Informal Institutions and Comparative Advantage of South-Based MNEs: Theory and Evidence

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Online Appendix

A Theory Appendix (continued)

This section provides two more generalizations of the benchmark model. The section number continues from the paper's Appendix A.

A.3 Allowing informal institutions to affect marginal cost as well as fixed cost: horizontal FDI

In the benchmark model, we assume that informal institutions affect only fixed costs. Here, we extend the model by allowing them to affect both variable and fixed costs. A firm's productivity is assumed to be determined by both an exogenous component ϕ and an endogenous part $\theta(I)$ that increases with investment in informal institutions. That is, informal institutions help to facilitate production processes and reduce a firm's input requirement. In particular, the profit functions of serving the home market, exporting and FDI are, respectively:

$$\Pi^D \equiv \pi^D - F^D(r_h, I_h) = B_h\tilde{\phi}\,\theta(I_h)(w_h)^{1-\sigma} - F^D(r_h, I_h) \tag{1}$$

$$\Pi^E \equiv \pi^E - F^E(r_d, I_h, I_d) = B_d\tilde{\phi}\,\theta(I_h)(\tau_{hd}w_h)^{1-\sigma} - F^E(r_d, I_h, I_d) \tag{2}$$

$$\Pi^{FDI} \equiv \pi^{FDI} - F^{FDI}(r_d, I_h, I_d) = B_d\tilde{\phi}\,\left(\theta(I_h)^{\eta}\theta(I_d)^{1-\eta}\right)\left((\tau_{hd}w_h)^{\eta}w_d^{1-\eta}\right)^{1-\sigma} - F^{FDI}(r_d, I_h, I_d) \tag{3}$$

where $\theta'(I) > 0$. The fixed costs of serving the home market, exporting and FDI are as in the benchmark model: $F^D(r_h, I_h) \equiv f^D(r_h, I_h) + k_h(I_h)$, $F^E(r_d, I_h, I_d) \equiv f^E(r_d, I_h, I_d) + k_d(I_d)$ and $F^{FDI}(r_d, I_h, I_d) \equiv f^E(r_d, I_h, I_d) + f^P(r_d, I_h, I_d) + k_d(I_d)$. The firms now choose I_h^* that maximizes Π^D to serve the home market, and subsequently $I_d^{E,*}$ and $I_d^{FDI,*}$ that maximize Π^E and Π^{FDI} in the

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case of exporting and horizontal FDI, respectively. Define $F^{D,*}(r_h) \equiv F^D(r_h, I_h^*)$, $F^{E,*}(r_h, r_d) \equiv F^E(r_d, I_h^*, I_d^{E,*})$ and $F^{FDI,*}(r_h, r_d) \equiv F^{FDI}(r_d, I_h^*, I_d^{FDI,*})$.

We repeat the assumptions made in the paper for ease of reference here. It is assumed that $f^D(r_h, I_h)$ strictly increases in r_h; strictly decreases in I_h; and

$$\frac{\partial}{\partial r_h}\left(\frac{\partial f^D(r_h, I_h)}{\partial I_h}\right) < 0. \tag{4}$$

Similarly, $f^S(r_d, I_h, I_d)$ strictly increases in r_d; strictly decreases in I_h and I_d; and

$$\frac{\partial}{\partial r_d}\left(\frac{\partial f^S(r_d, I_h, I_d)}{\partial I_h}\right) < 0; \qquad \frac{\partial}{\partial r_d}\left(\frac{\partial f^S(r_d, I_h, I_d)}{\partial I_d}\right) < 0, \qquad \text{for } S \in \{E, P\}. \tag{5}$$

We assume the neutral scenario that

$$\frac{\partial^2 f^S(r_d, I_h, I_d)}{\partial I_h \partial I_d} = 0, \qquad \text{for } S \in \{E, P\}, \tag{6}$$

so there are no reinforcing effects of r_h on the choice of I_d through I_h.

Proposition A.3.1 *(i) The investment in destination informal institutions will be higher for firms engaging in horizontal FDI than for firms entering the same market by exporting: $I_d^{FDI,*}(r_h, r_d) > I_d^{E,*}(r_h, r_d)$. (ii) The total fixed cost of production will be higher for horizontal FDI than for exporting: $F^{FDI,*}(r_h, r_d) > F^{E,*}(r_h, r_d)$. (iii) The total fixed cost of horizontal FDI will be higher in FDI destinations with poorer institutions: $dF^{FDI,*}/dr_d > 0$. (iv) The total fixed cost of exporting will be higher in destinations with poorer institutions: $dF^{E,*}/dr_d > 0$.*

Proof. (i) The proof is similar to that of the benchmark model in the paper, but with the net profit (instead of the total fixed cost) as the objective function:

$$\begin{aligned}
\frac{\partial \Pi^{FDI}}{\partial I_d}\Big|_{I_d = I_d^{E,*}} &= \frac{\partial \pi^{FDI}}{\partial I_d}\Big|_{I_d = I_d^{E,*}} - \frac{\partial f^E(r_d, I_h^*, I_d^{E,*})}{\partial I_d} - \frac{\partial f^P(r_d, I_h^*, I_d^{E,*})}{\partial I_d} - k_d'(I_d^{E,*}) \\
&> \frac{\partial \pi^{E}}{\partial I_d}\Big|_{I_d = I_d^{E,*}} - \frac{\partial f^E(r_d, I_h^*, I_d^{E,*})}{\partial I_d} - \frac{\partial f^P(r_d, I_h^*, I_d^{E,*})}{\partial I_d} - k_d'(I_d^{E,*}) \\
&= -\frac{\partial f^P(r_d, I_h^*, I_d^{E,*})}{\partial I_d} > 0,
\end{aligned}$$

where the first inequality follows because $\frac{\partial \pi^{FDI}}{\partial I_d} = (1-\eta)\theta'(I_d)\pi^{FDI}/\theta(I_d) > 0$ holds (by the assumption $\theta'(I) > 0$) while $\frac{\partial \pi^E}{\partial I_d} = 0$. The second equality follows from the FOC for $I_d^{E,*}$ and the last inequality follows from the assumption that $f^P(r_d, I_h, I_d)$ strictly decreases in I_d. The positive sign (in the case of profit maximization) implies that $I_d^{E,*} < I_d^{FDI,*}$.

(ii) We can write:

$$
\begin{aligned}
F^{FDI,*} - F^{E,*} &= \left\{ F^{FDI,*} - F^E(r_d, I_h^*, I_d^{FDI,*}) \right\} + \left\{ F^E(r_d, I_h^*, I_d^{FDI,*}) - F^{E,*} \right\} \\
&= f^P(r_d, I_h^*, I_d^{FDI,*}) \\
&+ \left\{ \pi^E(r_h, I_h^*) - \Pi^E(r_h, r_d, I_h^*, I_d^{FDI,*}) \right\} - \left\{ \pi^E(r_h, I_h^*) - \Pi^E(r_h, r_d, I_h^*, I_d^{E,*}) \right\} > 0,
\end{aligned}
$$

where the first equality follows from the definition of the fixed cost and profit functions. In the above expression, $\Pi^E(r_h, r_d, I_h^*, I_d^{E,*}) > \Pi^E(r_h, r_d, I_h^*, I_d^{FDI,*})$ holds by the optimality of $I_d^{E,*}$ (in maximizing the net profit of exporting) and by the fact that $I_d^{FDI,*} \neq I_d^{E,*}$. The last inequality thus follows.

