# The International Organization of Production in the Regulatory Void

Online Appendix

Philipp Herkenhoff* Sebastian Krautheim†

February 2020

*Johannes Gutenberg University Mainz
†University of Passau and CESifo. Corresponding author, email: sebastian.krautheim@alumni.eui.eu.

This Online Appendix contains three parts. In Section OA.1 we report results of several robustness checks of the explorative empirics in Section 2 of the main paper. Section OA.2 provides the solution to the extended model discussed in Section 4 of the main paper. We discuss our data sources in Section OA.3.

## OA.1 Empirical Robustness

In this section we assess the robustness of our results from the explorative empirics in Section 2 of the main paper. We proceed in three steps. First, we add additional industry-level control variables to assess the robustness of the level effect of ECSP. Next, we assess the robustness of the interaction effect by using industry-time FE and adding additional country-industry interaction terms controlling for institutional and endowment-based sources of comparative advantage. In a third step, we make two modifications to the regression sample.

### OA.1.1 Additional Industry Controls

Antràs and Chor (2013) have recently documented the importance of the average relative position of an industry in production chains as a determinant of intrafirm trade. In particular, they show in their model that headquarters tend to integrate more upstream stages of production when demand is relatively inelastic and outsource downstream stages. Conversely, when demand is relatively elastic, upstream stages are outsourced and more downstream stages are integrated. We construct the measure $DUse\_TUse$ developed by Antràs and Chor (2013) to account for the average relative position of an industry in production chains using the detailed BEA 2007 Input-Output Use table following the implementation laid out in their paper.[1] Of all output an industry produces for intermediate use in other industries, $DUse\_TUse$ is the share of that output that is used in the production of final output (direct use over total use). A larger $DUse\_TUse$ value therefore indicates a greater average "downstreamness" of an industry.

In Table OA.1, we add the interaction of $DUse\_TUse$ with the import demand elasticity estimates from Broda and Weinstein (2006) to our baseline specification. The level effect of the dummy variable $1(sigma > median)$ already controls for the elasticity of substitution from the baseline regression in the main paper. Therefore $\log sigma$ is omitted in here as well as in Table OA.2. In column 1, we introduce the new variables into our preferred specification with total cost as the normalization variable. We then introduce our measure of the environmental cost savings potential (ECSP) in column 2 and find that our effect is negative and significant at the 5% level. The magnitude of the coefficient only changes at the fourth decimal place compared to our baseline results in Table 2. The effects of the downstreamness interactions remain stable as well. In column 3 we add the interaction with the environmental policy stringency index (EPSI) and find a positive and significant effect as before. Compared to Table 2 also the magnitudes do not change much. Turning to the intensity definition with total sales in columns 4 to 6, we find that our previous results continue to hold here as well when the variables from Antràs and Chor (2013) are introduced. Both the level effect of the unethical environmental cost advantage and the

[1] They construct the measure from the 2002 IO table. Details on our construction are provided in the Data Sources section below.

Table OA.1: Robustness I - Downstreamness

| | Dependent Variable: Intrafirm Import Share | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Intensity Definition: | Total Cost | Total Cost | Total Cost | Total Sales | Total Sales | Total Sales | Payroll | Payroll | Payroll |
| log ECSP | | -0.0223** | -0.0396*** | | -0.0225** | -0.0412*** | | -0.0235** | -0.0270** |
| | | (0.0107) | (0.0141) | | (0.0107) | (0.0139) | | (0.0100) | (0.0135) |
| log ECSP X EPSI | | | 0.00844** | | | 0.00868** | | | 0.00149 |
| | | | (0.00427) | | | (0.00433) | | | (0.00408) |
| log other machinery intensity | 0.0196* | 0.0297*** | 0.0421*** | 0.0177* | 0.0275*** | 0.0342** | 0.0169* | 0.0295*** | 0.0330** |
| | (0.0113) | (0.0109) | (0.0137) | (0.0102) | (0.0104) | (0.0145) | (0.00929) | (0.00978) | (0.0138) |
| log skill intensity | 0.0426** | 0.0420** | 0.0639*** | 0.0320*** | 0.0327*** | 0.0363** | 0.0481* | 0.0521** | 0.0415 |
| | (0.0215) | (0.0207) | (0.0212) | (0.0117) | (0.0114) | (0.0152) | (0.0264) | (0.0254) | (0.0356) |
| log R&D intensity | 0.0216*** | 0.0202*** | 0.0266*** | 0.0224*** | 0.0208*** | 0.0280*** | 0.0212*** | 0.0194*** | 0.0275*** |
| | (0.00371) | (0.00371) | (0.00472) | (0.00367) | (0.00370) | (0.00483) | (0.00424) | (0.00416) | (0.00526) |
| log material intensity | 0.0744 | 0.0594 | 0.137** | 0.0287 | 0.0199 | 0.0208 | -0.00216 | 0.00512 | -0.00679 |
| | (0.0598) | (0.0594) | (0.0551) | (0.0240) | (0.0255) | (0.0338) | (0.0113) | (0.0112) | (0.0115) |
| dispersion | 0.0830*** | 0.0784*** | 0.0875*** | 0.0839*** | 0.0789*** | 0.0889*** | 0.0815*** | 0.0764*** | 0.0872*** |
| | (0.0143) | (0.0135) | (0.0148) | (0.0144) | (0.0137) | (0.0156) | (0.0146) | (0.0136) | (0.0158) |
| log building intensity | -0.00833 | -0.00683 | -0.00793 | -0.00854 | -0.00732 | -0.00885 | -0.0112** | -0.00900 | -0.0107 |
| | (0.00572) | (0.00570) | (0.00730) | (0.00583) | (0.00577) | (0.00713) | (0.00566) | (0.00570) | (0.00745) |
| log auto intensity | -0.0116*** | -0.0119*** | -0.0183*** | -0.0128*** | -0.0127*** | -0.0207*** | -0.0108** | -0.0110*** | -0.0191*** |
| | (0.00435) | (0.00419) | (0.00588) | (0.00436) | (0.00421) | (0.00604) | (0.00437) | (0.00415) | (0.00615) |
| log computer intensity | -0.00899 | -0.0121* | 0.00231 | -0.00808 | -0.0117* | 0.00305 | -0.0112* | -0.0144** | 0.000475 |
| | (0.00646) | (0.00648) | (0.0100) | (0.00628) | (0.00647) | (0.0103) | (0.00638) | (0.00624) | (0.0102) |
| 1(sigma<median) X DUse_TUse | -0.169*** | -0.170*** | -0.172*** | -0.167*** | -0.170*** | -0.172*** | -0.171*** | -0.172*** | -0.173*** |
| | (0.0332) | (0.0318) | (0.0453) | (0.0336) | (0.0321) | (0.0465) | (0.0338) | (0.0320) | (0.0462) |
| 1(sigma>median) X DUse_TUse | -0.122*** | -0.126*** | -0.137*** | -0.109*** | -0.119*** | -0.124*** | -0.118*** | -0.122*** | -0.134*** |
| | (0.0291) | (0.0294) | (0.0372) | (0.0318) | (0.0312) | (0.0379) | (0.0281) | (0.0285) | (0.0367) |
| 1(sigma>median) | -0.0348 | -0.0308 | -0.0196 | -0.0391 | -0.0333 | -0.0248 | -0.0390 | -0.0345 | -0.0220 |
| | (0.0279) | (0.0272) | (0.0354) | (0.0282) | (0.0272) | (0.0354) | (0.0277) | (0.0267) | (0.0354) |
| Country-Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| IO2007 industry clusters | 211 | 211 | 211 | 211 | 211 | 211 | 211 | 211 | 211 |
| Observations | 130,920 | 130,337 | 35,416 | 130,920 | 130,337 | 35,416 | 130,920 | 130,337 | 35,416 |
| Adj. R-squared | 0.177 | 0.179 | 0.178 | 0.177 | 0.179 | 0.176 | 0.177 | 0.179 | 0.175 |

