The Margins of Global Sourcing: Theory and Evidence from U.S. Firms *by* Pol Antràs, Teresa C. Fort and Felix Tintelnot

B Online Theory Appendix (Not for Publication)

B.1 Proofs of Main Propositions

Proof of Proposition 1

Proof of part (a):

Consider two firms with productivities φ_H and φ_L, with $\varphi_H > \varphi_L$. Denote by $\mathcal{J}_i(\varphi_H) = \{j : I_{ij}(\varphi_H) = 1\}$ and $\mathcal{J}_i(\varphi_L) = \{j : I_{ij}(\varphi_L) = 1\}$ the optimal sourcing strategies of these firms, and suppose that $\mathcal{J}_i(\varphi_H) \neq \mathcal{J}_i(\varphi_L)$ (when $\mathcal{J}_i(\varphi_H) = \mathcal{J}_i(\varphi_L)$ the result in the Proposition holds trivially). For firm φ_H to prefer $\mathcal{J}_i(\varphi_H)$ over $\mathcal{J}_i(\varphi_L)$, we need

$$\varphi_H^{\sigma-1}\left(\gamma\Theta_i\left(\mathcal{J}_i\left(\varphi_H\right)\right)\right)^{(\sigma-1)/\theta} B_i - \sum_{j\in\mathcal{J}_i(\varphi_H)} f_{ij} > \varphi_H^{\sigma-1}\left(\gamma\Theta_i\left(\mathcal{J}_i\left(\varphi_L\right)\right)\right)^{(\sigma-1)/\theta} B_i - \sum_{j\in\mathcal{J}_i(\varphi_L)} f_{ij},$$

while φ_L preferring $\mathcal{J}_i(\varphi_L)$ over $\mathcal{J}_i(\varphi_H)$ requires

$$\varphi_L^{\sigma-1}\left(\gamma\Theta_i\left(\mathcal{J}_i\left(\varphi_H\right)\right)\right)^{(\sigma-1)/\theta} B_i - \sum_{j\in\mathcal{J}_i(\varphi_H)} f_{ij} < \varphi_L^{\sigma-1}\left(\gamma\Theta_i\left(\mathcal{J}_i\left(\varphi_L\right)\right)\right)^{(\sigma-1)/\theta} B_i - \sum_{j\in\mathcal{J}_i(\varphi_L)} f_{ij}.$$

Combining these two conditions, we find

$$\left[\varphi_H^{\sigma-1} - \varphi_L^{\sigma-1}\right]\left[\Theta_i\left(\mathcal{J}_i\left(\varphi_H\right)\right)^{(\sigma-1)/\theta} - \Theta_i\left(\mathcal{J}_i\left(\varphi_L\right)\right)^{(\sigma-1)/\theta}\right]\gamma^{(\sigma-1)/\theta} B_i > 0.$$

Given $\varphi_H > \varphi_L$, this necessarily implies $\Theta_i(\varphi_H) > \Theta_i(\varphi_L)$.

Proof of part (b):

As noted in the main text, when $(\sigma-1)/\theta > 1$, the profit function in (11) features increasing differences in (I_{ij}, I_{ik}) for $j, k \in \{1, ..., J\}$ with $j \neq k$. Furthermore, it also features increasing differences in (I_{ij}, φ) for any $j \in J$. Invoking Topkis's monotonicity theorem, we can then conclude that for $\varphi_H \geq \varphi_L$, we must have $(I_{i1}(\varphi_H), I_{i2}(\varphi_H), ..., I_{iJ}(\varphi_H)) \geq (I_{i1}(\varphi_L), I_{i2}(\varphi_L), ..., I_{iJ}(\varphi_L))$. Naturally, this rules out a situation in which $I_{ij}(\varphi_H) = 0$ but $I_{ij}(\varphi_L) = 1$, and thus we can conclude that $\mathcal{J}_i(\varphi_L) \subseteq \mathcal{J}_i(\varphi_H)$ for $\varphi_H \geq \varphi_L$.

Proof of Proposition 2

Consider first the case, $j \notin \mathcal{J}$. The mapping $V_{ij}(\varphi, J)$ defined in the Proposition, is such that $V_{ij}(\varphi, J) = 1$ if

$$\varphi^{\sigma-1}\gamma^{(\sigma-1)/\theta} B\left(\Theta_i\left(\mathcal{J}\cup j\right)^{(\sigma-1)/\theta} - \Theta_i\left(\mathcal{J}\right)^{(\sigma-1)/\theta}\right) > f_{ij}$$

and $V_{ij}(\varphi, J) = 0$, otherwise. Because of increasing differences (see the proof of Proposition 1), the term $\Theta_i(\mathcal{J}\cup j)^{(\sigma-1)/\theta} - \Theta_i(\mathcal{J})^{(\sigma-1)/\theta}$ is increased by the addition of elements to the set $\mathcal{J}$. As a result, for $\mathcal{J} \subseteq \mathcal{J}'$, we cannot possibly have $V_{ij}(\varphi, \mathcal{J}) = 1$ and $V_{ij}(\varphi, \mathcal{J}') = 0$. Instead, we must have either $V_{ij}(\varphi, \mathcal{J}) = V_{ij}(\varphi, \mathcal{J}') = 0$, $V_{ij}(\varphi, \mathcal{J}) = V_{ij}(\varphi, \mathcal{J}') = 1$, or $V_{ij}(\varphi, \mathcal{J}) = 0$ and $V_{ij}(\varphi, \mathcal{J}') = 1$.

Second, consider the case $j \in \mathcal{J}$. The mapping $V_{ij}(\varphi, J)$ defined in the Proposition, is such that $V_{ij}(\varphi, J) = 1$ if

$$\varphi^{\sigma-1}\gamma^{(\sigma-1)/\theta}B\left(\Theta_i\left(\mathcal{J}\right)^{(\sigma-1)/\theta} - \Theta_i\left(\mathcal{J} \setminus j\right)^{(\sigma-1)/\theta}\right) > f_{ij}$$

and $V_{ij}(\varphi, J) = 0$, otherwise. Similarly to above, the term $\Theta_i\left(\mathcal{J}\right)^{(\sigma-1)/\theta} - \Theta_i\left(\mathcal{J} \setminus j\right)^{(\sigma-1)/\theta}$ is increased by the addition of elements to the set $\mathcal{J}$. As a result, for $\mathcal{J} \subseteq \mathcal{J}'$, we cannot possibly have $V_{ij}(\varphi, \mathcal{J}) = 1$ and $V_{ij}(\varphi, \mathcal{J}') = 0$. Instead, we must have either $V_{ij}(\varphi, \mathcal{J}) = V_{ij}(\varphi, \mathcal{J}') = 0$, $V_{ij}(\varphi, \mathcal{J}) = V_{ij}(\varphi, \mathcal{J}') = 1$, or $V_{ij}(\varphi, \mathcal{J}) = 0$ and $V_{ij}(\varphi, \mathcal{J}') = 1$.

Thus, we can conclude that $V_{ij}(\varphi, J') \geq V_{ij}(\varphi, J)$ for $J \subseteq J'$, as stated in the Proposition.

Proof of Proposition 3

Remember from equation (8) that $\Theta_i\left(\varphi\right) \equiv \sum\limits_{k \in \mathcal{J}_i(\varphi)} T_k\left(\tau_{ik}w_k\right)^{-\theta}$ and thus $\Theta_i\left(\varphi\right)$ corresponds to the sum of sourcing potentials of the countries belonging to the set $\mathcal{J}_i\left(\varphi\right)$. The (weakly) positive effect, holding B_i constant, of any sourcing potential $T_k\left(\tau_{ik}w_k\right)^{-\theta}$ on input flows when $\left(\sigma-1\right)/\theta \geq 1$ is then obvious from inspection of equation (12). The positive effect of a reduction of any fixed cost f_k on firm-level input flows follows from the fact that, holding constant B_i and when $\sigma - 1 \geq \theta$, a reduction in a fixed cost f_k cannot possibly reduce the profitability of any firm selecting into importing from any country j, but it may well increase it directly if $k = j$ or indirectly if selecting into k enhances the profitability of importing from j (remember that the profit function features increasing differences whenever $\sigma - 1 > \theta$).

Proof of Proposition 4

Given a vector of wages, equations (13) and (14) determine the equilibrium values of B_i and N_i. Notice that the firm-level global sourcing problem depends only on B_i, w_i and exogenous parameters, and not directly on N_i. As a result, if a unique solution for B_i exists, all thresholds $\tilde{\varphi}_{ij}$ for any pair of countries (i, j) will be pinned down uniquely, given wages. Hence, if a unique solution for B_i in equation (13) exists, we can ensure that there will be a unique value of N_i solving (14). Let us then focus on studying whether (13) indeed delivers a unique solution for B_i.