(iii) The derivative of $F^{FDI,*}$ with respect to r_d is:

$$
\frac{dF^{FDI,*}}{dr_d} = \frac{\partial f^E(r_d, I_h^*, I_d^{FDI,*})}{\partial r_d} + \frac{\partial f^P(r_d, I_h^*, I_d^{FDI,*})}{\partial r_d} + \frac{\partial F^{FDI}(r_d, I_h^*, I_d^{FDI,*})}{\partial I_d} \frac{\partial I_d^{FDI,*}}{\partial r_d} > 0,
$$

where the first and second terms are positive by the assumption that $f^S(r_d, I_h, I_d)$ strictly increases in r_d for $S \in \{E, P\}$, and $\frac{\partial I_d^{FDI,*}}{\partial r_d} > 0$ holds as will be shown in Proposition A.3.2. Next, note at $I_d^{FDI,*}$,

$$
\frac{\partial \Pi^{FDI}}{\partial I_d}\Big|_{I_d = I_d^{FDI,*}} = \frac{\partial \pi^{FDI}}{\partial I_d}\Big|_{I_d = I_d^{FDI,*}} - \frac{\partial F^{FDI}(r_d, I_h^*, I_d^{FDI,*})}{\partial I_d} = 0, \tag{7}
$$

where $\frac{\partial \pi^{FDI}}{\partial I_d} > 0$ as shown in the proof of (i) above. This implies $\frac{\partial F^{FDI}(r_d, I_h^*, I_d^{FDI,*})}{\partial I_d} > 0$. The result thus follows.

(iv) The proof is similar to (iii), with:

$$
\frac{dF^{E,*}}{dr_d} = \frac{\partial f^E(r_d, I_h^*, I_d^{E,*})}{\partial r_d} + \frac{\partial F^E(r_d, I_h^*, I_d^{E,*})}{\partial I_d} \frac{\partial I_d^{E,*}}{\partial r_d} > 0,
$$

where the first term is positive by the assumption that $f^E(r_d, I_h, I_d)$ strictly increases in r_d, $\frac{\partial I_d^{E,*}}{\partial r_d} > 0$ holds by Proposition A.3.2, and $\frac{\partial F^E(r_d, I_h^*, I_d^{E,*})}{\partial I_d} = 0$, since

$$
\frac{\partial \Pi^E}{\partial I_d}\Big|_{I_d = I_d^{E,*}} = \frac{\partial \pi^E}{\partial I_d}\Big|_{I_d = I_d^{E,*}} - \frac{\partial F^E(r_d, I_h^*, I_d^{E,*})}{\partial I_d} = 0, \tag{8}
$$

by the definition of $I_d^{E,*}$, and $\frac{\partial \pi^E}{\partial I_d} = 0$. ■

Proposition A.3.2 *(i) Firms based in countries with poorer institutions will invest more in home informal institutions:* $\frac{\partial I^{h,*}(r_h)}{\partial r_h} > 0$. *(ii) Firms exporting to countries with poorer institutions will invest more in destination informal institutions:* $\frac{\partial I_d^{E,*}(r_h, r_d)}{\partial r_d} > 0$. *(iii) Multinational firms undertaking horizontal FDI in countries with poorer institutions will invest more in destination informal* *institutions:* $\frac{\partial I_d^{FDI,*}(r_h,r_d)}{\partial r_d} > 0$. *(iv) As a corollary of (i), firms based in countries with poorer institutions and entering foreign markets will be more effective at reducing their fixed overhead in a given foreign market:* $\frac{dF^E(r_d,I_h^*,I_d^{E,*})}{dr_h} < 0$ *and* $\frac{dF^{FDI}(r_d,I_h^*,I_d^{FDI,*})}{dr_h} < 0$.

Proof. (i) Note at I_h^*:

$$\frac{\partial \Pi^D}{\partial I_h}|_{I_h=I_h^*} = \frac{\partial \pi^D}{\partial I_h}|_{I_h=I_h^*} - \frac{\partial F^D(r_h, I_h^*)}{\partial I_h} = 0. \tag{9}$$

By total differentiation of (9) with respect to r_h and I_h^*, we have:

$$\frac{\partial I_h^*}{\partial r_h} = -\frac{(1-\sigma)\frac{\pi^D}{\theta(I_h^*)\,w_h}\theta'(I_h^*)\omega'(r_h) - \frac{\partial^2 f^D(r_h,I_h^*)}{\partial r_h \partial I_h}}{\frac{\partial^2\Pi^D}{\partial I_h^2}} > 0.$$

The inequality follows because $\theta'(I) > 0 > \omega'(r)$ by the setup, $\frac{\partial^2 f^D(r_h,I_h^*)}{\partial r_h \partial I_h} < 0$ by the assumption in (4), and $\frac{\partial^2\Pi^D}{\partial I_h^2} < 0$ by the SOC for I_h^*.

(ii) By total differentiation of (8) with respect to r_d and $I^{E,*}$, we have:

$$\frac{\partial I_d^{E,*}}{\partial r_d} = -\frac{-\frac{\partial^2 f^E(r_d,I_h^*,I_d^{E,*})}{\partial r_d \partial I_d}}{\frac{\partial^2\Pi^E}{\partial I_d^2}} > 0,$$

by the assumption in (5) and by the SOC for $I_d^{E,*}$.

(iii) By total differentiation of (7) with respect to r_d and $I_d^{FDI,*}$, we have:

$$\frac{\partial I_d^{FDI,*}}{\partial r_d} = -\frac{(1-\eta)^2(1-\sigma)\frac{\pi^{FDI}}{\theta(I_d^{FDI,*})\,w_d}\theta'(I_d^{FDI,*})\omega'(r_d) - \frac{\partial^2 f^E(r_d,I_h^*,I_d^{FDI,*})}{\partial r_d \partial I_d} - \frac{\partial^2 f^P(r_d,I_h^*,I_d^{FDI,*})}{\partial r_d \partial I_d}}{\frac{\partial^2\Pi^{FDI}}{\partial I_d^2}} > 0,$$

since $\theta'(I) > 0 > \omega'(r)$ by the setup, $\frac{\partial^2 f^S(r_d,I_h,I_d)}{\partial r_d \partial I_d} < 0$ for $S \in \{E, P\}$ by the assumption in (5), and $\frac{\partial^2\Pi^{FDI}}{\partial I_d^2} < 0$ by the SOC for $I_d^{FDI,*}$.

(iv) As a corollary,

$$\begin{aligned}
\frac{dF^E(r_d, I_h^*, I_d^{E,*})}{dr_h} &= \frac{\partial f^E(r_d, I_h^*, I_d^{E,*})}{\partial I_h^*}\frac{\partial I_h^*}{\partial r_h} < 0, \\
\frac{dF^{FDI}(r_d, I_h^*, I_d^{FDI,*})}{dr_h} &= \frac{\partial f^E(r_d, I_h^*, I_d^{FDI,*})}{\partial I_h^*}\frac{\partial I_h^*}{\partial r_h} + \frac{\partial f^P(r_d, I_h^*, I_d^{FDI,*})}{\partial I_h^*}\frac{\partial I_h^*}{\partial r_h} < 0,
\end{aligned}$$

by the assumption that $f^S(r_d, I_h, I_d)$ strictly decreases in I_h for $S \in \{E, P\}$, and by Proposition A.3.2(i). ■

For each foreign market, firms choose the entry mode by comparing the difference in profits from horizontal FDI and exporting. Let $\Pi^{\Delta} \equiv \Pi^{FDI} - \Pi^{E}$ denote the difference:

$$\Pi^{\Delta} = B_d \tilde{\phi} \left[\theta(I_h^*)^{\eta} \theta(I_d^{FDI,*})^{1-\eta} (\tau_{hd} w_h)^{\eta(1-\sigma)} (w_d)^{(1-\eta)(1-\sigma)} - \theta(I_h^*)(\tau_{hd} w_h)^{1-\sigma} \right] - \left(F^{FDI,*} - F^{E,*} \right). \tag{10}$$