Note: Estimation by OLS with standard errors clustered at the industry level reported in parentheses. ***, **, and * denote significance the 1%, 5%, and 10% level, respectively. log ECSP is the log of expenditure on waste and hazardous materials removal over total cost, industry sales or payroll. sigma is the estimate of the import demand elasticity from Broda and Weinstein (2006). DUse_TUse measures the share of output of an industry used in production of final output relative to total demand for that industry's output as an intermediate input.

interaction effect with the environmental stringency index remain at magnitudes very similar to the ones estimated in Table 2.

In columns 7 to 9 we report the results with the payroll normalization. Compared to Table 2, the level effect in column 8 changes only in the fourth decimal place. When the environmental stringency index is added in column 9, the level effect continues to be significant and the interaction effect is positive and insignificant, as in Table 2.

In Table OA.2, we add additional controls that have been suggested as determinants of intrafirm trade in the literature to our preferred specification. In columns 1 and 2 we introduce the value added share in total sales, in columns 3 and 4 we add the 'importance' of an input measured as the total use of an industry's output as an intermediate input relative to total input purchases by all its buyers. Intermediation in columns 5 and 6 comes from Bernard, Jensen, Redding, and Schott (2013) and is a measure of the importance of intermediaries in the form of wholesalers in a given industry calculated from firm-level data. In columns 7 and 8 we add a measure of industry contractibility based on Nunn

