# Old Roots, New Routes: The Trade Patterns of Immigrant-Founded Firms

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**Abstract**

We study how immigrant founders shape U.S. international trade by linking administrative records on firms' customs transactions and their founders' countries of birth. We show that immigrant-founded firms are 1.2 percentage points more likely to import, devote 20 percentage points more of their imports to their founders' birth countries, and pay 16% lower prices for the same products there. These price gaps shrink sharply among firms buying from the same supplier, suggesting that founders' knowledge helps them find cheaper suppliers. We build a model of migration, occupational choice, and sequential supplier search in which entrepreneurs differ in talent and search costs vary by founder origin and supplier country. Using differences across founder origins in sourcing, import prices, entrepreneurship rates, and firm scale, we estimate that immigrant founders' search-cost advantages are worth roughly one-tenth of U.S. gains from trade, holding productivity and other incentives for entrepreneurship fixed. Trade liberalization makes these sourcing advantages more valuable, intensifying competition for native entrepreneurs and limiting natives' welfare gains. Tariffs erode these advantages, easing competition and cushioning natives' welfare losses.

**Keywords:** Search; Immigration; Entrepreneurship; International trade; Firm-level trade; Administrative data

**JEL Classification:** D83, F14, F22, L26

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# 1 Introduction

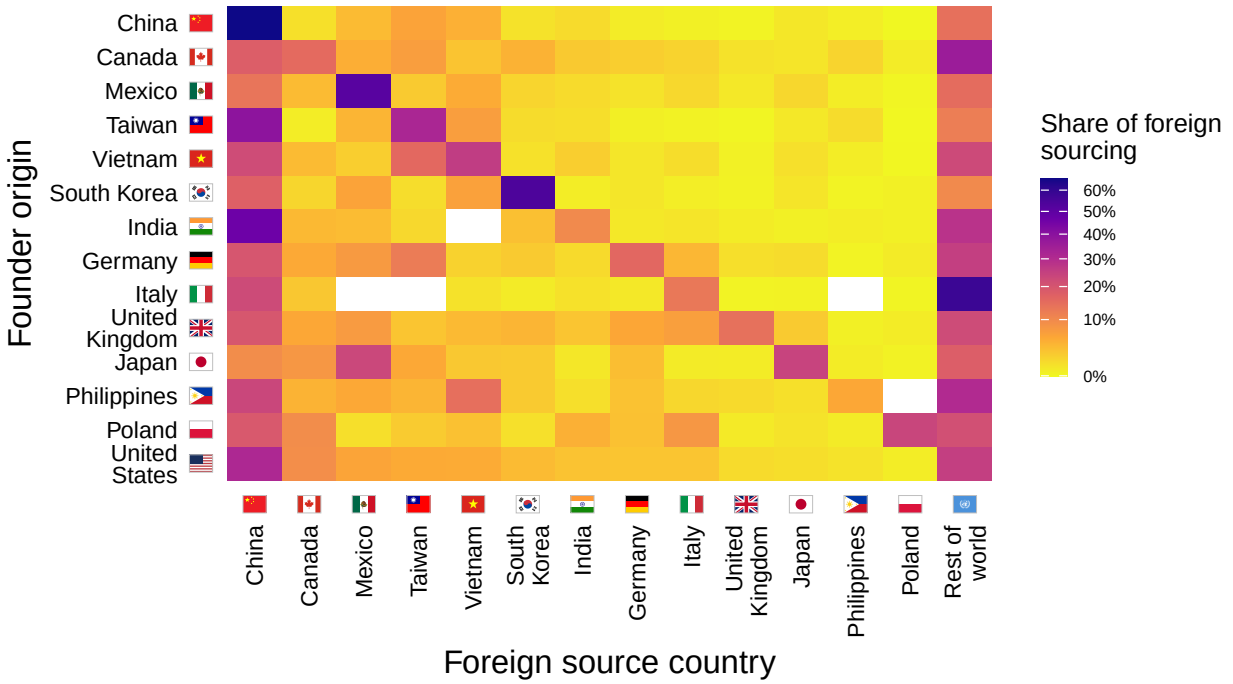
The United States is home to the world's largest immigrant population. What is the economic value of the knowledge and skills embodied in this population? The literature on immigrant entrepreneurship documents immigrants' disproportionate role in business formation (Kerr and Kerr, 2020; Azoulay et al., 2022), while work on migrant networks shows how immigrants facilitate trade with their countries of origin (Rauch, 2001). Less is known about how immigrants' knowledge of foreign markets contributes to the businesses they create. Does this knowledge give their firms a competitive advantage, and what is its value to the U.S. economy as a whole?

In this paper, we answer these questions. To do so, we combine administrative data linking firms to their founders and international transactions with a model that connects supplier search to the decision to become an entrepreneur. The data reveal that immigrant-founded firms are more likely to import and source disproportionately from their founders' birth countries, where they pay lower unit values than comparable firms buying the same products. These lower prices could reflect connections to systematically cheaper suppliers or better terms from suppliers relative to those obtained by other purchasers. The gap becomes much smaller when we compare firms buying from the same supplier, favoring the former explanation. This motivates our model of sequential supplier search in which immigrants retain a search cost advantage, lowering the average prices they pay in their countries of origin through the composition of their suppliers. We use the model to measure by how much U.S. consumption would change if immigrant founders faced native costs of searching for foreign suppliers, holding their other characteristics fixed. We find that these search-cost advantages are worth 0.25% of baseline U.S. consumption per capita (roughly one-tenth of the gains from trade) and are more valuable when embodied in productive founders, who put cheaper inputs to use at larger scale. These advantages also shape the effects of trade policy: trade liberalization makes supplier knowledge more valuable, intensifying competition for native entrepreneurs and limiting natives' gains, while tariffs erode these advantages and cushion natives' losses.

Our first contribution is to document immigrant founders' role in U.S. trade and entrepreneurship by linking administrative records on founders, their firms, and international transactions. We identify founders using early payroll records in the Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) infrastructure and ownership records in the Business Register (BR). We recover founders' countries of birth from linked demographic records and match their firms to the Longitudinal Firm Trade Transactions Database (LFTTD) and the Longitudinal Business Database (LBD). These links allow us to connect founders' origins to business formation, firm scale, and foreign sourcing, and calculate the import unit values their firms pay both across- and within-supplier.

Consistent with earlier work, the data reveal immigrants' disproportionate role in entrepreneurship. Immigrants make up roughly one-fifth of the U.S. labor force. In contrast, in our sample, roughly one-third of firms are immigrant-founded. Among workers in the linked records, im-

Figure 1: Foreign Sourcing by Founder Origin, 2022




*Notes.* Rows group firms by founder origin; columns denote foreign source countries. Each cell reports the source country's share of the group's 2022 foreign import value. The bottom row reports native-founded firms' sourcing. Blank cells are disclosure-suppressed; for affected rows, Rest of World includes the suppressed share. Colors use a $(2/3)$-power scale, with darker colors indicating larger sourcing shares. Legend labels are in percentage units. Founder-origin groups follow Table A.4, with the Rest of World founder group omitted.

migrants are 44% more likely than natives to have founded an employer firm active in 2022, and their firms are slightly larger.

Our key finding is that these businesses play an even larger role in international trade. In our sample, immigrant-founded firms account for roughly three-fifths of import and export value. This is both because they trade more intensively and have higher import participation rates. Comparing firms of the same age operating in the same industry and local labor market, immigrant-founded firms are 1.2 percentage points more likely to import than native-founded firms, against a baseline import participation rate of 5%. Conditional on trading, their import volumes are 30% larger.

A natural follow-up question is to ask where these firms purchase. Figure 1 shows that immigrant-founded firms devote substantially larger shares of their foreign imports to their founders' birth countries than native-founded firms do.[1] Rows group firms by their founders' countries of birth, and columns identify foreign supplier countries. Each cell reports that supplier country's share of the row's total foreign import value in 2022. The bottom row reports native-founded firms' sourcing distribution. The dominant pattern is diagonal. This pattern persists when we compare firms in the same industry and local labor market sourcing from the same country: on

[1]Public company histories offer concrete illustrations of the founder–supplier connections suggested by our anonymized Census data. Appendix Table A.1 gives examples of immigrant founders drawing on knowledge and contacts in their countries of origin to establish supplier relationships abroad.

average, having a founder born in that country is associated with a 20 percentage point higher share of the country in the firm's imports.

One explanation for these sourcing patterns is that immigrant founders' knowledge of their countries of birth lowers the cost of searching for suppliers there. Although we do not observe supplier search directly, we can look for its benefits in the prices firms pay.[2] Among firms in the same industry and local market importing the same narrowly defined product from the same country, those with a founder born in that country pay unit values 16% lower. When we compare buyers of the same product from the same supplier, the gap falls to an imprecisely estimated 4%. This attenuation suggests that founders' knowledge helps their firms find lower-priced suppliers. Two important concerns are that lower unit values may reflect purchases of lower-quality inputs or quantity discounts arising from immigrant-founded firms serving customers' demand for goods from their birth countries. To address the quality concern, we compare the same firm's purchases of the same product across countries, accounting both for the firm's general tendency to buy cheaper or lower-quality varieties and each source country's tendency to supply them. Unit values remain 7% lower in the founder's birth country, a highly statistically significant difference. And although firms with a founder born in the source country do place larger orders in our sample, explaining the full unit-value gap with quantity discounts would require discounts substantially greater than any of those estimated in the literature.

These sourcing and pricing patterns motivate our second contribution: a model that connects founders' knowledge of supplier markets to business formation. The model combines three distinct sources of heterogeneity. First, as in the entrepreneurship literature, potential founders differ in entrepreneurial productivity and nonpecuniary occupational incentives; these incentives reflect preferences for and barriers to wage employment across founder origins that affect the profits required to leave wage work. Second, as in Ricardian models of trade, countries possess comparative advantage in supplying particular businesses, which we capture through "business blueprints" that determine how effectively firms use inputs from each country. Third, and distinct to our setting, search costs for suppliers of these inputs vary jointly with the founder's country of birth and the supplier's country. Lower search costs allow founders to find cheaper suppliers, with larger benefits for more productive businesses. Together with source-country prices, search costs determine "supplier access"—the attractiveness of the sourcing opportunities available to founders—and shape the returns to entrepreneurship.

The welfare value of immigrants' supplier knowledge reflects both how it lowers production costs within firms and how it changes product variety and costs through firm entry and exit. Our key counterfactual assigns immigrant founders native search costs, holding their other characteristics fixed. In the model, each entrepreneur-operated firm produces a differentiated good, and consumers value variety. When immigrants lose their supplier knowledge, their firms contract or close, while native-founded firms can expand and new founders can enter. Entry supplies new

[2] As Stigler (1961) put it, "the value of information is the amount by which it reduces the expected cost to the buyer of his purchases."

varieties that can compensate consumers for those lost through immigrant exit. The businesses that enter, however, need not have the same production costs as those that leave; changes in the mix of active businesses can therefore compound the consumption loss.[3]

Our third contribution is to use the linked LEHD and trade data to distinguish supplier access, entrepreneurial productivity, and selection into entrepreneurship. Immigrants are more likely to found firms, and their businesses account for a disproportionate share of employment. These patterns can reflect higher entrepreneurial productivity, better access to low-cost suppliers, or differences in the returns required to enter entrepreneurship. Entrepreneurship rates and employment shares alone cannot tell us how much each contributes. By connecting founders' countries of birth to their firms' purchases abroad, our data permit us to measure supplier access using both the sourcing shares illustrated in Figure 1 and differences in import participation rates. In the model, higher entrepreneurial productivity raises profits across source countries, whereas country-specific search costs change countries' relative attractiveness. We therefore recover differences in supplier access from observed sourcing patterns, assuming equal access to domestic suppliers across founder origins.

After accounting for supplier access, we use entrepreneurship rates and firm employment shares by origin to distinguish underlying entrepreneurial productivity from differences in the returns required to enter entrepreneurship. In the model, groups with lower entrepreneurship rates have more selected pools of active firms. For a given entrepreneurship rate and supplier access, larger firms therefore indicate higher entrepreneurial productivity in the origin group as a whole. Comparing the resulting profit opportunities with observed entrepreneurship rates in the data then reveals the returns founders require to leave wage work. The links between individuals, firms, and trade thus let us distinguish the contribution of supplier knowledge from differences in entrepreneurial productivity and occupational incentives.

Unsurprisingly, we find that immigrant founders' search-cost advantages are generally strongest in their birth countries, where costs are between 33% and 78% below those faced by U.S.-born founders. After accounting for supplier access and selection into entrepreneurship, we also find higher mean entrepreneurial productivity across all immigrant-origin groups, with estimates 7–39% above the native mean. Encouragingly, our productivity estimates correlate positively with external measures such as the share of workers from each origin employed in management occupations and with the cognitive skill requirements of their occupations. The estimated occupational incentives also differ across origins: some groups require higher profits relative to wage earnings than natives to enter entrepreneurship, while others require less. The estimated incentives favor entrepreneurship more strongly among groups with more limited English proficiency, consistent with weaker wage alternatives making entrepreneurship relatively attractive (Fairlie

[3]This result might surprise those familiar with the optimal entry results of Dixit and Stiglitz (1977). Absent differences in occupational incentives or taxation of wage versus entrepreneurial income, marginal founders enter when expected profits equal forgone wages, and entry is socially optimal, even with heterogeneous firms (Dhingra and Morrow, 2019). Here, such differences make private entry thresholds differ from forgone wages. Occupational adjustment can therefore compound the consumption loss from worse supplier access.

and Lofstrom, 2015).[4]

With these estimates in hand, we ask three questions. First, how much is immigrant founders' knowledge of foreign suppliers worth to the U.S. economy? To answer this, we give immigrant founders native search costs, holding their other characteristics fixed. U.S. consumption per capita contracts by 0.25%, approximately one-tenth of the model's gains from trade.[5] Losing access to cheaper inputs raises immigrant-founded firms' costs and prices, making native-founded firms more competitive. Demand shifts toward native firms, raising the returns to native entrepreneurship and partly compensating natives for higher consumer prices. Their welfare, which accounts for the value of choosing between wage work and entrepreneurship, falls by only 0.10% by comparison. We also find that supplier knowledge is more valuable when embodied in productive founders. When we first remove immigrants' productivity advantages, equalizing their search costs produces an additional consumption loss of 0.10 percentage points, less than half the 0.25% loss when those productivity advantages are retained.

Second, how does immigrant founders' supplier knowledge shape the welfare effects of trade policy? This knowledge affects natives through both purchasing power and entrepreneurial opportunities. When tariffs fall, businesses with better access to the affected suppliers expand more strongly, benefiting consumers but potentially intensifying competition for native entrepreneurs. Tariff increases reverse this logic. We quantify the interaction between supplier knowledge and trade policy in two well-studied episodes: the 2018–19 U.S.–China tariff war and NAFTA. In the U.S.–China tariff war, tariff increases erode immigrant founders' advantages at Chinese suppliers, easing competition for native businesses and cushioning natives' losses. NAFTA works in reverse: tariff reductions make knowledge of Mexican and Canadian suppliers more valuable, strengthening immigrant-founded businesses and limiting natives' gains. Without these knowledge advantages, native welfare losses from the tariff war would be 18% larger and gains from NAFTA 14% larger, even as aggregate effects change little.

Third, how do changes in the size and origin composition of the immigrant population affect consumption and native welfare? The preceding exercises isolate supplier knowledge while holding entrepreneurial productivity and occupational incentives fixed. Changing the immigrant population instead captures their combined effects. Repatriating all immigrants lowers U.S. consumption per capita by 12% and native welfare by 9%. It also sharply changes the patterns of U.S. trade: total imports fall by 16%, with purchases from Mexico falling by 28%, while those from Canada rise by 3%. We also study additional admissions, adjusting for the fact that marginal entrants will generally differ in their productivity from immigrants already residing in the United States. Additional admissions raise consumption and native welfare for every origin. For the

[4]Differences in occupational incentives can reflect preferences or barriers, which we do not separately identify. Our supplier-access counterfactuals require only their combined effect on the profits needed to enter entrepreneurship. We hold these incentives fixed while allowing entry and exit to respond to changes in supplier access.

[5]This counterfactual holds resident populations fixed. Allowing residence to respond amplifies the loss to 0.46% because reduced supplier access disproportionately discourages U.S. residence among the most productive potential founders.

same number of admissions, targeting higher entrepreneurial productivity raises consumption gains roughly five- to eightfold and native welfare gains three- to fivefold.

Together, these findings show that immigrant founders' supplier knowledge raises U.S. consumption and shapes the distribution of gains and losses from trade policy. This knowledge is more valuable when embodied in productive founders, and productivity itself accounts for much of the gains from additional migrants.

**Literature review.** This paper contributes to research on migrant networks and trade by tracing these connections through the founders of firms. Rauch (2001) emphasizes how migrants' knowledge of buyers and sellers in their countries of origin helps connect international trading partners. That migrant connections can increase trade is well established, from early evidence linking migrant networks to trade (Gould, 1994; Head and Ries, 1998; Rauch and Trindade, 2002; Combes et al., 2005) to later quasi-experimental studies identifying causal effects of immigration on trade and supplier relationships (Cohen et al., 2017; Ottaviano et al., 2018; Parsons and Vézina, 2018; Steingress, 2018; Egger et al., 2019; Choi et al., 2024; Bonadio, 2026). These later studies often exploit variation in migrant or ancestry populations across regions to identify effects on trade. Closest to our focus on the entrepreneurs behind firms, Fung and Liu (2025) document stronger import ties between immigrant-owned Canadian firms and their owners' origins. Our U.S. evidence on import unit values and supplier relationships points to access to lower-priced suppliers as a mechanism behind such ties. We develop a quantitative model of supplier search and entrepreneurship to distinguish this knowledge from entrepreneurial productivity and occupational incentives, and quantify its contribution to consumption and native welfare as firms enter, exit, and adjust scale.

Our focus on knowledge embodied in individuals takes its cue from research on immigration, innovation, and growth, which studies immigrants' contributions to innovation and the international diffusion of knowledge (Kerr, 2008; Akcigit et al., 2017; Prato, 2025). On the trade side, there is a fairly rich literature on immigrant employees as conduits for trade with immigrants' origins that has largely focused on firms' exports (Hiller, 2013; Hatzigeorgiou and Lodefalk, 2016; Andrews et al., 2017; Cardoso and Ramanarayanan, 2022). An important exception is Erbahar and Gençosmanoğlu (2023), who study how immigrant employment affects Dutch firms' imports from workers' countries of origin. Related to our focus on founders, Mion and Opromolla (2014) show that managers carry market-specific export knowledge across firms, while Muendler and Rauch (2018) find that employee spinoffs disproportionately enter their parents' export markets.

We also contribute to research on immigrant entrepreneurship and entrepreneurial human capital. Research on immigrant entrepreneurship documents immigrants' role in firm creation and employment (Kerr and Kerr, 2017, 2020; Azoulay et al., 2022; Chodavadia et al., 2024). A growing quantitative literature connects this evidence to aggregate employment, productivity, and welfare through models of occupational choice and business formation (González, 2023; Iftikhar and Zaharieva, 2026; Ranasinghe and Shao, 2026). A complementary literature establishes that

founders, early employees, and active owners embody human and organizational capital critical for firm performance (Smith et al., 2019; Becker and Hvide, 2022; Choi et al., 2025). We identify country-specific supplier knowledge as a component of this entrepreneurial capital. Our evidence supports this focus on founders: their sourcing ties persist among firms without non-founder employees from the founders' countries of origin. In our model, this knowledge creates profitable business opportunities even holding entrepreneurial productivity fixed, and its value is greater for more productive founders. Entrepreneurial advantage therefore has a geographic dimension: equally productive founders can face different business opportunities because they know different supplier markets.

Our model therefore connects founder heterogeneity to the global sourcing decisions studied by Antràs, Fort and Tintelnot (2017). Related models explain firm-to-firm trade through buyer and seller heterogeneity (Bernard et al., 2018; Arkolakis et al., 2023; Eaton et al., 2026), including differences in productivity and relationship capability (Bernard et al., 2022). Our search mechanism builds on work on information frictions and the search for trading partners (Allen, 2014; Chaney, 2014; Lenoir et al., 2023), including supplier search and bargaining (Alviarez et al., 2023; Grossman et al., 2024). Rauch (2001) emphasizes that networks help firms find trading opportunities and enforce contracts. Fujiy et al. (2025) find that caste and religious proximity between firm owners in India is associated with more trade and lower prices, consistent with reduced contracting frictions. Startz (2025) studies both frictions among Nigerian importers, using data that distinguish in-person purchases from remote orders. She attributes the price advantage of buying in person, which persists within suppliers, to reduced contracting frictions. Our U.S. data do not record purchasing mode, but permit comparisons across founder origins and suppliers. The estimated founder-origin discount is much smaller within suppliers, consistent with founders' knowledge helping them find lower-priced suppliers.[6] By making supplier search costs depend on founder origin, we connect knowledge of foreign markets to both firms' sourcing decisions and individuals' decisions to become entrepreneurs (Kehoe et al., 2016; Díez and Ozdagli, 2025). In using relative sourcing shares to recover differences in bilateral supplier access, we also methodologically connect to Hortaçsu and Syverson (2004), who infer search-cost distributions from fund market shares, and Allen (2014), who recovers information frictions from trade flows and prices.

Finally, we contribute to quantitative work on immigration and the interaction of migration and trade policy. Di Giovanni et al. (2015) and Cruz and di Giovanni (2025) study how migration changes production and welfare through labor supply, market size, and firm adjustment. Related

[6]Our model shares the Ricardian logic of Eaton and Kortum (2002), with comparative cost advantages determining where firms source their inputs. EK's common-shape Fréchet structure implies that the distribution of prices within a destination is identical across source countries: less competitive sources sell only goods for which they are sufficiently productive, exactly offsetting their disadvantage. In our model, lower search costs allow founders to search more selectively in their birth countries, generating an additional price advantage there. This prediction is consistent with the aforementioned within-firm finding that firms pay lower unit values for the same product in their founders' birth countries, after accounting for common source-country price differences.

work examines how the ability to trade goods and services shapes local labor-market adjustment to immigration (Burstein et al., 2020) and how the share of immigrants in firms' workforces affects the welfare gains from immigration (Brinatti and Morales, 2026). Bonadio (2026) quantifies migrants' effects on trade costs and the geography of demand. Caliendo et al. (2021) study the joint effects of reducing trade and migration barriers, while Brinatti and Guo (2024) study the trade and welfare effects of U.S. immigration restrictions. We extend this literature by connecting immigration to trade through the businesses immigrants create and their founders' knowledge of foreign suppliers. Our founder-linked data allow us to measure this supplier access separately from entrepreneurial productivity and quantify its value as immigrants and natives choose which businesses to operate.

The remainder of the paper proceeds as follows. Section 2 describes the data and presents new facts on immigrant entrepreneurship and foreign sourcing. Section 3 presents the model, and Section 4 quantifies it. Section 5 presents our counterfactuals. Section 6 concludes.

# 2 Data and Motivating Facts

## 2.1 Data and Measurement

In this section, we describe the data and present the facts that motivate our model. The central idea is that immigrant founders' knowledge and contacts help their firms find lower-priced suppliers in their countries of birth. To measure this phenomenon, we construct a dataset linking U.S. firms to their founders' countries of birth and to the countries and suppliers from which they buy. The Longitudinal Business Database (LBD) and Business Register (BR) describe firms' industry, location, employment, and legal form (Chow et al., 2021). The Longitudinal Employer-Household Dynamics (LEHD) infrastructure links workers to their employers and reports workers' places of birth through the Individual Characteristics File (Vilhuber and McKinney, 2014). The Longitudinal Firm Trade Transactions Database (LFTTD) then links firms to merchandise customs transactions, including information such as the partner country, ten-digit product code, total customs value and physical quantity, and, for imports, supplier identifiers (Kamal and Ouyang, 2020).[7] Appendix A describes the data in further detail.

**Assigning founders.** We identify founders using early payroll and ownership records, following the logic of administrative startup studies such as Kerr and Kerr (2017), Azoulay et al. (2020), and Choi et al. (2025). For a corporation, the founder group consists of workers present in the firm's first observed payroll quarter who rank among its three highest earners during the first

[7] Strictly, U.S. imports use ten-digit Harmonized Tariff Schedule codes, whereas exports use ten-digit Schedule B codes. We use "HS10" as shorthand for both classifications.

payroll year. This rule is intended to capture active initial leaders rather than passive owners.[8] Owners of sole proprietorships do not appear on their own payroll, so we identify them from BR ownership records.[9] When we identify fewer than three owners, we follow Choi et al. (2025) and add early high earners to the founder group, up to a total of three people. This allows us to include initial leaders without an ownership stake. We exclude partnerships because their owners cannot be measured on the same basis. Nonprofits and government entities fall outside the scope of the paper.

Assigning founders requires identifying the workers present when a firm begins operating. An administrative reorganization of the firm (such as a single- to multi-establishment transition) can give an existing business a new LBD firm identifier, causing employees observed at the point of reorganization to be mistaken for its founders. We therefore use establishment histories to trace firms back to their initial payrolls across these administrative changes (Dent et al., 2018; Brown et al., 2019; Choi et al., 2025). Likewise, a firm's age is defined as the age of its oldest establishment, which prevents misclassification of new firm entry after merger and acquisition events. Appendix A.4 describes this procedure. Appendix A.5 describes the institutional basis for our founder definitions and the evidence on how initial top earners map to firm ownership.

**Defining immigrants.** We define an immigrant as someone born outside the United States or its territories, regardless of current citizenship or visa status, which the linked records do not report. A firm is immigrant-founded if at least one observed founder was born abroad; firms with mixed native–immigrant teams are therefore immigrant-founded. We fix the founder team at birth, so later hiring—including the hiring of co-national workers—does not change the firm's classification.

**Country coverage.** Unless otherwise noted, our analysis includes merchandise trade with every partner country recorded in the LFTTD. The LEHD identifies a limited number of foreign birth countries separately and groups the rest into broader regions (Vilhuber and McKinney, 2014). When we match founders' birth countries to their firms' import sources in Sections 2.3–2.5, we focus on 20 of these separately identified countries.[10] Elsewhere, we retain all founder origins, grouping those not represented individually into a broad "Rest of World" (ROW) residual. Appendix Table A.4 lists the countries and specifies the groupings used in each analysis.

[8] Owners who do not work at the firm may still help establish supplier relationships. Omitting them may leave some founder-country ties unobserved and attenuate the differences we estimate below.

[9] IRS guidance says: "As a sole proprietor, you are not an employee of the business" (Internal Revenue Service, 2023, p. 33).

[10] In 2022, these countries accounted for 72% of U.S. merchandise import value and 65% of merchandise export value (U.S. Census Bureau, 2023b). They were also the birthplaces of about 66% of U.S. foreign-born residents in the 2022 American Community Survey (ACS).

**Firm and supplier measurement.** The firm is the unit of analysis for our paper. For multi-establishment firms, in each year, we assign the vintage-consistent, six-digit NAICS industry and the 1990 commuting zone (CZ) with the largest share of the firm's employment.[11] We identify firms' foreign suppliers using the manufacturer identifier (MID) reported on each import transaction. The MID is constructed from the manufacturer's name and address. We clean it following Basker and Kamal (2021) to avoid counting minor reporting differences as different suppliers. Appendix A.6 describes the procedure and the remaining trade-data cleaning.

**Coverage.** Our baseline trade analyses use data from 2007–2022, beginning when LFTTD first distinguishes the ultimate consignee from the importer of record.[12]

LEHD records begin as early as 1985, but state coverage becomes nearly national only around 2000 (Vilhuber and McKinney, 2014). Because founder assignment requires payroll records near firm birth, the baseline sample omits firms born before LEHD coverage reaches their state, leaving older incumbents underrepresented. In 2022, the baseline sample contains about 30% of LBD employment among firms in the covered legal forms that are matched to the LEHD. We define the merchandise-trade frame by retaining transactions linked to valid firms—using the ultimate consignee for imports—that are arm's length, report valid partner-country and HS10 codes, fall outside HS chapters 27, 98, and 99, and exceed the standard value thresholds of $2,000 for imports and $2,500 for exports.[13] Within this frame, our identified firms account for about 24% of import value and 16% of export value. Appendix Table A.5 reports the cumulative effect of each restriction on raw-frame coverage.

For the quantification of the forthcoming model, the key question is whether the founder-origin sourcing patterns in our sample also characterize older incumbents whose founders we cannot identify. Large multinational firms account for a disproportionate share of international trade (Antràs and Yeaple, 2014). As firms grow, their own sourcing experience may reduce their reliance on founders' initial contacts. But those contacts can also give rise to lasting relationships. Monarch and Schmidt-Eisenlohr (2023) show that trade within supplier relationships grows as the relationships age, and Lu et al. (2024) show that supplier switching declines with firm age, conditional on size. Indeed, supplier diversification need not obscure the importance of core ties:

[11] The industry assignment follows Davis et al. (2014); we apply the same rule to commuting zones. For firms operating in several industries or commuting zones, the assigned industry and location may differ from those of the establishments using their imported goods. To gauge the overall importance of this concern, we use the Business Dynamics Statistics (BDS) for firms aged 25 or younger as a benchmark, since LEHD coverage becomes nearly national only around 2000 and our data run through 2022. The 2022 BDS imply that at least 91% of U.S. firms in this age range have a single establishment; using data from Alon et al. (2018), such firms account for roughly 72% of employment. This suggests that such ambiguity is a limited concern among the firms in our sample.

[12] The importer of record is the party legally responsible for customs entry and need not be the economic buyer. The ultimate consignee owns the merchandise at entry, so LFTTD prioritizes that identifier when linking imports to firms (Kamal and Ouyang, 2020).

[13] These are the Census Bureau's low-value reporting thresholds. Below these values, complete transaction-level information is not consistently available. We therefore impose the thresholds directly to define a consistently reported transaction universe (Kamal and Ouyang, 2020).

Table 1: Founder-Nativity Profile and Import Sourcing, 2022

| | Native-founded | Immigrant-founded |
|---|---|---|
| *Panel A. Scale and trade activity* | | |
| Employer firms | 1,696,000 | 852,000 |
| Employment per firm, mean | 13.58 | 14.51 |
| Total import customs value (billions) | $103.9 | $177.3 |
| Total export value (billions) | $37.40 | $51.07 |
| Importer share | 4.19% | 6.05% |
| Exporter share | 1.83% | 2.93% |
| Entrepreneurship rate | 2.34% | 3.38% |
| Labor-force share, by nativity | 81.24% | 18.76% |
| Firm-count share | 66.56% | 33.44% |
| Employment share | 65.07% | 34.93% |
| Import-value share | 36.95% | 63.05% |
| Export-value share | 42.27% | 57.73% |
| *Panel B. Conditional on importing* | | |
| Source countries per firm, mean | 2.00 | 2.16 |
| HS10 products per firm, mean | 4.77 | 6.68 |
| Foreign-supplier relationships per firm, mean | 4.82 | 7.07 |
| Source countries per HS10 product, mean | 1.11 | 1.01 |
| Foreign suppliers per source-country–HS10 cell, mean | 1.54 | 1.57 |

*Notes.* The firm-level statistics use the full eligible sample of firms active in 2022 with classifiable founder nativity, including foreign origins and trade partners outside the 20 individually identified countries. A firm is immigrant-founded if at least one observed founder was born outside the United States and its territories. Native-founded firms have only U.S.-born observed founders. The final two rows report firm–country statistics restricted to those 20 countries. For these rows, the left column reports observations without a founder born in the focal country, and the right column reports observations with such a founder. Import and export values are billions of 2022 dollars. Employment refers to LBD employment, summed across establishments. Labor-force shares use the 2022 ACS civilian labor force ages 18–64. Entrepreneurship rates measure the share of workers with positive 2022 LEHD earnings and valid, nonimputed birthplace who founded a firm with positive employment that year. We average origin-specific rates within each nativity group using ACS labor-force weights, including Rest of World. Appendix Table A.6 reports additional firm and founder characteristics, including ages, employment among traders, joint trading, and export scope. Census-derived statistics follow the review and rounding conventions in Appendix A.2.

Eaton et al. (2026) show that even firms with many suppliers tend to concentrate imports among a few main partners. If founders' contacts help establish these core supplier relationships, their influence on sourcing may persist even as firms gain experience and diversify. In what follows, we examine whether founder-origin sourcing patterns remain stable and economically significant as firms mature, including among firms aged 20 or older.

As a final complementary check, we construct an expanded sample that retains firms born before LEHD coverage. For this check, we treat all firms aged ten or older or with at least 500 employees as having no founder connections to foreign countries, including firms whose founders we observe (see Appendix A.7 for further detail). In 2022, this sample covers 99% of employment, 88% of import value, and 87% of export value (Appendix Table A.5).

**Summary statistics.** Table 1 summarizes our data for 2022. Immigrants account for roughly one-fifth of the U.S. labor force, whereas, in our sample, immigrant-founded firms account for roughly one-third of firms. Their role in trade is larger still: they account for roughly three-fifths of both import and export value and are more likely to import and export. Immigrant-founded firms are more internationally active even among importers (Panel B). They buy more HS10 products than native-founded importers (6.68 versus 4.77) and maintain more foreign-supplier relationships (7.07 versus 4.82). Both groups source from about two countries per firm. For a given

product, they source from about one country and use about 1.5 suppliers per source-country–product pair.

The entrepreneurship rate is also higher among immigrants: 3.38%, compared with 2.34% among natives, a difference of about 44%. We measure this rate as the share of workers with positive LEHD earnings in 2022 who founded an employer firm active that year.[14] Immigrant-founded firms are also slightly larger on average, employing 14.51 employees per firm compared to 13.58 among native-founded firms. These patterns echo existing evidence on immigrants' disproportionate role in entrepreneurship and job creation (Azoulay et al., 2022).

## 2.2 Selection into Importing

We first examine whether immigrant-founded firms are more likely to import and, among importers, whether they import more by value. To account for firm age and local industry conditions, the regressions include founding-cohort–year and six-digit-industry–CZ–year fixed effects.

For firm $f$ in year $t$, let $y_{ft}$ denote either a dummy variable for importing or log import value. Let $E_{ft}$ denote employment, $b_f$ the firm's founding year, $s_{ft}$ its six-digit NAICS industry, and $r_{ft}$ its commuting zone. We estimate:

$$y_{ft} = \mathbf{FE}_{b_f \times t} + \mathbf{FE}_{s_{ft} \times r_{ft} \times t} + \delta \log E_{ft} + \beta \, \mathbb{1}\{\text{Immigrant-founded}\}_f + \varepsilon_{ft}, \tag{1}$$

Column 1 of Table 2 omits the employment control. Column 2 includes it. Column 3 retains these controls but measures participation and import value after excluding imports from every observed founder-origin country.

As Table 2 shows, among firms founded in the same cohort and operating in the same six-digit industry, CZ, and year, immigrant-founded firms are 1.2 percentage points more likely to import (column 1). This is a sizable difference against the low participation rate in Table 1: only 4–6% of firms import to begin with. Conditional on importing, immigrant-founded firms import 30% more by value.[15] Further conditioning on current employment leaves the participation gap at 1.3 percentage points and raises the import-value difference to 40% (column 2). Compared with the unconditional 2022 gap of 1.9 percentage points (Table 1, Row 5), the conditional gap remains sizable, suggesting that sectoral and regional sorting alone do not explain the pattern.

A natural question is whether immigrant-founded firms' greater import activity is confined to trade with their founders' countries of birth. When we remove founder-origin imports, immigrant-founded firms remain 0.2 percentage points more likely to import and, conditional on importing,

[14] The overall rate is 2.54%, close to the 2.42% U.S. rate reported by the World Development Indicators (Appendix Table A.9).

[15] For regressions with logged outcomes, the prose converts a reported coefficient $b$ into a percentage difference using $100[\exp(b/100) - 1]$.

Table 2: Immigrant-Founded Firms and Selection into Importing

| Dependent variable | (1) | (2) | (3) |
|---|---|---|---|
| *Panel A. Import participation* | | | |
| $\mathbb{1}\{\text{Importer}\}$ | 1.21*** | 1.29*** | 0.23*** |
| | (0.02) | (0.02) | (0.02) |
| $N$ | 37,190,000 | 37,190,000 | 35,610,000 |
| *Panel B. Import value, conditional on importing* | | | |
| Log import value | 26.37*** | 33.37*** | 6.73*** |
| | (1.35) | (1.27) | (1.44) |
| $N$ | 1,459,000 | 1,459,000 | 1,258,000 |
| *Controls* | | | |
| $\mathbf{FE}_{b_f \times t}$ | Yes | Yes | Yes |
| $\mathbf{FE}_{s_{ft} \times r_{ft} \times t}$ | Yes | Yes | Yes |
| $\log E_{ft}$ | No | Yes | Yes |
| Founder-origin imports removed | No | No | Yes |

*Notes.* Entries are coefficients on immigrant-founded status from firm–year OLS regressions, 2007–2022. Coefficients and standard errors (in parentheses) are multiplied by 100. Standard errors are clustered by firm. Column 3 excludes imports from every observed founder-origin country; native-founded firms are unchanged. Column 3 additionally excludes immigrant-founded firms with founders whose birthplaces are reported only as broader regions in the LEHD, since their founder-origin imports cannot be removed separately. Among retained firms, those with no remaining imports are nonimporters in Panel A and excluded from Panel B. Census-derived statistics follow the review and rounding conventions in Appendix A.2.
*Significance.* †, *, **, and *** denote statistical significance at the 10%, 5%, 1%, and 0.1% levels, respectively.

import 7% more by value (column 3).[16]

## 2.3 Tilting Imports

We next ask whether firms source disproportionately from their founders' countries of birth. Specifically, we compare firms with and without a founder born in a given country $n$, examining both the probability of importing from that country and its share of the firm's total imports. At the firm–country–year level, we estimate:

$$y_{fnt} = \mathbf{FE}_{f \times t} + \mathbf{FE}_{n \times s_{ft} \times r_{ft} \times t} + \beta \mathbb{1}\{\text{Founder origin } n\}_{fn} + \varepsilon_{fnt}. \tag{2}$$

Here, $y_{fnt}$ is either a dummy for imports from country $n$ or country $n$'s share of the firm's worldwide imports.[17] We estimate these regressions over 2016–2017.[18] Firm–year fixed effects absorb firm age, scale, and overall propensity to import. The partner-country–industry–CZ–year

[16] Appendix Table A.10 further shows that, conditional on the local production environment and employment, immigrant-founded firms import from slightly more countries, source more products through more supplier relationships, and export at greater value and in more products, though not to more destinations. Removing founder-origin transactions leaves the value, product, and supplier differences positive but turns the source-country difference negative and makes the destination-country difference more negative. These patterns underscore immigrant-founded firms' broader participation in international trade.

[17] As noted above, exercises in Sections 2.3–2.5 are restricted to the 20 named countries discussed in Section 2.1. We calculate shares for firms with positive worldwide imports. Firms that import only from outside the 20 comparison countries have a zero share—and a zero dummy variable—for each of those countries.

[18] The full 2007–2022 repeated cross-section would contain approximately 744 million ($\approx 37,190,000 \times 20$) observations. For computational ease, we therefore restrict estimation to 2016–2017. All comparisons are within-year, and the unconditional sourcing tilt remains visible in 2022 (Figure 1), suggesting that the choice of window is unlikely to matter.

Table 3: Founder Origins and the Geography of Imports

| Dependent variable | (1) Import participation | (2) Country import share |
|---|---|---|
| Founder born in country $n$ | 1.46*** | 20.32*** |
| | (0.14) | (1.22) |
| $N$ | 101,700,000 | 3,937,000 |

*Notes.* The table reports OLS estimates for 2016–2017 at the firm–country–year level. Both regressions include firm–year and partner-country–six-digit-industry–CZ–year fixed effects. Coefficients and standard errors (in parentheses) are multiplied by 100. Standard errors are clustered by firm. The founder-origin indicator equals one if any founder was born in country $n$. Import shares condition on positive worldwide imports and divide imports from $n$ by the firm's worldwide imports. Census-derived statistics follow the review and rounding conventions in Appendix A.2.
*Significance.* †, *, **, and *** denote statistical significance at the 10%, 5%, 1%, and 0.1% levels, respectively.

fixed effects absorb local conditions shared by firms sourcing from country $n$, including migrant-network exposure and demand common to firms in the same industry and CZ.

Table 3 shows that founder origin sharply predicts where firms source from. With firm–year and partner-country–six-digit-industry–CZ–year fixed effects, a founder-country link is associated with a 1.5 percentage point higher probability of importing from country $n$ and a 20 percentage point higher share of that country in the firm's worldwide imports (columns 1 and 2). The estimates without region or sector interactions are only slightly larger—1.8 and 23 percentage points, respectively.[19] Sectoral and regional sorting therefore appear to account for little of the founder-origin gradient.[20]

The founder-country gradient also remains substantial among older firms. The age comparisons in Appendix Table A.11, Panel B, show positive and precisely estimated participation and import-share gradients in every age group. The import-share gradient narrows with age, while the participation gradient increases. The substantial differences among firms aged 20 or older suggest that founder-origin sourcing patterns extend well beyond firms' initial years of operation, addressing the concern that our findings reflect the sample's younger-firm composition.

Finally, linguistic and geographic ties may also lower the costs of finding suppliers beyond founders' countries of birth. Figure 1 offers an illustration: firms founded by immigrants from Taiwan, for example, allocate 39% of their foreign import value to China, compared with 31% among native-founded firms, alongside substantial sourcing from Taiwan itself. After direct founder-country links are removed, immigrant-founded firms allocate larger import shares to countries

[19] Appendix Table A.11, Panel A, reports estimates with country–year fixed effects for comparison with the baseline, allowing us to assess the contribution of sectoral and regional sorting. We also report results on exports; the gradients are qualitatively similar, though smaller. These export comparisons show that the founder-origin pattern extends to the geography of sales as well as purchases.

[20] Previous work links immigrant employment to firm-level trade (Hiller, 2013; Hatzigeorgiou and Lodefalk, 2016; Andrews et al., 2017; Cardoso and Ramanarayanan, 2022; Erbahar and Gençosmanoğlu, 2023). Even within the same local environment, immigrant founders may be better able to recruit co-national employees whose knowledge and contacts facilitate trade. When we exclude firm-years in which a nonfounder employee shares a country of birth with any founder, the participation and import-share gradients fall but remain substantial, at 0.7 and 13 percentage points, respectively (Appendix Table A.11, Panel A). This restriction is also more likely to exclude larger firms, whose workforces offer more opportunities for a birthplace match. The attenuation may therefore reflect changes in sample composition alongside any role for co-national employees. The sourcing pattern also persists when non-arm's-length trade is included (Appendix Table A.11, Panel C).

that share a plurality language with the founder's origin country and smaller shares to more geographically distant countries (Appendix Table A.12). The language gradient is consistent with evidence that shared language facilitates trade (Melitz, 2008; Melitz and Toubal, 2014). These patterns are consistent with country-specific access extending through linguistic and geographic connections rather than operating only through direct birth-country links.

## 2.4 Heterogeneous Unit Values

The preceding results show that immigrant-founded firms are more likely to import and especially likely to source from their founders' countries of birth. Import unit values provide a clue as to why. Knowledge of a source country may ease a firm's ability to find lower-priced suppliers. To test this, we examine whether firms record lower unit values when sourcing from their founders' countries of birth. We then use supplier identifiers to ask whether the unit-value gap persists when firms buy the same product from the same supplier.

Let $UV_{fngt}$ denote firm $f$'s import customs value divided by physical quantity—its "unit value"—for HS10 product $g$ from country $n$ in year $t$, aggregating across suppliers. For the within-supplier comparison, let $m$ index foreign suppliers and let $UV_{fngmt}$ be the corresponding ratio calculated separately for supplier $m$. We estimate the following specifications:

$$\begin{aligned}
\log UV_{fngt} &= \mathbf{FE}_{b_f \times t} + \mathbf{FE}_{n \times g \times s_{ft} \times r_{ft} \times t} + \beta \mathbb{1}\{\text{Founder origin } n\}_{fn} + \varepsilon_{fngt} \\
\log UV_{fngmt} &= \mathbf{FE}_{b_f \times t} + \mathbf{FE}_{n \times g \times s_{ft} \times r_{ft} \times m \times t} + \beta \mathbb{1}\{\text{Founder origin } n\}_{fn} + \varepsilon_{fngmt} \\
\log UV_{fngt} &= \mathbf{FE}_{f \times g \times t} + \mathbf{FE}_{n \times g \times t} + \beta \mathbb{1}\{\text{Founder origin } n\}_{fn} + \varepsilon_{fngt}.
\end{aligned} \tag{3}$$

The first specification compares firms within founding cohort and year and within source-country–HS10–industry–CZ–year cells. It therefore compares origin-linked and unlinked firms importing the same recorded product from the same country and year while operating in the same industry and local labor market. These fixed effects absorb common source-country–product conditions and country-specific local demand and diaspora exposure within the firm's production environment.[21] The second specification additionally holds the supplier fixed, comparing firms buying the same product from the same supplier. The third compares the same firm's purchases of the same HS10 product across source countries within a year, absorbing common source-country–product–year differences. Table 4 reports these three comparisons in columns 1–3, respectively.

Across suppliers, origin-linked firms record unit values 16% lower than those of other firms

[21] Admittedly, the firm's CZ need not coincide with its downstream market, especially for wholesalers and other firms that distribute imported goods domestically. This limitation has a natural direction for the sourcing-tilt results: founder-connected firms may disproportionately serve co-origin customers from outside their base of operations and therefore import more from the founder's country due to demand forces. Its implication for unit values is ambiguous, since those customers may demand more or less expensive varieties within an HS10. Greater demand could nevertheless lower unit values through larger orders and quantity discounts, which we examine below in Section 2.5.

Table 4: Anatomy of the Founder-Origin Import Unit-Value Gap

| Dependent variable | (1) | (2) | (3) |
|---|---|---|---|
| Log import unit value | -17.24*** | -4.42 | -6.92*** |
| | (3.51) | (8.75) | (1.27) |
| $N$ | 6,627,000 | 10,040,000 | 6,627,000 |
| *Fixed effects* | | | |
| $\mathbf{FE}_{b_f \times t}$ | Yes | Yes | No |
| $\mathbf{FE}_{n \times g \times s_{ft} \times r_{ft} \times t}$ | Yes | No | No |
| $\mathbf{FE}_{n \times g \times m \times s_{ft} \times r_{ft} \times t}$ | No | Yes | No |
| $\mathbf{FE}_{f \times g \times t}$ | No | No | Yes |
| $\mathbf{FE}_{n \times g \times t}$ | No | No | Yes |

*Notes.* Entries are coefficients from regressions of log import unit value on an indicator for a founder born in the source country. Coefficients and standard errors (in parentheses) are multiplied by 100. Standard errors are clustered by firm. All specifications cover 2007–2022 and require positive customs value and valid primary quantity. Columns 1 and 2 compare firms in the same source-country–HS10–six-digit-industry–CZ–year cell and include founding-cohort–year fixed effects. Column 2 additionally holds the supplier $m$ fixed and uses firm–source-country–HS10–supplier–year unit values. Columns 1 and 3 aggregate across suppliers to the firm–source-country–HS10–year level. Column 3 includes firm–HS10–year and source-country–HS10–year fixed effects. Census-derived statistics follow the review and rounding conventions in Appendix A.2.
*Significance.* †, *, **, and *** denote statistical significance at the 10%, 5%, 1%, and 0.1% levels, respectively.

in the same comparison cell (column 1).[22] That gap could reflect better terms with a given supplier or access to different, lower-priced suppliers. The first possibility is plausible: Alviarez et al. (2023) find that prices vary across buyers of the same supplier's product in ways consistent with bargaining. When we hold the supplier fixed, however, the estimated gap falls to 4% and is imprecise (column 2). This attenuation suggests that the suppliers firms reach account for much of the difference.[23]

Lower unit values could also reflect purchases of lower-quality varieties within an HS10 product. Column 3 of Table 4 makes the comparison within the firm as well as within the product. Among firms sourcing the same HS10 product from multiple countries in a year, unit values are 7% lower when the source is a founder's country of birth. Firm–product–year fixed effects absorb any source-invariant tendency of the firm to buy a cheaper or lower-quality version of the product, while source-country–product–year fixed effects absorb the corresponding tendency of that country to supply such a version on average. Of course, HS10 codes can still contain different brands or grades, leaving room for a quality explanation, but the remaining explanation is much more narrow: the same firm must select a cheaper or lower-quality variety from the founder's country, relative both to its purchases of the product elsewhere and to other firms' purchases from that country. This latent quality explanation also has less scope among more homogeneous goods. Using Rauch's (1999) classification, we continue to find lower founder-country unit val-

[22] Weighting observations by import value yields a 13% difference, while adding current employment as a control yields an 18% difference (Appendix Table A.18, Panel A, columns 3 and 4). The gap persists across most sectors and source countries and outside each source country's top product categories (Appendix Tables A.14 and A.15), while export unit values show little comparable difference (Appendix Table A.13, Panel C).

[23] Two robustness exercises reinforce this reading. As a check on bargaining, we relate supplier-level unit values to buyer and seller importance within the relationship. Unit values vary with relationship importance in the expected directions, but the founder-specific gradients show no consistent pattern (Appendix Table A.17). Using the 2018 tariff shock studied by Fajgelbaum et al. (2020), we also find similar and near-full tariff pass-through for founder-connected and unconnected buyers (Appendix Figure A.1).

ues in these categories (Appendix Table A.14, Panel E). Finally, in a related exercise, we examine whether stronger sourcing toward founders' origins is accompanied by lower unit values. Appendix Table A.16 reports estimates near zero in the bottom two quartiles of sourcing tilt, and unit values 6% and 10% lower in the third and fourth quartiles.[24] This progression is consistent with a common supplier-access explanation for the sourcing and unit-value patterns. A quality explanation would require the firms most tilted toward their founders' origins to buy systematically lower-quality varieties specifically from those origins. Related evidence points in the opposite direction: Ariu (2022) and Sabbadini (2024) link immigrant-worker exposure to improvements in the quality of imported inputs.

The founder-country unit-value gradient also persists across firm age (Appendix Table A.14, Panel A). Every estimate is negative and statistically significant. The sizable difference among firms aged 20 or older suggests that the unit-value pattern, like the sourcing tilt in Table 3, is not an artifact of the sample's younger-firm composition.

The founder-country unit-value gap also persists in the expanded sample that retains pre-LEHD incumbents. With source-country–HS10–industry–CZ–year fixed effects, origin-linked firms record unit values 20% lower in the unweighted specification and 13% lower when weighted by import value (Appendix Table A.13, Panel B). These specifications apply the founder-origin coding rule described in Section 2.1.

Lastly, as with tilt in Section 2.3, lower unit values are not confined to founders' countries of birth. After removing every direct founder–partner-country link, immigrant-founded firms record unit values about 11% lower after controlling for language and geographic distance (Appendix Table A.12). Together with the remaining importing difference in Table 2, column 3, and the language and distance gradients in sourcing documented in Section 2.3, these estimates suggest that immigrant founders' sourcing advantages extend beyond their countries of birth.

## 2.5 Interpreting the Evidence

Our interpretation of the above results is that immigrant founders' knowledge and contacts help their firms find lower-priced suppliers in their countries of birth and beyond.

Much of the literature on migrant networks and trade uses differences in migrant populations across regions for identification. The founder-origin sourcing tilts and unit value differences above also appear when we compare firms in the same six-digit industry and CZ, for the same partner country and year. Regional differences in migrant populations and industry composition are absorbed by these fixed effects and therefore cannot by themselves explain them. Local networks, however, may still matter within a CZ in two key ways. First, immigrant founders may be better able to draw on co-national contacts within their region to find suppliers abroad. We

[24] These estimates use immigrant-founded firms observed in both 2016 and 2017 and compare purchases across sources within firms, making their magnitudes more comparable to the 7% within-firm gap than to the 16% across-firm gap (see the discussion accompanying Appendix Table A.16 for further details).

view this as part of supplier access, captured in a reduced form way by the forthcoming model's founder-origin-specific cost of searching in each source country.

The same contacts, however, may also help firms reach co-origin customers, who have high demand for origin products. Their demand could tilt imports toward founders' birth countries without lowering search costs. McCully et al. (2026) show that immigrant households spend more on imports, especially from their origin countries, and Argente et al. (2026) show that consumer adoption of new foreign varieties induces local retailers to begin importing them. While such findings clearly could contaminate our results for origin tilt in Table 3, such demand has no clear implication for unit values: in general, co-origin customers may prefer more or less expensive varieties. Larger orders could nevertheless lower unit values through quantity discounts. Indeed, Appendix Table A.18 shows that origin-linked firms' average transactions are 0.18 log units larger. Using 2017 U.S. import transactions from the LFTTD, Ganapati and Hottman (2026) estimate a unit-value elasticity with respect to transaction quantity of -0.28. Applying this elasticity to our difference in average transaction size implies a discount of about 5% (4.98–5.08% using the 95% confidence interval for their elasticity) and leaves origin-linked unit values about 12% lower.[25] Explaining the entire gap would require an elasticity near -0.97, more than three times their estimate in magnitude. For context, at that elasticity, doubling the quantity in an order would nearly halve its unit price, raising the total amount paid by only 2%.[26]

To conclude: immigrant-founded firms import more often; founders' birth countries account for a disproportionate share of their imports; and origin-linked firms record lower unit values, with most of that difference disappearing when we compare purchases from the same supplier. Immigrants are also more entrepreneurial and their firms are, on average, slightly larger. Taken together, these patterns motivate a model in which founders' knowledge of particular markets helps them find suppliers there and shapes the return to starting a firm. The model combines this evidence with the entrepreneurship and employment patterns to quantify the contribution of supplier access while allowing entrepreneurial productivity and occupational incentives to differ across founder origins.

# 3 Model

This section develops a model of occupational choice and supplier search. The cost of searching for suppliers varies by founder origin and source country. Agents choose between wage work and entrepreneurship after observing their entrepreneurial productivity and a business blueprint that governs how well inputs from each country suit a prospective business. Production combines

[25] Average transaction size is total quantity divided by transaction count within a firm–source-country–HS10–year cell. This calculation follows Ganapati and Hottman's (2026) approximation below their equation (22), applying a transaction-level elasticity to aggregate average transaction size.

[26] Across a wide range of studies, using both international trade and domestic purchases data, we are unaware of quantity discount elasticities anywhere near -0.97.

equipped labor and materials to produce differentiated finished goods. The expected profits required to choose entrepreneurship over wage work may differ across founder origins because of differences in preferences and barriers to entrepreneurship. An agent starts a firm when the highest expected entrepreneurial payoff across source countries exceeds the payoff from wage work. Entrepreneurs then choose a source country and search sequentially until finding a supplier whose price is below a reservation value in the spirit of McCall (1970). Lower search costs make a country a more attractive source, allow firms to select cheaper suppliers there, and raise expected profits.

To simplify the presentation and highlight the core mechanism, we begin by presenting the model as a small open economy that takes foreign prices as given and holds populations by origin fixed. This setting allows us to characterize the welfare effects of supplier access and occupational adjustment before allowing foreign prices and migration to respond. Section 3.6 then embeds the model in a full multicountry general equilibrium and endogenizes migration.

## 3.1 Households

Let $N$ denote the set of countries. Agents living in the United States are indexed by birth country $o \in N$, with mass $L_o$ and total mass $L = \sum_{o \in N} L_o$. Agents are risk-neutral and have linear utility.

Before choosing between wage work and entrepreneurship, a prospective founder $f$ draws and observes entrepreneurial productivity $z_f$ and a business blueprint $\boldsymbol{\epsilon}_f \equiv (\epsilon_{fn})_{n \in N}$. Each component of the blueprint $\epsilon_{fn}$ measures how effectively the proposed business can utilize inputs from country $n$. These differences give countries a comparative advantage in supplying some businesses rather than others. An electronics business, for example, may use Taiwanese semiconductor components especially effectively, whereas a retail business has limited use for such inputs. Conditional on birth origin $o(f)$, productivity and the blueprint draws are independent and are distributed according to:

$$G_o(z) \equiv \Pr(z_f \leq z \mid o) = 1 - (\underline{z}_{o(f)}/z)^{\xi}, \qquad \Pr(\boldsymbol{\epsilon}_f \leq \boldsymbol{x}) = \exp\left( - \sum_{n \in N} x_n^{-\eta} \right). \tag{4}$$

Entrepreneurial productivity follows a Pareto distribution with scale $\underline{z}_o$ and common shape $\xi$. Its scale shifts productivity proportionally at every percentile, while the shape governs how rapidly the frequency of highly productive founders declines. Azoulay et al. (2022) find similar slopes when plotting log firm counts against log employment for immigrant- and native-founded firms: larger firms become rarer at similar rates in both groups. This pattern motivates allowing the productivity scale $\underline{z}_o$ to vary by origin while maintaining a common shape $\xi$.

The components of $\boldsymbol{\epsilon}_f$ are independent Fréchet draws with unit scale and common shape $\eta$. The shape parameter $\eta$ governs the strength of comparative advantage across source countries.

Agents have linear utility, so expected utilities from wage work and entrepreneurship are

given by

$$\mathcal{U}_o^w = \varsigma \frac{(1-\tau^w)w}{P}, \qquad \mathcal{U}_o^e(z_f, \boldsymbol{\epsilon}_f) = \varsigma T_o \frac{(1-\tau^e)\,\mathbb{E}_p[\pi_f \mid \boldsymbol{\epsilon}_f, z_f, o]}{P}. \tag{5}$$

A wage worker earns the competitive wage $w$.[27] The entrepreneurial payoff is expected net profit after supplier search, where $\mathbb{E}_p$ averages over the sequence of supplier price draws. The terms $\tau^w$ and $\tau^e$ are the respective tax rates of wage work and entrepreneurship, and $P$ is the consumption price index. Tax revenue, tariff revenue, and other net transfers are rebated in proportion to after-tax factor income; $\varsigma$ is the corresponding proportional rebate factor.[28]

The occupational payoff shifter $T_o > 0$ allows the expected-profit threshold for choosing entrepreneurship to differ across origins. It captures differences in preferences and barriers—including discrimination and financial frictions—that the model does not represent explicitly.

An agent becomes an entrepreneur when $\mathcal{U}_o^e(z_f, \boldsymbol{\epsilon}_f) > \mathcal{U}_o^w$. The share of origin-$o$ agents who choose entrepreneurship is denoted $\Pr(e \mid o)$. Section 3.3 derives this share and expected profits. Each entrepreneur operates one firm, so the mass of firms founded by origin-$o$ entrepreneurs is $L_o^e = |\mathcal{F}_o| = L_o \Pr(e \mid o)$, where $\mathcal{F}_o$ denotes their set of firms. The set of all firms is $\mathcal{F} = \bigcup_{o \in N} \mathcal{F}_o$. The remaining $L_o^w = L_o[1 - \Pr(e \mid o)]$ agents work for wages.

## 3.2 Production

Each entrepreneur produces a differentiated good. Let $y_f$ denote firm $f$'s output and $p_f$ its price. Each firm produces its good by combining equipped labor with one material input $x_f$, purchased from one country $n$.[29] The firm hires $\ell_f$ workers at wage $w$. If the firm considers source country $n$, one unit of material provides $\epsilon_{fn}$ units of effective material services. The production function is Cobb-Douglas in equipped labor and materials with firm-level entrepreneurial productivity $z_f > 0$ and material share $1 - \alpha \in (0, 1)$:

$$y_f = z_f \left(\frac{\ell_f}{\alpha}\right)^{\alpha} \left(\frac{\epsilon_{fn} x_f}{1-\alpha}\right)^{1-\alpha}. \tag{6}$$

[27] Appendix Table D.3 reports an exercise that allows entrepreneurial productivity to raise wage earnings to $wz_f$. Higher productivity still favors entrepreneurship because profits rise more than proportionally with $z_f$, whereas wages rise linearly. The consumption losses from our main counterfactual change little in this alternative setting.

[28] An equal per-capita rebate is also feasible, but it introduces an income component that affects occupational and migration choices independently of the sourcing mechanism. We therefore use proportional rebates, following Mayer (1984). Results are largely unchanged with additive rebates.

[29] Our model easily extends to multiple Cobb–Douglas material inputs if firms commit to all reservation cutoffs before observing supplier draws for each input. This commitment prevents firms from adjusting their search for one input in response to supplier matches for another. Without it, a good match for one input would raise the return to further search for complementary inputs. This interaction is the search analogue of the sourcing complementarities emphasized by Antràs et al. (2017). Under this timing assumption, the source-choice rule effectively replicates for each input, preserving the core sourcing mechanism (Appendix B.6). We therefore use one material input to simplify the exposition. The assumption that each input comes from one country has empirical support: although firms, on average, import several HS10 products, they source a given product from close to one country (Table 1, Row 16).

The final-good composite aggregates these goods with constant elasticity of substitution (CES) $\sigma > 1$ under $Y = (\int_{f\in\mathcal{F}} y_f^{(\sigma-1)/\sigma} df)^{\sigma/(\sigma-1)}$ which has a corresponding price index $P = (\int_{f\in\mathcal{F}} p_f^{1-\sigma} df)^{1/(1-\sigma)}$ generating demand curve $y_f = EP^{\sigma-1}p_f^{-\sigma}$, where $E$ denotes final expenditure.

Let $p_n^M$ denote the delivered price of a unit of materials from a particular supplier in country $n$. Conditional on this price and blueprint–source compatibility, the CES markup and Cobb-Douglas cost shares imply operating profit and output price once search costs are sunk:

$$\widetilde{\pi}_{fn}(p_n^M;\epsilon_{fn}) = \mathcal{D} z_f^{\sigma-1}\left(\frac{\epsilon_{fn}}{p_n^M}\right)^{(1-\alpha)(\sigma-1)}, \quad p_{fn}(p_n^M;\epsilon_{fn}) = \frac{\sigma}{\sigma-1}\frac{w^\alpha (p_n^M/\epsilon_{fn})^{1-\alpha}}{z_f}, \tag{7}$$

where $\mathcal{D}$ collects terms common across source countries and firms.[30] Firms' output prices differ because of entrepreneurial productivity $z_f$, the prices paid to their suppliers $p_n^M$, and the suitability of those inputs $\epsilon_{fn}$. Appendix B.1.1 derives these expressions.