The difference varies with r_d according to:

$$\frac{\partial \Pi^{\Delta}}{\partial r_d} = \left[(1-\eta) \frac{\pi^{FDI}}{\theta(I_d^{FDI,*})} \theta'(I_d^{FDI,*}) \frac{\partial I_d^{FDI,*}}{\partial r_d} + (1-\eta)(1-\sigma) \frac{\pi^{FDI}}{w_d} \omega'(r_d) \right] - \left[\frac{dF^{FDI,*}}{dr_d} - \frac{dF^{E,*}}{dr_d} \right] \tag{11}$$

where the first bracketed term is positive since $\theta'(I) > 0 > \omega'(r)$ and $\frac{\partial I_d^{FDI,*}}{\partial r_d} > 0$ by Proposition A.3.2. The sign of the second term depends on functional form assumptions about the importance of plant-level fixed cost f^P (incurred only under FDI) relative to distribution fixed cost f^E (incurred in both entry modes), as discussed in the paper. The cross derivative of the profit differential with respect to r_h and r_d is then:

$$\begin{aligned} \frac{\partial^2 \Pi^{\Delta}}{\partial r_h \partial r_d} = & \left[\eta(1-\eta) \frac{\pi^{FDI}}{\theta(I_h^*)\theta(I_d^{FDI,*})} \theta'(I_h^*) \theta'(I_d^{FDI,*}) \frac{\partial I_h^*}{\partial r_h} \frac{\partial I_d^{FDI,*}}{\partial r_d} \right. \\ & + \eta(1-\eta)(1-\sigma) \frac{\pi^{FDI}}{w_h \theta(I_d^{FDI,*})} \omega'(r_h) \theta'(I_d^{FDI,*}) \frac{\partial I_d^{FDI,*}}{\partial r_d} \\ & \left. + \eta(1-\eta)(1-\sigma) \frac{\pi^{FDI}}{\theta(I_h^*) w_d} \theta'(I_h^*) \omega'(r_d) \frac{\partial I_h^*}{\partial r_h} + \eta(1-\eta)(1-\sigma)^2 \frac{\pi^{FDI}}{w_h w_d} \omega'(r_h) \omega'(r_d) \right] \\ & - \left[\frac{\partial^2 F^{FDI,*}}{\partial r_h \partial r_d} - \frac{\partial^2 F^{E,*}}{\partial r_h \partial r_d} \right], \end{aligned} \tag{12}$$

where the terms in the first bracket are positive. Thus, the variable profit differential between FDI and exporting in destinations with higher r_d is larger for firms based in countries with higher r_h. The second bracketed term regarding the cross derivative of fixed cost differential with respect to r_h and r_d is negative, as shown in the paper. This reinforces the complementarity of r_h and r_d in variable profit difference between FDI and exporting in (12). The key proposition thus follows:

Proposition A.3.3 *(i)* **(Complementarity of Institutional Qualities in Firm-level Horizontal FDI)** *All else being equal, a firm will more likely choose to undertake horizontal FDI instead of exporting to serve a foreign market with poorer institutional qualities, the poorer the institutional quality at home is:* $\frac{\partial^2 \Pi^{\Delta}}{\partial r_h \partial r_d} > 0$. *(ii) All else being equal, a firm will more likely choose to undertake horizontal FDI instead of exporting to serve a foreign market with poorer institutional qualities, the more productive the firm is:* $\frac{\partial^2 \Pi^{\Delta}}{\partial \tilde{\phi} \partial r_d} > 0$. *(iii) All else being equal, a firm will more likely choose to undertake horizontal FDI instead of exporting to serve a foreign market with poorer institutional qualities, the larger the destination market demand is:* $\frac{\partial^2 \Pi^{\Delta}}{\partial B_d \partial r_d} > 0$. *(iv) All else being equal, a firm will more likely choose to undertake horizontal FDI instead of exporting to serve a foreign market with poorer institutional qualities, the less headquarters-intensive the sector is:* $\frac{\partial^2 \Pi^{\Delta}}{\partial \eta \partial r_d} < 0$.

Proof. (i) This follows from the derivations above.

(ii) By total differentiation of (11) with respect to $\tilde{\phi}$, we have:

$$\frac{\partial^2 \Pi^{\Delta}}{\partial \tilde{\phi} \partial r_d} = (1-\eta) \frac{\pi^{FDI}}{\tilde{\phi}\theta(I_d^{FDI,*})} \theta'(I_d^{FDI,*}) \frac{\partial I_d^{FDI,*}}{\partial r_d} + (1-\eta)(1-\sigma) \frac{\pi^{FDI}}{\tilde{\phi} w_d} \omega'(r_d) > 0, \tag{13}$$

since $\theta'(I) > 0 > \omega'(r)$, $\sigma > 1$, and $\frac{\partial I_d^{FDI,*}}{\partial r_d} > 0$ by Proposition A.3.2.

(iii) It is straightforward to see that B_d has an analogous (positive) effect on $\frac{\partial \Pi^{\Delta}}{\partial r_d}$ as $\tilde{\phi}$, because B_d and $\tilde{\phi}$ enter the profit function multiplicatively.

(iv) Finally, we have:

$$\begin{aligned} \frac{\partial^2 \Pi^{\Delta}}{\partial \eta \partial r_d} \quad = \quad & \left[(1-\eta) \ln \left\{ \frac{\theta(I_h^*)}{\theta(I_d^{FDI,*})} \left(\frac{\tau_{hd} w_h}{w_d} \right)^{(1-\sigma)} \right\} - 1 \right] (\pi^{FDI}/\theta(I_d^{FDI,*}))\theta'(I_d^{FDI,*}) \frac{\partial I_d^{FDI,*}}{\partial r_d} \\ & + (1-\sigma) \left[(1-\eta) \ln \left\{ \frac{\theta(I_h^*)}{\theta(I_d^{FDI,*})} \left(\frac{\tau_{hd} w_h}{w_d} \right)^{(1-\sigma)} \right\} - 1 \right] (\pi^{FDI}/w_d)\omega'(r_d) < 0, \end{aligned} \tag{14}$$

for $\left(\frac{\theta(I_h^*)}{\theta(I_d^{FDI,*})} \right)^{1-\eta} \left(\frac{\tau_{hd} w_h}{w_d} \right)^{(1-\eta)(1-\sigma)} < 1$, which is necessary if FDI is the chosen entry mode instead of exporting (because the FDI variable profit must be larger than exporting in order to compensate for the higher FDI fixed costs as shown in Proposition A.3.1(ii)). ■

A.4 Allowing informal institutions to affect marginal cost as well as fixed cost: vertical FDI

In this section, we extend the model of vertical FDI developed in Appendix A.2 of the paper and further allow informal institutions to affect both fixed and variable costs. To recap, a firm's productivity is assumed to be determined by both an exogenous component ϕ and an endogenous part $\theta(I)$ that increases with investment in informal institutions. That is, informal institutions help to facilitate production processes and reduce a firm's input requirement. If a firm chooses to produce both headquarters and intermediate components at home, it incurs a fixed overhead cost $f^D(r_h, I_h)$. If it chooses to produce the intermediate component in a country different from where it is headquartered, it incurs an *additional* overhead cost $f^{FDI}(r_d, I_h, I_d)$, where the level of informal institutions that the firm builds at home affects (to some extent) its fixed operating cost in the host country. We make the same assumptions about $f^D(r_h, I_h)$ as in Appendix A.3. In addition, assume that $f^{FDI}(r_d, I_h, I_d)$ strictly increases in r_d; strictly decreases in I_h and I_d; and

$$\frac{\partial}{\partial r_d} \left(\frac{\partial f^{FDI}(r_d, I_h, I_d)}{\partial I_h} \right) < 0; \qquad \frac{\partial}{\partial r_d} \left(\frac{\partial f^{FDI}(r_d, I_h, I_d)}{\partial I_d} \right) < 0. \tag{15}$$

We develop the analysis under the neutral scenario that

$$\frac{\partial^2 f^{FDI}(r_d, I_h, I_d)}{\partial I_h \partial I_d} = 0, \tag{16}$$

so there are no reinforcing effects of r_h on the choice of I_d through I_h.