Table OA.2: Robustness II - Additional Controls - Total Cost Definition

| | Dependent Variable: Intrafirm Import Share | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Intensity Definition: | Total Cost | Total Cost | Total Cost | Total Cost | Total Cost | Total Cost | Total Cost | Total Cost | Total Cost | Total Cost |
| log ECSP | -0.0215* | -0.0386*** | -0.0224** | -0.0400*** | -0.0143 | -0.0294** | -0.0137 | -0.0261* | -0.00679 | -0.0176 |
| | (0.0112) | (0.0142) | (0.0105) | (0.0141) | (0.0102) | (0.0142) | (0.0108) | (0.0139) | (0.0112) | (0.0142) |
| log ECSP | | 0.00846** | | 0.00857** | | 0.00875** | | 0.00814* | | 0.00844* |
| X EPSI | | (0.00427) | | (0.00428) | | (0.00426) | | (0.00434) | | (0.00434) |
| log other machinery intensity | 0.0308*** | 0.0434*** | 0.0303*** | 0.0422*** | 0.0218** | 0.0305** | 0.0310*** | 0.0476*** | 0.0244** | 0.0359*** |
| | (0.0112) | (0.0141) | (0.0105) | (0.0136) | (0.0109) | (0.0131) | (0.0109) | (0.0135) | (0.0107) | (0.0132) |
| log skill intensity | 0.0444** | 0.0663*** | 0.0493*** | 0.0673*** | 0.0383** | 0.0573*** | 0.0290 | 0.0450** | 0.0315* | 0.0399** |
| | (0.0214) | (0.0211) | (0.0165) | (0.0205) | (0.0184) | (0.0191) | (0.0214) | (0.0223) | (0.0172) | (0.0199) |
| log R&D intensity | 0.0202*** | 0.0266*** | 0.0197*** | 0.0265*** | 0.0158*** | 0.0204*** | 0.0193*** | 0.0253*** | 0.0153*** | 0.0197*** |
| | (0.00369) | (0.00471) | (0.00363) | (0.00465) | (0.00417) | (0.00467) | (0.00360) | (0.00455) | (0.00395) | (0.00447) |
| log material intensity | 0.0498 | 0.127* | 0.0790 | 0.145*** | 0.0489 | 0.119** | 0.0650 | 0.144*** | 0.0686 | 0.132** |
| | (0.0627) | (0.0646) | (0.0505) | (0.0536) | (0.0551) | (0.0523) | (0.0613) | (0.0547) | (0.0537) | (0.0600) |
| dispersion | 0.0781*** | 0.0873*** | 0.0853*** | 0.0916*** | 0.0840*** | 0.0996*** | 0.0796*** | 0.0890*** | 0.0891*** | 0.100*** |
| | (0.0134) | (0.0148) | (0.0117) | (0.0148) | (0.0119) | (0.0156) | (0.0127) | (0.0143) | (0.0117) | (0.0160) |
| log building intensity | -0.00646 | -0.00752 | -0.00728 | -0.00841 | -0.00561 | -0.00659 | -0.00397 | -0.00368 | -0.00298 | -0.00253 |
| | (0.00570) | (0.00709) | (0.00564) | (0.00727) | (0.00547) | (0.00696) | (0.00529) | (0.00666) | (0.00514) | (0.00627) |
| log auto intensity | -0.0120*** | -0.0186*** | -0.00864** | -0.0162*** | -0.00752* | -0.0114* | -0.0139*** | -0.0207*** | -0.00821** | -0.0140** |
| | (0.00421) | (0.00592) | (0.00401) | (0.00616) | (0.00408) | (0.00630) | (0.00432) | (0.00608) | (0.00414) | (0.00661) |
| log computer intensity | -0.0117* | 0.00274 | -0.0125* | 0.00221 | -0.0114* | 0.00342 | -0.0135* | -0.000120 | -0.0130* | 0.00117 |
| | (0.00650) | (0.0101) | (0.00637) | (0.00998) | (0.00651) | (0.00976) | (0.00686) | (0.00991) | (0.00691) | (0.00982) |
| 1(sigma<median) | -0.169*** | -0.172*** | -0.177*** | -0.177*** | -0.137*** | -0.126*** | -0.178*** | -0.184*** | -0.154*** | -0.142*** |
| X DUse_TUse | (0.0321) | (0.0457) | (0.0328) | (0.0458) | (0.0328) | (0.0467) | (0.0305) | (0.0422) | (0.0338) | (0.0455) |
| 1(sigma>median) | -0.121*** | -0.132*** | -0.123*** | -0.135*** | -0.103*** | -0.109*** | -0.145*** | -0.175*** | -0.124*** | -0.149*** |
| X DUse_TUse | (0.0320) | (0.0388) | (0.0286) | (0.0368) | (0.0299) | (0.0376) | (0.0285) | (0.0363) | (0.0307) | (0.0382) |
| 1(sigma>median) | -0.0321 | -0.0213 | -0.0360 | -0.0233 | -0.0236 | -0.00844 | -0.0229 | -0.00151 | -0.0205 | 0.00758 |
| | (0.0272) | (0.0351) | (0.0275) | (0.0356) | (0.0271) | (0.0358) | (0.0265) | (0.0338) | (0.0260) | (0.0329) |
| value added share | -0.0380 | -0.0391 | | | | | | | -0.00244 | 0.0117 |
| | (0.0908) | (0.107) | | | | | | | (0.0829) | (0.0900) |
| input importance | | | 1.732** | 1.081 | | | | | 1.078 | 0.0330 |
| | | | (0.812) | (0.904) | | | | | (0.778) | (0.921) |
| intermediation | | | | | -0.166*** | -0.241*** | | | -0.137*** | -0.218*** |
| | | | | | (0.0488) | (0.0601) | | | (0.0499) | (0.0616) |
| contractibility | | | | | | | -0.0624*** | -0.0927*** | -0.0605*** | -0.0876*** |
| | | | | | | | (0.0178) | (0.0234) | (0.0178) | (0.0217) |
| Country-Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| IO2007 industry clusters | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 | 205 |
| Observations | 130,337 | 35,416 | 130,337 | 35,416 | 130,337 | 35,416 | 127,484 | 34,547 | 127,484 | 34,547 |
| Adj. R-squared | 0.179 | 0.178 | 0.180 | 0.178 | 0.182 | 0.185 | 0.182 | 0.185 | 0.185 | 0.191 |

Note: Estimation by OLS with standard errors clustered at the industry level reported in parentheses. ***, **, and * denote significance the 1%, 5%, and 10% level, respectively. log ECSP is the log of expenditure on waste and hazardous materials removal over total cost. sigma is the estimate of the import demand elasticity from Broda and Weinstein (2006). DUse_TUse measures the share of output of an industry used in production of final output relative to total demand for that industry's output as an intermediate input.

and Trefler (2008).[2] Finally, in columns 9 and 10, we add all of the new controls jointly.

In column 1, the value added share makes the level effect of the ECSP insignificant, but when we add the interaction with the EPSI in column 2, both the coefficients are significant and at comparable levels to our main specification in Table 2 in terms of magnitude. In column 3, the level effect remains significant at 10% when input importance is introduced. The specification with the interaction effectively replicates the result from Table 2. The intermediation and contractibility variable render the level effect of the unethical cost advantage insignificant. Our results return, however, when we add the interaction effect. The magnitude of the level effect is diminished and significance reduced to 10% and 5%, respectively. The interaction effect continues to be significant at the 5% level at a stable magnitude. When we add all of

[2]The construction of all these variables is described in the Data Appendix below.

the additional controls in columns 9 and 10, the level effect of the unethical environmental cost advantage disappears, but the interaction effect continues to be significant.

### OA.1.2 Additional Country-Industry Interactions

Next, we assess the robustness of the interaction effect between ECSP and EPSI. We introduce industry-year FE to capture all industry characteristics that might determine the intrafirm trade share and add additional country-industry interactions. Because the interaction of log ECSP and EPSI is the only country-industry interaction in our main specification, the concern arises that this interaction term picks up country-industry variation that is unrelated to our variable of interest. We therefore follow Antràs (2016) and control for capital and skill abundance in interaction with (aggregated) capital and skill intensity as well as other institutional determinants of comparative advantage. In particular, we interact the controls for contractibility and intermediation from Table OA.2 with the strength of the rule of law in the exporting country. We also introduce three country-industry interactions that are not modeled in our theory but have featured prominently in recent work on institutional determinants of comparative advantage. We interact the external financial dependence measure from Rajan and Zingales (1998) as well as the asset tangibility measure from Braun (2002) with the ratio of private credit to GDP as a proxy for country-level financial development. Finally, we control for the interaction of sales volatility and labor market flexibility from Cuñat and Melitz (2012).