For given wages, the equilibrium condition (13) can be rearranged as follows

$$w_i f_e = B_i \int_{\tilde{\varphi}_{i\vartheta(i)}}^{\infty} \left(\gamma\Theta_i\left(\varphi\right)\right)^{(\sigma-1)/\theta}\varphi^{\sigma-1}dG_i\left(\varphi\right) - w_i \int_{\tilde{\varphi}_{i\vartheta(i)}}^{\infty} \sum_{j \in \mathcal{J}_i(\varphi)} f_{ij}dG_i\left(\varphi\right), \tag{B.1}$$

where $\vartheta\left(i\right)$ denotes the location from which the least productive active firm in country i sources its inputs, or formally, $\vartheta\left(i\right) = \{j \in J : \tilde{\varphi}_{ij} \leq \tilde{\varphi}_{ik} \text{ for all } k \in J\}$. Note that $\vartheta\left(i\right)$ satisfies

$$\left(\tilde{\varphi}_{i\vartheta(i)}\right)^{\sigma-1} B_i\left(\gamma T_{\vartheta(i)}\left(\tau_{i\vartheta(i)}w_{\vartheta(i)}\right)^{-\theta}\right)^{(\sigma-1)/\theta} = w_i f_{i\vartheta(i)}. \tag{B.2}$$

Remember also that $\Theta_i\left(\varphi\right) \equiv \sum_{k \in \mathcal{J}_i(\varphi)} T_k\left(\tau_{ik}w_k\right)^{-\theta}$, and $\mathcal{J}_i\left(\varphi\right) \subseteq J$ is the set of countries for which a firm based in i with productivity φ has paid the associated fixed cost of offshoring $w_i f_{ij}$.[1]

Computing the derivative of the right-hand-side of (B.1) with respect to B_i, and using (B.2) to

[1]To be precise, it could be the case that the least productive active firm in country i might source inputs from more than one location. In such a case, the left-hand-side of equation (B.2) would incorporate the other location's sourcing potential, but equation (B.3) below would remain unaltered.

eliminate the effects working through changes in $\tilde{\varphi}_{i\vartheta(i)}$, we can write this derivative as simply

$$\int_{\tilde{\varphi}_{i\vartheta(i)}}^{\infty} \frac{\partial\left(\varphi^{\sigma-1}\left(\gamma\Theta_i\left(\varphi\right)\right)^{(\sigma-1)/\theta}B_i - w_i \sum\limits_{j\in\mathcal{J}_i(\varphi)} f_{ij}\right)}{\partial B_i} dG_i\left(\varphi\right) > 0. \tag{B.3}$$

The fact that this derivative is positive follows directly from the firm's global sourcing problem in (11). In particular, holding constant the firm's sourcing strategy $\mathcal{J}_i\left(\varphi\right)$ – and thus $\Theta_i\left(\varphi\right)$ –, it is clear that an increase in B_i will increase firm-level profits $\varphi^{\sigma-1}\left(\gamma\Theta_i\left(\varphi\right)\right)^{(\sigma-1)/\theta}B_i - w_i\sum_{j\in\mathcal{J}_i(\varphi)} f_{ij}$. Now such an increase in B_i might well affect the profit-maximizing choice of $\mathcal{J}_i\left(\varphi\right)$ – and thus $\Theta_i\left(\varphi\right)$ –, but firm profits could not possibly be reduced by those changes, since the firm can always decide not to change the global sourcing strategy in light of the higher B_i and still obtain higher profits.[2] We can thus conclude that the right-hand-side of (B.1) is monotonically increasing in B_i.

It is also clear that when $B_i \to \infty$, all firms will find it optimal to source everywhere and the right-hand-side of (B.1) becomes

$$B_i\left(\gamma\sum\nolimits_{k\in J} T_k\left(\tau_{ik}w_k\right)^{-\theta}\right)^{(\sigma-1)/\theta}\int_{\underline{\varphi}_i}^{\infty}\varphi^{\sigma-1}dG_i\left(\varphi\right) - w_i\sum_{j\in J} f_{ij}$$

and thus goes to ∞. Conversely, when $B_i \to 0$, no firm can profitably source to any location, given the positive fixed costs of sourcing, and thus the right-hand-side of (B.1) goes to 0.

It thus only remains to show that the right-hand-side of (B.1) is a *continuously* non-decreasing function of B_i. This may not seem immediate because firm-level profits jump discontinuously with B_i whenever such changes in B_i lead to changes in the global sourcing strategy of firms. It can be shown, however, that

$$\int_{\tilde{\varphi}_{i\vartheta(i)}}^{\infty}\frac{\partial\left(\left(\Theta_i\left(\varphi\right)\right)^{(\sigma-1)/\theta}B_i\varphi^{\sigma-1}\right)}{\partial B_i}dG_i\left(\varphi\right)$$

is continuously differentiable in B_i. To see this, one can first follow the same steps as in the proof of Proposition 1 to show that $\Theta_i\left(\varphi; B_i\right)$ must be non-decreasing not only in φ, but also in B_i and $B_i\varphi^{\sigma-1}$. We can then represent $\left(\Theta_i\left(\varphi\right)\right)^{(\sigma-1)/\theta}B_i\varphi^{\sigma-1}$ as a non-decreasing step function in φ, in which the jumps occur at different levels of $B_i\varphi^{\sigma-1}$. This is analogous to writing

$$\left(\Theta_i\left(\varphi\right)\right)^{(\sigma-1)/\theta}B_i\varphi^{\sigma-1} = \begin{cases} \theta_1 B_i\varphi^{\sigma-1} & \text{if } \varphi < b_1/B_i^{1/(\sigma-1)} \\ \theta_2 B_i\varphi^{\sigma-1} & \text{if } b_1/B_i^{1/(\sigma-1)} \leq \varphi < b_2/B_i^{1/(\sigma-1)} \\ \vdots & \vdots \\ \theta_J B_i\varphi^{\sigma-1} & \text{if } b_{J-1}/B_i^{1/(\sigma-1)} \leq \varphi \end{cases}. \tag{B.4}$$

Hence, we have

$$\begin{aligned} \int_{\tilde{\varphi}_{i\vartheta(i)}}^{\infty}\left(\Theta_i\left(\varphi\right)\right)^{(\sigma-1)/\theta}B_i\varphi^{\sigma-1}dG_i\left(\varphi\right) &= \int_{\tilde{\varphi}_{i\vartheta(i)}}^{b_1/B_i^{1/(\sigma-1)}}\theta_1 B_i\varphi^{\sigma-1}dG_i\left(\varphi\right) + \\ &\int_{b_1/B_i^{1/(\sigma-1)}}^{b_2/B_i^{1/(\sigma-1)}}\theta_2 B_i\varphi^{\sigma-1}dG_i\left(\varphi\right) + \ldots + \int_{b_{J-1}/B_i^{1/(\sigma-1)}}^{\infty}\theta_J B_i\varphi^{\sigma-1}dG_i\left(\varphi\right). \end{aligned}$$

[2] Following the same steps as in the proof of Proposition 1 we can show that both $\Theta_i\left(\varphi\right)$ and $\sum_{j\in\mathcal{J}_i(\varphi)} f_{ij}$ are actually non-decreasing in B_i. This result is immaterial for the proof of existence and uniqueness in the case of free entry, but can be used to prove the same result for the case of an exogenous number of firms N_i.

It is then clear that the derivative of this expression with respect to B_i is a sum of continuous functions of B_i, and thus is continuous in B_i itself.[3]

Using similar arguments we can next show that

$$\int_{\tilde{\varphi}_{i\vartheta(i)}}^{\infty} \frac{\partial\left(w_i \sum\limits_{j\in\mathcal{J}_i(\varphi)} f_{ij}\right)}{\partial B_i} dG_i(\varphi) \tag{B.5}$$

is also continuously differentiable in B_i. First, a simple proof by contradiction can be used to show that $\sum_{j\in\mathcal{J}_i(\varphi)} f_{ij}$ is non-decreasing in $B_i\varphi^{\sigma-1}$. More specifically, suppose that for $\left(B_i\varphi^{\sigma-1}\right)_H > \left(B_i\varphi^{\sigma-1}\right)_L$ we also had $\sum_{j\in\mathcal{J}_{iH}} f_{ij} < \sum_{j\in\mathcal{J}_{iL}} f_{ij}$. Given the non-decreasing dependence of $\Theta_i(\varphi)$ on $B_i\varphi_i^{\sigma-1}$, we would then have

$$(\gamma\Theta_{iH}(\varphi))^{(\sigma-1)/\theta}\left(B_i\varphi^{\sigma-1}\right)_L - \sum\nolimits_{j\in\mathcal{J}_{iH}} f_{ij} > (\gamma\Theta_{iL}(\varphi))^{(\sigma-1)/\theta}\left(B_i\varphi^{\sigma-1}\right)_L - \sum\nolimits_{j\in\mathcal{J}_{iL}(\varphi)} f_{ij},$$

which clearly contradicts $\mathcal{J}_{iL}$ being optimal given $B_i\varphi^{\sigma-1} = \left(B_i\varphi^{\sigma-1}\right)_L$. With this result, $\sum\limits_{j\in\mathcal{J}_i(\varphi)} f_{ij}$ can then be expressed as a step function analogous to that in (B.4), in which the position of the steps is continuously differentiable in B_i. This in turn ensures that (B.1) is continuous in B_i and concludes the proof that there exists a unique B_i that solves equation (13).

B.2 Equilibrium in the Complements-Pareto Case

In Proposition 1, we have established that whenever $\sigma - 1 > \theta$, the model delivers a 'pecking order' in the extensive margin of offshoring. For each country i, we can then rank foreign countries in terms of some index of sourcing appeal. We shall assume, for the time being, that this ranking is strict in the sense that the set of firms sourcing from any two distinct countries j and k do not coincide; more specifically, the measure of firms sourcing from the strictly more attractive country is necessarily larger. This assumption is fairly immaterial, as we shall show below.

Suppose also for simplicity that $\tilde{\varphi}_i = \tilde{\varphi}_{ii}$, so that all firms that source a positive amount (i.e., all firms that are active) do so, at least in part, from Home. Denote by r the r-th least appealing country from which firms from i source from, so Home is $r = 1$. Define also

$$\Theta_{ir} = \sum_{j=1}^{r} T_j\left(\tau_{ij}w_j\right)^{-\theta}.$$

Note that Proposition 1 implies that the set of productivity thresholds $\tilde{\varphi}_{ir}$ defined in the main text will be such that any firm with productivity above that threshold $\tilde{\varphi}_{ir}$ necessarily sources from country r, or in terms of the notation in equation (17), $I_{ir}(\varphi) = 1$ for all $\varphi > \tilde{\varphi}_{ir}$.

[3] The two last expressions assume that there are $J-1$ jumps, implicitly assuming that at each jump, only one country is added to the sourcing strategy. Given the complementarities in our model, and as pointed out in footnote 1, an increase in B_i might well lead to the simultaneous inclusion of two or more locations. In such a case, there would be less than $J-1$ jumps, but the continuous differentiability of (B.4) would clearly be preserved.