Given the setup, the profit functions of domestic production and FDI are, respectively:

$$
\begin{aligned}
\Pi^{D} &\equiv \pi^{D} - F^{D}(r_h, I_h) = B\tilde{\phi}\,\theta(I_h)\,(w_h)^{1-\sigma} - F^{D}(r_h, I_h), &(17)\\
\Pi^{FDI} &\equiv \pi^{FDI} - F^{FDI}(r_h, r_d, I_h, I_d) = B\tilde{\phi}\,\theta(I_h)^{\eta}\theta(I_d)^{1-\eta}\left(w_h^{\eta}w_d^{1-\eta}\right)^{1-\sigma} - F^{FDI}(r_h, r_d, I_h, I_d), &(18)
\end{aligned}
$$

where $\theta'(I) > 0$, and the fixed costs of local production and FDI are as defined in Appendix A.2 of the paper: $F^{D}(r_h, I_h) \equiv f^{D}(r_h, I_h) + k_h(I_h)$, and $F^{FDI}(r_h, r_d, I_h, I_d) \equiv f^{D}(r_h, I_h) + f^{FDI}(r_d, I_h, I_d) + k_h(I_h) + k_d(I_d)$. Firms choose $I_h^{D,*}$ to maximize the profit of local production, and $I_h^{FDI,*}$ and $I_d^{FDI,*}$ to maximize the profit of multinational production, respectively. The first order conditions for $I_h^{FDI,*}$ and $I_d^{FDI,*}$ are, respectively:

$$
\begin{aligned}
\frac{\partial \pi^{FDI}(r_h, r_d, I_h^{FDI,*}, I_d^{FDI,*})}{\partial I_h} - \frac{\partial f^{D}(r_h, I_h^{FDI,*})}{\partial I_h} - \frac{\partial f^{FDI}(r_d, I_h^{FDI,*}, I_d^{FDI,*})}{\partial I_h} - k_h'(I_h^{FDI,*}) &= 0, &(19)\\
\frac{\partial \pi^{FDI}(r_h, r_d, I_h^{FDI,*}, I_d^{FDI,*})}{\partial I_d} - \frac{\partial f^{FDI}(r_d, I_h^{FDI,*}, I_d^{FDI,*})}{\partial I_d} - k_d'(I_d^{FDI,*}) &= 0. &(20)
\end{aligned}
$$

In this setup, the two rankings: $I_h^{FDI,*}(r_h, r_d) > I_h^{D,*}(r_h)$ and $F^{FDI,*}(r_h, r_d) > F^{D,*}(r_h)$, as suggested in Proposition A.2.1(i)–(ii), do not always hold. The paper's key propositions, however, do not depend on these two conditions. We thus omit them from the discussions below.[1]

Proposition A.4.1 *(i) The total fixed cost of multinational production will be higher in FDI destinations with poorer institutions: $dF^{FDI,*}/dr_d > 0$. (ii) For a given FDI destination, the total fixed cost of multinational production will be higher for MNEs based in countries with poorer institutions: $dF^{FDI,*}/dr_h > 0$.*

Proof. (i) The derivative of $F^{FDI,*}$ with respect to r_d is:

$$
\begin{aligned}
\frac{dF^{FDI,*}}{dr_d} &= \frac{\partial f^{FDI}(r_d, I_h^{FDI,*}, I_d^{FDI,*})}{\partial r_d}\\
&+ \frac{\partial F^{FDI}(r_h, r_d, I_h^{FDI,*}, I_d^{FDI,*})}{\partial I_h}\frac{\partial I_h^{FDI,*}}{\partial r_d} + \frac{\partial F^{FDI}(r_h, r_d, I_h^{FDI,*}, I_d^{FDI,*})}{\partial I_d}\frac{\partial I_d^{FDI,*}}{\partial r_d}\\
&= \frac{\partial f^{FDI}(r_d, I_h^{FDI,*}, I_d^{FDI,*})}{\partial r_d}\\
&+ \frac{\partial \pi^{FDI}(r_h, r_d, I_h^{FDI,*}, I_d^{FDI,*})}{\partial I_h}\frac{\partial I_h^{FDI,*}}{\partial r_d} + \frac{\partial \pi^{FDI}(r_h, r_d, I_h^{FDI,*}, I_d^{FDI,*})}{\partial I_d}\frac{\partial I_d^{FDI,*}}{\partial r_d} > 0,
\end{aligned}
$$

where the second equality follows from the FOCs for $I_h^{FDI,*}$ and $I_d^{FDI,*}$ in (19) and (20), respectively.

[1] A sufficient condition for $F^{FDI,*} > F^{D,*}$ to hold is $I_h^{FDI,*} > I_h^{D,*}$. This condition does not necessarily hold in the current setup due to two countervailing mechanisms. On one hand, firms have stronger incentives to build more I_h in the case of multinational production than if engaging only in local production, because in the former case I_h can be used to reduce both fixed costs of production at home and in the FDI destination. On the other hand, the incentives to build I_h are weakened in the case of multinational production, because the increase in firm productivity $\theta(I_h)$ matters only for the headquarters input (which is a fraction η of the production process), while it matters for the whole production process in the case of local production.

The sign follows by: the assumption that $f^{FDI}(r_d, I_h, I_d)$ strictly increases in r_d; the fact that $\frac{\partial \pi^{FDI}}{\partial I_h} > 0$ and $\frac{\partial \pi^{FDI}}{\partial I_d} > 0$ since $\theta'(I) > 0$; and the result that $\frac{\partial I_h^{FDI,*}}{\partial r_d} > 0$ and $\frac{\partial I_d^{FDI,*}}{\partial r_d} > 0$ as will be shown in Proposition A.4.2.

(ii) Similarly, we have:

$$\begin{aligned}
\frac{dF^{FDI,*}}{dr_h} &= \frac{\partial f^D(r_h, I_h^{FDI,*})}{\partial r_h} \\
&+ \frac{\partial F^{FDI}(r_h, r_d, I_h^{FDI,*}, I_d^{FDI,*})}{\partial I_h} \frac{\partial I_h^{FDI,*}}{\partial r_h} + \frac{\partial F^{FDI}(r_h, r_d, I_h^{FDI,*}, I_d^{FDI,*})}{\partial I_d} \frac{\partial I_d^{FDI,*}}{\partial r_h} \\
&= \frac{\partial f^D(r_h, I_h^{FDI,*})}{\partial r_h} \\
&+ \frac{\partial \pi^{FDI}(r_h, r_d, I_h^{FDI,*}, I_d^{FDI,*})}{\partial I_h} \frac{\partial I_h^{FDI,*}}{\partial r_h} + \frac{\partial \pi^{FDI}(r_h, r_d, I_h^{FDI,*}, I_d^{FDI,*})}{\partial I_d} \frac{\partial I_d^{FDI,*}}{\partial r_h} > 0,
\end{aligned}$$

where the second equality follows from the FOCs for $I_h^{FDI,*}$ and $I_d^{FDI,*}$ in (19) and (20), respectively. The sign follows by: the assumption that $f^D(r_h, I_h)$ strictly increases in r_h; the fact that $\frac{\partial \pi^{FDI}}{\partial I_h} > 0$ and $\frac{\partial \pi^{FDI}}{\partial I_d} > 0$ since $\theta'(I) > 0$; and the result that $\frac{\partial I_h^{FDI,*}}{\partial r_h} > 0$ and $\frac{\partial I_d^{FDI,*}}{\partial r_h} > 0$ as will be shown in Proposition A.4.2. ■