Table OA.3 shows that the effects of our variables of interest are robust to the inclusion of these additional controls and fixed effects. The interaction term of log ECSP with EPSI is significant, except when we normalize by payroll.

### OA.1.3 Changes to the Regression Sample

#### OA.1.3.1 Holding the Sample Constant

Because the OECD environmental stringency index is only available for 32 countries (excluding the U.S.) and for the period 2007 to 2012, the sample size in our main specification drops considerably when we add the interaction of the index with our measure of the environmental cost savings potential. In this section we report the specifications without the interaction effect, but with the smaller subsample. Table OA.4 shows our results. Columns 3, 6, and 9 replicate the respective columns from Table 2 in the main text. In column 2, the total cost specification, the level effect of the ECSP is negative as expected, but insignificant. The same holds for the coefficient in the total sales specification in column 5. When we normalize with payroll, the coefficient is negative and significant at the 5%-level. For our preferred specifications with total cost and total sales, the insignificant coefficients in columns 2 and 5 are consistent with our theory. In Section 2.4 we argue that we should find a negative level effect if most of the countries and territories have more lenient regulation than the U.S. Here we reduce the sample to OECD economies with similar levels of regulation to the U.S. plus six emerging economies. In light of this argument and our theoretical analysis in Section 3, it is therefore not surprising that we cannot find a significant level effect.

Table OA.3: Robustness III - Country-Industry Interactions

| Dependent Variable: Intrafirm Import Share | | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Intensity Definition: | Total Cost | Total Cost | Total Sales | Total Sales | Payroll | Payroll |
| log ECSP | 0.0101** | 0.0123*** | 0.0107** | 0.0125*** | 0.00262 | 0.00263 |
| X EPSI | (0.00427) | (0.00448) | (0.00428) | (0.00433) | (0.00401) | (0.00447) |
| log skill int. | | 0.0159 | | 0.0123 | | 0.000406 |
| X log skill abund. | | (0.0189) | | (0.0190) | | (0.0437) |
| log capital int. | | -0.00104 | | 0.000680 | | -0.00238 |
| X log capital abund. | | (0.00724) | | (0.00733) | | (0.00584) |
| external finance dep. | | 0.000175 | | 0.000176 | | 0.000187 |
| X credit/GDP | | (0.000124) | | (0.000124) | | (0.000124) |
| asset tangibility | | 0.00129** | | 0.00122** | | 0.00128** |
| X credit/GDP | | (0.000610) | | (0.000607) | | (0.000611) |
| sales volatility | | -0.233 | | -0.242 | | -0.235 |
| X labor market flex. | | (0.375) | | (0.372) | | (0.372) |
| intermediation | | -0.271 | | -0.271 | | -0.218 |
| X rule of law | | (0.172) | | (0.169) | | (0.174) |
| contractibility | | 0.0195 | | 0.0187 | | 0.0264 |
| X rule of law | | (0.0638) | | (0.0611) | | (0.0638) |
| Country-Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry-Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| IO2007 industry clusters | 210 | 210 | 210 | 210 | 210 | 210 |
| Observations | 38,093 | 36,397 | 38,397 | 36,669 | 38,397 | 36,669 |
| Adjusted R-squared | 0.245 | 0.248 | 0.244 | 0.247 | 0.244 | 0.246 |

Note: Estimation by OLS with standard errors clustered at the industry level reported in parentheses. ***, **, and * denote significance the 1%, 5%, and 10% level, respectively. log ECSP is the log of expenditure on waste and hazardous materials removal over total cost.

#### OA.1.3.2 Correctly Identifying the Headquarters

The import data we employ not only contain transactions between U.S. headquarters importing intermediate goods from foreign suppliers (the setting studied in the model), but also shipments for U.S. subsidiaries from foreign headquarter firms, for example. To increase the confidence that we are in fact measuring flows that are consistent with the model setup, we follow Nunn and Trefler (2013) and exclude the five countries Iceland, Italy, Finland, Liechtenstein and Switzerland from the analysis in this section and rerun the regressions from the main results table in the paper. The five countries are chosen based on data on parent-subsidiary links from ORBIS data. The subsidiaries of multinational companies present in these countries have the highest share of non-U.S. parents. Therefore, following Nunn and Trefler (2013), U.S. imports from these countries are most likely to contain a significant share of U.S. subsidiary imports.

Table OA.5 shows that the coefficients of our variables of interest are robust to the omission of those five countries. In fact, and consistent with the premise of our model, the coefficients become larger and more significant. We argue that the coefficients are driven by countries with weak regulatory environments. It is therefore in line with our reasoning that the effects become stronger when five highly developed economies with strong regulatory environments are excluded from the analysis.