## 3.3 Supplier Search

Fix a prospective founder $f$ of origin $o$ and a candidate source country $n$. Conditional on choosing $n$, the founder searches sequentially among suppliers in that country. Each draw uses $\kappa_{on}$ units of the final-good composite and therefore costs $P\kappa_{on}$. Suppliers produce with labor only and price at marginal cost.[31] We assume supplier productivities in all countries are distributed Pareto with shape $\theta$. This implies that delivered prices from suppliers in country $n$ satisfy $\Pr(p_n^M \le p) = (p/P_n^M)^\theta$ for $0 < p \le P_n^M$, where $P_n^M = w_n \tau^I_{nUSA}\tau^T_{nUSA}/A_n$ captures the component of input costs common to suppliers in country $n$. It reflects source-country wages, iceberg trade costs, bilateral tariffs, and absolute advantage $A_n$, the scale parameter of the Pareto supplier productivity distribution. A searching firm can recall previously drawn suppliers and each draw is i.i.d. Let $\pi_{fon}$ denote realized profit net of search costs when the founder searches in country $n$.

**Lemma 1** (Optimal supplier search)**.** *Suppose $\theta > (1-\alpha)(\sigma-1)$. The founder stops searching when the lowest observed price falls below a reservation price $0 < \bar{p}_{fon}^M \le P_n^M$. For an interior solution, $\bar{p}_{fon}^M < P_n^M$, expected net profit before the first supplier draw and the reservation price satisfy*

$$\mathbb{E}_p[\pi_{fon} \mid z_f, \epsilon_{fn}, o] = K z_f^\chi \left(\frac{\epsilon_{fn}}{P_n^M \kappa_{on}^{1/\theta}}\right)^{\chi(1-\alpha)}, \qquad \bar{p}_{fon}^M = K_p z_f^{-\chi/\theta}\left[\frac{(P_n^M)^\theta \kappa_{on}}{\epsilon_{fn}^{(1-\alpha)(\sigma-1)}}\right]^{\frac{\chi}{\theta(\sigma-1)}}, \tag{8}$$

[30] With CES demand and the Cobb-Douglas technology above, $\mathcal{D} = \frac{EP^{\sigma-1}}{\sigma}\left(\frac{\sigma}{\sigma-1}\right)^{1-\sigma} w^{-\alpha(\sigma-1)}$.

[31] Appendix B.5 considers an alternative in which the buyer recalls sampled suppliers and, after ending search, conducts a Bertrand procurement auction. This gives rise to endogenous supplier markups, which change profit levels and create supplier rents, but leave source-choice probabilities and the elasticities of expected profit with respect to blueprint–source compatibility, common input costs, and search costs unchanged.

*where* $\chi \equiv \theta(\sigma-1)/[\theta-(1-\alpha)(\sigma-1)]$ *and* $K$ *and* $K_p$ *collect terms common across founders and source countries. Holding other variables fixed, lower search costs,* $\kappa_{on}$*, reduce the reservation price, raise expected net profit, and reduce the expected input price.*

*Proof.* See Appendix B.1.2. □

Lower search costs make founders more selective: they continue searching until they find a supplier with a lower input price. More productive founders also search more selectively. Their businesses operate at larger scale, so finding a cheaper supplier generates greater operating-profit gains. Fixing a supplier, entrepreneurial productivity raises profits with elasticity $\sigma-1$. Endogenous search amplifies this response to $\chi > \sigma-1$, because more productive founders also obtain cheaper inputs through more selective search. A larger material share $1-\alpha$ makes these improvements more valuable. A lower $\theta$ increases the chance of finding an exceptionally low price and strengthens the amplification. Productivity and supplier access are therefore complementary: the same proportional reduction in search costs generates a larger profit gain for a more productive founder. We now state assumptions on certain parameters that make our model well-behaved.

**Assumption 1** (Parameter restrictions and interior search)**.** *For the remaining results, we maintain*

$$\theta > \max\{(1-\alpha)(\sigma-1),\, 1-\alpha\}, \qquad \chi < \xi < \frac{\eta}{1-\alpha}, \tag{9}$$

$$0 < \kappa_{on} < \frac{\chi(1-\alpha)}{\theta}\frac{(1-\tau^w)w}{(1-\tau^e)PT_o}. \tag{10}$$

Assumption 1 ensures finite aggregate entrepreneurial profits and a reservation price strictly below $P_n^M$ whenever sourcing from a country makes entrepreneurship preferable to wage work.[32]

Lemma 1 provides sufficient content to characterize $\mathcal{U}_o^e(z_f, \boldsymbol{\epsilon}_f)$ from equation (5): $\mathbb{E}_p[\pi_f \mid \boldsymbol{\epsilon}_f, z_f, o] = \max_{n\in N}\mathbb{E}_p[\pi_{fon} \mid z_f, \epsilon_{fn}, o]$. This also implies the founder chooses the source $n$ that maximizes $(\epsilon_{fn}/P_n^M)\kappa_{on}^{-1/\theta}$. Averaging occupational choice over productivity and blueprint draws yields the entrepreneurship rate. Combining this rate with firms' labor demand gives employment shares by founder origin.

**Proposition 1** (Entrepreneurship and employment)**.** *The entrepreneurship rate among origin-*$o$ *agents is*

$$\Pr(e \mid o) = \gamma(1, x_o) + x_o^{\xi(1-\alpha)/\eta}\Gamma(1-\xi(1-\alpha)/\eta, x_o), \tag{11}$$

[32] Although the interior-search condition (10) depends on the endogenous real wage $w/P$, whose level we do not observe in model units, it can always be satisfied through a joint rescaling of search costs and entrepreneurial productivity. Replacing every $\kappa_{on}$ with $c\kappa_{on}$ and every $z_f$ with $c^{(1-\alpha)/\theta}z_f$ leaves profits, occupational and sourcing choices, aggregate resource use, and the real wage unchanged. Cheaper search induces better supplier matches, exactly offsetting lower entrepreneurial productivity. A sufficiently small $c > 0$ therefore makes the condition hold in both the initial equilibrium and the counterfactuals considered, without changing our counterfactual results. Appendix B.1.2 provides the derivation.

*where $\gamma$ and $\Gamma$ are the lower and upper incomplete gamma functions.* $\Pr(e \mid o)$ *is strictly increasing in the entrepreneurship index* $x_o$

$$x_o \equiv \Phi_o \left[ T_o \frac{(1-\tau^e) K \underline{z}_o^{\chi}}{(1-\tau^w) w} \right]^{1/\delta}, \qquad \Phi_o \equiv \sum_{n \in N} (P_n^M)^{-\eta} \kappa_{on}^{-\eta/\theta}, \tag{12}$$

*where* $\delta \equiv \chi(1-\alpha)/\eta$ *and* $\Phi_o$ *is supplier access. Let* $\lambda_o^E$ *denote the share of downstream employment in origin-*$o$ *firms:*

$$\lambda_o^E \propto L_o \Phi_o^{\delta} \underline{z}_o^{\chi} \left[ \gamma(1-\delta, x_o) + x_o^{\xi(1-\alpha)/\eta - \delta} \Gamma\left(1 - \frac{\xi(1-\alpha)}{\eta}, x_o\right) \right]. \tag{13}$$

*Proof.* Appendix B.1.4 derives entrepreneurship rates, selected profits, and the employment-share formula. □

Proposition 1 links entrepreneurship rates to the attractiveness of running a firm relative to wage work, summarized by $x_o$. Supplier access $\Phi_o$ combines founders' search costs with the competitiveness of their potential source countries. Knowing how to find suppliers is more valuable where wages and trade costs already make inputs inexpensive. Access to several competitive countries also gives more business blueprints a profitable sourcing option. For given supplier access and market conditions, higher entrepreneurial productivity $z_f$ makes these opportunities more profitable. A higher $\underline{z}_o$ shifts the productivity distribution of potential founders upward and raises the entrepreneurship rate in that origin group. Occupational incentives also matter: a higher $T_o$ lowers the profits required to make entrepreneurship worthwhile, while better wage opportunities $w$ raise that threshold. The entrepreneurship rate then combines two groups. The first term $\gamma(1, x_o) = 1 - \exp(-x_o)$ is the share of agents whose blueprints make entrepreneurship worthwhile even at the lowest productivity $\underline{z}_o$. The second term adds agents whose higher productivity compensates for less favorable blueprint draws.

Equation (13) connects these occupational choices to origin-$o$ firms' share of total employment. The population $L_o$ determines the number of potential founders, while $\Phi_o^{\delta} \underline{z}_o^{\chi}$ captures how supplier access and entrepreneurial productivity affect labor demand via profitability of active firms. The bracketed term accounts for the number and composition of entrepreneurs. Holding other determinants fixed, a higher entrepreneurship rate raises the employment share, but marginal entrepreneurs have less profitable combinations of productivity and blueprint draws and contribute fewer jobs on average.[33] For given common parameters, knowing the entrepreneurship rate is sufficient to account for both effects, because equation (11) uniquely determines $x_o$.

[33] At low entrepreneurship rates, the common Pareto shape makes this entry response particularly strong. Holding occupational incentives fixed, higher productivity and better supplier access increase the number of firms, while the entry of smaller businesses nearly offsets their direct effect on average firm size. Large differences in entrepreneurial activity can therefore coexist with relatively small differences in average firm size, consistent with what we observe in Table 1.

The preceding results describe the scale of entrepreneurial activity: how many agents become entrepreneurs and how much employment their firms account for. Both higher entrepreneurial productivity and better supplier access can increase this scale. The next propositions use sourcing patterns and input prices to distinguish their contributions. Higher productivity makes a firm more profitable wherever it sources, while lower search costs in a particular country make that country relatively more attractive. Proposition 2 formalizes this distinction: at given common input costs, sourcing probabilities depend on relative search costs but not on entrepreneurial productivity or occupational payoff shifters.

**Proposition 2** (Sourcing probabilities and search costs)**.** *An origin-$o$ firm sources from $n$ with probability*

$$\omega_{on} \equiv \Pr(n_f^* = n \mid o) = \frac{(P_n^M)^{-\eta}\kappa_{on}^{-\eta/\theta}}{\sum_{n' \in N}(P_{n'}^M)^{-\eta}\kappa_{on'}^{-\eta/\theta}} = \frac{(P_n^M)^{-\eta}\kappa_{on}^{-\eta/\theta}}{\Phi_o}. \tag{14}$$

*For two founder origins $o, o'$ and source countries $n, n'$, relative sourcing odds satisfy*

$$\frac{\kappa_{on}/\kappa_{on'}}{\kappa_{o'n}/\kappa_{o'n'}} = \left(\frac{\omega_{on}/\omega_{on'}}{\omega_{o'n}/\omega_{o'n'}}\right)^{-\theta/\eta}. \tag{15}$$

*Proof.* See Appendix B.1.3. □

Proposition 2 gives an economic interpretation to the birthplace sourcing patterns in Table 3 and Figure 1. Founders' disproportionate sourcing from their birth countries, relative to unconnected founders, reflects lower search costs $\kappa_{on}$. These ratios recover relative search costs, which we quantify in Section 4. A stronger sourcing tilt toward a country implies a greater search-cost advantage there. The magnitude of that advantage depends on two forces. With fewer low prices—a higher $\theta$—cheaper search delivers smaller price reductions, so explaining a given sourcing tilt requires a larger search-cost difference. With more pronounced differences in blueprint–source fit—a lower $\eta$—firms respond less strongly to relative prices, again requiring a larger search-cost difference to explain the same tilt.

Relative odds reveal relative search costs. Import participation tells us whether founders have better foreign supplier access overall. Proposition 3 formalizes this connection and shows how import participation after excluding birthplace transactions can reveal whether the advantage extends to other countries.

**Proposition 3** (Import participation and supplier access)**.** *Suppose domestic supplier access is equal across origins, with $\kappa_{oUSA} = 1$ for every $o$. For $o \neq USA$, define $\Phi_o^{-o} \equiv \sum_{n \neq o}(P_n^M)^{-\eta}\kappa_{on}^{-\eta/\theta}$.*

1. ***Import participation.*** *Origin-$o$ firms are more likely to import than U.S.-born firms if and only if $\Phi_o > \Phi_{USA}$.*
2. ***Import participation excluding birthplace transactions.*** *If origin-$o$ firms remain more likely to import than U.S.-born firms after excluding birthplace transactions, then $\Phi_o^{-o} > \Phi_{USA}$.*

*Proof.* See Appendix B.1.5. □

Table 2, columns 1–2, shows that immigrant-founded firms are more likely to import than native-founded firms. This advantage persists after excluding imports from founders' countries of birth (column 3), counting firms with no remaining imports as nonimporters. Appendix Table A.8 reports overall import participation origin by origin, showing that the participation advantage holds for most foreign origins. Under common domestic search costs, these patterns point to better foreign supplier access extending beyond the birthplace. Section 4 uses this domestic benchmark to recover $\Phi_o$.

Finally, the mean and dispersion of log input prices provide complementary information about supplier search. As shown above in Lemma 1, lower search costs allow firms to find cheaper suppliers, while more productive founders have stronger incentives to search selectively. Comparisons of mean prices across sources isolate relative search-cost advantages after accounting for common input costs and founders' productivity. Dispersion within an origin group $o$ and source $n$ reflects both differences in supplier draws and differences in founders' selectiveness. It therefore contains information about the price and entrepreneurial productivity distributions. Let $p_f^M$ denote the input price paid by firm $f$ to its selected supplier.

**Proposition 4** (Unit values and supplier search)**.** *For origin-$o$ firms with productivity $z_f$ sourcing from $n$, mean log unit values satisfy*

$$\mathbb{E}[\log p_f^M \mid z_f, o, n_f^* = n] = \log P_n^M + \frac{1}{\theta}\log \kappa_{on} + B_o(z_f) + \mathcal{C}^{UV}, \tag{16}$$

*where $B_o(z_f)$ is common across sources, $B_o'(z_f) < 0$, and $\mathcal{C}^{UV}$ is common across origins and sources.*

*Across origin-$o$ firms sourcing from $n$, allowing productivity and blueprint draws to vary, log unit-value dispersion satisfies*

$$\mathrm{Var}(\log p_f^M \mid o, n_f^* = n) = 1/\theta^2 + \mathrm{Var}(\log \bar{p}_{fon}^M \mid o, n_f^* = n). \tag{17}$$

*As the entrepreneurship rate $\Pr(e \mid o)$ approaches zero, log unit-value variance converges to $1/\theta^2 + (\chi/(\xi\theta))^2$—and is therefore common for all $(o, n_f^*)$.*

*Proof.* See Appendix B.1.6. □

The term $B_o(z_f)$ captures differences in profitability and selection that are common across sources. Comparing sources at a given productivity removes this component, leaving common input costs and bilateral search costs. A lower $\theta$ makes greater price improvements attainable through search, so log search costs enter with coefficient $1/\theta$. This decomposition gives an interpretation in terms of search costs to the within-firm, within-product birthplace discount in Table 4, column 3. Firm–product–year effects absorb $B_o(z_f)$, while source-country–product–year effects absorb common input costs $P_n^M$.

The input prices firms pay are endogenous to search. Equation (17) reflects both primitive dispersion in supplier prices ($1/\theta$) and differences in entrepreneurs' selectiveness ($\chi/\xi$). The former generates price differences even among firms using the same search cutoff, contributing $1/\theta^2$. More productive entrepreneurs also search more selectively because cheaper inputs are more valuable at their larger scale (Lemma 1). At low entrepreneurship rates, this contribution is approximately $(\chi/(\xi\theta))^2$: a lower $\xi$ widens productivity differences across entrepreneurs, while $\chi/\theta$ measures how strongly search cutoffs respond to entrepreneurial productivity. The quantification in Section 4 uses unit value dispersion to discipline $\theta$ and $\xi$ jointly.

## 3.4 Equilibrium

We set the home wage as the numeraire ($w = 1$) and take common input costs from foreign source countries $(P_n^M)_{n\in N\setminus\{USA\}}$ as given. Final goods are used for household consumption $C$ and supplier search $X^{\text{search}}$. Labor is used in downstream production $L^{\text{prod}}$ and upstream supply to domestic and foreign buyers $L^{\text{up}}$. Final-goods and labor-market clearing require

$$E/P = Y = \left(\int_{f\in\mathcal{F}} y_f^{(\sigma-1)/\sigma} df\right)^{\sigma/(\sigma-1)} = C + X^{\text{search}}, \qquad \sum_{o\in N} L_o^w = L^{\text{prod}} + L^{\text{up}}. \tag{18}$$

Domestic firms import material inputs, while domestic suppliers also export to foreign buyers. Export receipts equal spending on imported materials, less tariffs and any exogenous net transfer from abroad. Appendix B.1.9 provides the detailed accounting for supplier search, upstream production, and exports.

**Definition 1** (Small-open-economy equilibrium)**.** *Given primitives, policies, origin populations, and foreign input costs, an equilibrium consists of* $(C, E, P)$ *and the associated occupational choices, firm decisions, and labor allocations. Agents choose the occupation yielding the higher payoff in equation* (5)*. Firms set prices according to equation* (7)*, follow the search policy in Lemma 1, and choose the source country that maximizes expected profits in equation* (8)*. The goods- and labor-market clearing conditions in equation* (18) *and the external-balance condition described above hold.*

Under Assumption 1, the economy with fixed origin populations and zero taxes, tariffs, and net transfers has a unique equilibrium, as established in Appendix B.1.9. Lastly, because it is convenient for quantification, we solve counterfactuals in proportional changes (e.g., the so-called "exact-hat" algebra approach of Dekle, Eaton and Kortum, 2008). For any positive variable $v$, we write $\widehat{v} = v'/v$ to denote the proportional change in $v$, where $v'$ is its value under a given counterfactual experiment.

## 3.5 Welfare

Following standard practice in quantitative trade, we measure aggregate welfare by real consumption per capita, equivalently, under trade balance, real income per capita:

$$W \equiv C/L. \tag{19}$$

Unlike the representative-household benchmark, our model generates differences in occupations and earnings both across and within origins, reflecting heterogeneity in productivity, blueprints, and supplier access. Since $W$ does not describe how gains are distributed, we complement it with a "veil-of-ignorance," inclusive value measure of welfare by origin: the expected payoff of an origin-$o$ agent before productivity and the business blueprint are known, allowing occupation to be optimally chosen after those draws. Let $\bar{\pi}_o$ denote expected net entrepreneurial profit per origin-$o$ agent as derived in Appendix B.1.4.[34] The occupational payoffs in equation (5) imply

$$V_o \equiv \mathbb{E}_{z,\boldsymbol{\epsilon}|o}\left[\max\left\{\mathcal{U}_o^w, \mathcal{U}_o^e(z,\boldsymbol{\epsilon})\right\}\right] = \underbrace{\mathcal{U}_o^w[1-\Pr(e \mid o)]}_{V_o^w} + \underbrace{\varsigma T_o \frac{(1-\tau^e)\bar{\pi}_o}{P}}_{V_o^e}. \tag{20}$$

The two components average wage-work and entrepreneurial payoffs over the draws that lead to each occupation. With linear utility and a continuum of agents, $V_o$ equals average consumption within origin $o$ when $T_o = 1$. Otherwise, it also reflects the occupational payoff shifter.

Better supplier access $\Phi_o$ lowers production costs and raises the returns to entrepreneurship. We first isolate the cost channel by holding occupational composition within each origin fixed, while allowing firms to change sources and adjust their relative scale.

**Proposition 5** (Supplier access and welfare)**.** *Under Assumption 1, with zero taxes, tariffs, and net transfers and fixed foreign prices, holding each origin group's population and occupational composition unchanged, the proportional change in consumption per capita is*

$$\widehat{W}^{\text{fix}} = \left(\sum_{o\in N} \lambda_o^{VA} \widehat{\Phi}_o^{\delta}\right)^{\zeta}, \qquad \zeta \equiv \frac{\theta-(1-\alpha)(\sigma-1)}{(\sigma-1)[\theta-(1-\alpha)]} > 0. \tag{21}$$

*Proof.* See Appendix B.1.10. □

Supplier-access improvements enter with baseline value-added weights $\lambda_o^{VA}$: access matters more for aggregate consumption when it improves for groups that account for more production. Recall that $\delta$ governs how access translates into entrepreneurial returns—thus determining the

[34] One complication of stochastic search is that a long search can leave some founders with negative realized net profit. To ensure positive consumption for all agents, we assume that founders insure against supplier-search risk after drawing $z_f$ and $\boldsymbol{\epsilon}_f$ and choosing entrepreneurship but before searching. Insurance pays each founder their expected net profit and commits them to follow the optimal search rule, leaving expected payoffs and aggregate outcomes unchanged.

change in relative scale across origin groups—while $\zeta$ maps the aggregate cost improvement into consumption.

Adding in occupational adjustment can either amplify or dampen this welfare change. Following a rise in foreign sourcing costs, exit by more-exposed founders releases wage labor but removes differentiated downstream varieties, which damages welfare through standard "love-of-variety" effects. Entry by less-exposed founders has the opposite effect. Selection on blueprints and productivity also changes the productivity composition of active firms. Appendix B.1.10 derives the full decomposition, including these selection and expenditure responses.

Building on Proposition 5, the appendix derives two further results, both holding occupational composition fixed. First, differences in founder groups' domestic sourcing shares $\omega_{oUSA}$ raise gains from trade relative to a case in which every group has the same domestic sourcing share, even keeping the aggregate domestic share $\bar{\omega}_{USA}$ unchanged (Appendix B.1.11). This result reflects the same aggregation mechanism as in Blaum et al. (2018), with heterogeneity here operating across founder groups. Second, at a given aggregate sourcing share, uneven exposure to a given country $n$ reduces the shift away from it following a small increase in common input costs $P_n^M$. Moreover, heterogeneity in search costs in other countries among groups overly exposed to the cost increase helps to determine where aggregate trade is diverted (Appendix B.1.12). These effects parallel the import-share dispersion result in Edmond et al. (2015) and the composition mechanisms highlighted by French (2016, 2017).

## 3.6 Model Extensions

**Endogenous migration.** We extend the model in Section 3 to allow for endogenous migration. We allow people to observe entrepreneurial productivity $z_f$ before choosing residence. They draw their business blueprint $\boldsymbol{\epsilon}_f$ afterward. Let $o$ denote birthplace and $i$ residence. Before the blueprint is drawn, the value of living in $i$, conditional on productivity $z_f$, is

$$V_{oi}(z_f) = \mathbb{E}_{\boldsymbol{\epsilon}_f|i}\left[\max\left\{\mathcal{U}_{oi}^w, \mathcal{U}_{oi}^e(z_f, \boldsymbol{\epsilon}_f)\right\}\right]. \tag{22}$$

The occupational payoffs in the maximization are country-specific counterparts of equation (5). The earlier value $V_o$ also averaged over entrepreneurial productivity; here, agents know their productivity before choosing where to reside, so the choice-relevant welfare object conditions on $z_f$. Following the quantitative spatial literature reviewed by Redding and Rossi-Hansberg (2017), agents draw idiosyncratic taste shocks over residence locations from a Fréchet distribution with shape $\varrho$. This implies residence probabilities and population masses

$$\begin{aligned} \Pr(i \mid o, z_f) &= \frac{[V_{oi}(z_f)/\iota_{oi}]^{\varrho}}{\sum_{i' \in N}[V_{oi'}(z_f)/\iota_{oi'}]^{\varrho}}, \\ L_{oi} &= L_{0o}\int_{\underline{z}_o}^{\infty} \Pr(i \mid o, z_f)\, dG_o(z_f). \end{aligned} \tag{23}$$

Here $\iota_{oi}$ is the multiplicative utility cost of migration from $o$ to $i$, $L_{0o}$ is the mass born in $o$ such that $L_{0o} = \sum_{i \in N} L_{oi}$, and $G_o$ is the productivity distribution for origin-$o$ agents at "birth." Supplier access therefore affects both resident numbers and selection on entrepreneurial productivity. In Section 5 we set $\varrho = 2$ following Desmet et al. (2018). Appendix B.2 provides further details on residence choice and selection on entrepreneurial productivity.

**Multicountry general equilibrium.** Above, we assume that domestic firms' aggregate input purchases do not affect wages in foreign source countries. We now relax this assumption: input demand affects wages in source countries, which feed back into sourcing, entrepreneurship, and consumer prices. The household and firm problems apply in every country. Let $P_{ni}^M$ denote common input costs for suppliers in country $n$ serving buyers in country $i$, with $P_n^M = P_{nUSA}^M$. Common input costs and labor markets satisfy

$$\widehat{P}_{ni}^M = \widehat{\tau}_{ni}^I \widehat{\tau}_{ni}^T \widehat{w}_n / \widehat{A}_n, \qquad \sum_{o \in N} L_{oi}^w = L_i^{\text{prod}} + L_i^{\text{up}}, \qquad w_n L_n^{\text{up}} = \sum_{(o,i) \in N^2} X_{oin} / \tau_{ni}^T.$$

Here $\tau_{ni}^I$ and $\tau_{ni}^T$ are iceberg and gross tariff factors, and $X_{oin}$ is tariff-inclusive material spending on source $n$ by origin-$o$ firms operating in $i$. The labor terms are the country-specific counterparts of those in equation (18): upstream suppliers serve buyers worldwide. Together with country budgets and goods-market clearing, these conditions determine relative wages, expenditure, prices, and rebates. Appendix B.3 gives the complete equilibrium and its exact-hat representation.

# 4 Quantification

We now quantify the model for the United States in 2022. We hold the observed population by origin ($L_o$) fixed and take foreign wages, prices, and expenditure as given. We set the demand elasticity ($\sigma$) and tax parameters ($\tau^w$, $\tau^e$) using values from the literature. We use the OECD Inter-Country Input-Output (ICIO) tables to match total and foreign material spending as shares of downstream gross output. These expenditure shares determine the material-input exponent $1 - \alpha$ and the aggregate level of foreign sourcing. We estimate the source-choice elasticity ($\eta$) from firms' responses to tariffs during the 2018–19 U.S.–China tariff war and recover the price and entrepreneurial productivity shape parameters ($\theta, \xi$) jointly from unit-value dispersion and production accounting. Appendix C.6 describes how we quantify the extensions that allow residence and foreign wages and prices to adjust.

Given these common parameters, sourcing shares recover founder-origin differences in $\kappa_{on}$ under the assumption of equal domestic search costs via equation (15) from Proposition 2. Entrepreneurship rates and founder-firm employment shares recover entrepreneurial productivity scales ($\underline{z}_o$) and occupational incentives ($T_o$) using Proposition 1. Table 5 collects the parameters and calibration inputs.

Table 5: Parameters and calibration inputs

| Object | Value | Role | Source |
|---|---|---|---|
| *Panel A. Parameters* | | | |
| $\theta$ | 1.44 | Price distribution shape | Equations (C23) and (C25) |
| $\xi$ | 6.06 | Entrepreneurial Pareto shape | Equations (C23) and (C25) |
| $\eta$ | 4.49 | Source-choice elasticity | Linked Census/Table 6 |
| $\sigma$ | 3.85 | Demand elasticity | Antràs et al. (2017) |
| $1-\alpha$ | 0.24 | U.S. sourceable-input exponent | 2022 OECD ICIO |
| $\tau^w$ | 0.30 | Wage-income tax rate | Piketty et al. (2018) |
| $\tau^e$ | 0.20 | Entrepreneurial-income tax rate | Bhandari and McGrattan (2021) |
| *Panel B. Normalizations* | | | |
| $\bar{z}_{USA}$ | 1.00 | Native productivity units | — |
| $\Phi_{USA}$ | 1.00 | Native supplier-access units | — |
| *Panel C. Identifying assumptions* | | | |
| $T_{USA}$ | 1.00 | Native occupational incentives | Assumption |
| $\kappa_{oUSA}$ | 1.00 | Equal domestic search costs | Assumption |
| *Panel D. External data inputs* | | | |
| $(\tau^T_{nUSA})_{n\in N}$ | By source | Baseline U.S. import tariffs | Teti (2024, 2025) |
| $\mathrm{Var}(\log UV)$ | 0.86 | Within-cell unit-value variance | Linked Census |
| $L_o$ | By origin | Resident labor-force mass | 2022 ACS |
| $\Pr(e \mid o)$ | By origin | Entrepreneurship rate | Linked Census/Appendix Table A.8 |
| $\lambda^E_o$ | By origin | Founder-employment share | Linked Census/Appendix Table A.8 |
| $\Pr(\text{import} \mid o)$ | By origin | Importer participation | Linked Census/Appendix Table A.8 |
| $\widetilde{\omega}_{on}$ | By pair | Conditional foreign-source shares | Linked Census/Figure 1 |
| $s^D_{USA}$ | 0.03 | U.S. trade deficit as expenditure share | ICIO accounts; Eq. (C52) |

**External parameters.** We set the elasticity of substitution $\sigma$ to 3.85 following Antràs et al. (2017). The wage-income tax rate is $\tau^w = 0.30$, following Piketty et al. (2018). We set the entrepreneurial-income tax rate to $\tau^e = 0.20$, motivated by Bhandari and McGrattan (2021), who find that effective marginal tax rates on business income are roughly two-thirds of those on wage income. Population by origin ($L_o$) comes from the 2022 ACS, and baseline tariffs included in $P^M_n$ and rebate $\varsigma$ come from Teti (2024, 2025). Appendix C.1 documents these inputs.

**ICIO expenditure.** We use the 2022 ICIO tables to measure material spending relative to downstream gross output. Following Caliendo and Parro (2015) we treat goods from agriculture, mining, and manufacturing as sourceable materials and interpret downstream production to include distribution and delivery. Nontradable inputs enter the local composite, represented by equipped labor, $\ell$, with production exponent $\alpha$. Under this mapping, total material spending accounts for 18% of downstream gross output, which equals expenditure $E$ in the model. Adjusting this share for the markup implied by $\sigma$ gives $1-\alpha = 0.24$. Foreign material purchases, including tariffs, account for $m^F_{USA} = 4.68\%$ of downstream gross output. We use this expenditure share to determine the aggregate level of foreign sourcing. Appendix C.1.1 provides further details.

We set the net transfer from abroad $D$ to match the trade deficit implied by the ICIO tables, roughly 3% of U.S. expenditure. For all counterfactuals, we set $D = 0$ and use the resulting

Table 6: Tariffs and conditional foreign-source shares

| | (1) | (2) |
|---|---|---|
| $\widehat{\eta+1}$ | 3.90*** | 5.49*** |
| | (0.26) | (0.47) |
| $N$ | 570,000 | 773,000 |
| *Specification* | | |
| Estimator | OLS | PPML |

*Notes.* The table reports estimates of equation (24). The first row is the sign-adjusted coefficient on log tariffs $\widehat{\eta+1} = -\widehat{\beta}_{\log \tau^T}$; standard errors, clustered by source-country–product, appear in parentheses. Column 1 uses OLS with log shares and omits zero-share cells. Column 2 uses PPML with shares in levels and retains zero-share cells. Census-derived statistics follow the review and rounding conventions in Appendix A.2.
*Significance.* †, *, **, and *** denote statistical significance at the 10%, 5%, 1%, and 0.1% levels, respectively.

balanced-trade equilibrium as the baseline, following Ossa (2014) and Caliendo and Parro (2015).

## 4.1 Estimating the source-choice elasticity

The source-choice elasticity $\eta$ governs how firms reallocate purchases when source prices change. We estimate it using the 2018 U.S. tariff changes studied by Fajgelbaum et al. (2020). Let $\widetilde{\omega}_{ongt} = V_{ongt}/\sum_{n' \neq USA} V_{on'gt}$ denote source $n$'s share of origin-$o$ firms' foreign customs value in product $g$ and year $t$. Equation (14) implies the estimating equation

$$\log \widetilde{\omega}_{ongt} = \mathbf{FE}_{o\times g\times t} + \mathbf{FE}_{o\times n\times g} + \mathbf{FE}_{o\times n\times t} - (\eta+1)\log \tau^T_{gnt} + \varepsilon_{ongt}, \tag{24}$$

where $\tau^T_{gnt}$ is one plus the U.S. import tariff rate for HS10 product $g$ from source country $n$ in year $t$. The coefficient is $-(\eta+1)$ because customs values exclude duties: converting tariff-inclusive spending to customs value therefore divides by the tariff factor.

Customs records do not include domestic purchases, so these shares condition on foreign sourcing. The model's IIA property ensures that excluding domestic sourcing leaves relative odds among foreign sources unchanged; origin–product–year fixed effects ($\mathbf{FE}_{o\times g\times t}$) absorb the foreign-share denominator. The remaining fixed effects absorb persistent origin–source–product differences ($\mathbf{FE}_{o\times n\times g}$) and origin–source shocks shared across products ($\mathbf{FE}_{o\times n\times t}$). Identification comes from the remaining source–product–year tariff variation, assuming it is unrelated to other delivered-cost or search-cost shocks.[35]

We estimate this specification by PPML using shares in levels on the left-hand side of equation (24), retaining zero trade flows. Table 6 gives $\widehat{\eta} = 4.49$, which we use in the quantification. For completeness, the table also reports $\eta$ estimated using OLS.

[35] A related exogeneity assumption underlies Fajgelbaum et al. (2020), who instrument duty-inclusive import prices with the 2018 tariff changes to estimate import demand. They find no evidence of differential pretrends in import outcomes and quantitatively minimal evidence of tariff anticipation, supporting the assumption that tariff changes are uncorrelated with contemporaneous demand and supply shocks conditional on their fixed effects. Our firm-level event studies likewise show no evidence of differential pretrends in unit values for either founder-connected or other buyers (Appendix Figure A.1).

## 4.2 Dispersion and founder-origin heterogeneity

We jointly identify the supplier-price shape $\theta$ and the entrepreneurial productivity shape $\xi$ using two restrictions. In the model, unit-value dispersion reflects both primitive dispersion in supplier prices via $\theta$ and differences in firms' search cutoffs via $\xi$.[36] We measure the variance of log unit values within founder-origin–source-country–HS10 cells using 2022 purchases of reference-priced and exchange-traded goods as classified by Rauch (1999). These relatively homogeneous goods reduce the scope for latent quality to drive the measured dispersion. Matching this variance to the model-implied expression in Proposition 4 gives the first restriction on $(\theta, \xi)$.

The second restriction matches the aggregate profit share inferred from occupational choice to that implied by production data. We define this share as net entrepreneurial profits divided by total wage and profit income. Given the material share $1 - \alpha$ and demand elasticity $\sigma$, the ICIO data imply operating profits before search costs relative to wage income. We subtract spending on supplier search to obtain net profits. A higher $\theta$ lowers the share of operating profits spent on search, increasing the share of income accruing to entrepreneurs. The native entrepreneurship rate tells us how many natives run firms, while $T_{USA} = 1$ equates the marginal founder's after-tax profits with after-tax wage earnings. Conditional on supplier-price dispersion, a thicker productivity tail (lower $\xi$) raises average profits above this threshold, holding the number of native firms fixed. Native founders' employment share and worker counts translate these profits into an aggregate profit share. For each candidate $\theta$, we therefore choose $\xi$ so that the profit share inferred from occupational choice matches that implied by the ICIO data.[37]

Appendix Figure C.2 plots the combinations of $(\theta, \xi)$ satisfying each restriction. Both curves slope downward: less dispersion in supplier prices (higher $\theta$) requires more dispersion in entrepreneurial productivity (lower $\xi$). A thicker productivity tail widens differences in firms' search selectivity and raises average profits above the native entrepreneurship threshold. Their intersection gives $\theta = 1.44$ and $\xi = 6.06$. Appendix C provides further details.

**Supplier access.** In the model, importer probabilities equal foreign material spending shares. Applying the observed importer probabilities to the model's material spending share, however, implies foreign spending of only $0.85\%$ of downstream gross output, compared with $4.68\%$ in the data.[38]

[36] This is because more productive entrepreneurs search more selectively, only accepting sufficiently low prices (Lemma 1).

[37] At the calibrated parameters, net entrepreneurial profits account for $16\%$ of total national income. For comparison, BEA data imply that corporate profits account for $15\%$ of total national income in 2022; see NIPA Table 1.12 (U.S. Bureau of Economic Analysis, 2026). Note that this comparison is untargeted: ICIO supplies country-level expenditure shares, while the model's markup and search cost structure determine the division of income between wages and profits.

[38] This would naturally imply much smaller gains from trade. The expression in Proposition 5, which holds occupational composition fixed, gives gains from trade of $0.32\%$ using the raw importer probabilities. Solving the model with observed tariffs and allowing occupations to adjust gives $0.37\%$. This is considerably lower than even the low end of estimates provided by Arkolakis, Costinot and Rodríguez-Clare (2012).

We recover domestic sourcing shares $\omega_{oUSA}$ from observed importer probabilities $\Pr(\text{import} \mid o)$ by shifting log importer odds by the same amount across origins to match aggregate foreign material spending. Holding each origin's total foreign spending fixed, we then shift relative log odds across foreign source countries by amounts common across origins to match the ICIO source shares.[39] Appendix C.1.2 provides further details.

We assume equal domestic search costs, $\kappa_{oUSA} = 1$, for every origin. As shown in Proposition 3, this identifying restriction attributes greater reliance on foreign suppliers to better foreign access.[40] The adjusted sourcing shares then identify total supplier access and search costs, both relative to natives:

$$\frac{\Phi_o}{\Phi_{USA}} = \frac{\omega_{USA\,USA}}{\omega_{oUSA}}, \qquad \frac{\kappa_{on}}{\kappa_{USAn}} = \left(\frac{\omega_{on}/\omega_{oUSA}}{\omega_{USAn}/\omega_{USA\,USA}}\right)^{-\theta/\eta}. \tag{25}$$

**Entrepreneurial productivity and occupational incentives.** With supplier access $\Phi_o$ in hand, Proposition 1 recovers each entrepreneurship index $x_o$ from the entrepreneurship rate (Appendix Table A.8).[41] We normalize $\underline{z}_{USA} = 1$, which measures entrepreneurial productivity in native units. For exposition, we use the low-entrepreneurship-rate approximations below; the quantification uses the exact relationships in Appendix C.2:[42]

$$\frac{x_o}{x_{USA}} \approx \left[\frac{\Pr(e \mid o)}{\Pr(e \mid USA)}\right]^{\eta/[\xi(1-\alpha)]}, \qquad \underline{z}_o^{\chi} \approx \frac{\lambda_o^E/L_o}{\lambda_{USA}^E/L_{USA}}\Phi_o^{-\delta}\left(\frac{x_{USA}}{x_o}\right)^{(\xi-\chi)(1-\alpha)/\eta},$$
$$T_o = \frac{(x_o/x_{USA})^{\delta}}{\Phi_o^{\delta}\underline{z}_o^{\chi}}. \tag{26}$$

As in Azoulay et al. (2022), we use entrepreneurship rates and firm employment to learn about entrepreneurial productivity. In our model, holding entrepreneurship rates and supplier access fixed, greater employment in a founder origin group's firms, $\lambda_o^E$, per member of that origin implies a higher entrepreneurial productivity scale $\underline{z}_o$. The occupational shifter $T_o$ then reconciles the entrepreneurship rate with the inferred profit opportunities $\Phi_o^{\delta}\underline{z}_o^{\chi}$ and wage earnings. A lower $T_o$ means that higher profits are required to make entrepreneurship worthwhile.

The recovered supplier-access differences coexist with higher average entrepreneurial productivity among immigrants. All 14 immigrant-origin groups have productivity scales $\underline{z}_o$ between

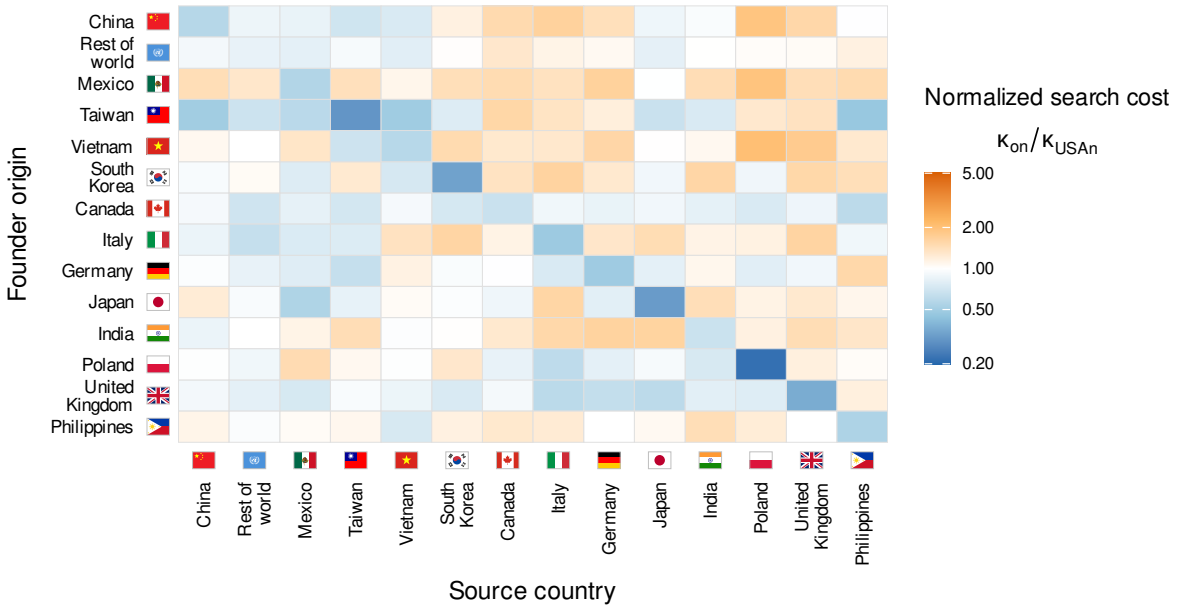
[39] The original and adjusted foreign-source shares have a weighted correlation of 0.95 (Appendix Figure C.1).

[40] An alternative explanation is that origin-$o$ buyers have greater difficulty finding domestic suppliers. Appendix Table D.9 allows immigrant founders' domestic search costs to be higher than natives', repeats the inversion, and reports the effects of equalizing foreign search costs.

[41] We construct the imputed rates in Appendix Table A.8 by multiplying the World Bank's 2022 U.S. employer entrepreneurship rate of 2.42% by each origin's Census firm share divided by its ACS labor-force share. Their unweighted correlation with the alternative person-level Census founder probabilities reported in the same table and used in Table 1 is 0.85, and our counterfactual results are quite similar if we use those person-level rates.

[42] The displayed approximations have a maximum relative error below 0.58% across founder origin groups at the calibrated entrepreneurship rates.

Figure 2: Relative search costs by founder origin and source




*Notes.* Each cell reports $\kappa_{on}/\kappa_{USAn}$, the search costs of an origin-$o$ founder relative to a U.S.-born founder at the same source. For the reported ratio, colors use $\log_{10}$ scaling. We omit the U.S.-born row, which equals one by construction, and the U.S. source column, which equals one under the common domestic-access restriction. Values below one indicate lower search costs than those faced by U.S.-born founders. Comparisons across other source columns describe relative gaps, not search-cost levels.

7–39% above the U.S.-born scale. For 9 groups, however, the recovered occupational shifters $T_o$ make entrepreneurship less attractive at given profit and wage opportunities. Appendix Table C.2 reports these estimates; Appendix Figure C.3 plots them.

The recovered productivity scales line up with skills that should help founders run businesses. Across foreign origins, $\underline{z}_o$ correlates positively with the share of employees in management occupations (0.85) and the cognitive skill requirements of their occupations (0.66) (Appendix Figure C.3B). Language proficiency helps explain why productive capabilities and occupational incentives need not move together. As Fairlie and Lofstrom (2015) emphasize, limited English can hinder communication with customers and suppliers while also restricting opportunities in wage employment. Consistent with these two forces, limited English proficiency correlates negatively with $\log \underline{z}_o$ (-0.70) but positively with $\log T_o$ (0.80). Weaker wage alternatives can make entrepreneurship relatively attractive even when productive opportunities are limited. Because the benchmark imposes a common wage, such differences in outside opportunities may be absorbed into the occupational shifters.

## 4.3 Recovered relative search costs

Figure 2 plots the recovered search-cost ratios $\kappa_{on}/\kappa_{USAn}$, using equation (25) with founder origins in rows and source countries in columns. Values below one indicate lower search costs than those faced by U.S.-born founders buying from the same source. Among the 13 foreign countries of birth reported separately, founders have their largest relative search-cost advantage in their

birth country in 12 cases. Estimated search costs in founders' birth countries are 33–78% below those faced by U.S.-born founders.

Advantages beyond the country of birth vary considerably across origins. Canadian- and German-born founders have lower search costs than natives across most foreign sources. Interestingly, these two countries also have the largest foreign-born population shares among the 13 foreign countries of birth reported separately: 22% in Canada and 18% in Germany. Philippine- and Vietnamese-born founders' advantages are concentrated in a few markets, and they face higher costs than natives at most other sources; both countries have foreign-born population shares below 1%. Some advantages extend across several nearby markets: Taiwanese-born founders have lower costs throughout the East and Southeast Asian sources shown in the matrix, including China, Japan, Korea, the Philippines, and Vietnam.

The value of these differences depends on both their magnitude and the competitiveness of the sources involved. Excluding the United States and the founder's birth country, the supplier-access index $\Phi_o$ exceeds the native benchmark for 10 of the 14 foreign-origin groups, with a median ratio of 1.28. Taiwanese-born founders have an access ratio of 4.35, compared with 2.09 for Canadian-born founders, whose cost advantages cover more sources. Relatively strong advantages in some deeper markets can therefore provide greater access than smaller advantages spread across more markets.

# 5 The value of immigrant entrepreneurship and supplier knowledge

We organize our counterfactuals around three key questions. First, how much is founders' knowledge of foreign suppliers worth for U.S. consumption per capita? Second, how does immigrant founders' supplier knowledge shape the welfare effects of trade policy? Third, how do changes in the size and origin composition of the immigrant population affect consumption and native welfare?

## 5.1 Valuing differences in search costs

We first ask how much immigrant founders' lower foreign search costs contribute to U.S. consumption. We assign immigrant founders the search costs faced by U.S.-born founders at each foreign source. We shock search costs using

$$\widehat{\kappa}_{on} \equiv \frac{\kappa_{USAn}}{\kappa_{on}} = \left( \frac{\omega_{on}/\omega_{oUSA}}{\omega_{USAn}/\omega_{USAUSA}} \right)^{\theta/\eta}, \tag{27}$$

such that $\kappa'_{on} = \widehat{\kappa}_{on}\kappa_{on} = \kappa_{USAn}$.

Consumption per capita is our primary aggregate outcome. Let $\bar{P}$ be the price index holding

Table 7: Equalizing founder-origin search costs in foreign source countries

| | Residence held fixed | Residence responds |
|---|---|---|
| $100\Delta \log(C_{USA}/L_{USA})$ | -0.25 | -0.46 |
| $-100\Delta \log \bar{P}$ | -0.25 | -0.58 |
| $100\Delta \log\|\mathcal{F}\|/(\sigma-1)$ | 0.02 | 0.15 |
| $100\Delta \log \mathcal{R}^{\mathrm{EQ}}$ | -0.02 | -0.03 |
| Inclusive-value welfare (U.S.-born) | -0.10 | -0.20 |
| U.S.-born entrepreneurship rate (pp) | 0.02 | 0.04 |
| Foreign-born entrepreneurship rate (pp) | -0.09 | -0.15 |
| Foreign sourcing share (pp) | -2.51 | -2.33 |
| Foreign-born resident share (pp) | 0.00 | -0.10 |

*Notes.* The counterfactual assigns each U.S. immigrant founder the U.S.-born search costs at each foreign source. Entries compare the counterfactual with the baseline with balanced trade for the stated equilibrium and residence assumptions. Consumption, U.S.-born welfare, and the consumption decomposition are log changes multiplied by 100; all other outcomes are percentage-point changes. Inclusive-value welfare is conditional on U.S. residence in both columns and excludes residence tastes. Foreign wages, prices, and expenditure remain fixed; U.S. prices, expenditure, occupation, and sourcing adjust in both columns. Baseline U.S. population shares use ACS when residence is held fixed and UN WPP/DESA when residence responds. Appendix C.6 describes the calibrated parameters and the additional inversion when residence responds.

the mass of active varieties fixed, let $|\mathcal{F}|$ be that mass, and let $\mathcal{R}^{\mathrm{EQ}}$ be equilibrium income per capita. CES demand gives the exact decomposition

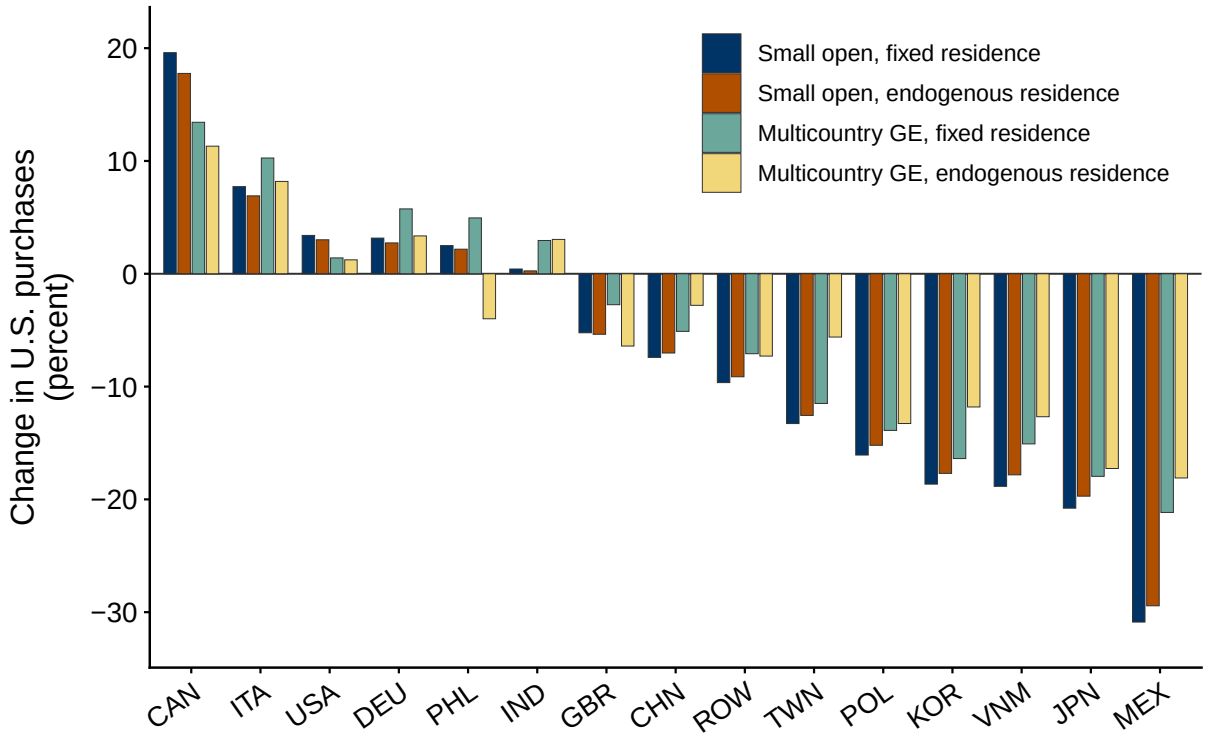
$$\Delta \log(C/L) = -\Delta \log \bar{P} + \frac{1}{\sigma-1}\Delta \log|\mathcal{F}| + \Delta \log \mathcal{R}^{\mathrm{EQ}}, \tag{28}$$

The three terms measure the average-price, variety, and equilibrium-income contributions to changes in consumption per capita. We also report the U.S.-born inclusive value conditional on U.S. residence (equation 20). It captures the option value of choosing between wage work and entrepreneurship as productivity and sourcing opportunities vary.

We begin with the first column of Table 7, which holds residence and foreign wages and prices fixed while occupation and sourcing adjust. Equalizing immigrant founders' foreign search costs to those of U.S.-born founders lowers consumption per capita by $0.25\%$, about one-tenth of the model's $2.30\%$ gains from trade. Immigrant founders lose access to low-cost supplier matches, raising production costs and reducing their firms' scale. Their contraction raises the return to serving their customers, encouraging native expansion and entry. The U.S.-born entrepreneurship rate correspondingly rises by $0.02$ percentage points, while the foreign-born rate falls by $0.09$ percentage points. Because the native population is much larger, native entry outweighs immigrant exit and the total number of firms rises.

Our calibration assigns immigrant origins entrepreneurial productivity scales $7$–$39\%$ above the native level (Appendix Table C.2). Higher productivity lowers unit costs and encourages more selective supplier search, since cheaper inputs yield larger gains at greater scale (Lemma 1). Occupational payoff shifters $T_o$ vary across origins. Groups with lower shifters require higher expected profits relative to wage earnings than natives to choose entrepreneurship, while those with higher shifters require less.

Figure 3: Change in U.S. Purchases by Source




*Notes.* The figure reports percentage changes in tariff-inclusive U.S. purchases from each source after immigrant founders are assigned the search costs of U.S.-born founders in foreign source countries. The first two series hold foreign wages, prices, and expenditure fixed; the other two allow them to adjust. USA denotes domestic purchases.

Native entry adds varieties but also changes the composition of active firms. Improved demand draws in native founders with less favorable combinations of productivity and business blueprints than native incumbents, while exit tightens selection within the affected immigrant-origin groups. The variety contribution is small, at $0.02\%$. The same demand reallocation improves native entrepreneurial payoffs, partly compensating for higher consumer prices and limiting natives' inclusive-value welfare loss to $0.10\%$.[43]

Figure 3 shows how equalization of search costs changes the geography of trade. Holding residence and foreign prices fixed, purchases from Mexico and Japan fall by $31\%$ and $21\%$, while purchases from Canada rise by $20\%$. Domestic purchases also rise. Assigning immigrant founders U.S.-born foreign search costs shifts purchases away from sources reached through their supplier knowledge and toward those used more heavily by natives.

Lastly, immigrant founders' productivity advantage also amplifies the value of their supplier knowledge. Giving these founders the native productivity scale ($\underline{z}_{USA} = 1$), while keeping supplier access, occupational incentives, and resident populations unchanged, lowers consumption per capita by $4.28\%$ (Appendix Table D.5). The resulting contraction of their businesses reduces

[43] Equalizing search costs only in immigrant founders' origin markets lowers consumption by $0.18\%$ (Appendix Table D.4), equal to 72% of the loss in Table 7. Equalizing foreign search costs one founder origin at a time shows that no single group drives the aggregate loss (Appendix Table D.6).

the gains from finding cheaper suppliers, leaving less to lose from equalizing their search costs. Equalizing search costs as well raises the consumption loss to $4.38\%$. The additional loss of $0.10$ percentage points is less than half of the $0.25\%$ loss when founders retain their productivity advantage.

**Extensions and alternative assumptions.** Allowing people to choose where they live raises the consumption loss from equalization of search costs to $0.46\%$ (Table 7). People know their entrepreneurial productivity before choosing residence. Because productive founders have more to gain from supplier access, losing that advantage disproportionately discourages U.S. residence among people with strong entrepreneurial prospects, generating amplification. The foreign-born resident share falls by only $0.10$ percentage points, but this small population change masks the loss of people particularly well suited to operating businesses in the United States.

Allowing wages and supplier prices abroad to adjust in full general equilibrium dampens the losses from equalization of search costs. Weaker U.S. demand for foreign inputs lowers wages and supplier prices in most source countries relative to the United States. This partly offsets the direct loss of supplier access, reducing the consumption loss to $0.11\%$ when residence is held fixed and $0.20\%$ when it responds (Appendix Table D.1). Figure 3 shows that allowing residence and foreign prices to respond largely preserves the broad geographic pattern of trade reallocation: purchases from Mexico and Japan fall, while purchases from Canada and the United States rise. Foreign-price adjustment moderates several of these changes, however.

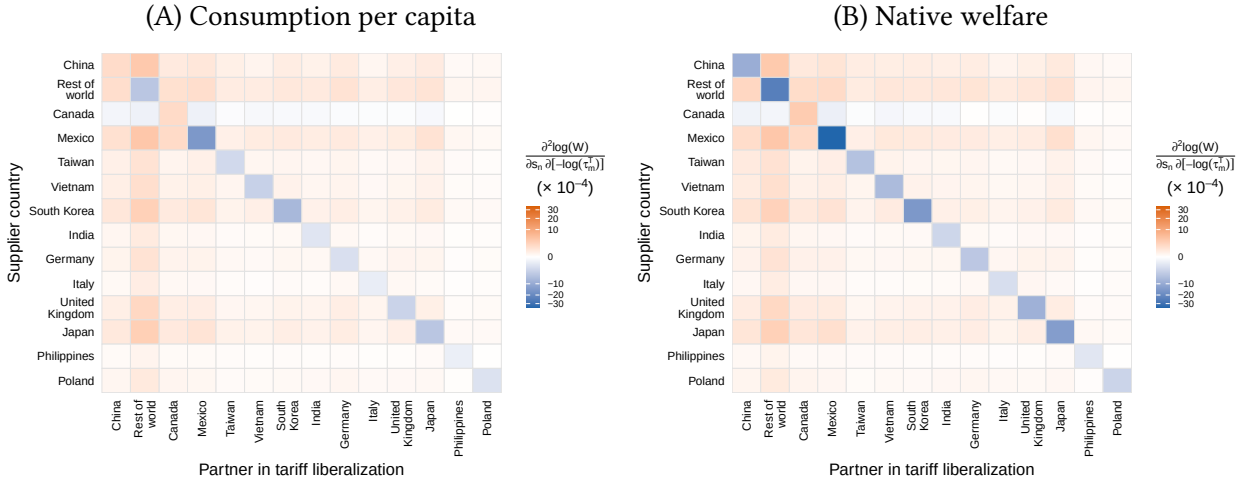
The consumption loss also survives changes in how we separate supplier access from productivity and occupational incentives. Allowing productivity to raise wage earnings as well as entrepreneurial returns yields similar losses (Appendix Table D.3). Lastly, as an alternative identification exercise, we set productivity scales and occupational payoff shifters equal across origins and infer supplier access from entrepreneurship rates, treating founder-employment shares as predictions. Equalizing foreign search costs still lowers consumption by $0.79\%$, but immigrant exit now outweighs native entry. Appendix Table D.10 reports the results.

## 5.2 Immigration and Trade-Cost Incidence

Our second question is how immigrant founders' supplier knowledge shapes the welfare effects of trade policy. We begin by asking how the gains from bilateral tariff reductions vary with the supplier knowledge retained by immigrant founders. We then consider two prominent examples of trade cost shocks that have received outsized attention in the literature: the 2018–19 U.S.–China tariff war (Amiti et al., 2019; Fajgelbaum et al., 2020) and NAFTA (Caliendo and Parro, 2015), comparing their effects with measured and equalized search costs. We hold residence fixed and allow occupations and prices to adjust in every country, using the extension in Section 3.6.[44]

[44]Bilateral tariff changes affect foreign demand for U.S. materials as well as U.S. demand for foreign inputs. Allowing wages and supplier prices abroad to adjust captures the resulting terms-of-trade responses.

Figure 4: Supplier Knowledge and the Gains from Tariff Liberalization




*Notes.* Each cell measures how retaining more of U.S.-based founders' supplier knowledge for country $n$ changes the marginal gain from reciprocal tariff liberalization with partner $m$. Rows identify supplier countries; columns identify tariff partners. The parameter $s_n$ is the share of calibrated log differences in search costs from U.S.-born founders that is retained. It equals one at measured search costs and zero at complete equalization. The cross-partial is evaluated at $s_n = 1$ and the calibrated tariffs. The tariff direction is $-\log \tau_m^T$: both countries' gross tariff factors fall in the same proportion. A positive value means that supplier knowledge raises the marginal welfare gain from liberalization. Native welfare is occupational inclusive value conditional on U.S. residence. Resident populations remain fixed; occupation, sourcing, wages, prices, expenditure, and rebates adjust in every country. Trade deficits are removed before the experiments. Colors use a signed square-root scale common to both panels; legend values are in units of $10^{-4}$. Gray cells fail the step-size stability criterion in Appendix C.8.1.

### 5.2.1 Supplier knowledge and the gains from liberalization

We first ask how the gains from bilateral tariff reductions depend on the supplier knowledge embodied in the existing immigrant population. For foreign supplier country $n$, let $s_n$ measure the share of founders' calibrated log differences in search costs from natives that we retain:

$$\log \kappa_{on}(s_n) = (1 - s_n) \log \kappa_{USAn} + s_n \log \kappa_{on}.$$

At $s_n = 1$, founders retain their calibrated search costs; at $s_n = 0$, all U.S.-based founders face native search costs in that source country $n$. Native costs, search costs in other source countries $n' \neq n$, and costs faced by founders abroad remain unchanged.

We examine how retaining more supplier knowledge changes the marginal gain from a reciprocal tariff reduction with trading partner $m$. Both countries' gross tariff factors $\tau^T = 1 + t$ fall in the same proportion. We do this as a simplified way of capturing retaliation (in the case of a tariff war) or liberalization (in the case of a tariff agreement). We call this the cross-partial elasticity, $\partial^2 \log W / [\partial s_n \, \partial(-\log \tau_m^T)]$ where $W$ is a measure of welfare and the cross-partial is evaluated at calibrated tariff pairs and $s_n = 1$. Figure 4 reports the responses of consumption per capita and native welfare. Rows identify the country whose supplier knowledge varies, $n$, and columns identify the tariff partner, $m$. A positive interaction means that supplier knowledge increases the gains from liberalization or magnifies the losses from reciprocal tariff increases.[45]

We begin with the diagonal, which pairs changes in supplier knowledge with tariff reduc-

[45] Appendix C.8.1 describes the numerical calculation.

tions involving the same country. Retaining the observed differences in search costs lowers natives' marginal gain from liberalization for every partner except Canada. Mexico has the most negative diagonal interaction in both panels. Mexican inputs account for $4.6\%$ of immigrant-founded firms' material purchases, compared with $2.0\%$ for native-founded firms—the largest immigrant–native spending-share gap across supplier countries. This greater exposure helps explain why supplier knowledge matters particularly strongly for liberalization with Mexico. Retaining immigrant founders' sourcing advantages strengthens the competitive pressure on native businesses; changes in entrepreneurial opportunities account for about two-thirds of the negative native-welfare interaction. For aggregate consumption, supplier knowledge strengthens the average-price benefit from liberalization, but less favorable variety and income responses more than offset that benefit.

