule of Law, Tax Rate, RTA Dummies, Industry FE, Year FE					
# observations	22,199	22,199	22,199	16,566	16,566	16,566
R-squared	0.18	0.19	0.11	0.18	0.19	0.13

Notes: * p<0.10, ** p<0.05, *** p<0.01; t-statistics based on robust standard errors clustered by country appear in parentheses. The regressions add one more control to the Table 7 specifications: the lagged share of affiliate financing raised in the host country from the BEA data. Only benchmark years in 1989-2009 are included. All regressions include the full set of controls described in Table 3, as well as industry and year fixed effects.

Table 11: Parent-Firm Fixed Effects, Affiliate Level

Dependent variable:	Local sales	3rd ctry sales	US sales	Local sales	3rd ctry sales	US sales
	Total sales	Total sales	Total sales	Total sales	Total sales	Total sales
	(1)	(2)	(3)	(4)	(5)	(6)
Fin Development	-0.033	0.023	0.010	-0.026	0.022	0.004
	(-1.94)*	(1.56)	(1.59)	(-1.44)	(1.39)	(0.58)
Fin Development × Ext Fin Dependence				-0.009	0.006	0.003
				(-5.03)***	(3.65)***	(1.99)**
Controls	Log GDP, Log GDP per capita, Log Distance, Log K/L, Log H/L, Rule of Law, Tax Rate, RTA Dummies, Industry FE, Year FE					
# observations	215,181	215,181	215,181	161,427	161,427	161,427
R-squared	0.27	0.27	0.24	0.28	0.27	0.24

Notes: * p<0.10, ** p<0.05, *** p<0.01; t-statistics based on robust standard errors clustered by country appear in parentheses. The regressions replicate Table 7 using parent firm and year fixed effects in place of industry and year fixed effects. All regressions include the full set of controls described in Table 3.

Table 12: Cross Section vs. Time Series: Country Fixed Effects, Aggregate Level

Dependent variable:	Local sales	3rd ctry sales	US sales	Local sales	3rd ctry sales	US sales	Local sales	3rd ctry sales	US sales
	Total sales	Total sales	Total sales	Total sales	Total sales	Total sales	Total sales	Total sales	Total sales
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Fin Development	0.005	-0.015	0.010	0.014	-0.020	0.006			
	(0.38)	(-1.21)	(2.04)**	(0.94)	(-1.45)	(1.24)			
Fin Development × Ext Fin Dependence				-0.012	0.009	0.003	-0.011	0.009	0.003
				(-3.46)***	(2.85)***	(2.08)**	(-3.19)***	(2.61)***	(1.87)*
Controls	Country FE, Industry FE, Year FE			Country FE, Industry FE, Year FE			Country-Year FE, Industry FE		
	Log GDP, Log GDP per capita, Log Distance, Log K/L, Log H/L, Rule of Law, Tax Rate, RTA Dummies								
# Obs	15,531	15,531	15,531	10,435	10,435	10,435	11,392	11,392	11,392
R^2	0.27	0.29	0.16	0.30	0.31	0.18	0.32	0.33	0.20

Notes: * p<0.10, ** p<0.05, *** p<0.01; t-statistics based on robust standard errors clustered by country appear in parentheses. The regressions replicate Table 5 adding country fixed effects to the industry and year fixed effects in columns 1-6, while including country-year fixed effects and industry fixed effects in columns 7-9. All regressions include the full set of controls described in Table 3.

Appendix Table 1: Economic Growth and Multinational Activity

Dependent variable: GDP per capita growth

Time horizon:	1989-2009		5-Year Periods in 1989-2009	
	(1)	(2)	(3)	(4)
Aggregate MNC Sales Growth	0.165***	0.189***	0.107***	0.137***
	(0.0322)	(0.0283)	(0.0295)	(0.0202)
Growth in Share Local MNC Sales		0.618*		0.193**
		(0.324)		(0.0820)
Growth in Share US MNC Sales		0.479		-0.131
		(0.349)		(0.0865)
Initial log GDP per capita	-0.053	-0.0576	-0.015*	-0.020**
	(0.0374)	(0.0385)	(0.00783)	(0.00895)
# Obs	44	38	204	164
R^2	0.549	0.593	0.199	0.325

Notes: * p<0.10, ** p<0.05, *** p<0.01; t-statistics based on robust standard errors in Columns 1-2 and clustered by country in Columns 3-4 appear in parentheses. The unit of observation is the country in columns 1-2 and the country-period in columns 3-4, where a period is a 5-year interval between benchmark years in 1989-2009. The dependent variable is the cumulative growth in GDP per capita over the period indicated in the row heading. The right-hand side variables are cumulative growth rates in aggregate MNC sales or in the composition of aggregate MNC sales over the concurrent period.