In light of the profit function in 10, these thresholds are given by

$$\begin{aligned}
\tilde{\varphi}_{i1}^{\sigma-1} &= \frac{w_i f_{i1}}{\gamma^{(\sigma-1)/\theta} B_i \left(T_i\left(w_i\right)^{-\theta}\right)^{(\sigma-1)/\theta}}; \\
\tilde{\varphi}_{ir}^{\sigma-1} &= \frac{w_i f_{ir}}{\gamma^{(\sigma-1)/\theta} B_i \left(\Theta_{ir}^{(\sigma-1)/\theta} - \Theta_{ir-1}^{(\sigma-1)/\theta}\right)} \quad \text{for } r > 1.
\end{aligned} \tag{B.6}$$

Consider now the industry equilibrium. Using the above notation, we can write the free entry condition (13) as

$$\gamma^{(\sigma-1)/\theta} B_i \sum_{r=1}^{J-1} \Theta_{ir}^{(\sigma-1)/\theta} \int_{\tilde{\varphi}_{ir}}^{\tilde{\varphi}_{ir+1}} \varphi^{\sigma-1} dG_i\left(\varphi\right) - w_i \sum_{r=1}^{J} f_{ir} \int_{\tilde{\varphi}_{ir}}^{\infty} dG_i\left(\varphi\right) = w_i f_e.$$

Next, invoking the Pareto distribution, $G_i\left(\varphi\right) = 1 - \left(\underline{\varphi}_i/\varphi\right)^{\kappa}$, and solving for the integrals, we obtain:

$$\gamma^{(\sigma-1)/\theta} B_i \sum_{r=1}^{J-1} \Theta_{ir}^{(\sigma-1)/\theta} \kappa \left(\underline{\varphi}_i\right)^{\kappa} \frac{\left(\tilde{\varphi}_{ir}\right)^{\sigma-\kappa-1} - \left(\tilde{\varphi}_{ir+1}\right)^{\sigma-\kappa-1}}{\kappa-\sigma+1} - w_i \sum_{r=1}^{J} f_{ir} \left(\frac{\underline{\varphi}_i}{\tilde{\varphi}_{ir}}\right)^{\kappa} = w_i f_e.$$

Plugging the thresholds in (B.6) delivers

$$\begin{aligned}
&\frac{\kappa}{\kappa-\sigma+1}\left(\frac{\underline{\varphi}_i}{\tilde{\varphi}_{i1}}\right)^{\kappa} w_i f_{i1} - \frac{\kappa}{\kappa-\sigma+1}\left(\frac{\underline{\varphi}_i}{\tilde{\varphi}_{i2}}\right)^{\kappa} \frac{\Theta_1^{(\sigma-1)/\theta}}{\left(\Theta_{i2}^{(\sigma-1)/\theta} - \Theta_1^{(\sigma-1)/\theta}\right)} w_i f_{i2} \\
&\quad + \kappa \left(\underline{\varphi}_i\right)^{\kappa} \sum_{r=2}^{J-1} \Theta_{ir}^{(\sigma-1)/\theta} \frac{\left(\tilde{\varphi}_{ir}\right)^{-\kappa} \frac{w_i f_{ir}}{\left(\Theta_{ir}^{(\sigma-1)/\theta} - \Theta_{ir-1}^{(\sigma-1)/\theta}\right)} - \left(\tilde{\varphi}_{ir+1}\right)^{-\kappa} \frac{w_i f_{ir+1}}{\left(\Theta_{ir+1}^{(\sigma-1)/\theta} - \Theta_{ir}^{(\sigma-1)/\theta}\right)}}{\kappa-\sigma+1} \\
&\quad - w_i \sum_{r=1}^{J} f_{ir} \left(\frac{\underline{\varphi}_i}{\tilde{\varphi}_{ir}}\right)^{\kappa} = w_i f_e.
\end{aligned}$$

Expanding the summation involving the terms Θ_{ir}, canceling the terms in $\Theta_{ir}^{(\sigma-1)/\theta} - \Theta_{ir-1}^{(\sigma-1)/\theta}$, and simplifying, we finally obtain

$$\frac{\sigma-1}{\kappa-\sigma+1} \sum_{r=1}^{J} \left(\frac{\underline{\varphi}_i}{\tilde{\varphi}_{ir}}\right)^{\kappa} f_{ir} = f_{ei}. \tag{B.7}$$

It is worth emphasizing that this equation holds regardless of the relative values of $\sigma - 1$ and θ as long as these parameters and the degree of heterogeneity in fixed costs are such that a hierarchy in sourcing decisions exists. The key insight of Proposition 1 is that $\sigma - 1 > \theta$ is a sufficient condition for this hierarchical structure to emerge regardless of the values of the fixed costs of offshoring f_{ij}.

In deriving equation (B.7), we have assumed that, from the point of view of firms in country i, the ranking of the appeal of the various source countries was strict. Whenever $\sigma - 1 > \theta$, the complementary in the sourcing decisions of firms implies, however, that the set of firms sourcing from two distinct countries j and k can in principle coincide. Intuitively, it could be the case that sourcing from country j can only be profitable when a firm in i also sources from country k, and vice versa. Fortunately, the above analysis can be readily adapted to deal with this sort of situations. More specifically, it suffices to define a *merged* country $j \cup k$ with a sourcing potential equal to the sum of j's and k's sourcing potential and with a sourcing fixed cost also equal to the sum of j's and k's sourcing fixed costs. This merged country can then be assigned a position r in the ranking of sourcing appeal across countries, and then it only suffices to be careful to run the summations in the expressions above replacing J with $J - \mathcal{M}$ where $\mathcal{M}$ is the number of countries that have been *dropped* by being merged with other countries. It is then straightforward to see that one can again find its way to equation (B.7).

Note that equation (B.7) in turn implies that

$$\int_{\tilde{\varphi}_i}^{\infty} \sum_{j \in \mathcal{J}_i(\varphi)} f_{ij} dG_i(\varphi) + f_{ei} = \left(\frac{\sigma - 1}{\kappa - \sigma + 1} + 1 \right) f_{ei},$$

and thus plugging this expression in (14), we can conclude that

$$N_i = \frac{(\sigma - 1)\, \eta L_i}{\sigma \kappa f_{ei}}, \tag{B.8}$$

as claimed in footnote 12.

Some of the above expressions are useful in deriving the gravity equation in (18) characterizing bilateral manufacturing trade flows in the case of independent entry decisions (i.e., $\sigma - 1 = \theta$). To see this, begin with equation (15) and plug the formula for the Pareto distribution in (16) to obtain

$$M_{ij} = (\sigma - 1)\, N_i B_i \gamma T_j \left(\tau_{ij} w_j\right)^{-\theta} \kappa \underline{\varphi}_i^{\kappa} \frac{\left(\tilde{\varphi}_{ij}\right)^{\sigma - 1 - \kappa}}{\kappa - \sigma + 1}.$$

With independent entry decisions, the threshold in (B.6) simplifies to

$$\tilde{\varphi}_{ij}^{\sigma - 1} = \frac{w_i f_{ij}}{\gamma B_i T_j \left(\tau_{ij} w_j\right)^{-\theta}}.$$

Plugging this expression for $\tilde{\varphi}_{ij}^{\sigma-1}$ into the previous one for M_{ij}, imposing $\theta = \sigma - 1$, and manipulating the resulting expression in a manner analogous to the derivation of the general gravity equation in (17), we obtain

$$M_{ij} = N_i \left(B_i\right)^{\frac{\kappa}{\sigma - 1}} \left(\tau_{ij}\right)^{-\kappa} \underline{\varphi}_i^{\kappa} \left(w_i f_{ij}\right)^{1 - \frac{\kappa}{\sigma - 1}} \frac{Q_j}{\sum_k N_k \left(B_k\right)^{\frac{\kappa}{\sigma - 1}} \left(\tau_{kj}\right)^{-\kappa} \left(\tilde{\varphi}_k\right)^{\kappa} \left(w_k f_{kj}\right)^{1 - \frac{\kappa}{\sigma - 1}}}.$$

Using (3) and (B.8) and defining

$$\Psi_i = \frac{f_{ei}}{L_i} \underline{\varphi}_i^{-\kappa} P_i^{-\kappa} w_i^{\kappa/(\sigma - 1) - 1},$$

we thus obtain equation (18) in the main text.

B.3 Details on Some Extensions of the Model

Towards the end of section 1, we briefly mentioned three extensions of our theoretical model. In this section of the Online Appendix we provide more details on these extensions. Because we do not incorporate these features into the structural estimation and quantitative analysis, we will limit ourselves to discussing the effects of these extensions on firm behavior, and not on the aggregate implications of the model.

A. Tradable Final Goods: Exporting and Importing

In the benchmark model in the main text, we have assumed that final-good varieties are prohibitively costly to trade across borders. We have done so to focus our analysis on the determinants and implications of selection into global sourcing. In this section, we briefly relax this assumption and demonstrate the existence of intuitive complementarities between the extensive margin of exporting and that of importing at the firm level.

Suppose then that trade in final-varieties is only partially costly and involves both iceberg trade costs τ_{ij}^X as well as fixed costs f_{ij}^X of exporting. Firm behavior conditional on a sourcing strategy is largely analogous to that in section 2.1. In particular, after observing the realization of its supplier-specific productivity shocks, each final-good producer will continue to choose the location of production for each input to minimize costs, which will lead to the same marginal cost function $c_i(\varphi)$ obtained above in equation (9). The main novelty is that the firm will now produce output not only for the domestic market but also for a set of endogenously chosen foreign markets, which constitute the firm's 'exporting strategy'. We can then express the problem of determining the optimal exporting and sourcing strategies of a firm from country i with core productivity φ as:

$$\begin{aligned}\max_{\substack{I_{ij}^M \in \{0,1\}_{j=1}^J \\ I_{ik}^X \in \{0,1\}_{k=1}^J}} \pi_i\left(\varphi, \mathbf{I}^M, \mathbf{I}^X\right) &= \varphi^{(\sigma-1)} \left(\gamma \sum_{j=1}^J I_{ij}^M T_j \left(\tau_{ij} w_j\right)^{-\theta}\right)^{(\sigma-1)/\theta} \sum_{k=1}^J I_{ik}^X \left(\tau_{ik}^X\right)^{1-\sigma} B_k \\ &\quad -w_i \sum_{j=1}^J I_{ij}^M f_{ij} - w_i \sum_{k=1}^J I_{ik}^X f_{ij}^X,\end{aligned}$$

Note that $\mathbf{I}^M$ and $\mathbf{I}^X$ denote the vector of extensive margin import and export decisions, respectively. It is straightforward to see that, whenever $(\sigma-1)/\theta > 1$, this more general profit function continues to feature increasing differences in $\left(I_j^M, I_k^M\right)$ for $j,k \in \{1,...,J\}$ with $j \neq k$, and also features increasing differences in $\left(I_j^M, \varphi\right)$ for any $j \in \{1,...,J\}$. As a result, Proposition 1 continues to apply here and we obtain a 'pecking order' in the extensive margin of offshoring in the complements case.