Table OA.4: Robustness IV - Constant Sample

| | Dependent Variable: Intrafirm Import Share | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Intensity Definition: | Total Cost | Total Cost | Total Cost | Total Sales | Total Sales | Total Sales | Payroll | Payroll | Payroll |
| log ECSP | | -0.0193 | -0.0401*** | | -0.0174 | -0.0388*** | | -0.0230** | -0.0270* |
| | | (0.0120) | (0.0143) | | (0.0118) | (0.0143) | | (0.0115) | (0.0140) |
| log ECSP X EPSI | | | 0.00893** | | | 0.00917** | | | 0.00174 |
| | | | (0.00428) | | | (0.00434) | | | (0.00410) |
| sigma | -8.58e-06 | -5.11e-05 | -4.90e-05 | 3.92e-05 | -1.20e-05 | -1.10e-05 | -7.46e-05 | -0.000110 | -0.000110 |
| | (0.000621) | (0.000619) | (0.000619) | (0.000593) | (0.000595) | (0.000594) | (0.000649) | (0.000643) | (0.000643) |
| log other machinery intensity | 0.0466*** | 0.0561*** | 0.0560*** | 0.0419*** | 0.0504*** | 0.0503*** | 0.0354*** | 0.0488*** | 0.0488*** |
| | (0.0131) | (0.0140) | (0.0140) | (0.0132) | (0.0144) | (0.0145) | (0.0128) | (0.0137) | (0.0137) |
| log skill intensity | 0.0605*** | 0.0583*** | 0.0584*** | 0.0381** | 0.0375** | 0.0375** | 0.0462 | 0.0491 | 0.0491 |
| | (0.0217) | (0.0211) | (0.0211) | (0.0153) | (0.0152) | (0.0152) | (0.0385) | (0.0375) | (0.0375) |
| log R&D intensity | 0.0277*** | 0.0267*** | 0.0267*** | 0.0289*** | 0.0279*** | 0.0278*** | 0.0283*** | 0.0269*** | 0.0269*** |
| | (0.00476) | (0.00480) | (0.00481) | (0.00492) | (0.00494) | (0.00494) | (0.00548) | (0.00543) | (0.00543) |
| log materials intensity | 0.141** | 0.130** | 0.130** | 0.0497 | 0.0452 | 0.0455 | -0.0177 | -0.00969 | -0.00968 |
| | (0.0595) | (0.0590) | (0.0590) | (0.0315) | (0.0329) | (0.0330) | (0.0118) | (0.0116) | (0.0116) |
| dispersion | 0.0898*** | 0.0862*** | 0.0862*** | 0.0904*** | 0.0872*** | 0.0871*** | 0.0895*** | 0.0849*** | 0.0850*** |
| | (0.0141) | (0.0139) | (0.0139) | (0.0147) | (0.0146) | (0.0146) | (0.0151) | (0.0147) | (0.0147) |
| log building intensity | -0.0130* | -0.0117 | -0.0117 | -0.0111 | -0.0103 | -0.0103 | -0.0165** | -0.0146* | -0.0146* |
| | (0.00772) | (0.00770) | (0.00771) | (0.00743) | (0.00739) | (0.00740) | (0.00771) | (0.00774) | (0.00774) |
| log auto intensity | -0.0184*** | -0.0181*** | -0.0182*** | -0.0217*** | -0.0210*** | -0.0211*** | -0.0188*** | -0.0182*** | -0.0182*** |
| | (0.00616) | (0.00597) | (0.00597) | (0.00625) | (0.00614) | (0.00615) | (0.00657) | (0.00629) | (0.00629) |
| log computer intensity | 0.00339 | 0.000582 | 0.000720 | 0.00615 | 0.00322 | 0.00337 | 0.00105 | -0.00235 | -0.00233 |
| | (0.0105) | (0.0106) | (0.0106) | (0.0106) | (0.0108) | (0.0108) | (0.0110) | (0.0109) | (0.0109) |
| Country-Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| IO2007 industry clusters | 212 | 212 | 212 | 212 | 212 | 212 | 212 | 212 | 212 |
| Observations | 35,434 | 35,434 | 35,434 | 35,434 | 35,434 | 35,434 | 35,434 | 35,434 | 35,434 |
| Adj. R-squared | 0.163 | 0.164 | 0.164 | 0.163 | 0.164 | 0.164 | 0.161 | 0.162 | 0.162 |

Note: Estimation by OLS with standard errors clustered at the industry level reported in parentheses. ***, **, and * denote significance the 1%, 5%, and 10% level, respectively. log ECSP is the log of expenditure on waste and hazardous materials removal over total cost, total sales, or payroll. sigma is the estimate of the import demand elasticity from Broda and Weinstein (2006).

## OA.2 Solving the Extended Model

We solve the extended model by backward induction. As we have seen above, in period $t_5$, all firms not having faced a boycott in period $t_3$ set the same price and generate the same revenues as in equation (6) of the baseline model. Bargaining takes place in period $t_4$ and also delivers the same outcome as in the baseline model. In period $t_3$ nature decides which of the unethical firms face a boycott. A fraction $1-\gamma$ of firms is investigated. The unethical firms among them are boycotted. In period $t_2$, production of intermediates takes place, again with the same quantities as in the baseline model.

These quantities are chosen in period $t_1(b)$ and are given by (10) for the headquarter and by (11) for the supplier. Firms who choose to produce ethically and those who would like to be unethical but only have the ethical technology available reach these investment quantities in the investment game with continuous best response functions. Firms who have the unethical technology available and whose suppliers choose to use it, optimally mimic the firms who are forced to be ethical.

In period $t_1(a)$, the supplier finds out whether it is able to use the unethical technology in the production of the variety $\omega$ it has been matched with. It then maximizes expected profits by comparing expected unethical profits of mimicking $E(\pi^u_{S,k})$ to the certain profits of ethical production $\pi^e_{S,k}$ (as well