Proposition A.4.2 *(i) Multinational firms headquartered in countries with poorer institutions will invest more in informal institutions:* $\frac{\partial I_h^{FDI,*}(r_h,r_d)}{\partial r_h} > 0$ *and* $\frac{\partial I_d^{FDI,*}(r_h,r_d)}{\partial r_h} > 0$*. As a corollary, multinational firms headquartered in countries with poorer institutions will be more effective at reducing their fixed overhead in a given FDI destination:* $\frac{df^{FDI}(r_d,I_h^{FDI,*},I_d^{FDI,*})}{dr_h} < 0$*. (ii) Multinational firms undertaking FDI in countries with poorer institutions will also invest more in informal institutions:* $\frac{\partial I_h^{FDI,*}(r_h,r_d)}{\partial r_d} > 0$ *and* $\frac{\partial I_d^{FDI,*}(r_h,r_d)}{\partial r_d} > 0$*.*

Proof. (i) By total differentiation of (19) with respect to r_h and $I_h^{FDI,*}$, we have:

$$\frac{\partial I_h^{FDI,*}}{\partial r_h} = -\frac{\frac{\partial^2 \pi^{FDI}}{\partial r_h \partial I_h} - \frac{\partial^2 f^D(r_h, I_h^{FDI,*})}{\partial r_h \partial I_h}}{\frac{\partial^2 \Pi^{FDI}}{\partial I_h^2}} > 0.$$

The inequality follows because: $\frac{\partial^2 \pi^{FDI}}{\partial r_h \partial I_h} = \eta^2(1-\sigma)\frac{\pi^{FDI}}{\theta(I_h) w_h}\theta'(I_h)\omega'(r_h) > 0$; $\frac{\partial^2 f^D(r_h, I_h^{FDI,*})}{\partial r_h \partial I_h} < 0$ by the assumption in (4); and $\frac{\partial^2 \Pi^{FDI}}{\partial I_h^2} < 0$ by the SOC for $I_h^{FDI,*}$. Similarly, by total differentiation of (20) with respect to r_h and $I_d^{FDI,*}$, we have:

$$\frac{\partial I_d^{FDI,*}}{\partial r_h} = -\frac{\frac{\partial^2 \pi^{FDI}}{\partial r_h \partial I_d}}{\frac{\partial^2 \Pi^{FDI}}{\partial I_d^2}} > 0.$$

The inequality follows because: $\frac{\partial^2 \pi^{FDI}}{\partial r_h \partial I_d} = \eta(1-\eta)(1-\sigma)\frac{\pi^{FDI}}{\theta(I_d) w_h}\theta'(I_d)\omega'(r_h) > 0$; and $\frac{\partial^2 \Pi^{FDI}}{\partial I_d^2} < 0$

by the SOC for $I_d^{FDI,*}$. As a corollary,

$$\frac{df^{FDI}(r_d, I_h^{FDI,*}, I_d^{FDI,*})}{dr_h} = \frac{\partial f^{FDI}(r_d, I_h^{FDI,*}, I_d^{FDI,*})}{\partial I_h}\frac{\partial I_h^{FDI,*}}{\partial r_h} + \frac{\partial f^{FDI}(r_d, I_h^{FDI,*}, I_d^{FDI,*})}{\partial I_d}\frac{\partial I_d^{FDI,*}}{\partial r_h} < 0$$

by the assumption that $f^{FDI}(r_d, I_h, I_d)$ decreases in I_h and I_d, and the previous result: $\frac{\partial I_h^{FDI,*}}{\partial r_h} > 0$ and $\frac{\partial I_d^{FDI,*}}{\partial r_h} > 0$.

(ii) By total differentiation of (19) with respect to r_d and $I_h^{FDI,*}$, we have:

$$\frac{\partial I_h^{FDI,*}}{\partial r_d} = -\frac{\frac{\partial^2 \pi^{FDI}}{\partial r_d \partial I_h} - \frac{\partial^2 f^{FDI}(r_d, I_h^{FDI,*}, I_d^{FDI,*})}{\partial r_d \partial I_h}}{\frac{\partial^2 \Pi^{FDI}}{\partial I_h^2}} > 0.$$

The inequality follows because: $\frac{\partial^2 \pi^{FDI}}{\partial r_d \partial I_h} = \eta(1-\eta)(1-\sigma)\frac{\pi^{FDI}}{\theta(I_h)w_d}\theta'(I_h)\omega'(r_d) > 0$; $\frac{\partial^2 f^{FDI}(r_d, I_h^{FDI,*}, I_d^{FDI,*})}{\partial r_d \partial I_h} < 0$ by the assumption in (15); and $\frac{\partial^2 \Pi^{FDI}}{\partial I_h^2} < 0$ by the SOC for $I_h^{FDI,*}$. Similarly, by total differentiation of (20) with respect to r_d and $I_d^{FDI,*}$, we have:

$$\frac{\partial I_d^{FDI,*}}{\partial r_d} = -\frac{\frac{\partial^2 \pi^{FDI}}{\partial r_d \partial I_d} - \frac{\partial^2 f^{FDI}(r_d, I_h^{FDI,*}, I_d^{FDI,*})}{\partial r_d \partial I_d}}{\frac{\partial^2 \Pi^{FDI}}{\partial I_d^2}} > 0.$$

The inequality follows because: $\frac{\partial^2 \pi^{FDI}}{\partial r_d \partial I_d} = (1-\eta)^2(1-\sigma)\frac{\pi^{FDI}}{\theta(I_d)w_d}\theta'(I_d)\omega'(r_d) > 0$; $\frac{\partial^2 f^{FDI}(r_d, I_h^{FDI,*}, I_d^{FDI,*})}{\partial r_d \partial I_d} < 0$ by the assumption in (15); and $\frac{\partial^2 \Pi^{FDI}}{\partial I_d^2} < 0$ by the SOC for $I_d^{FDI,*}$. ■

A firm's net profit from local production given the optimal choice of $I_h^{D,*}$ and net profit from FDI given the optimal choice of $I_h^{FDI,*}$ and $I_d^{FDI,*}$ are, respectively:

$$\begin{aligned}
\Pi^{D,*} &\equiv \pi^{D,*} - F^D(r_h, I_h^{D,*}) = B\tilde{\phi}\,\theta(I_h^{D,*})\,(w_h)^{1-\sigma} - F^D(r_h, I_h^{D,*}), && (21)\\
\Pi^{FDI,*} &\equiv \pi^{FDI,*} - F^{FDI}(r_h, r_d, I_h^{FDI,*}, I_d^{FDI,*}) \\
&= B\tilde{\phi}\,\theta(I_h^{FDI,*})^{\eta}\ \theta(I_d^{FDI,*})^{1-\eta}\left(w_h^{\eta}w_d^{1-\eta}\right)^{1-\sigma} - F^{FDI}(r_h, r_d, I_h^{FDI,*}, I_d^{FDI,*}). && (22)
\end{aligned}$$

Among possible destinations of FDI, firms take into account the lower wages but higher fixed costs associated with poorer institutions, and choose r_d that maximizes (22). The FOC for the optimal choice r_d^* requires that at r_d^*:

$$\frac{\partial \pi^{FDI,*}}{\partial w_d}\omega'(r_d) - \frac{\partial f^{FDI}(r_d, I_h^{FDI,*}, I_d^{FDI,*})}{\partial r_d} = 0, \tag{23}$$

by the envelope theorem, where $\frac{\partial \Pi^{FDI,*}}{\partial I_h}\frac{\partial I_h^{FDI,*}}{\partial r_d} + \frac{\partial \Pi^{FDI,*}}{\partial I_d}\frac{\partial I_d^{FDI,*}}{\partial r_d} = 0$.