Canada has a different sourcing pattern. Native-founded firms devote $2.8\%$ of their material purchases to Canadian suppliers, compared with $1.5\%$ among immigrant-founded firms. Nine of the fourteen immigrant-origin groups face higher search costs in Canada than natives. Retaining these differences therefore preserves natives' relative sourcing advantage, helping explain why the entrepreneurial-opportunity component moves in their favor when Canadian tariffs fall. Both this component and purchasing power contribute positively to the native-welfare interaction.

China illustrates why consumption and native welfare can respond differently. Retaining more supplier knowledge raises the marginal consumption gain from liberalization with China but reduces the native welfare gain. Lower tariffs make Chinese inputs cheaper, encouraging businesses that use those inputs to expand. Their expansion benefits consumers but also increases competition for native entrepreneurs. Founders' supplier access determines how strongly these businesses respond, so its effect on the gains from liberalization depends on both purchasing power and entrepreneurial opportunities.

Most off-diagonal responses have the opposite sign. Changing access to one source country therefore also changes the gains from liberalizing trade with other countries. Access to alternative source countries matters alongside knowledge of the market in which tariffs fall.

### 5.2.2 The U.S.–China tariff war and NAFTA

We next examine how supplier knowledge changes the effects of the U.S.–China tariff war and NAFTA. We evaluate each policy with founders' measured search costs and then repeat the exercise after assigning immigrant founders the search costs of U.S.-born founders. We equalize search costs in China in the tariff-war exercise and in Mexico and Canada in the NAFTA exercise. Costs elsewhere remain unchanged. Table 8 compares the results. Each column measures the effect of the tariff change with search costs held fixed, so differences between the measured and equalized columns show how supplier knowledge changes the policy's effects.[46]

[46] Equalization also changes the pre-policy sourcing mix and founder composition. To assess how much differences in the pre-policy sourcing mix contribute to the results, we conduct a separate robustness exercise. We choose common bilateral iceberg cost changes to match the measured economy's pre-policy aggregate sourcing shares,

Table 8: The U.S.–China Tariff War and NAFTA: Effects and Incidence

| | U.S.–China tariff increases 2018–19 | | NAFTA tariff reductions 1993–2005 | |
|---|---|---|---|---|
| Search costs | Measured | Equalized | Measured | Equalized |
| *Panel A. Aggregate U.S. outcome* | | | | |
| Consumption per capita (log points) | -0.058 | -0.058 | 0.033 | 0.031 |
| *Panel B. Chinese-origin U.S. residents* | | | | |
| Consumption per person (log points) | -0.665 | -0.051 | 0.079 | 0.033 |
| Inclusive-value welfare (log points) | -0.917 | -0.045 | 0.100 | 0.034 |
| Entrepreneurship rate (percentage points) | -0.173 | 0.004 | 0.015 | 0.000 |
| Founder revenue share (percentage points) | -0.039 | 0.000 | 0.001 | 0.000 |
| *Panel C. Mexican-origin U.S. residents* | | | | |
| Consumption per person (log points) | 0.031 | -0.059 | 0.194 | 0.029 |
| Inclusive-value welfare (log points) | 0.031 | -0.059 | 0.195 | 0.029 |
| Entrepreneurship rate (percentage points) | 0.016 | 0.001 | 0.029 | -0.001 |
| Founder revenue share (percentage points) | 0.026 | -0.001 | 0.024 | 0.000 |
| *Panel D. Canadian-origin U.S. residents* | | | | |
| Consumption per person (log points) | -0.006 | 0.014 | 0.095 | 0.032 |
| Inclusive-value welfare (log points) | -0.027 | -0.013 | 0.074 | 0.032 |
| Entrepreneurship rate (percentage points) | 0.008 | 0.010 | 0.008 | 0.000 |
| Founder revenue share (percentage points) | 0.001 | 0.002 | 0.003 | 0.000 |
| *Panel E. U.S.-born residents* | | | | |
| Consumption per person (log points) | -0.052 | -0.061 | 0.027 | 0.031 |
| Inclusive-value welfare (log points) | -0.052 | -0.061 | 0.027 | 0.031 |
| Entrepreneurship rate (percentage points) | 0.002 | 0.001 | -0.001 | 0.000 |
| Founder revenue share (percentage points) | 0.040 | -0.009 | -0.045 | -0.002 |

*Notes.* All outcomes refer to U.S. residents. Each column compares post-policy and pre-policy equilibria under the same cost regime. "Measured" columns retain origin-specific U.S. sourcing costs. "Equalized" columns set all U.S.-based founder origins' search costs in China (tariff war), or Mexico and Canada (NAFTA), to U.S.-born founders' costs in those countries. Other costs remain fixed. Both exercises use the multicountry model with representative sourcing abroad. Residence is fixed; occupation, sourcing, wages, prices, expenditure, and rebates adjust. The China exercise uses the calibration in Appendix C.6, raising U.S. tariffs from 3.1 to 21.0% and Chinese tariffs from 8.0 to 21.8% (Bown, 2021). NAFTA uses the 1993 accounts and one-sector median tariff factors from Caliendo and Parro (2015), applying all six directed NAFTA changes through 2005, with 1990 UN population and migrant stocks and modern founder behavior. Untargeted tariffs remain fixed. Welfare is occupational inclusive value conditional on U.S. residence. Log points are $100 \log(\text{post}/\text{pre})$; rates and shares are percentage-point changes.

**The U.S.–China tariff war.** We raise the U.S. tariff on Chinese inputs from 3.1% to 21.0% and China's retaliatory tariff from 8.0% to 21.8%, following Bown (2021).

As in Fajgelbaum et al. (2020), the aggregate losses from the tariff war are small: U.S. consumption per capita falls by $0.06\%$. Incidence varies widely across origins, however. Chinese-origin consumption falls by $0.66\%$, compared with $0.05\%$ among natives. Chinese-origin founders' reliance on Chinese suppliers exposes them disproportionately to the tariffs, reducing their entrepreneurship rate by $0.17$ percentage points.

Equalizing founders' search costs in China substantially narrows these differences in exposure. Chinese-origin consumption losses fall to $0.05\%$, and their entrepreneurship rate is unchanged. Aggregate consumption losses remain close to $0.06\%$. Native welfare losses, however, rise from $0.052\%$ to $0.061\%$—an $18\%$ larger loss. This is consistent with the negative China–China interaction in Figure 4B: supplier knowledge reduces natives' gains from tariff cuts but

holding these changes fixed during the tariff experiment. Occupation, sourcing, and firm scale adjust throughout. In this comparison, equalization increases natives' welfare losses from the tariff war by $19\%$ and their gains from NAFTA by $22\%$, while aggregate consumption effects are nearly identical across cost regimes.

cushions their losses from tariff increases. Higher tariffs erode immigrant founders' sourcing advantages, easing competition for native entrepreneurs. Equalization reduces the scope for this competitive relief.

**NAFTA.** We use production and trade data from 1993 and population counts by birthplace and residence from 1990.[47] We then apply the tariff reductions among the United States, Canada, and Mexico between 1993 and 2005 using data from Caliendo and Parro (2015).

Knowledge of Mexican and Canadian suppliers allows immigrant-founded businesses to benefit disproportionately from NAFTA's tariff reductions. With measured search costs, consumption among Mexican-origin U.S. residents rises by $0.19\%$, while consumption among Canadian-origin residents rises by $0.10\%$. Assigning immigrant founders native search costs in these source countries reduces the two groups' gains to $0.03\%$ and $0.03\%$, respectively.

Equalizing search costs raises native welfare gains from NAFTA by $14.2\%$, even as it slightly reduces the aggregate consumption gain of $0.03\%$ under measured search costs. With their sourcing advantages intact, immigrant-founded firms expand more strongly after tariff cuts, intensifying competition for native businesses. Equalization weakens this competitive pressure and lets natives capture more of the gains from liberalization. The same mechanism works in reverse in the China tariff war.

These sourcing differences also affect the expansion of trade. With measured search costs, the value of U.S. imports from Mexico and Canada rises by $15.49\%$ following NAFTA; with equalized costs, it rises by $14.30\%$, a $7.7\%$ smaller increase. Export growth to the two countries falls from $20.05\%$ to $18.82\%$.

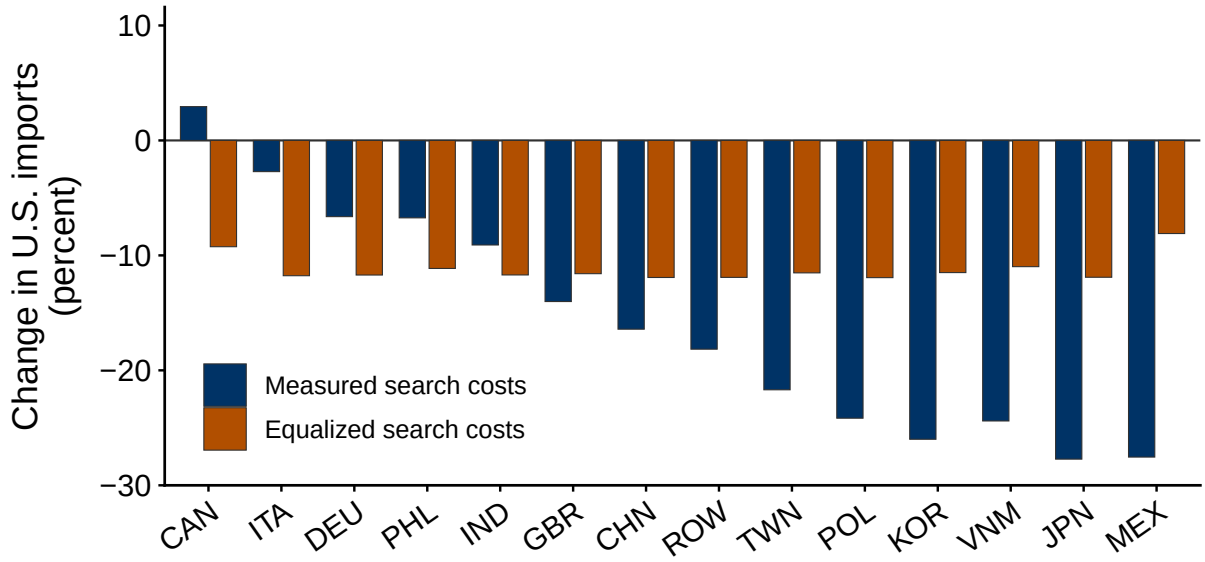
Appendix Table D.12 reports the same tariff experiments allowing residence choices to respond. With measured search costs, NAFTA increases Mexican- and Canadian-origin U.S. residence stocks by $0.403\%$ and $0.241\%$, while the tariff war lowers the Chinese-origin stock by $0.067\%$. Supplier knowledge continues to shape immigrant incidence, while changes in resident composition also affect consumption and welfare conditional on U.S. residence.

## 5.3 Changing the immigrant population

Our final question concerns the size and origin composition of the immigrant population. A larger immigrant population brings more potential founders; its origin mix determines their productivity, occupational incentives, and knowledge of particular supplier markets. The preceding

[47] We retain the differences in entrepreneurship, firm employment, and sourcing across founder origins measured in our modern U.S. data when calibrating this earlier economy. Applying these patterns to 1993 is a strong assumption. The growth of immigrant business networks may have strengthened origin-specific sourcing advantages over time, making our modern estimates overstate their importance for NAFTA. Conversely, established supplier networks and specialized sourcing intermediaries may have made foreign suppliers more accessible without founders' origin ties, weakening these advantages and causing us to understate their earlier importance. Changes in entrepreneurial productivity and occupational selection also matter, leaving the overall direction of bias uncertain.

Figure 5: Repatriation and U.S. Imports




*Notes.* All foreign-born U.S. residents return to their birth countries; everyone else's residence remains fixed. The figure reports percentage changes in U.S. material import expenditure by source under measured and equalized search costs. In the latter case, immigrant founders are assigned U.S.-born founders' search costs at each foreign source before repatriation. Occupation, sourcing, wages, prices, and expenditure adjust in every country. Imports are tariff-inclusive expenditure measured in the U.S. wage numeraire, as in Figure 3. Each series reports ordinary percentage changes relative to its own deficit-free reference before repatriation.

experiments change supplier knowledge while holding entrepreneurial productivity and occupational incentives fixed. Here, we move people, changing the supply of labor and potential founders together with the productivity, occupational incentives, and supplier knowledge they bring. We conduct two experiments. First, we return all foreign-born U.S. residents to their birth countries—"repatriation." Second, we study a policy of additional admissions, allowing newly admitted immigrants to differ in entrepreneurial productivity from immigrants already in the United States. Appendix Table D.13 reports additional experiments with alternative immigrant-population profiles.

### 5.3.1 Returning immigrants to their birth countries

We first ask how consumption and native welfare would change if all foreign-born U.S. residents returned to their birth countries. This reduces the U.S. working-age foreign-born share from $18.76\%$ to zero while preserving each origin's total population. Everyone else remains where they live. International trade remains open.

U.S. consumption per capita falls by $12.11\%$ and U.S.-born residents' inclusive-value welfare falls by $9.30\%$. About two-thirds of the consumption loss reflects population scale, with productivity differences accounting for most of the remainder. Figure 5 shows how U.S. material imports change across source countries. Total imports fall by $16.42\%$. Purchases fall from every trading partner except Canada, where they rise by $2.94\%$. The largest decline is for Japan ($27.72\%$), followed by Mexico ($27.54\%$). With equalized search costs, import declines are more uniform and

total imports fall by $10.93\%$, while the consumption loss is almost unchanged at $12.01\%$.

In a recent paper, Cruz and di Giovanni (2025) show that repatriating all immigrants lowers native welfare by $14.03\%$ in the long run through its effects on market size, firm entry, and product variety. Our analysis complements theirs by using observed differences in entrepreneurship, firm employment, and sourcing across origins to quantify immigrants' contribution as founders versus workers. In our quantification, native entrepreneurship expands following repatriation, but replacement entry only partly offsets the loss of immigrant founders' productivity and supplier knowledge.

### 5.3.2 Marginal admissions by origin

We next ask how consumption and native welfare change with additional admissions from each origin. We lower U.S. migration barriers $\iota_{oi}$ (equation 23), one origin at a time, holding other origins' populations and foreign conditions fixed, and scale the local effects to 100,000 additional admissions. Those induced to migrate may differ in entrepreneurial productivity from existing immigrants. To measure the contribution of search-cost differences, we repeat the exercise with U.S.-born search costs at foreign sources for all incumbent and additional immigrant founders. Appendix C.8.3 provides further details on the implementation of this counterfactual.

Table 9 shows that additional admissions raise consumption per capita and native welfare for every origin. Per 100,000 admissions, consumption gains range from $0.017\%$ for Mexico to $0.039\%$ for Canada, while native welfare gains range from $0.014\%$ to $0.022\%$. The larger Canadian gains reflect higher entrepreneurial productivity and stronger selection into entrepreneurship: in the calibration, Canadians require higher monetary returns to choose entrepreneurship, so they are especially positively selected as entrepreneurs.

Selective admissions policies can also change the productivity composition of entrants within a given origin. The "Threshold policy" columns consider lowering migration barriers only above the 90th percentile of each origin's initial marginal-entrant productivity distribution, with the relaxation calibrated to 100,000 additional residents. Across individual origins, consumption gains are roughly five to eight times as large and native welfare gains three to five times as large as under untargeted admissions.

Most gains remain when immigrant founders face U.S.-born foreign search costs, with Canada still producing the largest consumption gain and Mexico the smallest. Search-cost differences nevertheless matter for particular origins. They account for $18\%$ of the consumption gain from Taiwanese admissions and about two-fifths of their advantage over Chinese admissions.

At the existing origin mix, 100,000 additional admissions raise consumption per capita by $0.020\%$ and native welfare by $0.015\%$, with search-cost differences accounting for $1.6\%$ of the consumption gain. Applying these local elasticities to the 2007–22 rise in the foreign-born share of roughly 10% implies gains of about $0.9\%$ in consumption per capita and $0.7\%$ in native welfare,

Table 9: Marginal U.S. admissions induced by origin-specific migration costs

| | | Consumption per capita | | | U.S.-born welfare | | | |
|---|---|---|---|---|---|---|---|---|
| Origin | Baseline stock (thousands) | Total | Search-cost contribution | Threshold policy | Total | Search-cost contribution | Threshold policy | Materials imports from origin |
| Canada | 845.7 | 0.03872 | +0.00260 | 0.30400 | 0.02154 | +0.00106 | 0.11354 | +0.388 |
| Italy | 352.5 | 0.03405 | +0.00217 | 0.26480 | 0.02008 | +0.00097 | 0.10115 | +1.030 |
| United Kingdom | 800.8 | 0.02898 | +0.00189 | 0.18819 | 0.01825 | +0.00078 | 0.07374 | +1.705 |
| Taiwan | 364.1 | 0.03221 | +0.00579 | 0.25139 | 0.01992 | +0.00265 | 0.10102 | +2.205 |
| South Korea | 992.8 | 0.02810 | +0.00131 | 0.20747 | 0.01797 | +0.00052 | 0.08042 | +2.218 |
| Japan | 488.1 | 0.02770 | +0.00226 | 0.20771 | 0.01774 | +0.00082 | 0.07979 | +1.985 |
| Germany | 1040.5 | 0.02720 | +0.00110 | 0.19854 | 0.01759 | +0.00046 | 0.07683 | +0.734 |
| India | 2481.1 | 0.02602 | -0.00009 | 0.17961 | 0.01725 | +0.00011 | 0.07088 | +0.273 |
| Rest of world | 16457.6 | 0.02293 | +0.00032 | 0.11122 | 0.01613 | +0.00019 | 0.04661 | +0.065 |
| Vietnam | 1265.4 | 0.02132 | -0.00024 | 0.14442 | 0.01563 | -0.00003 | 0.05856 | +0.307 |
| China | 2046.4 | 0.02111 | +0.00147 | 0.13951 | 0.01587 | +0.00085 | 0.05964 | +0.261 |
| Poland | 381.6 | 0.02022 | +0.00061 | 0.13727 | 0.01526 | +0.00027 | 0.05623 | +5.914 |
| Philippines | 1997.7 | 0.01851 | -0.00026 | 0.11647 | 0.01459 | -0.00007 | 0.04817 | +0.380 |
| Mexico | 10201.7 | 0.01654 | -0.00025 | 0.08640 | 0.01388 | -0.00012 | 0.03754 | +0.196 |
| Current foreign-born mix | 39715.9 | 0.01974 | +0.00032 | 0.06916 | 0.01505 | +0.00017 | 0.03214 | +0.042 |

*Notes.* Total and search-cost contributions are local log-point changes per 100,000 admissions. The starting equilibrium has balanced trade and corresponds to the column "Residence responds" in Table 7. Baseline stocks are all-age residents after deficit removal, anchored to 2020 WPP/DESA counts. Each origin-specific row lowers that origin's U.S. migration cost. Only that origin's residence choices respond; other origins' residence allocations remain fixed at each productivity level. Occupation, sourcing, and the U.S. equilibrium adjust; foreign conditions remain fixed. Welfare is U.S.-born occupational inclusive value conditional on U.S. residence. The search-cost contribution subtracts from Total the effect when all incumbent and additional immigrant founders face U.S.-born search costs at foreign sources. This comparison preserves baseline and post-admission residence allocations at each productivity level; each effect uses its own baseline. Threshold policy reports total log-point changes from a finite relaxation calibrated to 100,000 net additional residents. Migration costs fall only above the original marginal entrant distribution's 90th productivity percentile; the cutoff remains fixed. Residence choices respond at all productivity levels within the affected origin. For the bottom row, cutoffs apply within origins and the additional residents retain the baseline origin proportions. The final column measures tariff-inclusive materials imports from the named origin. The bottom row admits immigrants in the existing foreign-born proportions, holds U.S.-born residence fixed at each productivity level, and reports total foreign-born stocks and materials imports from all foreign sources. Appendix C.8.3 describes the calibration and implementation.

holding the native population and origin mix fixed.[48]

# 6 Conclusion

The United States is home to the world's largest immigrant population. The literature on immigrant entrepreneurship documents immigrants' disproportionate role in business formation, while work on migrant networks shows how immigrants facilitate trade with their countries of origin. Less is known about how these trade connections operate through the businesses immigrants create and what they are worth to the U.S. economy. We address this gap by combining administrative data linking firms to their founders and international transactions with a model of supplier search and occupational choice.

First, we document that immigrant-founded firms import more often, source disproportionately from their founders' birth countries, and pay lower unit values there. The unit-value gap becomes much smaller when we compare firms buying from the same supplier. Second, we develop a model in which supplier knowledge lowers search costs and raises the returns to en-

[48]Locally, a one-percentage-point increase in the foreign-born share raises consumption per capita by approximately $0.75\%$, compared with the $0.24\%$ per-capita income gain for the same share increase in Azoulay et al. (2022).

trepreneurship, with larger gains for more productive founders. Third, we use the linked data to distinguish supplier access from entrepreneurial productivity and occupational incentives and quantify the value of search-cost differences. Immigrant founders' lower foreign search costs are worth $0.25\%$ of baseline U.S. consumption per capita. When these costs rise to native levels, improved entrepreneurial opportunities partly compensate natives for higher consumer prices. Equalizing search costs in the affected source countries also raises natives' welfare gains from NAFTA and their losses from the U.S.–China tariff war, while changing the aggregate consumption effects little. Returning immigrants to their birth countries lowers consumption and native welfare despite increased native entrepreneurship, while additional admissions raise both for every origin. Most of the admissions gains remain when immigrant founders face native search costs in foreign supplier countries.

Future questions abound. For example, domestic trade remains less visible in our analysis. We do not observe firms' domestic purchases, and our quantification makes the stark assumption that founders of all origins face the same domestic supplier access. Observing these purchases would allow us to assess whether immigrants' foreign sourcing advantages accompany advantages or disadvantages in reaching domestic suppliers.

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Appendix for

# Old Roots, New Routes: The Trade Patterns of Immigrant-Founded Firms


| | | |
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# A Data and Additional Empirical Results

This appendix provides further details on the data and empirical results in Section 2. We begin with the company histories discussed in the introduction, then discuss the construction of the linked Census records. Finally, we present additional empirical results.

## A.1 Illustrative Company Histories

Table A.1 summarizes publicly documented examples of immigrant founders drawing on knowledge and relationships in their countries of origin to establish foreign supplier connections.

## A.2 Disclosure Avoidance and Rounding

All results based on the restricted-use LBD, BR, LEHD, and LFTTD were produced within a Federal Statistical Research Data Center and reviewed for disclosure avoidance before release (Project 7517031; release CBDRB-FY26-0300) (U.S. Census Bureau, 2026). The review covers the underlying and implicit samples for reported summary statistics, model estimates, figures, and quantitative moments and parameters. Under the Census Bureau's standard rules, unweighted counts follow size-dependent entity-count rounding and other statistics are reported to no more than four significant digits. For shares based on unweighted counts, such as $\Pr(\text{import} \mid o)$, we first round the numerators and denominators according to these unweighted entity count rounding rules and then take their ratio up to four significant digits, so that these shares are approximate.

## A.3 Linked Census Records

The core dataset is built around a repaired Census firm-year panel. The Longitudinal Business Database (LBD) provides the universe of U.S. nonfarm employer establishments and firms, with annual measures of employment, industry and geography, legal form, and years of firm entry and exit (Chow et al., 2021). The Business Register (BR), which underlies the LBD, is used to recover ownership information for sole proprietorships (Davis et al., 2009). The Longitudinal Employer-Household Dynamics (LEHD) infrastructure links workers to employers through quarterly unemployment-insurance wage records and supplies person-level demographic information, including place of birth, through the Individual Characteristics File (Vilhuber and McKinney, 2014). The Longitudinal Firm Trade Transactions Database (LFTTD) is the Census Bureau's customs-to-BR link: merchandise export and import declarations are matched to LBD firm identifiers using tax identifiers and, where needed, probabilistic name matching (Kamal and Ouyang, 2020).

The construction proceeds from the firm panel outward. We first define the population of employer firms and their annual characteristics using the LBD/BR, after repairing firm identifiers

Table A.1: Immigrant Founders and Suppliers in Their Countries of Origin

| Company | Sector | Story |
|---|---|---|
| Bausch & Lomb | Optical goods | German immigrant John Jacob Bausch opened an optical-goods shop in Rochester in 1853. Fellow German immigrant Henry Lomb worked in and helped finance the early business, becoming an equal partner in 1863. Bausch imported spectacles, telescopes, microscopes, and opera glasses from Germany through his brother Johann Georg, who operated an optical store there. The business that became Bausch & Lomb subsequently expanded into manufacturing (Kolbow, 2011). The company reported $5.1 billion in revenue in 2025 (Bausch + Lomb Corporation, 2026). |
| Linksys | Networking equipment | Taiwanese immigrants Janie and Victor Tsao founded the predecessor to Linksys in 1988. Drawing on their familiarity with Taiwan, they initially matched U.S. technology vendors with Taiwanese manufacturers able to produce goods cheaply. One of those manufacturers then offered them a printer-connection product to market in the United States, helping turn the consultancy into a product business (Mount, 2004). By the time of its $500 million acquisition by Cisco in 2003, Linksys was a leading provider of home-networking products (Cisco Systems, 2003; Mount, 2004). |
| MSI | Flooring and surfaces distribution | Indian immigrants Manu and Rika Shah used family contacts to import lower-cost stone from India (Nishi, 2008; Brennan, 2023). MSI ranked first among U.S. flooring distributors in 2025, with reported sales of $2.7 billion (Floor Covering Weekly, 2025). |
| Progresso | Packaged foods | Sicilian immigrant Giuseppe Uddo began importing Italian foods into New Orleans after arriving in 1907 (General Mills, 2015). The business that became Progresso later sourced olives, peeled tomatoes, and other staples from Sicily through his brother-in-law Francesco Taormina, who supplied its Brooklyn operations (Denker, 2003). In 2023, Progresso ranked second among U.S. soup brands, with $892.5 million in retail sales and a 15.3% share of retail sales value (Clipsham, 2025). |
| UGG | Footwear | Australian immigrant Brian Smith founded UGG in Southern California in 1978 (UGG, n.d.). He contacted Australian bootmaker Country Leather after seeing its advertisement in *Surfer* magazine. The owner had received inquiries from several prospective U.S. importers. Smith credits his Australian background and personal connections with helping him secure the rights to import the boots (Warner, 2015). UGG brand sales reached $2.7 billion in fiscal 2026 (Deckers Outdoor Corporation, 2026). |
| Vizio | Consumer electronics | Taiwan-born founder William Wang drew on electronics-industry contacts in Taiwan and partnered with AmTRAN, whose founder he had befriended while working there, as both supplier and investor (Lawton et al., 2008). Vizio held 10.4% of the U.S. television market in 2023 (Hu, 2024). Walmart acquired Vizio in December 2024 for approximately $2.3 billion (Walmart, 2024). |

*Notes.* The table summarizes public company histories, interviews, and business reporting.

as described below. We then attach LEHD worker histories, which identify the individuals present at the firm at entry and their places of birth. Finally, we attach LFTTD transactions to construct trade outcomes.

## A.4 Constructing Longitudinal Firms

The unit of analysis in the paper is a firm. This creates a measurement problem because the LBD is longitudinal at the establishment level, while the firm identifiers available in annual business-register files are not, by themselves, true longitudinal firm identifiers. Establishments are tracked across years, but Chow et al. (2021) note that firm identifiers are cross-sectionally rather than longitudinally consistent: a continuing enterprise can receive a new identifier after an EIN or legal-form change or a single-unit/multi-unit transition, while an old identifier can be recycled after extended inactivity. If left uncorrected, these identifier changes would create false firm births and deaths, mismeasure firm age and growth, and potentially assign founders to what are in fact reorganized incumbents.

We first construct annual firm records by aggregating employment and payroll across establishments that share a firm identifier in a given year. We include establishment-years with positive employment or payroll. Retaining years with positive payroll but zero employment helps us trace firm histories and identify founders.[1] To determine whether a firm identifier continues across years, we also check LBD records with no positive employment or payroll. If the identifier remains present during a period of inactivity, we keep its earlier and later active records in the same history. We split the history only when the identifier disappears from the LBD and later reappears.

We then repair changes in firm identifiers using establishment continuations. For each pair of adjacent years, we follow establishments by their longitudinal establishment identifier and aggregate source-year employment flows from each firm identifier in $t-1$ to each firm identifier in $t$. The bridge weight is the prior-year employment of establishments that continue into the next year. Continuations under the same identifier are kept together. When one identifier disappears and a different identifier appears, we bridge the two only if the continuing establishments form the unique largest employment flow out of the disappearing identifier and the unique largest employment flow into the newly appearing identifier, with no ties. We also require the new identifier to have a single predecessor. This largest-flow rule repairs clean administrative breaks, including single-unit/multi-unit transitions, but does not carry founder identity through acquisitions or mergers (Brown et al., 2019; Choi et al., 2025).

Transitions into an already active identifier are classified as acquisitions by an incumbent and are not linked. Newly appearing identifiers with multiple predecessors are treated as merger

[1] The LBD measures employment as the number of employees on the payroll during the pay period including March 12, whereas payroll is a total for the calendar year. An establishment that enters after March 12 therefore records zero employment but positive payroll in its year of entry, so its first year of positive payroll precedes its first year of positive employment.

or multi-predecessor events and are also not linked.[2] For analysis, we retain only firm-years with positive LBD employment. Following the LBD/BDS convention and Choi et al. (2025), we define the LBD birth year of each repaired firm from the establishments attached to it at entry: the birth year is the first employment year of the oldest such establishment. Firm age is measured relative to that birth year, and startup status is assigned only when that oldest establishment is new in the same year. Annual employment and trade outcomes remain measured using the contemporaneous firm boundary in the administrative data. Annual firm industry is the establishment-employment-weighted modal six-digit NAICS after harmonizing vintages with the BDS vintage-consistent classification. Annual commuting zone is the employment-modal 1990 commuting zone across the firm's establishments.

## A.5 Founders, Nativity, and Countries

Founder measurement starts from this repaired firm panel and its LBD history. We search LEHD wage records for the repaired firm around entry. A firm enters the founder-measured frame only if its first observed LEHD payroll quarter falls within two years of either the employment-based LBD birth year described in Section A.4 or the first positive-payroll year of the repaired firm's oldest establishment. Firm age and startup status remain based solely on the employment-based birth year. This window is deliberately narrow: it allows small timing differences between the LBD start dates and the first linked payroll record in the LEHD, but it is designed to capture the initial payroll group rather than high-earning employees observed only after a later administrative reorganization.

Founder assignment then follows the logic of administrative startup studies that combine early wage records with ownership information (Kerr and Kerr, 2017; Azoulay et al., 2020; Choi et al., 2025). We use the term "founder" to mean an active founder-manager or initial leader, not every individual with a passive legal ownership stake. Legal form is measured at firm birth and determines the founder-assignment rule thereafter. For corporations, we classify as founders the individuals with positive wage earnings in the first observed LEHD payroll quarter for the firm who are also among the three workers with the highest earnings at the firm during its first observed LEHD payroll year.

Sole proprietorships require separate treatment. Owners of sole proprietorships do not pay themselves wage income and therefore do not appear as employees of their own firms in LEHD wage records. For these firms, we use distinct Protected Identification Keys (PIKs) for owners in BR ownership records and, when there are fewer than three, we follow Choi et al. (2025) and supplement the founder group up to three people with the highest-earning workers observed in the first LEHD payroll year. Partnerships, nonprofit organizations, and government entities are excluded from the main analysis. Active partners generally receive pass-through income rather than wage income, and that income is not consistently observed in either the BR ownership fields

[2] This is again consistent with Choi et al. (2025).

or LEHD wage records. As a result, founder assignment for partnerships is not comparable to founder assignment for corporations and sole proprietorships. Public Statistics of U.S. Businesses (SUSB) tabulations suggest that this restriction removes a limited part of the employer-firm economy (Table A.2). In 2022, partnerships account for roughly one-tenth to one-seventh of firms in the aggregate and in manufacturing, retail trade, and wholesale trade, and their employment and sales shares are similar.

The corporate wage-record definition is defensible for both institutional and empirical reasons. Institutionally, active owner-managers of C and S corporations generally have reason to appear in employee wage records: corporate officers and shareholder-employees who provide more than minor services to the corporation are typically paid employment compensation. Consistent with this institutional setting, Nelson (2016) documents that employer S corporations commonly have at least one shareholder-employee and that privately held C corporations pay a substantial share of owner income as executive compensation. Kopczuk and Zwick (2020) note that owner-managers can take business income as bonus compensation, and a C-corporation owner-manager has a tax reason to prefer a bonus because the payment is deductible from the corporate tax base. Since LEHD records quarterly wage earnings, bonuses paid through payroll should appear in the wage records we use. Direct evidence from C corporations is limited but points in the same direction. In their 2011–2015 sample, Dobridge et al. (2021) identify roughly 60,000 observations for individuals owning at least 20% of one or more C corporations; about 43,000 of these observations (72%) also involve receipt of a W-2 from at least one corporation the individual owns in that year. Among firms with roughly 50 or fewer employees, owners also account for more than half of workers above the within-firm 99th earnings percentile. Thus, substantial C-corporation owners commonly appear on payroll and are concentrated among firms' highest earners. The small size of firms at birth further supports this approach: in the 2022 Business Dynamics Statistics, age-zero employer firms average 4.83 employees. With such small initial workforces, selecting the three highest earners can capture a substantial portion of the initial team, making it plausible that active owners receiving payroll compensation are included. Lastly, using data on S corporations, Hyatt et al. (2021) find that the top-three LEHD earners include at least one owner in 69% of first-year, single-establishment S corporations. Because an owner appears in payroll in 73% of these firms, their reported shares imply a conditional rate of about 95% ($= 69/73$). Similarly, Azoulay et al. (2020) find that 90% of S-corporation owner-workers are among the three highest-paid employees in the firm's first year.

At the firm level, an immigrant-founded firm is a firm with at least one foreign-born founder, including a firm with a mixed native–immigrant founder team. Founder teams are defined at firm birth and held fixed throughout the panel, so subsequent hiring does not change founder classification. In country-indexed regressions (i.e. Sections 2.3–2.4), the founder-country indicator equals one when at least one founder of firm $f$ was born in country $n$. This construction permits a firm with multiple foreign-born founders from different countries to have more than one founder-country link. For applications requiring one origin per firm, we prioritize foreign-born

Table A.2: Employer Firms by Legal Form of Organization in 2022 Statistics of U.S. Businesses (SUSB)

| | Covered | | | Partnerships | | | Other | | |
|---|---|---|---|---|---|---|---|---|---|
| Sector | Firms | Emp. | Sales | Firms | Emp. | Sales | Firms | Emp. | Sales |
| All sectors | 81.3% | 74.3% | 81.4% | 12.2% | 12.2% | 10.7% | 7.0% | 13.5% | 7.8% |
| Manufacturing | 86.3% | 90.2% | 88.7% | 14.5% | 9.2% | 10.1% | 0.2% | 0.6% | 1.2% |
| Retail trade | 86.4% | 90.4% | 88.3% | 13.1% | 8.3% | 10.9% | 0.8% | 1.3% | 0.8% |
| Wholesale trade | 90.6% | 89.1% | 89.1% | 9.6% | 9.6% | 8.7% | 0.5% | 1.3% | 2.2% |

*Notes.* Entries are percentages from the 2022 SUSB U.S. rows by NAICS sector and legal form, enterprise-size total. Covered firms are corporations, S-corporations, and sole proprietorships; other combines nonprofits, government, and residual legal forms. Firm shares use the SUSB total row because legal-form-of-organization (LFO) firm counts are slightly non-additive.

founders, then those whose birthplace is a separately identified foreign country rather than Rest of World, and finally those with higher earnings in the firm's first observed LEHD payroll year. These definitions separate founder-origin exposure from the nativity composition of the rest of the workforce. In the co-national-employee robustness exercise, we drop every country row in a firm–year whenever the firm has a nonfounder with positive earnings that year who was born in any country represented among its founders.

Place of birth is measured in the LEHD Individual Characteristics File. We retain founders with valid person identifiers and nonmissing, nonimputed place of birth. A firm remains in the sample when at least one founder survives these restrictions, and its nativity and origin assignments use the retained founders. We define immigrant status using country of birth rather than citizenship, visa status, or naturalization status, none of which is observed in the linked data. U.S.-born individuals and individuals born in Puerto Rico or other U.S. territories are classified as native-born for the purposes of the firm-level immigrant-founder indicator. This distinction matters because place of birth and citizenship do not necessarily coincide. However, applying the same geographic convention to the 2022 ACS one-year records, only 6% of civilian labor-force participants born outside the United States and its territories are U.S. citizens at birth. The main exception is people born abroad to American parents, whose classification as immigrants should attenuate rather than generate the founder-nativity differences that we estimate.

We remove founder records with ages outside the range of 16–75 before constructing subsequent founder-based objects. We impute missing ages with the mean of the remaining observed ages. For the founder-age summary (Table A.6), we first average across founders within each firm and then average those firm-level means across firms.

LEHD provides partial coverage of undocumented workers, who can appear in unemployment-insurance wage records (Andersson et al., 2014; Hotchkiss et al., 2015; Mouw, 2016). Cruz and di Giovanni (2025) estimate that undocumented immigrants account for 21% of U.S. immigrants aged 15 or older in 2016–2020, but incomplete coverage likely leaves many outside our linked sample. For workers who do appear, linkage to personal characteristics relies on Social Security numbers (SSNs), which underlie the PIKs used to link LEHD records (Vilhuber and McKinney, 2014). Abowd et al. (2018) document cases of apparently shared SSNs and earnings inconsistent

Table A.3: Age at U.S. Entry for Foreign-Born Civilian Employed Workers

| Industry group | Mean | P25 | P50 | P75 |
|---|---|---|---|---|
| *All individuals* | | | | |
| | 23.0 | 15.0 | 23.0 | 30.0 |
| *All self-employed* | | | | |
| All industries | 24.1 | 17.0 | 24.0 | 31.0 |
| Manufacturing | 23.7 | 17.0 | 23.0 | 31.0 |
| Retail trade | 24.7 | 17.0 | 24.0 | 32.0 |
| Wholesale trade | 24.5 | 16.0 | 24.0 | 32.0 |
| Other industries | 23.7 | 16.0 | 23.3 | 30.8 |
| *Incorporated self-employed* | | | | |
| All industries | 23.8 | 17.0 | 23.0 | 31.0 |
| Manufacturing | 23.2 | 16.0 | 23.0 | 30.0 |
| Retail trade | 24.1 | 17.0 | 24.0 | 31.0 |
| Wholesale trade | 24.2 | 15.0 | 24.0 | 31.0 |
| Other industries | 23.5 | 15.4 | 23.0 | 30.4 |

*Notes.* Source: 2022 American Community Survey one-year Public Use Microdata Sample person file. The sample contains foreign-born civilian employed workers. "All self-employed" includes workers in incorporated and unincorporated businesses, practices, and farms; "Incorporated self-employed" retains the incorporated group. Age at entry is current age minus years since U.S. entry. P25, P50, and P75 are percentiles. Industry is the respondent's current industry. "Other industries" is a simple, not person-weighted, average of the omitted industry rows.

with the original holder's age. To limit these linkage problems, we require valid person identifiers and nonmissing, nonimputed birthplace and exclude founder records with observed ages outside 16–75.

The LEHD place-of-birth field identifies the United States and 23 other high-frequency birthplace categories, alongside coarser residual regions (Vilhuber and McKinney, 2014). These 24 categories are Canada, China, Colombia, Cuba, the Dominican Republic, El Salvador, Germany, Guatemala, Haiti, India, Iran, Italy, Jamaica, Japan, Mexico, the Philippines, Poland, Puerto Rico, South Korea, Taiwan, the United Kingdom, the United States, USSR Core, and Vietnam. Remaining places of birth are coded as broader regions or as not specified.

LEHD observes contemporaneous age but not age at migration. Table A.3 benchmarks age at migration using the 2022 ACS one-year records for foreign-born civilian employed workers and computes age at U.S. entry as current age minus years since U.S. entry. The average foreign-born civilian employed worker entered the United States at about age 23, while the average foreign-born self-employed worker entered at about age 24. Among the latter, the median is 24, with half entering between ages 17 and 31. Manufacturing, retail trade, and wholesale trade self-employment rows closely match this overall pattern; retail and wholesale have slightly older upper tails. The incorporated self-employed, the closest public ACS proxy for incorporated founder-managers, show nearly the same pattern.

**Country coverage.** LFTTD records U.S. merchandise trade with all countries. Our firm-level summary statistics retain all founder origins and trade partners, and our quantification retains

Table A.4: Country Coverage and Grouping by Exhibit

| Exhibit or section | Founder origins | Trade partners or sources |
|---|---|---|
| Table 1, except its final two rows; Table A.6; Table 2, columns 1–2 | All origins, grouped by native- or immigrant-founded status. | All LFTTD countries. |
| Table 2, column 3 | Native-founded firms and immigrant-founded firms whose founder countries can be identified separately. | All LFTTD countries, excluding each firm's founder-origin countries. |
| Table 1, final two rows; Tables 3–4 and their corresponding appendix comparisons | Links to the 20 comparison countries listed below. | The 20 comparison countries. |
| Figure 1; Table A.8; Section 4 | All origins, grouped into the United States, 13 foreign countries, and Rest of World. | All foreign sources, grouped into the 13 foreign countries and Rest of World. Quantification also includes domestic purchases, measured using ICIO. |
| Table A.12 | Native-founded firms and immigrant-founded firms assigned to a separately identified foreign origin. | All valid LFTTD countries except Cuba, excluding direct founder-country links. Countries remain individually represented. |

*Comparison countries.* The 20 countries are Canada, China, Colombia, the Dominican Republic, El Salvador, Germany, Guatemala, Haiti, India, Iran, Italy, Jamaica, Japan, Mexico, the Philippines, Poland, South Korea, Taiwan, the United Kingdom, and Vietnam. These are drawn from the birthplace categories separately identified in LEHD. Puerto Rico is grouped with the United States, "USSR Core" is a regional category, and Cuba is excluded from the direct country comparisons because the embargo leaves too little bilateral merchandise trade.
*Quantification groups.* The 13 individually represented foreign countries are Canada, China, Germany, India, Italy, Japan, Mexico, the Philippines, Poland, South Korea, Taiwan, the United Kingdom, and Vietnam. Individual representation requires separate identification in both LEHD and the OECD Inter-Country Input-Output (ICIO) tables and sufficient Census observations to satisfy disclosure requirements. All remaining founder origins and foreign sources, including Cuba and regional birthplace categories, enter Rest of World.
*Founder-country links.* Direct country comparisons retain every observed founder link to the 20 comparison countries and do not define a Rest-of-World link. In the country-level participation and share regressions, firms without a founder from these countries remain in the sample with all founder-country indicators equal to zero. Table A.16 additionally requires at least one founder link to a named foreign country.
*Single-origin assignment.* Exercises requiring one origin per firm prioritize foreign-born founders, then separately identified foreign countries, with first-year payroll earnings breaking remaining ties (Appendix A.5). Table A.12 first removes every direct founder-country link and then applies this assignment. Immigrant-founded firms assigned to Rest of World or a residual or missing origin are excluded from that exercise.

all origins and sources through country aggregation. Comparisons based on a founder's connection to a particular trading partner require a separately identified birthplace in LEHD. Table A.4 reports the country coverage and grouping used in each exhibit.

## A.6 Trade Transactions and Supplier Measures

LFTTD records merchandise trade transactions linked to U.S. business identifiers (Kamal and Ouyang, 2020). Each import transaction reports the U.S. firm identifier, origin and exporting country, transaction date, HS10 product, value, physical quantity, related-party status, and the manufacturer identification field (MID). We assign imports to their recorded country of origin, where the goods were produced or last substantially transformed. This may differ from the exporting country when goods reach the United States through an intermediary in another country. The import value object is the customs value recorded on the import declaration. This is closer to a free-on-board (FOB) concept than to a cost, insurance, and freight (CIF) concept: it excludes U.S. import duties and the international freight, insurance, and other charges incurred in bringing

the merchandise to the United States. Export value is recorded on a free-alongside-ship basis and likewise excludes freight, insurance, and transport costs beyond the U.S. port of export. We deflate each shipment using the Consumer Price Index for its transaction month and then aggregate the resulting real values in a given year. The physical quantity is the primary quantity reported for the HS10 line, in the unit prescribed for that customs product code.[3]

The common transaction sample drops imports with customs value at or below $2,000 and exports with value at or below $2,500, as well as records with missing or invalid partner-country or HS10 codes. We also drop HS chapter 27 and chapters 98 and 99. Chapter 27 covers mineral fuels, while chapters 98 and 99 contain special classification provisions and temporary statutory provisions rather than ordinary product categories.

We exclude transactions flagged as related-party trade because our model describes supplier search between independent buyers and sellers and abstracts from ownership links and multinational production. The customs classification includes trade between parties linked by ownership or control, such as affiliates within the same multinational enterprise (U.S. Census Bureau, n.d.). Recorded values in these transactions may also reflect tax incentives and internal production decisions, complicating their interpretation as prices negotiated between independent buyers and sellers (Diewert, 2009). This restriction accounts for the largest individual reduction in raw trade coverage reported in Table A.5. The quantification in Section 4 uses the sourcing tilts to recover founder-origin differences in supplier access, while aggregate expenditure shares come from the ICIO. The relevant question is therefore whether excluding related-party transactions changes these tilts. Table A.11 shows that they remain substantial when these transactions are included. With firm–year and country–year fixed effects, the founder-country import-participation coefficient changes from 1.75 to 1.69 percentage points, and the import-share coefficient from 22.95 to 20.16 percentage points. Our counterfactuals nevertheless abstract from complementarities between trade and multinational production, which Ramondo and Rodríguez-Clare (2013) show can amplify the gains from trade.

The participation, value, product, and partner-country outcomes do not require valid physical quantity or a usable MID. Supplier-count outcomes use cleaned MIDs where available, but missing MIDs do not remove transactions from the other non-unit-value outcomes. Unit-value regressions additionally exclude transactions whose primary quantity is imputed, missing, nonpositive, or otherwise not comparable. The import unit-value regressions also require a usable MID.

We use the notation of Section 2: $f$ denotes the firm, $n$ the partner country, $g$ the HS10 product, $m$ the cleaned supplier identifier, and $t$ the calendar year. Firm employment, six-digit industry, and commuting zone are $E_{ft}$, $s_{ft}$, and $r_{ft}$, respectively; $b_f$ is the employment-based

[3]Primary quantity measures the shipment in the first unit prescribed for its product code, such as individual items, dozens, or kilograms. Weight-based quantities generally exclude packaging. Some products also require a secondary quantity, measuring the same goods in another unit; we use only the primary quantity to construct unit values. See the U.S. Census Bureau's *International Trade Definitions*.

founding year.

**Firm-year outcomes.** We aggregate transactions to measure import and export participation, total value, and the numbers of partner countries, products, and foreign suppliers. The selection regressions use 2007–2022. When founder-origin trade is removed, we exclude transactions with every observed founder-origin country before reconstructing the outcomes. Firms trading only with founder origins become nontraders; logged outcomes require positive remaining trade. Native-founded firms are unchanged.

**Country participation and shares.** Country shares condition on positive worldwide trade and divide value from each country by the firm's worldwide total, including partners outside the 20 named countries. A firm can have more than one founder-country link. The co-national-employee restriction removes the entire firm-year whenever a nonfounder employee with positive annual earnings was born in any country represented among its founders.

**Unit values across and within suppliers.** In the across-supplier specifications, we sum customs value and valid primary quantity over transactions in each annual firm–source-country–HS10 cell and define $UV_{fngt}$ as their ratio. This pools the firm's suppliers and gives what is in effect a quantity-weighted annual unit value. The within-supplier specification instead takes the ratio separately for each firm–source-country–HS10–supplier–year cell. The baseline across- and within-supplier specifications use 2007–2022; the held-out sourcing-tilt exercise uses 2016–2017. Physical units are product-specific, so quantities are not compared across HS10 products. Product codes are used within year, and external data are matched using the relevant HS vintage.

Annual aggregation matches the frequency of the firm controls and fixed effects and reduces shipment-level measurement error. Related LFTTD studies likewise aggregate transactions before estimation: Alviarez et al. (2023) use buyer–supplier–product–year unit values, while Heise (2024) aggregates to quarterly relationship–product cells and reports annual aggregation as a robustness check.

For unit-value analyses, we then apply outlier filters in the spirit of Alviarez et al. (2023) and Heise (2024). Using these annual firm-country-HS10 unit values, we trim observations in the tails of the unit-value distribution within narrow HS10-country-year markets, using the 1st and 99th percentiles as the benchmark cutoffs. We also exclude firm-country-HS10-year cells where the absolute year-over-year log change is above four.[4] These restrictions keep the identifying variation in comparisons among plausibly comparable products and avoid letting reporting errors in either value or quantity drive the estimates.

For imports, we construct supplier identifiers from the manufacturer identification (MID) field. Kamal and Monarch (2018) show that MIDs support analysis of buyer–supplier relationships, although name abbreviations, transliteration, and address variation can split or blur sup-

[4] If there is no adjacent-year cell, we keep the observation.

plier identities. Following the cleaning logic in Basker and Kamal (2021), we strip street numbers and city-name/address components from the MID and normalize punctuation before constructing the supplier identifier. We use the resulting panels to count the foreign suppliers used by an importer and to run within-supplier comparisons.

## A.7 Sample Coverage and Characteristics

Table A.5 traces how the firm and transaction restrictions affect employment and trade coverage in 2022. The baseline founder-measured sample retains 22.21% of employment in the raw LBD/BR frame, 9.12% of raw import value, and 6.30% of raw export value. Relative to employment in covered legal forms observed in LEHD and to merchandise trade after the transaction restrictions, these shares are approximately 30%, 24%, and 16%, respectively.

Founder assignment uses LEHD histories beginning as early as 1985, with most states covered by 2000 (Vilhuber and McKinney, 2014). Because we require payroll records near firm entry (Appendix A.5), the baseline sample underrepresents older firms born before their state's LEHD coverage, including economically important incumbent traders. For selected specifications, we construct an expanded sample that retains these incumbents. We set founder-origin indicators to zero whenever a firm is at least ten years old or has at least 500 employees.[5] We apply this rule even when founders are observed, so that the treatment of large or old firms does not depend on whether their birth falls within LEHD coverage. These specifications omit founding-cohort–year fixed effects to preserve comparisons with retained incumbents in cohorts where positively coded immigrant-founded firms are rare. Table A.5 reports coverage for both the baseline and expanded samples.

The trade panel begins in 2007, when LFTTD starts reporting the ultimate-consignee EIN alongside the importer-of-record EIN. The importer of record is responsible for customs entry, duties, and compliance and may be a broker or intermediary. The ultimate consignee owns the merchandise at entry and therefore more closely matches the firm making the sourcing decision (Kamal and Ouyang, 2020). The firm–country sourcing-tilt regressions use 2016–2017; the tariff event study uses its separately stated window.

Table A.6 supplements the main summary statistics with additional firm and founder characteristics in 2022. Immigrant-founded firms are younger on average, although their founders were slightly older at founding. They are more likely to both import and export (1.76% versus 1.00%). Conditional on trading, employment is similar across the two groups; immigrant-founded exporters serve roughly the same number of destinations but export more HS10 products (5.10 versus 3.70).

Table A.7 compares sector composition by founder nativity and provides public benchmarks

[5]The size threshold includes firms that account for much of aggregate trade. In the Census Bureau's 2022–2023 Profile of U.S. Importing and Exporting Companies, companies with at least 500 employees account for 67% of known export value and 68% of known import value in 2023.

Table A.5: Cumulative Coverage of the Firm and Trade Frames, 2022

| Frame or filter | LBD/BR employment | LFTTD import value | LFTTD export value |
|---|---|---|---|
| *Panel A. Employer-firm frame* | | | |
| 2022 LBD/BR employer-firm cross-section | 100% | — | — |
| Repaired longitudinal firm identifiers | 100% | — | — |
| Covered legal forms for founder measurement | 75.59% | — | — |
| Covered by the LEHD Employer Characteristics File | 72.90% | — | — |
| Retained in expanded firm sample | 72.28% | — | — |
| Retained in baseline founder-measured sample | 22.21% | — | — |
| Baseline retained share of relevant frame | 30.47% | — | — |
| *Panel B. Merchandise-trade frame* | | | |
| 2022 raw LFTTD transactions | — | 100% | 100% |
| Linked to valid firm identifier | — | 94.48% | 87.61% |
| Valid ultimate consignee | — | 85.97% | — |
| Arm's-length transactions | — | 45.22% | 54.32% |
| Excluding HS chapters 27, 98, and 99 | — | 40.70% | 45.91% |
| Valid partner country | — | 40.70% | 45.86% |
| Valid value and other non-unit-value restrictions | — | 38.66% | 38.58% |
| Linked to expanded firm sample | — | 34.08% | 33.74% |
| Linked to baseline founder-measured sample | — | 9.12% | 6.30% |
| Baseline retained share of relevant frame | — | 23.59% | 16.33% |

*Notes.* Except for the shaded rows, entries are percentages of the raw frame in the first row of each panel. The shaded rows report the baseline founder-measured sample as a share of the relevant frame: employment in covered legal forms appearing in the LEHD Employer Characteristics File in Panel A (22.21/72.90), and trade value after all transaction restrictions in Panel B (9.12/38.66 for imports and 6.30/38.58 for exports). Panel A reports cumulative employment retained as the firm restrictions are applied. Covered legal forms are corporations, S corporations, and sole proprietorships. Panel B reports cumulative import and export value retained from the raw LFTTD transactions. The ultimate-consignee restriction applies only to imports; arm's-length trade excludes related-party transactions. The expanded-sample rows apply the broader firm restriction, and the baseline sample requires founders to be observed near firm birth. A dash denotes a restriction that does not apply to that trade margin. These coverage shares do not impose the quantity or MID restrictions used in the unit-value analysis. Census-derived statistics follow the review and rounding conventions in Appendix A.2.

Table A.6: Additional Founder and Firm Characteristics, 2022

| | Native-founded | Immigrant-founded |
|---|---|---|
| Firm age (years), mean | 10.75 | 9.23 |
| Founder age at founding (years), mean | 38.35 | 39.62 |
| Joint importer–exporter share | 1.00% | 1.76% |
| Employment per importer, mean | 65.39 | 63.43 |
| Employment per exporter, mean | 93.85 | 101.20 |
| Destination countries per exporter, mean | 3.57 | 3.54 |
| HS10 products per exporter, mean | 3.70 | 5.10 |

*Notes.* The sample contains firms active in 2022 with observed founder nativity. A firm is immigrant-founded if at least one observed founder was born outside the United States and its territories. These statistics supplement Table 1. Founder age is first averaged within each firm and then across firms. Trader employment and export scope condition on positive trade in the indicated margin. Employment refers to LBD employment, summed across establishments. Census-derived statistics follow the review and rounding conventions in Appendix A.2.

for employment, firm counts, and trade value. Manufacturing accounts for a smaller share of import and export value in our sample than in the public benchmark. This difference is consistent with our exclusion of related-party trade, which accounts for a larger share of trade among firms with manufacturing establishments than among other firms.[6]

[6]In 2007, related-party transactions accounted for 62% of import value and 37% of export value among firms with U.S. manufacturing plants, compared with 32% and 14%, respectively, among firms without them (Antràs et al., 2024).

Table A.7: Sector Composition and Immigrant-Founded Activity, 2022

*Panel A. Sector distribution by founder nativity*

| | Firm-count share | | | Employment share | | |
|---|---|---|---|---|---|---|
| Sector | Native-founded | Immigrant-founded | SUSB benchmark | Native-founded | Immigrant-founded | SUSB benchmark |
| Manufacturing | 3.69% | 3.05% | 3.94% | 5.37% | 5.30% | 10.90% |
| Wholesale trade | 3.72% | 5.11% | 4.80% | 3.51% | 3.80% | 5.43% |
| Retail trade | 9.61% | 14.79% | 10.63% | 7.76% | 7.48% | 14.27% |
| All other sectors | 82.99% | 77.05% | 80.63% | 83.36% | 83.42% | 69.40% |

*Panel B. Sector distribution of trade value*

| | Import-value share | | Export-value share | |
|---|---|---|---|---|
| Sector | Founder sample | Profile | Founder sample | Profile |
| Manufacturing | 19.99% | 40.36% | 24.53% | 54.72% |
| Wholesale trade | 45.17% | 35.34% | 40.88% | 26.71% |
| Retail trade | 8.88% | 8.81% | 3.95% | 2.02% |
| All other sectors | 25.96% | 15.50% | 30.64% | 16.55% |

*Notes.* Entries are percentages. In Panel A, firm-count and employment shares sum to 100 within each founder-nativity column. Founder-sample firms are assigned to their employment-modal six-digit NAICS industry. The public comparison uses 2022 SUSB sector totals for corporations, S corporations, and sole proprietorships. Shares are normalized across sectors; firms can enter multiple sector or legal-form counts. Panel B reports each sector's share of aggregate trade value. Founder-sample trade excludes related-party transactions and HS chapters 27, 98, and 99; the public Profile benchmark does not. Manufacturing is NAICS 31–33, wholesale 42, and retail 44–45; other sectors are the residual. Sources: U.S. Census Bureau (2022, 2025). Census-derived statistics follow the review and rounding conventions in Appendix A.2.

Table A.8 reports founder-origin characteristics. Among the named foreign origins, person-level founder probabilities range from 2.09% for the Philippines to 8.70% for South Korea, and import participation ranges from 3.85% for the Philippines to 18.33% for Taiwan. India and China account for the largest import-value shares among the named foreign origins.

Table A.8: Founder-Origin Characteristics and Trade Shares, 2022

| Founder origin | Labor-force share | Census founder probability | Imputed $\Pr(e \mid o)$ | Firm share | Employment share | Importer probability | Import-value share | Export-value share |
|---|---|---|---|---|---|---|---|---|
| South Korea | 0.39% | 8.70% | 11.34% | 1.81% | 1.26% | 8.26% | 4.63% | 2.82% |
| China | 0.82% | 7.32% | 8.01% | 2.71% | 1.71% | 8.84% | 7.05% | 6.22% |
| Vietnam | 0.52% | 7.13% | 7.29% | 1.57% | 1.08% | 4.00% | 0.86% | 1.01% |
| Taiwan | 0.13% | 5.63% | 8.53% | 0.47% | 0.50% | 18.33% | 5.30% | 4.71% |
| Poland | 0.14% | 4.75% | 6.56% | 0.39% | 0.30% | 7.07% | 0.15% | 0.28% |
| Italy | 0.09% | 4.54% | 9.20% | 0.34% | 0.53% | 8.72% | 1.62% | 2.24% |
| India | 1.21% | 3.97% | 5.82% | 2.90% | 2.66% | 4.32% | 11.07% | 4.31% |
| Canada | 0.31% | 3.30% | 6.13% | 0.78% | 1.44% | 9.00% | 1.79% | 2.19% |
| United Kingdom | 0.29% | 3.29% | 6.17% | 0.75% | 1.15% | 10.00% | 1.82% | 3.36% |
| Japan | 0.17% | 3.15% | 5.70% | 0.41% | 0.56% | 11.43% | 1.36% | 2.44% |
| Rest of world | 9.07% | 2.93% | 3.74% | 14.01% | 15.94% | 5.60% | 21.87% | 21.90% |
| Mexico | 4.45% | 2.69% | 2.99% | 5.50% | 5.38% | 4.07% | 3.68% | 4.52% |
| Germany | 0.38% | 2.63% | 4.98% | 0.78% | 1.15% | 7.50% | 1.29% | 1.01% |
| United States | 81.24% | 2.34% | 1.98% | 66.56% | 65.07% | 4.19% | 36.95% | 42.27% |
| Philippines | 0.79% | 2.09% | 3.12% | 1.02% | 1.27% | 3.85% | 0.55% | 0.73% |

*Notes.* Origins follow Table A.4. Labor-force shares are $L_o / \sum_{k \in N} L_k$, measured using person weights in the 2022 ACS one-year PUMS for U.S. civilian labor-force participants ages 18–64; U.S. territories are included in the United States. Each firm is assigned one founder origin using the nativity, country, and earnings priority rule in Appendix A.5. The founder probability is the share of origin-$o$ workers with positive 2022 LEHD earnings and a valid, nonimputed birthplace who founded a firm with positive 2022 employment. The imputed model rate $\Pr(e \mid o)$ equals the 2022 U.S. WDI employer rate, 2.42%, times the Census firm share divided by the ACS labor-force share (Appendix C.1). The unweighted Pearson correlation between the Census founder probabilities and imputed model rates is 0.849 across all 15 origin groups, computed before display rounding. Import participation is measured among active founder firms; employment shares aggregate their LBD employment. Import- and export-value shares use aggregate trade in the founder sample. Rest of World trade shares are the residual after subtracting the United States and the named foreign origins; shares may not sum to 100 because of rounding. Census-derived statistics follow the review and rounding conventions in Appendix A.2.

## A.8 External Benchmarks for the Founder Sample

Table A.9 compares founder and firm characteristics in our sample with related administrative and survey benchmarks. These comparisons help assess how founder identification and sample restrictions shape the observed population. The benchmarks differ in coverage and definitions, as documented in the table, so they provide helpful context rather than exact validation targets.