Appendix Table 2: Host-Country Financial Development

Country	Mean	St Dev	Country	Mean	St Dev	Country	Mean	St Dev
Algeria	0.15	0.16	Guatemala	0.21	0.08	Peru	0.17	0.08
Argentina	0.16	0.05	Guyana	0.43	0.08	Philippines	0.29	0.10
Australia	0.82	0.23	Haiti	0.13	0.02	Poland	0.25	0.09
Austria	0.99	0.10	Honduras	0.35	0.10	Portugal	1.05	0.45
Bahrain	0.41	0.07	Hong Kong	1.43	0.14	Qatar	0.29	0.04
Bangladesh	0.28	0.06	Hungary	0.38	0.14	Russia	0.19	0.12
Belgium	0.71	0.18	Iceland	0.88	0.76	Saudi Arabia	0.26	0.07
Bolivia	0.41	0.13	India	0.30	0.09	Senegal	0.20	0.04
Botswana	0.14	0.04	Indonesia	0.33	0.13	Singapore	0.92	0.12
Brazil	0.35	0.08	Iran	0.21	0.04	Slovakia	0.41	0.07
Bulgaria	0.34	0.22	Ireland	1.01	0.59	Slovenia	0.44	0.22
Cameroon	0.12	0.07	Israel	0.71	0.14	South Africa	0.63	0.10
Canada	0.96	0.24	Italy	0.71	0.18	Spain	1.05	0.42
Chile	0.55	0.12	Jamaica	0.22	0.05	Sri Lanka	0.23	0.08
Colombia	0.30	0.07	Japan	1.49	0.41	Sudan	0.04	0.02
Congo	0.06	0.05	Jordan	0.71	0.12	Sweden	0.69	0.35
Costa Rica	0.22	0.12	Kenya	0.22	0.02	Switzerland	1.61	0.07
Cote D'Ivoire	0.20	0.09	Kuwait	0.47	0.19	Syria	0.09	0.01
Croatia	0.61	0.13	Luxembourg	1.24	0.47	Tanzania	0.09	0.05
Cyprus	1.42	0.36	Malawi	0.07	0.02	Thailand	1.03	0.28
Czech Republic	0.49	0.14	Malaysia	1.09	0.22	Trinidad & Tobago	0.30	0.03
Denmark	0.97	0.70	Malta	0.97	0.15	Tunisia	0.54	0.04
Dominican Rep	0.21	0.05	Mexico	0.19	0.06	Turkey	0.17	0.07
Ecuador	0.23	0.06	Morocco	0.43	0.17	Uganda	0.05	0.02
Egypt	0.38	0.12	Netherlands	1.24	0.43	United Kingdom	1.31	0.30
El Salvador	0.35	0.09	New Zealand	1.05	0.25	Uruguay	0.32	0.15
Finland	0.69	0.14	Norway	0.64	0.09	Venezuela	0.13	0.07
France	0.91	0.09	Oman	0.34	0.04	Vietnam	0.51	0.28
Gabon	0.11	0.04	Pakistan	0.24	0.02	Yemen	0.06	0.01
Germany	1.05	0.10	Panama	0.69	0.18	Zambia	0.07	0.03
Ghana	0.08	0.04	Papua New Guinea	0.18	0.05			
Greece	0.50	0.24	Paraguay	0.22	0.05			
Panel Variation:	0.51	0.44						

Notes: This table summarizes the variation in financial development in the panel, as measured by private credit normalized by GDP. Lebanon is further included in our sample in Table 8, Panel B, where financial development is measured instead by stock market capitalization normalized by GDP.

Appendix Table 3: Tobit, Aggregate Level

Dependent variable:	Local sales	3rd ctry sales	US sales	Local sales	3rd ctry sales	US sales
	Total sales	Total sales	Total sales	Total sales	Total sales	Total sales
	(1)	(2)	(3)	(4)	(5)	(6)
Fin Development	-0.058	0.057	0.060	-0.060	0.055	0.052
	(-2.88)***	(2.15)**	(3.42)***	(-2.92)***	(2.11)**	(3.37)***
Fin Development × Ext Fin Dependence				-0.013	0.008	0.007
				(-3.71)***	(2.13)**	(2.95)***
Controls	Log GDP, Log GDP per capita, Log Distance, Log K/L, Log H/L, Rule of Law, Tax Rate, RTA Dummies, Industry FE, Year FE					
# observations	15,531	15,531	15,531	10,435	10,435	10,435
R-squared	0.37	0.30	0.27	0.42	0.31	0.38

Notes: * p<0.10, ** p<0.05, *** p<0.01; t-statistics based on robust standard errors clustered by country appear in parentheses. The regressions replicate Table 5, but apply Tobit instead of OLS estimation. All regressions include the full set of controls described in Table 3, as well as industry and year fixed effects.

Appendix Table 4: Weighted Least Squares, Affiliate Level

Dependent variable:	Local sales	3rd ctry sales	US sales	Local sales	3rd ctry sales	US sales
	Total sales	Total sales	Total sales	Total sales	Total sales	Total sales
	(1)	(2)	(3)	(4)	(5)	(6)
Fin Development	-0.051	0.032	0.019	-0.046	0.034	0.012
	(-2.56)**	(1.89)*	(2.40)**	(-2.10)**	(1.80)*	(1.34)
Fin Development × Ext Fin Dependence				-0.008	0.004	0.004
				(-3.86)***	(2.39)**	(2.06)**
Controls	Log GDP, Log GDP per capita, Log Distance, Log K/L, Log H/L, Rule of Law, Tax Rate, RTA Dummies, Industry FE, Year FE					
# observations	210,852	210,852	210,852	159,137	159,137	159,137
R-squared	0.16	0.18	0.09	0.16	0.18	0.11

Notes: * p<0.10, ** p<0.05, *** p<0.01; t-statistics based on robust standard errors clustered by country appear in parentheses. The regressions replicate Table 5, but apply Weighted Least Squares instead of OLS estimation, using log total affiliate sales as weights. All regressions include the full set of controls described in Table 3, as well as industry and year fixed effects.