Proposition A.4.3 *(i)* **(Complementarity of Institutional Qualities in Firm-level Vertical FDI)** *All else being equal, a firm will choose to undertake FDI in countries with poorer* *institutional qualities, the poorer the institutional quality at home is:* $\frac{\partial r_d^*}{\partial r_h} > 0$*. (ii) All else being equal, a firm will choose to undertake FDI in countries with poorer institutional qualities, the more productive the firm is:* $\frac{\partial r_d^*}{\partial \tilde{\phi}} > 0$*. (iii) All else being equal, a firm will choose to undertake FDI in countries with poorer institutional qualities, the larger the world demand for the sector is:* $\frac{\partial r_d^*}{\partial B} > 0$*.*

Proof. (i) By totally differentiating (23) with respect to r_d^* and r_h, we obtain:

$$\begin{aligned}\frac{\partial r_d^*}{\partial r_h} &= -\frac{\frac{\partial^2 \pi^{FDI,*}}{\partial w_h \partial w_d}\omega'(r_h)\omega'(r_d) + \frac{\partial^2 \pi^{FDI,*}}{\partial \theta(I_h)\partial w_d}\theta'(I_h)\omega'(r_d)\frac{\partial I_h^{FDI,*}}{\partial r_h} + \frac{\partial^2 \pi^{FDI,*}}{\partial \theta(I_d)\partial w_d}\theta'(I_d)\omega'(r_d)\frac{\partial I_d^{FDI,*}}{\partial r_h}}{\frac{\partial^2 \Pi^{FDI,*}}{\partial r_d^2}} \\ &\quad -\frac{-\frac{\partial^2 f^{FDI}}{\partial r_d \partial I_h}\frac{\partial I_h^{FDI,*}}{\partial r_h} - \frac{\partial^2 f^{FDI}}{\partial r_d \partial I_d}\frac{\partial I_d^{FDI,*}}{\partial r_h}}{\frac{\partial^2 \Pi^{FDI,*}}{\partial r_d^2}} > 0. \end{aligned} \tag{24}$$

The inequality holds because: $\frac{\partial^2 \pi^{FDI,*}}{\partial w_h \partial w_d} > 0$ by the Cobb-Douglas functional form of π^{FDI}; $\frac{\partial^2 \pi^{FDI,*}}{\partial \theta(I_h)\partial w_d} < 0$, $\theta'(I) > 0 > \omega'(r)$, and $\frac{\partial I_h^{FDI,*}}{\partial r_h} > 0$ by Proposition A.4.2; $\frac{\partial^2 \pi^{FDI,*}}{\partial \theta(I_d)\partial w_d} < 0$, $\theta'(I) > 0 > \omega'(r)$, and $\frac{\partial I_d^{FDI,*}}{\partial r_h} > 0$ by Proposition A.4.2; $\frac{\partial^2 f^{FDI}}{\partial r_d \partial I_h} < 0$ and $\frac{\partial^2 f^{FDI}}{\partial r_d \partial I_d} < 0$ by the assumption in (15); and $\frac{\partial^2 \Pi^{FDI,*}}{\partial r_d^2} < 0$ by the SOC for r_d^*.

(ii) Similarly, by total differentiation of (23) with respect to r_d^* and $\tilde{\phi}$, we have:

$$\frac{\partial r_d^*}{\partial \tilde{\phi}} = -\frac{\frac{\partial^2 \pi^{FDI,*}}{\partial \tilde{\phi} \partial w_d}\omega'(r_d)}{\frac{\partial^2 \Pi^{FDI,*}}{\partial r_d^2}} > 0, \tag{25}$$

because $\frac{\partial^2 \pi^{FDI,*}}{\partial \tilde{\phi} \partial w_d} = (1-\eta)(1-\sigma)\pi^{FDI,*}/(\tilde{\phi} w_d) < 0$, $\omega'(r) < 0$, and $\frac{\partial^2 \Pi^{FDI,*}}{\partial r_d^2} < 0$ by the SOC for r_d^*.

(iii) It is straightforward to see that B has an analogous (positive) effect as $\tilde{\phi}$ on r_d^*, because B and $\tilde{\phi}$ enter π^{FDI} multiplicatively. ■

Note that by similar derivations, we have:

$$\frac{\partial r_d^*}{\partial \eta} = -\frac{\frac{\partial^2 \pi^{FDI,*}}{\partial \eta \partial w_d}\omega'(r_d)}{\frac{\partial^2 \Pi^{FDI,*}}{\partial r_d^2}},$$

where

$$\frac{\partial^2 \pi^{FDI,*}}{\partial \eta \partial w_d} = (1-\sigma)\left[(1-\eta)\ln\left\{\frac{\theta(I_h^{FDI,*})}{\theta(I_d^{FDI,*})}\left(\frac{w_h}{w_d}\right)^{(1-\sigma)}\right\} - 1\right]\pi^{FDI,*}/w_d,$$

which is positive if $\left(\frac{\theta(I_h^{FDI,*})}{\theta(I_d^{FDI,*})}\right)^{1-\eta}\left(\frac{w_h}{w_d}\right)^{(1-\eta)(1-\sigma)} < 1$. This condition does not necessarily hold in the current setup, given the theoretical ambiguity in the ranking between $F^{FDI,*}$ and $F^{D,*}$, and the possibility that the informal institutions built at home could differ between multinational and local production ($I_h^{FDI,*} \neq I_h^{D,*}$ in general). Thus, the result $\frac{\partial r_d^*}{\partial \eta} < 0$ in Proposition A.2.3(iv) does not generalize to this setup.

B Empirical Appendix (additional tables)

Table B.1: List of source countries of parent firms from *fDi Markets* not matched by Orbis

Afghanistan	Cuba	Laos	Republic of the Congo
Albania	Djibouti	Lebanon	Russia
Algeria	Dominican Republic	Libya	Rwanda
Andorra	Ecuador	Macau	San Marino
Antigua	El Salvador	Malawi	Senegal
Armenia	Equatorial Guinea	Mali	Seychelles
Azerbaijan	Fiji	Martinique	Sierra Leone
Bahamas	French Polynesia	Moldova	Solomon Islands
Barbados	Gabon	Monaco	Sudan
Belarus	Gambia	Mongolia	Syria
Belize	Georgia	Mozambique	Tajikistan
Bolivia	Ghana	Myanmar (Burma)	Tanzania
Brunei	Greenland	Namibia	Togo
Burkina Faso	Guatemala	Nepal	Trinidad & Tobago
Burundi	Haiti	New Caledonia	Turkmenistan
Cambodia	Honduras	Nicaragua	Turks and Caicos Islands
Cameroon	Iraq	Palestine	Uganda
Congo (DRC)	Jamaica	Papua New Guinea	Uzbekistan
Costa Rica	Kazakhstan	Peru	Vanuatu
Cote d'Ivoire (Ivory Coast)	Kyrgyzstan	Puerto Rico	Yemen

Table B.2: Contract intensity of FDI sectors

Industry Sector	CI
Aerospace	0.89
Alternative/Renewable Energy	0.52
Automotive Components	0.89
Automotive OEM	0.89
Beverages	0.73
Biotechnology	0.52
Building & Construction Materials	0.44
Business Machines & Equipment	0.84
Business Services	.
Ceramics & Glass	0.44
Chemicals	0.52
Coal, Oil and Natural Gas	.
Communications	0.82
Consumer Electronics	0.82
Consumer Products	.
Electronic Components	0.82
Engines & Turbines	0.84
Financial Services	.
Food & Tobacco	0.34
Healthcare	.
Hotels & Tourism	.
Industrial Machinery, Equipment & Tools	0.84
Leisure & Entertainment	.
Medical Devices	0.82
Metals	0.34
Minerals	.
Non-Automotive Transport OEM	0.89
Paper, Printing & Packaging	0.54
Pharmaceuticals	0.52
Plastics	0.45
Real Estate	.
Rubber	0.60
Semiconductors	0.82
Software & IT Services	.
Space & Defense	0.84
Textiles	0.67
Transportation	.
Warehousing & Storage	.
Wood Products	0.56

Note: The contract intensity measure is based on those of Nunn (2007). The concordance with the *fDi Markets* sector is provided in Desbordes and Wei (2017, Table A1).