Table A.9: Founder and Firm Sample Moments: External Benchmarks

| Moment | Founder sample | External estimate | Sample and definition |
|---|---|---|---|
| *Panel A. Founder measurement and nativity* | | | |
| Founder age at founding | Native-founded: 38.35<br>Immigrant-founded: 39.62 | 41.9 (Azoulay et al.)<br>44.4 (KFS) | Startup founders in Azoulay et al. (2020); primary owners of new employer firms in the Kauffman Firm Survey (KFS) (Ballou et al., 2008) |
| Immigrant representation | 33.44% of active firms are immigrant-founded | 33% of young firms<br>19% of owner persons | Young firms with at least one immigrant among the top three initial earners in Chodavadia et al. (2024); foreign-born owner persons in the 2022 Annual Business Survey (ABS) |
| U.S. entrepreneurship rate | 2.54% (Census/ACS) | 2.42% (WDI/ILO) | ACS-weighted Census founder rate versus modeled current-employer share of total U.S. employment in 2022 |
| Export participation | Native-founded: 1.83%;<br>immigrant-founded: 2.93% | Native-owned: 4%;<br>immigrant- or mixed-owned: 8% | Employer firms in Kerr and Kerr (2020); self-reported foreign sales of goods or services rather than linked merchandise customs transactions |
| *Panel B. Firm characteristics and trade participation* | | | |
| Employment coverage | 22.21% of 2022 LBD/BR employment | 28.32% of employer employment | Estimated employment at firms age 25 or younger in covered legal forms, using 2022 BDS age shares and SUSB legal-form employment |
| Employment per firm | Native-founded: 13.58<br>Immigrant-founded: 14.51 | Age 25 or younger: 12<br>All ages: 24 | 2022 Business Dynamics Statistics (BDS) employer firms |
| Firm age | Native-founded: 10.75<br>Immigrant-founded: 9.23 | Approximately 13 | 2022 BDS firms with non-left-censored age |
| Trade participation | Import: 4.19% / 6.05%<br>Export: 1.83% / 2.93%<br>Both: 1.00% / 1.76% | Import: 6%<br>Export: 4%<br>Both: 2% | Founder-sample entries report native-founded / immigrant-founded rates; public entries are from the 2022 BDS of U.S. Goods Traders (BDS-GT) |
| Employment per trader | Importers: 65.39 / 63.43<br>Exporters: 93.85 / 101.20 | Importers: 97<br>Exporters: 113 | Founder-sample entries report native-founded / immigrant-founded means; BDS-GT entries restrict to firms with observed age |

*Notes.* Founder and firm characteristics come from Tables 1 and A.6; employment coverage comes from Table A.5. The entrepreneurship aggregate uses origin-specific Census founder probabilities and 2022 ACS U.S.-resident civilian-labor-force weights. KFS identifies the primary owner by equity share. The Chodavadia et al. (2024) benchmark covers single-unit firms launched in 2018–2020 and observed in 2020 across 25 LEHD states. ABS owners can change over time; founders in our sample are fixed at firm birth. For employment coverage, we multiply each sector's 2022 Statistics of U.S. Businesses (SUSB) employment in covered legal forms (corporations, S corporations, and sole proprietorships) by its 2022 BDS employment share at firms aged 25 or younger, sum across sectors, and divide by total SUSB employer employment. BDS age moments are approximated from published age bins and exclude firms operating before 1977. BDS-GT includes related-party trade and all merchandise chapters above its reporting thresholds. Sources: U.S. Census Bureau (2022, 2024b,c) and World Bank (2026). Census-derived statistics follow the review and rounding conventions in Appendix A.2.

## A.9 Additional Import and Export Selection

Table A.10 reports import selection and sourcing scope in Panel A and the corresponding export outcomes in Panel B. Column 1 compares firms within founding cohort and calendar year. The remaining columns add industry–CZ–year fixed effects, current employment, and the removal of founder-origin transactions.

Table A.10: Additional Import and Export Selection Results

| Dependent variable | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| *Panel A. Imports* | | | | |
| Import participation | 2.52*** | 1.21*** | 1.29*** | 0.23*** |
| | (0.02) | (0.02) | (0.02) | (0.02) |
| $N$, participation | 37,190,000 | 37,190,000 | 37,190,000 | 35,610,000 |
| Log import value | 64.26*** | 26.37*** | 33.37*** | 6.73*** |
| | (0.97) | (1.35) | (1.27) | (1.44) |
| Log source countries | 6.77*** | -0.83* | 1.48*** | -1.67*** |
| | (0.27) | (0.41) | (0.38) | (0.35) |
| Log HS10 products | 28.82*** | 10.98*** | 14.52*** | 1.64* |
| | (0.44) | (0.64) | (0.59) | (0.67) |
| Log supplier relationships | 24.76*** | 7.45*** | 11.30*** | 2.25*** |
| | (0.45) | (0.67) | (0.62) | (0.68) |
| $N$, conditional on importing | 1,459,000 | 1,459,000 | 1,459,000 | 1,258,000 |
| *Panel B. Exports* | | | | |
| Export participation | 1.83*** | 0.80*** | — | — |
| | (0.02) | (0.02) | | |
| $N$, participation | 37,190,000 | 37,190,000 | — | — |
| Log export value | 53.38*** | 32.23*** | 37.85*** | 17.42*** |
| | (1.12) | (1.67) | (1.59) | (1.72) |
| Log destination countries | 3.39*** | -3.51*** | -0.39 | -2.60*** |
| | (0.52) | (0.80) | (0.74) | (0.56) |
| Log HS10 products | 17.77*** | 6.89*** | 9.61*** | 2.34** |
| | (0.50) | (0.77) | (0.73) | (0.79) |
| $N$, conditional on exporting | 963,000 | 963,000 | 963,000 | 854,000 |
| *Fixed effects and controls* | | | | |
| $\mathbf{FE}_{b_f \times t}$ | Yes | Yes | Yes | Yes |
| $\mathbf{FE}_{s_{ft} \times r_{ft} \times t}$ | No | Yes | Yes | Yes |
| $\log E_{ft}$ | No | No | Yes | Yes |
| Founder-origin trade removed | No | No | No | Yes |

*Notes.* Entries are coefficients on immigrant-founded status from firm–year OLS regressions for 2007–2022. Coefficients and standard errors (in parentheses) are multiplied by 100. Standard errors are clustered by firm. Logged outcomes condition on positive trade in the indicated margin; their regressions share the reported conditional $N$. Industry is six-digit NAICS and location is the 1990 CZ. Column 4 removes transactions with every observed founder-origin country before reconstructing outcomes. It also excludes immigrant-founded firms with founders whose birthplaces are reported only as broader regions in the LEHD, since their founder-origin transactions cannot be removed separately. Firms trading only with founder origins become nontraders; logged outcomes require positive remaining trade. Native-founded firms are unchanged. Dashes denote unavailable estimates. Census-derived statistics follow the review and rounding conventions in Appendix A.2.
*Significance.* †, *, **, and *** denote statistical significance at the 10%, 5%, 1%, and 0.1% levels, respectively.

In Panel A, immigrant-founded firms source from 1% more countries and 16% more products and use 12% more supplier relationships conditional on industry, CZ, and employment (column 3). Removing founder-origin imports leaves product and supplier counts about 2% higher and source-country counts 2% lower (column 4). Panel B reports the corresponding export outcomes. Immigrant-founded firms export more often and, conditional on exporting, sell more value and more products. The destination-count coefficient is close to zero with employment

controls and negative after founder-origin destinations are removed.

## A.10 Founder Origins and Trade Geography

Table A.11 supplements the main import-tilt estimates with less-conditioned comparisons, export outcomes, and changes in firm age and transaction scope. The founder-country indicator retains every observed founder link. Participation is defined for all active firms, while country shares condition on positive worldwide trade.

Table A.11: Founder-Country Links: Additional Specifications and Samples

| | Imports | | Exports | |
|---|---|---|---|---|
| Specification or sample | Participation | Country share | Participation | Country share |
| *Panel A. Alternative comparisons* | | | | |
| Country–year FE | 1.75*** | 22.95*** | 0.74*** | 14.77*** |
| | (0.20) | (1.05) | (0.08) | (0.83) |
| *N* | 101,700,000 | 3,937,000 | 101,700,000 | 2,596,000 |
| Country–industry–CZ–year FE | 1.46*** | 20.32*** | 0.69*** | 14.97*** |
| | (0.14) | (1.22) | (0.08) | (1.20) |
| *N* | 101,700,000 | 3,937,000 | 101,700,000 | 2,596,000 |
| Same FE; no co-national nonfounders | 0.67*** | 13.22*** | 0.36*** | 10.21*** |
| | (0.06) | (1.06) | (0.03) | (0.95) |
| *N* | 89,430,000 | 3,141,000 | 89,430,000 | 2,107,000 |
| *Panel B. Firm-age subsamples; country–year FE* | | | | |
| Firm age 0–9 | 1.58*** | 24.68*** | 0.61*** | 16.83*** |
| | (0.20) | (1.14) | (0.07) | (0.95) |
| *N* | 60,280,000 | 2,031,000 | 60,280,000 | 1,240,000 |
| Firm age 10–19 | 1.92*** | 20.88*** | 0.89*** | 12.97*** |
| | (0.20) | (1.03) | (0.10) | (0.83) |
| *N* | 33,040,000 | 1,410,000 | 33,040,000 | 987,000 |
| Firm age 20 or older | 2.77*** | 18.44*** | 1.42*** | 11.86*** |
| | (0.28) | (1.02) | (0.16) | (1.00) |
| *N* | 8,380,000 | 496,000 | 8,380,000 | 369,000 |
| *Panel C. Alternative transaction sample; country–year FE* | | | | |
| Related-party trade included | 1.69*** | 20.16*** | — | — |
| | (0.16) | (1.19) | | |
| *N* | 101,700,000 | 4,679,000 | — | — |

*Notes.* Entries are coefficients on a founder born in partner country $n$ from firm–country–year OLS regressions for 2016–2017. Coefficients and standard errors (in parentheses) are multiplied by 100. Standard errors are clustered by firm. Every specification includes firm–year fixed effects. Country shares divide bilateral trade by worldwide trade, including unnamed partners, and require a positive worldwide denominator.
Panel A changes the partner-country fixed effects as indicated; industry is six-digit NAICS. The final comparison removes firm–years with a nonfounder employee born in any country represented among the founders. Panels B and C use country–year fixed effects in addition to firm–year effects. Panel C includes related-party imports in both the bilateral numerator and worldwide denominator; all other transaction restrictions are unchanged. Dashes denote unavailable estimates. Census-derived statistics follow the review and rounding conventions in Appendix A.2.
*Significance.* †, *, **, and *** denote statistical significance at the 10%, 5%, 1%, and 0.1% levels, respectively.

In Panel A, the export-participation and country-share coefficients are positive in all three comparisons. Panel B reports estimates by firm age: participation coefficients rise with age, while country-share coefficients decline. Panel C includes related-party imports in both the participation and share outcomes.

### Language and Distance Beyond the Founder Country

Table A.12 reports import-share, export-share, and import-unit-value regressions on common language and geographic distance. The sample excludes every direct founder–partner-country link. The specification includes demeaned language and distance, their interaction, and interactions of all three terms with immigrant-founded status. Group-specific gradients combine the corresponding coefficients.

Table A.12: Third-Country Language and Geographic Links

| Regressor | Import share (1) | Export share (2) | Import log unit value (3) |
|---|---|---|---|
| Immigrant-founded $I_f$ | -0.48*** | -0.20*** | -11.48*** |
| | (0.05) | (0.04) | (1.41) |
| Demeaned common language $\widetilde{L}_{fn}$ | 19.82*** | -0.63 | -229.70*** |
| | (4.53) | (1.78) | (26.26) |
| Demeaned log distance $\widetilde{D}_{fn}$ | -0.29*** | -0.35*** | -21.69*** |
| | (0.06) | (0.07) | (2.47) |
| Demeaned language–distance interaction $\widetilde{LD}_{fn}$ | -2.23*** | 0.10 | 24.08*** |
| | (0.51) | (0.20) | (2.96) |
| $I_f \widetilde{L}_{fn}$ | -16.93*** | 4.50* | 145.20*** |
| | (4.77) | (2.05) | (39.55) |
| $I_f \widetilde{D}_{fn}$ | 0.15* | 0.36*** | 21.25*** |
| | (0.07) | (0.08) | (3.39) |
| $I_f \widetilde{LD}_{fn}$ | 1.98*** | -0.43† | -14.46** |
| | (0.54) | (0.24) | (4.46) |
| $N$ | 5,325,000 | 3,464,000 | 5,031,000 |

*Notes.* The sample excludes direct founder–partner-country links. Immigrant-founded firms are assigned to one named foreign founder origin; native-founded firms form the comparison group. Country mappings follow Table A.4. Share regressions condition on positive worldwide trade.

Common language equals one when the founder-origin and partner countries share their plurality language. Distance is logged great-circle distance between geographic centroids. Both variables are demeaned in the estimation sample; their interaction is formed first. Columns 1 and 2 use OLS for 2016–2017 with founding-cohort–year and partner-country–year fixed effects. Column 3 uses the 2007–2022 unit-value sample with founding-cohort–year and source-country–HS10–industry–CZ–year fixed effects, as in Table 4, column 1. Coefficients and standard errors are multiplied by 100. Standard errors are clustered by firm. Census-derived statistics follow the review and rounding conventions in Appendix A.2.

*Significance.* †, *, **, and *** denote statistical significance at the 10%, 5%, 1%, and 0.1% levels, respectively.

## A.11 Unit Values and Alternative Mechanisms

This subsection reports additional unit-value comparisons, sample restrictions, heterogeneity, and mechanism exercises. The regressions use the 2007–2022 transaction and unit-value samples described in Appendix A.6, with separate windows where indicated.

### Additional Comparisons and Sample Scope

Table A.13 reports additional comparisons and samples for the unit-value regressions. Panel A includes weighted and unweighted country–product–year and within-supplier comparisons, value and quantity counterparts of the more detailed comparisons, and the exclusion of co-national

nonfounder employees. Panel B reports estimates for the expanded firm sample, and Panel C reports export results.

Table A.13: Founder Origins and Unit Values: Additional Comparisons and Samples

| Comparison | Log unit value | Log trade value | Log quantity | $N$ |
|---|---|---|---|---|
| *Panel A. Additional import comparisons* | | | | |
| Country–product–year FE | -25.35*** | — | — | 6,627,000 |
| | (1.14) | | | |
| Country–product–year FE, value weighted | -15.99*** | — | — | 6,627,000 |
| | (2.11) | | | |
| Within supplier | -10.74*** | — | — | 10,040,000 |
| | (1.29) | | | |
| Within supplier, value weighted | -4.04 | — | — | 10,040,000 |
| | (5.61) | | | |
| Within supplier, industry, and CZ | -4.42 | 8.1 | 12.5 | 10,040,000 |
| | (8.75) | (17.5) | (19.2) | |
| Within firm–product–year | -6.92*** | 41.15*** | 48.07*** | 6,627,000 |
| | (1.27) | (2.85) | (3.45) | |
| Industry–CZ comparisons; no co-national nonfounders | -14.43* | — | — | 5,310,000 |
| | (6.42) | | | |
| *Panel B. Expanded firm sample* | | | | |
| Country–product–year FE | -30.03*** | — | — | 18,710,000 |
| | (1.07) | | | |
| Country–product–industry–CZ–year FE | -22.84*** | — | — | 18,710,000 |
| | (3.16) | | | |
| Country–product–year FE, value weighted | -18.35*** | — | — | 18,710,000 |
| | (2.05) | | | |
| Country–product–industry–CZ–year FE, value weighted | -14.39** | — | — | 18,710,000 |
| | (5.00) | | | |
| *Panel C. Export comparisons* | | | | |
| Country–product–year FE | -6.59*** | 6.08*** | 12.67*** | 3,147,000 |
| | (1.69) | (1.54) | (2.53) | |
| Country–product–industry–CZ–year FE | -4.85 | — | — | 3,147,000 |
| | (7.05) | | | |
| Same FE, export-value weighted | -5.99 | — | — | 3,147,000 |
| | (16.19) | | | |

*Notes.* Entries are coefficients on a founder born in partner country $n$ for 2007–2022. Coefficients and standard errors (in parentheses) are multiplied by 100. Standard errors are clustered by firm. The unit is a firm–country–HS10–year, with a supplier dimension in the within-supplier rows. Trade value is import customs value or export value, and quantity is valid primary quantity. All regressions are unweighted unless indicated; value weights are the cell's import customs value or export value. Industry is six-digit NAICS. No row controls for current employment.

Panel A includes founding-cohort–year effects except in the within-firm–product–year row. The first two within-supplier rows include source-country–HS10–supplier–year effects; the third adds industry and CZ to these cells. The within-firm row includes firm–HS10–year and source-country–HS10–year effects. The final row includes source-country–HS10–industry–CZ–year effects and removes firm–years with a nonfounder employee born in any founder-origin country. The reported quantity coefficients satisfy $\widehat{\beta}^{Q} = \widehat{\beta}^{V} - \widehat{\beta}^{UV}$; their standard errors are estimated directly.

Panel B retains pre-LEHD firms under the rule in Appendix A.7: founder-origin indicators are set to zero when a firm is at least 10 years old or has at least 500 employees. These rows omit founding-cohort–year effects. Panel C includes founding-cohort–year effects and uses founder–destination-country links. Its first-row quantity coefficient follows the same coefficient identity, with a directly estimated standard error. Dashes denote unavailable estimates. Census-derived statistics follow the review and rounding conventions in Appendix A.2.

*Significance.* †, *, **, and *** denote statistical significance at the 10%, 5%, 1%, and 0.1% levels, respectively.

Table A.14 reports import-unit-value estimates by firm age, industry, broad product class, source country, and Rauch category. Panel A presents weighted and unweighted estimates for the same three age groups.

Table A.15 reports the founder-origin coefficient and its interaction with the source country's

## Table A.14: Founder Origins and Import Unit Values: Heterogeneity

| Sample | Unweighted | Import-value weighted | $N$ |
|---|---|---|---|
| *Panel A. Firm age* | | | |
| Age 0–9 | -31.98*** | -20.83*** | 3,248,000 |
| | (1.16) | (2.07) | |
| Age 10–19 | -19.13*** | -12.05*** | 2,382,000 |
| | (1.83) | (3.39) | |
| Age 20 or older | -14.22*** | -18.17* | 997,000 |
| | (3.37) | (7.89) | |
| *Panel B. Firm industry* | | | |
| Manufacturing (NAICS 31–33) | -1.61 | — | 1,049,000 |
| | (3.88) | | |
| Wholesale trade (NAICS 42) | -20.72*** | — | 3,350,000 |
| | (1.34) | | |
| Retail trade (NAICS 44–45) | -36.36*** | — | 1,024,000 |
| | (2.70) | | |
| *Panel C. Broad Economic Categories* | | | |
| Consumption goods | -33.30*** | — | 2,656,000 |
| | (1.32) | | |
| Intermediate goods | -20.91*** | — | 2,830,000 |
| | (1.58) | | |
| *Panel D. Selected source countries* | | | |
| Canada | -1.57 | — | 806,000 |
| | (2.76) | | |
| China | -38.64*** | — | 2,940,000 |
| | (1.55) | | |
| India | -23.80*** | — | 350,000 |
| | (2.72) | | |
| Mexico | -17.52*** | — | 233,000 |
| | (2.15) | | |
| South Korea | -14.27*** | — | 282,000 |
| | (2.99) | | |
| Vietnam | -22.82*** | — | 156,000 |
| | (5.00) | | |
| *Panel E. Conservative Rauch classification* | | | |
| Differentiated goods (N) | -26.80*** | — | 5,871,000 |
| | (1.21) | | |
| Reference-priced goods (R) | -15.21*** | — | 664,000 |
| | (2.62) | | |
| Organized-exchange goods (W) | -9.78*** | — | 92,000 |
| | (2.49) | | |

*Notes.* Each entry is the coefficient on a founder born in the source country from a separate import log-unit-value regression for 2007–2022 with founding-cohort–year and source-country–HS10–year fixed effects. Coefficients and standard errors (in parentheses) are multiplied by 100. Standard errors are clustered by firm. Panel A's weighted and unweighted estimates use the same observations. Dashes denote unreported estimates.

Panel C maps HS6 products to BEC Revision 4 with year-specific crosswalks and omits capital goods. When a product has several matches, the classification with the largest concordance weight is retained (Liao et al., 2020). Panel E uses the conservative Rauch (1999) mapping. Counts for complementary groups are calculated by subtraction from the corresponding full sample. Census-derived statistics follow the review and rounding conventions in Appendix A.2.

*Significance.* †, *, **, and *** denote statistical significance at the 10%, 5%, 1%, and 0.1% levels, respectively.

Table A.15: Origin Links in Source-Country Top Product Categories

| Top-category level | Log unit value | | Log customs value | | Log primary quantity | | $N$ |
|---|---|---|---|---|---|---|---|
| | Founder origin (1) | Founder origin × top category (2) | Founder origin (3) | Founder origin × top category (4) | Founder origin (5) | Founder origin × top category (6) | |
| HS4 | -24.92*** | -24.46*** | 6.87*** | 30.38*** | 31.79*** | 54.84*** | 6,627,000 |
| | (1.14) | (4.43) | (1.25) | (5.71) | (1.58) | (7.70) | |
| HS6 | -25.29*** | -7.88† | 7.10*** | 38.80*** | 32.39*** | 46.68*** | 6,627,000 |
| | (1.14) | (4.31) | (1.25) | (8.01) | (1.58) | (9.36) | |

*Notes.* For each source country and HS aggregation level, the top category has the largest aggregate import value in the sample. The first coefficient for each outcome is on the founder-origin indicator; the second is on its interaction with the top-category indicator. Their sum is the founder-origin effect within the top category. Source-country–HS10–year fixed effects absorb the top-category main effect. All regressions use the baseline sample and include founding-cohort–year fixed effects. Standard errors are clustered by firm. Coefficients and standard errors are multiplied by 100. Primary-quantity coefficients are derived from $\widehat{\beta}^{Q} = \widehat{\beta}^{V} - \widehat{\beta}^{UV}$; their standard errors are estimated directly. Census-derived statistics follow the review and rounding conventions in Appendix A.2.
*Significance.* †, *, **, and *** denote statistical significance at the 10%, 5%, 1%, and 0.1% levels, respectively.

top HS4 or HS6 category for unit value, customs value, and physical quantity. The sum of the two coefficients gives the founder-origin difference within a top category.

### A.11.1 Sourcing Tilt and Unit Values

We examine whether founder-country links with stronger sourcing tilts also exhibit larger unit-value differences. This connects the preceding findings: if knowledge of a founder's country facilitates access to lower-price suppliers, stronger sourcing toward that country should be accompanied by lower unit values. Corollary B.1 formalizes this relationship.

Using the full 2016–2017 sample from equation (2), we re-estimate the import-participation specification without the founder-origin indicator. We measure sourcing tilt using the residual for each firm–founder-country link and assign links to quartiles using their residuals from the other year. This separates the observations used to measure sourcing tilt from those used to measure unit values.

Let $D^{q}_{fnt}$ equal one if country $n$ is a founder's country of birth and the firm–country link falls in quartile $q$ of sourcing tilt measured in the other year. We estimate:

$$\log UV_{fngt} = \mathbf{FE}_{f\times t} + \mathbf{FE}_{n\times g\times s_{ft}\times r_{ft}\times t} + \sum_{q=1}^{4} \beta_q D^{q}_{fnt} + \varepsilon_{fngt}.$$

The specification includes firm–year and source-country–HS10–industry–CZ–year fixed effects. Each $\beta_q$ measures the founder-country unit-value difference for links in quartile $q$, relative to purchases from countries where none of the firm's founders were born.[7]

We restrict this exercise to immigrant-founded firms with an identifiable founder-country link, excluding native-founded firms. Firms must be active in both 2016 and 2017 because we as-

[7]The specification isolates the founder-country difference relative to the firm's other sources rather than the between-firm component of the baseline specification. The 10% top-quartile estimate is therefore closer in spirit to the 7% within-firm estimate in Table 4, column 3, than to the larger across-firm estimates.

sign sourcing-tilt quartiles using the other year's observations. Firms with founders from multiple named countries contribute multiple links, which may fall in different quartiles. These restrictions contribute to the smaller observation count.

Table A.16 reports estimates near zero for firm–founder-country links in the bottom two quartiles of held-out sourcing tilt. Unit values are then 6% and 10% lower in the third and fourth quartiles. This progression is consistent with a common supplier-access explanation for the sourcing and unit-value patterns. The search-cost mechanism of the model generates both facts from the same bilateral friction. In contrast, a latent-quality account instead requires the firms most tilted toward their founders' origins to also have systematically lower demand for quality specifically when sourcing from those origins. Related evidence points in the opposite direction: Ariu (2022) finds that an inflow of foreign workers leads firms to upgrade inputs sourced from those workers' origin countries; Sabbadini (2024) similarly links immigrant-worker exposure to higher-quality imported inputs.

Table A.16: Unit Values by Held-Out Founder-Country Sourcing Tilt

| Held-out sourcing-tilt quartile | $\widehat{\beta}_q$ | S.E. |
|---|---|---|
| 1 (least tilted) | 3.31 | 4.41 |
| 2 | 2.13 | 4.67 |
| 3 | -6.50* | 2.56 |
| 4 (most tilted) | -10.79** | 3.38 |
| $N$ | 318,000 | |

*Notes.* Entries are coefficients from a regression of log import unit value on indicators for founder-country links in each held-out sourcing-tilt quartile. Coefficients and standard errors are multiplied by 100. Standard errors are clustered by firm. The regression covers 2016–2017 and requires positive customs value and valid primary quantity.
Firm–founder-country links are grouped into quartiles of sourcing tilt measured in the other year. Tilt is estimated using the full participation sample. The unit-value regression retains firms active in both years with at least one founder born in a named foreign country and includes firm–year and source-country–HS10–industry–CZ–year fixed effects. Industry is six-digit NAICS. Census-derived statistics follow the review and rounding conventions in Appendix A.2.
*Significance.* †, *, **, and *** denote statistical significance at the 10%, 5%, 1%, and 0.1% levels, respectively.

### A.11.2 Bargaining and Relationship Importance

Table A.17 relates import unit values to buyer and supplier shares and their interactions with the founder-origin indicator. The two-sided bargaining predictions are $\beta_{SS} > 0$ and $\beta_{BS} < 0$.

Following the reduced-form implications in Alviarez, Fioretti, Kikkawa and Morlacco (2023), we construct contemporaneous measures of each side's importance in the relationship. Define supplier $m$'s customs-value share of buyer $f$'s purchases of product $g$ and buyer $f$'s quantity share of supplier $m$'s observed U.S. sales of that product as

$$SS_{fngmt} = \frac{V_{fngmt}}{\sum_{n',m'} V_{fn'gm't}}, \qquad BS_{fngmt} = \frac{Q_{fngmt}}{\sum_{f'} Q_{f'ngmt}}. \tag{A1}$$

The buyer-share denominator is the supplier's observed U.S. sales. We construct both measures from the full usable arm's-length import universe before restricting the sample by founder status,

and demean each over the entire estimation sample. Let $\widetilde{SS}_{fngmt} = SS_{fngmt} - \overline{SS}$ and $\widetilde{BS}_{fngmt} = BS_{fngmt} - \overline{BS}$ denote the resulting measures.

At the firm–source-country–HS10–supplier–year level, we estimate

$$\begin{aligned}\log UV_{fngmt} = \mathcal{A}^{j}_{fngmt} &+ \beta^{j}_{0}\mathbb{1}\{\text{Founder origin } n\}_{fn} + \beta^{j}_{SS}\widetilde{SS}_{fngmt} + \beta^{j}_{BS}\widetilde{BS}_{fngmt} \\ &+ \theta^{j}_{SS}\mathbb{1}\{\text{Founder origin } n\}_{fn}\widetilde{SS}_{fngmt} \\ &+ \theta^{j}_{BS}\mathbb{1}\{\text{Founder origin } n\}_{fn}\widetilde{BS}_{fngmt} + \varepsilon^{j}_{fngmt}, \qquad j \in \{\text{baseline}, \text{controls}\},\end{aligned} \tag{A2}$$

The two fixed-effect sets match the within-supplier unit-value specifications in Panel A of Table A.13:

$$\mathcal{A}^{\text{baseline}}_{fngmt} = \mathbf{FE}_{b_f \times t} + \mathbf{FE}_{n \times g \times m \times t}, \tag{A3}$$

$$\mathcal{A}^{\text{controls}}_{fngmt} = \mathbf{FE}_{b_f \times t} + \mathbf{FE}_{n \times g \times m \times s_{ft} \times r_{ft} \times t}. \tag{A4}$$

The baseline and additional-controls regressions are estimated without weights, and standard errors are clustered by firm; we also report an import-value-weighted version of the baseline specification. The table reports coefficients and standard errors multiplied by 100.

Table A.17: Relationship Importance and Import Unit Values

| | Baseline within-supplier **FE** | | Additional-controls within-supplier **FE** |
|---|---|---|---|
| Regressor | Unweighted | Import-value weighted | Unweighted |
| | (1) | (2) | (3) |
| $\mathbb{1}\{\text{Founder origin } n\}_{fn}$ | 4.56* | -3.33 | 2.67 |
| | (2.04) | (7.56) | (13.14) |
| Demeaned buyer share $\widetilde{BS}_{fngmt}$ | -98.19*** | -70.92*** | -58.33*** |
| | (1.83) | (5.36) | (13.39) |
| Demeaned supplier share $\widetilde{SS}_{fngmt}$ | 8.98*** | 13.78*** | 8.48 |
| | (0.92) | (3.60) | (7.12) |
| $\mathbb{1}\{\text{Founder origin } n\}_{fn} \times \widetilde{BS}_{fngmt}$ | 23.05*** | -4.41 | 10.64 |
| | (3.38) | (18.69) | (19.54) |
| $\mathbb{1}\{\text{Founder origin } n\}_{fn} \times \widetilde{SS}_{fngmt}$ | 3.00 | 4.34 | 0.77 |
| | (1.98) | (7.71) | (12.06) |
| $N$ | 10,040,000 | 10,040,000 | 10,040,000 |

*Notes.* The unit is a firm–source-country–HS10–supplier–year. Coefficients and standard errors from equation (A2) are multiplied by 100. Standard errors are clustered by firm. Supplier share is the supplier's share of the buyer's spending on an HS10 product. Buyer share is the buyer's share of the supplier's observed U.S. sales of that product, measured in quantity. Both shares are demeaned over the estimation sample. Column 2 weights by import customs value. Fixed effects are defined in equations (A3) and (A4). Census-derived statistics follow the review and rounding conventions in Appendix A.2.

*Significance.* †, *, **, and *** denote statistical significance at the 10%, 5%, 1%, and 0.1% levels, respectively.

### A.11.3 Tariff Pass-Through for Founder-Connected Buyers

Figure A.1 plots event-study estimates for before-duty and duty-inclusive unit values, separately for founder-connected and other buyers. This exercise uses observations from 2011–2015 and

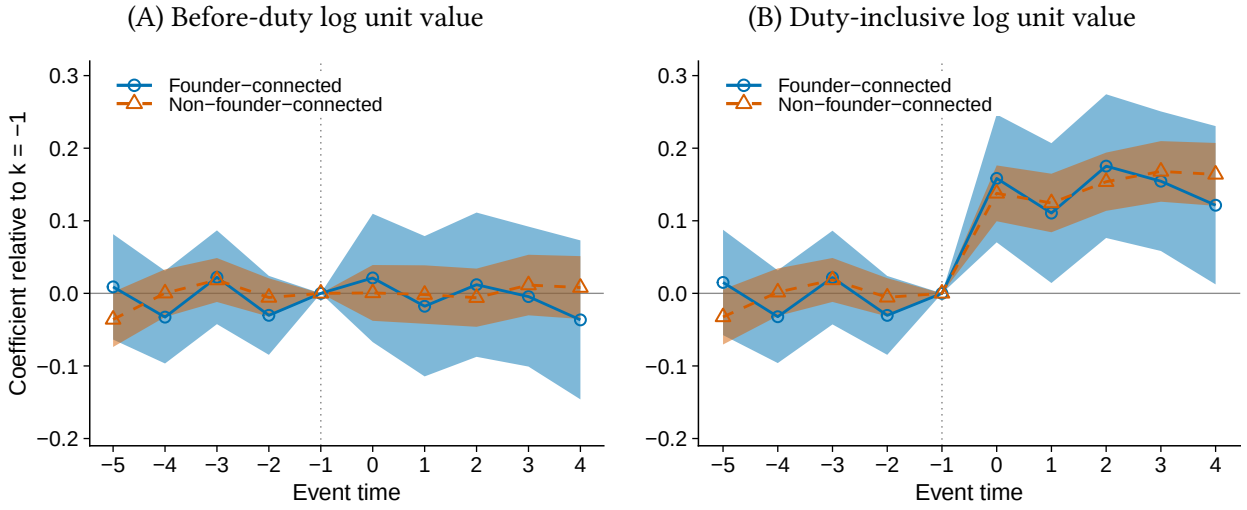
2019–2023, extending the baseline sample by one year.

We adapt the variety-level event-study design of Fajgelbaum, Goldberg, Kennedy and Khandelwal (2020) to the firm level. As in their design, a variety is a source-country–HS10 pair and tariff-targeted varieties are compared with untargeted varieties using product–time and source-country–time fixed effects. We add the importing firm to the time-invariant variety fixed effect. Let $A_{ng}$ indicate that source-country–HS10 pair $(n, g)$ was targeted and let $R_t^k$ denote the relative-time dummy. For price definition $a \in \{\text{before}, \text{duty}\}$, we estimate separately among founder-connected and non-founder-connected buyers

$$\log UV_{fngt}^{a} = \mathbf{FE}_{f\times n\times g} + \mathbf{FE}_{g\times t} + \mathbf{FE}_{n\times t} + \sum_{\substack{k=-5 \\ k\neq -1}}^{4} \beta_k^a R_t^k A_{ng} + \varepsilon_{fngt}^{a}. \tag{A5}$$

We map calendar time to event time using $k = t-2016$ for $t \leq 2015$ and $k = t-2019$ for $t \geq 2019$. We omit 2016 and 2017 to avoid contamination from anticipation and policy uncertainty during the run-up to the tariffs. We also omit 2018 because tariffs were introduced and increased in stages during the year, so annual outcomes mix untreated and treated months. Thus, 2015 is the last clean pre-treatment year and the omitted reference period ($k = -1$), while 2019 is the first fully treated calendar year ($k = 0$). The four regressions cross the two buyer samples with before-duty $UV^{\text{before}} = V/Q$ and duty-inclusive $UV^{\text{duty}} = (V + D)/Q$.

Figure A.1: Unit Values Around Tariff Exposure




*Notes.* Panels report separate event studies for founder-connected and other buyers. Panel A uses before-duty unit values; Panel B includes duties. Points are coefficients and shaded bands are 95% confidence intervals. The omitted period is 2015 ($k = -1$); 2019 is the first fully treated year ($k = 0$), and 2016–2018 are excluded. The sample retains source-country–HS10 cells bought by at least one connected and one other firm. Untargeted cells form the comparison group. Observations are weighted so that each source-country–HS10 cell receives equal weight. The connected and other samples contain 707,000 and 3,365,000 observations. Standard errors are clustered by firm–HS10.

### A.11.4 Quantity Discounts

Table A.18 reports founder-origin coefficients for unit value, customs value, physical quantity, transaction count, and average transaction size, together with implied quantity discounts. In the main unit-value specification, applying an elasticity of $-0.284$ implies a quantity discount of about 5% and leaves origin-linked unit values about 12% lower. The break-even elasticity is $-0.973$.

Let $N^{ship}_{fngt}$ denote the number of transactions in a firm–source-country–product–year cell and let $\bar{q}_{fngt} = Q_{fngt}/N^{ship}_{fngt}$ denote average transaction size.

For each $k \in \{UV, Q, N, \bar{q}\}$, write the regression

$$y^k_{fngt} = \mathbf{FE}_{b_f \times t} + \mathbf{FE}_{n \times g \times t} + \beta^k \mathbb{1}\{\text{Founder origin } n\}_{fn} + \varepsilon^k_{fngt}, \tag{A6}$$

with standard errors clustered by firm. Thus, the observations and comparison cells are identical across the four outcomes. Because

$$\log Q_{fngt} = \log N^{ship}_{fngt} + \log \bar{q}_{fngt}, \tag{A7}$$

we recover $\widehat{\beta}^N = \widehat{\beta}^Q - \widehat{\beta}^{\bar{q}}$. If the unit-value elasticity with respect to average transaction size is $\gamma$, the adjusted founder-origin coefficient is

$$\widehat{\beta}^{SF}(\gamma) = \widehat{\beta}^{UV} - \gamma \widehat{\beta}^{\bar{q}}. \tag{A8}$$

Table A.18 evaluates this expression at the transaction-level quantity-discount elasticity $\gamma = -0.284$ estimated by Ganapati and Hottman (2026). Their reported standard error implies a 95% confidence interval of $[-0.287, -0.281]$. It also reports the break-even elasticity $\gamma^* = \widehat{\beta}^{UV}/\widehat{\beta}^{\bar{q}}$ that would account for the entire unit-value gap.

Table A.18: Transaction Frequency, Size, and Quantity Discounts

| | Country–product–year comparisons (1) | Industry–CZ comparisons (2) | Industry–CZ + log employment (3) | Industry–CZ value weighted (4) |
|---|---|---|---|---|
| *Panel A. Regression estimates* | | | | |
| Log unit value | -25.35*** | -17.24*** | -19.63*** | -13.83** |
| | (1.14) | (3.51) | (3.64) | (5.27) |
| Log customs value | 7.40*** | — | — | — |
| | (1.24) | — | — | — |
| Log primary quantity | 32.75*** | — | — | — |
| | (1.57) | — | — | — |
| Log transaction count | 12.43 | — | — | — |
| | — | — | — | — |
| Log average transaction size | 20.32*** | 17.71*** | 17.27*** | 13.26* |
| | (1.19) | (4.26) | (4.32) | (6.60) |
| $N$ | 6,627,000 | 6,627,000 | 6,627,000 | 6,627,000 |
| *Panel B. Quantity-discount adjustment* | | | | |
| Implied quantity-discount component $-0.284\widehat{\beta}^{\bar{q}}$ | -5.8 | -5.0 | -4.9 | -3.8 |
| Adjusted residual $\widehat{\beta}^{UV} - (-0.284\widehat{\beta}^{\bar{q}})$ | -19.6 | -12.2 | -14.7 | -10.1 |
| Break-even elasticity $\gamma^* = \widehat{\beta}^{UV}/\widehat{\beta}^{\bar{q}}$ | -1.248 | -0.973 | -1.137 | -1.043 |

*Notes.* Coefficients and standard errors are multiplied by 100, except the break-even elasticity. Standard errors are clustered by firm. All columns include founding-cohort–year effects. Column 1 adds source-country–HS10–year effects; Columns 2–4 instead add source-country–HS10–industry–CZ–year effects. Column 3 controls for current log employment, and Column 4 weights by import value. All columns use 2007–2022.

Log transaction count plus log average transaction size equals log total quantity. The column 1 transaction-count coefficient is derived from the corresponding coefficient identity. Its standard error requires the covariance between the quantity and average-transaction-size estimates. Dashes denote unavailable estimates.

Panel B applies the quantity-discount elasticity $-0.284$ from Ganapati and Hottman (2026). The adjusted residual is defined in equation (A8); the break-even elasticity sets that residual to zero. Panel B entries are calculated from the unit-value and transaction-size estimates in Panel A. Census-derived statistics follow the review and rounding conventions in Appendix A.2.

*Significance.* †, *, **, and *** denote statistical significance at the 10%, 5%, 1%, and 0.1% levels, respectively.

### A.11.5 Supplier Quality and Appeal

We adapt the model in Section 3 to allow suppliers to differ in input quality. Supplier $m$ in country $n$ provides $q_m > 0$ units of quality-adjusted materials per physical unit. If firm $f$ purchases $Q_{fm}$ physical units at delivered price $p^L_{mn}$, its material input and the corresponding price are

$$x_f = q_m Q_{fm}, \qquad p^M_{mn} = \frac{p^L_{mn}}{q_m}. \tag{A9}$$

The benchmark corresponds to $q_m = 1$. Blueprint–source compatibility $\epsilon_{fn}$ continues to determine how effectively the firm uses these materials. Operating profit and material expenditure $X^L_{fm} = p^L_{mn} Q_{fm}$ at an accepted match are

$$\begin{aligned} \widetilde{\pi}_{fn}(p^M_{mn}; \epsilon_{fn}) &= \mathcal{D} z_f^{\sigma-1} \left( \frac{\epsilon_{fn} q_m}{p^L_{mn}} \right)^r, \\ X^L_{fm} &= r \widetilde{\pi}_{fn}(p^M_{mn}; \epsilon_{fn}), \end{aligned} \tag{A10}$$

where $r \equiv (1-\alpha)(\sigma-1)$ is the absolute price elasticity of material expenditure. We maintain the main model's price distribution for $p_n^M$, now measured in quality-adjusted units. Each supplier draw reveals price and quality, so the search rule in Lemma 1 applies to this price.

The model connects supplier prices to both search costs and the buyer's operating scale. The following result expresses the profitability component of Proposition 4 in terms of employment.

**Proposition A.1** (Supplier prices and firm scale)**.** *Let $\bar{\ell}_f$ denote expected employment before supplier search, conditional on the founder's productivity, blueprint, and chosen source. Under the maintained assumptions of the main model,*

$$\mathbb{E}[\log p_f^M \mid \bar{\ell}_f, o, n_f^* = n] = \log P_n^M + \frac{1}{\theta}\log \kappa_{on} - \frac{1}{\theta}\log \bar{\ell}_f + \mathcal{C}^\ell,$$

*where $\mathcal{C}^\ell$ is common across firms, origins, and sources.*

*Proof.* Write $v_f = \mathbb{E}_p[\pi_f \mid z_f, \boldsymbol{\epsilon}_f, o]$ for expected profit net of search costs at the chosen source. The reservation condition gives

$$\log \bar{p}_{fon}^M = \log P_n^M + \frac{1}{\theta}\log \kappa_{on} - \frac{1}{\theta}\log v_f + \frac{1}{\theta}\log\left(\frac{P(\theta - r)}{r}\right).$$

Expected operating profit is $\theta/(\theta - r)$ times $v_f$. Since labor demand is proportional to operating profit,

$$\bar{\ell}_f = \frac{\alpha(\sigma-1)}{w}\frac{\theta}{\theta - r}\, v_f.$$

Substituting into the reservation condition and using $\mathbb{E}_p[\log p_f^M] = \log \bar{p}_{fon}^M - 1/\theta$ gives the result. □

Lower search costs allow firms to obtain lower quality-adjusted prices at a given operating scale. Larger firms also obtain lower prices at given search costs: their greater material demand makes further search more valuable. Comparisons across firms therefore combine differences in supplier access with differences in scale.

We next relate these prices to the demand-based adjustment. Suppose that price and quality are common across a supplier's U.S. buyers. Summing material expenditure over the matched buyers $\mathcal{F}_{mn}$ gives

$$X_{mn}^L = \left(p_{mn}^L\right)^{-r} q_m^r \mathcal{B}_{mn}, \qquad \mathcal{B}_{mn} \equiv \sum_{f \in \mathcal{F}_{mn}} r\mathcal{D} z_f^{\sigma-1} \epsilon_{fn}^r. \tag{A11}$$

The term $\mathcal{B}_{mn}$ captures the number, productivity, and blueprint–source fit of the supplier's buyers. Thus, for supplier expenditure share $s_{mn}^L$ within source country $n$,

$$\log s_{mn}^L = \mathbf{FE}_n - r\log p_{mn}^L + r\log q_m + \log \mathcal{B}_{mn}. \tag{A12}$$

where $\mathbf{FE}_n$ absorbs the expenditure-share denominator. At the model price coefficient, the demand relationship identifies log supplier appeal,

$$a_{mn} \equiv \frac{\log s^L_{mn} - \mathbf{FE}_n + r \log p^L_{mn}}{r} = \log q_m + \frac{1}{r} \log \mathcal{B}_{mn}.$$

Subtracting this index from the observed price therefore removes buyer composition as well as supplier quality:

$$\log p^L_{mn} - a_{mn} = \log p^M_{mn} - \frac{1}{r} \log \mathcal{B}_{mn}.$$

Let $m(f)$ denote the supplier selected by firm $f$, and write $y^{QA}_f = \log p^L_{m(f)n} - a_{m(f)n}$. Proposition A.1 implies

$$\mathbb{E}[y^{QA}_f \mid \bar{\ell}_f, o, n^*_f = n] = \log P^M_n + \frac{1}{\theta} \log \kappa_{on} - \frac{1}{\theta} \log \bar{\ell}_f + \mathcal{C}^\ell - \frac{1}{r} \mathbb{E}[\log \mathcal{B}_{m(f)n} \mid \bar{\ell}_f, o, n^*_f = n].$$

Following Khandelwal (2010), we use the supplier-demand relationship to construct an empirical quality/appeal adjustment. Introducing HS10 product and year indices $(g, t)$, we aggregate customs value $V_{mngt}$, import charges $C_{mngt}$, and physical quantity $Q_{mngt}$ across eligible U.S. buyers in the LFTTD to form supplier cells. Delivered pre-duty unit value and expenditure share are

$$UV^L_{mngt} = \frac{V_{mngt} + C_{mngt}}{Q_{mngt}}, \qquad s^L_{mngt} = \frac{V_{mngt} + C_{mngt}}{\sum_{m'} (V_{m'ngt} + C_{m'ngt})}. \tag{A13}$$

Because supplier prices may respond to unobserved demand or appeal, we estimate the price coefficient by two-stage least squares (TSLS). The excluded instrument is the supplier's observed import charges per physical unit,

$$Z^C_{mngt} = \log \left( \frac{C_{mngt}}{Q_{mngt}} \right). \tag{A14}$$

The first stage and demand equation are

$$\log UV^L_{mngt} = \mathbf{FE}_{m \times n \times g} + \mathbf{FE}_{n \times g \times t} + \pi_C Z^C_{mngt} + \nu_{mngt}, \tag{A15}$$

$$\log s^L_{mngt} = \mathbf{FE}_{m \times n \times g} + \mathbf{FE}_{n \times g \times t} - \rho \log UV^L_{mngt} + u_{mngt}. \tag{A16}$$

The model predicts $\rho = r$; we estimate $\rho$ freely by TSLS. The supplier–source-country–product effects absorb persistent supplier appeal, while the source-country–product–year effects absorb the share denominator and market-year conditions common across suppliers. The exclusion restriction is that, conditional on these fixed effects, innovations in import charges per unit affect supplier expenditure shares through delivered prices and are otherwise uncorrelated with innovations in supplier quality, appeal, and buyer composition.

This follows Khandelwal (2010), who uses observed transportation cost per unit to instrument

CIF unit value. Here, identification comes from within-supplier changes in unit charges relative to other suppliers in the same source-country–product–year market.

Using the estimated price coefficient, we recover the log supplier-appeal index

$$\widehat{a}_{mngt} \equiv \frac{\log s^L_{mngt} - \widehat{\mathbf{FE}}_{n\times g\times t} + \widehat{\rho}\log UV^L_{mngt}}{\widehat{\rho}} = \frac{\widehat{\mathbf{FE}}_{m\times n\times g} + \widehat{u}_{mngt}}{\widehat{\rho}}. \tag{A17}$$

Here $\widehat{u}_{mngt}$ is the TSLS residual, evaluated at observed delivered unit values. The index combines supplier quality with the composition of the supplier's U.S. buyers.

For each $(f, n, g, t)$ cell, we aggregate the index across the suppliers for which it is available. Let $\mathcal{M}^Q_{fngt}$ denote this supported set and define

$$V^Q_{fngt} = \sum_{m\in\mathcal{M}^Q_{fngt}} V_{fmngt}, \qquad Q^Q_{fngt} = \sum_{m\in\mathcal{M}^Q_{fngt}} Q_{fmngt},$$

and

$$y^a_{fngt} = \sum_{m\in\mathcal{M}^Q_{fngt}} \omega^Q_{fmngt}\widehat{a}_{mngt}, \qquad \omega^Q_{fmngt} = \frac{Q_{fmngt}}{Q^Q_{fngt}}. \tag{A18}$$

Thus, we aggregate log supplier appeal using quantity weights. On this common supplier support, the raw and quality/appeal-adjusted outcomes are

$$y^{UV}_{fngt} = \log\left(\frac{V^Q_{fngt}}{Q^Q_{fngt}}\right), \qquad y^{QA}_{fngt} = y^{UV}_{fngt} - y^a_{fngt}. \tag{A19}$$

The supplier-demand system uses delivered prices, and the firm-level unit-value outcome uses customs value.

We estimate the founder-origin regression separately for these outcomes. When observations, weights, and fixed effects are held constant, $\widehat{\beta}^{UV} = \widehat{\beta}^{a} + \widehat{\beta}^{QA}$ within each specification. Table A.19 reports the quality/appeal-adjusted estimates. All columns include founding-cohort–year fixed effects. Column 1 compares firms within source-country–product–year cells; column 2 further narrows the comparison to the same industry and CZ; column 3 also conditions on current log employment.

Proposition A.1 motivates our preference for column 3. Comparing firms within industries and local labor markets makes wages and material shares more comparable, while current employment proxies the expected operating scale that governs search selectivity. Current employment also reflects the accepted supplier draw. In the model, writing $T_f = \log(\bar{p}^M_{fon}/p^M_f)$, with $T_f \sim \mathrm{Exp}(\theta)$, gives

$$\log \ell_f = \log \bar{\ell}_f + \log\left(\frac{\theta - r}{\theta}\right) + rT_f.$$

A better supplier draw lowers the input price and expands employment. We therefore estimate

the employment coefficient freely and interpret column 3 as a comparison among firms of similar realized operating scale. The supplier-appeal adjustment continues to include differences in their suppliers' broader buyer composition.

Table A.19: Supplier Quality/Appeal Adjustment: Additional Estimates

| | (1) | (2) | (3) |
|---|---|---|---|
| Quality/appeal-adjusted log unit value | 13.71*** | -12.00 | -31.36* |
| | (4.14) | (14.78) | (14.34) |
| $N$ | 6,495,000 | 6,495,000 | 6,495,000 |
| $\mathbf{FE}_{b_f \times t}$ | Yes | Yes | Yes |
| $\mathbf{FE}_{n \times g \times t}$ | Yes | No | No |
| $\mathbf{FE}_{n \times g \times s_{ft} \times r_{ft} \times t}$ | No | Yes | Yes |
| $\log E_{ft}$ | No | No | Yes |

*Notes.* Entries are coefficients on a founder born in the source country in the 2007–2022 supported sample. Coefficients and standard errors (in parentheses) are multiplied by 100. Standard errors are clustered by firm. Column 1 includes source-country–HS10–year fixed effects; Columns 2–3 include source-country–HS10–six-digit-industry–CZ–year fixed effects. Column 3 also controls for current log employment.
Supplier demand is estimated by TSLS. Import charges per physical unit instrument for delivered unit value; supplier–source-country–product and source-country–product–year fixed effects enter, and standard errors are clustered by supplier. The resulting index is aggregated to firm cells using quantity weights. It combines supplier quality, appeal, and buyer composition. The quality adjustment restricts the sample to observations with an available supplier quality/appeal measure. Census-derived statistics follow the review and rounding conventions in Appendix A.2.
*Significance.* †, *, **, and *** denote statistical significance at the 10%, 5%, 1%, and 0.1% levels, respectively.

In the preferred specification, founder-country quality/appeal-adjusted unit values are 27% lower, with the difference statistically significant at the 5% level. The corresponding estimates are 15% higher in the broader country–product–year comparison and 11% lower, but imprecisely estimated, within industry–CZ cells without employment controls. The founder-country discount therefore persists after adjusting for supplier appeal and comparing buyers operating at similar scale.

## A.12 Firm Size and Conditional Employment Growth

Table A.20 reports current employment and conditional one-year employment growth by trade status. The specifications use the same founding-cohort–year and industry–CZ–year fixed effects as the selection regressions.

For $\ell \in \{M, X\}$, trade status is defined contemporaneously and separately using imports and exports. Let $D^{\ell}_{j,ft}$, $j = 1, \ldots, 6$, denote in order the six overlapping status indicators listed in Table A.20. The current-employment regression is

$$\log E_{ft} = \mathbf{FE}_{b_f \times t} + \mathbf{FE}_{s_{ft} \times r_{ft} \times t} + \sum_{j=1}^{6} \beta^{\ell}_{j} D^{\ell}_{j,ft} + \varepsilon^{\ell}_{ft}, \tag{A20}$$

and the conditional next-year-employment regression is

$$\log E_{f,t+1} = \mathbf{FE}_{b_f \times t} + \mathbf{FE}_{s_{ft} \times r_{ft} \times t} + \rho^{\ell} \log E_{ft} + \sum_{j=1}^{6} \gamma^{\ell}_{j} D^{\ell}_{j,ft} + \nu^{\ell}_{ft}. \tag{A21}$$

The second specification conditions on current log employment and is estimated among firms with positive employment in the following year. We therefore interpret the trade-status coefficients as differences in conditional one-year employment growth. The employment-level contrasts supply the fixed-cost moments in the quantitative model; Appendix C.7, equation (C45), gives that mapping.

Table A.20: Firm Size and Conditional Employment Growth by Trade Scope

| | Import | | Export | |
|---|---|---|---|---|
| Trade-status indicator | Current log employment (1) | Conditional growth (2) | Current log employment (3) | Conditional growth (4) |
| 1. Immigrant-founded | -0.05 | -0.01** | -0.05 | -0.01*** |
| | (0.06) | (0.00) | (0.06) | (0.00) |
| 2. Immigrant-founded trader | 1.08*** | 0.12*** | 1.11*** | 0.10*** |
| | (0.06) | (0.01) | (0.07) | (0.01) |
| 3. Immigrant-founded, origin-only trader | -0.76*** | -0.06*** | -1.02*** | -0.09*** |
| | (0.04) | (0.01) | (0.05) | (0.01) |
| 4. Immigrant-founded, non-origin-only trader | -0.36*** | -0.04*** | -0.41*** | -0.05*** |
| | (0.04) | (0.01) | (0.05) | (0.01) |
| 5. Native-founded trader | 1.40*** | 0.15*** | 1.28*** | 0.11*** |
| | (0.05) | (0.01) | (0.04) | (0.01) |
| 6. Native-founded, one-country trader | -0.70*** | -0.07*** | -0.66*** | -0.06*** |
| | (0.03) | (0.01) | (0.03) | (0.01) |
| *Additional controls* | | | | |
| $\mathbf{FE}_{b_{ft}\times t}$ | Yes | Yes | Yes | Yes |
| $\mathbf{FE}_{s_{ft}\times r_{ft}\times t}$ | Yes | Yes | Yes | Yes |
| $\log E_{ft}$ | No | Yes | No | Yes |
| $N$ | 2,402,000 | 2,179,000 | 2,402,000 | 2,179,000 |

*Notes.* The table reports OLS estimates of equations (A20) and (A21). Coefficients and standard errors are raw (unscaled) values. Standard errors are clustered by firm. The six trade-status indicators overlap and are interpreted jointly; native-founded nontraders are the omitted group. A firm is origin-linked if any observed founder was born in the relevant partner country. Growth regressions condition on survival to the following year. Census-derived statistics follow the review and rounding conventions in Appendix A.2.
*Significance.* †, *, **, and *** denote statistical significance at the 10%, 5%, 1%, and 0.1% levels, respectively.

Sums of the coefficients give size and growth contrasts for mutually exclusive sourcing groups.

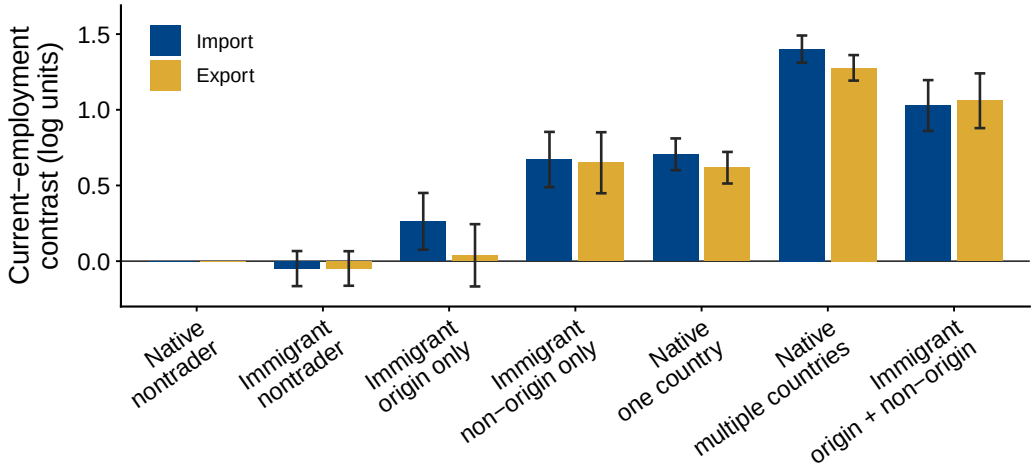
For either outcome, write $\theta_j^\ell$ for the corresponding raw coefficient ($\beta_j^\ell$ for current employment and $\gamma_j^\ell$ for conditional growth). The seven mutually exclusive group contrasts relative to native-founded nontraders are

$$\begin{aligned} \text{native nontrader}: &\quad 0, & \text{immigrant nontrader}: &\quad \theta_1^\ell, \\ \text{immigrant origin-only}: &\quad \theta_1^\ell + \theta_2^\ell + \theta_3^\ell, & \text{immigrant non-origin-only}: &\quad \theta_1^\ell + \theta_2^\ell + \theta_4^\ell, \\ \text{native one-country}: &\quad \theta_5^\ell + \theta_6^\ell, & \text{native multi-country}: &\quad \theta_5^\ell, \\ \text{immigrant origin and non-origin}: &\quad \theta_1^\ell + \theta_2^\ell. \end{aligned}$$

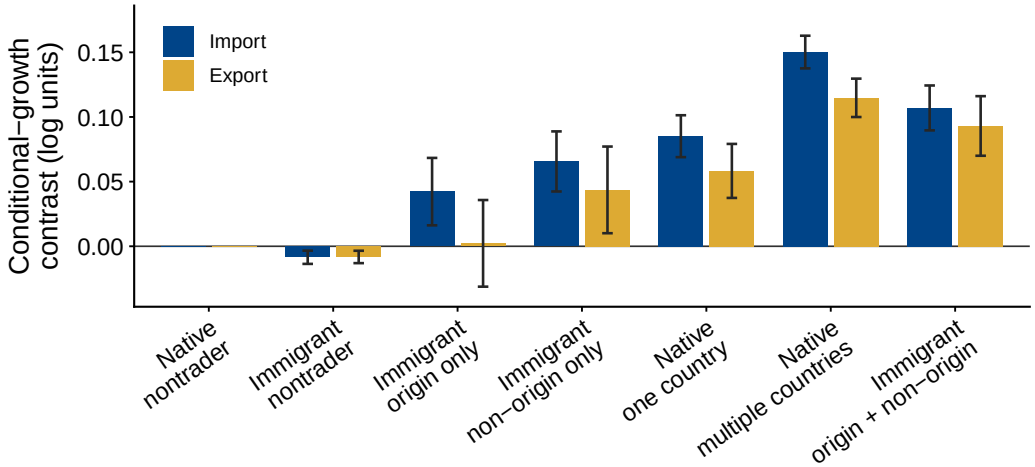
Figure A.2 plots these sums for import- and export-defined status.

Figure A.2: Lifecycle Partitions by Trade Scope

(A) Current employment




(B) Conditional one-year growth




*Notes.* Each panel reports contrasts with native-founded nontraders for seven mutually exclusive groups, defined separately by import and export status. Bar heights are linear combinations of the coefficients in Table A.20. Whiskers are approximate 95% intervals constructed from the reported marginal standard errors under a zero-covariance assumption.

# B Model Appendix

Appendix B.1 derives the firm decisions, occupational choices, equilibrium, and welfare results in Section 3. We then allow people to choose where they live (Appendix B.2) and allow wages and prices to adjust across countries (Appendix B.3), as outlined in Section 3.6. Appendix B.4 allows for customer preferences for goods made with inputs from their countries of birth. The final two subsections consider Bertrand procurement and multiple material inputs. We retain the main text's notation: unprimed quantities describe the initial equilibrium, primes denote counterfactual values, and $\widehat{v} = v'/v$.

## B.1 Derivations for the Main-Text Model

This subsection derives the results in Section 3, holding people's countries of residence and foreign prices unchanged. We derive sourcing probabilities before entrepreneurship rates because the latter calculation uses the independence of the chosen source and its profit value. The equilibrium and welfare proofs follow the firm and occupational choices.

### B.1.1 Production Choices Conditional on a Supplier

Fix firm $f$'s source country $n$, input price $p_f^M$, and blueprint–source compatibility $\epsilon_{fn}$. Supplier search costs are sunk. Cost minimization under the technology in equation (6) gives unit production cost $c_f$ and conditional input demands:

$$c_f = \frac{w^\alpha (p_f^M/\epsilon_{fn})^{1-\alpha}}{z_f}, \qquad w\ell_f = \alpha c_f y_f, \qquad p_f^M x_f = (1-\alpha) c_f y_f.$$

Labor and material expenditures therefore account for shares $\alpha$ and $1-\alpha$ of variable production cost.

Facing CES demand, the firm chooses its price to maximize $(p_f - c_f) E P^{\sigma-1} p_f^{-\sigma}$. The first-order condition gives $p_f^* = \sigma c_f/(\sigma-1)$, so operating profit equals revenue divided by $\sigma$. Substituting $c_f$ recovers the price and operating-profit expressions in equation (7) of the main text. The associated optimal output, labor demand, and material demand are

$$\begin{aligned} y_f^* &= E P^{\sigma-1} (p_f^*)^{-\sigma}, \\ \ell_f^* &= \frac{\alpha(\sigma-1)}{\sigma w} p_f^* y_f^* = \frac{\alpha(\sigma-1)}{w} \widetilde{\pi}_{fn}, \\ x_f^* &= \frac{(1-\alpha)(\sigma-1)}{\sigma p_f^M} p_f^* y_f^* = \frac{(1-\alpha)(\sigma-1)}{p_f^M} \widetilde{\pi}_{fn}. \end{aligned} \tag{B1}$$

Here asterisks denote optimal choices conditional on the realized supplier match, and $\widetilde{\pi}_{fn}$ abbreviates $\widetilde{\pi}_{fn}(p_f^M; \epsilon_{fn})$, operating profit before search costs. Labor demand is measured in workers.

Material demand $x_f^*$ is the physical quantity purchased; $\epsilon_{fn}x_f^*$ is the corresponding quantity of effective material services.

### B.1.2 Optimal Supplier Search

*Proof of Lemma 1.* Fix a prospective founder $f$, origin $o$, and source country $n$. Write $r = (1-\alpha)(\sigma-1)$, the absolute elasticity of operating profit with respect to the input price. Thus $\widetilde{\pi}_{fn}(p;\epsilon_{fn}) = \widetilde{\pi}_{fn}(P_n^M;\epsilon_{fn})(p/P_n^M)^{-r}$. The assumption $\theta > r$ ensures that expected operating profit from a supplier draw is finite.