Appendix Table 5: Interacting Financial Development with Other Industry Variables, Aggregate Level

Dependent variable:	Local sales	3rd ctry sales	US sales	Local sales	3rd ctry sales	US sales
	Total sales	Total sales	Total sales	Total sales	Total sales	Total sales
	(1)	(2)	(3)	(4)	(5)	(6)
Fin Development	0.782	-0.702	-0.080	0.088	-0.079	-0.009
	(2.31)**	(-2.41)**	(-0.67)	(0.65)	(-0.73)	(-0.17)
Fin Development ×	-0.013	0.010	0.003	-0.013	0.010	0.003
Ext Fin Dependence	(-3.72)***	(3.07)***	(2.29)**	(-3.70)***	(3.05)***	(2.29)**
Fin Development ×	-0.071	0.062	0.009			
Industry Capital Intensity	(-2.47)**	(2.51)**	(0.87)			
Fin Development ×				-0.140	0.111	0.029
Industry Skill Intensity				(-1.12)	(1.10)	(0.59)
Controls	Log GDP, Log GDP per capita, Log Distance, Log K/L, Log H/L, Rule of Law, Tax Rate, RTA Dummies, Industry FE, Year FE					
# Obs	10,435	10,435	10,435	10,435	10,435	10,435
R^2	0.24	0.25	0.15	0.24	0.25	0.15

Notes: * p<0.10, ** p<0.05, *** p<0.01; t-statistics based on robust standard errors clustered by country appear in parentheses. The regressions replicate columns 4-6 of Table 5 adding: financial development interacted with industry capital intensity, and financial development interacted with industry skill intensity. The measures of capital and skill intensity are computed from the NBER CES Manufacturing Dataset, as the log real capital stock divided by total employment, and log nonproduction workers divided by total employment respectively. All regressions include the full set of controls described in Table 3, as well as industry and year fixed effects.

Appendix Table 6: Interacting Financial Development with Other Firm Variables, Affiliate Level

Dependent variable:	Local sales Total sales	3rd ctry sales Total sales	US sales Total sales	Local sales Total sales	3rd ctry sales Total sales	US sales Total sales	Local sales Total sales	3rd ctry sales Total sales	US sales Total sales
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Fin Development	-0.066	0.020	0.045	-0.048	0.033	0.015	-0.025	0.025	-0.000
	(-0.96)	(0.39)	(1.26)	(-1.96)*	(1.57)	(1.24)	(-0.97)	(1.46)	(-0.02)
Fin Development ×	-0.007	0.003	0.004	-0.007	0.002	0.004	-0.007	0.003	0.003
Ext Fin Dependence	(-3.21)***	(1.87)*	(1.90)*	(-2.86)***	(1.77)*	(1.99)**	(-3.22)***	(1.81)*	(1.84)*
Log Parent Sales	0.012	-0.011	-0.000						
	(2.26)**	(-3.07)***	(-0.13)						
Fin Development ×	0.001	0.001	-0.002						
Log Parent Sales	(0.26)	(0.30)	(-0.83)						
Parent R&D / Sales				-0.017	-0.038	0.055			
				(-0.24)	(-0.62)	(2.41)**			
Fin Development ×				-0.019	0.057	-0.038			
Parent R&D / Sales				(-0.27)	(1.01)	(-1.82)**			
Affiliate Wage							0.000	-0.000	-0.000
							(1.57)	(-1.23)	(-1.23)
Fin Development ×							-0.000	0.000	0.000
Affiliate Wage							(-1.62)	(1.19)	(1.33)
Controls	Log GDP, Log GDP per capita, Log Distance, Log K/L, Log H/L, Rule of Law, Tax Rate, RTA Dummies, Industry FE, Year FE								
# Obs	120,447	120,447	120,447	120,448	120,448	120,448	149,089	149,089	149,089
R^2	0.15	0.17	0.10	0.15	0.17	0.10	0.16	0.18	0.12

Notes: * p<0.10, ** p<0.05, *** p<0.01; t-statistics based on robust standard errors clustered by country appear in parentheses. The regressions replicate columns 4-6 of Table 7 adding: financial development interacted with log parent sales, financial development interacted with parent R&D divided by sales, and financial development interacted with the affiliate average wage compensation per worker. All firm-level variables are calculated from the Bureau of Economic Analysis Survey of U.S. Direct Investment Abroad. All regressions include the full set of controls described in Table 3, as well as industry and year fixed effects.

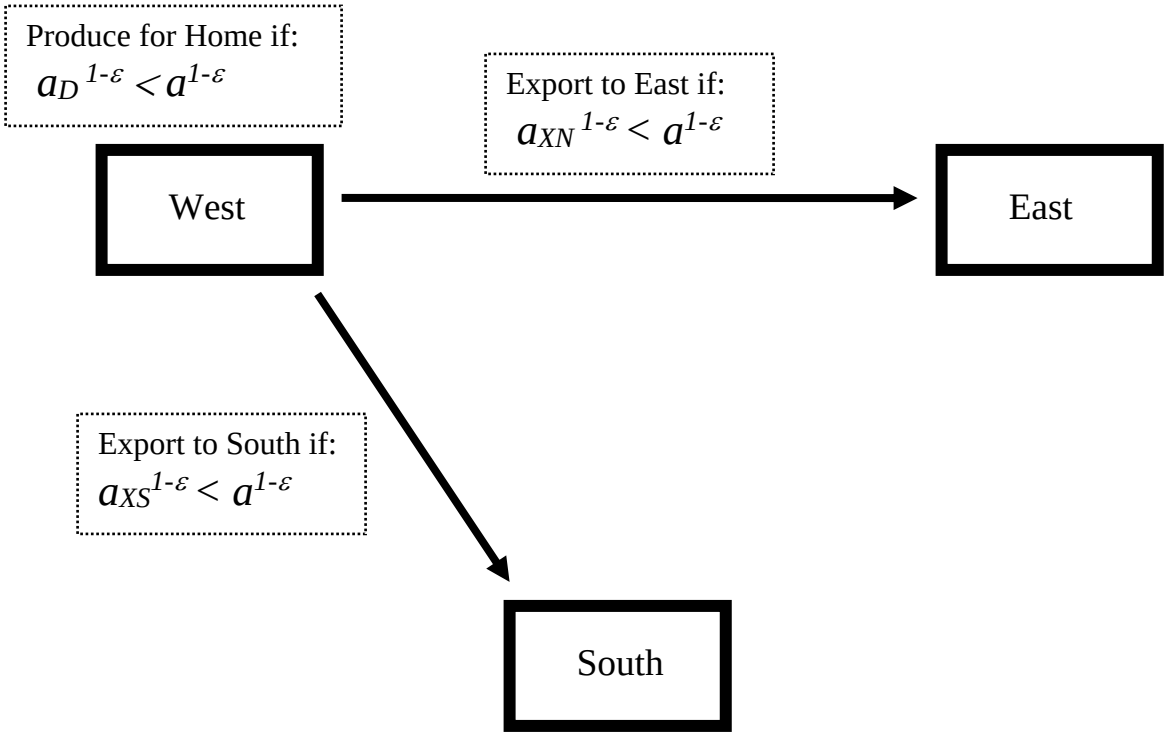
Appendix Table 7: EU vs non-EU Host Countries, Aggregate Level