Table OA.5: Robustness V - Correct Headquarter Identification

| | Dependent Variable: Intrafirm Import Share | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Intensity Definition: | Total Cost | Total Cost | Total Cost | Total Sales | Total Sales | Total Sales | Payroll | Payroll | Payroll |
| log ECSP | | -0.0243** | -0.0435*** | | -0.0215* | -0.0423*** | | -0.0253** | -0.0322** |
| | | (0.0122) | (0.0144) | | (0.0119) | (0.0144) | | (0.0114) | (0.0138) |
| log ECSP | | | 0.00916** | | | 0.00966** | | | 0.00273 |
| X EPSI | | | (0.00431) | | | (0.00442) | | | (0.00393) |
| sigma | -0.000384 | -0.000561 | -2.97e-06 | -0.000189 | -0.000379 | 5.11e-05 | -0.000375 | -0.000549 | -6.34e-05 |
| | (0.000521) | (0.000521) | (0.000688) | (0.000461) | (0.000473) | (0.000663) | (0.000523) | (0.000522) | (0.000711) |
| log other machinery intensity | 0.0284** | 0.0391*** | 0.0602*** | 0.0306*** | 0.0400*** | 0.0556*** | 0.0266*** | 0.0398*** | 0.0532*** |
| | (0.0115) | (0.0111) | (0.0142) | (0.0101) | (0.0102) | (0.0145) | (0.00971) | (0.0101) | (0.0140) |
| log skill intensity | 0.0365 | 0.0341 | 0.0539** | 0.0338*** | 0.0336*** | 0.0361** | 0.0460 | 0.0489* | 0.0432 |
| | (0.0226) | (0.0217) | (0.0218) | (0.0124) | (0.0121) | (0.0151) | (0.0284) | (0.0277) | (0.0378) |
| log R&D intensity | 0.0221*** | 0.0206*** | 0.0265*** | 0.0222*** | 0.0208*** | 0.0275*** | 0.0214*** | 0.0196*** | 0.0268*** |
| | (0.00387) | (0.00399) | (0.00476) | (0.00376) | (0.00389) | (0.00486) | (0.00448) | (0.00449) | (0.00538) |
| dispersion | 0.0842*** | 0.0788*** | 0.0853*** | 0.0837*** | 0.0789*** | 0.0862*** | 0.0824*** | 0.0765*** | 0.0844*** |
| | (0.0145) | (0.0140) | (0.0148) | (0.0144) | (0.0141) | (0.0154) | (0.0143) | (0.0137) | (0.0155) |
| log material intensity | 0.0679 | 0.0514 | 0.121** | 0.0572** | 0.0503** | 0.0487 | -0.00428 | 0.00459 | -0.00856 |
| | (0.0648) | (0.0635) | (0.0609) | (0.0221) | (0.0241) | (0.0322) | (0.0119) | (0.0118) | (0.0120) |
| log building intensity | -0.0103 | -0.00833 | -0.0130* | -0.00814 | -0.00671 | -0.0114 | -0.0131** | -0.0104* | -0.0157** |
| | (0.00639) | (0.00639) | (0.00774) | (0.00644) | (0.00637) | (0.00753) | (0.00607) | (0.00622) | (0.00785) |
| log auto intensity | -0.0116** | -0.0119*** | -0.0182*** | -0.0132*** | -0.0131*** | -0.0211*** | -0.0106** | -0.0107** | -0.0183*** |
| | (0.00465) | (0.00443) | (0.00599) | (0.00463) | (0.00446) | (0.00613) | (0.00476) | (0.00447) | (0.00626) |
| log computer intensity | -0.00916 | -0.0123 | -0.000134 | -0.00691 | -0.0103 | 0.00267 | -0.0116 | -0.0148* | -0.00270 |
| | (0.00783) | (0.00792) | (0.0106) | (0.00722) | (0.00758) | (0.0107) | (0.00782) | (0.00776) | (0.0108) |
| Country-Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| IO2007 industry clusters | 212 | 212 | 212 | 212 | 212 | 212 | 212 | 212 | 212 |
| Observations | 124,931 | 124,384 | 32,041 | 124,931 | 124,384 | 32,041 | 124,931 | 124,384 | 32,041 |
| Adj. R-squared | 0.164 | 0.166 | 0.170 | 0.166 | 0.167 | 0.171 | 0.164 | 0.166 | 0.169 |

Note: Estimation by OLS with standard errors clustered at the industry level reported in parentheses. ***, **, and * denote significance the 1%, 5%, and 10% level, respectively. log ECSP is the log of expenditure on waste and hazardous materials removal over total cost. sigma is the estimate of the import demand elasticity from Broda and Weinstein (2006).

as the outcome of zero demand in case of openly unethical production, which is never optimal). This comparison is identical to the baseline model. Although only a fraction $\kappa$ of firms are able to use the unethical technology, from the perspective of an unethical firm the probability of being investigated and being hit by a boycott is $1-\gamma$. Therefore, as in the baseline model, the supplier would prefer unethical production whenever $\beta < \beta_S = 1 - \frac{1-\gamma}{\alpha(1-\mu)}$. Only a fraction $\kappa$ of suppliers is able to use the unethical technology, the others must choose ethical production even if $\beta < \beta_S$. Investments are then made simultaneously and non-cooperatively, where the headquarter spends $c_h h(\omega)^e_k$ on headquarter services and the supplier spends $c^e_m m(\omega)^e_k$ in case of ethical production and $c^u_m m(\omega)^e_k$ otherwise.

In period $t_0$, the headquarter chooses the organizational form and extracts a transfer payment before knowing whether the supplier will be able to use the unethical technology. As in the baseline model, the headquarter intensity $\beta$ determines the organization of production. If $\beta > \beta_S$, the supplier will implement the ethical technology in period $t_1(a)$. The headquarter then chooses outsourcing for $\beta < \beta_e$ and integration otherwise and extracts a transfer payment amounting to the full profits of the supplier under ethical production $\pi^e_{S,k}$ given by equation (17) in the baseline model.

If $\beta < \beta_S$, the headquarter anticipates that the supplier will choose the unethical technology if it is able to do so and mimic ethical firms. At $t_0$, this happens with probability $\kappa$ from the perspective of both supplier and headquarter. The headquarter therefore extracts the supplier's future expected profits, which are now different from the baseline model and given by

$$(1-\kappa)\pi^e_{k,S} + \kappa\ E(\pi^u_{k,S}),$$

where $E(\pi^u_{k,S})$ is given by equation (18) in the baseline model. Accordingly, the organizational decision is now also slightly modified compared to the baseline model. Even with $\beta < \beta_S$, there is still a probability $1-\kappa$ that ethical production takes place. Therefore, the ratio of profits under integration relative to outsourcing is in this case given by

$$\tilde{\Theta}^u(\beta) = \frac{(1-\kappa)\,\Pi^e_V + \kappa E\left(\Pi^u_V\right)}{(1-\kappa)\,\Pi^e_O + \kappa E\left(\Pi^u_O\right)},$$

where $\Pi^e_k$ and $E\left(\Pi^u_k\right)$ are given by equations (20) and (21) from the baseline model. Simplification yields

$$\tilde{\Theta}^u(\beta) = \left[\left(\frac{\phi_V}{\phi_O}\right)^{\beta}\left(\frac{1-\phi_V}{1-\phi_O}\right)^{1-\beta}\right]^{\frac{\alpha}{1-\alpha}} \frac{\gamma' - (1-\beta)\,\alpha\mu' + \phi_V\alpha\left[\mu' - \beta\,(1+\mu')\right]}{\gamma' - (1-\beta)\,\alpha\mu' + \phi_O\alpha\left[\mu' - \beta\,(1+\mu')\right]},$$

where $\gamma' \equiv 1-\kappa\,(1-\gamma)$ and $\mu' \equiv 1-\kappa\,(1-\mu)$. The integration cutoff under unethical production $\tilde{\beta}_u$ is implicitly defined by

$$\tilde{\Theta}^u(\tilde{\beta}_u) = 1. \tag{OA.1}$$

Corollary OA.1 to Lemma 2 summarizes the organization of production with the ethical technology in the extended model.