The key new feature of the above profit function $\pi_i\left(\varphi, \mathbf{I}^M, \mathbf{I}^X\right)$ is that it also exhibits increasing differences in $\left(I_j^M, I_j^X\right)$ for any $j,k \in \{1,...,J\}$ and increasing differences in $\left(I_j^X, \varphi\right)$ for any $j \in \{1,...,J\}$. This has at least two implications. First, regardless of whether $\sigma - 1 > \theta$ or $\sigma - 1 < \theta$, any change in parameters that increases the sourcing capability $\Theta_i(\varphi)$ of the firm – such as reduction in any τ_{ij} or an increase in any T_j – will necessarily lead to a (weak) increase in the vector $\mathbf{I}^X$, and thus (weakly) increase the export margin of exporting. Second, restricting attention to the complements case $(\sigma-1)/\theta > 1$, the model delivers a complementarity between the exporting and importing margins of firms. For instance, holding constant the vector of residual demand parameters B_i, reductions in the costs of trading final goods across countries will not only increase the participation of firms in export markets, but will also increase the extensive margin of sourcing, in the sense that vector $\mathbf{I}^M$ is non-increasing in τ_{ik}^X. Furthermore, as firm productivity increases, the participation of firms in both export and import markets increases, and at a faster rate than when one of these margins is shut down.

B. Introducing Value Added in Assembly

In our benchmark model, we assume that the marginal cost of final-good producers consists of the cost of procuring a measure one of intermediate inputs. Here we consider the case in which final-good producers also hire local labor to assemble the bundle of inputs. In particular, let the marginal cost for firm φ based in country i of producing a unit of a final-good variety now be

$$c_i(\varphi) = \frac{1}{\varphi}\left(\int_0^1 (w_i)^{\mu}\left(z_i\left(v,\varphi;\mathcal{J}_i(\varphi)\right)\right)^{(1-\mu)(1-\rho)} dv\right)^{1/(1-\rho)}, \tag{B.9}$$

which is analogous to equation (5) except for value-added (labor payments) accounting for a share $\mu \in (0,1)$ of the costs of assembly.

It should be clear that the use of labor in final-good production does not affect the location from which inputs are sourced conditional on a sourcing strategy. Following the same steps as in the benchmark model, we find the same intermediate input import shares as in equation (7), the same sourcing potential as in (8), and a resulting profit function conditional on a sourcing strategy $\mathcal{J}_i(\varphi)$ equal to

$$\pi_i(\varphi) = \varphi^{\sigma-1}(w_i)^{-\mu(\sigma-1)}\left(\gamma\Theta_i(\varphi)\right)^{(1-\mu)(\sigma-1)/\theta} B_i - w_i \sum_{j\in\mathcal{J}_i(\varphi)} f_{ij}, \tag{B.10}$$

which is analogous to equation (10) in the main text. The two main differences are that country i's wage rate now directly affects operating profits, and that the elasticity of firm profits to the firm's sourcing capability is equal to $(1-\mu)(\sigma-1)/\theta$ rather than $(\sigma-1)/\theta$, as in our benchmark model. The profit function π_i continues to be supermodular in φ and $\Theta_i(\varphi)$, but now features increasing differences in (I_{ij}, I_{ik}) for $j,k \in \{1,...,J\}$ and $j \neq k$, whenever $(1-\mu)(\sigma-1)/\theta > 1$. As a result, the main Propositions 1-3 characterizing the optimal sourcing strategy and firm-level comparative statics continue to hold in this extension, except that the region of the parameter space in which import entry decisions are complementary is given by $(1-\mu)(\sigma-1)/\theta > 1$ instead of $(\sigma-1)/\theta > 1$.

Clearly, for large values of μ it is possible that $(\sigma-1)/\theta > 1$ but $(1-\mu)(\sigma-1)/\theta < 1$. One might then be concerned that, because in our estimation we back out σ from markup data and θ from the effect of cost-shifters on the import shares in (9), we might infer that the complements case best describes the data when in fact $(1-\mu)(\sigma-1)/\theta < 1$, and thus import entry decision are substitutes. Nevertheless, as we describe in Appendix A.1, when constructing our measure of domestic intermediate input purchases, we add a firm's total production-worker wage bill in manufacturing to its total expenditures on material inputs. We include production worker wages in a firm's input costs because our complete-contracting model does not determine whether intermediate inputs are sourced from external suppliers or are provided within firm boundaries, thus constituting value added (which maps to the share μ in this extension).

In sum, our construction of domestic input shares is such that our model interprets some of the domestic intermediate inputs sourced by the firm as being provided within the firm by production workers. Of course, these production worker services do not constitute the entire amount of domestic labor services used by the firm. Yet, this is unlikely to overturn our key condition $(\sigma-1)/\theta > 1$ for two reasons. First, the majority of non-production worker labor in our framework is more likely to constitute a fixed rather than a marginal cost, and will therefore not affect μ. Second, even if some non-production worker labor relates to marginal costs, these are likely a small fraction, and our benchmark estimates of $\sigma = 3.85$ and $\theta = 1.79$. imply that small changes in μ will not affect our conclusion.

C. Endogenous Input Variety

Our benchmark model assumes that all final good producers use a measure one of inputs. We next briefly outline how our results extend and generalize to the case in which the final-good producer is allowed to choose the complexity of production, as captured by the measure of inputs used in production (see Acemoglu et al., 2007). As we shall see, this ends up producing an equilibrium essentially identical to the one we have described above, but with additional implications for how the measure of inputs purchased by firms changes with firm productivity.

The formal details of this extension are as follows. Final-good production continues to combine inputs according to a CES technology, but we now let the measure of inputs be firm-specific and given by $n_i(\varphi)$. More specifically, we generalize the marginal cost function in (5) as follows:

$$c_i\left(\{j(v)\}_{v=0}^{1}, \varphi\right) = \frac{1}{\varphi} n_i(\varphi)^{1/(\rho-1)-\lambda} \left(\int_0^{n_i(\varphi)} \left(\tau_{ij(v)} a_{j(v)}(v, \varphi) w_{j(v)}\right)^{1-\rho} dv\right)^{1/(1-\rho)}.$$

A higher value of $n_i(\varphi)$ enhances productivity via an input variety effect. As in Acemoglu et al. (2007), we introduce the term $n_i(\varphi)^{1/(\rho-1)-\lambda}$ in front of the integral in order to control the importance of variety effects for productivity via a parameter λ disentangled from the elasticity substitution between inputs ρ. In order to create a check on the optimal degree of complexity, we assume that firms face a fixed cost equal to $w_i n_i(\varphi) f_i^n$ when combining $n_i(\varphi)$ inputs in production. As in our benchmark model, in each of the countries in which the final-good producer incurred the fixed cost of sourcing, there is a competitive fringe of potential suppliers that can provide differentiated inputs to the firm with a firm-specific intermediate input efficiencies drawn from a Fréchet distribution.

With a continuum of inputs, the equilibrium measure of inputs used in production by a final-good producer has no implications for the distribution of input prices faced by that producer. Exploiting this feature, we can use derivations analogous to those in the benchmark model and in Eaton and Kortum (2002), to write the marginal cost of production as

$$c_i(\varphi) = \frac{1}{\varphi}(n_i(\varphi))^{-\lambda}(\gamma\Theta_i(\varphi))^{-1/\theta}, \tag{B.11}$$

and the firm's profits conditional on a sourcing strategy $\mathcal{J}_i(\varphi)$ as

$$\pi_i(\varphi) = \varphi^{\sigma-1}(n_i(\varphi))^{(\sigma-1)\lambda}(\gamma\Theta_i(\varphi))^{(\sigma-1)/\theta} B_i - w_i \sum_{j\in\mathcal{J}_i(\varphi)} f_{ij} - w_i n_i(\varphi) f_i^n,$$

where B_i is again given in (3). It is clear that conditional on a sourcing strategy $\mathcal{J}_i(\varphi)$ – and thus a value of $\Theta_i(\varphi)$ – this profit function is supermodular in productivity and the measure of inputs $n_i(\varphi)$.[4] Hence, a novel prediction from this extension is that more productive firms will tend to source more inputs from all sources combined (domestic and foreign) than less productive firms, even when these firms share a common sourcing strategy.[5] In the complements case with $\sigma - 1 > \theta$, this variant of the model also predicts that more productive firms will tend to buy (weakly) more inputs from *any* source than less productive firms.

As pointed out in the main text, it is important to emphasize that input-specific fixed costs do not serve as a substitute for country-specific fixed costs of sourcing. By this we mean that, in the absence of the latter type of fixed costs, our framework would not be able to account for the key facts motivating our benchmark model, since in such a case, all firms would source inputs from all countries, thus violating the patterns in Figure 1 and Table 1 in the Introduction.

[4] For the choice of $n_i(\varphi)$ to satisfy the second-order conditions for a maximum, we need to impose that the efficiency gains from input variety are small enough to guarantee that $(\sigma-1)\lambda < 1$ holds.

[5] Although our benchmark model is also consistent with more productive firms importing more inputs than less productive firms, with a common measure of inputs, this could only be rationalized by having more productive firms sourcing less inputs domestically than less productive firms.

C Online Data Appendix (Not for Publication)

C.1 Sample

Table C.1 provides details of all firms in the Economic Censuses with positive sales and employment. The first row corresponds to firms that consist only of manufacturing establishments ("M" firms). The second row presents information for all firms with one or more manufacturing establishments and at least one establishment outside of manufacturing ("M+" firms). Together, these two types of firms comprise our sample.

Table C.1: Sample of firms

Firm Type	Firms	Imports $millions	Empl 000s	Sales $billions	Fraction Importers
Manufacturing Only (M)	238,800	76,020	5,869	1,239	0.23
Manufacturing Plus (M+)	11,500	829,592	20,581	9,527	0.77
Other (O)	4,006,400	100,169	77,400	12,620	0.03
Wholesale Only (W)	300,300	241,077	3,489	2,305	0.31
Wholesale and Other (WO)	7,600	141,753	6,365	2,259	0.51
Total	4,564,600	1,388,612	113,704	27,950	0.06

Notes: Table provides information on firms in the Economic Census with positive sales and employment. Analysis in paper based on all M and M+ firms. Numbers rounded for disclosure avoidance. Imports exclude products classified under mining.