Table B.3: firm-level FDI dependence on institutional quality — *dropping subsets of observations*

	VA	PV	GE	RQ	RL	CC	CE	LS
I. Dropping US firms								
$\boldsymbol{G_{h,t-1} * G_{d,t-1}}$	**0.623*****	**1.122*****	**1.124*****	**1.191*****	**1.148*****	**0.763*****	**0.00122*****	**0.493*****
	(0.0922)	**(0.127)**	**(0.156)**	**(0.160)**	**(0.133)**	**(0.103)**	**(0.000308)**	**(0.0593)**
$\ln(prod_{f,t-1})$	0.173	0.0674	0.426**	0.391*	0.328*	0.312**	0.847**	1.255**
	(0.149)	(0.129)	(0.201)	(0.206)	(0.176)	(0.157)	(0.387)	(0.528)
$\boldsymbol{\ln(prod_{f,t-1}) * G_{d,t-1}}$	**-0.337*****	**-0.279*****	**-0.449*****	**-0.489*****	**-0.384*****	**-0.424*****	**-0.0118****	**-0.197*****
	(0.109)	**(0.107)**	**(0.122)**	**(0.132)**	**(0.102)**	**(0.0972)**	**(0.00510)**	**(0.0728)**
$RD_{f,t-1}$	-6.724***	-5.672***	-10.22***	-9.105***	-7.567***	-6.462***	-52.49***	-7.787
	(1.431)	(1.408)	(2.055)	(1.784)	(1.771)	(1.755)	(8.662)	(9.416)
$\boldsymbol{RD_{f,t-1} * G_{d,t-1}}$	**2.378***	**5.065****	**5.925*****	**5.494*****	**3.321****	**1.194**	**0.665*****	**0.475**
	(1.264)	**(2.315)**	**(1.666)**	**(1.618)**	**(1.355)**	**(1.667)**	**(0.124)**	**(1.428)**
# Observations	6683	6683	6683	6683	6683	6683	6672	6652
R^2	0.823	0.825	0.830	0.831	0.832	0.829	0.824	0.825
II. Dropping US as destination								
$\boldsymbol{G_{h,t-1} * G_{d,t-1}}$	**0.516*****	**0.694*****	**1.378*****	**0.984*****	**1.366*****	**0.546*****	**0.000724****	**0.532*****
	(0.0933)	**(0.131)**	**(0.169)**	**(0.159)**	**(0.146)**	**(0.111)**	**(0.000335)**	**(0.0581)**
$\ln(prod_{f,t-1})$	0.377**	0.396**	0.607***	0.570***	0.496***	0.495***	0.793**	0.883
	(0.164)	(0.160)	(0.210)	(0.220)	(0.187)	(0.179)	(0.341)	(0.565)
$\boldsymbol{\ln(prod_{f,t-1}) * G_{d,t-1}}$	**-0.278****	**-0.174***	**-0.392*****	**-0.446*****	**-0.387*****	**-0.365*****	**-0.00543**	**-0.0808**
	(0.118)	**(0.102)**	**(0.128)**	**(0.139)**	**(0.110)**	**(0.0990)**	**(0.00476)**	**(0.0773)**
$RD_{f,t-1}$	-5.910***	-5.813***	-9.319***	-8.776***	-6.632***	-6.540***	-31.87***	-20.84***
	(1.361)	(1.153)	(1.455)	(1.344)	(1.343)	(1.368)	(4.151)	(5.909)
$\boldsymbol{RD_{f,t-1} * G_{d,t-1}}$	**0.294**	**6.177*****	**6.122*****	**5.482*****	**4.078*****	**2.899*****	**0.379*****	**2.689*****
	(1.084)	**(1.225)**	**(1.015)**	**(0.951)**	**(1.032)**	**(1.069)**	**(0.0571)**	**(0.839)**
# Observations	5971	5971	5971	5971	5971	5971	5959	5940
R^2	0.811	0.811	0.815	0.815	0.817	0.814	0.809	0.812
III. Dropping top service sectors								
$\boldsymbol{G_{h,t-1} * G_{d,t-1}}$	**0.584*****	**0.981*****	**1.009*****	**0.966*****	**1.064*****	**0.619*****	**0.00115*****	**0.402*****
	(0.0932)	**(0.140)**	**(0.162)**	**(0.175)**	**(0.135)**	**(0.107)**	**(0.000324)**	**(0.0609)**
$\ln(prod_{f,t-1})$	0.210	0.0906	0.461**	0.441**	0.382**	0.337**	0.889**	1.182**
	(0.154)	(0.137)	(0.205)	(0.212)	(0.184)	(0.164)	(0.403)	(0.542)
$\boldsymbol{\ln(prod_{f,t-1}) * G_{d,t-1}}$	**-0.358*****	**-0.280****	**-0.454*****	**-0.497*****	**-0.406*****	**-0.417*****	**-0.0119****	**-0.179****
	(0.110)	**(0.110)**	**(0.121)**	**(0.134)**	**(0.105)**	**(0.0986)**	**(0.00528)**	**(0.0744)**
$RD_{f,t-1}$	-4.990***	-5.234***	-12.52***	-10.71***	-9.010***	-7.263***	-47.25***	-34.45***
	(1.326)	(1.209)	(1.762)	(1.596)	(1.608)	(1.515)	(5.301)	(7.592)
$\boldsymbol{RD_{f,t-1} * G_{d,t-1}}$	**3.456*****	**9.954*****	**8.932*****	**8.026*****	**6.158*****	**5.434*****	**0.612*****	**4.818*****
	(1.082)	**(1.471)**	**(1.159)**	**(1.134)**	**(1.042)**	**(1.134)**	**(0.0719)**	**(1.066)**
# Observations	6258	6258	6258	6258	6258	6258	6247	6228
R^2	0.825	0.828	0.832	0.831	0.834	0.830	0.825	0.828
origin-year FE	Y	Y	Y	Y	Y	Y	Y	Y
destination-year FE	Y	Y	Y	Y	Y	Y	Y	Y
destination-sector FE	Y	Y	Y	Y	Y	Y	Y	Y
extra country-pair controls	Y	Y	Y	Y	Y	Y	Y	Y

Note: PPML estimation of equation (19) of the paper. In estimation III, the top service sectors dropped are: Software & IT Services, Business Services, and Financial Services (cf. Figure 4 of the paper). Robust standard errors clustered by country pairs are reported in parentheses. Productivity estimates based on the WRDG method and operating revenues. The entries ***, ** and * indicate statistical significance at 1%, 5% and 10%, respectively.