Dependent variable:	Local sales	3rd ctry sales	US sales	Local sales	3rd ctry sales	US sales
	Total sales	Total sales	Total sales	Total sales	Total sales	Total sales
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: EU host countries						
Fin Development	0.006	-0.014	0.008	0.013	-0.018	0.005
	(0.21)	(-0.54)	(1.40)	(0.45)	(-0.61)	(0.83)
Fin Development × Ext Fin Dependence				-0.015	0.012	0.003
				(-2.92)***	(2.18)**	(1.52)
Controls	Log GDP, Log GDP per capita, Log Distance, Log K/L, Log H/L, Rule of Law, Tax Rate, RTA Dummies, Industry FE, Year FE					
# Obs	6,098	6,098	6,098	4,191	4,191	4,191
R^2	0.32	0.30	0.14	0.31	0.29	0.11
Panel B: Non-EU host countries						
Fin Development	-0.097	0.066	0.030	-0.098	0.071	0.027
	(-3.53)***	(2.60)**	(3.68)***	(-3.58)***	(2.65)***	(3.63)***
Fin Development × Ext Fin Dependence				-0.009	0.007	0.002
				(-2.14)**	(1.87)*	(1.11)
Controls	Log GDP, Log GDP per capita, Log Distance, Log K/L, Log H/L, Rule of Law, Tax Rate, RTA Dummies, Industry FE, Year FE					
# Obs	9,433	9,433	9,433	6,244	6,244	6,244
R^2	0.22	0.21	0.16	0.16	0.22	0.19

Notes: * p<0.10, ** p<0.05, *** p<0.01; t-statistics based on robust standard errors clustered by country appear in parentheses. The regressions replicate columns 4-6 of Table 5 for the EU and non-EU host country sub-samples respectively. All regressions include the full set of controls described in Table 3, as well as industry and year fixed effects.

Figure 1
Modes of Operation (illustrated for Western firms)

If $a^{1-\varepsilon} < a_I{}^{1-\varepsilon}$ (No FDI):



If $a^{1-\varepsilon} > a_I{}^{1-\varepsilon}$ (FDI in South):