Let $V_{fon}(p;\epsilon_{fn})$ denote the value when the lowest price observed so far is $p$. With recall, independent draws, and a constant per-draw cost, the founder faces a stationary McCall-style stopping problem (McCall, 1970):

$$V_{fon}(p;\epsilon_{fn}) = \max\left\{\widetilde{\pi}_{fn}(p;\epsilon_{fn}), -P\kappa_{on} + \int_0^{P_n^M} V_{fon}(\min\{p,x\};\epsilon_{fn})\frac{\theta x^{\theta-1}}{(P_n^M)^\theta}\,dx\right\}. \tag{B2}$$

Before the first draw, expected net profit is

$$\mathbb{E}_p[\pi_{fon} \mid z_f, \epsilon_{fn}, o] = -P\kappa_{on} + \int_0^{P_n^M} V_{fon}(x;\epsilon_{fn})\frac{\theta x^{\theta-1}}{(P_n^M)^\theta}\,dx. \tag{B3}$$

At an interior reservation price, the founder is indifferent between stopping and paying for another draw:

$$\begin{aligned} P\kappa_{on} &= \int_0^{\bar{p}_{fon}^M} \left[\widetilde{\pi}_{fn}(x;\epsilon_{fn}) - \widetilde{\pi}_{fn}(\bar{p}_{fon}^M;\epsilon_{fn})\right]\frac{\theta x^{\theta-1}}{(P_n^M)^\theta}\,dx \\ &= \frac{r}{\theta-r}\widetilde{\pi}_{fn}(\bar{p}_{fon}^M;\epsilon_{fn})\left(\frac{\bar{p}_{fon}^M}{P_n^M}\right)^\theta. \end{aligned} \tag{B4}$$

The expected gain from another draw is strictly increasing in the lowest price observed. If $P\kappa_{on} \geq r\widetilde{\pi}_{fn}(P_n^M;\epsilon_{fn})/(\theta-r)$, the founder accepts the first draw, so $\bar{p}_{fon}^M = P_n^M$. Otherwise, the unique interior cutoff is

$$\bar{p}_{fon}^M = P_n^M\left[\frac{\mathcal{D}z_f^{\sigma-1}r}{\theta-r}\frac{(\epsilon_{fn}/P_n^M)^r}{P\kappa_{on}}\right]^{-1/(\theta-r)}. \tag{B5}$$

For this interior cutoff, the value function $V_{fon}(p;\epsilon_{fn}) = \widetilde{\pi}_{fn}(\min\{p,\bar{p}_{fon}^M\};\epsilon_{fn})$ satisfies the Bellman equation: above the cutoff, continued search attains the reservation value; below it, the expected gain from another draw is less than its cost. The policy has a finite expected number of draws.

The same policy solves the ex-ante cutoff problem. A draw falls below a candidate cutoff $0 < \bar{p}^M \leq P_n^M$ with probability $(\bar{p}^M/P_n^M)^\theta$, so the expected number of draws is $(P_n^M/\bar{p}^M)^\theta$.

Expected net profit is

$$\begin{aligned}\mathbb{E}_p[\pi_{fon} \mid z_f, \epsilon_{fn}, o] &= \max_{0<\bar{p}^M \le P_n^M} \left\{ \mathbb{E}_p[\widetilde{\pi}_{fn}(p_n^M; \epsilon_{fn}) \mid p_n^M \le \bar{p}^M] - P\kappa_{on} \left(\frac{P_n^M}{\bar{p}^M}\right)^\theta \right\} \\ &= \max_{0<\bar{p}^M \le P_n^M} \left\{ \mathcal{D} z_f^{\sigma-1} \left(\frac{\epsilon_{fn}}{\bar{p}^M}\right)^r \frac{\theta}{\theta - r} - P\kappa_{on} \left(\frac{P_n^M}{\bar{p}^M}\right)^\theta \right\}.\end{aligned} \tag{B6}$$

Its first-order condition is (B4). At an interior optimum, expected net profit is $\widetilde{\pi}_{fn}(\bar{p}_{fon}^M; \epsilon_{fn})$. Substituting (B5) gives (8), with

$$K = P^{-r/(\theta-r)} \mathcal{D}^{\theta/(\theta-r)} \left(\frac{r}{\theta - r}\right)^{r/(\theta-r)}, \qquad K_p = \left[\frac{\theta P}{\chi(1-\alpha)K}\right]^{1/\theta}.$$

The accepted price follows the price distribution conditional on falling below $\bar{p}_{fon}^M$. Its expectation is

$$\mathbb{E}_p[p_n^M \mid p_n^M \le \bar{p}_{fon}^M] = \frac{\theta}{\theta + 1} \bar{p}_{fon}^M.$$

Holding other variables fixed, the cutoff has elasticity $1/(\theta - r)$ with respect to $\kappa_{on}$, while expected net profit has elasticity $-r/(\theta - r)$. Lower search costs therefore lower the cutoff and expected input price and raise net profit in the interior region. □

**Interiority and units.** A source at which the founder accepts every first draw has expected net profit at most $P\kappa_{on}(\theta - r)/r$. Condition (10) places this upper bound below the profit needed to prefer entrepreneurship to wage work. Hence all sources that can support entrepreneurship have interior cutoffs. This also ensures that the interior profit expression identifies when entrepreneurship is optimal and ranks all sources relevant for entrepreneurs, even though some unsuccessful business ideas would accept the first draw.

Within the interior region, the model does not separately identify the common level of search costs from the units of entrepreneurial productivity. The transformation $\kappa_{on} \mapsto c\kappa_{on}$ for every source and $z_f \mapsto c^{(1-\alpha)/\theta} z_f$ leaves profits, occupational and sourcing choices, and aggregate resource use unchanged. We fix these units in the quantification by normalizing the cost of finding a U.S. supplier and the native productivity support.

### B.1.3 Sourcing Probabilities and Relative Search Costs

*Proof of Proposition 2.* The source ranking in Lemma 1 implies that an entrepreneur chooses

$$n_f^* \in \arg\max_{n \in N} \frac{\epsilon_{fn}}{P_n^M} \kappa_{on}^{-1/\theta}. \tag{B7}$$

Under the maintained interiority restriction, the entrepreneur's optimized expected net profit is

$$\mathbb{E}_p[\pi_f \mid \boldsymbol{\epsilon}_f, z_f, o] = \max_{n \in N} \mathbb{E}_p[\pi_{fon} \mid z_f, \epsilon_{fn}, o] = K z_f^{\chi} \left[ \max_{n \in N} \left\{ \frac{\epsilon_{fn}}{P_n^M} \kappa_{on}^{-1/\theta} \right\} \right]^{\chi(1-\alpha)}. \tag{B8}$$

Using $n_f^*$ for the maximizing source, the independent common-shape Fréchet draws imply, for $x > 0$,

$$\Pr\left( \max_{q \in N} \left\{ \frac{\epsilon_{fq}}{P_q^M} \kappa_{oq}^{-1/\theta} \right\} \leq x \mid z_f, o \right) = \exp(-\Phi_o x^{-\eta}),$$

$$\Pr\left( n_f^* = n, \max_{q \in N} \left\{ \frac{\epsilon_{fq}}{P_q^M} \kappa_{oq}^{-1/\theta} \right\} \leq x \mid z_f, o \right) = \frac{(P_n^M)^{-\eta} \kappa_{on}^{-\eta/\theta}}{\Phi_o} \exp(-\Phi_o x^{-\eta}).$$

Thus the winning source is independent of the winning value, conditional on productivity and origin. Entrepreneurship imposes a threshold on that value at each productivity. Conditioning on being an entrepreneur leaves the source probabilities unchanged. They also do not depend on productivity, so averaging over productivity among entrepreneurs gives (14).

Taking log source odds removes $\Phi_o$. Differencing across founder origins then removes common input costs, yielding (15).

Write $r = (1-\alpha)(\sigma - 1)$. Expected operating profit is $\theta/(\theta - r)$ times optimized expected net profit, and material spending is $r$ times operating profit. Expected material spending is therefore proportional to optimized expected net profit, with a factor common across sources. The source–profit independence established above implies that source-choice probabilities also equal material-expenditure shares. For $n \neq USA$, conditioning on importing makes both shares equal to $\omega_{on}/(1 - \omega_{oUSA})$. □

### B.1.4 Entrepreneurship and Aggregate Profits

*Proof of the entrepreneurship rate formula in Proposition 1.* An agent chooses entrepreneurship when expected profit from the best sourcing opportunity exceeds the wage-work payoff:

$$\mathbb{E}_p[\pi_f \mid \boldsymbol{\epsilon}_f, z_f, o] > \frac{1}{T_o} \frac{(1-\tau^w)w}{1-\tau^e}. \tag{B9}$$

The Fréchet maximum in Appendix B.1.3 and the interior profit expression give

$$\Pr(\mathbb{E}_p[\pi_f \mid \boldsymbol{\epsilon}_f, z_f, o] \leq x \mid z_f, o) = \exp\left[ -\Phi_o \left( \frac{x}{K z_f^{\chi}} \right)^{-1/\delta} \right]. \tag{B10}$$

Under (10), this formula applies at all profit thresholds at or above the occupational cutoff, which is the region needed for entrepreneurship rates and selected-profit moments.

We derive equation (11) using the entrepreneurship index $x_o$ in equation (12). Let $G_o$ de-

note the Pareto productivity distribution in equation (4). The occupational cutoff and Fréchet profit distribution in equations (B9) and (B10) imply that an agent with productivity $z$ chooses entrepreneurship with probability

$$\Pr(e \mid z, o) = 1 - \exp\left[-x_o \left(\frac{z}{\underline{z}_o}\right)^{\eta/(1-\alpha)}\right]. \tag{B11}$$

This probability averages over blueprint draws while holding productivity fixed. To average over productivity, set $t = x_o(z/\underline{z}_o)^{\eta/(1-\alpha)}$. The Pareto density then gives

$$\Pr(e \mid o) = \frac{\xi(1-\alpha)}{\eta} x_o^{\xi(1-\alpha)/\eta} \int_{x_o}^{\infty} [1 - \exp(-t)] t^{-1-\xi(1-\alpha)/\eta}\, dt.$$

Integration by parts separates the contribution at the lower productivity bound from the remaining tail:

$$\begin{aligned} \Pr(e \mid o) &= 1 - \exp(-x_o) + x_o^{\xi(1-\alpha)/\eta} \int_{x_o}^{\infty} t^{-\xi(1-\alpha)/\eta} \exp(-t)\, dt \\ &= \gamma(1, x_o) + x_o^{\xi(1-\alpha)/\eta} \Gamma\left(1 - \frac{\xi(1-\alpha)}{\eta}, x_o\right). \end{aligned} \tag{B12}$$

The boundary term at infinity vanishes because $\xi > 0$. The conditional probability in equation (B11) is strictly increasing in $x_o$ at every productivity. Its average tends to zero as $x_o$ tends to zero and to one as $x_o$ tends to infinity. □

**Aggregate profits.** Average entrepreneurial profit per agent assigns zero to draws that lead to wage work and integrates profits over the draws that lead to entrepreneurship. As in the main text, $\mathbb{E}_p[\pi_f \mid \epsilon_f, z_f, o]$ averages profit over supplier draws for a given productivity and blueprint. We suppress these conditioning arguments below and then average over blueprint draws and productivity to account for selection into entrepreneurship.

For fixed $z$, set $t = (K\Phi_o^{\delta} z^{\chi}/\mathbb{E}_p[\pi_f])^{1/\delta}$ in the expected-profit integral. The Fréchet distribution in equation (B10) gives density $\exp(-t)$ before occupational selection, and the occupational cutoff becomes $t = x_o(z/\underline{z}_o)^{\eta/(1-\alpha)}$. Expected entrepreneurial profit is therefore

$$\begin{aligned} \mathbb{E}[\mathbb{E}_p[\pi_f]\mathbb{1}\{e\} \mid z, o] &= K\Phi_o^{\delta} z^{\chi} \int_0^{x_o(z/\underline{z}_o)^{\eta/(1-\alpha)}} t^{-\delta} \exp(-t)\, dt \\ &= K\Phi_o^{\delta} z^{\chi} \gamma\left(1 - \delta, x_o \left(\frac{z}{\underline{z}_o}\right)^{\eta/(1-\alpha)}\right). \end{aligned} \tag{B13}$$

Here $\mathbb{1}\{e\}$ indicates entrepreneurship. The condition $\delta < 1$ ensures that the integral is finite at $t = 0$, which corresponds to arbitrarily large profits.

Next average over Pareto productivity. Setting $v = z/\underline{z}_o$ gives

$$\bar{\pi}_o = K\Phi_o^{\delta}\underline{z}_o^{\chi}\xi \int_1^{\infty} v^{\chi-\xi-1}\gamma\big(1-\delta, x_o v^{\eta/(1-\alpha)}\big)\, dv.$$

Integrate by parts, using $v^{\chi-\xi}/(\chi-\xi)$ as the antiderivative of the power term. The boundary at infinity vanishes under $\xi > \chi$. Substituting $t = x_o v^{\eta/(1-\alpha)}$ in the remaining integral and using $\chi = \delta\eta/(1-\alpha)$ yields

$$\bar{\pi}_o = K\Phi_o^{\delta}\underline{z}_o^{\chi}\frac{\xi}{\xi-\chi}\left[\gamma(1-\delta, x_o) + x_o^{\xi(1-\alpha)/\eta-\delta}\int_{x_o}^{\infty} t^{-\xi(1-\alpha)/\eta}\exp(-t)\, dt\right]. \tag{B14}$$

The remaining integral is $\Gamma(1-\xi(1-\alpha)/\eta, x_o)$, so

$$\bar{\pi}_o = K\Phi_o^{\delta}\underline{z}_o^{\chi}\frac{\xi}{\xi-\chi}\left[\gamma(1-\delta, x_o) + x_o^{\xi(1-\alpha)/\eta-\delta}\Gamma\left(1-\frac{\xi(1-\alpha)}{\eta}, x_o\right)\right]. \tag{B15}$$

This moment is finite under $\xi > \chi$ and $\delta < 1$.

**Founder employment.** Fix a founder's productivity, blueprint, and chosen source $n$, and let $r = (1-\alpha)(\sigma-1)$ as in the supplier-search derivation. Expected gross operating profit is proportional to $(\bar{p}_{fon}^M)^{-r}$, while expected search expenditure is proportional to $(\bar{p}_{fon}^M)^{-\theta}$. The first-order condition in equation (B6) therefore gives

$$P\kappa_{on}\left(P_n^M/\bar{p}_{fon}^M\right)^{\theta} = \frac{r}{\theta}\,\mathbb{E}_p[\widetilde{\pi}_{fn}], \qquad \mathbb{E}_p[\pi_f] = \left(1-\frac{r}{\theta}\right)\mathbb{E}_p[\widetilde{\pi}_{fn}]. \tag{B16}$$

The labor-demand expression in equation (B1) makes the downstream wage bill equal to $\alpha(\sigma-1)$ times gross operating profit. Averaging over supplier draws gives

$$w\,\mathbb{E}_p[\ell_f] = \frac{\alpha(\sigma-1)}{1-r/\theta}\,\mathbb{E}_p[\pi_f], \tag{B17}$$

where $\ell_f$ is the firm's employment. Aggregating over founders makes employment in origin-$o$ firms proportional to $L_o\bar{\pi}_o$. Thus

$$\lambda_o^E = \frac{L_o\bar{\pi}_o}{\sum_{o'\in N} L_{o'}\bar{\pi}_{o'}}.$$

Substituting equation (B15) and canceling the common factors $K$ and $\xi/(\xi-\chi)$ gives the employment-share formula in equation (13), completing the derivation of Proposition 1.

**Log-profit moments among entrepreneurs.** The unit-value result in Proposition 4 also uses the variance of log expected profit among entrepreneurs:

$$s^2_{\pi,o}(\theta,\xi) = \mathrm{Var}(\log \mathbb{E}_p[\pi_f] \mid e, o). \tag{B18}$$

To calculate $s^2_{\pi,o}(\theta,\xi)$, repeat the selected-profit integration with $(\mathbb{E}_p[\pi_f])^q$ in place of $\mathbb{E}_p[\pi_f]$, where $q$ is a power used to obtain moments. The change of variable in equation (B13) replaces $t^{-\delta}$ by $t^{-q\delta}$. Averaging over Pareto productivity then replaces $\chi$ by $q\chi$ in equation (B14). Dividing by the entrepreneurship rate gives

$$\begin{aligned}\mathbb{E}[(\mathbb{E}_p[\pi_f])^q \mid e, o] = (K\Phi_o^\delta \underline{z}_o^\chi)^q \frac{\xi}{\xi - q\chi} \\ \times \frac{\gamma(1-q\delta, x_o) + x_o^{\xi(1-\alpha)/\eta - q\delta}\Gamma\left(1 - \frac{\xi(1-\alpha)}{\eta}, x_o\right)}{\Pr(e \mid o)}.\end{aligned} \tag{B19}$$

This expression is finite for $q\delta < 1$ and $q\chi < \xi$. At $q = 0$ it equals one; at $q = 1$ it equals average profit per entrepreneur $\bar{\pi}_o/\Pr(e \mid o)$.

Differentiating a power moment at zero gives log moments. Taking the log of the power moment before differentiating makes the second derivative subtract the squared mean:

$$\begin{aligned}\frac{d}{dq}\log \mathbb{E}[(\mathbb{E}_p[\pi_f])^q \mid e, o]\Big|_{q=0} &= \mathbb{E}[\log \mathbb{E}_p[\pi_f] \mid e, o], \\ \frac{d^2}{dq^2}\log \mathbb{E}[(\mathbb{E}_p[\pi_f])^q \mid e, o]\Big|_{q=0} &= s^2_{\pi,o}(\theta,\xi).\end{aligned}$$

The derivatives of the lower incomplete gamma function that appear in this calculation are ordinary log-weighted integrals:

$$\partial_1^k \gamma(1,x) = \int_0^x \exp(-t)(\log t)^k \, dt, \qquad k = 1, 2.$$

Here $\partial_1$ differentiates the first argument. The mean is therefore

$$\begin{aligned}\mathbb{E}[\log \mathbb{E}_p[\pi_f] \mid e, o] = \log(K\Phi_o^\delta \underline{z}_o^\chi) + \frac{\chi}{\xi} \\ - \delta \frac{\partial_1\gamma(1, x_o) + x_o^{\xi(1-\alpha)/\eta}\log x_o \Gamma\left(1 - \frac{\xi(1-\alpha)}{\eta}, x_o\right)}{\Pr(e \mid o)}.\end{aligned} \tag{B20}$$

For the variance, the common profit scale drops out. The factor $\xi/(\xi - q\chi)$ contributes $(\chi/\xi)^2$;

differentiating the gamma-function terms gives the remaining selection adjustment:

$$s^2_{\pi,o}(\theta,\xi) = \left(\frac{\chi}{\xi}\right)^2 + \delta^2\left\{\frac{\partial_1^2\gamma(1,x_o) + x_o^{\xi(1-\alpha)/\eta}(\log x_o)^2\Gamma\left(1-\frac{\xi(1-\alpha)}{\eta},x_o\right)}{\Pr(e\mid o)} - \left[\frac{\partial_1\gamma(1,x_o) + x_o^{\xi(1-\alpha)/\eta}\log x_o\Gamma\left(1-\frac{\xi(1-\alpha)}{\eta},x_o\right)}{\Pr(e\mid o)}\right]^2\right\}. \tag{B21}$$

As entrepreneurship vanishes, this variance approaches $(\chi/\xi)^2$. To see this, let $\underline{\pi}_o$ denote the profit threshold in equation (B9). The definition of $x_o$ gives $\underline{\pi}_o = K\Phi_o^{\delta}\underline{z}_o^{\chi}x_o^{-\delta}$. Write $s = \xi(1-\alpha)/\eta$. The maintained assumptions imply $0 < \delta < s < 1$, so $\Pr(e \mid o) \sim x_o^s\Gamma(1-s)$ as $x_o \to 0$. Normalizing equation (B19) by the profit threshold yields, for $q$ in a neighborhood of zero,

$$\mathbb{E}\left[\left(\frac{\mathbb{E}_p[\pi_f]}{\underline{\pi}_o}\right)^q \,\middle|\, e,o\right] = \frac{\xi}{\xi-q\chi}\frac{x_o^{q\delta}\gamma(1-q\delta,x_o) + x_o^s\Gamma(1-s,x_o)}{\Pr(e\mid o)} \longrightarrow \frac{\xi}{\xi-q\chi}.$$

The lower-gamma term in the numerator and its first two $q$ derivatives are $O(x_o)$, so they vanish relative to the entrepreneurship rate. The displayed moment and its first two derivatives therefore converge. Since it is the moment-generating function of $\log(\mathbb{E}_p[\pi_f]/\underline{\pi}_o)$, this log profit converges to an exponential distribution with rate $\xi/\chi$, and its variance converges to $(\chi/\xi)^2$. Subtracting the log profit threshold does not change the variance, giving the same limit for $s^2_{\pi,o}(\theta,\xi)$.

### B.1.5 Import Participation and Supplier Access

*Proof of Proposition 3.* Under $\kappa_{oUSA} = 1$ for every origin, domestic source shares satisfy $\Phi_o\omega_{oUSA} = \Phi_{USA}\omega_{USAUSA} = (P^M_{USA})^{-\eta}$. Subtracting the domestic source share from one gives

$$\Pr(n_f^* \neq USA \mid e,o) = 1 - \frac{(P^M_{USA})^{-\eta}}{\Phi_o}. \tag{B22}$$

The ratio of access indices satisfies

$$\frac{\Phi_o}{\Phi_{USA}} = \frac{\omega_{USAUSA}}{\omega_{oUSA}}.$$

Higher import participation is therefore equivalent to higher total access.

Excluding birthplace transactions leaves measured participation equal to $1-\omega_{oUSA}-\omega_{oo}$, while the native participation rate remains $1-\omega_{USAUSA}$. A remaining advantage implies $\omega_{oUSA}+$

$\omega_{oo} < \omega_{USA\,USA}$. Since $0 < \omega_{USA\,USA} < 1$, this implies $\omega_{oUSA} < \omega_{USA\,USA}(1-\omega_{oo})$. Consequently,

$$\frac{\sum_{n\neq o}(P_n^M)^{-\eta}\kappa_{on}^{-\eta/\theta}}{\Phi_{USA}} = \frac{\Phi_o(1-\omega_{oo})}{\Phi_{USA}} = \frac{\omega_{USA\,USA}(1-\omega_{oo})}{\omega_{oUSA}} > 1.$$

This establishes

$$\Pr(n_f^* \notin \{USA, o\} \mid o) > \Pr(n_f^* \neq USA \mid USA) \quad \Longrightarrow \quad \Phi_o^{-o} > \Phi_{USA}. \tag{B23}$$

The converse need not hold: this last inequality permits $\omega_{oUSA} + \omega_{oo} \geq \omega_{USA\,USA}$. Birthplace access remains in $\Phi_o$, the denominator of the original sourcing probabilities, even when birthplace transactions are excluded from measured imports. Domestic access is retained in $\Phi_o^{-o}$. □

### B.1.6 Unit Values and Supplier Search

*Proof of Proposition 4.* Write $r = (1-\alpha)(\sigma-1)$ and suppress the blueprint and productivity conditioning arguments in expected net profit. At an entrepreneur's chosen source, eliminating gross operating profit from equation (B16) and taking logs gives

$$\log \bar{p}_{fon}^M = \log P_n^M - \frac{1}{\theta}\log \mathbb{E}_p[\pi_f] + \frac{1}{\theta}\log \kappa_{on} + \frac{1}{\theta}\log\left(\frac{P(\theta-r)}{r}\right). \tag{B24}$$

The accepted supplier's log price falls below the log cutoff by an exponential random variable with mean $1/\theta$ and variance $1/\theta^2$, independently of the cutoff. Therefore

$$\mathbb{E}_p[\log p_f^M] = \log P_n^M + \frac{1}{\theta}\log \kappa_{on} - \frac{1}{\theta}\log \mathbb{E}_p[\pi_f] + \frac{1}{\theta}\log\left(\frac{P(\theta-r)}{r}\right) - \frac{1}{\theta}.$$

The source–profit independence established in Appendix B.1.3 implies

$$\mathbb{E}[\log \mathbb{E}_p[\pi_f] \mid e, z_f, o, n_f^* = n] = \mathbb{E}[\log \mathbb{E}_p[\pi_f] \mid e, z_f, o].$$

Thus (16) holds with

$$B_o(z_f) = -\frac{1}{\theta}\,\mathbb{E}[\log \mathbb{E}_p[\pi_f] \mid e, z_f, o], \qquad \mathcal{C}^{UV} = \frac{1}{\theta}\log\left(\frac{P(\theta-r)}{r}\right) - \frac{1}{\theta}.$$

To establish $B_o'(z_f) < 0$, let $\underline{\pi}_o$ denote the occupational cutoff in (B9) and write $t_o(z_f) = x_o(z_f/\underline{z}_o)^{\eta/(1-\alpha)}$. Equation (B10) implies, for $u > 1$,

$$\Pr(\mathbb{E}_p[\pi_f] > u\underline{\pi}_o \mid e, z_f, o) = \frac{1-\exp[-t_o(z_f)u^{-1/\delta}]}{1-\exp[-t_o(z_f)]}.$$

The right-hand side has a strictly positive derivative with respect to $t_o(z_f)$, since $x/(e^x-1)$ is strictly decreasing for $x>0$. Because $t_o'(z_f)>0$, conditional expected log profit has a strictly positive derivative with respect to $z_f$, giving $B_o'(z_f)<0$.

Since the source probabilities do not depend on productivity, the same independence holds after averaging over productivity among entrepreneurs. The resulting origin component is $B_o \equiv \mathbb{E}[B_o(z_f) \mid e,o]$, which is still common across sources. Source-common differences between delivered prices and customs unit values can be absorbed in the common input-cost component.

For the variance, hold origin and source fixed and average over productivity and blueprints among entrepreneurs. The independent supplier-draw component contributes $1/\theta^2$. Adding the variance of log cutoffs gives equation (17). The search first-order condition and source–profit independence imply

$$\operatorname{Var}(\log \bar{p}^M_{fon} \mid e,o,n^*_f=n) = \frac{1}{\theta^2}\operatorname{Var}(\log \mathbb{E}_p[\pi_f] \mid e,o).$$

The variance on the right is $s^2_{\pi,o}(\theta,\xi)$ in equation (B21). Appendix B.1.4 establishes that it converges to $(\chi/\xi)^2$ as $x_o \to 0$. Since $\Pr(e \mid o) \to 0$ if and only if $x_o \to 0$ for fixed shape parameters, the unit-value variance converges to $1/\theta^2 + [\chi/(\xi\theta)]^2$, as stated in the proposition. □

For the extension to multiple inputs, see Appendix B.6.

### B.1.7 Sourcing Tilt and Relative Unit Values

**Corollary B.1** (Sourcing tilt and relative unit values). *Let $\mu_{on}(z_f) \equiv \mathbb{E}[\log p^M_f \mid z_f,o,n^*_f=n]$ denote the mean log unit value in Proposition 4. For founder origin $o \neq USA$ and another source $n \neq o$, define the birthplace unit-value gap adjusted for differences in common input costs:*

$$\Delta^{UV}_{on}(z_f) \equiv \mu_{oo}(z_f) - \mu_{on}(z_f) - \log\frac{P^M_o}{P^M_n} = \frac{1}{\theta}\log\frac{\kappa_{oo}}{\kappa_{on}}.$$

*Let $\widetilde{\omega}_{oo} \equiv \omega_{oo}/(1-\omega_{oUSA})$ denote the probability of sourcing from the birthplace conditional on importing. Holding entrepreneurial productivity, common input costs, and non-birthplace search costs fixed, a higher conditional birthplace sourcing probability corresponds to a larger relative birthplace unit-value discount:*

$$\frac{\partial \Delta^{UV}_{on}(z_f)}{\partial \widetilde{\omega}_{oo}} = -\frac{1}{\eta\widetilde{\omega}_{oo}(1-\widetilde{\omega}_{oo})} < 0.$$

Appendix Table A.16 shows that firms with the strongest birthplace sourcing tilt pay the lowest unit values there relative to their purchases from other sources, controlling for firm–year and source-country–product–industry–CZ–year fixed effects. Holding other source conditions fixed, stronger sourcing tilt and lower relative unit values reflect the same advantage in search costs. Their relationship depends on $\eta$: when comparative advantages are weak, a modest relative price advantage accompanies substantial sourcing tilt. When comparative advantages are pronounced,

the same tilt requires a larger relative price advantage. The supplier-tail parameter $\theta$ cancels because it governs both the search-cost difference inferred from sourcing and the relative price difference generated by that search-cost advantage.

*Proof of Corollary B.1.* By Proposition 4, differencing conditional mean log unit values between the birthplace $o \neq USA$ and another source $n \neq o$ and subtracting the difference in log common input costs gives

$$\Delta_{on}^{UV}(z_f) = \frac{1}{\theta} \log \frac{\kappa_{oo}}{\kappa_{on}}.$$

The common profitability component $B_o(z_f)$ cancels even when it changes with search costs. Holding productivity, common input costs, and non-birthplace search costs fixed, differentiating the conditional birthplace share obtained from equation (14) gives

$$\frac{\partial \Delta_{on}^{UV}(z_f)}{\partial \widetilde{\omega}_{oo}} = \frac{1}{\theta} \frac{\partial \log \kappa_{oo}}{\partial \widetilde{\omega}_{oo}} = -\frac{1}{\eta \widetilde{\omega}_{oo}(1 - \widetilde{\omega}_{oo})} < 0.$$

This comparative static concerns expected sourcing probabilities and the relative unit-value gap. It does not impose a deterministic ranking on realized sourcing decisions. □

### B.1.8 Comparison with Eaton–Kortum Sourcing

In an Eaton–Kortum representation (Eaton and Kortum, 2002), an origin-$o$ firm draws source-$n$ supplier efficiency $Z_{fon}$ with $\Pr(Z_{fon} \leq x) = \exp(-\widetilde{S}_{on} x^{-\eta})$ and chooses the lowest delivered unit cost $P_n^M / Z_{fon}$. Its source probabilities are

$$\omega_{on}^{EK} = \frac{\widetilde{S}_{on}(P_n^M)^{-\eta}}{\sum_{q \in N} \widetilde{S}_{oq}(P_q^M)^{-\eta}}.$$

Setting $\widetilde{S}_{on} = \kappa_{on}^{-\eta/\theta}$ reproduces (14). The common-shape Fréchet property makes the winning efficiency-to-cost draw independent of the winning source. Its log mean is $(\gamma_E + \log \Phi_o)/\eta$, where $\gamma_E$ is Euler's constant. The corresponding mean log price and the search result are

$$\begin{aligned} \mathbb{E}[\log p_f^M \mid o, n]_{EK} &= -\frac{\gamma_E + \log \Phi_o}{\eta} \equiv B_o^{EK}, \\ \mathbb{E}[\log p_f^M \mid e, o, n_f^* = n]_{\text{search}} &= \log P_n^M + \frac{1}{\theta} \log \kappa_{on} + B_o + \mathcal{C}^{UV}. \end{aligned} \tag{B25}$$

The EK expression describes the drawing problem above. Conditioning further on any entry rule depending on productivity and the winning cost can change its origin-specific mean but preserves independence from source identity. In EK, a less competitive source wins only with a proportionately better draw, so selection offsets its disadvantage in conditional prices. Under sequential search, bilateral search costs also change the reservation cutoff, leaving the additional

bilateral price component in (16).

### B.1.9 Counterfactual Equilibrium and Foreign Absorption

This subsection derives the search, production, and trade accounts behind the main-text equilibrium. We retain $w = 1$ and take common input costs $P_n^M$ from foreign source countries as given. We then establish existence and uniqueness in the case with no taxes, tariffs, or transfers and express its equilibrium conditions in proportional changes.

**Search and market accounting.** Given the firms' decisions, labor used in downstream production is $L^{\text{prod}} \equiv \int_{f\in\mathcal{F}} \ell_f \, df$. If $o(f)$ and $n_f^*$ denote firm $f$'s founder origin and chosen source, let $X_{on} \equiv \int_{\{f:o(f)=o,\, n_f^*=n\}} p_f^M x_f \, df$ denote tariff-inclusive material spending by origin $o$ on source $n$. Domestic purchases face no tariff. Expected search demand and domestic upstream receipts are

$$X^{\text{search}} \equiv \int_{f\in\mathcal{F}} \kappa_{o(f)n_f^*} \left( \frac{P_{n_f^*}^M}{\bar{p}_{fo(f)n_f^*}^M} \right)^{\theta} df, \qquad wL^{\text{up,dom}} = \sum_{o\in N} X_{oUSA}.$$

Final-good market clearing in (18) requires $E/P = C + X^{\text{search}}$. Let $\mathcal{T}$ denote tariff revenue and $D$ the exogenous net transfer from abroad, with $D = 0$ corresponding to balanced trade. Competitive upstream pricing equates export receipts to the wage bill of suppliers serving foreign buyers. External balance and total upstream labor therefore satisfy

$$wL^{\text{up,for}} + D = \sum_{o\in N} \sum_{n\neq USA} X_{on} - \mathcal{T}, \qquad L^{\text{up}} \equiv L^{\text{up,dom}} + L^{\text{up,for}}. \tag{B26}$$

Foreign buyers absorb the exports implied by this account at the given prices.

Aggregate net entrepreneurial profits are $\Pi_o = L_o \bar{\pi}_o$ by origin and $\Pi = \sum_{o\in N} \Pi_o$ economy-wide. Aggregating household budgets, with full rebating of tax revenue and net transfers, gives

$$PC = w \sum_{o\in N} L_o^w + \Pi + \mathcal{T} + D. \tag{B27}$$

**Equilibrium without taxes, tariffs, or transfers.** Fix origin populations, set taxes, tariffs, and transfers to zero, and maintain the parameter restrictions in (9). Net profits are the share $[1-(1-\alpha)(\sigma-1)/\theta]/\sigma$ of expenditure $E$. Combining the household budget with search expenditure gives

$$\left[1 - \frac{(1-\alpha)(\sigma-1)}{\theta}\right] w \sum_{o\in N} L_o^w = (\sigma-1)\Pi, \qquad E = \frac{\sigma}{\sigma-1} w \sum_{o\in N} L_o^w. \tag{B28}$$

Factor shares and this budget imply that the labor available to produce exports is

$$\begin{aligned} L^{\text{up,for}} &= \sum_{o \in N} L_o^w - L^{\text{prod}} - L^{\text{up,dom}} \\ &= \frac{(1-\alpha)(\sigma-1)}{[1-(1-\alpha)(\sigma-1)/\theta]w} \sum_{o \in N} \Pi_o (1 - \omega_{oUSA}) \geq 0. \end{aligned} \tag{B29}$$

The wage bill embodied in these exports equals spending on imported materials. The assumed foreign absorption therefore clears the home labor market and satisfies balanced trade with non-negative exports.

At given supplier access, a rise in the common scale of entrepreneurship indices raises profits and reduces worker supply. The domestic budget therefore balances at exactly one scale.

**Proposition B.1** (Small-open equilibrium)**.** *Under the preceding conditions, the interior-search equations have a unique positive solution. If this solution satisfies* (10)*, it implements a unique interior-search equilibrium of the small-open economy.*

*Proof.* Given supplier access, productivity supports, and occupational shifters, equation (12) fixes the ratios of entrepreneurship indices across origins. Only their common scale remains to be determined. As this scale rises from zero to infinity, worker supply falls continuously from $L$ to zero, while aggregate profits rise continuously from zero without bound. Both changes are strict. The two sides of the first equality in equation (B28) therefore cross exactly once. This argument allows $T_o$ to differ across origins.

At the crossing, the second equality determines $E$. Substituting the expression for $K$ from the search problem into the entrepreneurship index shows that its price-index term is $P^{\eta[1/(1-\alpha)-1/\theta]}$. Its exponent is positive under the parameter restrictions, so a unique positive $P$ reproduces the common scale. The chosen $E$ equals aggregate firm revenue, so integrating CES demand gives $P^{1-\sigma} = \int_{f \in \mathcal{F}} p_f^{1-\sigma}\, df$, verifying the price-index definition. Equation (B29) supplies the required foreign absorption. The remaining choices follow from the household and firm decision rules, with (10) ensuring interior search. □

**Counterfactual changes.** Hold origin populations, productivity distributions, occupational payoff shifters, and the production and search elasticities fixed. Supplier access may change through search costs or exogenous common input costs. Using the main-text convention $\widehat{v} = v'/v$, occupational choice implies

$$\widehat{x}_o / \widehat{\Phi}_o = \widehat{E}^{\frac{\eta}{(1-\alpha)(\sigma-1)}} \widehat{P}^{\eta\left(\frac{1}{1-\alpha}-\frac{1}{\theta}\right)}. \tag{B30}$$

Thus $\widehat{x}_o/\widehat{\Phi}_o$ is common across origins: supplier access determines relative changes in the entrepreneurship indices, while expenditure and the price index determine their common component. For each candidate common component, evaluate $\widehat{\Pi}_o$ and $\widehat{L}_o^w$ from selected profits in (B15)

and worker supply $L_o^w = L_o[1 - \Pr(e \mid o)]$ in (11). Let $\lambda_o^{VA} = \Pi_o/\Pi$ denote baseline value-added weights and $\lambda_o^w = L_o^w/\sum_{k\in N} L_k^w$ baseline worker shares. The budget in (B28) becomes the scalar equation

$$\sum_{o\in N} \lambda_o^{VA} \widehat{\Pi}_o = \sum_{o\in N} \lambda_o^w \widehat{L}_o^w. \tag{B31}$$

At its unique solution, either side of (B31) gives $\widehat{E}$, and (B30) gives

$$\widehat{P} = \left[ \frac{(\widehat{x}_o/\widehat{\Phi}_o)^{(1-\alpha)(\sigma-1)/\eta}}{\widehat{E}} \right]^{\frac{\theta}{(\sigma-1)[\theta-(1-\alpha)]}}. \tag{B32}$$

These expenditure and price changes determine the consumption response in the next subsection.

### B.1.10 Welfare and Occupational Adjustment

We retain the preceding equilibrium's assumptions: origin populations are unchanged, taxes, tariffs, and transfers are zero, and the parameter restrictions hold. Under interior search, search spending is a constant share of final-good expenditure $E$, so consumption expenditure $PC$ is also a constant share of $E$. It follows that $\widehat{W} = \widehat{E}/\widehat{P}$.

*Proof of Proposition 5.* Hold occupational composition fixed through compensating changes in the occupational payoff shifters $T_o$, so that $x_o' = x_o$. This keeps both the mass of wage workers and the productivity distribution of entrepreneurs within each origin unchanged. Firms can still change sources and adjust their relative size. With a fixed wage and labor supply, the accounting in Appendix B.1.9 implies $\widehat{E} = 1$.

At fixed $x_o$, equation (B15) implies that origin profits change in proportion to $\widehat{K}\widehat{\Phi}_o^{\delta}$. Substituting the source-common profit term from the search problem, using $\widehat{E} = 1$, gives $\widehat{K} = \widehat{P}^{1/\zeta}$. Aggregate profits are proportional to expenditure, so

$$1 = \sum_{o\in N} \lambda_o^{VA} \widehat{\Pi}_o = \widehat{P}^{1/\zeta} \sum_{o\in N} \lambda_o^{VA} \widehat{\Phi}_o^{\delta}.$$

Since $\widehat{W}^{\text{fix}} = \widehat{P}^{-1}$, rearranging gives (21). □

**Endogenous occupational choice.** We now hold occupational payoff shifters fixed and allow agents to change occupations. The welfare response then reflects changes in the number and productivity of active entrepreneurs, as well as changes in labor supply and expenditure. This selection margin is related to the role of firm decisions in aggregate trade responses emphasized by Adão et al. (2026). Here the active firm pool changes through occupational choice, as in models of entrepreneurship and trade (Kehoe et al., 2016; Díez and Ozdagli, 2025).

To separate these effects, define the access index $A$ and selection index $S$:

$$\begin{aligned} A &\equiv \sum_{o\in N} \lambda_o^{VA} \widehat{\Phi}_o^{\delta}, \\ S &\equiv \frac{1}{A} \sum_{o\in N} \lambda_o^{VA} \widehat{\Phi}_o^{\delta} \frac{\widehat{\Pi}_o}{\widehat{x}_o^{\delta}}. \end{aligned} \tag{B33}$$

The index $A$ aggregates supplier-access changes. With occupational shifters fixed, $\widehat{x}_o^{\delta} = \widehat{K}\widehat{\Phi}_o^{\delta}$, so dividing $\widehat{\Pi}_o$ by $\widehat{x}_o^{\delta}$ removes the profit change that would occur without a change in occupational selection. The remaining ratio captures the change in the selected-profit term in equation (B15). The index $S$ averages these selection responses with weights proportional to $\lambda_o^{VA}\widehat{\Phi}_o^{\delta}$.

Using $\zeta$ from Proposition 5 and $\nu \equiv \theta/[\theta-(1-\alpha)] > 0$, the full proportional welfare change is

$$\widehat{W} = \underbrace{A^{\zeta}}_{\widehat{W}^{\text{fix}}} \quad \underbrace{S^{\zeta}\widehat{E}^{\nu}}_{\text{occupational adjustment}}. \tag{B34}$$

The fixed-occupation response is the first term. The second term combines selection into entrepreneurship with the expenditure response implied by changes in wage-labor supply. This adjustment can increase or decrease the welfare change relative to the fixed-occupation comparison: entrepreneurial exit releases labor but removes varieties, while entry uses labor and adds varieties.

*Derivation of equation* (B34). Proposition B.1 gives the unique counterfactual equilibrium. Substituting (B32) into $\widehat{W} = \widehat{E}/\widehat{P}$ gives

$$\widehat{W} = \widehat{E}^{1+\frac{\theta}{(\sigma-1)[\theta-(1-\alpha)]}} \left(\frac{\widehat{x}_o}{\widehat{\Phi}_o}\right)^{-\frac{\theta(1-\alpha)}{\eta[\theta-(1-\alpha)]}}.$$

The selected-profit change and the definitions in (B33) imply, for any origin $o$,

$$\widehat{E} = \sum_{j\in N} \lambda_j^{VA}\widehat{\Pi}_j = \left(\frac{\widehat{x}_o}{\widehat{\Phi}_o}\right)^{\delta} AS.$$

Eliminating the common ratio $\widehat{x}_o/\widehat{\Phi}_o$ and collecting exponents gives (B34). □

### B.1.11 Gains from Trade and Sourcing Heterogeneity

Differences in domestic sourcing shares across founder groups raise gains from trade relative to a common-share economy with the same aggregate domestic share. This comparison holds occupational composition fixed as in Proposition 5. It isolates the information in founder groups' sourcing shares beyond the economy's aggregate domestic share.

Define $GFT^{\text{fix}} \equiv W/W^{\text{aut,fix}}$ as baseline consumption per capita divided by its autarky level under fixed occupational composition. Autarky removes foreign sourcing opportunities while leaving common domestic input costs and search access unchanged. Only domestic suppliers remain available, so $\widehat{\Phi}_o = \omega_{oUSA}$: the fraction of supplier access retained equals the baseline domestic sourcing share. Define the value-added-weighted power mean and arithmetic mean of these shares as

$$\widetilde{\omega} \equiv \left( \sum_{o \in N} \lambda_o^{VA} \omega_{oUSA}^{\delta} \right)^{1/\delta}, \qquad \bar{\omega} \equiv \sum_{o \in N} \lambda_o^{VA} \omega_{oUSA}.$$

The corresponding gains from trade satisfy

$$GFT^{\text{fix}} = \widetilde{\omega}^{-\delta\zeta} \geq \bar{\omega}^{-\delta\zeta} = GFT^{\text{hom}}, \tag{B35}$$

where $GFT^{\text{hom}}$ is the fixed-occupation gain when every founder group has domestic sourcing share $\bar{\omega}$. Equality holds when all groups with positive value-added weights have the same domestic share.

The common-share economy retains the domestic-share and trade-elasticity form of Arkolakis, Costinot and Rodríguez-Clare (2012). The power mean connects our result to the framework of Blaum, Lelarge and Peters (2018) for heterogeneous importers, with sourcing heterogeneity here operating across founder-origin groups. Holding the aggregate domestic share fixed makes the comparison informative: two economies can have the same aggregate import exposure but different gains from trade because that exposure is distributed differently across founder groups.

Moving from autarky to the baseline, foreign sourcing provides the largest proportional improvements in supplier access to groups with low domestic sourcing shares. Their firms expand relative to those of other groups, even though occupational composition within each origin remains fixed. The comparison does not rank gains when occupational choices also adjust: the selection and expenditure effects in equation (B34) can overturn it.

*Derivation of equation* (B35). Under autarky, supplier access consists only of the unchanged domestic contribution. Thus $\widehat{\Phi}_o = \omega_{oUSA}$, and Proposition 5 gives $W^{\text{aut,fix}}/W = \widetilde{\omega}^{\delta\zeta}$. Because $0 < \delta < 1$, Jensen's inequality implies

$$\left( \sum_{o \in N} \lambda_o^{VA} \omega_{oUSA}^{\delta} \right)^{1/\delta} \leq \sum_{o \in N} \lambda_o^{VA} \omega_{oUSA}.$$

Raising both sides to the negative exponent $-\delta\zeta$ gives (B35). □

### B.1.12 Source Reallocation and Trade Diversion

Uneven exposure across founder groups reduces the aggregate shift away from a source whose costs rise. Where purchases move depends on which alternative sources the exposed groups

already use. We derive these results for a small increase in common input costs from one foreign source country, holding all other common input costs and search costs fixed. We maintain the same zero taxes, tariffs, and transfers, unchanged origin populations, and fixed occupational composition as in the gains-from-trade comparison.

Let $\bar{\omega}_n \equiv \sum_{o \in N} \lambda_o^{VA} \omega_{on}$ denote the aggregate sourcing share of country $n$. Fixing occupational composition does not fix the value-added weights: firms can expand or contract. The proof of Proposition 5 implies

$$\lambda_o^{VA\prime} = \frac{\lambda_o^{VA} \widehat{\Phi}_o^{\delta}}{\sum_{j \in N} \lambda_j^{VA} \widehat{\Phi}_j^{\delta}}.$$

Aggregate sourcing therefore changes both because firms redirect purchases and because founder groups' shares of value added change.

**Proposition B.2** (Source reallocation and trade diversion)**.** *Under these conditions, an increase $d \log P_s^M > 0$ in common input costs from foreign source country $s$ changes aggregate sourcing shares by*

$$-d\bar{\omega}_s = \eta \left[ \bar{\omega}_s (1 - \bar{\omega}_s) - (1 - \delta) \operatorname{Var}_{\lambda^{VA}}(\omega_{os}) \right] d \log P_s^M, \tag{B36}$$

$$d\bar{\omega}_n = \eta \left[ \bar{\omega}_s \bar{\omega}_n + (1 - \delta) \operatorname{Cov}_{\lambda^{VA}}(\omega_{os}, \omega_{on}) \right] d \log P_s^M, \quad n \neq s. \tag{B37}$$

*All shares, weights, variances, and covariances are evaluated at the baseline. The moments use value-added weights $\lambda_o^{VA}$ across founder origins.*

If every founder group has the same sourcing shares, the variance and covariance terms vanish. At a given aggregate share $\bar{\omega}_s$, uneven exposure reduces the shift away from source $s$. Groups that buy little from $s$ have little spending to redirect, while groups concentrated in $s$ have relatively unattractive alternatives. More-exposed groups also contract relative to other groups, which partly offsets this weaker substitution. Since $0 < \delta < 1$, the net effect of exposure dispersion is to dampen the aggregate sourcing response.

The covariance term determines how diversion toward each alternative source differs from an economy with common sourcing portfolios. If groups with high shares in $s$ also have high shares in $n$, more spending shifts toward $n$ than the aggregate shares alone would predict. A negative covariance reduces that diversion. These composition effects parallel French (2016, 2017) and the sectoral import-share dispersion result in Edmond, Midrigan and Xu (2015). Allowing occupational choices to adjust adds changes in the composition of the active firm pool.

*Proof of Proposition B.2.* First consider substitution within a founder group. Differentiating equation (14) with respect to $P_s^M$ gives

$$d\omega_{os} = -\eta \omega_{os}(1 - \omega_{os}) d \log P_s^M, \qquad d\omega_{on} = \eta \omega_{os} \omega_{on} d \log P_s^M, \quad n \neq s.$$

Weighted by baseline value-added shares, the decline in purchases from $s$ is proportional to $\bar{\omega}_s(1-\bar{\omega}_s) - \mathrm{Var}_{\lambda^{VA}}(\omega_{os})$. The increase for source $n \neq s$ is proportional to $\bar{\omega}_s\bar{\omega}_n + \mathrm{Cov}_{\lambda^{VA}}(\omega_{os}, \omega_{on})$.

Next consider the weights. Differentiating $\Phi_o$ gives $d\log\Phi_o = -\eta\omega_{os}d\log P_s^M$. Differentiating the post-shock value-added weights yields

$$d\log\lambda_o^{VA} = -\eta\delta(\omega_{os} - \bar{\omega}_s)d\log P_s^M.$$

Thus groups with above-average exposure to $s$ lose value-added share. Their contribution to the change in sourcing from any country $n$ is

$$\sum_{o\in N}\omega_{on}d\lambda_o^{VA} = -\eta\delta\,\mathrm{Cov}_{\lambda^{VA}}(\omega_{os}, \omega_{on})d\log P_s^M.$$

For $n = s$, the covariance is the variance of exposure to $s$.

Finally, differentiating the aggregate share combines the two contributions:

$$d\bar{\omega}_n = \sum_{o\in N}\lambda_o^{VA}d\omega_{on} + \sum_{o\in N}\omega_{on}d\lambda_o^{VA}.$$

Substituting the within-group responses and the change in weights gives (B36) for $n = s$ and (B37) for $n \neq s$. □

## B.2 Residence Choice

We now allow people to choose where they live, as described in Section 3.6. They observe entrepreneurial productivity before choosing residence and draw their business blueprint afterward. We add the residence index $i$ to the main-text quantities: $L_{oUSA} = L_o$, $\kappa_{oUSAn} = \kappa_{on}$, and $\Phi_{oUSA} = \Phi_o$ for U.S. residents. Common input costs $P_{ni}^M$ retain the source–destination ordering used in that section. The timing is

$$\begin{aligned}\text{birth in } o \longrightarrow (z_f, \boldsymbol{\upsilon}_f^R) \longrightarrow \text{residence } i \longrightarrow \boldsymbol{\epsilon}_f \\ \longrightarrow \text{occupation and source choice} \longrightarrow \text{supplier search and production.}\end{aligned} \tag{B38}$$

Here $\boldsymbol{\upsilon}_f^R$ collects independent unit-scale Fréchet residence tastes with shape $\varrho$:

$$\Pr(\boldsymbol{\upsilon}_f^R \leq \boldsymbol{x}) = \exp\left(-\sum_{i\in N}x_i^{-\varrho}\right).$$

Productivity and residence tastes are independent of the blueprint and supplier draws. Under this timing, residence selects people on entrepreneurial productivity. We allow $(\alpha_i, \eta_i, \sigma_i)$ to vary across destinations while keeping $\theta$ and $\xi$ common.

For a prospective founder born in $o$ and living in $i$, supplier access is

$$\Phi_{oi} = \sum_{n \in N} (P_{ni}^{M})^{-\eta_i} \kappa_{oin}^{-\eta_i/\theta}. \tag{B39}$$

The country-$i$ versions of the two elasticities defined in the main text are

$$\delta_i = \frac{\chi_i(1-\alpha_i)}{\eta_i}, \qquad \chi_i = \frac{\theta(\sigma_i - 1)}{\theta - (1-\alpha_i)(\sigma_i - 1)}. \tag{B40}$$

Here $\delta_i$ governs the response of optimized profit to supplier access, while $\chi_i$ is its elasticity with respect to entrepreneurial productivity. We maintain $\delta_i < 1$ and $\xi > \chi_i$ in every country $i$, so the expected-profit expressions below are finite.

Let $K_i$ collect the profit terms common across founders and sources in country $i$, just as $K$ does in equation (8). For a person with productivity $z_f$, the country-$i$ counterpart of the main-text entrepreneurship index is

$$x_{oi}(z_f) = \Phi_{oi} \left[ T_{oi} \frac{(1-\tau_i^e) K_i z_f^{\chi_i}}{(1-\tau_i^w) w_i} \right]^{1/\delta_i}. \tag{B41}$$

At the lower productivity support, $x_{oUSA}(\underline{z}_o) = x_o$ from the main text. Conditional on $z_f$, a person becomes an entrepreneur with probability

$$\Pr(e \mid o, i, z_f) = 1 - \exp[-x_{oi}(z_f)]\,. \tag{B42}$$

More productive people are more likely to become entrepreneurs because productivity raises the return to every business blueprint.

Before the blueprint is drawn, the value of living in $i$ is the wage payoff plus the option to become an entrepreneur. Conditional on productivity, it is

$$V_{oi}(z_f) = \varsigma_i \frac{(1-\tau_i^w) w_i}{P_i} \left\{ \exp[-x_{oi}(z_f)] + x_{oi}(z_f)^{\delta_i} \gamma(1-\delta_i, x_{oi}(z_f)) \right\}. \tag{B43}$$

The first term values wage work for people whose blueprint does not make entrepreneurship worthwhile. The second integrates entrepreneurial payoffs over the blueprints for which entrepreneurship is optimal.

If $\iota_{oi}$ is the utility cost of moving from $o$ to $i$, a person with productivity $z_f$ chooses $i$ with probability

$$\Pr(i \mid o, z_f) = \frac{[V_{oi}(z_f)/\iota_{oi}]^{\varrho}}{\sum_{j \in N} [V_{oj}(z_f)/\iota_{oj}]^{\varrho}}. \tag{B44}$$

Destinations with better entrepreneurial opportunities attract more productive members of a birth cohort. The productivity distribution among their current residents is therefore selected

rather than Pareto as in the main text.

Let $L_{0o}$ be the mass born in country $o$. Integrating over the birth-cohort distribution $G_o$ gives resident, entrepreneur, and worker masses:

$$\begin{aligned} L_{oi} &= L_{0o} \int_{\underline{z}_o}^{\infty} \Pr(i \mid o, z_f)\, dG_o(z_f), \\ L_{oi}^{e} &= L_{0o} \int_{\underline{z}_o}^{\infty} \Pr(i \mid o, z_f)\, \{1 - \exp[-x_{oi}(z_f)]\}\, dG_o(z_f), \\ L_{oi}^{w} &= L_{0o} \int_{\underline{z}_o}^{\infty} \Pr(i \mid o, z_f) \exp[-x_{oi}(z_f)]\, dG_o(z_f). \end{aligned} \tag{B45}$$

These masses satisfy $L_{oi} = L_{oi}^{e} + L_{oi}^{w}$. They reduce to the closed-form Pareto occupation shares in equation (11) when residence is independent of productivity.

Selected entrepreneurial profit among people born in $o$ and residing in $i$ is

$$\Pi_{oi} = L_{0o} K_i \Phi_{oi}^{\delta_i} \int_{\underline{z}_o}^{\infty} \Pr(i \mid o, z_f) z_f^{\chi_i} \gamma(1 - \delta_i, x_{oi}(z_f))\, dG_o(z_f). \tag{B46}$$

Residence selection affects both the number of such residents and their productivity distribution.

Because residence probabilities depend on entrepreneurial productivity, these cohort aggregates generally have no closed form. We evaluate the resulting one-dimensional Pareto integrals by numerical quadrature; Appendix C.6.3 describes the transformation and convergence check.

**Counterfactual residence and occupation.** Conditional on productivity, the entrepreneurship index changes according to

$$\widehat{x}_{oi}(z_f) \equiv \frac{x'_{oi}(z_f)}{x_{oi}(z_f)} = \widehat{\Phi}_{oi} \left[ \frac{T'_{oi}}{T_{oi}} \frac{(1 - \tau_i^{e\prime})/(1 - \tau_i^{e})}{(1 - \tau_i^{w\prime})/(1 - \tau_i^{w})} \frac{\widehat{K}_i}{\widehat{w}_i} \right]^{1/\delta_i}. \tag{B47}$$

Evaluating equation (B43) at counterfactual values gives $V'_{oi}(z_f)$ and therefore

$$\widehat{V}_{oi}(z_f) = \frac{V'_{oi}(z_f)}{V_{oi}(z_f)}. \tag{B48}$$

Substituting $V'_{oi}(z_f)$ into equation (B44) gives the counterfactual residence probabilities. Replacing baseline values by their primed counterparts in equations (B45) and (B46) then gives

$$\widehat{L}_{oi} = \frac{L'_{oi}}{L_{oi}}, \qquad \widehat{L}_{oi}^{e} = \frac{L_{oi}^{e\prime}}{L_{oi}^{e}}, \qquad \widehat{L}_{oi}^{w} = \frac{L_{oi}^{w\prime}}{L_{oi}^{w}}, \tag{B49}$$

and

$$\widehat{\Pi}_{oi} = \frac{\Pi'_{oi}}{\Pi_{oi}}. \tag{B50}$$

These changes feed directly into country profits, wage income, and labor market clearing.

For $\varrho > 1$, welfare for the cohort born in $o$ is its expected value before productivity and residence tastes are realized:

$$\mathcal{V}_o = \Gamma\left(1 - \frac{1}{\varrho}\right) \int_{\underline{z}_o}^{\infty} \left\{ \sum_{i \in N} \left[ \frac{V_{oi}(z_f)}{\iota_{oi}} \right]^{\varrho} \right\}^{1/\varrho} dG_o(z_f), \qquad \widehat{\mathcal{V}}_o = \frac{\mathcal{V}'_o}{\mathcal{V}_o}. \tag{B51}$$

The counterfactual tables report occupational welfare conditional on U.S. residence, defined in equation (C65), rather than the cohort value $\mathcal{V}_o$. When people can change where they live, the resident, occupation, and profit measures above replace their counterparts in the main text. Production, supplier search, the household budget, and market clearing are otherwise unchanged. Foreign prices remain fixed, and foreign absorption clears the home labor market. The next subsection allows wages and prices to adjust across countries.

## B.3 Equilibrium across Countries

We now allow demand for materials to affect wages in source countries, as described in Section 3.6. We retain $o$ for birth country, $i$ for the country in which a person lives and produces, and $n$ for the material source. Setting $i = USA$ recovers the U.S. quantities in the main text.

The household and firm problems are the country-indexed counterparts of those in the main text. Entrepreneurial productivity satisfies $z_f \sim G_o(z_f)$, with the Pareto specialization in equation (4), and blueprint–source fit retains the same unit-scale Fréchet distribution. A firm in country $i$ faces expenditure $E_i$, final-good price $P_i$, wage $w_i$, production elasticity $\alpha_i$, demand elasticity $\sigma_i$, and source-choice elasticity $\eta_i$. The quantified counterfactuals use the schedule in equation (C27), with $\theta$ and $\xi$ common across countries. The firm pays $P_i \kappa_{oin}$ for each supplier draw from $n$. The production and search results in equations (7)–(8) then apply with the corresponding country subscripts.

Let $P_{ni}^M$ denote the component of input costs common to suppliers in source country $n$ serving buyers in country $i$. As in the main text, this term can reflect cross-country wage differences, bilateral tariffs or iceberg costs, and other sources of absolute advantage. Supplier access is given by equation (B39), and the source probability for an entrepreneur born in $o$ and residing in $i$ is

$$\omega_{oin} = \frac{\left(P_{ni}^M\right)^{-\eta_i} \kappa_{oin}^{-\eta_i/\theta}}{\Phi_{oi}}. \tag{B52}$$

Entrepreneurial productivity raises the value of every source proportionally, so it affects entrepreneurship rates and firm size without changing these conditional source probabilities.

Let $L_{oi}$, $L_{oi}^w$, $L_{oi}^e$, and $\Pi_{oi}$ denote resident, worker, entrepreneur, and aggregate-profit measures. When people remain in their initial country, $L_{oi}$ is an endowment and the remaining quantities follow from the main-text occupation rules. When residence responds, all four are

given in Appendix B.2. Country totals satisfy

$$L_i = \sum_{o \in N} L_{oi}, \qquad \Pi_i = \sum_{o \in N} \Pi_{oi}, \qquad L_i^w = \sum_{o \in N} L_{oi}^w.$$

### B.3.1 Equilibrium in Levels

We set the U.S. wage as the numeraire ($w_{USA} = 1$). Final goods in country $i$ are used for household consumption $C_i$ and supplier search $X_i^{\text{search}}$. Labor is used in downstream production $L_i^{\text{prod}}$ and upstream supply to domestic and foreign buyers $L_i^{\text{up}}$. Final-goods and labor-market clearing require

$$E_i/P_i = Y_i = \left( \int_{f \in \mathcal{F}_i} y_f^{(\sigma_i - 1)/\sigma_i} df \right)^{\sigma_i/(\sigma_i - 1)} = C_i + X_i^{\text{search}}, \tag{B53}$$

$$\sum_{o \in N} L_{oi}^w = L_i^{\text{prod}} + L_i^{\text{up}}, \tag{B54}$$

where $\mathcal{F}_i$ is the set of firms producing in $i$.

Let $X_{oin}$ denote tariff-inclusive material spending by origin-$o$ firms in $i$ on source $n$, with $X_{oUSAn} = X_{on}$ for U.S. firms. Suppliers receive payments net of the gross tariff factor $\tau_{ni}^T$, with $\tau_{ii}^T = 1$. Competitive upstream production and tariff accounting imply

$$w_n L_n^{\text{up}} = \sum_{o,i} \frac{X_{oin}}{\tau_{ni}^T}, \qquad \mathcal{T}_i = \sum_{o,n} \left( 1 - \frac{1}{\tau_{ni}^T} \right) X_{oin}. \tag{B55}$$

Here $\mathcal{T}_i$ is tariff revenue. Together with labor-market clearing, upstream demand determines source-country wages, which enter common input costs $P_{ni}^M$.