**Corollary OA.1** *In the extended model, $\beta_e$ is unchanged and still defined by equation* (22).
***Proof:*** *This follows directly from Lemma 2.*

For production using the unethical technology, we can state the following proposition paralleling Proposition 1 from the baseline model.

**Proposition OA.1** *In the extended model, there exists a unique $\beta_e$ below which the headquarter chooses outsourcing irrespective of the technology choice of the supplier. Integration is always chosen for headquarter intensities above $\tilde{\beta}_u$ and it always holds that $\beta_e < \tilde{\beta}_u$. A sufficient condition for a unique interior solution $\tilde{\beta}_u \in (\beta_e, 1)$ to exist is given by $\gamma > 1 - \frac{3(1-\phi_V)}{(3+\phi_V)\kappa}$. For any $\beta \in (\beta_e, \tilde{\beta}_u)$ the headquarter chooses integration if and only if the supplier produces ethically and chooses outsourcing if and only if unethical production is anticipated.*
***Proof:*** *In the text.*

Setting $\kappa = 1$ reduces $\tilde{\Theta}^u(\beta)$ to $\Theta^u(\beta)$ from the baseline model. Inspection of the definitions of $\gamma'$ and $\mu'$ reveals that $\frac{\partial\gamma'}{\partial\gamma} > 0$ with $0 < \gamma < \gamma' < 1$ and that $\frac{\partial\mu'}{\partial\mu} > 0$ with $0 < \mu < \mu' < 1$. This implies that the proofs we provide for existence and uniqueness of the integration cutoff $\beta_u$ as well as the relative size of $\beta_e$ and $\beta_u$ in Appendix Sections A.2.1, A.2.2, and A.2.3 continue to hold qualitatively for $\tilde{\beta}_u$. It also follows directly that $\beta_e < \tilde{\beta}_u < \beta_u$. To see this, note that $\beta_u$ and $\tilde{\beta}_u$ are both decreasing in $\gamma$, and for any value of $\gamma, \kappa \in (0,1)$ it holds that $\gamma' > \gamma$. In terms of parameter constraints, we now require $\gamma' > \frac{4\phi_V}{3+\phi_V}$ for existence and uniqueness. Inserting the definition of $\gamma'$ and solving for $\gamma$ gives the parameter constraint stated in Proposition OA.1. It is straightforward to show that the condition is less strict on $\gamma$ than the condition in the baseline model.

Next, we can state the following proposition about the different cases that may arise in the extended model paralleling Proposition 2 from the baseline model.

**Proposition OA.2** *(i) In the extended model, there exist three possible orderings of $\beta_S$, $\beta_e$, and $\tilde{\beta}_u$ that can arise in equilibrium: $\beta_e < \beta_S < \tilde{\beta}_u$ (Case 1); $\beta_e < \tilde{\beta}_u < \beta_S$ (Case 2) and $\beta_S < \beta_e < \tilde{\beta}_u$ (Case 3). (ii) Define $\tilde{\beta}$ as the headquarter intensity above which integration actually takes place in the extended model. It differs across the three cases and is characterized by:*

$$\tilde{\beta} = \begin{cases} \min\{\beta_S; \tilde{\beta}_u\} & \text{if } \beta_S > \beta_e \\ \beta_e & \text{otherwise.} \end{cases} \tag{OA.2}$$

*(iii) Unethical outsourcing and ethical integration are equilibrium outcomes in all three cases. Unethical integration and ethical outsourcing can occur in equilibrium in Cases 2 and 3, respectively.*
***Proof:*** *In the text.*

The proof follows directly from the proof of Proposition 2 in Appendix Section A.3 together with the parameter constraint from Proposition OA.1, which ensures that $\tilde{\beta}_u \in (0, 1)$. All the relationships given in Appendix Section A.3 hold when $\bar{\beta}$ is replaced with $\tilde{\beta}$ and $\tilde{\beta}_u$ replaces $\beta_u$.

Paralleling Proposition 3 from the baseline model, we can state the following proposition.

**Proposition OA.3** *In the extended model, the outsourcing cutoff is weakly increasing in the unethical cost advantage, i.e. $\frac{\partial \tilde{\beta}}{\partial(1-\mu)} \geq 0$.*
***Proof:*** *In the text.*

It has been shown above that $\beta_S$ and $\beta_e$ remain unchanged in the extended model. Concerning $\tilde{\beta}_u$, Proposition OA.1 implies that Proposition 1 can be applied in the extended model with the adjusted parameter condition. In the proof of Proposition 1, it is shown in Appendix Section A.2.3 that $\beta_u$ is increasing in $1 - \mu$. Because $\mu'$ is increasing in $\mu$, it therefore follows that also $\frac{\partial \tilde{\beta}_u}{\partial 1-\mu} > 0$.

## OA.3 Data Appendix

### OA.3.1 Correlation Table

Table OA.6 provides the pairwise correlations between the explanatory varialbes of our main specification in Section 2.

### OA.3.2 Intrafirm Trade

Data on intrafirm trade flows cover the years 2007 to 2014. Up to and including the year 2012, the data are coded in NAICS 2007 industry codes and the other two years are coded in NAICS 2012. We use the NAICS 2007 concordance with IO2007 industry provided by the BEA with its Input-Output tables and the NAICS 2007 to NAICS 2012 concordance from the U.S. Census Bureau to recode the import flows.