Table B.4: firm-level FDI dependence on institutional quality — *dropping tax havens*

	VA	PV	GE	RQ	RL	CC	CE	LS
List I of tax havens								
$\boldsymbol{G_{h,t-1} * G_{d,t-1}}$	**0.655*****	**1.055*****	**1.069*****	**1.073*****	**1.077*****	**0.632*****	**0.00113*****	**0.399*****
	(0.0936)	**(0.142)**	**(0.167)**	**(0.171)**	**(0.135)**	**(0.107)**	**(0.000331)**	**(0.0623)**
$\ln(prod_{f,t-1})$	0.142	0.0513	0.373*	0.359*	0.294	0.259	0.924**	1.024*
	(0.152)	(0.135)	(0.209)	(0.212)	(0.184)	(0.162)	(0.397)	(0.528)
$\boldsymbol{\ln(prod_{f,t-1}) * G_{d,t-1}}$	**-0.327*****	**-0.268****	**-0.410*****	**-0.458*****	**-0.367*****	**-0.380*****	**-0.0128****	**-0.163****
	(0.112)	**(0.108)**	**(0.124)**	**(0.135)**	**(0.106)**	**(0.0981)**	**(0.00513)**	**(0.0725)**
$RD_{f,t-1}$	-4.661***	-5.258***	-12.17***	-10.56***	-8.040***	-6.725***	-54.56***	-31.04***
	(1.233)	(1.139)	(1.590)	(1.460)	(1.479)	(1.387)	(4.952)	(6.487)
$\boldsymbol{RD_{f,t-1} * G_{d,t-1}}$	**2.713*****	**9.893*****	**8.604*****	**7.971*****	**5.350*****	**4.801*****	**0.714*****	**4.316*****
	(0.994)	**(1.357)**	**(1.014)**	**(0.974)**	**(0.966)**	**(1.034)**	**(0.0656)**	**(0.901)**
# Observations	6296	6296	6296	6296	6296	6296	6285	6267
R^2	0.834	0.836	0.841	0.840	0.842	0.838	0.834	0.836
List II of tax havens								
$\boldsymbol{G_{h,t-1} * G_{d,t-1}}$	**0.602*****	**1.028*****	**1.066*****	**1.017*****	**1.107*****	**0.671*****	**0.00123*****	**0.428*****
	(0.0917)	**(0.130)**	**(0.158)**	**(0.164)**	**(0.132)**	**(0.104)**	**(0.000313)**	**(0.0578)**
$\ln(prod_{f,t-1})$	0.203	0.0881	0.466**	0.430**	0.362**	0.335**	0.973***	1.228**
	(0.147)	(0.129)	(0.196)	(0.201)	(0.173)	(0.157)	(0.376)	(0.525)
$\boldsymbol{\ln(prod_{f,t-1}) * G_{d,t-1}}$	**-0.341*****	**-0.269****	**-0.459*****	**-0.487*****	**-0.392*****	**-0.414*****	**-0.0129*****	**-0.186****
	(0.106)	**(0.105)**	**(0.117)**	**(0.128)**	**(0.101)**	**(0.0957)**	**(0.00496)**	**(0.0724)**
$RD_{f,t-1}$	-4.992***	-5.143***	-12.38***	-10.82***	-8.577***	-7.059***	-49.06***	-32.77***
	(1.166)	(1.085)	(1.513)	(1.398)	(1.426)	(1.324)	(4.540)	(6.229)
$\boldsymbol{RD_{f,t-1} * G_{d,t-1}}$	**3.351*****	**9.619*****	**8.911*****	**8.242*****	**5.911*****	**5.327*****	**0.638*****	**4.591*****
	(0.959)	**(1.270)**	**(0.962)**	**(0.949)**	**(0.915)**	**(0.947)**	**(0.0610)**	**(0.862)**
# Observations	7043	7043	7043	7043	7043	7043	7031	7019
R^2	0.825	0.827	0.832	0.832	0.834	0.830	0.825	0.828
origin-year FE	Y	Y	Y	Y	Y	Y	Y	Y
destination-year FE	Y	Y	Y	Y	Y	Y	Y	Y
destination-sector FE	Y	Y	Y	Y	Y	Y	Y	Y
extra country-pair controls	Y	Y	Y	Y	Y	Y	Y	Y

Note: PPML estimation of equation (19) of the paper. List I of tax havens is based on Investopedia. List II of tax havens is based on the EU's publication in 2015. See Section 3.3.2 of the paper for the list of countries considered to be tax havens by these two sources. Robust standard errors clustered by country pairs are reported in parentheses. Productivity estimates based on the WRDG method and operating revenues. The entries ***, ** and * indicate statistical significance at 1%, 5% and 10%, respectively.

Table B.5: firm-level FDI dependence on institutional quality — *control for initial institutional qualities*

	VA	PV	GE	RQ	RL	CC	CE	LS
1. Formal home x formal destination institutions								
$G_{h,t-1} * G_{d,t-1}$	1.751***	1.030***	1.672***	1.003***	1.666***	-0.189	-0.00321**	0.524***
	(0.448)	(0.212)	(0.384)	(0.302)	(0.414)	(0.277)	(0.00138)	(0.106)
$G_{h,0} * G_{d,0}$	-1.161***	-0.00327	-0.610*	0.0480	-0.571	0.958***	0.00386***	-0.116
	(0.438)	(0.219)	(0.355)	(0.343)	(0.398)	(0.282)	(0.00119)	(0.102)
2. Formal home x formal destination institutions x sectoral contract intensity								
$G_{h,t-1} * G_{d,t-1}$	0.723	0.863***	1.053***	-0.415	0.637	-0.662***	-0.0000665	0.136
	(0.505)	(0.247)	(0.388)	(0.354)	(0.446)	(0.256)	(0.00146)	(0.112)
$CI_s * G_{h,t-1} * G_{d,t-1}$	0.795***	1.132***	0.442***	0.959***	0.942***	0.630***	0.000967***	-0.0230
	(0.183)	(0.274)	(0.164)	(0.159)	(0.156)	(0.140)	(0.000131)	(0.0248)
$G_{h,0} * G_{d,0}$	-0.600	-0.734***	-0.509	0.497	-0.126	0.828***	0.000552	0.157
	(0.514)	(0.258)	(0.354)	(0.396)	(0.418)	(0.275)	(0.00120)	(0.0959)
3. Informal home x formal destination institutions								
$I_h * G_{d,t-1}$	-0.00871*	-0.0198***	-0.0312***	-0.0374***	-0.0276***	-0.0172***	-0.000835***	-0.0181***
	(0.00505)	(0.00484)	(0.00515)	(0.00551)	(0.00454)	(0.00405)	(0.000278)	(0.00366)
$G_{h,0} * G_{d,0}$	0.146	0.444***	0.434***	1.088***	0.423**	0.503***	0.000992***	0.131**
	(0.177)	(0.129)	(0.166)	(0.242)	(0.173)	(0.124)	(0.000302)	(0.0656)
4. Informal home x formal destination institutions x sectoral contract intensity								
$I_h * G_{d,t-1}$	0.00230	-0.0184***	-0.0208***	-0.0206***	-0.0171***	-0.0130***	-0.000737**	-0.0176***
	(0.00596)	(0.00623)	(0.00543)	(0.00646)	(0.00490)	(0.00497)	(0.000305)	(0.00354)
$CI_s * I_h * G_{d,t-1}$	-0.0121***	0.00201	-0.0184***	-0.0131**	-0.0163***	-0.0163***	-0.000561***	-0.00705***
	(0.00461)	(0.00884)	(0.00500)	(0.00587)	(0.00457)	(0.00530)	(0.000101)	(0.00102)
$G_{h,0} * G_{d,0}$	-0.0671	-0.266*	0.0712	0.0771	0.193	-0.0272	0.000526	0.145***
	(0.207)	(0.160)	(0.172)	(0.312)	(0.175)	(0.142)	(0.000354)	(0.0562)
origin-year FE	Y	Y	Y	Y	Y	Y	Y	Y
destination-year FE	Y	Y	Y	Y	Y	Y	Y	Y
destination-sector FE	Y	Y	Y	Y	Y	Y	Y	Y
extra country-pair controls	Y	Y	Y	Y	Y	Y	Y	Y

Note: PPML estimation of equation (19) of the paper, with variations in the specifications as explained in the footnote of Tables 6, 11, and 12 of the paper. $G_{h,0}$ and $G_{d,0}$ refer to the institutional qualities in year 2007. Informal institutions are based on measure (iv): % of market capitalization of connected firms. Robust standard errors clustered by country pairs are reported in parentheses. Productivity estimates based on the WRDG method and operating revenues. The entries ***, ** and * indicate statistical significance at 1%, 5% and 10%, respectively.

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