Tax revenue and net transfers $D_i$ are rebated in proportion to after-tax factor income. The household budget and rebate factor satisfy

$$\begin{aligned} P_i C_i &= w_i \sum_{o \in N} L_{oi}^w + \Pi_i + \mathcal{T}_i + D_i, \\ \varsigma_i &= \frac{P_i C_i}{(1 - \tau_i^w) w_i \sum_{o \in N} L_{oi}^w + (1 - \tau_i^e) \Pi_i}. \end{aligned} \tag{B56}$$

Population endowments are resident masses $L_{oi}$ when people remain in their initial country and birth-cohort masses $L_{0o}$ when they can move. Given primitives, policies, population endowments, and net transfers $(D_i)_{i \in N}$, an equilibrium across countries consists of $(w_i, C_i, E_i, P_i)_{i \in N}$ and the associated residence and occupational choices, firm decisions, and labor allocations. People choose the occupation yielding the higher payoff in the country-specific version of equation (5). Firms set prices according to equation (7), follow the search policy in Lemma 1, and choose the source country that maximizes expected profits in equation (8), with the correspond-

ing country subscripts. When people can move, residence choices follow Appendix B.2. The market-clearing and budget conditions in equations (B53)–(B56) hold in every country. One country budget is redundant when world transfers sum to zero.

### B.3.2 Existence and Uniqueness without Taxes, Tariffs, or Transfers

We establish existence and uniqueness for the interior-search equations when people remain in their initial country and taxes, tariffs, and transfers are zero. Entrepreneurial productivity retains the origin-specific Pareto distribution in the main text. Every firm can source from every country. As in the quantification, search costs may differ across founder origins in the United States but are common across origins within each foreign country.

We retain $L_{oi}$ for the population born in $o$ and living in $i$, and $\underline{z}_o$ for the lower support of its entrepreneurial productivity. For these proofs, occupational payoff shifters are common across origins within each country: $T_{oi} = T_i$. The elasticities $\eta_i$ and $\sigma_i$ are common within each country and may differ across countries. All populations, shifters, search costs, and iceberg costs are finite and strictly positive. We maintain the parameter restrictions in the main text in every country.

Conditional on wages, supplier access and source shares are

$$\Phi_{oi} = \sum_{n \in N} (P_{ni}^M)^{-\eta_i} \kappa_{oin}^{-\eta_i/\theta}, \qquad \omega_{oin} = \frac{(P_{ni}^M)^{-\eta_i} \kappa_{oin}^{-\eta_i/\theta}}{\Phi_{oi}}, \tag{B57}$$

Here $P_{ni}^M = w_n \tau_{ni}^I / A_n$. Let $x_{oi}$ be the entrepreneurship index evaluated at $\underline{z}_o$. The country-indexed versions of equations (11) and (B15) give

$$L_{oi}^w = L_{oi}[1 - \Pr(e \mid o, i)], \qquad \Pi_{oi} = L_{oi} \bar{\pi}_{oi}, \tag{B58}$$

where the entrepreneurship rate and selected profit are evaluated at $x_{oi}$ using country $i$'s parameters.

**Proposition B.3** (Existence)**.** *Under the preceding conditions, the equilibrium equations have a strictly positive solution after imposing a nominal normalization. If the solution also satisfies*

$$0 < \kappa_{oin} < \frac{(1-\alpha_i)(\sigma_i - 1)}{\theta - (1-\alpha_i)(\sigma_i - 1)} \frac{w_i}{P_i} \frac{1}{T_i} \qquad \textit{for every } o, i, n, \tag{B59}$$

*it implements an interior-search equilibrium of the underlying supplier-search problem.*

*Proof.* The proof follows the logic of Alvarez and Lucas (2007). Fix a strictly positive wage vector. The argument in the proof of Proposition B.1 applies within each country: supplier access, productivity supports, and occupational shifters fix the ratios of entrepreneurship indices across

origins. Their common scale must satisfy the country budget

$$\left[1-\frac{(1-\alpha_i)(\sigma_i-1)}{\theta}\right]\sum_{o\in N}L_{oi}^{w}=\frac{\sigma_i-1}{w_i}\sum_{o\in N}\Pi_{oi}. \tag{B60}$$

As in that proof, worker supply decreases and profits increase with the common scale, so the budget determines it uniquely. The same accounting and positive price-index exponent then determine $E_i$ and $P_i$. These quantities, occupational masses, and profits vary continuously with wages. Source shares and firm policies follow from equation (B57) and the main-text stopping rule.

It remains to choose wages. Let value excess demand for labor in country $i$ be

$$\begin{aligned}\mathcal{Z}_i(w)=&\sum_{o,j\in N}\frac{(1-\alpha_j)(\sigma_j-1)}{1-(1-\alpha_j)(\sigma_j-1)/\theta}\Pi_{oj}(w)\omega_{oji}(w)\\&-\frac{(1-\alpha_i)(\sigma_i-1)}{1-(1-\alpha_i)(\sigma_i-1)/\theta}\sum_{o\in N}\Pi_{oi}(w).\end{aligned} \tag{B61}$$

Country budgets imply $\mathcal{Z}_i = w_i(L_i^{\text{prod}} + L_i^{\text{up}} - L_i^{w})$. Hence $\mathcal{Z}$ is continuous, $\sum_{i\in N}\mathcal{Z}_i = 0$, and $\mathcal{Z}_i/w_i$ is homogeneous of degree zero and bounded below by the negative of country $i$'s population.

Normalize wages to the simplex. If a sequence approaches its boundary, choose a country with a positive limiting wage. Its country budget keeps profits for at least one founder origin bounded away from zero. Sources whose wages tend to zero become arbitrarily attractive to those founders, so their purchases concentrate on the set of zero-wage countries. At least one such country receives positive supplier revenue while its wage vanishes. Consequently,

$$\max_{i:w_i\to 0}\frac{\mathcal{Z}_i(w)}{w_i}\longrightarrow+\infty. \tag{B62}$$

To complete the argument, put $\overline{\mathcal{Z}}_i(w)=\mathcal{Z}_i(w)/w_i$ and restrict wages to the simplex with $w_i\geq\varepsilon>0$. The correspondence

$$w\mapsto\arg\max_{\widetilde{w}}\widetilde{w}\cdot\overline{\mathcal{Z}}(w)$$

on this truncated simplex has a fixed point $w^{\varepsilon}$. At that point, $\widetilde{w}\cdot\overline{\mathcal{Z}}(w^{\varepsilon})\leq 0$ for every feasible $\widetilde{w}$, since $w^{\varepsilon}\cdot\overline{\mathcal{Z}}(w^{\varepsilon})=\sum_{i\in N}\mathcal{Z}_i=0$. Take a convergent subsequence as $\varepsilon$ tends to zero. Equation (B62) rules out a boundary limit. The limiting inequality makes every component of $\overline{\mathcal{Z}}$ weakly negative, and Walras' law makes every component zero. Rescaling the resulting wage vector to $w_{USA}=1$ gives a positive solution. Condition (B59) ensures that its reservation policies are interior, completing the proof. □

**Proposition B.4** (Uniqueness). *Under the conditions of Proposition B.3, the equilibrium equations*

*have at most one strictly positive solution up to the wage numeraire. If condition (B59) holds, the interior-search equilibrium is therefore unique. Aggregate allocations and firm policies are unique apart from occupational and source-choice ties on sets of measure zero.*

*Proof.* The key bound concerns selected profit relative to the wage. After using the entrepreneurship index to replace the common profit scale, its dependence on $x$ is summarized by

$$g_i(x) = \frac{\xi}{\xi - \chi_i}\left[x^{\delta_i}\gamma(1-\delta_i, x) + x^{\xi(1-\alpha_i)/\eta_i}\Gamma\left(1 - \frac{\xi(1-\alpha_i)}{\eta_i}, x\right)\right].$$

For origin-$o$ residents of country $i$, $\Pi_{oi}/w_i = L_{oi}(1/T_i)g_i(x_{oi})$. Write

$$A_i(x) = x^{\delta_i}\gamma(1-\delta_i, x), \qquad B_i(x) = x^{\xi(1-\alpha_i)/\eta_i}\Gamma\left(1 - \frac{\xi(1-\alpha_i)}{\eta_i}, x\right).$$

The derivative terms created by the two incomplete gamma functions cancel, so

$$\frac{d\log g_i(x)}{d\log x} = \frac{\delta_i A_i(x) + [\xi(1-\alpha_i)/\eta_i]B_i(x)}{A_i(x) + B_i(x)} \in (0,1). \tag{B63}$$

The elasticity is a weighted average of $\delta_i$ and $\xi(1-\alpha_i)/\eta_i$; the inequalities follow from the maintained restrictions. To compare two solutions of the same economy, label one unprimed and the other primed and write $\widehat{v} = v'/v$. Then

$$\begin{aligned} \widehat{x}_{oi} \le 1 \quad &\Longrightarrow \quad \widehat{\Pi}_{oi}/\widehat{w}_i \le 1, \\ \widehat{x}_{oi} > 1 \quad &\Longrightarrow \quad \widehat{\Pi}_{oi}/\widehat{w}_i < \widehat{x}_{oi}. \end{aligned} \tag{B64}$$

In every country, the country budget implies

$$\min_{o\in N}\widehat{x}_{oi} \le 1 \le \max_{o\in N}\widehat{x}_{oi}; \tag{B65}$$

otherwise its worker side and profit side would move in opposite directions.

For each origin and residence country, define

$$\Omega_{oi} = \sum_{n\in N}\omega_{oin}\widehat{w}_n^{-\eta_i}.$$

Source shares and relative entrepreneurship indices then satisfy

$$\frac{\omega'_{oin}}{\omega_{oin}} = \frac{\widehat{w}_n^{-\eta_i}}{\Omega_{oi}}, \qquad \frac{\widehat{x}_{oi}}{\widehat{x}_{o'i}} = \frac{\Omega_{oi}}{\Omega_{o'i}}. \tag{B66}$$

Within each foreign country, common search costs imply the same source shares and hence the same $\Omega_{oi}$ across origins. Equation (B66) then makes the changes in entrepreneurship indices

common across origins, and (B65) sets them to one. Worker masses are therefore unchanged, so the country budget implies $\widehat{\Pi}_i = \widehat{w}_i$ for every $i \neq USA$.

Suppose wages differ across the two solutions. Reverse their order if needed and let $M = \max_n \widehat{w}_n > 1$. Every maximizing country is foreign because $\widehat{w}_{USA} = 1$. Choose one such country $n$. Dividing its input balance by its initial value and using $\widehat{\Pi}_n = M$ gives

$$M = \sum_{o,i \in N} s_{oin} \frac{\widehat{\Pi}_{oi} M^{-\eta_i}}{\Omega_{oi}}, \qquad s_{oin} > 0, \qquad \sum_{o,i \in N} s_{oin} = 1, \tag{B67}$$

where $s_{oin}$ is the initial share of country $n$'s supplier receipts from origin-$o$ firms in country $i$. Since source support is complete and $\widehat{w}_{USA} = 1 < M$, we have $\Omega_{oi} > M^{-\eta_i}$ for every $(o, i)$. In each country $i$, choose an origin $o_i^-$ with $\widehat{x}_{o_i^-,i} \leq 1$, which exists by (B65). If $\widehat{x}_{oi} \leq 1$, then

$$\frac{\widehat{\Pi}_{oi}}{\Omega_{oi}} \leq \frac{\widehat{w}_i}{\Omega_{oi}} < M^{1+\eta_i}.$$

If instead $\widehat{x}_{oi} > 1$, equations (B64) and (B66) give

$$\frac{\widehat{\Pi}_{oi}}{\Omega_{oi}} < \widehat{w}_i \frac{\widehat{x}_{oi}}{\Omega_{oi}} = \widehat{w}_i \frac{\widehat{x}_{o_i^-,i}}{\Omega_{o_i^-,i}} < M^{1+\eta_i}.$$

Multiplying each bound by $M^{-\eta_i}$ shows that every term averaged on the right side of (B67) is strictly smaller than its left side, a contradiction. All wage ratios must therefore equal one.

It follows that $\Omega_{oi} = 1$ for every origin and residence country. Changes in entrepreneurship indices are then common within each country, and (B65) sets them to one. Profits, expenditures, source shares, and price indices follow uniquely from the preceding equations; the remaining household and firm choices then follow from their first-order and stopping conditions. □

### B.3.3 Equilibrium in Exact Changes

As in the main text, write $\widehat{v} = v'/v$ for the proportional change in any positive variable $v$. We retain the origin–residence indices $(o, i)$ for populations and profits. In the baseline calibration, source shares abroad are common across founder origins. We sum purchases across origins after determining their residence and occupational choices.

Given an initial equilibrium and counterfactual primitives, equilibrium across countries in exact changes solves for

$$\left( (\widehat{w}_i)_{i \neq USA}, (\widehat{E}_i)_{i \in N}, (\widehat{P}_i)_{i \in N}, (\widehat{\varsigma}_i)_{i \in N} \right), \qquad \widehat{w}_{USA} = 1. \tag{B68}$$

Given wages, expenditures, prices, and rebate factors, household and firm decisions follow the main text, applied country by country. Evaluating supplier access in equation (B39) and source

probabilities in equation (B52) at counterfactual common input costs and search costs gives $\Phi'_{oi}$ and $\omega'_{oin}$. The proportional change in supplier access is $\widehat{\Phi}_{oi} = \Phi'_{oi}/\Phi_{oi}$. Common input costs change according to

$$\widehat{P}^M_{ni} = \widehat{\tau}^I_{ni}\widehat{\tau}^T_{ni}\widehat{w}_n/\widehat{A}_n. \tag{B69}$$

Thus sourcing decisions respond to bilateral policies, wages, and upstream productivity in source countries. When foreign wages remain fixed, imposed changes in tariffs or iceberg costs can still change delivered input prices.

The country-indexed counterparts of equations (11) and (B15) determine occupational choices and entrepreneurial profits for each $(o, i)$ when people remain in their initial country. For experiments that leave resident populations unchanged, $\widehat{L}_{oi} = 1$; exogenous population changes enter through the corresponding resident masses. When residence responds, equations (B49) and (B50) instead determine resident, worker, entrepreneur, and profit changes after integrating over the birth-cohort productivity distribution. Summing across origins gives country totals:

$$\widehat{\Pi}_i = \sum_{o\in N} \frac{\Pi_{oi}}{\Pi_i}\widehat{\Pi}_{oi}, \qquad \widehat{L}^w_i = \sum_{o\in N} \frac{L^w_{oi}}{L^w_i}\widehat{L}^w_{oi}. \tag{B70}$$

A counterfactual equilibrium is a positive vector in equation (B68) for which the resulting household and firm decisions satisfy the exact-change counterparts of the goods-market, labor-market, payment, and budget conditions in equations (B53)–(B56) in every country. The wage normalization fixes nominal units. When world transfers sum to zero, one country budget follows from Walras' law.

## B.4 Customer Preferences

This appendix allows customers to prefer goods made with inputs from their countries of birth. McCully et al. (2026) find that immigrants spend 132% more on grocery imports from their birth country than otherwise similar native households in the same county. We introduce household source preferences in the United States, retaining the foreign household assumptions.

Interpret $\epsilon_{fn}$ as the appeal of firm $f$'s product made with source-$n$ inputs. Its components are independent Fréchet draws with shape $\eta$ and scales $b_{o(f)n}$, where

$$b_{on} = \exp(a_B \mathbb{1}\{o = n,\ n \notin \{\text{USA}, \text{ROW}\}\}).$$

Production becomes $y_f = z_f(\ell_f/\alpha)^\alpha[x_f/(1-\alpha)]^{1-\alpha}$. Households of origin $o$ have CES preferences with elasticity $\sigma$ and demand weight

$$a_{ofn} = \epsilon_{fn}^{(1-\alpha)(\sigma-1)} \frac{b_{on}}{\sum_{q\in N}(L_q/L)b_{qn}}.$$

Household source preferences are proportional to $b_{on}$ and normalized to have population-weighted mean one for each source. Households within an origin have the same expenditure shares and price index, while incomes can differ. In the preference normalization and rebate rule, $L_o/L$ denotes observed baseline population shares, held fixed across counterfactuals, including those with endogenous residence.

Let $E_o$ be origin-$o$ household expenditure and $P_o$ its CES price index. With $n_f$ denoting firm $f$'s chosen source, the normalization gives

$$P_o^{1-\sigma} = \int_{f\in\mathcal{F}} a_{ofn_f} p_f^{1-\sigma} df,$$
$$P^{1-\sigma} \equiv \int_{f\in\mathcal{F}} \epsilon_{fn_f}^{(1-\alpha)(\sigma-1)} p_f^{1-\sigma} df = \sum_{o\in N} (L_o/L) P_o^{1-\sigma}.$$

Supplier search uses this common CES composite. An additional origin-specific proportional rebate sets

$$E_o = (L_o/L)(E - PX^{\text{search}}) \left(\frac{P_o}{P}\right)^{1-\sigma}.$$

Let $I_o$ be the group's disposable income after the model's existing proportional rebate. The extra transfer $E_o - I_o$ multiplies each household's disposable income by $E_o/I_o$. Transfers sum to zero and preserve income differences within each origin group.

Origin-$o$ household demand aggregates to $a_{ofn_f} E_o P_o^{\sigma-1} p_f^{-\sigma}$. Aggregating it with supplier-search demand gives

$$y_{fn} = \epsilon_{fn}^{(1-\alpha)(\sigma-1)} E P^{\sigma-1} p_{fn}^{-\sigma}.$$

At given $b_{on}$, output prices are multiplied by $\epsilon_{fn}^{1-\alpha}$ and quantities divided by it relative to a model with $\epsilon_{fn}$ in production. Revenues, profits, $P$, and physical factor demands coincide. With residence fixed, search, sourcing, and occupation choices therefore coincide as well: the extra rebate multiplies both occupational payoffs by the same factor within each origin.

Consumption per capita is $(\sum_o E_o/P_o)/\sum_o L_o$, using actual U.S. resident counts. When residence responds, multiply each origin's U.S. payoff by $(E_o/I_o)(P/P_o)$, normalized to one at the observed baseline. This retains the fitted residence intercepts and ability selection without recalibrating the firm side. Welfare can differ even when production allocations coincide because household source preferences change origin-specific consumption price indexes and the additional rebates redistribute expenditure across origins. In Table B.1, the responding-residence columns jointly solve for residence and equilibrium under this adjustment. These comparisons include both household source preferences and the extra origin rebate.

**Quantification.** The pooled birthplace unit-value coefficient identifies the preference parameter $a_B$, conditional on sourcing shares. We choose $a_B$ to match the price coefficient in Table 4, column 1. This target is distinct from the within-cell variance used to identify $\theta$ and $\xi$.

In this extension, supplier access and sourcing shares satisfy

$$\Phi_o = \sum_{n \in N} (P_n^M)^{-\eta} b_{on}^{\eta} \kappa_{on}^{-\eta/\theta}, \qquad \omega_{on} = \frac{(P_n^M)^{-\eta} b_{on}^{\eta} \kappa_{on}^{-\eta/\theta}}{\Phi_o}.$$

For each candidate $a_B$, we hold baseline supplier access, entrepreneurial productivity, and occupational incentives fixed. We re-invert search costs according to $\kappa_{on}(a_B) = b_{on}(a_B)^{\theta} \kappa_{on}(0)$, where $\kappa_{on}(0)$ denotes the costs recovered in the main model. With common input costs fixed, this leaves $\kappa_{on}/b_{on}^{\theta}$ unchanged. Baseline source choice, entrepreneurship, employment, and expected profits therefore remain unchanged. We draw three million transactions from active firms purchasing from named foreign sources, accounting for selection into entrepreneurship and source choice. Each transaction records founder origin, source, and expected profits. The sample includes U.S.-born founders and the 13 named foreign founder origins, and excludes the aggregate ROW founder and source categories. ROW remains in the calibrated sourcing accounts; its search costs are recovered from sourcing shares with $b_{on} = 1$.

To construct unit values, let $\mathbb{E}_p[\pi_j]$ be expected profit net of search costs for transaction $j$, and let $U_j$ be an independent draw from the uniform distribution on $(0, 1)$. The reservation condition in Lemma 1 gives

$$\log \bar{p}_j^M = \log P_{n_j}^M + \frac{1}{\theta} \left[ \log(P \kappa_{o_j n_j}) - \log\left( \frac{r}{\theta - r} \right) - \log \mathbb{E}_p[\pi_j] \right], \qquad r = (1 - \alpha)(\sigma - 1).$$

The accepted supplier price is $p_j^M = \bar{p}_j^M U_j^{1/\theta}$. Removing the tariff factor gives the customs unit value $UV_j = p_j^M / \tau_{n_j USA}^T$. Changing $a_B$ shifts log unit values within origin–source cells without changing their variances. Common input costs enter the regression through source intercepts. We estimate the regression below and choose $a_B$ to satisfy the coefficient target:

$$\log UV_j = \lambda_{n_j} + \beta^{UV}(a_B) \mathbb{1}\{o_j = n_j\} + u_j, \qquad \beta^{UV}(a_B) = -0.1724. \tag{B71}$$

Here $\lambda_n$ is a source fixed effect. The model abstracts from product, year, industry, location, and founding-cohort variation, leaving source effects to absorb common sourcing conditions. We estimate the regression without observation weights. We trim below the first and above the 99th unit-value percentile within each source, recomputing these thresholds for every candidate. We use seed 20261007 and the same draws across candidates. The fitted value is $a_B = 0.20$. The main model predicts $\beta^{UV}(0) = -0.3444$, a discount of approximately 29%, compared with 16% in the data. We retain the fitted $a_B$ in the four cases reported below without retargeting this coefficient.

Table B.1: Customer preferences and consumption per capita

| | Small open economy | | Multicountry GE | |
|---|---|---|---|---|
| Residence | Fixed | Responding | Fixed | Responding |
| Main model | −0.253 | −0.460 | −0.107 | −0.203 |
| Customer preferences | −0.220 | −0.295 | −0.094 | −0.126 |

Notes: Entries are 100 times the log change in U.S. consumption per capita when immigrant founders' foreign search costs are equalized to those of U.S.-born founders. Customer preferences remain fixed in the second row. Each entry compares the balanced-trade counterfactual with its balanced-trade baseline. Occupation responds in every column. The second row uses the fitted customer preferences and the origin rebate described above; taste-normalization and rebate weights remain at observed population shares.

## B.5 Bertrand Procurement

Section 3.3 assumes that suppliers price at marginal cost. Here we allow sampled suppliers to compete in a Bertrand procurement auction. With the same distribution of supplier costs, this changes profit levels and creates upstream rents while preserving the elasticities governing source choice.

**Bertrand procurement.** Fix a prospective founder $f$ of origin $o$ and a candidate source country $n$. Operating profit at input price $p$ remains $\widetilde{\pi}_{fn}(p;\epsilon_{fn})$, as defined in equation (7), and each supplier draw costs $P\kappa_{on}$. Under marginal-cost pricing, only the lowest price drawn matters, giving the reservation rule in equation (B5).

Now suppose the founder can recall sampled suppliers and conducts a Bertrand procurement auction after stopping. Let $c^{(1)} \le c^{(2)}$ denote the two lowest marginal costs drawn, with $c^{(2)} = \infty$ when the founder has retained only one supplier. These costs follow $\Pr(c \le x) = (x/P_n^M)^\theta$ for $0 < x \le P_n^M$; they equal supplier prices under marginal-cost pricing. Material demand has absolute price elasticity $1 + (1-\alpha)(\sigma-1)$, so an unconstrained supplier charges the monopoly markup

$$\mu^B \equiv \frac{1 + (1-\alpha)(\sigma-1)}{(1-\alpha)(\sigma-1)}.$$

A runner-up can undercut any price above its marginal cost. The winning supplier therefore charges

$$p_{fon}^M\left(c^{(1)}, c^{(2)}\right) = \min\left\{\mu^B c^{(1)}, c^{(2)}\right\}. \tag{B72}$$

Stopping profit is $\widetilde{\pi}_{fn}(p_{fon}^M(c^{(1)}, c^{(2)});\epsilon_{fn})$.

**Search.** Bertrand pricing makes the search state two-dimensional: a new draw can improve either the winning supplier or the runner-up that constrains its price. Let $\mathrm{Min}_2\{c^{(1)}, c^{(2)}, x\}$ return the two lowest marginal costs after a new draw $x$. The Bellman equation is

$$W^B_{fon}\big(c^{(1)}, c^{(2)}\big) = \max\Bigg\{\widetilde{\pi}_{fn}\big(p^M_{fon}\big(c^{(1)}, c^{(2)}\big)\,; \epsilon_{fn}\big)\,, \\ -P\kappa_{on} + \int_0^{P_n^M} W^B_{fon}\big(\mathrm{Min}_2\{c^{(1)}, c^{(2)}, x\}\big)\,\frac{\theta x^{\theta-1}}{(P_n^M)^\theta}\,dx\Bigg\}. \tag{B73}$$

Let $V^B_{fon} \equiv W^B_{fon}(\infty, \infty)$ denote expected net profit before the first draw, with $\widetilde{\pi}_{fn}(\infty; \epsilon_{fn}) = 0$.

**Proposition B.5** (Bertrand pricing and supplier search)**.** *Suppose supplier marginal costs are independent draws from the distribution above and $\theta > (1-\alpha)(\sigma-1)$. There is a positive constant $k^B = k^B(\alpha, \sigma, \theta)$ such that, whenever*

$$\frac{P\kappa_{on}}{\widetilde{\pi}_{fn}(P_n^M; \epsilon_{fn})} < k^B,$$

*expected net profit is*

$$V^B_{fon} = K^B z_f^\chi \left(\frac{\epsilon_{fn}}{P_n^M}\kappa_{on}^{-1/\theta}\right)^{\frac{\theta(1-\alpha)(\sigma-1)}{\theta-(1-\alpha)(\sigma-1)}}, \qquad K^B \equiv (k^B)^{\eta\delta/\theta} P^{-\eta\delta/\theta} \mathcal{D}^{\chi/(\sigma-1)}. \tag{B74}$$

*Equation (B74) differs from the main-text expression (8) only in the common multiplicative constant, $K^B$ rather than $K$.*

Conditioning on costs below a threshold preserves the cost distribution's shape. A lower search cost changes the scale of the costs drawn under the optimal policy, but not the normalized stopping problem. Bertrand competition therefore changes a common constant rather than the source-specific profit elasticities.

*Proof.* For the proof only, write $r \equiv (1-\alpha)(\sigma-1)$, the absolute elasticity of operating profit with respect to the input price. Dividing the Bellman equation by $\widetilde{\pi}_{fn}(P_n^M; \epsilon_{fn})$ yields the normalized value

$$v(\widetilde{\kappa}) \equiv \frac{V^B_{fon}}{\widetilde{\pi}_{fn}(P_n^M; \epsilon_{fn})}, \qquad \widetilde{\kappa} \equiv \frac{P\kappa_{on}}{\widetilde{\pi}_{fn}(P_n^M; \epsilon_{fn})}.$$

The normalized value $v(\widetilde{\kappa})$ is continuous and strictly decreasing whenever search occurs. It diverges as $\widetilde{\kappa} \downarrow 0$ and equals zero for sufficiently costly search. Hence there is a unique $k^B > 0$ such that $v(k^B) = 1$.

Fix $\widetilde{\kappa} < k^B$ and define

$$p^\dagger \equiv P_n^M v(\widetilde{\kappa})^{-1/r} < P_n^M.$$

At any search history, the founder can ignore the suppliers already drawn and restart, guaranteeing $v(\widetilde{\kappa})$. The founder therefore never stops when $p^M_{fon}(c^{(1)}, c^{(2)}) > p^\dagger$. Draws above $p^\dagger$ can be ignored: they cannot supply at an accepted price, and when such a draw is the runner-up at stopping, the monopoly-price branch of (B72) determines the transaction price.

A draw falls below $p^\dagger$ with probability $(p^\dagger/P^M_n)^\theta$. Conditional on doing so,

$$\Pr\left(\frac{c}{p^\dagger} \le x \,\middle|\, c \le p^\dagger\right) = x^\theta, \qquad 0 < x \le 1.$$

After rescaling qualifying draws by $P^M_n/p^\dagger$, the founder faces the original stopping problem with normalized cost $\widetilde{\kappa}(p^\dagger/P^M_n)^{r-\theta}$. Hence

$$v(\widetilde{\kappa}) = \left(\frac{p^\dagger}{P^M_n}\right)^{-r} v\left(\widetilde{\kappa}\left(\frac{p^\dagger}{P^M_n}\right)^{r-\theta}\right).$$

Because $(p^\dagger/P^M_n)^{-r} = v(\widetilde{\kappa})$, the definition and uniqueness of $k^B$ imply

$$\widetilde{\kappa}\left(\frac{p^\dagger}{P^M_n}\right)^{r-\theta} = k^B.$$

Therefore

$$v(\widetilde{\kappa}) = \left(\frac{k^B}{\widetilde{\kappa}}\right)^{r/(\theta-r)}.$$

Substituting for $\widetilde{\kappa}$ and using

$$\frac{r}{\theta - r} = \frac{\eta\delta}{\theta}, \qquad \frac{\theta}{\theta - r} = \frac{\chi}{\sigma - 1}$$

gives

$$V^B_{fon} = (k^B)^{\eta\delta/\theta}\widetilde{\pi}_{fn}(P^M_n; \epsilon_{fn})^{\chi/(\sigma-1)}(P\kappa_{on})^{-\eta\delta/\theta}.$$

Substituting equation (7) evaluated at $p^M_n = P^M_n$ gives equation (B74). □

**Implications for source choice and unit values.** The source-specific term is the same as under marginal-cost pricing. Bertrand pricing therefore leaves source rankings, gravity probabilities, and the independence of source identity from maximized value unchanged. Conditional on wages and prices, source-level changes in expected profit also coincide with the main text. Bertrand pricing changes only the common profit term $K^B$.

The proposition applies to sources in the interior search region. A sufficient condition for every source capable of inducing entrepreneurship to lie in that region is

$$\frac{1-\tau^e}{1-\tau^w} T_o \frac{P}{w}\kappa_{on} < k^B(\alpha, \sigma, \theta) \qquad \text{for every } (o, n). \tag{B75}$$

If $P\kappa_{on}/\widetilde{\pi}_{fn}(P_n^M;\epsilon_{fn}) \geq k^B$, then $V_{fon}^B \leq \widetilde{\pi}_{fn}(P_n^M;\epsilon_{fn}) \leq P\kappa_{on}/k^B$; under (B75), such a source cannot make entrepreneurship preferable to wage work. The corresponding restriction under marginal-cost pricing replaces $k^B$ with $(1-\alpha)(\sigma-1)/[\theta-(1-\alpha)(\sigma-1)]$.

The same scaling preserves the main text's source-relative unit-value prediction. Under interior search, write the winning price as $p_{fon}^{\dagger}H_f^B$, where

$$p_{fon}^{\dagger} = P_n^M\left[\frac{P\kappa_{on}}{k^B(\alpha,\sigma,\theta)\widetilde{\pi}_{fn}(P_n^M;\epsilon_{fn})}\right]^{1/[\theta-(1-\alpha)(\sigma-1)]},$$

and the distribution of $H_f^B$ depends only on $(\alpha,\sigma,\theta)$. The transaction price is

$$p_{fon}^M = p_{fon}^{\dagger}H_f^B.$$

The coefficients on blueprint fit, search costs, and common input costs are unchanged from marginal-cost pricing. Equation (16) retains its source-relative coefficient. The variance term becomes $\mathrm{Var}(\log H_f^B)$ in place of $1/\theta^2$.

The argument applies country by country when residence-country subscripts are restored. Bertrand pricing also creates supplier rents, breaking the main text's mapping from receipts in each source country to upstream labor income.

## B.6 Multiple Inputs and Adaptive Search

We extend the supplier-search problem in Lemma 1 to $G$ material inputs, with one source country for each. The remaining primitives are as in the main text. Let $g = 1,\ldots,G$ index inputs and let $\alpha_g > 0$ denote input $g$'s Cobb–Douglas share, where $\sum_{g=1}^G \alpha_g = 1-\alpha$. Adding the input index to the business blueprint gives $\boldsymbol{\epsilon}_f = (\epsilon_{fgn})_{g,n}$. If $n_g$ is the source country for input $g$, production and operating profit become

$$y_f = z_f\left(\frac{\ell_f}{\alpha}\right)^{\alpha}\prod_{g=1}^{G}\left(\frac{\epsilon_{fgn_g}x_{fg}}{\alpha_g}\right)^{\alpha_g},$$

$$\widetilde{\pi}_f = \mathcal{D}z_f^{\sigma-1}\prod_{g=1}^{G}\left(\frac{\epsilon_{fgn_g}}{p_{fgn_g}^M}\right)^{\alpha_g(\sigma-1)}.$$

Here $p_{fgn}^M$ is the price of input $g$ from country $n$, and $\mathcal{D}$ collects terms common across firms and source choices.

Supplier prices retain the independent distributions in the main text, while a draw for input $g$ from country $n$ costs $P\kappa_{ong}$. After observing its input–country fits and choosing one source per input, the firm commits to the entire vector of reservation cutoffs before observing any supplier draws. To ensure interior search for every input whenever entrepreneurship is preferred, replace

the main-text search-cost bound with

$$0 < P\kappa_{ong} < \frac{\alpha_g(\sigma-1)}{\theta-(1-\alpha)(\sigma-1)}\frac{1}{T_o}\frac{(1-\tau^w)w}{1-\tau^e}, \qquad \text{for every } o,n,g.$$

For an interior solution, the cutoff conditions are

$$P\kappa_{on_gg}\left(P^M_{n_g}/\bar{p}^M_{fon_gg}\right)^\theta = \frac{\alpha_g(\sigma-1)}{\theta}\,\mathbb{E}_p[\widetilde{\pi}_f \mid \boldsymbol{\epsilon}_f, z_f, o], \qquad g=1,\dots,G.$$

Summing across inputs gives

$$\mathbb{E}_p[\pi_f \mid \boldsymbol{\epsilon}_f, z_f, o] = \left[1-\frac{(1-\alpha)(\sigma-1)}{\theta}\right]\mathbb{E}_p[\widetilde{\pi}_f \mid \boldsymbol{\epsilon}_f, z_f, o].$$

The objective is strictly concave in expected draw counts. Under the bound above, any net profit implied by this system that exceeds the occupational cutoff in (B9) puts every reservation price below $P^M_{n_g}$. Its optimum is therefore feasible for every source vector capable of inducing entrepreneurship. The parameter restriction $\theta > (1-\alpha)(\sigma-1)$ and aggregate search-cost share are therefore the same as in the one-input model. Solving the cutoff system gives

$$\mathbb{E}_p[\pi_f \mid \boldsymbol{\epsilon}_f, z_f, o] \propto z_f^\chi \prod_{g=1}^{G}\left(\frac{\epsilon_{fgn_g}}{P^M_{n_g}}\kappa_{on_gg}^{-1/\theta}\right)^{\frac{\theta\alpha_g(\sigma-1)}{\theta-(1-\alpha)(\sigma-1)}}.$$

Here $\chi$ is the entrepreneurial-productivity exponent from the main text. The omitted factor is common across source choices.

Because this expression is a product of positive input-specific terms, source choice among entrepreneurs separates by input:

$$n^*_{fg} \in \arg\max_{n\in N}\frac{\epsilon_{fgn}}{P^M_n}\kappa_{ong}^{-1/\theta}.$$

With independent unit-scale Fréchet fits of shape $\eta$, input $g$'s source share is therefore

$$\omega_{ong} = \frac{(P^M_n)^{-\eta}\kappa_{ong}^{-\eta/\theta}}{\sum_{q\in N}(P^M_q)^{-\eta}\kappa_{oqg}^{-\eta/\theta}}.$$

The winning source label is independent of the winning value. Independence across inputs therefore makes these shares invariant to selection into entrepreneurship. The source-odds inversion and unit-value comparison in the main text continue to apply input by input.

Cobb–Douglas inputs are complements: a good match for one input raises the return to improving the others. Without commitment, search requires a Bellman problem with the vector of best matches as its state and a choice of which input to search next. This state-contingent inter-

action is related to the sourcing complementarities in Antràs et al. (2017). Commitment preserves the ex ante complementarity among inputs but rules out this adaptive-search response.

# C Quantification and Counterfactual Accounting

This appendix gives the details of the quantification in Section 4. We construct founder-origin source shares and recover supplier access, entrepreneurial productivity, and occupational shifters conditional on the common Pareto shapes. The profit-to-wage and unit-value dispersion restrictions then determine those shapes. We then quantify the extensions that allow residence and foreign prices to respond, followed by fixed sourcing costs. The final subsection describes counterfactual accounting and computation.

## C.1 Founder-origin source shares

The U.S. calibration combines the 2022 founder-origin moments in Appendix Table A.8 with aggregate expenditure in the OECD ICIO. We use the firm, founder, and trade definitions in Section 2 and the country grouping in Appendix Table A.4. Throughout this section, $o$ denotes founder origin, $n$ denotes the source country, and $i$ denotes the residence country.

Importer participation $\Pr(\text{import} \mid o)$ measures the fraction of active founder firms that import. Conditional foreign-source shares $\widetilde{\omega}_{on}$ distribute each origin's foreign customs value across sources. The model shares $\omega_{on}$ instead describe total material spending, including domestic purchases. We reconcile these objects by preserving relative sourcing odds across founder origins and matching aggregate expenditure to the ICIO.

Founder-employment shares $\lambda_o^E$ supply the aggregation weights. With common markups, factor shares, and wages, employment is proportional to downstream value added and material spending. We therefore use $\lambda_o^{VA} = \lambda_o^E$, as in the main text. Customs values determine the foreign sourcing pattern within each origin; employment determines each origin's weight in aggregate spending.

**Population and other inputs.** The resident masses $L_o$ are the 2022 one-year ACS civilian labor force ages 18–64 by birthplace, with U.S. territories included in the United States. The model's entrepreneurship rates combine Census firm shares with these ACS labor-force masses and an aggregate employer-rate anchor. Let $f_o$ denote origin $o$'s share of firms and $\bar{p}^e$ the World Bank's 2022 U.S. employer share of total employment, $2.42\%$. Applying this rate to the model's labor-force population, we set

$$\Pr(e \mid o) = \bar{p}^e \frac{f_o}{L_o / \sum_{k \in N} L_k}. \tag{C1}$$

This matches both the aggregate rate and the founder-origin composition of firms. Appendix Table A.8 reports these imputed rates alongside the descriptive person-level founder probabilities. We take $\eta$ from the tariff estimates in Table 6; Table 5 gives the remaining scalar inputs and their sources. The baseline tariff factors and ICIO expenditure targets are constructed below.

### C.1.1 ICIO expenditure targets

We use the 2022 table from the 2025 edition of the OECD Inter-Country Input-Output (ICIO) database to measure where countries buy their materials and how much downstream expenditure goes to those purchases. The source shares, including domestic purchases, provide the aggregate targets for the founder-origin sourcing shares $(\omega_{on})_{(o,n)\in N^2}$. The material spending share helps determine the material share in production $1-\alpha_i$. We construct both measures from the same set of purchases. Throughout this subsection, $i$ indexes the buyer country and $n$ the source country; the U.S. targets set $i = USA$.

**Mapping industries to the model.** As in Caliendo and Parro (2015), we treat goods from agriculture, mining, and manufacturing (ICIO sectors A/B/C) as upstream goods.[8] These are the model's sourceable materials. We count their sales to other industries and to final users, but omit intermediate purchases among A/B/C industries. We interpret downstream production to include distribution and delivery. A/B/C goods recorded as final purchases in the ICIO therefore enter as inputs to downstream firms. Domestic production and distribution services enter the local composite.

Let $Z^0_{nv,ik}$ denote industry $k$'s purchases in country $i$ of intermediate inputs from industry $v$ in country $n$, and let $F^0_{nv,i}$ denote final absorption in $i$ of output from $(n,v)$. The superscript $0$ denotes basic-price flows, which exclude tariffs. Write $\mathcal{K}^M = \{A,B,C\}$ for the sourceable sectors. Industries outside $\mathcal{K}^M$ are the downstream industries.

The model treats purchases from all other sectors as part of the local composite, including purchases that the ICIO records as imports. We therefore assign these purchases to the buyer's country while preserving their total value. For intermediate inputs from sectors $v \notin \mathcal{K}^M$, this gives

$$\widetilde{Z}_{iv,ik} = \sum_{n\in N} Z^0_{nv,ik}, \qquad \widetilde{Z}_{nv,ik} = 0 \quad (n \neq i). \tag{C2}$$

We make the same assignment for non-sourceable final absorption:

$$\widetilde{F}_{iv,i} = \sum_{n\in N} F^0_{nv,i}, \qquad \widetilde{F}_{nv,i} = 0 \quad (n \neq i), \qquad v \notin \mathcal{K}^M. \tag{C3}$$

Final purchases of sourceable goods retain their observed country of origin:

$$\widetilde{F}_{nv,i} = F^0_{nv,i}, \qquad v \in \mathcal{K}^M. \tag{C4}$$

[8] These sectors cover approximately 95% of U.S. merchandise import value in 2017.

Country $i$'s total purchases of materials from $n$, measured before tariffs, are therefore

$$B^0_{ni} \equiv \sum_{v \in \mathcal{K}^M} \left( \sum_{k \notin \mathcal{K}^M} Z^0_{nv,ik} + F^0_{nv,i} \right). \tag{C5}$$

We combine countries not represented separately in the model into Rest of World, as both buyer and source countries. Trade between countries within this group becomes domestic sourcing at basic prices, with a tariff factor of one. We aggregate flows to the model's country groups before calculating source shares.

**Material spending and tariff revenue.** Buyers pay tariffs on imported materials, while suppliers receive the value before tariffs. The difference is tariff revenue. Let $\tau^T_{ni}$ be one plus the baseline tariff rate from source $n$ to buyer country $i$, with $\tau^T_{ii} = 1$. We apply this bilateral tariff factor uniformly to the A/B/C purchases in $B^0_{ni}$. In the model, $X_{in} = \sum_o X_{oin}$ sums material spending across founder origins. The observed spending and producer receipts satisfy

$$X_{in} = \tau^T_{ni} B^0_{ni}, \qquad R_{in} = B^0_{ni} = \frac{X_{in}}{\tau^T_{ni}}. \tag{C6}$$

One dollar of tariff-inclusive material spending therefore generates $1/\tau^T_{ni}$ dollars of producer receipts. This distinction determines tariff revenue and upstream labor income in the country accounts.

Summing across sources gives total material spending $X_i$ and the tariff revenue associated with these purchases $\mathcal{T}^{M,0}_i$:

$$X_i = \sum_{n \in N} X_{in}, \qquad \mathcal{T}^{M,0}_i = \sum_{n \in N} (\tau^T_{ni} - 1) B^0_{ni}. \tag{C7}$$

We construct spending on the local composite from downstream value added, taxes less subsidies, and non-sourceable intermediate purchases. To avoid counting tariffs twice, we subtract the tariff amount already included in material spending:

$$X^{\text{loc}}_i \equiv \sum_{k \notin \mathcal{K}^M} (VA_{ik} + TLS_{ik}) - \mathcal{T}^{M,0}_i + \sum_{k \notin \mathcal{K}^M} \sum_{v \notin \mathcal{K}^M} \sum_{n \in N} \widetilde{Z}_{nv,ik}. \tag{C8}$$

Here $VA_{ik}$ is value added and $TLS_{ik}$ is taxes less subsidies. This adjustment leaves total downstream expenditure unchanged:

$$E_i \equiv X^{\text{loc}}_i + X_i \approx \sum_{k \notin \mathcal{K}^M} GO_{ik} + \sum_{n \in N} \sum_{v \in \mathcal{K}^M} F^0_{nv,i}, \tag{C9}$$

where $GO_{ik}$ is gross output. The approximate equality reflects small accounting residuals in

the published ICIO table.[9] Downstream expenditure thus equals gross output of downstream industries plus final purchases of upstream goods, up to these residuals. We exclude intermediate flows among A/B/C industries and upstream value added from this total.

**Material cost shares and sourcing shares.** Let $m_i$ denote materials' share of downstream expenditure. Because downstream firms charge a markup, this share is smaller than the material share of variable production costs. We adjust it by the model's markup to recover the production exponent $1 - \alpha_i$:

$$m_i \equiv \frac{X_i}{E_i}, \qquad 1 - \alpha_i = \frac{\sigma_i}{\sigma_i - 1} m_i. \tag{C10}$$

Here $\sigma_i$ is the elasticity of substitution across downstream varieties, so $\sigma_i/(\sigma_i - 1)$ is the gross markup.

We also construct each source country's share of total material spending. Including tariffs in both the numerator and denominator, we obtain the source shares used in Section 4:

$$\omega_{in}^{\text{ICIO}} = \frac{X_{in}}{X_i}. \tag{C11}$$

For each buyer country, these shares sum to one across domestic and foreign sources. The U.S. shares anchor the founder-origin sourcing shares to aggregate material spending; the remaining rows describe sourcing by the other model countries.

**Baseline tariffs.** For U.S. trade, we use January 1, 2022 rates from Teti's U.S. Trade War Extension. For imports, we average HS2022 HTS10 tariff lines (version 2025-10) within partner–HS6 cells and weight them by December 2022 Census year-to-date general-import values. We exclude chapters 98 and 99 and retain chapter 27. Matched tariffs cover more than 99.5% of standard-product import value for every model source.

For U.S. exports, we use the extension's bilateral HS2017 rates, including foreign retaliation, weighted by 2021 BACI HS2017 V202401b trade. We split BACI's combined petroleum category using destination-specific product shares from December 2021 Census year-to-date exports, preserving each destination's BACI petroleum total (U.S. Census Bureau, 2021). We require matched products to cover at least 99% of standard-product export value, except for Mexico, where the minimum is 98% and coverage is 98.31%. In both directions, we match individual partners before aggregating to Rest of World, omit unmatched products and renormalize weights, and use the published tariffs without further outlier capping.

For trade involving neither the United States nor Taiwan, we use Teti's 2021 Global Tariff Database, capped at the 95th percentile: the trade-weighted bilateral rate (`tariff95_w`) when available and the simple rate (`tariff95`) otherwise (Teti, 2024). We aggregate partners into Rest

[9] The absolute accounting discrepancy is below $3 \times 10^{-4}\%$ of downstream gross output plus final purchases of upstream goods in every model country, and approximately $1 \times 10^{-7}\%$ in the United States.

of World using 2021 BACI HS92 V202401b trade weights, mapping code 490 to Taiwan. Only partners with tariff data enter these averages; they cover at least 90% of BACI trade value for every Rest-of-World pair.

For Taiwan's trade with countries other than the United States, we use 2021 UNCTAD TRAINS HS6 schedules through WITS, weighted by 2021 BACI product-level trade. We take the lower of the most-favored-nation and confirmed applicable preferential rates, retaining the former when preferential observations are incomplete. Tariffs and weights share the same classification: HS2017 for named destinations except Mexico, whose latest available schedule is from 2018 in HS2012. We match partners before aggregating to Rest of World; matched products cover at least 99% of each pair's trade. Small Rest-of-World shares use earlier schedules or the capped Global Tariff Database rate. We apply no further capping to WITS schedules.

### C.1.2 Reconciling Census sourcing with ICIO expenditure

Reconciliation has two steps. First, a common multiplier on importer odds recovers domestic expenditure shares. Common source-country factors then allocate foreign spending so that every aggregate source share matches the ICIO. As in Section 4, this procedure attributes measurement differences between the Census and ICIO objects to adjustments common across founder origins.

Before reconciliation, we complete disclosure-suppressed entries in $\widetilde{\omega}_{on}$ with the mean among observed founder-origin rows in the same source column, excluding the diagonal row. Rest of World is the residual that makes each foreign row sum to one. The completed matrix has strictly positive entries. Suppressed cells are left blank in Figure 1.

**Domestic expenditure shares.** The common odds multiplier $c > 0$ determines each origin's domestic share:

$$\omega_{oUSA} = \left[1 + c\frac{\Pr(\text{import} \mid o)}{1 - \Pr(\text{import} \mid o)}\right]^{-1}, \qquad \sum_{o \in N} \lambda_o^E \omega_{oUSA} = \omega_{USAUSA}^{\text{ICIO}}. \tag{C12}$$

Because we separately match total material spending relative to downstream gross output, this restriction also matches foreign material spending relative to output. The aggregate domestic share decreases continuously from one to zero as $c$ increases, so an interior ICIO target determines a unique multiplier. Multiplying every origin's importer odds by the same $c$ preserves all pairwise odds ratios.

**Foreign expenditure shares.** Holding domestic shares fixed, the common source factors $g_n > 0$ adjust foreign purchases to match aggregate ICIO spending:

$$\omega_{on} = (1 - \omega_{oUSA})\frac{g_n \widetilde{\omega}_{on}}{\sum_{k \neq USA} g_k \widetilde{\omega}_{ok}}, \qquad n \neq USA. \tag{C13}$$

These factors arise from choosing foreign shares that minimize weighted relative entropy from the completed customs shares:

$$\begin{aligned} \min_{\{\omega_{on}\geq 0\}_{o,\, n\neq USA}} \quad & \sum_{o\in N} \lambda_o^E \sum_{n\neq USA} \omega_{on} \log\left(\frac{\omega_{on}}{(1-\omega_{oUSA})\widetilde{\omega}_{on}}\right) & & \\ \text{subject to} \quad & \sum_{n\neq USA} \omega_{on} = 1-\omega_{oUSA}, & & \forall o, \\ & \sum_{o\in N} \lambda_o^E \omega_{on} = \omega_{USAn}^{\text{ICIO}}, & & \forall n \neq USA. \end{aligned} \tag{C14}$$

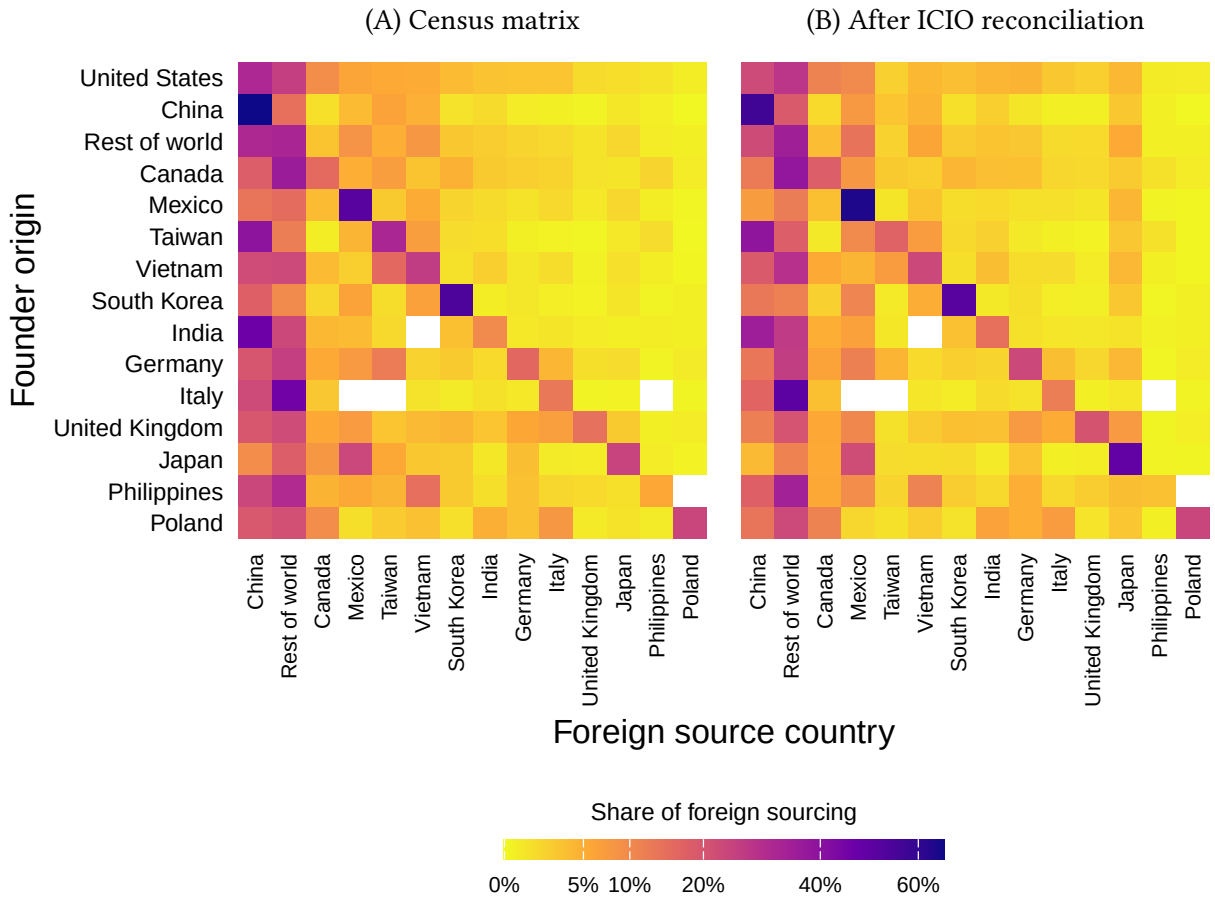
The objective penalizes changes in each origin's conditional foreign-source distribution, weighting origins by foreign spending. Strict convexity and a positive feasible allocation give a unique solution. Its first-order conditions give equation (C13). A common multiplier on all $g_n$ cancels, so one factor can be normalized to one. This is the diagonal-equivalence result in Sinkhorn (1967). For any two origins $o, o'$ and foreign sources $n, k$, the common factors preserve the cross-origin relative odds:

$$\frac{\omega_{on}/\omega_{ok}}{\omega_{o'n}/\omega_{o'k}} = \frac{\widetilde{\omega}_{on}/\widetilde{\omega}_{ok}}{\widetilde{\omega}_{o'n}/\widetilde{\omega}_{o'k}}. \tag{C15}$$

For given $(\eta, \theta)$, equation (15) implies that the original and reconciled shares yield the same $(\kappa_{on}/\kappa_{USAn})/(\kappa_{ok}/\kappa_{USAk})$ for any foreign sources $n, k$. The equalization shocks in equation (27) therefore retain the same ratios $\widehat{\kappa}_{on}/\widehat{\kappa}_{ok}$.

Figure C.1 compares the conditional Census shares with their reconciled counterparts. The before-and-after source shares have a Pearson correlation of 0.95, weighting each origin by its share of foreign spending, proportional to $\lambda_o^E(1-\omega_{oUSA})$, and sources equally within each origin. The adjustment changes common source levels, but the origin–source tilts remain visible because the reconciliation preserves the double odds above.

Figure C.1: Foreign-source shares before and after ICIO reconciliation




*Notes.* Panel A shows each source country's share of a founder group's foreign purchases in the Census data. Panel B shows these shares after adjustment to match aggregate sourcing in the OECD input-output data. Both panels use the same founder-origin and source ordering. Colors use a $(2/3)$-power scale, with higher shares darker, as in Figure 1. Blank entries are disclosure-suppressed and are completed before reconciliation using the method described in the text. The shared legend reports shares in percentage units. The before-and-after shares have a Pearson correlation of 0.95, weighting origins by their shares of foreign spending and sources equally within each origin.

## C.2 Recovering founder-origin heterogeneity

For a candidate $(\theta, \xi)$ and the remaining scalar parameters, source shares recover access; entrepreneurship rates recover entrepreneurship indices; the assumption $T_{USA} = 1$ determines the profit scale; and employment shares recover productivity supports and occupational shifters. The restrictions that select the common Pareto shapes follow this conditional inversion.

### C.2.1 Effective supplier access

For the inversion, we measure access relative to U.S.-born access in the observed economy. We set $\Phi_{USA} = 1$ there and absorb the common access scale into $K$. Source $n$ contributes $\mathcal{A}_{on} \equiv \Phi_o \omega_{on}$

to origin $o$'s total supplier access:

$$\mathcal{A}_{on} \propto (P_n^M)^{-\eta} \kappa_{on}^{-\eta/\theta}, \qquad \Phi_o = \sum_{n \in N} \mathcal{A}_{on}, \qquad \omega_{on} = \frac{\mathcal{A}_{on}}{\Phi_o}, \tag{C16}$$

where the proportionality factor is common across origins and sources and fixes the baseline units. It remains fixed in counterfactuals. To convert access measured as a sum of delivered-cost terms to these native units, divide every access term by baseline native access and multiply $K$ by that same value raised to $\delta$. This leaves $K\Phi_o^\delta$, and hence profits and occupational choices, unchanged. Under $\kappa_{oUSA} = 1$, domestic access $\mathcal{A}_{oUSA}$ is the same for every origin. Since native access sums to one, $\mathcal{A}_{oUSA} = \omega_{USAUSA}$. Hence

$$\Phi_o = \frac{\omega_{USAUSA}}{\omega_{oUSA}}, \qquad \mathcal{A}_{on} = \frac{\omega_{USAUSA}\omega_{on}}{\omega_{oUSA}}, \qquad \frac{\kappa_{on}}{\kappa_{USAn}} = \left( \frac{\omega_{on}/\omega_{oUSA}}{\omega_{USAn}/\omega_{USAUSA}} \right)^{-\theta/\eta}. \tag{C17}$$

The last expression compares founders sourcing from the same country, so common input costs cancel.

### C.2.2 Entrepreneurship rates

Proposition 1 gives the entrepreneurship rate as a strictly increasing function of $x_o$, ranging from zero to one. Its proof is in Appendix B.1.4. Every observed entrepreneurship rate between zero and one therefore determines a unique entrepreneurship index. With the identifying restriction $T_{USA} = 1$ and the native units $z_{USA} = \Phi_{USA} = 1$, the native index fixes the common profit scale:

$$\frac{K}{w} = \frac{1 - \tau^w}{1 - \tau^e} x_{USA}^\delta.$$

### C.2.3 Entrepreneurial profits and founder employment

Appendix B.1.4 derives average entrepreneurial profit per agent in equation (B15) and shows that founder employment is proportional to net profit in equation (B17). We use these results to recover productivity supports from observed founder-employment shares.

Taking ratios across origins cancels the common labor coefficient, $K$, and $\xi/(\xi - \chi)$. Let $s \equiv \xi(1-\alpha)/\eta$ and write the remaining selected-profit term as

$$H(x) \equiv \gamma(1 - \delta, x) + x^{s-\delta}\Gamma(1 - s, x). \tag{C18}$$

With $z_{USA} = \Phi_{USA} = 1$, employment shares then imply

$$z_o^\chi = \frac{\lambda_o^E / L_o}{\lambda_{USA}^E / L_{USA}} \Phi_o^{-\delta} \frac{H(x_{USA})}{H(x_o)}. \tag{C19}$$

The positive right-hand side uniquely determines each productivity support. Taking the ratio of the origin and native entrepreneurship indices in equation (12) cancels the common profit scale and tax terms. Under $T_{USA} = 1$, the occupational shifter is therefore

$$T_o = \frac{(x_o/x_{USA})^{\delta}}{\Phi_o^{\delta} \underline{z}_o^{\chi}}. \tag{C20}$$

The first two relationships in equation (26) use approximations for low entrepreneurship rates. Under $0 < \delta < s < 1$, as $x$ tends to zero, $\Pr(e \mid o) \sim x_o^s \Gamma(1-s)$ and $H(x) \sim x^{s-\delta}\Gamma(1-s)$. Taking ratios across origins gives the displayed entrepreneurship-index and productivity-support approximations. The occupational-shifter expression is exact. The quantification uses the exact functions for entrepreneurship rates and selected profits throughout.

These approximations also characterize average employment per firm, $\bar{\ell}_o$. Under the benchmark's common Pareto shape, wages, and tax rates, dividing employment shares by firm masses gives

$$\frac{\bar{\ell}_o}{\bar{\ell}_{USA}} = \frac{\lambda_o^E/[L_o \Pr(e \mid o)]}{\lambda_{USA}^E/[L_{USA} \Pr(e \mid USA)]} \approx \frac{T_{USA}}{T_o}. \tag{C21}$$

The approximation follows because $H(x_o)/\Pr(e \mid o) \sim x_o^{-\delta}$, so the entrepreneurship index cancels productivity and supplier access from average profits per entrant, leaving a term proportional to $1/T_o$.

## C.3 The aggregate profit-to-wage restriction

The function $R(\theta, \xi)$ is the aggregate profit-to-wage ratio implied by occupational choice, conditional on observed entrepreneurship rates, founder-employment shares, populations, and externally calibrated parameters. The identifying restriction $T_{USA} = 1$ makes after-tax entrepreneurial profits and wage earnings enter native occupational choice symmetrically. Unlike the choices of productivity and access units, this restriction determines the profit threshold for native entrepreneurship. It identifies native profits for each candidate pair without recovering origin-specific $\kappa_{on}$, $\underline{z}_o$, or $T_o$. The native units above give the system

$$\Pr(e \mid USA) = \gamma(1, x_{USA}) + x_{USA}^{\xi(1-\alpha)/\eta} \Gamma\left(1 - \frac{\xi(1-\alpha)}{\eta}, x_{USA}\right), \tag{C22a}$$

$$\frac{\bar{\pi}_{USA}}{w} = \frac{1-\tau^w}{1-\tau^e} x_{USA}^{\delta} \frac{\xi}{\xi - \chi} \left[\gamma(1-\delta, x_{USA}) + x_{USA}^{\xi(1-\alpha)/\eta - \delta} \Gamma\left(1 - \frac{\xi(1-\alpha)}{\eta}, x_{USA}\right)\right], \tag{C22b}$$

$$R(\theta, \xi) = \frac{L_{USA}}{\lambda_{USA}^E} \frac{\bar{\pi}_{USA}/w}{\sum_{o \in N} L_o[1 - \Pr(e \mid o)]}. \tag{C22c}$$

For each $\xi$, equation (C22a) is strictly increasing in $x_{USA}$, so the observed native entrepreneurship rate gives a unique index by numerical inversion. The remaining equations then evaluate $R$.

Equation (B17) makes native founders' employment share equal their share of aggregate profits, which justifies the aggregation in (C22c).

The production-accounting ratio follows from CES markups, factor shares, and search expenditure in equation (B16). Writing $r = (1-\alpha)(\sigma-1)$, we require

$$R(\theta,\xi) = Q(\theta) \equiv \frac{1 - r/\theta}{\alpha(\sigma-1) + \sigma s^{\text{up}}}. \tag{C23}$$

Here $s^{\text{up}} = 0.15$ is U.S. upstream wage income relative to U.S. downstream expenditure. It is constructed by summing tariff-exclusive purchases from U.S. suppliers across destinations using ICIO spending, sourcing shares, tariff wedges, and relative country expenditures as in Appendix C.8. These inputs are fixed in the two-parameter calibration. Thus $Q'(\theta) = r/\{\theta^2[\alpha(\sigma-1)+\sigma s^{\text{up}}]\} > 0$.