C.2 Premia and Decomposition

Following Bernard et al. (2007), we report employment, sales, and productivity premia for firms that import in 2007. To do so, we regress the log each of these variables on an importer dummy and industry controls. Table C.2 reports the results. The top panel presents results using 2007 values of firm size and productivity and the bottom panel uses 2002 values. The first column of the table shows that firms importing in 2007 are larger and more productive than non-importers. In addition, these premia for 2007 import status were present in 2002. The magnitude of these import premia is similar to those typically found for exporters, with importers being on average about three times larger and about eight percent more productive than non-importers.

We confirm the importance of the extensive margins of trade, both in terms of the number of imported products and the number of importing firms, first documented by Bernard et al. (2009). Following those authors, we decompose total U.S. imports $M_{US,j}$ from country j according to

$$ln(M_{US,j}) = ln(N_{US,j}^{firms}) + ln(N_{US,j}^{prods}) + ln\left(\frac{O_{US,j}}{N_{US,j}^{firms} \times N_{US,j}^{prods}}\right) + ln\left(\frac{M_{US,j}}{O_{US,j}}\right),$$

where $O_{US,j}$ is the number of firm-product combinations with positive imports from j. The first two terms represent the unique numbers of firms ($N_{US,j}^{firms}$) importing and products ($N_{US,j}^{prods}$) imported

Table C.2: Premia for 2007 importers

	All Firms	Non-2002 Importers
2007 Log employment	1.552	1.268
2007 Log sales	1.741	1.401
2007 Log value-added per worker	0.077	0.052
2002 Log employment	1.465	1.153
2002 Log sales	1.641	1.271
2002 Log value-added per worker	0.083	0.059

Notes: All results are from OLS regressions of the variable listed on the left on an indicator equal to one if the firm imported in 2007. The first column includes all firms (250,300 in top panel and 181,500 in bottom). The second column is based on the subset of firms that did not import in 2002 (158,800 firms). Results with 2002 variables are based only on the subset of firms that existed in 2002. All regressions include four digit industry controls. All coefficients are statistically significant at the one percent level.

from country j. The third term, referred to as the density, captures the fraction of firm-production combinations with positive import values. The final term captures the intensive margin. It measures the average import value per firm-product observation, for all combinations with positive imports. Table C.3 presents coefficients from OLS regressions of the logarithm of each margin on the logarithm of total trade. As is well known, these OLS coefficients sum to one, with each coefficient representing the share of overall variation explained by each margin. As in previous work, we find that variation in the extensive margins account for the majority of the variation in aggregate import volume across countries. The extensive margins account for a total of 65 percent, while the intensive margin explains just 35 percent of the total variation.

Table C.3: Extensive and intensive margin decomposition

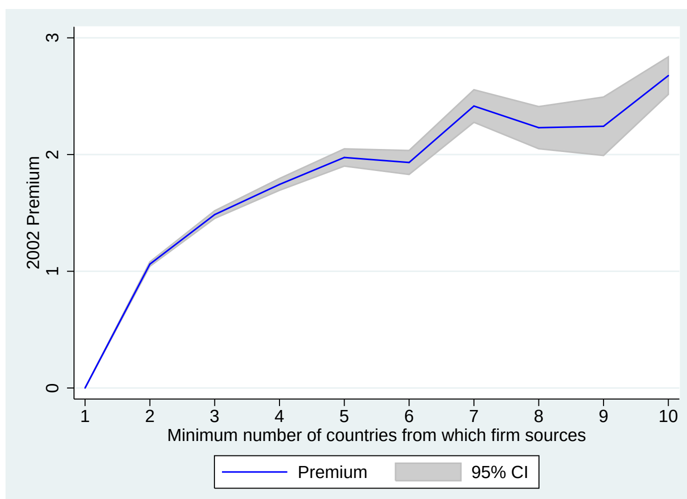
	Log of number of importing firms	Log of number of imported products	Log of Density	Log of average import value per product per firm
	0.541	0.535	-0.426	0.350
	(0.016)	(0.015)	(0.014)	(0.018)
Adj. R^2	0.85	0.84	0.81	0.64
Observations	221	221	221	221

Notes: Each column corresponds to results from regressing the log of each margin on the log of total import values. The coefficients are a measure of the fraction of variation in aggregate import volumes across countries explained by that margin. Density represents the fraction of all possible firm-product combinations with positive import values. The estimated coefficients sum to one.

C.3 Premia Figures

In the Introduction, we plot the relationship between the log of firm sales and the minimum number of countries from which a firm sources. To construct the figure, we regress the log of firm sales on cumulative dummies for the number of countries from which a firm sources and industry controls. The omitted category is non-importers, so the premia are interpreted as the difference in size between non-importers and firms that import from at least one country, at least two countries, etc. The horizontal axis denotes the number of countries from which a firm sources, with 1 corresponding to firms that use only domestic inputs. The introduction figure controls for firm industry with variables that measure the share of a firm's employment in four-digit NAICS industries. (These are simply industry fixed effects for all firms that span only one industry.) Here we show that the patterns depicted in the introduction are robust when considering a firm's size prior to importing and when controlling for the products that a firm imports or exports. Figure C.1 plots the relationship between a firm's log sales in 2002 and the number of countries from which it sources in 2007, for firms that did *not* import in 2002. Figure C.2 depicts the relationship when controlling for the number of products a firm imports (left panel) and the number of products the firm exports (right panel). In additional undisclosed results, available upon request, we show similar patterns when using firm employment and the log of value-added labor productivity.

Figure C.1: Importer premia for firm's 2002 sales, limited to firms that do not import in 2002,

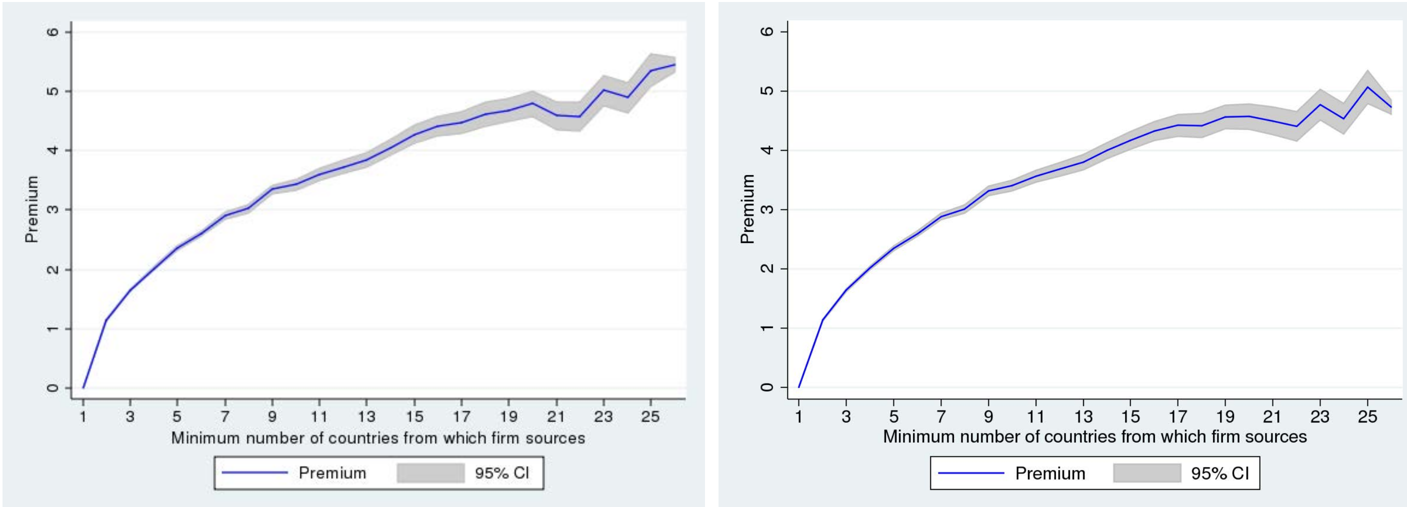


C.4 Measuring Total and Domestic Input Use

We construct a measure of a firm's total intermediate input purchases using material input purchases from the Censuses of Manufactures, Construction, and Mining and merchandise purchases from the Census of Wholesale. This approach ensures a more complete metric of a firm's inputs than traditional measures based purely on manufacturers' use of materials because it takes into account the input usage of both the manufacturing as well as the wholesale establishments of U.S. firms.[6]

[6]The wholesale sector includes a significant number of plants that design goods and coordinate production, often by offshoring, but do not perform physical transformation activities (see Bernard and Fort, 2015, for

Figure C.2: Importer premia with product controls



(a) Controlling for number of products imported by the firm

(b) Controlling for number of products exported by the firm

The model does not take a stance on whether intermediate inputs are sourced within or across firm boundaries. For the purposes of this paper, this is of little relevance for international transactions, but it might lead to important biases in our measure of overall input use if a significant share of domestic inputs is produced within the firm and is recorded as value added. For this reason, we add a firm's total production-worker wage bill to the firm's total input purchases. In terms of our model, this corresponds to assuming that the final-good producer employs production workers to manufacture internally any inputs produced by the firm, while it uses the other factors of production (nonproduction workers, physical capital, and land) to combine intermediate inputs and cover all fixed costs. This approach is also motivated by the notion that the services typically provided by production workers are particularly offshorable. Table C.4 presents summary statistics on foreign input shares. The mean share of imported inputs is 0.14, with a standard deviation of 0.23.

Table C.4: Summary statistics on firms' share of foreign input sourcing

mean	std. dev.	median	75 pctile	90 pctile
0.14	0.23	0.03	0.15	0.47

Notes: This table reports statistics on the share of imported inputs for the subset of offshoring firms.

a description). Ignoring these plants' inputs could severely understate multi-sector firms' total inputs. For example, Feenstra and Jensen (2012) find that a significant fraction of some manufacturing firms' imports are not reported as input purchases. We address this issue by including a firm's wholesale plants' inputs. Although there is no way to measure inputs for establishments outside the manufacturing and wholesale sectors, those plants are much less likely to be involved in production or importing. An alternative approach would be to use an estimate of the demand elasticity σ and exploit the CES structure of our model to back out input usage from sales data.