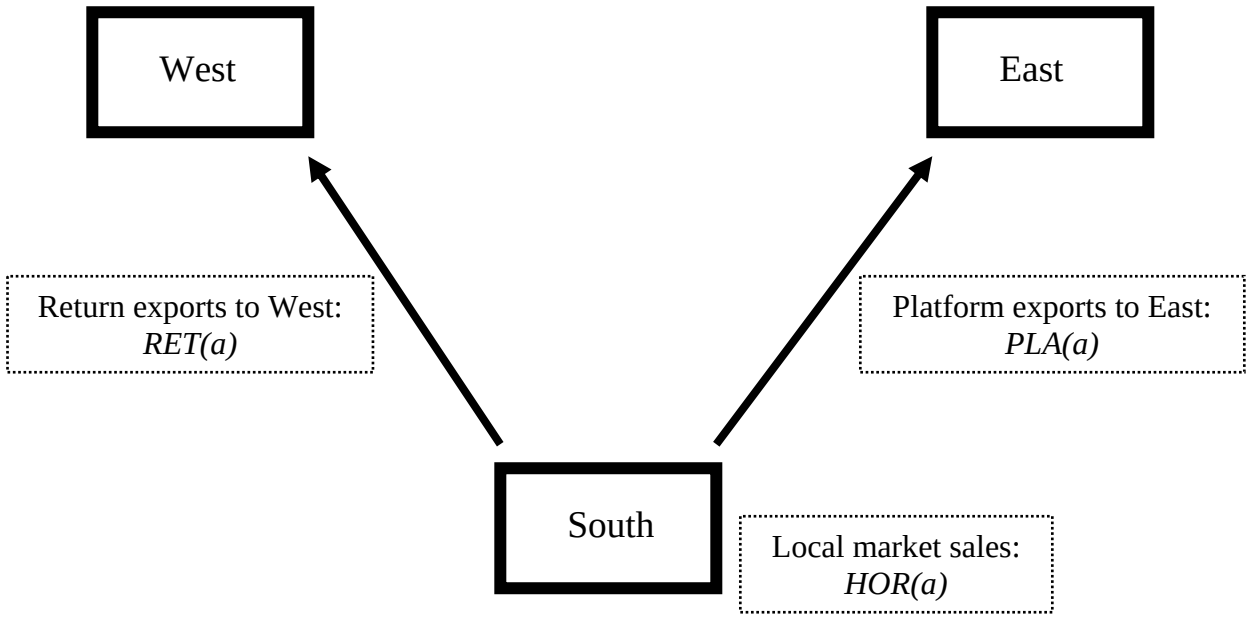
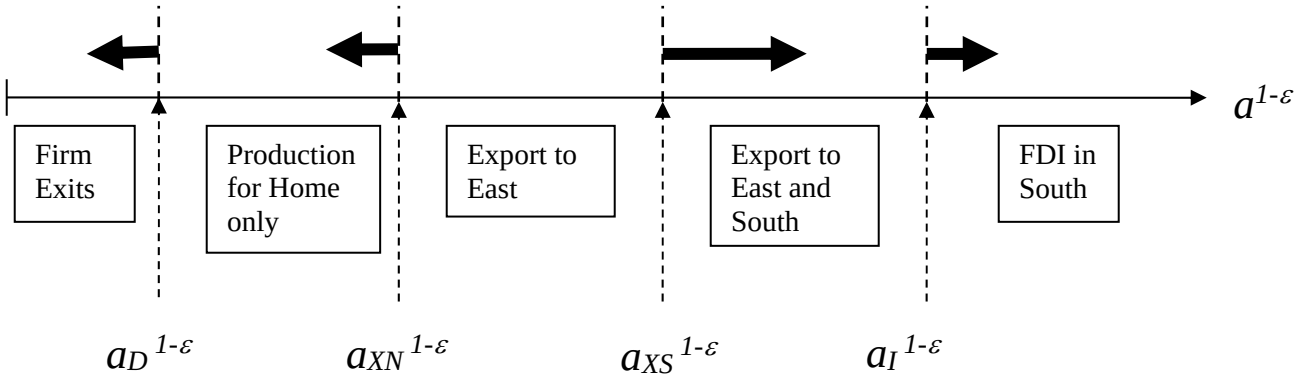


Figure 2
Response of Cutoffs to an Improvement in Southern Financial Development: Competition Effect and Weak or No Financing Effect

In West:



In South:

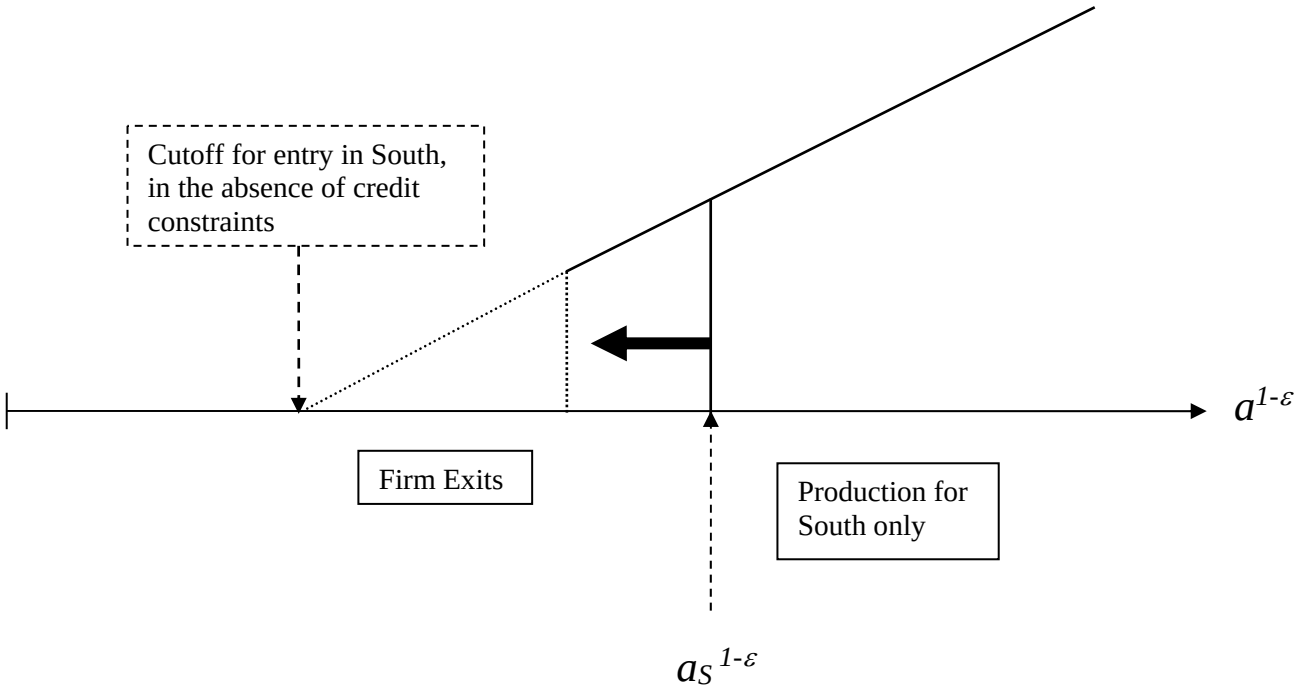


Figure 3
Response of Cutoffs to an Improvement in Southern Financial Development: Competition Effect and Strong Financing Effect

In West:

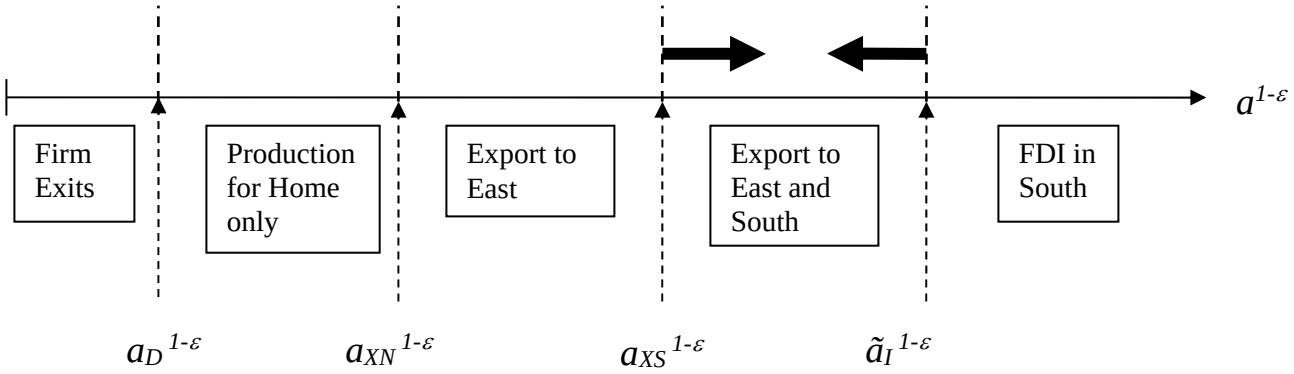


Figure 4a
The Distribution of MNC Affiliates by Active Sales Destinations

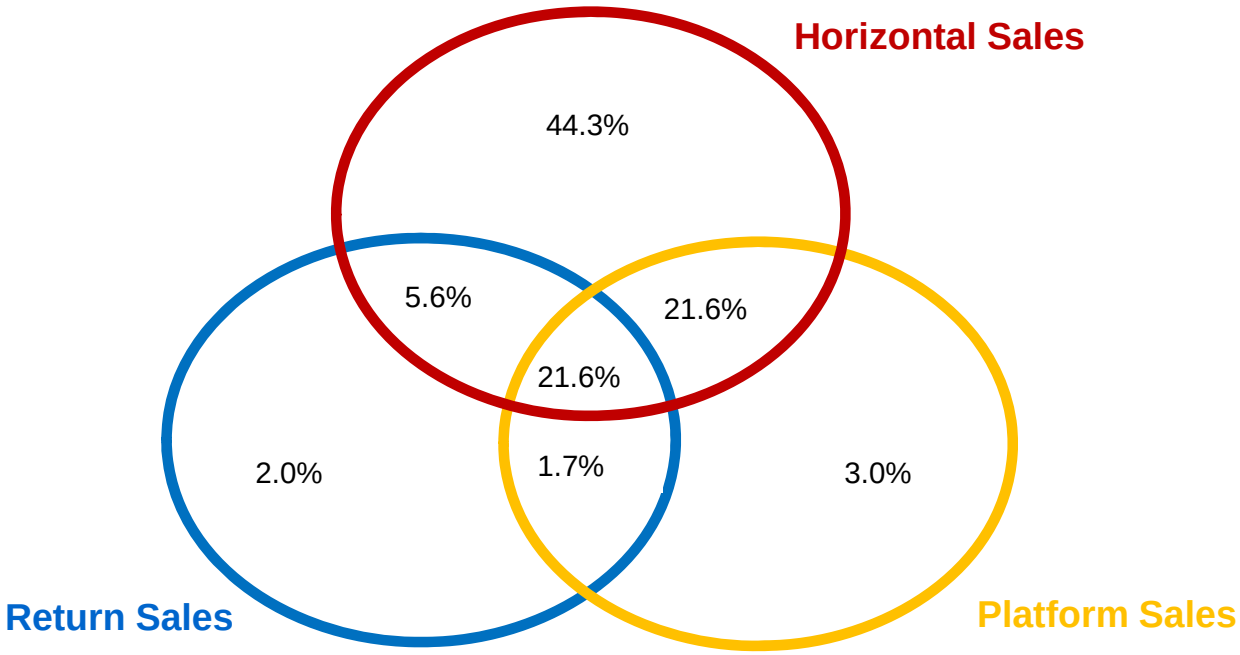
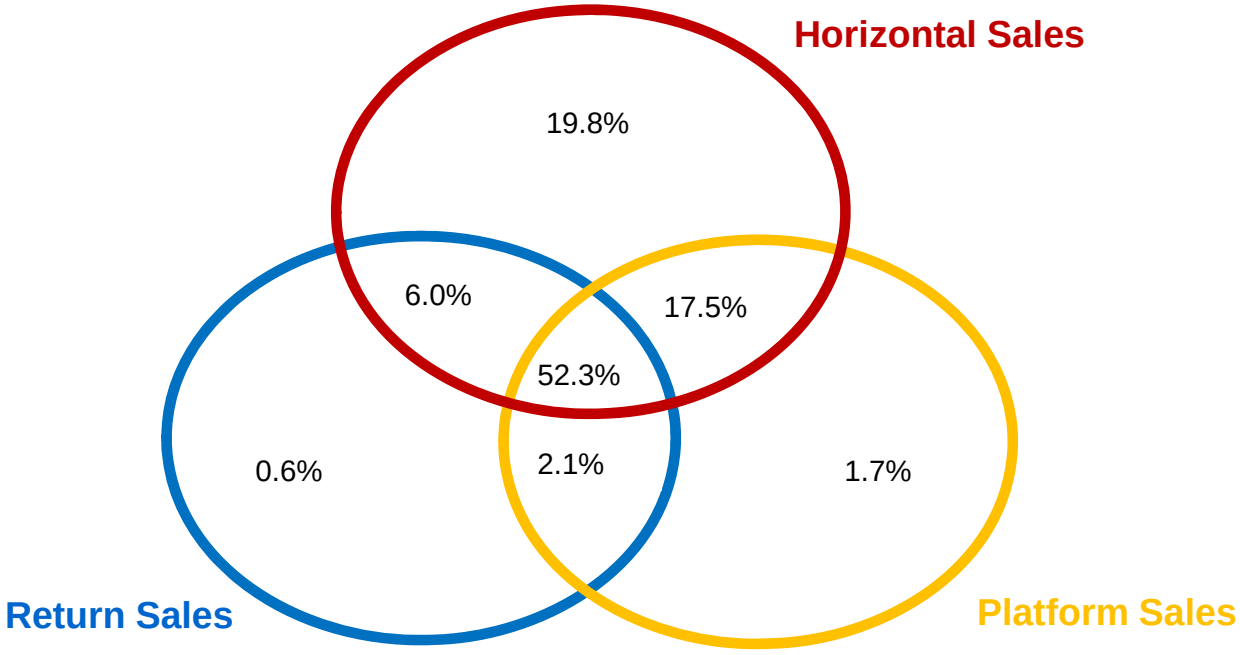
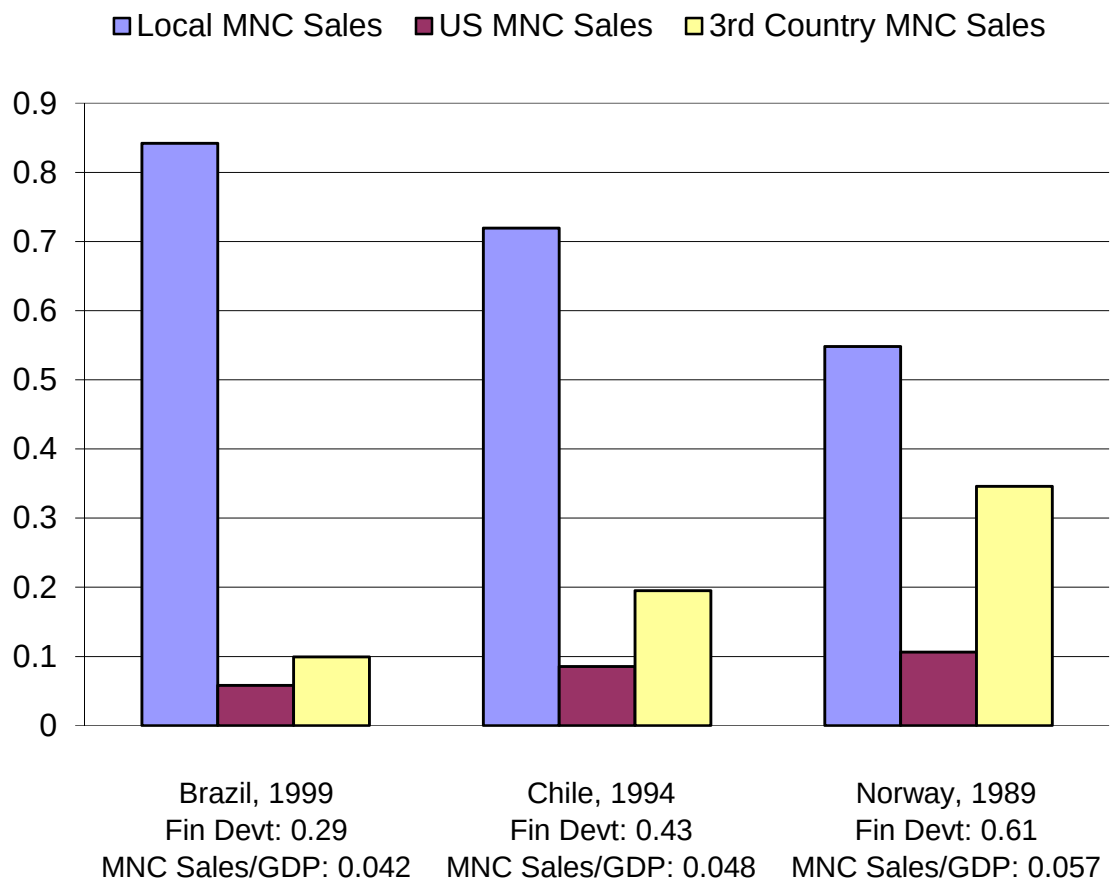


Figure 4b
The Distribution of MNC Affiliate Sales across Destinations



Notes: This figure summarizes the breakdown of multinational firms' affiliate activity by market destination in 1989. Affiliates in the red circle are engaged in horizontal sales; in the blue circle - in return sales to the US; and in the yellow circle - in export-platform sales to third-countries. Affiliates in overlapping segments of the three circles pursue multiple sales destinations. The percentages reported sum to 100%. Each segment reports the percentage share of affiliates active in a given set of destinations (Figure 4a) or the percentage share of total affiliate sales captured by affiliates in that segment (Figure 4b).

Figure 5: An Example
MNC Sales Shares in Host Countries at Different Levels of Financial Development



Notes: This figure illustrates how the level and composition of aggregate MNC affiliate sales vary across three host countries at the 50th, 60th and 75th percentiles of the distribution of financial development. Financial Development is measured by the ratio of private credit to GDP.