**Monotonicity of occupational profits.** Both derivatives of $R$ are negative when the observed entrepreneurship rates are held fixed. To show the result for $\theta$, set $a = \eta/(1-\alpha)$ and let $U, V$ be independent unit-rate exponential draws. The Pareto productivity draw has $\log(z/\underline{z}) = V/\xi$, and the maximized blueprint contribution to log profit is $-\delta \log U$. Under $T_{USA} = 1$, define

$$W_\xi = \log x_{USA} + \frac{a}{\xi} V - \log U.$$

A native chooses entrepreneurship if $W_\xi > 0$, and expected profit relative to the profit threshold is $\exp(\delta W_\xi)$. Holding $\xi$ fixed leaves $x_{USA}$ and the distribution of $W_\xi$ fixed, while $\delta = \theta r/[\eta(\theta - r)]$ strictly decreases with $\theta$. Profits therefore decrease for every entrepreneur, implying $R_\theta < 0$.

For the derivative with respect to $\xi$, hold $\theta$ and hence $\delta$ fixed. Write $t = \chi/\xi$, $B = -\delta \log U$, and $X_t = B + tV$. Let $q_t$ satisfy $\Pr(X_t > q_t) = \Pr(e \mid USA)$, so log profit relative to the profit threshold is $X_t - q_t$. The density of $B$ is strictly log-concave. Consequently the conditional density of $V$, proportional to $\exp(-v) f_B(y - tv)$, has an increasing likelihood ratio in $v$ as $y$ increases, and $m_t(y) \equiv \mathbb{E}[V \mid X_t = y]$ is strictly increasing. Differentiating the condition that fixes the native entrepreneurship rate gives $q_t' = m_t(q_t)$. For every $h > 0$,

$$\frac{d}{dt} \Pr(X_t > q_t + h) = f_{X_t}(q_t + h)[m_t(q_t + h) - m_t(q_t)] > 0.$$

Larger $t$ therefore raises every upper-tail probability of profits relative to the fixed profit threshold, while leaving the native entrepreneurship rate unchanged. Since $t$ decreases with $\xi$, mean profits and $R$ strictly decrease with $\xi$. The maintained restrictions $\delta < 1$ and $\chi < \xi$ ensure finite mean profits.

It follows that, along the admissible solutions to $R(\theta,\xi) = Q(\theta)$,

$$\frac{d\xi}{d\theta} = \frac{Q'(\theta) - R_\theta(\theta,\xi)}{R_\xi(\theta,\xi)} < 0.$$

Each $\theta$ admitting a solution therefore determines a unique $\xi$. Together with the exact unit-value moment, this restriction gives the two nonlinear equations used to determine $(\theta, \xi)$. The numerical Jacobian has full rank at the calibrated solution.

## C.4 Unit-value dispersion

We apply the unit-value result in Appendix B.1.6 to the empirical within-cell variance. This supplies the second restriction on $(\theta, \xi)$, alongside the profit-to-worker-income moment in equation (C23).

**Within-cell unit-value dispersion.** Customs unit values omit duties and international shipping charges. Delivery wedges common within a source change the common input-cost term in equation (B24), which drops out of the variance within founder-origin–source–product cells. For product $g$, the variance formula in Proposition 4 therefore gives

$$\operatorname{Var}(\log UV \mid e, o, n, g) = \frac{1}{\theta^2}\left[1 + s^2_{\pi,o}(\theta, \xi)\right]. \tag{C24}$$

Here $s^2_{\pi,o}(\theta, \xi)$ is the log-profit variance derived in equation (B21).

The number of origin-$o$ entrepreneurs is $L_o \Pr(e \mid o)$. Weighting equation (C24) by each origin's share of firms gives the exact model moment:

$$f_o = \frac{L_o \Pr(e \mid o)}{\sum_{o' \in N} L_{o'} \Pr(e \mid o')}, \qquad \sum_{o \in N} f_o \operatorname{Var}(\log UV \mid e, o, n, g) = \frac{1 + \sum_{o \in N} f_o s^2_{\pi,o}(\theta, \xi)}{\theta^2}. \tag{C25}$$

At the low entrepreneurship rates in the data, Proposition 4 gives the approximation

$$\widehat{\operatorname{Var}}^{\text{Census}}(\log UV_{fngt}) = 0.86 \approx \underbrace{\frac{1}{\theta^2}}_{\text{supplier draws}} + \underbrace{\left(\frac{\chi}{\xi\theta}\right)^2}_{\text{search cutoffs}}. \tag{C26}$$

At the calibrated parameters, the approximate search-cutoff term differs from the exact founder-weighted term by 0.01%.

**Pooling and sensitivity to origin weights.** The empirical moment pools variation within founder-origin–source–product cells. Removing cell means excludes differences in product units, source price levels, and origin-specific mean unit values. The model implies common conditional dispersion across sources within an origin. Pooling across empirical products additionally treats its common tail parameters as an approximation for the selected reference-priced and exchange-traded goods. This construction combines within-cell information while allowing mean unit values to differ across products and markets.

The pooling formula weights each cell's sample variance by its residual degrees of freedom $N_{ong}-1$, accounting for estimation of the cell mean. Its implied origin weights are therefore proportional to $\sum_{n,g}(N_{ong}-1)$. These weights can differ from each origin's share of entrepreneurs because origins differ in import participation, product coverage, and the number of source countries per firm.

The choice of origin weights has little effect on the calibration. At the observed low entrepreneurship rates, the selection variance $s^2_{\pi,o}(\theta,\xi)$ is close to the common term $(\chi/\xi)^2$. Under this approximation, all nonnegative origin weights summing to one give the same model variance. Weights affect the exact moment only through the small origin-specific selection adjustment.

We bound this sensitivity by allowing the origin weights to vary freely. For any nonnegative weights $(\nu_o)_{o\in N}$ summing to one, the weighted selection variance lies between its smallest and largest origin-specific values. A parameter pair can therefore match the empirical variance under some admissible weights if and only if

$$\frac{1+\min_{o\in N} s^2_{\pi,o}(\theta,\xi)}{\theta^2} \;\le\; \widehat{\mathrm{Var}}^{\mathrm{Census}}(\log UV_{fngt}) \;\le\; \frac{1+\max_{o\in N} s^2_{\pi,o}(\theta,\xi)}{\theta^2}.$$

We evaluate these inequalities jointly with the profit-to-worker-income condition, holding the other calibration inputs fixed and recomputing selection at each candidate parameter pair. The largest absolute changes from the main-text estimates are $0.0173\%$ for $\theta$ and $0.0173\%$ for $\xi$. These numerical bounds cover all admissible origin weights.

Releasing additional Census statistics entails disclosure review. Given that the bound above establishes little sensitivity to the weighting choice, we did not seek a separate release of the empirical pooling weights and instead use the founder-count approximation $f_o$.

## C.5 Joint determination of supplier and entrepreneurial dispersion

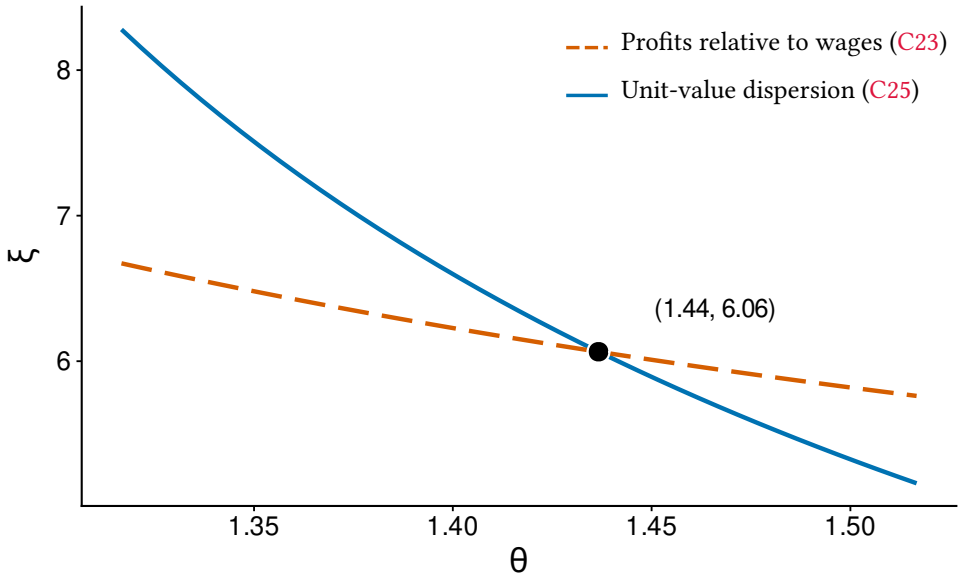
Figure C.2 plots both restrictions in $(\theta,\xi)$ space.

Both curves slope downward. If log supplier prices become less dispersed—a higher $\theta$—matching either moment requires more dispersion in entrepreneurial productivity, or a lower $\xi$. The curves differ in how much additional founder heterogeneity they require.

For the solid curve, equation (C26) gives two reasons. Raising $\theta$ reduces dispersion among supplier draws, $1/\theta^2$. It also reduces the effect of founder productivity on search cutoffs: $\chi/\theta = (\sigma-1)/[\theta-(1-\alpha)(\sigma-1)]$ falls with $\theta$. Both changes narrow unit-value dispersion at a fixed $\xi$, so $\xi$ must fall to restore the observed variance. The curve rises sharply toward the left because supplier draws already use up much of that variance when $\theta$ is low. At $\theta = 1.30$, $1/\theta^2 = 0.59$ of the observed variance of 0.86, leaving only 0.27 for differences in search cutoffs; at $\theta = 1.50$, supplier draws contribute 0.44.

The dashed curve follows equation (C23). Raising $\theta$ weakens the search advantage of productive founders, reducing profits inferred from occupational choice at a fixed $\xi$. At the same time,

Figure C.2: Joint identification of supplier and entrepreneurial dispersion




*Notes.* For each $\theta$, the solid curve gives the $\xi$ that matches the observed within-cell variance of log unit values using equation (C25). The dashed curve gives the $\xi$ that equates the profit-to-wage ratios implied by occupational choice and production accounts in equation (C23). The dot marks their intersection, $(\theta, \xi) = (1.44, 6.06)$.

firms spend a smaller share of operating surplus on search, so the production accounts leave more for profits. Lowering $\xi$ closes this gap: with the native entrepreneurship rate held fixed, a thicker founder tail raises the profits of founders above the profit threshold. This restriction also calls for a lower $\xi$, but by less than the unit-value restriction over the range shown. To the left of the intersection, the $\xi$ that matches profits implies too much unit-value dispersion; to the right, it implies too little. The two restrictions meet at $\theta = 1.44$ and $\xi = 6.06$.

## C.6 Quantifying the Extensions

The extensions in Section 3.6 use the source shares, Pareto shapes, and U.S. moments from Section 4. Foreign entrepreneurship rates and country expenditure accounts identify the additional destination parameters. When people can change where they live, observed residence shares also discipline migration barriers, and we recover productivity supports jointly with residence selection.

### C.6.1 Data and destination parameters

We retain the main text's country grouping. Following Appendix B.3, $o$ denotes birth origin, $i$ residence, and $n$ the source of materials. The main text suppresses the U.S. residence index: for example, $L_{oUSA} = L_o$. The country-specific versions of supplier access $\Phi_o$, the profit scale $K$, and the elasticities $\delta$ and $\chi$ retain their main-text meanings.

When people remain in their initial country, U.S. resident masses are the 2022 ACS labor-force

counts used in the main text. Foreign resident masses combine 2020 population totals from WPP 2024 with the 2020 bilateral birthplace stocks in UN DESA's 2024 International Migrant Stock release. Exercises that allow residence to respond use these WPP–UN DESA masses in every destination, including the United States. We exclude unallocated origins (UN DESA code 2003, Others) and aggregate the remaining counts to the model country groups. The UN counts cover all ages; we do not adjust them to the U.S. labor-force concept. Census firm moments and the economic accounts retain the years used in the main text.

As a comparison, the all-age foreign-born share in the United States is $13.8\%$ in the 2022 ACS and $12.9\%$ in WPP–UN DESA, treating U.S. territories as part of the United States. Both sources rank Mexico, India, and China as the three largest named origins. Among foreign-born residents, their respective shares are $23.1$, $6.1$, and $4.8\%$ in the ACS, compared with $25.5$, $6.3$, and $5.2\%$ in WPP–UN DESA.

For foreign destinations, the entrepreneurship target is the World Bank share of employed people who are employers (World Bank, 2026). We use an ILOSTAT employment-weighted mean for ROW and the DGBAS manpower survey for Taiwan, which the World Bank series does not cover. Each destination contributes one aggregate employer-rate moment because these data do not distinguish birthplace. The measures count employers rather than all self-employed workers, consistent with the Census employer-firm moments. Birthplace groups remain distinct for residence and occupation; we sum their purchases within each foreign destination.

The U.S. source shares are those constructed above. Each foreign destination uses its ICIO sourcing row for every birthplace. Supplier access follows equation (B39), the country-indexed version of the main-text access measure. That equation measures access in delivered-price units. The conversion to U.S.-born access units follows Appendix C.2.1, with the U.S. residence subscript restored.

We retain common $\theta$ and $\xi$ and choose destination elasticities to minimize squared log deviations from the U.S. values $(\eta, \sigma) = (4.49, 3.85)$, subject to the moment and interiority conditions. Let $m_i$ denote the observed share of expenditure on sourceable materials. Preserving this share requires $1 - \alpha_i = \sigma_i m_i/(\sigma_i - 1)$. For our common $\theta$ and $\xi$, the conditions with a 1% buffer give the problem

$$\begin{aligned} \min_{\eta_i, \sigma_i} \quad & \left[\log\left(\frac{\eta_i}{\eta}\right)\right]^2 + \left[\log\left(\frac{\sigma_i}{\sigma}\right)\right]^2 \\ \text{subject to} \quad & \frac{1}{1 - m_i} < \sigma_i \leq \frac{\theta(\xi + 1)}{\theta + 1.01\xi m_i}, \\ & \eta_i \geq \frac{1.01\xi\sigma_i m_i}{\sigma_i - 1}, \qquad \eta_i \geq \frac{\theta\sigma_i m_i}{\theta - 1.01\sigma_i m_i}. \end{aligned}$$

For the U.S. parameters and country accounts used here, this problem has the following closed-

form solution:

$$\begin{aligned} \sigma_i &= \min\left\{\sigma, \frac{\theta(\xi+1)}{\theta+1.01\xi m_i}\right\}, \\ \eta_i &= \max\left\{\eta, \frac{1.01\xi\sigma_i m_i}{\sigma_i-1}, \frac{\theta\sigma_i m_i}{\theta-1.01\sigma_i m_i}\right\}, \\ 1-\alpha_i &= \frac{\sigma_i m_i}{\sigma_i-1}. \end{aligned} \tag{C27}$$

In each destination requiring adjustment, the upper bound on $\sigma_i$ lies below $\sigma$. Raising $\sigma_i$ toward that bound also weakly lowers the required $\eta_i$ toward $\eta$, so both deviations are minimized at the upper bound. Destinations where the U.S. values satisfy the restrictions retain those values. The resulting parameters preserve material expenditure shares and ensure finite unconditional Pareto profit moments. The destination elasticities $\delta_i$ and $\chi_i$ then follow from equation (B40). U.S. parameters remain unchanged. Table C.1 reports the destination elasticities. We use the same destination parameters when residence responds but foreign wages, prices, and expenditure remain fixed. Calibrated parameters remain fixed within each counterfactual.

Table C.1: Source-choice and demand elasticities by destination

| Destination $i$ | Source-choice elasticity $\eta_i$ | Demand elasticity $\sigma_i$ |
|---|---|---|
| United States | 4.49 | 3.85 |
| Canada | 4.49 | 3.84 |
| China | 4.49 | 2.66 |
| Germany | 4.49 | 3.57 |
| United Kingdom | 4.49 | 3.85 |
| India | 4.49 | 2.67 |
| Italy | 4.49 | 3.46 |
| Japan | 4.49 | 3.24 |
| Korea | 4.49 | 3.04 |
| Mexico | 4.49 | 2.86 |
| Philippines | 4.49 | 2.71 |
| Poland | 4.49 | 3.18 |
| Taiwan | 4.49 | 2.88 |
| Vietnam | 5.45 | 2.27 |
| Rest of World | 4.49 | 3.34 |

*Notes.* Exercises in which foreign wages and prices adjust or residence responds use these destination-specific elasticities. Equation (C27) gives the adjustment from the U.S. values $(4.49, 3.85)$, preserving observed material expenditure shares and common $(\theta, \xi)$. Parameters remain fixed within each counterfactual. Rest of World aggregates countries outside the 14 named destinations.

### C.6.2 Holding Residence Unchanged

When people remain in their initial country, the inversion in Section 4 supplies the U.S. entrepreneurship indices and origin productivity supports. The same supports apply in every destination. Write $x_{oi}$ for the main-text entrepreneurship index with country-$i$ parameters. It equals $x_{oi}(\underline{z}_o)$ in the productivity-dependent notation of equation (B41).

In each foreign destination, occupational payoff shifters are common across birth origins:

$$T_{oi} = T_{o'i}, \qquad o, o' \in N, \quad i \neq USA. \tag{C28}$$

Since access is also common across origins within a foreign destination, equation (12) makes $x_{oi}/\underline{z}_o^{\eta_i/(1-\alpha_i)}$ common there. Substituting these indices into equation (11), with the destination parameters, determines that common level from the observed employer rate:

$$\Pr(e \mid i) = \frac{\sum_{o \in N} L_{oi} \Pr(e \mid o, i)}{\sum_{o \in N} L_{oi}} = \frac{\sum_{o \in N} L^e_{oi}}{\sum_{o \in N} L_{oi}}, \qquad i \neq USA. \tag{C29}$$

The country-indexed profit formula in equation (B15) then gives aggregate profits as a function of $K_i$. Matching profits relative to worker income $w_i \sum_{o \in N} L_{oi}^w$ to the country account determines $K_i/w_i$. Rearranging the entrepreneurship index recovers the occupational payoff shifters. In the United States, this reproduces the main text's inversion and the native restriction $T_{USA\,USA} = 1$.

### C.6.3 Allowing Residence to Respond

Under the timing in equation (B38), people observe their Pareto productivity draw and residence tastes before choosing a destination; the business blueprint arrives afterward. The productivity distribution is still the one in equation (4), but it now describes a birth cohort. Residence selection changes the distribution among the people observed in each country. We therefore retain the main text's $\theta$ and $\xi$ and jointly re-estimate productivity supports, migration barriers, and occupational payoff shifters.

UN DESA does not separately report every origin–destination stock. Each origin's residence choices are restricted to destinations with positive population in the constructed baseline, denoted $\mathcal{S}_o$. Of the 225 pairs, 177 are active and 48 are excluded. These sets remain fixed in counterfactuals. Equation (B44) applies with the denominator summed over $j \in \mathcal{S}_o$ and migration elasticity $\varrho = 2$ (Desmet et al., 2018). The residence shares to be matched are

$$\Pr(i \mid o) = \frac{L_{oi}}{\sum_{j \in N} L_{oj}}. \tag{C30}$$

The calibration uses the conditional entrepreneurship probabilities, residence values, and selected resident and profit masses derived in equations (B42)–(B46). The index $x_{oi}$ continues to denote its value at $\underline{z}_o$; $x_{oi}(z_f)$ varies with the realized productivity draw. The calibration targets the active residence shares, origin-specific U.S. entrepreneurship rates, 14 foreign employer rates, U.S. founder-employment shares, and profits relative to worker income. Reconciled U.S. sourcing shares carry over.

Normalize $\underline{z}_{USA} = 1$ and one migration barrier per origin. The joint system contains 14 foreign log productivity supports and 14 foreign occupational shifters, common across origins within each destination as in equation (C28). For each candidate vector, 162 relative migration barriers reproduce the 177 active residence shares after one normalization per origin, and 15 U.S. entrepreneurship indices reproduce the U.S. origin-specific entrepreneurship rates. The birth-cohort mass, denoted $L_{0o}$ as in the model appendix, follows from

$$L_{0o} = \frac{L_{o\,USA}}{\Pr(USA \mid o)}. \tag{C31}$$

The 28 remaining moments match the 14 foreign employer rates in equation (C29) and 14 independent U.S. founder-employment ratios. As in the main-text inversion, common markups

and factor shares make founder employment proportional to profits:

$$\frac{\lambda_o^E}{\lambda_{USA}^E} = \frac{\Pi_{oUSA}}{\Pi_{USAUSA}}. \tag{C32}$$

Profits now follow equation (B46), which integrates over residence selection. The common $K_{USA}$ cancels from these ratios. Changing a productivity support changes residence selection, so all 14 foreign supports must be re-estimated.

When foreign wages and prices remain fixed, the ICIO profit-to-worker-income ratio determines $K_{USA}/w_{USA}$ using

$$\Pi_{USA} = \sum_{o \in N} \Pi_{oUSA}, \qquad \mathcal{W}_{USA} = w_{USA} \sum_{o \in N} L_{oUSA}^w. \tag{C33}$$

When wages and prices adjust abroad, the corresponding account determines $K_i/w_i$ in every destination. Given these scales and the fitted entrepreneurship indices, equation (12), with destination subscripts, recovers the occupational payoff shifters. The U.S.-born shifter is allowed to adjust: with foreign wages and prices fixed, it is $T_{USAUSA} = 1.05$. The restriction $T_{USAUSA} = 1$ applies to the calibration in which people remain in their initial country. The tail shapes remain $\theta = 1.44$ and $\xi = 6.06$; the unit-value variance is not retargeted when residence can respond.

We integrate over the unit-exponential transformation $\xi \log(z_f/\underline{z}_o)$ of each Pareto draw. Doubling the nodes per panel changes the consumption response to equalization of search costs with foreign prices fixed by less than $10^{-4}$ log point, below the $5 \times 10^{-4}$ tolerance.

### C.6.4 Calibrated origin characteristics

Table C.2 reports the origin-specific supplier-access ratios, productivity scales, mean productivity among U.S. residents, and occupational payoff shifters used in the four specifications. The calibrated supplier-access ratios are common to all four specifications. The productivity scales and payoff shifters differ with the timing of the productivity draw. For either timing, allowing foreign wages and prices to adjust leaves these estimates unchanged to the reported precision. Resident means also reflect the equilibrium adjustment during deficit removal.

When people remain in their initial country, productivity is drawn after residence, so its conditional mean is the analytical Pareto moment $\mathbb{E}[z_f \mid o, i = USA] = \xi \underline{z}_o/(\xi - 1)$, which is finite because $\xi > 1$. When residence responds, the corresponding moment at the baseline with balanced trade is

$$\mathbb{E}[z_f \mid o, i = USA] = \frac{\int_{\underline{z}_o}^{\infty} z_f \Pr(USA \mid o, z_f)\, dG_o(z_f)}{\int_{\underline{z}_o}^{\infty} \Pr(USA \mid o, z_f)\, dG_o(z_f)}.$$

We evaluate this expression using the same residence probabilities and quadrature as the corresponding equilibrium. It therefore describes the selected productivity distribution among U.S.

residents, not the unconditional birth-origin distribution.

Table C.2: Origin-specific supplier access, entrepreneurial productivity, and payoff shifters

| | | Foreign wages and prices fixed | | | | | | Foreign wages and prices adjust | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Residence held fixed | | | Residence responds | | | Residence held fixed | | | Residence responds | | |
| Founder origin | $\Phi_o/\Phi_{USA}$ | $\underline{z}_o$ | Mean | $T_o$ | $\underline{z}_o$ | Mean | $T_o$ | $\underline{z}_o$ | Mean | $T_o$ | $\underline{z}_o$ | Mean | $T_o$ |
| U.S.-born | 1.000 | 1.000 | 1.197 | 1.000 | 1.000 | 1.198 | 1.048 | 1.000 | 1.197 | 1.000 | 1.000 | 1.198 | 1.048 |
| Canada | 1.306 | 1.335 | 1.599 | 0.534 | 1.550 | 1.860 | 0.230 | 1.335 | 1.599 | 0.534 | 1.550 | 1.859 | 0.230 |
| China | 1.296 | 1.145 | 1.371 | 1.547 | 1.306 | 1.550 | 0.819 | 1.145 | 1.371 | 1.547 | 1.306 | 1.540 | 0.819 |
| Germany | 1.207 | 1.242 | 1.488 | 0.669 | 1.453 | 1.738 | 0.293 | 1.242 | 1.488 | 0.669 | 1.453 | 1.736 | 0.293 |
| United Kingdom | 1.374 | 1.292 | 1.547 | 0.632 | 0.863 | 1.107 | 1.459 | 1.292 | 1.547 | 0.632 | 0.863 | 1.104 | 1.459 |
| India | 1.008 | 1.180 | 1.413 | 1.066 | 1.377 | 1.639 | 0.477 | 1.180 | 1.413 | 1.066 | 1.377 | 1.638 | 0.477 |
| Italy | 1.288 | 1.390 | 1.664 | 0.620 | 1.487 | 1.786 | 0.411 | 1.390 | 1.664 | 0.620 | 1.487 | 1.784 | 0.411 |
| Japan | 1.473 | 1.239 | 1.484 | 0.721 | 1.262 | 1.543 | 0.421 | 1.239 | 1.484 | 0.721 | 1.262 | 1.542 | 0.421 |
| Korea | 1.257 | 1.238 | 1.482 | 1.398 | 1.340 | 1.632 | 0.732 | 1.238 | 1.482 | 1.398 | 1.340 | 1.623 | 0.732 |
| Mexico | 0.993 | 1.071 | 1.282 | 0.999 | 1.409 | 1.644 | 0.373 | 1.071 | 1.282 | 0.999 | 1.409 | 1.640 | 0.373 |
| Philippines | 0.980 | 1.128 | 1.351 | 0.786 | 1.342 | 1.583 | 0.386 | 1.128 | 1.351 | 0.786 | 1.342 | 1.594 | 0.386 |
| Poland | 1.180 | 1.154 | 1.382 | 1.278 | 1.275 | 1.538 | 0.637 | 1.154 | 1.382 | 1.278 | 1.275 | 1.537 | 0.637 |
| Taiwan | 2.002 | 1.245 | 1.491 | 0.923 | 1.341 | 1.620 | 0.529 | 1.245 | 1.491 | 0.923 | 1.341 | 1.606 | 0.529 |
| Vietnam | 0.989 | 1.161 | 1.390 | 1.426 | 1.329 | 1.561 | 0.847 | 1.161 | 1.390 | 1.426 | 1.329 | 1.535 | 0.847 |
| Rest of World | 1.087 | 1.137 | 1.362 | 0.859 | 1.507 | 1.783 | 0.241 | 1.137 | 1.362 | 0.859 | 1.507 | 1.784 | 0.241 |

*Notes.* $\Phi_o/\Phi_{USA}$ reports calibrated supplier access relative to U.S.-born founders. Under common domestic access, it equals $\omega_{USA\,USA}/\omega_{o\,USA}$ and is identical across the four specifications, which use the same reconciled U.S. source shares before deficit removal. $\underline{z}_o$ is the origin-specific lower support of entrepreneurial productivity. Mean denotes $\mathbb{E}[z_f \mid o, i = USA]$ at the corresponding equilibrium with balanced trade and includes both workers and entrepreneurs. $T_o$ is the payoff shifter for entrepreneurship. We normalize $\underline{z}_{USA} = 1$. When residence is held fixed, $\underline{z}_o$ describes the productivity distribution drawn by U.S. residents. When residence responds, it describes the birth-origin distribution drawn before residence choice. The two equilibrium treatments use the same U.S. primitive inversion for a given residence timing, accounting for the equal $\underline{z}_o$ and $T_o$ entries, to the reported precision. Their selected conditional means can differ because residence probabilities respond to wages and prices. ROW denotes Rest of World.

### C.6.5 Alternative supplier-access assumptions

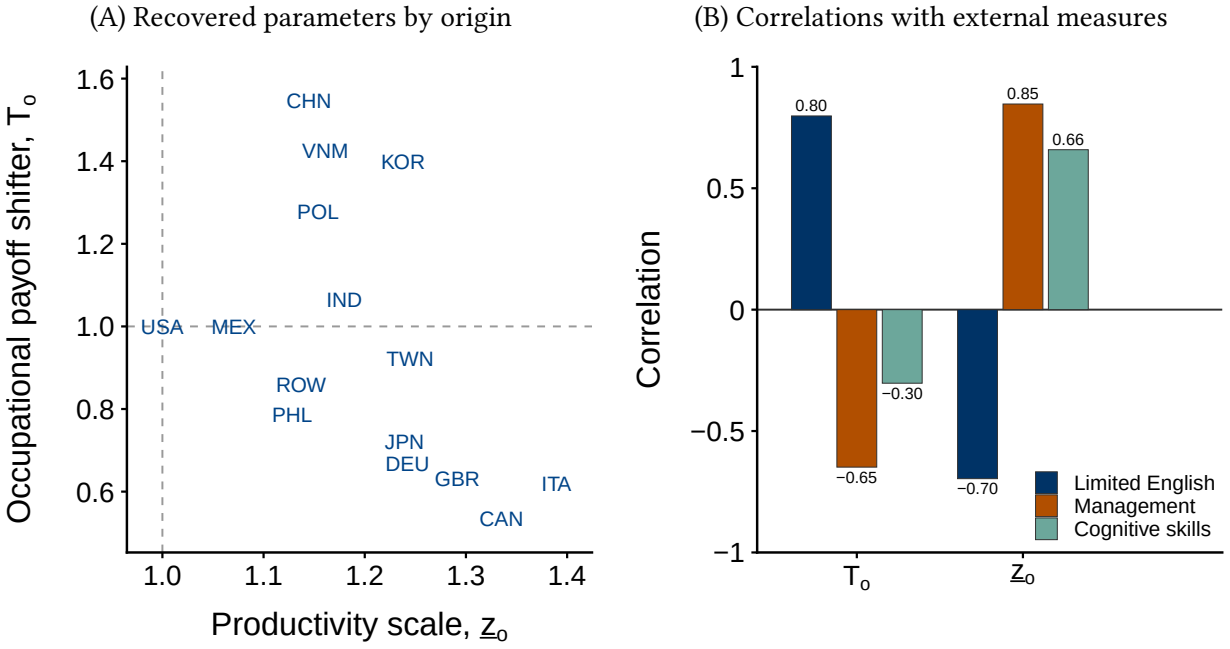
**Domestic search costs.** The first alternative sets immigrant founders' domestic search costs to $\kappa_{o\,USA} = 1.05$ or $1.10$, retaining $\kappa_{USA\,USA} = 1$. Source odds still determine relative search costs through equation (15). We repeat the inversion under the specified domestic costs, recovering productivity supports and occupational and residence shifters as required to match the baseline moments. The scalar parameters and income-tax rates remain at their main-text values.

**Access inferred from entrepreneurship.** The second alternative imposes common productivity supports and occupational payoff shifters across origins. The main-text entrepreneurship index then implies

$$\frac{\Phi_o}{\Phi_{USA}} = \frac{x_o}{x_{USA}}.$$

Thus supplier access accounts for cross-origin differences in the entrepreneurship indices. The common occupational shifter matches aggregate profits relative to worker income. Entrepreneur-

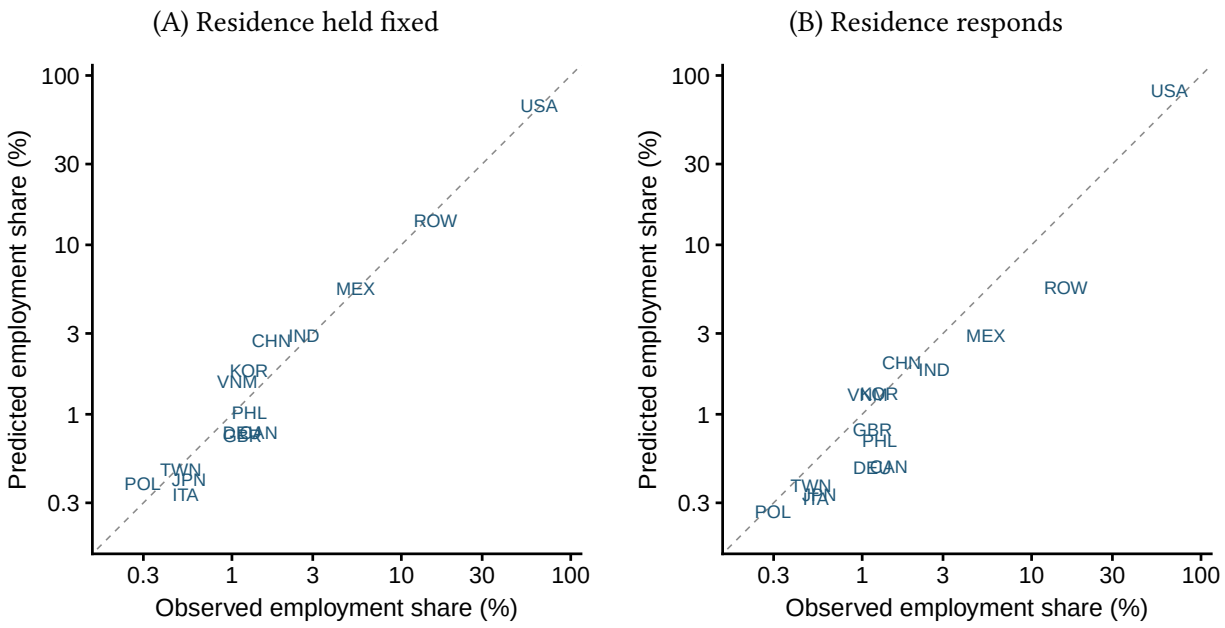
Figure C.3: Entrepreneurial productivity, occupational incentives, and external correlates




*Notes.* Panel A shows the fixed-residence estimates, normalized to one for U.S.-born founders. Panel B reports unweighted correlations with the log parameters across 13 foreign origins, excluding USA and ROW. Measures use survey weights from the 2022 ACS for ages 18–64. Limited English is the labor-force share speaking English less than very well; management is the share of wage employees in management occupations. Cognitive skills average O*NET requirements for critical thinking, complex problem solving, and decision-making across employees' occupations. In levels, the correlations of $T_o$ with limited English, management, and cognitive skills are $0.78$, $-0.61$, and $-0.28$, respectively. The corresponding correlations for $z_o$ are $-0.69$, $0.84$, and $0.64$.

ship rates remain targets, while founder-employment shares are predictions; those predicted shares weight the reconciliation of sourcing patterns with aggregate purchases. The access rule is imposed separately under each residence timing, so inferred access can differ between them. Individual productivity and blueprint heterogeneity remain. The predicted immigrant-founded employment share is $33.4\%$ when residence is unchanged and $18.8\%$ when it responds, compared with $34.9\%$ observed. Figure C.4 compares these untargeted predictions with observed employment shares across founder-origin groups.

Figure C.4: Founder-employment shares with access inferred from entrepreneurship




*Notes.* Observed and predicted employment shares for 15 founder-origin groups under common productivity supports and occupational payoff shifters. Employment shares are untargeted. Correlations between observed and predicted log shares are 0.97 with residence held fixed (Panel A) and 0.96 when residence responds (Panel B). Both axes use logarithmic scales; dashed lines indicate equality.

**Portable search costs.** For Table D.2, we extend the ratios of search costs estimated in the United States to foreign destinations, relative to local natives, retaining equal supplier access to domestic sources. For U.S.-born founders abroad buying from U.S. suppliers, we use the equal-weight geometric mean of the 14 foreign origins' own-country cost ratios, including Rest of World. This ratio is $0.47$. Recalibration preserves the observed trade, entrepreneurship, and demographic targets.

## C.7 Quantification with fixed sourcing costs

We add fixed labor requirements for foreign sourcing to the main model. These costs select firms into sourcing groups and separate source shares in firm counts from shares in material spending. Table A.20 reports the size differences that motivate this extension. Within founding cohorts and industry–location cells in the same year, immigrant-founded firms importing only

from their founder's country of origin are about $36\%$ smaller than U.S.-born one-country importers. Those importing only from other countries are about $3\%$ smaller, and the nonimporter gap is also small.[10]

We use the Census and ICIO inputs from Section 4, together with four firm-size contrasts, to quantify the extension. People remain in their initial country. Appendix D.3 reports the resulting counterfactuals.

### Sourcing choices and fixed costs

We group source countries into domestic, founder-origin, and other-foreign alternatives. Search within a country is unchanged.

For a named immigrant founder of origin $o \notin \{USA, ROW\}$, partition the feasible sources into

$$\mathcal{N}_o^D = \{USA\}, \qquad \mathcal{N}_o^O = \{o\}, \qquad \mathcal{N}_o^B = N \setminus \{USA, o\}, \qquad \mathcal{M}_o = \{D, O, B\}, \tag{C34}$$

where $D$, $O$, and $B$ index domestic, founder-origin, and other-foreign sourcing. Each firm continues to choose one source country. U.S.-born founders and the residual foreign-born group have two alternatives, $\mathcal{M}_o = \{D, B\}$, with

$$\mathcal{N}_o^D = \{USA\}, \qquad \mathcal{N}_o^B = N \setminus \{USA\}.$$

For either partition, define access within sourcing group $m$ by

$$\Phi_o^m \equiv \sum_{n \in \mathcal{N}_o^m} (P_n^M)^{-\eta} \kappa_{on}^{-\eta/\theta}, \qquad \sum_{m \in \mathcal{M}_o} \Phi_o^m = \Phi_o. \tag{C35}$$

Let $q_o^m$ be the labor required to use sourcing group $m$ and $F_o^m = w q_o^m$ its monetary cost. This requirement depends on founder origin and sourcing group, but not on the individual founder's productivity. Domestic sourcing has no fixed cost, $q_o^D = 0$, and there is no common operating requirement. Foreign economies retain zero fixed sourcing costs.

As in Section 3.3, the prospective founder observes productivity and the entire vector of blueprint–source fits, compares the best opportunity in each sourcing group net of its fixed cost, and chooses between wage work and entrepreneurship. Conditional on choosing entrepreneurship, the founder pays the fixed cost of the winning sourcing group, searches for a supplier in the winning country, and produces.

The supplier-search problem and its expected profit in equation (8) are unchanged. We retain $\pi_{fon}$ for profit after supplier search but before the fixed sourcing cost, which we call variable

[10] Relatedly, Kerr and Kerr (2020) find that immigrant-founded firms tend to have fewer employees than native-founded firms conditional on industry, location, and owner characteristics, with no statistically significant size gap in high-tech sectors.

profit. Net profit also subtracts $F_o^m$. Since this cost is the same for every country in group $m$, expected net profit is

$$\mathbb{E}_p[\pi_f \mid \boldsymbol{\epsilon}_f, z_f, o] = \max_{m \in \mathcal{M}_o} \left\{ \max_{n \in \mathcal{N}_o^m} \mathbb{E}_p[\pi_{fon} \mid z_f, \epsilon_{fn}, o] - F_o^m \right\}. \tag{C36}$$

The founder chooses entrepreneurship when this profit exceeds the wage-work payoff in equation (B9). With zero fixed costs, the expression reduces to the main text's maximization over all source countries. The fixed cost changes occupation and source choice, but leaves the search rule and accepted-supplier distribution unchanged conditional on a source and blueprint.

Within each group, the best expected variable profit follows the Fréchet distribution in equation (B10), with group access $\Phi_o^m$ replacing total access $\Phi_o$. Blueprint fits are independent across countries and the source sets are disjoint, so these expected profits are independent across groups conditional on productivity. Productivity scales all of the founder's variable-profit opportunities.

**Entrepreneurship, profits, and employment**

Let $\underline{\pi}_o$ denote the wage-equivalent profit threshold in equation (B9). Entrepreneurship requires expected net profit, after both supplier-search and fixed sourcing costs, to exceed this threshold. We write $\mathbb{E}_p[\pi_f]$ for the expected net profit in equation (C36), suppressing its conditioning on productivity and the blueprint.

Let $t \geq \underline{\pi}_o$ be a possible level of expected net profit. Group $m$ must generate variable profit $t + F_o^m$ to deliver that level. The main-text entrepreneurship index therefore becomes

$$x_o^m(t) \equiv \Phi_o^m \left( \frac{K \underline{z}_o^\chi}{t + F_o^m} \right)^{1/\delta}, \qquad x_o(t) \equiv \sum_{m \in \mathcal{M}_o} x_o^m(t). \tag{C37}$$

Evaluating $x_o(t)$ at the profit threshold gives the entrepreneurship rate from equation (B12), with $x_o(\underline{\pi}_o)$ replacing $x_o$. Each observed rate determines a unique value of this total index. At zero fixed costs, $x_o(\underline{\pi}_o)$ reduces to the index in equation (12).

To obtain probabilities and profits for each group, consider $\Pr(e, m, \mathbb{E}_p[\pi_f] \leq t \mid o)$: the probability that an origin-$o$ potential founder becomes an entrepreneur, chooses group $m$, and has expected net profit no greater than $t$. For $t > \underline{\pi}_o$, its differential gives the probability of operating a group-$m$ firm with expected net profit in $[t, t + dt]$. For $m$ to win at $t$, its variable profit must equal $t + F_o^m$, while every other group $k$ earns at most $t + F_o^k$. Differentiating $m$'s profit distribution and multiplying by the probabilities of these other events gives the density conditional on productivity. Integrating over productivity using the Pareto calculation in Appendix B.1.4 gives

$$d\Pr(e,m,\mathbb{E}_p[\pi_f]\le t\mid o)=\frac{\xi}{\chi}\frac{x_o^m(t)}{t+F_o^m}x_o(t)^{\xi(1-\alpha)/\eta-1}\times\Gamma\left(1-\frac{\xi(1-\alpha)}{\eta},x_o(t)\right)dt. \tag{C38}$$

Integrating above the profit threshold gives the probability of operating a group-$m$ firm, denoted by $\Pr(e,m\mid o)$. Let $\bar\pi_o^{\text{var},m}$ be variable profit per potential founder, with zero assigned to all who do not operate a group-$m$ firm. Then

$$\begin{aligned}\Pr(e,m\mid o)&=\int_{\underline{\pi}_o}^{\infty}d\Pr(e,m,\mathbb{E}_p[\pi_f]\le t\mid o)\,,\\ \bar\pi_o^{\text{var},m}&=\int_{\underline{\pi}_o}^{\infty}(t+F_o^m)d\Pr(e,m,\mathbb{E}_p[\pi_f]\le t\mid o)\,.\end{aligned} \tag{C39}$$

The probability in the first line is measured across all potential founders, rather than conditional on operating a firm. Summing it across groups gives $\Pr(e\mid o)$. Firm counts and aggregate variable profits are $|\mathcal{F}_o^m|=L_o\Pr(e,m\mid o)$ and $\Pi_o^{\text{var},m}=L_o\bar\pi_o^{\text{var},m}$. The fixed sourcing wage bill is $X_o^{\text{fix},m}=L_oF_o^m\Pr(e,m\mid o)$, so net entrepreneurial profit, corresponding to $\Pi_o$ in the main text, is $\Pi_o=\sum_m(\Pi_o^{\text{var},m}-X_o^{\text{fix},m})$. Finite expected variable profit requires $\delta<1$ and $\xi>\chi$, as in the main text. The parameters used here satisfy these restrictions.

When all fixed costs are zero, the group-selection density is proportional to $\Phi_o^m$. Summing over groups recovers the main-text profit formula in equation (B15); count and material-spending shares coincide, and the size distribution is the same across groups. A common fixed cost also leaves group choice independent of selected profit, although it raises the variable profit required for entrepreneurship. A single available group gives the corresponding one-group moments, while $F_o^m\to\infty$ makes both $\Pr(e,m\mid o)$ and $\bar\pi_o^{\text{var},m}$ converge to zero.

Production employment follows equation (B17), evaluated at profit before the fixed sourcing cost. Adding fixed sourcing labor gives mean total employment among group-$m$ founders:

$$\mathbb{E}[\ell_f+q_o^m\mid e,m,o]=\frac{\alpha(\sigma-1)}{w(1-r/\theta)}\frac{\bar\pi_o^{\text{var},m}}{\Pr(e,m\mid o)}+q_o^m,\qquad r=(1-\alpha)(\sigma-1). \tag{C40}$$

The profit ratio is mean variable profit among operating group-$m$ firms. Weighting employment by $\Pr(e,m\mid o)$ and summing across groups gives employment per potential founder.

**Selection and firm size.** Fixed costs generate firm-size selection across sourcing groups. For any two available alternatives $m$ and $k$, equation (C38) implies

$$\frac{d\Pr(e,m,\mathbb{E}_p[\pi_f]\le t\mid o)}{d\Pr(e,k,\mathbb{E}_p[\pi_f]\le t\mid o)}=\frac{\Phi_o^m}{\Phi_o^k}\left(\frac{t+F_o^k}{t+F_o^m}\right)^{1+1/\delta}. \tag{C41}$$

If $F_o^m > F_o^k$, this likelihood ratio rises with $t$. Firms paying the higher sourcing cost therefore have higher net payoffs and still higher variable profits when they select that alternative. The result does not require alternative $m$ to have higher expected variable profit in isolation, so the empirical size contrasts can discipline cost differences without assuming their signs.

The size comparisons use mean log total employment. The accepted-supplier distribution in Appendix B.1.6 makes $u = (p_f^M/\bar{p}_{fon}^M)^\theta$ uniform on $(0,1)$. Conditional on group $m$ and expected net profit $t$, gross operating profit before search and fixed sourcing costs is $(t + F_o^m)u^{-r/\theta}$. Multiplying by $\alpha(\sigma-1)/w$ gives production employment; adding $q_o^m$ gives total employment. Averaging its logarithm yields

$$\begin{aligned}&\mathbb{E}[\log(\ell_f + q_o^m) \mid e, m, o] \\ &\quad = \frac{1}{\Pr(e, m \mid o)} \int_{\underline{\pi}_o}^{\infty} \left\{ \int_0^1 \log\left[ \frac{\alpha(\sigma-1)}{w}(t + F_o^m)u^{-r/\theta} + q_o^m \right] du \right\} \\ &\qquad \times d\Pr(e, m, \mathbb{E}_p[\pi_f] \le t \mid o)\,.\end{aligned} \tag{C42}$$

The integral averages over sourcing-group selection and supplier draws. Dividing by $\Pr(e, m \mid o)$ conditions the mean on operating a group-$m$ firm.

### Calibration

We retain the main-text estimates $\theta = 1.44$ and $\xi = 6.06$ at their unrounded values, the source-choice elasticity $\eta = 4.49$ estimated from the 2018 tariff variation, and the elasticity of substitution $\sigma = 3.85$. The ICIO production shares, tax rates, 2022 origin populations, and tariff baseline also remain as in the main text; Table 5 records their values and sources.

The additional parameters are three sourcing-cost coefficients $(f_O, f_B^I, f_B^N)$, a common immigrant productivity level $a_I$, and a participation-odds multiplier $c$. The first four are chosen jointly using the firm-size contrasts. The odds adjustment reconciles participation with ICIO's domestic material spending share.

**Cost coefficients and productivity normalization.** At the observed calibration baseline, we parameterize the physical labor requirements for named immigrant founders as

$$\begin{aligned} q_o^D &= 0, \\ q_o^O &= f_O \frac{K}{w}\Gamma(1-\delta)\underline{z}_o^\chi, \quad f_O \ge 0, \\ q_o^B &= f_B^I \frac{K}{w}\Gamma(1-\delta)\underline{z}_o^\chi, \quad f_B^I \ge 0. \end{aligned} \tag{C43}$$

U.S.-born founders have $q_{USA}^D = 0$ and

$$q_{USA}^B = f_B^N \frac{K}{w}\Gamma(1-\delta)\underline{z}_{USA}^\chi, \qquad f_B^N \ge 0.$$

The residual foreign-born U.S. group uses the same $B$ cost coefficient as other immigrant origins and has no separate $O$ alternative. The three coefficients are nonnegative; we impose no ordering on them or on variable-profit scales across sourcing groups. The coefficients in equation (C43) are dimensionless. They scale fixed labor requirements by origin productivity at the observed baseline; $q_o^m$ does not vary with an individual firm's realized productivity. Counterfactual monetary costs follow $F_o^{m\prime} = \widehat{w}\widehat{q}_o^m F_o^m$.

As in the main text, we normalize native productivity to $\underline{z}_{USA} = 1$. Let $\mathcal{I} = N \setminus \{USA\}$ denote immigrant origins, including the residual foreign-born group, and let $\widetilde{\lambda}_o^E$ be origin $o$'s observed employment share conditional on immigrant-founded employment. We separate each immigrant productivity support into a common level and an origin component:

$$\underline{z}_o = a_I \widetilde{z}_o, \qquad o \in \mathcal{I}, \qquad \sum_{o \in \mathcal{I}} \widetilde{\lambda}_o^E \log \widetilde{z}_o = 0. \tag{C44}$$

Under this normalization, $a_I$ is the geometric mean of immigrant productivity supports, weighted by conditional founder employment. A change in $a_I$ shifts all immigrant productivity levels together relative to natives and preserves both their relative supports and the Pareto shape $\xi$.

**Firm-size targets.** The current-employment regression in (A20) supplies four size contrasts. Using the import coefficients $\widehat{\beta}_j^M$, the empirical contrasts are

$$\begin{aligned}
\Delta_{O-D}^{\text{data}} &= \widehat{\beta}_2^M + \widehat{\beta}_3^M, \\
\Delta_{B-O}^{\text{data}} &= \widehat{\beta}_4^M - \widehat{\beta}_3^M, \\
\Delta_{N_B-I_B}^{\text{data}} &= (\widehat{\beta}_5^M + \widehat{\beta}_6^M) - (\widehat{\beta}_1^M + \widehat{\beta}_2^M + \widehat{\beta}_4^M), \\
\Delta_{I_D-N_D}^{\text{data}} &= \widehat{\beta}_1^M.
\end{aligned} \tag{C45}$$

We retain the first two contrasts and target zero for the two small immigrant–native gaps. The nonimporter estimate is $-0.049$ (standard error $0.059$) and is statistically indistinguishable from zero. The importer estimate is $0.034$; rejecting zero at the $5\%$ level would require a standard error below $0.0175$.[11]

Write $I$ for immigrant founders and $o(f)$ for firm $f$'s founder origin, as in the main text. The model counterparts use mean log employment from equation (C42). Pooling across immigrant origins uses firm-count weights:

$$\mathbb{E}[\log(\ell_f + q_{o(f)}^m) \mid e, m, I] \equiv \frac{\sum_{o \in \mathcal{I}} |\mathcal{F}_o^m| \mathbb{E}[\log(\ell_f + q_o^m) \mid e, m, o]}{\sum_{o \in \mathcal{I}} |\mathcal{F}_o^m|}, \qquad m \in \{D, O, B\}.$$

[11] The coefficient covariance matrix is unavailable. Ignoring covariance yields a standard error of $0.107$, so rejection would require covariances that sharply reduce the contrast's variance.

The $O$ average includes only origins with that sourcing alternative. Then

$$\begin{aligned}
\Delta^{\text{model}}_{O-D} &= \mathbb{E}[\log(\ell_f + q^O_{o(f)}) \mid e, O, I] - \mathbb{E}[\log \ell_f \mid e, D, I],\\
\Delta^{\text{model}}_{B-O} &= \mathbb{E}[\log(\ell_f + q^B_{o(f)}) \mid e, B, I] - \mathbb{E}[\log(\ell_f + q^O_{o(f)}) \mid e, O, I],\\
\Delta^{\text{model}}_{N_B-I_B} &= \mathbb{E}[\log(\ell_f + q^B_{USA}) \mid e, B, USA] - \mathbb{E}[\log(\ell_f + q^B_{o(f)}) \mid e, B, I],\\
\Delta^{\text{model}}_{I_D-N_D} &= \mathbb{E}[\log \ell_f \mid e, D, I] - \mathbb{E}[\log \ell_f \mid e, D, USA].
\end{aligned}$$

We match these differences to the four calibration targets. Immigrant-founded $D$ firms map to nonimporters, $O$ firms to origin-only importers, and $B$ firms to non-origin-only importers. Native $B$ firms map to native-founded one-country importers.

We jointly choose $(f_O, f^I_B, f^N_B, a_I)$ to match the four targets. The importer comparisons identify sourcing costs through selection and fixed labor: higher costs select firms with larger variable profits and add labor to measured employment. The nonimporter comparison identifies $a_I$, since domestic firms pay no fixed sourcing cost. We estimate these parameters jointly because costs also affect selection into domestic sourcing.

**Participation and source shares.** We combine Census importer participation and conditional foreign customs values with aggregate ICIO material spending, as in Section 4. Fixed costs change the mapping from participation to material spending: importers and nonimporters have different selected mean spending. They also change the material-spending weights used to aggregate across founder origins.

Within a sourcing group, the identity of the winning country is independent of the winning blueprint value. Its conditional share $\omega^m_{on} \equiv \Pr(n \mid e, m, o)$ therefore follows equation (14), with the source set restricted to $\mathcal{N}^m_o$ and total access replaced by $\Phi^m_o$. This is both the country share of firms and the country share of material spending conditional on group $m$. Across groups, fixed-cost selection separates counts from values. For $n \in \mathcal{N}^m_o$, the count and material-spending shares among entrepreneurs are

$$\omega^C_{on} = \frac{|\mathcal{F}^m_o|}{\sum_{k\in\mathcal{M}_o}|\mathcal{F}^k_o|}\omega^m_{on}, \qquad \omega^V_{on} = \frac{\Pi^{\text{var},m}_o}{\sum_{k\in\mathcal{M}_o}\Pi^{\text{var},k}_o}\omega^m_{on}. \tag{C46}$$

Fixed labor also changes the weights used to aggregate source shares. An origin's material spending is proportional to its variable profit, while its employment includes fixed sourcing labor. We therefore use

$$\lambda^M_o = \frac{\sum_m \Pi^{\text{var},m}_o}{\sum_{k\in N}\sum_m \Pi^{\text{var},m}_k}.$$

These weights are generated within the calibration; setting them equal to observed founder-employment shares would count fixed sourcing labor as material spending. Without fixed labor, these weights coincide with the employment weights in the main text.

The model-implied domestic material spending share combines importer participation with

average profit before fixed costs among importers and nonimporters:

$$\omega_o^{V,D} = \left[1 + \frac{\sum_{m \neq D} \Pr(e, m \mid o)}{\Pr(e, D \mid o)} \frac{\sum_{m \neq D} \bar{\pi}_o^{\text{var},m} / \sum_{m \neq D} \Pr(e, m \mid o)}{\bar{\pi}_o^{\text{var},D} / \Pr(e, D \mid o)}\right]^{-1}. \tag{C47}$$

The first ratio is importer participation odds. The second compares mean profit before fixed costs, which is proportional to material spending, per importer and nonimporter. Thus supplying participation probabilities still leaves the model to predict material-spending shares.

We reconcile the participation inputs with ICIO using one common shift in log odds. As in the main text, $\Pr(\text{import} \mid o)$ denotes the Census participation input. The adjusted target, denoted by a tilde, is

$$\widetilde{\Pr}(\text{import} \mid o) = \frac{c \Pr(\text{import} \mid o)}{1 - \Pr(\text{import} \mid o) + c \Pr(\text{import} \mid o)}, \qquad c > 0. \tag{C48}$$

Every pairwise participation odds ratio is preserved. We choose $c$ jointly with the model parameters so that the domestic shares in equation (C47) satisfy $\sum_{o \in N} \lambda_o^M \omega_o^{V,D} = \omega_{USA\,USA}^{\text{ICIO}}$. The calibration therefore targets the adjusted participation rates rather than the absolute Census rates.

Conditional foreign customs values are value rather than count data. For a named foreign origin, the diagonal of the conditional foreign matrix identifies

$$\frac{\Pi_o^{\text{var},O} / \tau_{oUSA}^T}{\Pi_o^{\text{var},O} / \tau_{oUSA}^T + \Pi_o^{\text{var},B} \sum_{n \in \mathcal{N}_o^B} \omega_{on}^B / \tau_{nUSA}^T}.$$

Dividing source-specific spending by its tariff factor removes duties. The normalized off-diagonal entries supply geography within $B$; their model counterparts apply the same tariff adjustment to the within-group source shares. ICIO supplies aggregate foreign-source geography through the sourcing construction in Appendix C.1.1.

We apply common source factors within $B$ to match ICIO foreign-source geography, keeping each origin's observed $O/(O+B)$ customs-value share fixed.

**Access and relative productivity.** As in the main text, we set $\kappa_{oUSA} = 1$ for every origin. For candidate sourcing-cost coefficients and participation shift $c$, we jointly recover each origin's sourcing-group access and occupational cutoff in units of $K \underline{z}_o^\chi$. The targets are its entrepreneurship rate, adjusted importer probability, and, for named immigrant origins, the founder-origin share of foreign spending. Fixed-cost selection therefore enters the access inversion through both participation and spending per firm.

For $n \in \mathcal{N}_o^m$, define the recovered source-specific access component by $\mathcal{A}_{on} = \Phi_o^m \omega_{on}^m$. This is source $n$'s contribution to total access, as defined above. Common input costs cancel in the

comparison across founder origins, as in the main text:

$$\frac{\kappa_{on}}{\kappa_{USAn}} = \left(\frac{\mathcal{A}_{on}}{\mathcal{A}_{USAn}}\right)^{-\theta/\eta}.$$

Participation and spending identify relative search costs after accounting for selection. The counterfactual equalizes foreign search costs. The fixed labor requirements for foreign sourcing remain separate from costs per draw.

Conditional employment shares recover relative productivity across immigrant origins. Write $e_o$ for expected production plus fixed sourcing employment per potential founder in units of $(K/w)\underline{z}_o^{\chi}$, evaluated at the candidate costs, access, and occupational cutoff. Relative employment gives

$$\left(\frac{\widetilde{z}_o}{\widetilde{z}_k}\right)^{\chi} = \frac{\widetilde{\lambda}_o^E}{\widetilde{\lambda}_k^E}\frac{L_k e_k}{L_o e_o}, \qquad o, k \in \mathcal{I}.$$

As in the main text, the inversion adjusts employment for population, supplier access, and occupational selection. Here employment also includes fixed sourcing labor. These comparisons determine the relative supports under the normalization in (C44).

The size contrasts determine the common level $a_I$. The aggregate employment share of immigrant-founded firms is untargeted.

**Income accounting.** The national accounts determine the common profit scale. Let $s^{\text{var}} = [1-(1-\alpha)(\sigma-1)/\theta]/\sigma$ be variable profit per unit of downstream expenditure and let $s^{w,0}$ be production and upstream wage payments per unit of downstream expenditure, excluding fixed sourcing labor. Using worker supply $L_o^w = L_o[1-\Pr(e \mid o)]$, the accounts require

$$\sum_{o\in N}\sum_m \Pi_o^{\text{var},m} = s^{\text{var}}E, \qquad w\sum_{o\in N} L_o^w = s^{w,0}E + \sum_{o\in N}\sum_m X_o^{\text{fix},m}.$$

These identities recover $K/w$ after paying fixed sourcing labor. The occupational cutoff then recovers $T_o$ for every origin through equation (B9). In the main text, the native occupational shifter is set to one as an identifying restriction, and the income accounts help identify $\theta$ and $\xi$. Here we retain those shapes and re-estimate the native shifter so the accounts and entrepreneurship rates remain fitted with fixed labor.

### Untargeted unit-value dispersion

Unit-value dispersion is an untargeted implication of the added sourcing selection. The search rule and accepted-supplier distribution are unchanged conditional on a source and blueprint. The cutoff–profit relation (B24) and variance decomposition (C24) therefore continue to apply, with selected moments conditioned on sourcing group $m$ and expected profit measured before its fixed cost, $\mathbb{E}_p[\pi_f] + F_o^m$.

The required log-profit moments use the probability differential in equation (C38). Integrating $\log(t + F_o^m)$ and its square for $t \geq \underline{\pi}_o$, then dividing each integral by $\Pr(e, m \mid o)$, gives the first and second moments among entrepreneurs choosing group $m$. The variance subtracts the squared mean. These moments account for productivity and blueprint selection jointly; the closed-form moments without fixed costs do not apply to this group-selected distribution.

Selection makes the origin component $B_o$, averaged over productivity, specific to the sourcing group. Within a group, selection shifts mean log unit values by the same amount across source countries, preserving the source-relative comparison of search costs. Comparing $O$ with $B$ also reflects their different selected mean log profits. Firms selected into a more costly alternative search more intensively, partly offsetting their access disadvantage through a lower reservation price.

The empirical variance and founder-count weights are defined in Appendix C.4. We evaluate equation (C24) using the group-specific log-profit variances and aggregate the available origin–sourcing-group implications with the corresponding public founder-count weights. The supplier-draw component remains $1/\theta^2$.

### Computation and fit

For candidate values of $(f_O, f_B^I, f_B^N, a_I, c)$, we jointly recover group access and occupational cutoffs, then relative productivity supports and occupational shifters. We update the five parameters to match the four size targets and the ICIO domestic material spending share, adjusting common source-country factors within $B$ to match ICIO foreign material spending shares throughout. We integrate productivity analytically and use quadrature over net profit.

The implied immigrant employment share $h$ provides an equivalent parameterization of $a_I$:

$$\frac{h}{1-h} = a_I^{\chi} \frac{\sum_{o \in \mathcal{I}} L_o e_o \widetilde{z}_o^{\chi}}{L_{USA} e_{USA}}.$$

Given the relative supports and selected employment, this mapping is strictly increasing in $a_I$. The observed aggregate immigrant employment share is not a calibration target.

Doubling quadrature from 64 to 128 nodes leaves the reported results unchanged at the displayed precision. Three dispersed starting values converge to the same calibration. The Jacobian has full rank, including the five parameters $(f_O, f_B^I, f_B^N, a_I, c)$ that jointly fit the four size targets and the domestic material spending share. These checks establish local identification and numerical stability; they do not establish global uniqueness.

**Calibration fit.** The fitted sourcing coefficients are $(f_O, f_B^I, f_B^N) = (4.82, 7.75, 18.42)$, with no operating cost. Their ordering is estimated rather than imposed. These are the normalized coefficients in equation (C43), not labor units. The U.S.-born foreign-sourcing requirement is $0.455$ labor units per importer; immigrant requirements also reflect their origin productivity supports.