This new measure of total intermediate input purchases is highly correlated with traditional input measures for manufacturing firms based on reported inputs of materials and parts from only the Census of Manufactures. A firm's share of inputs from country j, χ_{ij}, is computed as imports from j divided by total input purchases. A firm's share of domestic inputs, χ_{ii}, is simply the difference between its total input purchases and imports, divided by total input purchases. A very small fraction of firms has negative values for their implied domestic input purchases using this approach. This occurs when a firm's total input purchases are less than its imports. Likely explanations for this are measurement error and imports of capital equipment. To address any potential bias from dropping these firms, we therefore use the maximum of a firm's implied domestic input use and its production worker wages as its domestic input usage and adjust total input usage accordingly.[7]

C.5 Robustness of Country Sourcing Potentials

In this section we further elaborate on our approach to estimating and interpreting country sourcing potentials. To assess the robustness of our estimates, we re-estimate sourcing potentials using firms that import from one country, 2 countries, 3 countries, 4-9 countries, 10-19 countries, and 20+ countries. The correlation coefficients between our baseline estimates and those using the samples of firms that source from just one country, and those sourcing from just 2 countries are quite low. This seems to be driven by strange selection criteria, since a firm sourcing only from a non-top country (e.g., El Salvador) is quite different from the average firm, and not representative of the aggregate patterns our theory seeks to explain. When we limit the set of countries to the top 10 countries based on number of firms (as listed in Table 1), we find a correlation coefficient of 0.708 for firms sourcing from just one country. The correlation coefficient between our baseline estimates and the other samples is higher for all other samples (we have not disclosed each correlation due to disclosure concerns). The correlation coefficient between our baseline estimates and the sample of firms sourcing from three countries is 0.417 across all countries, and becomes substantially higher as the sourcing set grows. As an alternative check, we also examined the trade-weighted correlation coefficients between our baseline estimates and those based on each of the samples described above. The trade-weighted correlation coefficients for all subsamples are in the same range, or substantially higher, as the coefficient for firms sourcing from at least three countries.

When estimating sourcing potentials, we have also noticed that the estimates are somewhat sensitive to controlling for firm size. Large firms tend to have larger domestic shares, a feature at odds with our theory. On the other hand, there are certain countries from which some extremely large firms import disproportionately large shares of inputs (e.g., Mexico). This heterogeneity is beyond the scope of this paper, but suggests there is substantial scope for exploring this variation in future work.

C.6 Estimation of the Trade Elasticity

We identify the firm-level trade elasticity, θ, using variation in country wages. The wage data are from the International Labor Organization reported average nominal monthly wages in local currencies for 2007. These wages were converted to USD using exchange rates from the World Bank. When data for 2007 were missing, we used data for the next closest year within a two-year range. To address the fact that skill levels differ across countries, we follow Eaton and Kortum (2002) and use human

[7] This approach leads to a tiny number of firms with zero implied domestic sourcing. In an alternative approach, we have limited the sample of firms in the structural analysis to firms with at least fifty percent of their sales in manufacturing. We do not report the numbers from this analysis here to minimize disclosure issues, but note that the numerical results are very similar and the qualitative interpretations remain unchanged.

capital adjusted wages, $w_i^{HCadj} = (w_i)e^{-0.06H_i}$, where H_i is the years of schooling from Barro and Lee (2010) and 0.06 represents the return to education estimated in Bils and Klenow (2000).

Table C.5 presents several robustness tests for estimation of the firm-level trade elasticity. We use data on country GDP from the World Bank Development Indicators (WDI) and country tariffs are the simple average of country tariffs from the World Bank WITS database. Column 1 shows that our estimate of θ is somewhat smaller, suggesting greater complementarity, when controlling for GDP. Column 2 shows that it is virtually unchanged when controlling for tariffs. In column 3 we report the results of constraining the coefficient on tariffs and wages to be the same. Finally, column 4 shows results when we do not control for the number of firms in an country.

Table C.5: Robustness estimates for the firm-level trade elasticity

Dependent variable is log ξ				
	IV R1	IV R2	IV R3	IV R4
HC adjusted wage	-1.31	-1.81		-2.08
	(0.28)	(0.71)		(0.75)
log(1+tariff)+ log wage			-1.54	
			(0.58)	
log distance	-0.49	-0.72	-0.54	-0.88
	(0.22)	(0.35)	(0.26)	(0.36)
Common language	0.17	0.24	0.12	0.15
	(0.24)	(0.32)	(0.26)	(0.32)
log R&D	0.34	0.52	0.49	0.50
	(0.13)	(0.13)	(0.11)	(0.09)
log KL	0.23	0.45	0.30	0.60
	(0.22)	(0.40)	(0.33)	(0.45)
Control of corruption	0.48	0.61	0.53	0.73
	(0.18)	(0.31)	(0.27)	(0.36)
log GDP	0.18			
	(0.18)			
log (1+tariff)		6.75		
		(9.78)		
log no. of firms	0.00	-0.03	0.01	
	(0.10)	(0.13)	(0.12)	
Constant	-14.19	-11.14	-10.31	-11.76
	(4.75)	(2.36)	(1.96)	(2.73)
Observations	57	57	57	58
F-Stat	48.04	6.30	3.91	7.36

Notes: Standard errors in parentheses. The human capital-adjusted wage is instrumented by population. In IV R3, the coefficient on wages and tariffs is constrained to be identical. For this specification, both population and tariffs are the instruments. F-Stat is the Cragg-Donald F-statistic for the excluded instrument(s).

In section 4.2 of the main text, we claim that the orthogonality condition that ensures that our firm-level estimates of θ are consistent, does *not* guarantee that the estimate in column 5 is consistent as well. We now substantiate this claim. Remember from equation (19) that

$$\frac{\chi_{ij}^n}{\chi_{ii}^n} = T_j \left(\tau_{ij} w_j\right)^{-\theta} \epsilon_j^n, \tag{C.1}$$

where ϵ_j^n represents measurement error, or a shock that is only observed by firms after their sourcing strategy is selected. Under these conditions, we have $\mathbb{E}\left(\log \epsilon_j^n \mid \log\left(T_j\left(\tau_{ij}w_j\right)^{-\theta}\right)\right) = 0$. In the main text, we leveraged this orthogonality condition to obtain a consistent estimate of $\log \xi_j = \log\left(T_j\left(\tau_{ij}w_j\right)^{-\theta}\right)$ using firm-level data and then projected this estimate on human-capital-adjusted wages to obtain an estimate of θ in a simple cross-country regression.

As pointed out in sections 2.4 and 4.2, as a potential alternative way to back out θ, we could have simply aggregated the import data at the country-level and estimated θ exploiting the relationship:

$$\sum_{\{n:j\in\mathcal{J}^n\}} \chi_{ij}^n = T_j\left(\tau_{ij}w_j\right)^{-\theta} \sum_{\{n:j\in\mathcal{J}^n\}} \chi_{ii}^n \epsilon_j^n. \tag{C.2}$$

In the main text, we note that if $\epsilon_j^n = 1$, this implies that a gravity equation that controls for the domestic input purchases of firms that source from j should deliver a trade elasticity equal to θ. In the presence of measurement error, i.e., $\epsilon_j^n \neq 1$, it is not clear however that such a regression would provide a consistent estimate of θ. To see this, note that we can write equation (C.2) as

$$\log\left(\sum_{\{n:j\in\mathcal{J}^n\}} \chi_{ij}^n\right) - \log\left(\sum_{\{n:j\in\mathcal{J}^n\}} \chi_{ii}^n\right) = \log\left(T_j\tau_{ij}^{-\theta}\right) - \theta\log w_j + u_{ij},$$

where

$$u_{ij} = \log\left(\sum_{\{n:j\in\mathcal{J}^n\}} \frac{\chi_{ii}^n}{\sum_{\{n:j\in\mathcal{J}^n\}}\chi_{ii}^n}\epsilon_j^n\right).$$

It is then clear that even if $\log\left(T_j\left(\tau_{ij}w_j\right)^{-\theta}\right)$ and ϵ_j^n are uncorrelated, $\log\left(T_j\left(\tau_{ij}w_j\right)^{-\theta}\right)$ and u_{ij} may well be correlated because the sourcing potential of a country directly impacts the set of firms sourcing from j (i.e., n such that $j \in \mathcal{J}^n$), as well as the share of their spending on domestic inputs (i.e., χ_{ii}^n). For these reasons, we treat the estimate of θ in column 5 of Table 4 with caution and consider instead the one in column 2, based on firm-level data, as our benchmark one.

C.7 Moments and Model Fit - Various Models

In Tables C.6 and C.7 we present the value of the moments used in the estimation for various models at the estimated parameters.

C.8 Lower Chinese Fixed Costs Counterfactual

As an alternative to an increase in Chinese sourcing potential from 1997 to 2007, we explore the effects of a change in fixed costs of sourcing from China that is calibrated to explain the growth in the share of aggregate imports from China from 1997 to 2007 (same target as in the main section of the paper). We find that under constant sourcing potentials, in 1997 fixed costs of sourcing from China would have needed to be 8.85 times larger than their size in 2007. Table C.8 is analogous to Table 7 in the main text and illustrates the third country effects of this shock to the fixed costs of sourcing from China. It is visible that the third market effects are qualitatively similar to those in obtained for an increase in the Chinese sourcing potential, but compared to the data, this alternative counterfactual underpredicts the fraction of firms that would have imported from China in 1997. With respect to the price index, the effects are similar to the Chinese sourcing potential increase discussed in the main text, also implying about a 0.19 percent fall in the price index. Finally, this counterfactual fails to

Table C.6: Moments and other statistics at estimated parameters – Various Models

	Baseline model	Independent entry decisions model ($\theta = 2.85$)	Universal importing model	Common fixed costs across countries model	Data
Targeted moments:					
$\hat{m}_1(\hat{\delta})$ (first element)	0.268	0.268	1.000	0.174	0.258
$\hat{m}_1(\hat{\delta})$ (second element)	0.073	0.073	1.000	0.067	0.085
$\hat{m}_2(\hat{\delta})$: corr(model,data)	0.984	0.984	0.000	0.681	-
$\hat{m}_3(\hat{\delta})$	0.498	0.498	0.498	0.498	0.500
Share of firms sourcing from China	0.080	0.080	1.000	0.174	0.086
Untargeted moments:					
Share of imports in total sourcing	0.037	0.035	0.162	0.040	0.186
Imports by ctr: corr(model,data)	0.783	0.784	0.717	0.671	-
Share of China in aggregate imports	0.201	0.206	0.118	0.244	0.137
Total following pecking order	0.338	0.340	1.000	0.091	0.360

Notes: The moments are described in the text above equation (21). The detailed list of $\hat{m}_2(\hat{\delta})$ for the various models is presented in Table C.7 below. One may be surprised to see that the Total following pecking order statistic is not equal to zero for the Common fixed costs across countries and Universal importing models. We note that for those models, the share of firms following the pecking order is equal to zero up to row 9 in Table 6.

generate an expansion in the U.S. and third-market sourcing of continuers.