Appendix Figure 1: Economic Growth and Multinational Activity, 1989-2009

Figure 1a: Growth in Total MNC Sales

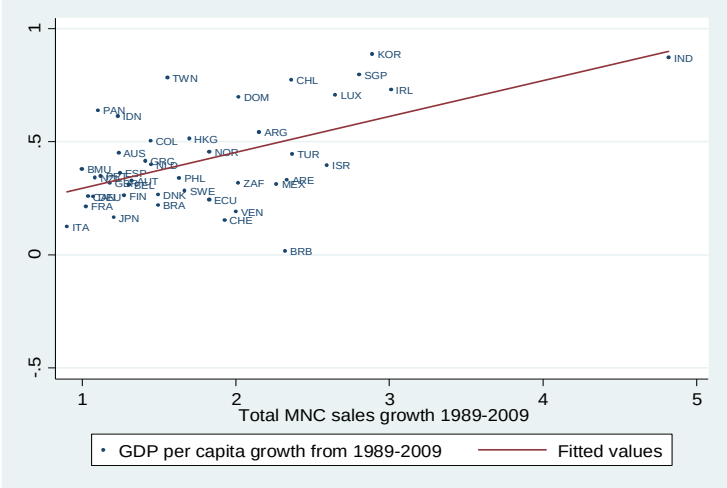


Figure 1b: Growth in the Share of Local MNC Sales

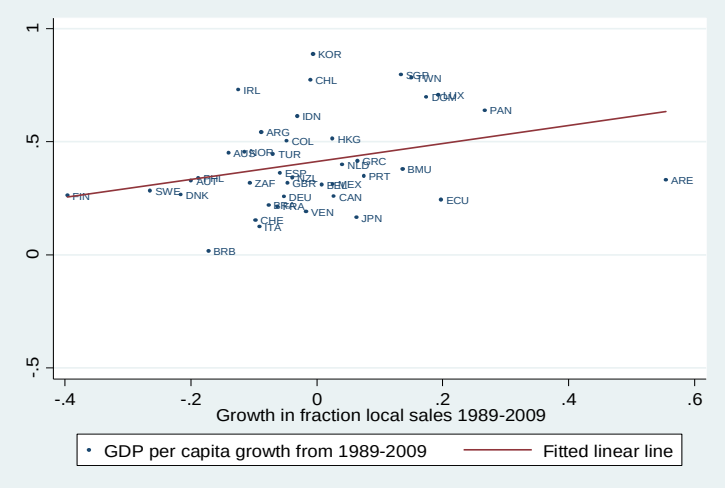


Figure 1c: Growth in the Share of US MNC Sales

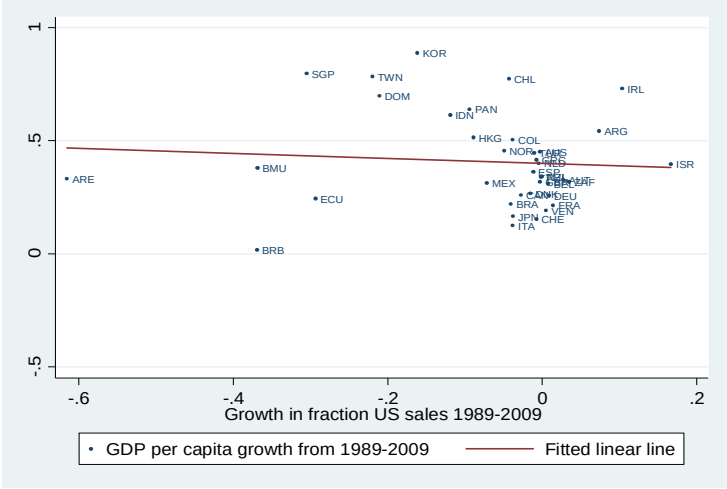
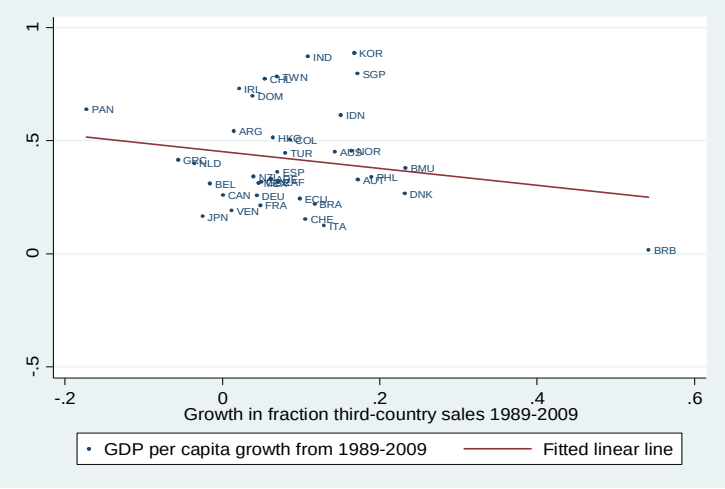


Figure 1d: Growth in the Share of 3-rd Country MNC Sales



Notes: This figure illustrates the relationship between economic growth and growth in aggregate multinational activity from 1989 to 2009 across 44 host countries. Observations are labeled by their country ISO code. Plotted on the vertical axis of each figure is the cumulative growth in GDP per capita. Plotted on the horizontal axis is the cumulative growth in aggregate MNC sales (Figure 1a), as well as the cumulative growth in the shares of aggregate MNC sales sold in the host-country market (Figure 1b), in the US (Figure 1c), and in third-country markets (Figure 1d).