Table C.3: Fixed sourcing costs: calibration fit

| Moment | Data | Target | Model |
|---|---|---|---|
| *Targeted moments* | | | |
| Immigrant origin-only importer minus nonimporter (log points) | 31.22 | 31.22 | 31.22 |
| Immigrant other-foreign importer minus origin-only importer (log points) | 40.83 | 40.83 | 40.83 |
| Native importer minus immigrant other-foreign importer (log points) | 3.44 | 0.00 | 0.00 |
| Immigrant minus native nonimporter (log points) | −4.91 | 0.00 | 0.00 |
| Domestic material spending share (%) | 73.27 | 73.27 | 73.27 |
| *Untargeted moments* | | | |
| Immigrant-founded employment share (%) | 34.93 | — | 34.42 |
| Within-cell log-unit-value variance | 0.864 | — | 0.931 |

*Notes.* People remain in their initial country and foreign wages and prices are fixed; occupation and sourcing can change. The main-text values of $\theta$, $\xi$, $\eta$, and $\sigma$ are maintained. Employment includes production and fixed sourcing labor. Size differences in the Data column are regression-adjusted differences in mean log employment from equation (C45), multiplied by 100. The Target column reports the calibration targets; the two immigrant–native size gaps are targeted at zero. Dashes indicate untargeted moments. Native importers map to native-founded one-country importers. The three sourcing coefficients and the common immigrant productivity level $a_I$ jointly match the four log-employment targets. The common participation odds shift matches the ICIO domestic material spending share; Census participation levels are adjusted inputs. Entrepreneurship rates, employment shares conditional on immigrant-founded employment, and the founder-origin share of foreign spending remain fitted. Common source factors reconcile geography within other-foreign sourcing.

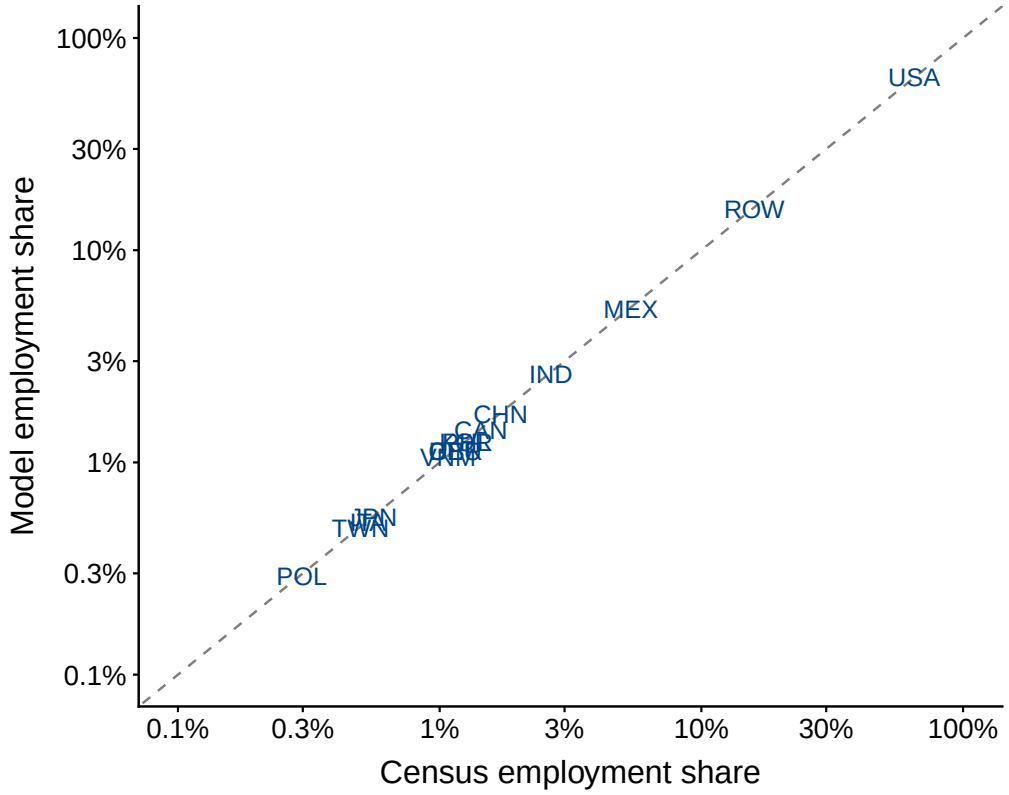
In aggregate, the fixed sourcing wage bill is $0.108\%$ of expenditure. The U.S.-born occupational shifter is $T_{USA} = 1.063$. Under the normalization in (C44), the common immigrant productivity level is $a_I = 1.15$.

The participation odds multiplier is $c = 3.29$. U.S.-born participation rises from $4.19\%$ in the Census input to $12.58\%$ in the adjusted target. Weighting by calibrated firm counts, aggregate participation rises from $4.81$ to $14.13\%$. The model then matches ICIO's domestic material spending share of $73.27\%$ and its conditional foreign-source geography. The adjustment preserves relative participation odds across origins; it does not preserve expenditure odds, which also depend on selected spending per firm.

Table C.3 reports the calibration fit. The model implies an untargeted immigrant-founded employment share of $34.42\%$, compared with $34.93\%$ in the Census. It also implies within-cell log-unit-value variance of $0.931$, compared with $0.864$. Figure C.5 compares model and Census employment shares across all $15$ founder-origin groups; their correlation in logs is $1.000$.

The alternative calibration omits the common participation odds adjustment. Both calibrations fit the four firm-size targets, including zero immigrant–native gaps, and hold out aggregate immigrant-founded employment. Without the odds adjustment, the model also matches Census importer participation levels but overpredicts the domestic material spending share by $22.87\%$, similar to the $18.25\%$ overprediction reported by Antràs et al. (2017).

Figure C.5: Fixed sourcing costs: employment shares by founder origin




*Notes.* Each label compares a founder-origin group's share of total employment in the Census (horizontal axis) and the fixed-sourcing-cost calibration (vertical axis). Both axes use log10 scales; tick labels report shares in percent. The dashed 45-degree line indicates equality. The unweighted correlation of log shares across all 15 groups is 1.000. Employment includes production and fixed sourcing labor. Relative employment shares among immigrant origins are calibration targets; their aggregate employment share is untargeted. USA denotes U.S.-born founders and ROW denotes Rest of World. Shares refer to the calibrated observed economy, before deficit removal.

## C.8 Counterfactual Accounting and Computation

The counterfactuals use the source-choice, profit, and household-budget relations derived in the main text, with country subscripts when wages and prices adjust abroad. Appendix B.3.1 states the corresponding market-clearing conditions. This subsection constructs the bilateral payment and income shares used to evaluate them, then defines the reported outcomes and describes how we compute trade-cost interactions.

### Bilateral payments and deficit removal

Observed trade is imbalanced. We translate baseline sourcing shares into bilateral payments and remove deficits in equilibrium before applying the counterfactual shocks. Material spending includes tariffs, and source shares measure each source's share of that spending. Producer receipts exclude tariffs. The ICIO and tariff inputs follow the construction in Appendix C.1.1.

For founders of origin $o$ residing in country $i$, write $\lambda_{oi}^{VA}$ for their share of that country's downstream value added. The U.S. weights are the main text's $\lambda_{o}^{VA}$. Their source shares are $\omega_{oin}$, with $\omega_{oUSAn} = \omega_{on}$. The material spending share is $m_i = (1-\alpha_i)(\sigma_i - 1)/\sigma_i$. Multiplying these three shares gives material spending on source $n$ relative to country $i$'s downstream expenditure:

$$\frac{X_{oin}}{E_i} = \lambda_{oi}^{VA} m_i \omega_{oin}. \tag{C49}$$

In the baseline calibration, source shares abroad are common across founder origins. We sum purchases across origins within each destination after determining residence and occupational choices. Let $R_{oin} = X_{oin}/\tau_{ni}^{T}$ denote producer receipts and $R_{in} = \sum_{o \in N} R_{oin}$ their sum across founder origins. Relative to downstream expenditure, these receipts give the payment shares

$$\mathfrak{a}_{ni} \equiv \frac{R_{in}}{E_i}, \qquad \widetilde{m}_i \equiv \sum_{n \in N} \mathfrak{a}_{ni}. \tag{C50}$$

Here $\mathfrak{a}_{ni}$ is source $n$'s receipts from country $i$ per dollar of downstream expenditure in $i$, and $\widetilde{m}_i$ sums these receipt shares across sources. The latter excludes tariffs; the material spending share $m_i$ includes them. The production exponent $1-\alpha_i$ measures materials' share of variable production costs, before accounting for the markup.

If $e_i = E_i / \sum_{j \in N} E_j$ is country $i$'s share of world downstream expenditure, balanced source payments require

$$\widetilde{m}_i e_i = \sum_{j \in N} \mathfrak{a}_{ij} e_j, \qquad \sum_{i \in N} e_i = 1. \tag{C51}$$

With observed imbalances, the deficit share is instead

$$s_i^D \equiv \frac{D_i}{E_i} = \widetilde{m}_i - \frac{\sum_{j \in N} \mathfrak{a}_{ij} e_j}{e_i}. \tag{C52}$$

**The baseline with balanced trade.** Following Ossa (2014), we first set $D_i' = 0$ and solve for an equilibrium with balanced trade, holding policies, search costs, and other structural primitives unchanged. Wages, prices, occupation, sourcing, and expenditure can adjust, so supplier access can also change. In the exercises that take foreign wages and prices as given, those variables remain fixed. Residence responds during deficit removal only in the exercises that allow people to move. The resulting payment matrix and expenditure weights satisfy equation (C51).

We use this equilibrium as the baseline for the subsequent search-cost shock, with $D_i = D_i' = 0$. Each set of assumptions about residence and foreign-price adjustment therefore has its own baseline with balanced trade. Reported policy effects exclude the change caused by removing deficits.

**Deficits held at shares of world expenditure.** Table D.7 instead starts from the observed economy and keeps each country's deficit at its baseline share of world expenditure. We set the new deficit according to

$$\frac{D_i'}{E_i} = s_i^D \sum_{j \in N} e_j \widehat{E}_j. \tag{C53}$$

This rule preserves $D_i'/\sum_{j\in N} E_j' = D_i/\sum_{j\in N} E_j$. When foreign expenditure is fixed, the rule applies only to the U.S. deficit. When expenditure adjusts abroad, it applies to every country, preserving zero-sum world deficits.

### Income and resource shares

We express the main text's household budget and resource use as shares of downstream expenditure $E_i$. The tariff-revenue share is

$$s_i^{\mathcal{T}} = \sum_{o \in N} \sum_{n \in N} \frac{X_{oin}}{E_i} \left(1 - \frac{1}{\tau_{ni}^T}\right). \tag{C54}$$

Optimal supplier search leaves entrepreneurial profit equal to the share $[1-(1-\alpha_i)(\sigma_i-1)/\theta]/\sigma_i$ of downstream expenditure:

$$s_i^{\Pi} = \frac{\Pi_i}{E_i} = \frac{1-(1-\alpha_i)(\sigma_i-1)/\theta}{\sigma_i}. \tag{C55}$$

Production labor income, supplier-search expenditure, and upstream labor income have shares

$$s_i^{\text{prod}} = \frac{\alpha_i(\sigma_i - 1)}{\sigma_i}, \tag{C56}$$

$$s_i^{\text{search}} = \frac{(1-\alpha_i)(\sigma_i - 1)}{\theta\sigma_i}, \tag{C57}$$

$$s_i^{\text{up}} = \frac{\sum_{j\in N} \mathfrak{a}_{ij} e_j}{e_i}. \tag{C58}$$

Because the final-good composite is used only for consumption and supplier search,

$$s_i^C \equiv \frac{P_i C_i}{E_i} = 1 - s_i^{\text{search}}. \tag{C59}$$

Writing $s_i^W = s_i^{\text{prod}} + s_i^{\text{up}}$, the household budget is

$$s_i^W + s_i^\Pi + s_i^{\mathcal{T}} + s_i^D = s_i^C. \tag{C60}$$

These equalities determine the income and resource shares used in equilibrium; they are not additional empirical targets.

The same accounts determine payoffs relative to expenditure per capita. Using the resident and occupational masses already defined in the model, the wage satisfies

$$\frac{w_i}{E_i/L_i} = \frac{s_i^W}{\sum_{o\in N} L_{oi}^w / L_i}. \tag{C61}$$

For origin-$o$ entrepreneurs in $i$, divide aggregate profits by the number of entrepreneurs and express the result in the same units:

$$\frac{\Pi_{oi}/L_{oi}^e}{E_i/L_i} = \frac{\Pi_{oi}/E_i}{L_{oi}^e/L_i}. \tag{C62}$$

Equations (C61)–(C62) provide the payoff normalizations for occupational choice.

### Counterfactual quantities and bilateral values

When people remain in their initial country, the country-indexed versions of equations (11) and (B15) give occupational masses and profits at counterfactual prices and supplier access. When residence responds, birth-cohort masses $L_{0o}$ remain fixed and we evaluate equations (B45) and (B46) at the counterfactual values. The resulting mass and profit changes are defined in equations (B49) and (B50). They update population, founder value-added weights, source payments, and wage labor $\sum_{o\in N} L_{oi}^w$.

When foreign wages, prices, and destination values remain fixed, U.S. prices, expenditure,

occupation, and transfers adjust, and foreign absorption clears the U.S. labor market. Residence probabilities abroad can change when the U.S. option changes. When foreign outcomes can respond, wages, prices, expenditure, and rebates adjust in every country, with the U.S. wage as numeraire. The search-cost equalization experiment changes only $\kappa_{oUSAn}$ at foreign sources.

Material spending includes tariffs, usable delivered input value removes tariffs and iceberg costs, and producer receipts determine upstream labor demand. Their counterfactual changes are

$$\widehat{X}_{oin} = \widehat{\Pi}_{oi}\frac{\omega'_{oin}}{\omega_{oin}}, \qquad \widehat{V}^{M,\mathrm{del}}_{oin} = \frac{\widehat{X}_{oin}}{\widehat{\tau}^{T}_{ni}\widehat{\tau}^{I}_{ni}}, \qquad \widehat{R}_{oin} = \frac{\widehat{X}_{oin}}{\widehat{\tau}^{T}_{ni}}. \tag{C63}$$

These objects determine upstream labor demand, tariff revenue, and country budgets. Together with the expenditure weights in equation (C51) and the household budget in equation (C60), they give the exact-change counterparts of the market-clearing conditions in Appendix B.3.1.

### Consumption and occupational welfare

The household budget in equation (B27) gives income per capita as

$$\mathcal{R}^{\mathrm{EQ}} \equiv \frac{w\sum_{o\in N} L^{w}_{o} + \Pi + (\mathcal{T} + D)}{L}. \tag{C64}$$

Together with equation (28), this identity separates the roles of average prices, product variety, and income from wages, profits, tariff revenue, and other net transfers. These three components add exactly to the change in consumption per capita under either residence assumption, whether foreign wages and prices remain fixed or adjust.

When people remain in their initial country, occupational welfare is the inclusive value in equation (20). When residence responds, we average the same occupational value over the selected U.S. resident productivity distribution:

$$V_{o|USA} = \frac{\displaystyle\int_{\underline{z}_o}^{\infty} \Pr(USA \mid o, z_f) V_{oUSA}(z_f)\, dG_o(z_f)}{\Pr(USA \mid o)}. \tag{C65}$$

Here $V_{oUSA}(z_f)$ is the occupational value before the blueprint draw in equation (B43). Both residence probabilities and occupational values are evaluated in each equilibrium. Reported U.S.-born welfare is $100\Delta \log V_{USA|USA}$; it excludes residence tastes. The integral is finite because $\Pr(USA \mid o, z_f) \leq 1$ and $\xi > \chi_{USA}$. Consumption per capita instead averages real spending over the entire resident population. Income taxes retain the main text's separate worker and entrepreneur rates, with revenue rebated proportionally to after-tax factor income.

Residence responds to opportunities across destinations, so its response need not have the same sign as welfare conditional on U.S. residence.

**Fixed sourcing costs**

The fixed-cost counterfactuals use the calibration in Appendix C.7, holding origin masses fixed. Within sourcing mode $m$, supplier access changes by $\widehat{\Phi}_o^m = \sum_{n\in\mathcal{N}_o^m} \omega_{on}^m \widehat{\mathcal{A}}_{on}$, where $\widehat{\mathcal{A}}_{on} = (\widehat{P}_n^M)^{-\eta}\widehat{\kappa}_{on}^{-\eta/\theta}$. The conditional source shares satisfy

$$\frac{\omega_{on}^{m\prime}}{\omega_{on}^m} = \frac{\widehat{\mathcal{A}}_{on}}{\widehat{\Phi}_o^m}. \tag{C66}$$

The occupational threshold follows equation (B9), and fixed sourcing costs change by $F_o^{m\prime} = \widehat{w}\widehat{q}_o^m F_o^m$. Together with the candidate profit scale $K'$, these quantities determine the counterfactual payoff indices in equation (C37) and the group probabilities and variable profits in equation (C39).

Variable profit determines material spending and production employment; entrepreneurial income deducts the fixed sourcing bill. Aggregating within origin gives

$$\Pi_o^{\text{var}} = \sum_m \Pi_o^{\text{var},m}, \qquad X_o^{\text{fix}} = \sum_m X_o^{\text{fix},m}, \qquad \Pi_o = \Pi_o^{\text{var}} - X_o^{\text{fix}}.$$

We evaluate the same objects at counterfactual values to obtain their exact changes. A zero baseline fixed-cost bill is handled in levels. For $n \in \mathcal{N}_o^m$, the material-spending relation in equation (C63) becomes

$$\widehat{X}_{on} = \widehat{\Pi}_o^{\text{var},m}\frac{\omega_{on}^{m\prime}}{\omega_{on}^m}. \tag{C67}$$

The tariff and delivery adjustments in that equation continue to give producer receipts and delivered input values.

The fixed sourcing wage bill is $X^{\text{fix}} = \sum_{o\in N} X_o^{\text{fix}}$, with labor requirement $L^{\text{fix}} = X^{\text{fix}}/w$. Labor clearing in equation (18) therefore becomes

$$\sum_{o\in N} L_o^w = L^{\text{prod}} + L^{\text{up}} + L^{\text{fix}}. \tag{C68}$$

The household budget uses $\Pi = \sum_{o\in N}\Pi_o$ and includes the fixed sourcing wage bill in worker income. Final-good clearing in equation (18) is unchanged: fixed sourcing costs use labor, while supplier search uses the final good. Search expenditure remains a fixed share of downstream expenditure, so $\widehat{P}\widehat{X}^{\text{search}} = \widehat{E}$ and $\widehat{P}\widehat{C} = \widehat{E}$ under the maintained parameters. The proportional rebate is evaluated from the resulting household budget.

Occupational welfare follows equation (20), using the revised entrepreneurship rates and net profit per resident $\bar{\pi}_o = \Pi_o/L_o$ in each equilibrium. The fixed-cost extension changes the income and labor-demand calculations while retaining the equilibrium unknowns.

### C.8.1 Search costs and tariff interactions

We compute the interactions in Figure 4 for consumption per capita and U.S.-born occupational welfare. Residence remains fixed in every country. Occupation and sourcing respond, as do relative wages, prices, expenditure, and rebates. The U.S. wage is the numeraire, and trade deficits are removed before the experiments.

For foreign supplier country $n$, all U.S.-based founder origins' search costs follow

$$\log \kappa_{on}(s_n) = (1 - s_n) \log \kappa_{USAn} + s_n \log \kappa_{on}, \qquad o \in N. \tag{C69}$$

The parameter $s_n$ is the share of calibrated log differences in search costs from natives that is retained. Measured costs correspond to $s_n = 1$ and complete equalization to $s_n = 0$. U.S.-born costs are unchanged. Search costs in other source countries and in foreign residence countries remain fixed.

For trading partner $m$, both gross tariff factors $\tau^T_{mUSA}$ and $\tau^T_{USAm}$ change in the same proportion. The reported interaction is

$$\mathcal{C}^W_{nm} = \left. \frac{\partial^2 \log W}{\partial s_n \, \partial(-\log \tau^T_m)} \right|_{s_n = 1},$$

where the tariff derivative includes both directions. A positive value means that retaining more supplier knowledge raises the marginal gain from reciprocal tariff liberalization.

Write $F(a, b) = \log W$ when $s_n = a$ and both tariff factors are multiplied by $\exp(b)$. All other trade costs remain fixed. We solve the four equilibria defining

$$D_h = \frac{F(1-h, h) - F(1, h) - F(1-h, 0) + F(1, 0)}{h^2}.$$

Positive numerical tariff steps avoid import subsidies when calibrated tariffs are near zero, while steps in search costs reduce retained knowledge from $s_n = 1$ to $s_n = 1 - h$. Both numerical steps run opposite to the directions in the reported cross-partial, so their sign changes cancel. The estimate is $2D_{h/2} - D_h$ with $h = 0.01$. We also solve at $h/4 = 0.0025$ and compare the independently refined estimate $2D_{h/4} - D_{h/2}$. Gray cells have inconsistent signs across steps, a reported magnitude no larger than twice either the step difference $|D_{h/2} - D_h|$ or the refinement difference, or a sign reversal in the third-step check. Numerical results retain full precision, and every equilibrium has a maximum residual below $10^{-12}$. Tariff revenue equals tariff-inclusive spending less duty-exclusive producer receipts and is rebated.

Table 8 instead compares finite historical tariff changes with measured search costs and with all U.S.-based founder origins assigned native search costs in the affected source countries. Each policy effect uses its own cost regime's pre-policy equilibrium. The difference between those effects isolates the interaction; it excludes the direct welfare effect of equalizing search costs in

the absence of the tariff change. The China exercise changes tariffs in the two directions by different amounts. NAFTA applies six directed tariff cuts in the historical calibration, including the Canada–Mexico pair.

### C.8.2 Immigrant-population profiles

Table D.13 uses the fixed-residence economic benchmark with a separately solved U.S. demographic reference. Both the U.S. reference and comparison-country profiles use 2020 WPP/DESA stocks. Unallocated bilateral origins are excluded; native denominators retain WPP population less full DESA migrant totals. Comparison-country natives and identified U.S.-born emigrants are excluded from the transferred immigrant profile. ROW retains its original residual population diagonal, including within-region migration.

We replace U.S. immigrant-to-native ratios origin by origin, holding the U.S.-born population fixed. Population changes are transfers between the United States and immigrants' birth countries, preserving each origin's total population. U.S.-born residence remains fixed, and foreign wages, prices, and expenditure are held fixed. Foreign population counts therefore do not affect U.S. outcomes. Each origin retains its calibrated productivity distribution and other characteristics, while U.S. occupation and sourcing adjust.

The share-only experiment changes the number of immigrants relative to natives while preserving their origin mix; the mix-only experiment changes their distribution across origins while holding their total number fixed. The Shapley decomposition averages each component's marginal effect across the two orders. To measure search-cost contributions, we repeat the joint, share-only, and mix-only population changes after assigning immigrant founders U.S.-born search costs at foreign sources, retaining other calibrated characteristics. Each cost regime uses its own baseline with balanced trade. The contributions subtract the effects under equalized search costs from those under measured costs, in percentage points. They include occupational adjustment and interactions with calibrated productivity and occupational incentives.

### C.8.3 Marginal admissions

This subsection gives the calculations for Table 9. We use the baseline in Table 7 that allows residence to respond, with choices governed by equation (23). Appendix C.6.3 describes the calibration.

Lowering $\iota_{oUSA}$ makes U.S. residence more attractive to origin-$o$ agents without changing their productivity or supplier knowledge. Immigrants already living in the United States are selected from their origin's productivity distribution given baseline migration costs and opportunities across destinations. Additional arrivals come from the same underlying distribution, but their composition depends on whose residence choices respond to the lower migration cost. We recover their productivity distribution from the change in residence probabilities at each productivity level and use it to compute entrepreneurship rates, profits, and the gains from additional

admissions.

Let $\Pr(USA \mid o, z)$ and $\Pr'(USA \mid o, z)$ be the focal origin's baseline and counterfactual residence probabilities. With its birth-cohort productivity distribution $G_o$ fixed, the distribution of additional immigrants is

$$dG_o^{\text{add}}(z) = \frac{\Pr'(USA \mid o, z) - \Pr(USA \mid o, z)}{\Pr'(USA \mid o) - \Pr(USA \mid o)}\, dG_o(z). \tag{C70}$$

Here $z$ denotes entrepreneurial productivity and the denominator is the change in the origin's unconditional probability of U.S. residence.

Only the focal origin's residence choices respond in these origin-specific experiments. Every other origin, including the U.S.-born, retains its baseline residence probabilities at each productivity level and destination, fixing both its headcount and resident productivity distribution. Occupation and the U.S. equilibrium adjust for all origins, while foreign wages, prices, and expenditure remain fixed.

Let $\varepsilon_o^Y$ denote the approximate percentage change in outcome $Y$ when lower migration costs increase origin $o$'s U.S. resident population by 1%. Let $\mathcal{A}_o^Y$ express this response per 100,000 additional immigrants:

$$\varepsilon_o^Y \equiv \frac{\partial \log Y / \partial(-\log \iota_{oUSA})}{\partial \log L_{oUSA} / \partial(-\log \iota_{oUSA})}, \qquad \mathcal{A}_o^Y \equiv 100 \frac{100{,}000}{L_{oUSA}} \varepsilon_o^Y. \tag{C71}$$

Expressing effects per 100,000 admissions lets us compare origins of different sizes.

Residence choices depend on entrepreneurial productivity, so calculating resident populations and aggregate payoffs requires integrating over each origin's productivity distribution. These integrals generally have no closed form, and we evaluate them numerically. To approximate the derivatives, we solve the equilibrium for small increases and decreases in $-\log \iota_{oUSA}$ around the baseline. We divide the resulting differences in log outcomes and log resident counts by the distance between these policy changes. We check stability using smaller changes and more precise numerical integration. We also solve counterfactuals that admit exactly 100,000 additional immigrants. In the "Total" and "Search-cost contribution" columns of Table 9, the reported approximations differ from the directly computed consumption and welfare effects by less than $2.5\%$.

To measure the search-cost contribution, we repeat these population changes after assigning all incumbent and additional immigrant founders in the United States U.S.-born search costs at foreign sources. We retain the original baseline and post-admission residence allocations at each productivity level, preserving both headcounts and the productivity selection of new arrivals. Occupation, sourcing, and the U.S. equilibrium still adjust. The search-cost contribution columns subtract the effects with search costs equalized from the effects in the "Total" columns, each measured relative to its own baseline, in log points per 100,000 admissions.

**Admissions in the current foreign-born mix.** The bottom row of Table 9 considers 100,000 additional admissions with origin shares equal to those of the baseline foreign-born population. We adjust all foreign-origin U.S. migration costs jointly so that each origin's stock increases in the same proportion, while U.S.-born residence remains fixed at every productivity level. The origin shares match those of existing immigrants, but the productivity of new arrivals within each origin still depends on who responds to the lower migration costs.

With natives fixed, a foreign-born share $s$ implies a stock proportional to $s/(1-s)$. The increase from $12.6\%$ in 2007 to $13.9\%$ in 2022 gives a log change of

$$\log[(0.139/0.861)/(0.126/0.874)] = 0.1132.$$

Applying the elasticities gives $100[\exp(0.0784 \times 0.1132) - 1] \approx 0.89\%$ for consumption and $100[\exp(0.0598 \times 0.1132) - 1] \approx 0.68\%$ for native welfare.

# D Additional Counterfactual Results

This appendix reports additional counterfactuals for Section 5. Appendix C.6 describes the calibrations with foreign prices and residence allowed to respond; Appendix C.7 gives the fixed-sourcing-cost calibration. Counterfactual accounting and computation follow Appendix C.8.

## D.1 Equalization of Search Costs

### Allowing wages and prices abroad to adjust

Table D.1 repeats the equalization of search costs in Table 7 with wages, prices, and expenditure determined jointly across countries. The columns hold residence fixed or allow it to respond; occupation and sourcing adjust in both.

Table D.1: Equalizing search costs when wages and prices abroad adjust

| | Residence held fixed | Residence responds |
|---|---|---|
| $100\Delta \log(C_{USA}/L_{USA})$ | -0.11 | -0.20 |
| $100\Delta \log \mathcal{R}^{\mathrm{EQ}}$ | -0.01 | -0.01 |
| $-100\Delta \log \bar{P}$ | -0.13 | -0.32 |
| $100\Delta \log\lvert\mathcal{F}\rvert/(\sigma_{USA}-1)$ | 0.03 | 0.14 |
| Inclusive-value welfare (U.S.-born) | -0.01 | -0.03 |
| U.S.-born entrepreneurship rate (pp) | 0.01 | 0.02 |
| Foreign-born entrepreneurship rate (pp) | -0.05 | -0.10 |
| Foreign sourcing share (pp) | -1.15 | -1.02 |
| Foreign-born resident share (pp) | 0.00 | -0.01 |

*Notes.* The counterfactual assigns each U.S. immigrant founder U.S.-born search costs at foreign sources. The calibration is described in Appendix C.6. Productivity is drawn after residence in the first column and before residence in the second. Entries compare the counterfactual with its corresponding baseline with balanced trade. Consumption, welfare, and the consumption decomposition are log changes multiplied by 100; other outcomes are percentage-point changes. Inclusive-value welfare is the occupational value in equation (20), conditional on U.S.-born people residing in the United States, and excludes residence tastes. When residence responds, the value uses each equilibrium's selected resident productivity distribution. $\mathcal{R}^{\mathrm{EQ}}$ is defined in equation (C64). Occupation, sourcing, wages, prices, and expenditure adjust in every country. Tariffs are unchanged. Baseline U.S. population shares use ACS when residence is held fixed and UN WPP/DESA when residence responds.

### Portability of search costs

Table D.2 extends the ratios of search costs estimated in the United States to foreign destinations, relative to local natives. Appendix C.6.5 describes the recalibration. Panel A equalizes immigrant founders' search costs only in the United States; Panel B applies the equalization in every destination. With residence responding, worldwide equalization leaves U.S. consumption per capita unchanged and raises native welfare by $0.37\%$.

Table D.2: Portability of search costs across destinations

| Calibration | Residence held fixed | | Residence responds | |
|---|---|---|---|---|
| | Consumption per capita | Inclusive-value welfare (U.S.-born) | Consumption per capita | Inclusive-value welfare (U.S.-born) |
| *A. U.S.-only equalization* | | | | |
| Baseline | -0.11 | -0.01 | -0.20 | -0.03 |
| Portable search costs | -0.11 | -0.01 | -0.19 | 0.00 |
| *B. Worldwide equalization* | | | | |
| Portable search costs | -0.11 | -0.01 | 0.00 | 0.37 |

*Notes.* Entries are U.S. log changes multiplied by 100 relative to each calibration's own equilibrium with balanced trade. Consumption averages over all U.S. residents. Panel A assigns U.S. immigrant founders the foreign-source search costs of U.S.-born founders. Panel B applies the same equalization relative to local natives in every destination. Natives' costs remain fixed. Appendix C.6.5 describes the portable-cost calibration; both calibrations match the same observed targets. Worldwide and U.S.-only equalization coincide under the baseline calibration, which has common sourcing costs across origins abroad. Productivity is drawn after residence in the first specification and before residence in the second. Inclusive-value welfare is the occupational value in equation (20), conditional on U.S.-born people residing in the United States, and excludes residence tastes. When residence responds, it uses each equilibrium's selected resident productivity distribution. Occupation, sourcing, wages, prices, and expenditure adjust in every country; tariffs remain fixed.

## Productivity in wage work and entrepreneurship

Table D.3 repeats the equalization of search costs in Table 7 with wage earnings $w_i z_f$. The same productivity draw therefore enters wage earnings and entrepreneurial production. We recalibrate with residence held unchanged, obtaining $\theta = 1.402$ and $\xi = 6.641$, and retain these parameters when residence can respond. Consumption falls by $0.25\%$ and $0.51\%$ under the two residence assumptions, respectively.

Table D.3: Equalizing search costs when productivity also raises wage earnings

| | Residence held fixed | Residence responds |
|---|---|---|
| $100\Delta \log(C_{USA}/L_{USA})$ | -0.25 | -0.52 |
| $-100\Delta \log \bar{P}$ | -0.27 | -0.66 |
| $100\Delta \log\lvert\mathcal{F}\rvert/(\sigma-1)$ | 0.03 | 0.23 |
| $100\Delta \log \mathcal{R}^{\mathrm{EQ}}$ | -0.02 | -0.08 |
| Inclusive-value welfare (U.S.-born) | -0.10 | -0.21 |
| U.S.-born entrepreneurship rate (pp) | 0.03 | 0.05 |
| Foreign-born entrepreneurship rate (pp) | -0.11 | -0.17 |
| Foreign sourcing share (pp) | -2.51 | -2.32 |
| Foreign-born resident share (pp) | 0.00 | -0.10 |

*Notes.* The counterfactual assigns U.S. immigrant founders U.S.-born search costs at foreign sources. Both columns use wage earnings $w_i z_f$, $\eta = 4.485$, and $\sigma = 3.85$. Each column compares with its own equilibrium with balanced trade. The first five rows are log changes multiplied by 100; the remaining rows are percentage-point changes. Welfare is occupational inclusive value conditional on U.S. residence, excludes residence tastes, and incorporates resident productivity selection when residence responds. Foreign wages, prices, expenditure, and tariffs remain fixed; U.S. occupation and sourcing adjust. Baseline population shares use ACS when residence is held fixed and UN WPP/DESA when residence responds.

### Equalization of search costs in founders' origin markets

Table D.4 repeats the equalization in Table 7 only for purchases from founders' birth countries. We retain the same calibrations and baselines with balanced trade. Consumption falls by $0.18\%$ when residence is unchanged and $0.34\%$ when it responds.

Table D.4: Equalizing search costs only in founders' origin markets

| | Residence held fixed | Residence responds |
|---|---|---|
| $100\Delta \log(C_{USA}/L_{USA})$ | -0.18 | -0.35 |
| $-100\Delta \log \bar{P}$ | -0.15 | -0.40 |
| $100\Delta \log\lvert\mathcal{F}\rvert/(\sigma-1)$ | -0.02 | 0.07 |
| $100\Delta \log \mathcal{R}^{\mathrm{EQ}}$ | -0.01 | -0.02 |
| Inclusive-value welfare (U.S.-born) | -0.07 | -0.15 |
| U.S.-born entrepreneurship rate (pp) | 0.02 | 0.03 |
| Foreign-born entrepreneurship rate (pp) | -0.08 | -0.14 |
| Foreign sourcing share (pp) | -1.94 | -1.80 |
| Foreign-born resident share (pp) | 0.00 | -0.08 |

*Notes.* The counterfactual assigns each U.S. immigrant founder the U.S.-born search costs only in the founder's origin market. Search costs at other sources remain unchanged. Origin and source groups include the composite rest-of-world group. Both columns retain the assumptions about residence and foreign prices in Table 7 and compare with their respective baselines with balanced trade. The first five rows are log changes multiplied by 100; the remaining rows are percentage-point changes. Welfare is occupational inclusive value conditional on U.S. residence, excludes residence tastes, and incorporates resident productivity selection when residence responds. Occupation and sourcing adjust. Foreign wages, prices, expenditure, and tariffs remain fixed. Baseline population shares use ACS when residence is held fixed and UN WPP/DESA when residence responds.

### Equalizing search costs, productivity, and occupational incentives

Table D.5 uses the two specifications in Table 7 to equalize foreign search costs, entrepreneurial productivity scales, and occupational payoff shifters, separately and jointly. Foreign wages and prices remain fixed. When people remain in their initial country, productivity equalization sets $\underline{z}_o = \underline{z}_{USA}$. When residence responds, we instead multiply entrepreneurial productivity in the United States by an origin-specific factor, leaving birth draws and productivity abroad unchanged. People know their productivity draw and the U.S. multiplier before choosing residence.

When residence responds, equalizing occupational payoff shifters raises the foreign-born resident share by $5.31$ percentage points and consumption by $17.87\%$.

Table D.5: Equalizing search costs, entrepreneurial productivity, and payoff shifters

| | Residence held fixed | | Residence responds | |
|---|---|---|---|---|
| Equalized primitives | Consumption per capita | Inclusive-value welfare (U.S.-born) | Consumption per capita | Inclusive-value welfare (U.S.-born) |
| Search costs | -0.25 | -0.10 | -0.46 | -0.20 |
| Productivity | -4.37 | -1.25 | -6.01 | -2.03 |
| Entrepreneurial payoffs | 0.02 | 0.01 | 16.44 | 10.12 |
| Search costs and productivity | -4.48 | -1.27 | -6.37 | -2.13 |
| Search costs and payoffs | -0.23 | -0.09 | 15.74 | 9.62 |
| Productivity and payoffs | -4.37 | -1.25 | -6.39 | -2.12 |
| All three | -4.47 | -1.28 | -6.71 | -2.21 |

*Notes.* Entries are log changes multiplied by 100 relative to each specification's equilibrium with balanced trade in Table 7. Equalization of search costs assigns U.S. immigrant founders native search costs at foreign sources. With residence held fixed, productivity equalization sets $\underline{z}_o = \underline{z}_{USA}$. When residence responds, it applies the U.S.-specific entrepreneurial productivity multiplier $\widehat{A}_{oUSA} = \underline{z}_{USA}/\underline{z}_o$, with $A_{oi} = 1$ initially, and leaves birth draws and productivity abroad unchanged. Payoff equalization sets $T_{oUSA} = T_{USAUSA}$ at each specification's calibrated native value. U.S.-born primitives are unchanged. Both specifications hold $(\theta, \xi, \eta, \sigma)$ fixed and use their existing baseline calibrations without re-estimation. Productivity is drawn after residence in the first specification and before residence in the second; people anticipate the U.S. multiplier when residence can respond. Inclusive-value welfare conditions on U.S. residence, uses each equilibrium's resident productivity distribution, and excludes residence tastes. Occupation and sourcing adjust throughout. Tariff factors remain fixed. Baseline U.S. population shares use ACS when residence is held fixed and UN WPP/DESA when residence responds.

## Origin-by-origin effects

Table D.6 equalizes foreign search costs for one founder origin at a time. Founders from that origin receive U.S.-born search costs; other origins' costs remain fixed. With residence and foreign prices held fixed, the largest loss is $0.10\%$ for Rest of World, compared with $0.25\%$ when search costs are equalized for all immigrant origins simultaneously.

Table D.6: Consumption effects of equalizing search costs by founder origin

| | Foreign wages and prices fixed | | Foreign wages and prices adjust | |
|---|---|---|---|---|
| Founder origin | Residence held fixed | Residence responds | Residence held fixed | Residence responds |
| Rest of World | -0.096 | -0.183 | -0.037 | -0.086 |
| China | -0.035 | -0.058 | -0.013 | -0.016 |
| Canada | -0.026 | -0.046 | -0.012 | -0.029 |
| United Kingdom | -0.024 | -0.038 | -0.013 | -0.025 |
| Taiwan | -0.023 | -0.036 | -0.010 | -0.010 |
| Korea | -0.016 | -0.030 | -0.005 | -0.010 |
| Germany | -0.014 | -0.026 | -0.006 | -0.013 |
| Japan | -0.013 | -0.023 | -0.006 | -0.013 |
| Italy | -0.009 | -0.016 | -0.004 | -0.008 |
| India | -0.005 | -0.006 | -0.001 | -0.001 |
| Poland | -0.003 | -0.006 | -0.001 | -0.003 |
| Vietnam | 0.001 | 0.001 | 0.001 | 0.000 |
| Philippines | 0.002 | 0.004 | 0.001 | 0.006 |
| Mexico | 0.011 | 0.015 | 0.004 | 0.015 |
| All immigrant origins | -0.253 | -0.460 | -0.107 | -0.203 |

*Notes.* Each origin row applies equation (27) only to U.S.-resident founders of that origin, assigning them U.S.-born search costs at foreign sources. Other origins' costs remain fixed. Entries are signed $100\Delta \log(C_{USA}/L_{USA})$ relative to the baseline after removing trade deficits, so negative values are consumption losses and positive values are gains. The final row equalizes search costs for all immigrant origins at once, as in Table 7. It is not the sum of the one-at-a-time rows because the economy responds jointly to the changes. Occupation and sourcing choices respond in every column, and residence responds in the columns labeled accordingly. The calibration with foreign conditions held fixed is that of Table 7; Appendix C.6 describes the calibration when foreign outcomes respond. The access-equalization shock holds all tariff factors fixed.

### Deficit treatment

As an alternative to removing deficits, Table D.7 starts from the observed economy and keeps each country's deficit at its baseline share of world expenditure. Equation (C53) in Appendix C.8 gives the rule.

Table D.7: Equal search costs with deficits held at 2022 shares of world spending

| | Foreign wages and prices fixed | | Foreign wages and prices adjust | |
|---|---|---|---|---|
| | Residence held fixed | Residence responds | Residence held fixed | Residence responds |
| $100\Delta \log(C_{USA}/L_{USA})$ | -0.253 | -0.483 | -0.168 | -0.309 |
| $100\Delta \log \mathcal{R}^{\mathrm{EQ}}$ | -0.021 | -0.029 | -0.051 | -0.062 |
| $-100\Delta \log \bar{P}$ | -0.253 | -0.605 | -0.128 | -0.429 |
| $100\Delta \log\lvert\mathcal{F}\rvert/(\sigma-1)$ | 0.021 | 0.151 | 0.011 | 0.182 |
| U.S.-born inclusive-value welfare | -0.097 | -0.205 | -0.011 | -0.045 |
| U.S.-born entrepreneurship rate (pp) | 0.023 | 0.039 | 0.022 | 0.036 |
| Foreign-born entrepreneurship rate (pp) | -0.090 | -0.140 | -0.091 | -0.154 |
| Foreign sourcing share (pp) | -2.508 | -2.508 | -1.067 | -1.067 |
| Foreign-born resident share (pp) | 0.000 | -0.115 | 0.000 | 0.017 |

*Notes.* The counterfactual assigns each U.S. immigrant founder the same search costs as U.S.-born founders, at foreign sources. Each column states whether foreign outcomes and residence can respond. Entries compare the counterfactual with the observed deficit-inclusive 2022 baseline. Deficits follow equation (C53) rather than being eliminated before the access shock. Consumption, U.S.-born welfare, and the consumption decomposition are log changes multiplied by 100; all other outcomes are percentage-point changes. $\mathcal{R}^{\mathrm{EQ}}$ is defined in equation (C64). Occupation and sourcing choices can respond in every column. Baseline U.S. population shares use ACS when residence is held fixed and UN WPP/DESA when residence responds. The calibrations are those of Tables 7 and D.1. Welfare is the U.S.-born occupational inclusive value conditional on U.S. residence, including productivity selection when residence responds and excluding residence tastes.

### Occupational incidence

Table D.8 separates the wage-work and entrepreneurship contributions to U.S. destination value in equation (20). We average both contributions over each origin's U.S. residents. Their sum is the occupational inclusive value reported as welfare in every panel, including productivity selection when residence responds. These contributions incorporate changes in occupation; they do not track people who remain in the same occupation.

Table D.8: Value of wage work and entrepreneurship among U.S. residents

| **A. Small-open, residence held fixed** | | | **B. Small-open, residence responds** | | |
|---|---|---|---|---|---|
| | U.S.-born | Foreign-born | | U.S.-born | Foreign-born |
| Wage work | -0.270 | -0.155 | Wage work | -0.481 | -0.289 |
| Entrepreneurship | 0.882 | -1.617 | Entrepreneurship | 1.448 | -2.484 |
| Welfare | -0.102 | -0.690 | Welfare | -0.197 | -1.124 |
| Resident share (pp) | — | 0.000 | Resident share (pp) | — | -0.103 |
| **C. Multicountry, residence held fixed** | | | **D. Multicountry, residence responds** | | |
| | U.S.-born | Foreign-born | | U.S.-born | Foreign-born |
| Wage work | -0.119 | -0.047 | Wage work | -0.217 | -0.090 |
| Entrepreneurship | 0.658 | -1.030 | Entrepreneurship | 1.017 | -1.966 |
| Welfare | -0.006 | -0.386 | Welfare | -0.034 | -0.689 |
| Resident share (pp) | — | 0.000 | Resident share (pp) | — | -0.010 |

*Notes.* Entries are log changes multiplied by 100, except the foreign-born resident share, which is reported in percentage points. The first two rows report the average wage-work and entrepreneurship contributions to U.S. destination value. The contributions add in levels, so their log changes do not add to the welfare change. All three values condition on U.S. residence; panels where residence responds integrate over the selected resident productivity distribution in each equilibrium and exclude residence tastes. "Foreign-born" is a fixed-weight geometric mean across the 14 foreign-origin groups, using their resident shares at the corresponding equilibrium with balanced trade. Payoffs include occupational shifters, income taxes, and rebated revenue. An em dash marks the U.S.-born resident-share change, which is implied by the foreign-born share change. The calibrations are those of Tables 7 and D.1. The shock assigns U.S. immigrant founders native search costs at foreign sources, holding tariffs fixed. Baseline U.S. population shares use ACS when residence is held fixed and UN WPP/DESA when residence responds.

## D.2 Alternative Supplier-Access Assumptions

### Higher domestic search costs

Table D.9 repeats Table 7 with immigrant domestic search costs of 1.05 and 1.10, relative to a native cost of one. Both exercises hold foreign wages and prices fixed. Appendix C.6.5 describes the calibration under each assumption. The inferred advantages in foreign search costs and consumption losses are smaller than under equal domestic costs. Consumption and U.S.-born welfare fall under both residence assumptions.

Table D.9: Equalizing foreign search costs with higher domestic search costs

| | $\kappa_{oUSA} = 1.05$ | | $\kappa_{oUSA} = 1.10$ | |
|---|---|---|---|---|
| | Residence held fixed | Residence responds | Residence held fixed | Residence responds |
| $100\Delta \log(C_{USA}/L_{USA})$ | -0.156 | -0.278 | -0.054 | -0.083 |
| $100\Delta \log \mathcal{R}^{\mathrm{EQ}}$ | -0.011 | -0.017 | -0.002 | -0.001 |
| $-100\Delta \log \bar{P}$ | -0.163 | -0.342 | -0.067 | -0.085 |
| $100\Delta \log\lvert\mathcal{F}\rvert/(\sigma-1)$ | 0.018 | 0.080 | 0.015 | 0.003 |
| U.S.-born inclusive-value welfare | -0.062 | -0.119 | -0.019 | -0.035 |
| U.S.-born entrepreneurship rate (pp) | 0.014 | 0.022 | 0.005 | 0.007 |
| Foreign-born entrepreneurship rate (pp) | -0.053 | -0.095 | -0.016 | -0.042 |
| Foreign sourcing share (pp) | -1.507 | -1.414 | -0.468 | -0.443 |
| Foreign-born resident share (pp) | 0.000 | -0.063 | 0.000 | -0.021 |

*Notes.* Each column group sets $\kappa_{oUSA}$ to the indicated value for $o \neq USA$, with $\kappa_{USAUSA} = 1$. Foreign-source search costs are equalized to those of U.S.-born founders. Each column compares with its own equilibrium with balanced trade. The calibration follows Appendix C.6.5. Productivity is drawn after residence in the columns with residence held fixed and before residence in the columns where residence responds. The first five rows are log changes multiplied by 100; the remaining rows are percentage-point changes. Welfare is the U.S.-born occupational inclusive value conditional on U.S. residence, including selected resident productivity when residence responds and excluding residence tastes. Foreign wages, prices, and expenditure remain fixed; U.S. occupation and sourcing adjust. Tariffs are unchanged. Baseline U.S. population shares use ACS when residence is held fixed and UN WPP/DESA when residence responds.

### Access inferred from entrepreneurship

Table D.10 repeats equalization of foreign search costs with access inferred from entrepreneurship indices. Origins share productivity supports and occupational payoff shifters, retaining individual heterogeneity in productivity and business blueprints. Residence is unchanged in the first column and responds in the second. Consumption falls by $0.79\%$ and $0.82\%$, respectively. The number of firms falls in both columns, whereas it rises in Table 7.

Table D.10: Equalizing foreign search costs when supplier access explains entrepreneurship differences

| | Residence held fixed | Residence responds |
|---|---|---|
| $100\Delta \log(C_{USA}/L_{USA})$ | -0.791 | -0.821 |
| $100\Delta \log \mathcal{R}^{\mathrm{EQ}}$ | -0.078 | -0.011 |
| $-100\Delta \log \bar{P}$ | -0.686 | -0.243 |
| $100\Delta \log\lvert\mathcal{F}\rvert/(\sigma-1)$ | -0.026 | -0.567 |
| Inclusive-value welfare (U.S.-born) | -0.328 | -0.380 |
| U.S.-born entrepreneurship rate (pp) | 0.067 | 0.074 |
| Foreign-born entrepreneurship rate (pp) | -0.299 | -0.764 |
| Foreign sourcing share (pp) | -8.707 | -4.477 |
| Foreign-born resident share (pp) | 0.000 | -0.237 |

*Notes.* The calibration in Appendix C.6.5 targets entrepreneurship rates and treats founder-employment shares as predictions. The inferred access matrices can differ across the two residence assumptions. The counterfactual equalizes foreign-source search costs to those of U.S.-born founders. Both columns compare with their own equilibrium with balanced trade. Productivity is drawn after residence in the first column and before residence in the second. The common parameters $(\theta, \xi, \eta, \sigma)$ and income-tax rates retain the values used in Table 7. The first five rows are log changes multiplied by 100; the remaining rows are percentage-point changes. Welfare is the U.S.-born occupational inclusive value conditional on U.S. residence, including selected resident productivity when residence responds and excluding residence tastes. Foreign wages, prices, and expenditure remain fixed; U.S. occupation and sourcing adjust. Tariffs are unchanged. Baseline U.S. population shares use ACS when residence is held fixed and UN WPP/DESA when residence responds.

## D.3 Fixed Sourcing Costs

Table D.11 reports two experiments under each calibration, relative to its own baseline with balanced trade. Columns (1)–(2) use the ICIO-reconciled calibration in Appendix C.7; columns (3)–(4) omit the common participation odds adjustment. The first experiment assigns immigrant founders U.S.-born search costs at foreign sources, setting $\widehat{\kappa}_{on} = \kappa_{USAn}/\kappa_{on}$ for $n \neq USA$ using each fixed-cost calibration. The second also sets $q_o^{O\prime} = q_o^{B\prime} = q_{USA}^{B}$ for immigrant founders, with only the $B$ change applying to the residual origin group. The equalization applies to labor requirements; the coefficients normalized by origin productivity can differ.

With ICIO reconciliation, assigning immigrant founders U.S.-born search costs lowers consumption per capita by $0.177\%$. Also assigning them the U.S.-born fixed labor requirement for foreign sourcing increases the loss to $0.184\%$.

Table D.11: Equalizing search costs with fixed sourcing costs

| | With ICIO reconciliation | | Without ICIO reconciliation | |
|---|---|---|---|---|
| | Native search costs | Native search costs and sourcing requirements | Native search costs | Native search costs and sourcing requirements |
| | (1) | (2) | (3) | (4) |
| Consumption per capita (log points) | −0.178 | −0.184 | −0.071 | −0.074 |
| Average-price contribution | −0.336 | −0.295 | −0.137 | −0.122 |
| Variety contribution | 0.175 | 0.127 | 0.074 | 0.056 |
| Nominal-income contribution | −0.016 | −0.016 | −0.008 | −0.008 |
| Price index (log points) | 0.161 | 0.168 | 0.063 | 0.066 |
| Entrepreneurship rate (percentage points) | 0.012 | 0.008 | 0.005 | 0.004 |
| Foreign sourcing share (percentage points) | −1.588 | −1.673 | −0.818 | −0.859 |

*Notes.* Changes are relative to each calibration's own equilibrium with balanced trade. Columns (1)–(2) apply a common participation odds adjustment to match ICIO expenditure shares; columns (3)–(4) match Census participation levels without this adjustment. Both calibrations fit all four firm-size targets, including zero immigrant–native gaps. Residence and foreign wages, prices, and expenditure remain unchanged; U.S. occupation and sourcing adjust. Each column assigns immigrant founders U.S.-born search costs at foreign sources. Columns (2) and (4) also assign the U.S.-born physical fixed labor requirement to every immigrant foreign-sourcing mode. Consumption, its decomposition, and the price index are 100 times log changes. The decomposition follows equation (28); components may not sum exactly because of rounding. The foreign sourcing share is measured in variable input expenditure. Tariffs remain fixed, and income taxes are rebated in proportion to after-tax factor income.

## D.4 The U.S.–China Tariff War and NAFTA with Endogenous Residence

Table D.12 repeats the experiments in Table 8 with residence choices governed by equation (23). People know their entrepreneurial productivity before choosing where to live. The China calibration uses UN population and migrant stocks in every destination, whereas the fixed-residence specification uses ACS U.S. population counts. Both NAFTA specifications use 1990 UN counts. Differences from the main table therefore reflect productivity selection and recalibration as well as migration adjustment. Welfare remains conditional on U.S. residence, averaging over each equilibrium's selected residents.

Table D.12: The U.S.–China Tariff War and NAFTA with Endogenous Residence

| | U.S.–China tariff increases 2018–19 | | NAFTA tariff reductions 1993–2005 | |
|---|---|---|---|---|
| Search costs | Measured | Equalized | Measured | Equalized |
| *Panel A. Aggregate U.S. outcomes* | | | | |
| Consumption per capita (log points) | -0.077 | -0.066 | 0.055 | 0.042 |
| U.S. resident population (% change) | -0.027 | -0.022 | 0.016 | 0.013 |
| *Panel B. Chinese-origin U.S. residents* | | | | |
| Consumption per person (log points) | -1.855 | -0.049 | 0.115 | 0.025 |
| Inclusive-value welfare (log points) | -1.578 | -0.053 | 0.112 | 0.026 |
| Entrepreneurship rate (percentage points) | -0.354 | 0.006 | 0.015 | -0.005 |
| Founder revenue share (percentage points) | -0.064 | 0.003 | 0.002 | 0.000 |
| U.S. residence stock (% change) | -0.067 | 0.250 | 0.146 | 0.093 |
| *Panel C. Mexican-origin U.S. residents* | | | | |
| Consumption per person (log points) | 0.251 | -0.060 | 0.627 | 0.202 |
| Inclusive-value welfare (log points) | 0.042 | -0.069 | 0.327 | 0.120 |
| Entrepreneurship rate (percentage points) | 0.036 | 0.002 | 0.081 | 0.020 |
| Founder revenue share (percentage points) | 0.044 | -0.011 | 0.091 | 0.030 |
| U.S. residence stock (% change) | -0.311 | -0.303 | 0.403 | 0.352 |
| *Panel D. Canadian-origin U.S. residents* | | | | |
| Consumption per person (log points) | 0.111 | 0.155 | 0.168 | 0.063 |
| Inclusive-value welfare (log points) | -0.022 | 0.000 | 0.099 | 0.052 |
| Entrepreneurship rate (percentage points) | 0.020 | 0.023 | 0.011 | 0.001 |
| Founder revenue share (percentage points) | 0.002 | 0.003 | 0.009 | 0.004 |
| U.S. residence stock (% change) | -0.228 | -0.199 | 0.241 | 0.202 |
| *Panel E. U.S.-born U.S. residents* | | | | |
| Consumption per person (log points) | -0.069 | -0.070 | 0.039 | 0.039 |
| Inclusive-value welfare (log points) | -0.068 | -0.070 | 0.039 | 0.039 |
| Entrepreneurship rate (percentage points) | 0.003 | 0.001 | -0.003 | -0.001 |
| Founder revenue share (percentage points) | 0.073 | 0.000 | -0.124 | -0.034 |
| U.S. residence stock (% change) | -0.003 | -0.002 | 0.001 | 0.001 |

*Notes.* All outcomes refer to U.S. residents. Each column compares post-policy and pre-policy equilibria under the same cost regime, after removing trade deficits. Tariff changes and equalization of search costs follow Table 8. Residence, occupation, sourcing, wages, prices, expenditure, and rebates adjust in every country. Migration costs and worldwide birth-origin populations remain fixed, with $\varrho = 2$. Both calibrations match baseline residence stocks and founder moments under productivity selection, retaining the fixed-residence productivity shape parameters. Consumption includes after-tax income and rebated income-tax and tariff revenue. Welfare is occupational inclusive value conditional on U.S. residence, excluding residence tastes. Consumption, welfare, and entrepreneurship rates use each equilibrium's selected resident productivity distribution. Log points are $100 \log(\text{post}/\text{pre})$; rates and shares are percentage-point changes. Residence-stock and population changes are $100(L_{\text{post}}/L_{\text{pre}} - 1)$, using each column's own pre-policy population. Founder revenue shares are shares of all U.S. firms' revenue.

Equalizing search costs reduces Mexican-origin consumption gains from NAFTA from $0.629\%$ to $0.202\%$. Chinese-origin consumption losses in the tariff war fall from $1.838\%$ to $0.049\%$.

## D.5 Alternative Immigrant-Population Profiles

Table D.13 supplements the population exercises in Section 5.3 by giving the United States each comparison country's immigrant share and origin mix, holding the U.S.-born population fixed. Each origin retains its calibrated characteristics; occupation and sourcing adjust. The indented rows report search-cost contributions, and the Share and Mix columns give a Shapley decomposition. Appendix C.8.2 describes the population construction and decomposition.

Table D.13: U.S. outcomes under alternative immigrant-population profiles

| | Demographic change | | Consumption per capita | | | U.S.-born welfare | | | |
|---|---|---|---|---|---|---|---|---|---|
| Profile | Δ foreign-born share (pp) | Largest origin-mix change | Total | Share | Mix | Total | Share | Mix | Largest materials-import change (%) |
| Philippines | -12.89 | CHN + | -8.72 | -9.21 | 0.48 | -6.48 | -6.66 | 0.19 | MEX -35.22 |
| *Search costs (pp)* | | | -0.19 | -0.30 | +0.11 | -0.07 | -0.13 | +0.06 | |
| Vietnam | -12.87 | ROW − | -8.70 | -9.81 | 1.11 | -6.47 | -6.89 | 0.43 | MEX -35.05 |
| *Search costs (pp)* | | | -0.19 | -0.54 | +0.35 | -0.07 | -0.24 | +0.17 | |
| China | -12.86 | ROW + | -8.70 | -9.13 | 0.44 | -6.46 | -6.61 | 0.15 | MEX -35.10 |
| *Search costs (pp)* | | | -0.19 | -0.32 | +0.13 | -0.07 | -0.13 | +0.06 | |
| India | -12.63 | ROW + | -8.57 | -8.38 | -0.18 | -6.36 | -6.30 | -0.06 | MEX -34.77 |
| *Search costs (pp)* | | | -0.19 | -0.16 | -0.02 | -0.07 | -0.06 | -0.01 | |
| Mexico | -12.53 | ROW + | -8.49 | -8.58 | 0.10 | -6.31 | -6.34 | 0.03 | MEX -34.53 |
| *Search costs (pp)* | | | -0.18 | -0.19 | +0.01 | -0.07 | -0.07 | 0.00 | |
| Rest of world | -12.19 | ROW − | -8.16 | -9.11 | 0.95 | -6.13 | -6.46 | 0.33 | MEX -34.36 |
| *Search costs (pp)* | | | -0.17 | -0.25 | +0.09 | -0.06 | -0.11 | +0.05 | |
| Poland | -11.13 | MEX − | -7.36 | -8.23 | 0.87 | -5.61 | -5.89 | 0.28 | MEX -31.33 |
| *Search costs (pp)* | | | -0.13 | -0.23 | +0.10 | -0.06 | -0.09 | +0.04 | |
| Japan | -10.43 | MEX − | -7.01 | -7.36 | 0.34 | -5.31 | -5.44 | 0.13 | MEX -31.79 |
| *Search costs (pp)* | | | -0.12 | -0.21 | +0.10 | -0.04 | -0.10 | +0.05 | |
| South Korea | -10.08 | CHN + | -6.93 | -6.87 | -0.05 | -5.18 | -5.19 | 0.02 | MEX -32.08 |
| *Search costs (pp)* | | | -0.11 | -0.20 | +0.08 | -0.04 | -0.10 | +0.06 | |
| Taiwan | -8.58 | MEX − | -5.96 | -5.88 | -0.08 | -4.47 | -4.46 | -0.01 | MEX -30.65 |
| *Search costs (pp)* | | | -0.12 | -0.12 | 0.00 | -0.04 | -0.06 | +0.01 | |
| Italy | -2.71 | ROW + | -2.01 | -1.91 | -0.09 | -1.50 | -1.48 | -0.02 | KOR -21.53 |
| *Search costs (pp)* | | | -0.05 | -0.04 | -0.02 | -0.02 | -0.02 | 0.00 | |
| United Kingdom | -1.26 | MEX − | -0.44 | -0.93 | 0.48 | -0.55 | -0.71 | 0.16 | POL +202.05 |
| *Search costs (pp)* | | | 0.00 | -0.02 | +0.02 | 0.00 | -0.01 | +0.01 | |
| Germany | 0.88 | ROW + | 0.87 | 0.64 | 0.23 | 0.57 | 0.50 | 0.08 | POL +375.61 |
| *Search costs (pp)* | | | +0.03 | +0.01 | +0.01 | +0.02 | +0.01 | +0.01 | |
| Canada | 8.04 | MEX − | 7.06 | 6.25 | 0.81 | 5.19 | 4.89 | 0.30 | GBR +62.48 |
| *Search costs (pp)* | | | +0.21 | +0.12 | +0.09 | +0.12 | +0.07 | +0.05 | |

*Notes.* Each profile's first line reports the full effects; the indented line reports the search-cost contribution. The exercise uses the fixed-residence benchmark with 2020 WPP/DESA population profiles, constructed as described in Appendix C.8.2. U.S.-born population and foreign wages, prices, and expenditure remain fixed; U.S. occupation and sourcing adjust. Consumption and U.S.-born occupational inclusive-value welfare totals are percentage changes from the U.S. reference with balanced trade. Consumption covers all U.S. residents; welfare conditions on U.S. residence. Share and Mix separate changes in the immigrant share and origin composition using a Shapley decomposition; they are in percentage points and sum to Total before rounding. Indented entries subtract effects under equalized foreign-source search costs from those under measured costs, each relative to its own baseline, in percentage points. The demographic columns report the foreign-born share change in percentage points and the origin with the largest absolute change in its share among the foreign-born; + and − indicate increases and decreases. The last column identifies the foreign source with the largest absolute percentage change in tariff-inclusive materials purchases under the full profile change and reports that change, as in Figure 3. ROW denotes Rest of World and is included among origins and foreign sources.

Adopting Canada's profile raises consumption per capita by 7.06% and U.S.-born welfare by 5.19%.

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