C.9 Reduced-Form Evidence on Interdependencies

Constructing China Shock Measures

We construct the China shocks using bilateral trade data from the UN Comtrade database, which we map from six-digit HS codes to six-digit NAICS industries using the concordance from Pierce and Schott (2012). This concordance does not always map to a six-digit NAICS. In those cases where the concordance maps to a five-digit NAICS, we aggregate the analysis accordingly. In addition, the concordance implies zero trade for a number of six-digit NAICS industries. We use the 2007 Census of Manufacturers data to assess the credibility of zero trade flows. Since plants classified in these industries often have significant exports, we conclude that the implied zero trade flows are a data measurement issue. We therefore aggregate the trade data as needed to ensure that every industry has positive imports, though we maintain the disaggregated information whenever it is available. For example, consider a four-digit NAICS that is an aggregation of four six-digit NAICS codes. If we have detailed import shares at the NAICS6 level for two of the detailed NAICS6 industries, we use the six-digit shares for those industries. For the remaining two NAICS6 codes with implied zero shares, we aggregate to the lowest level of aggregation necessary to ensure non-zero flows for all codes and assign the aggregate share to the remaining NAICS6 codes that would otherwise have had zero implied shares.

This firm-level shock is given by

$$shock_n^{input} = \sum_{h \in n} s_{nh} China_{h2007}^{input} - \sum_{h \in n} s_{nh} China_{h1997}^{input}, \tag{C.3}$$

where s_{nh} is industry h's share of firm n's manufacturing sales in 1997. The importance of Chinese imports as inputs in a particular industry is

$$China_{ht}^{input} = \sum_{m \in h} s_{mh} \frac{EU15imports_{mt}^{China}}{EU15imports_{mt}^{World/US}},$$

where s_{mh} is the expenditure share of inputs from industry m in industry h and $\frac{EU15imports_{mt}^{China}}{EU15imports_{mt}^{World/US}}$ is China's share of EU15 country imports in industry m and year t, excluding imports from the US, as well as trade among the EU15 countries. We measure the expenditure shares of inputs using the 1997 BEA input-output tables. We measure Chinese market shares using UN Comtrade data. We follow the general approach in Autor et al. (2013) and use Chinese exports to the following original European Union countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and the U.K.[8] The underlying shock measure is thus a weighted average of changes in Chinese market share in these countries for a firm's inputs, making it unlikely that demand or supply shocks for U.S. firms drive the variation.

Deflating Inputs and Imports

We deflate all nominal values to 1997 values using industry deflators from the NBER-CES productivity database for six-digit NAICS 1997 codes. We use the Fort-Klimek NAICS 2002 codes to classify establishments in both 1997 and 2007 on a consistent industry basis.[9] There is a one-to-one mapping from NAICS 1997 codes to NAICS 2002 codes for manufacturing industries. For plants outside of manufacturing, and for firm imports outside manufacturing, we deflate plant-level variables using the Bureau of Labor Statistics Consumer Price Index for urban consumers, all items, taken from FRED. This deflator value is 1.292 between 2007 and 1997.

We use the deflator series pimat to deflate plant-level non-imported input expenditures, by industry. Since the model implicitly treats production workers as substitutable with purchased material inputs, we deflate their wages using the pimat deflator for the plant's industry. Wholesale plant input purchases are deflated using the CPI. After deflating, we compute real total inputs as $Inputs_n = MatPurch_n + Merch_n^{whole} + ProdWorkerWages_n^{manuf}$.

We use the deflator series piship to deflate plant sales. We also deflate firm imports by industry using the piship deflators. Firm imports are reported at the level of HS10, 2007 vintage. We first apply the Pierce-Schott HS10 to NAICS concordance to convert import values to NAICS 2007. We then concord the NAICS 2007 codes to NAICS 2002 codes using sales shares we construct from the 2007 CM data.[10] We then deflate firm imports by the industry of the imports themselves, using the piship industry deflators.

Finally, we compute real domestic inputs as deflated total inputs - deflated total imports. We drop a very small number of firms for which implied deflated domestic input purchases are zero or negative.

[8] We use EU15 countries since we do not face the same data constraints as ADH who need trade data back to 1990. All our results are robust to using the ADH countries, but our first stage statistics are somewhat weaker, especially for the results in Online Appendix Table C.11, where we instrument for both firm-level Chinese imports and Chinese import penetration in a firm's industry.

[9] See Fort and Klimek (2016) for details on these industry codes.

[10] The 2007 CM collects establishment-level data on a NAICS 2002 and NAICS 2007 basis, which allows us to construct an aggregate sales-weighted concordance.

Robustness Tests for the Evidence on Interdependencies

Here we present summary statistics for manufacturing firms' in 1997 by their China import status (see table C.9). We also show that the evidence presented in section 5.4 is robust to controlling for import penetration in a firm's industry and to instrumenting for import penetration in a firm's industry (see Tables C.10 and C.11, respectively). We measure Chinese import penetration as total Chinese imports in an industry divided by total US absorption in the industry. We measure absorption using shipments and exports from the CM, and imports from Comtrade data. We aggregate industries as necessary to ensure a positive measure of imports for all industries. In undisclosed results (available internally to researchers with access to the data) we also ensure that the results are robust to excluding Canada and to limiting the treatment group to new China importers. The former is important since the match rates from the EC data to the import data are significantly lower for Canada prior to 2007.

First Stage Statistics

Table C.12 presents first-stage estimates for all the specifications.

C.10 Countries per Product Counts

In section 3.2, we show that most firms source most products from a single location. Table C.14 reproduces these results (right panel), and also shows that in contrast, firms tend to import multiple products from a particular country. Table C.15 shows that the pattern of sourcing most inputs from one location persists for firms that source from at least three foreign countries. We also compare these firm-level statistics to the same numbers for exporting. To make a valid comparison, we must first aggregate to the HS6 level. This ensures the same number of product categories for imports and exports. Table C.16 shows that, even at the HS6 level, most firms source most products from one location. This is in contrast to firms' exporting decisions, where we see that the median firm sells at least one product to three destinations and the 95th percentile sells to 21 countries.

We conclude by reporting some figures that illustrate the superior performance of importers in our sample. Even though U.S. importers constitute only 25.8 % of U.S. firms that perform some manufacturing, the sales of these importers constitute 95.6% of the sales of all firms performing some manufacturing, and their manufacturing sales account for 92.1% of U.S. manufacturing sales. More broadly, when looking at firms in all sectors of the U.S. economy, the sales of importers are 70.2% of the total sales of all U.S. firms. These figures are comparable on the exporting side. The sales of manufacturing exporters constitute 93.7% of the sales of all manufacturing firms, with their manufacturing sales accounting for 90.1% of U.S. manufacturing sales. Furthermore, the sales of exporters in all sectors account for 61.8% of the total sales of U.S. firms.

Table C.7: Moment $\hat{m}_2(\hat{\delta})$ at estimated parameters – Various Models

	Baseline model	Independent entry decisions model ($\theta = 2.85$)	Universal importing model	Common fixed costs across countries model	Data
'CAN'	0.149	0.149	1.000	0.053	0.151
'MEX'	0.037	0.036	1.000	0.055	0.031
'GTM'	0.007	0.007	1.000	0.017	0.001
'SLV'	0.004	0.003	1.000	0.007	0.001
'HND'	0.003	0.003	1.000	0.007	0.002
'CRI'	0.003	0.003	1.000	0.005	0.002
'PAN'	0.000	0.000	1.000	0.000	0.001
'DOM'	0.002	0.002	1.000	0.005	0.003
'TTO'	0.000	0.000	1.000	0.000	0.001
'COL'	0.002	0.002	1.000	0.003	0.003
'VEN'	0.001	0.001	1.000	0.002	0.001
'ECU'	0.000	0.000	1.000	0.001	0.001
'PER'	0.006	0.006	1.000	0.013	0.002
'CHL'	0.005	0.005	1.000	0.005	0.003
'BRA'	0.008	0.008	1.000	0.017	0.011
'ARG'	0.002	0.002	1.000	0.005	0.004
'SWE'	0.010	0.010	1.000	0.005	0.012
'NOR'	0.006	0.005	1.000	0.004	0.004
'FIN'	0.007	0.007	1.000	0.004	0.005
'DNK'	0.007	0.007	1.000	0.003	0.008
'GBR'	0.036	0.036	1.000	0.020	0.046
'IRL'	0.007	0.007	1.000	0.004	0.006
'NLD'	0.015	0.014	1.000	0.008	0.016
'BEL'	0.006	0.006	1.000	0.006	0.011
'LUX'	0.001	0.001	1.000	0.000	0.001
'FRA'	0.018	0.018	1.000	0.016	0.024
'DEU'	0.051	0.051	1.000	0.036	0.052
'AUT'	0.008	0.008	1.000	0.005	0.009
'CZE'	0.002	0.002	1.000	0.004	0.006
'SVK'	0.001	0.001	1.000	0.001	0.002
'HUN'	0.002	0.002	1.000	0.003	0.004
'CHE'	0.016	0.016	1.000	0.009	0.017
'POL'	0.002	0.002	1.000	0.004	0.005
'RUS'	0.003	0.003	1.000	0.012	0.002
'UKR'	0.001	0.001	1.000	0.003	0.001
'ESP'	0.006	0.006	1.000	0.007	0.013
'PRT'	0.004	0.004	1.000	0.005	0.003
'ITA'	0.016	0.016	1.000	0.028	0.034
'SVN'	0.003	0.003	1.000	0.003	0.002
'GRC'	0.001	0.001	1.000	0.002	0.002
'ROM'	0.002	0.002	1.000	0.004	0.002
'BGR'	0.001	0.001	1.000	0.002	0.001
'TUR'	0.004	0.004	1.000	0.009	0.005
'ISR'	0.011	0.011	1.000	0.012	0.009
'SAU'	0.000	0.000	1.000	0.000	0.001
'ARE'	0.001	0.001	1.000	0.002	0.002
'IND'	0.014	0.014	1.000	0.032	0.020
'PAK'	0.013	0.013	1.000	0.036	0.003
'BGD'	0.002	0.002	1.000	0.010	0.001
'LKA'	0.004	0.004	1.000	0.011	0.001
'THA'	0.008	0.008	1.000	0.024	0.011
'VNM'	0.012	0.012	1.000	0.038	0.004
'MYS'	0.006	0.006	1.000	0.014	0.010
'SGP'	0.014	0.014	1.000	0.008	0.010
'IDN'	0.006	0.006	1.000	0.020	0.006
'PHL'	0.005	0.005	1.000	0.016	0.006
'MAC'	0.003	0.003	1.000	0.006	0.001
'CHN'	0.080	0.080	1.000	0.174	0.086
'KOR'	0.022	0.022	1.000	0.033	0.022
'HKG'	0.026	0.026	1.000	0.016	0.019
'TWN'	0.042	0.042	1.000	0.062	0.042
'JPN'	0.036	0.036	1.000	0.036	0.032
'AUS'	0.009	0.008	1.000	0.005	0.012
'NZL'	0.006	0.005	1.000	0.003	0.005
'EGY'	0.001	0.001	1.000	0.003	0.001
'ZAF'	0.002	0.002	1.000	0.004	0.004

Notes: Moment $\hat{m}_2(\hat{\delta})$ is equal to the share of firms that imports from each country.

Table C.8: Third country sourcing effects of Chinese fixed costs shock

Chinese import status	Change in sourcing from U.S.	Change in sourcing from other countries	Change in sourcing from China	Share of firms	Share of imports from China
Entrants	1.007	1.012	∞	0.077	0.691
Continuers	0.994	0.994	0.994	0.003	0.309
Others	0.994	0.987	-	0.920	0.000

Notes: The table groups firms by Chinese import status. Entrants are those firms (i.e. bundles of productivity levels and fixed cost draws) that begin sourcing from China. Continuers are firms that source from China before and after the shock. Others are firms that do not source from China before or after the shock. The shock to the fixed costs of sourcing from China is calibrated to match the observed 178 percent increase in the Chinese import share from 1997 to 2007.

Table C.9: Firm-level means for firm characteristics in 1997, by firms' Chinese import status in 1997

	Sales	Employment	Domestic inputs	China imports	Other country imports	No. source countries
a) Non-importers	4	3	2	0	0	1
b) China importers	1071	307	398	2	74	7.9
c) Other country importers	110	44	50	0	3	3.4

Notes: This table reports firm-level means by firms' 1997 China import status, for the 127,400 firms in the balanced panel used in the regression analyses table 10. No. of source countries includes the US, but excludes China. Inputs and import inflated to 2007 $ values. Employment rounded to nearest 10 and sales, inputs, and imports rounded to nearest $million for disclosure avoidance.

Table C.10: Estimates of the impact of the China shock on firm-level sourcing, controlling for import penetration

Dependent variable is firm-level change from 1997 to 2007 in:

	Domestic inputs	No. of countries	Foreign inputs	Firm empl.	Domestic inputs	No. of countries	Foreign inputs	Firm empl.
	OLS				IV			
China, DHS	0.065	0.254	0.362	0.104	1.271	0.707	0.872	0.184
	(0.009)	(0.007)	(0.012)	(0.007)	(0.428)	(0.106)	(0.271)	(0.258)
Import Penetration	-0.024	0.07	0.022	-0.536	-1.132	-0.346	-0.445	-0.610
	(0.150)	(0.080)	(0.151)	(0.115)	(0.517)	(0.109)	(0.247)	(0.269)
Constant	0.055	0.141	0.314	-0.055	-0.088	0.087	0.254	-0.064
	(0.022)	(0.014)	(0.030)	(0.016)	(0.053)	(0.017)	(0.045)	(0.035)
N	127,400	127,400	127,400	127,400	127,400	127,400	127,400	127,400
First Stage Statistics	Coeff (se) 1.809 (0.498)				KP F stat 13.20			

Notes: All variables are changes or growth rates from 1997 to 2007. China, DHS is a Davis-Haltiwanger-Schuh growth rate in firm imports from China. Domestic inputs, foreign inputs, and firm employment are a DHS growth rate. No. of countries is the log difference in the number of countries (excluding China) from which the firm imports. Import penetration is the change in industry-level import penetration from China for the sales-weighted average of a firm's 1997 industries. Standard errors are in parentheses and clustered by 439 NAICS industries. In the IV specifications, firm-level sourcing from China is instrumented by the change in Chinese market share in EU15 countries of a weighted average of the firm's inputs. KP F stat is the Kleibergen Paap F-statistic. N rounded for disclosure avoidance.

Table C.11: Estimates of the impact of the China shock on firm-level sourcing instrumenting for import penetration

Dependent variable is firm-level change from 1997 to 2007 in:

	Domestic inputs	No. of countries	Foreign inputs	Firm empl.	Domestic inputs	No. of countries	Foreign inputs	Firm empl.
	OLS				IV			
China, DHS	0.065	0.254	0.362	0.104	0.859	0.931	1.381	0.067
	(0.009)	(0.007)	(0.012)	(0.007)	(0.301)	(0.102)	(0.244)	(0.249)
Import Penetration	-0.024	0.07	0.022	-0.536	-0.221	-0.838	-1.568	-0.352
	(0.150)	(0.080)	(0.151)	(0.115)	(0.541)	(0.182)	(0.391)	(0.366)
Constant	0.055	0.141	0.314	-0.055	-0.061	0.073	0.220	-0.057
	(0.022)	(0.014)	(0.030)	(0.016)	(0.045)	(0.015)	(0.040)	(0.036)
N	127,400	127,400	127,400	127,400	127,400	127,400	127,400	127,400
First Stage Statistics	Coeff (se) for China, DHS 2.798 (0.670)				KP F stat 7.12			

Notes: All variables are changes or growth rates from 1997 to 2007. China, DHS is a Davis-Haltiwanger-Schuh growth rate in firm imports from China. Domestic inputs, foreign inputs, and firm employment are a DHS growth rate. No. of countries is the log difference in the number of countries (excluding China) from which the firm imports. Import penetration is the change in industry-level import penetration from China for the sales-weighted average of a firm's 1997 industries. Standard errors are in parentheses and clustered by 439 NAICS industries. In the IV specifications, firm-level sourcing from China is instrumented by the change in Chinese market share in EU15 countries of a weighted average of the firm's inputs and import penetration is instrumented by the same shock in a firm's output industries. KP F stat is the Kleibergen Paap F-statistic. N rounded for disclosure avoidance.

Table C.12: First-stage regressions for the DHS China growth rate specifications

Dependent variable is change from 1997 to 2007 in firm				
	China DHS	China DHS	China DHS	China Imp Pen
Input shock	2.685	1.809	2.798	0.626
	(0.505)	(0.498)	(0.670)	(0.207)
Import Penetration		0.720		
		(0.171)		
Output shock			-0.059	0.311
			(0.145)	(0.064)
Constant	0.033	0.044	0.037	-0.034
	(0.029)	(0.026)	(0.025)	(0.009)
Adj. R2	0.01	0.02	0.01	0.29

Notes: All variables are changes or growth rates from 1997 to 2007. China, DHS is a Davis-Haltiwanger-Schuh growth rate in firm imports from China. Import Penetration is the change in import penetration for the sales-weighted average of a firm's 1997 industries. Input shock is the change in Chinese market share in EU15 countries of a weighted average of the firm's inputs. Output shock is the change in Chinese market share in EU15 countries of a weighted average of the firm's inputs. Shocks are assigned based on the firm's 1997 industry. Standard errors are in parentheses and clustered by 439 NAICS industries. N rounded for disclosure avoidance.

Table C.13: Firm-level statistics on the number of source countries and imported inputs

	Mean	Std. Dev.	25th Ptile	Median	95th Ptile
Country Count	3.26	5.09	1	2	11
Product Count	11.91	48.88	1	3	41

Notes: The first row reports on the number of countries from which a firm imports. The second row reports on the number of unique HS10 products a firm imports. Note that data confidentiality protection rules preclude us from disclosing exact percentiles. Statistics for all percentiles in the paper are therefore the average for all firms that are within +/- one percent of the reported percentile.

Table C.14: Firm-level statistics on the number of imported products per source country and the number of source countries per imported product

	Products Per Country			Countries Per Product		
	Firm-level			Firm-level		
	Mean	Median	Max	Mean	Median	Max
Mean	2.78	2.18	7.21	1.11	1.03	1.78
Median	2.00	2.00	2.00	1.00	1.00	1.00
95%tile	8.23	5.00	25.00	1.61	1.00	4.00

Notes: The left panel reports on the number of unique HS10 products that a firm imports from a particular country. The right panel reports on the number of countries from which a firm imports the same HS10 product.

Table C.15: Number of countries from which a firm imports the same HS10 product, for firms that import from at least 3 countries

	Firm Level		
	Mean	Median	Max
Mean	1.28	1.05	3.18
Median	1.19	1.00	2.00
95%tile	1.96	1.00	9.00

Notes: Table reports statistics on the firm-level mean, median, and maximum of the number of countries from which a firm imports the same HS10 product.

Table C.16: Number of countries per HS6 product traded by a firm

	Firm Level Imports			Firm Level Exports		
	Mean	Median	Max	Mean	Median	Max
Mean	1.15	1.05	1.92	1.80	1.36	4.88
Median	1.00	1.00	1.00	1.12	1.00	2.00
95%tile	1.93	1.00	5.00	4.64	3.00	21.00

Notes: Table reports statistics on the firm-level mean, median, and maximum of the number of countries from which a firm imports or exports the same HS6 product.