Table OA.6: Correlations Among Explanatory Variables

| | ECSP | Other Machinery | Skill | R&D | Materials | Dispersion | Building | Auto | Computer | Sigma | EPSI |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ECSP | 1 | | | | | | | | | | |
| Other Machinery | 0.4581*** | 1 | | | | | | | | | |
| Skill | -0.1349*** | -0.0653*** | 1 | | | | | | | | |
| R&D | -0.1793*** | -0.0121** | 0.3542*** | 1 | | | | | | | |
| Materials | -0.0731*** | -0.2055*** | -0.8116*** | -0.2007*** | 1 | | | | | | |
| Dispersion | -0.1002*** | 0.0863*** | -0.1215*** | 0.1022*** | 0.1225*** | 1 | | | | | |
| Building | 0.2811*** | 0.5276*** | 0.1181*** | 0.0542*** | -0.2817*** | -0.0037 | 1 | | | | |
| Auto | 0.1239*** | 0.185*** | 0.2689*** | -0.2173*** | -0.352*** | -0.1473*** | 0.1906*** | 1 | | | |
| Computer | -0.0768*** | 0.1679*** | 0.7251*** | 0.2922*** | -0.6533*** | 0.0274*** | 0.2733*** | 0.3231*** | 1 | | |
| Sigma | -0.09*** | -0.1709*** | -0.1381*** | -0.0695*** | 0.1272*** | 0.0172*** | -0.0188*** | -0.0804*** | -0.1172*** | 1 | |
| EPSI | -0.0233*** | -0.0162*** | -0.0037 | -0.0016 | 0.0096* | 0.0045 | -0.0347*** | -0.0179*** | -0.0073 | 0.0089* | 1 |

Note: The table shows the correlation between the logs of the listed variables (except for dispersion, sigma and EPSI, which are in levels) using the cost normalization. The sample is identical to the one from the preferred specification in Column 3 of Table 2.

### OA.3.3 Industry Characteristics

Data used to construct the ECSP measure, capital intensity and its components, skill intensity and material intensity come from from the Annual Survey of Manufactures (ASM). We use data from 2007 to 2014 and exploit variation across industries and over time. The ASM data are slightly more aggregated than 6-digit NAICS 2007 codes for the years 2007 to 2011 and are coded as NAICS 2012 in the remaining three years. We use the concordance between IO2007 and NAICS 2007 provided by the BEA with its 2007 Input-Output tables as well as the NAICS 2012 to NAICS 2007 concordance provided by the U.S. Census Bureau to achieve a consistent aggregation.

Within-industry dispersion is taken from the dataset provided by Antràs and Chor (2013) who in turn take the data from Nunn and Trefler (2008), who construct dispersion as the standard deviation of the HS10 log exports within each HS6 code across U.S. port locations and destination countries from the year 2000. The aggregation of these original estimates to IO2002 codes is described in Antràs and Chor (2013), Appendix B, p. 2201. We take their data and convert them to IO2007 codes.

R&D data come from Compustat. We download information on sales and R&D expenditure of U.S. firms listed in Compustat for the years 2007 to 2014. Each firm-year was provided with the NAICS 2007 industry in which the firm operates. The firm-level observations were aggregated at the NAICS 2007 level and then recoded to IO2007 using the concordance from the BEA Input-Output table.

### OA.3.4 Import Demand Elasticities

For the construction of the IO2007-level import demand elasticities we follow the Antràs and Chor (2013) methodology. First, we combine the original estimates at the HS10-level with a full list of HS10 industry codes from Pierce and Schott (2012). We then employ HS10-level US imports summed over the years 2007 to 2014 from Schott (2008) to generate trade-weighted elasticities for HS10 codes that do not have an estimate. In the first round, we use HS10 codes that share the same first nine digits to generate the missing elasticities. We repeat the procedure using the first eight digits, then seven, up until two digits to fill in as many elasticities as possible. Because there are two different estimates for the same HS10 code 2103204020, we drop the observation. We then use a concordance table built from the BEA IO2002-HS10 concordance and a IO2002-IO2007 crosswalk to aggregate the HS10 codes to IO2007 industries, again using total imports from 2007 to 2014 as weights. We are left with three IO2007 codes without an assigned elasticity: 112120, 323120, and 333295. Those are assigned the values of the nearest neighbors 1121$A$0, 323110, and 33329$A$.

### OA.3.5 Environmental Policy Stringency Index

We download the data from the OECD.stat website from 2007 up to the most recent year for which all countries were assigned an index value, which was 2012 at the time of the download. The data are available from `https://stats.oecd.org/Index.aspx?DataSetCode=EPS`.

### OA.3.6 Data Used for Robustness Checks

**DUse_TUse** *DUse_TUse* measures the share of industry output used as intermediates that is used in final good production. In the construction of this variable we follow closely the description of the implementation in Antràs and Chor (2013), pp. 2160 and 2161, who construct the measure from the 2002 IO Use Table. We use the 2007 IO use table from the BEA to make the data compatible with our time period. Regressing the data provided by Antràs and Chor (2013) on our self-constructed values of *DUse_TUse*, we find an R-squared of 76.8%, a constant term of −0.02689 and slope coefficient of .96902. Because we expect the vertical relationships within an economy to be relatively slow moving over time, these values make us confident about the correctness of our own implementation of the construction.

**Other Controls** We calculate **input importance** from the detailed BEA IO Use Tables after redefinitions. We first isolate intermediate sales to all other industries and intermediate purchases from all other industries for each industry. Next we construct an IO matrix of zeros and ones, where a one indicates a vertical relationship between two industries. By associating the intermediate sales and purchases with this IO matrix, we can recover total intermediate purchases of the industries a particular industry is selling to (its buyer industries). Dividing total intermediate sales of a selling industry by total intermediate purchases of its buyer industries thus gives us a measure of how important the selling industry's output is as an input.

**Contractibility** is a measure of industry contractibility suggested by Nunn and Trefler (2008). We follow Antràs and Chor (2013) and Nunn (2007) in the construction of this measure. We download the original Rauch (1999) data in SITC rev. 2 codes and associate the product classification of the 4-digit codes with HS10 codes from Pierce and Schott (2012). These HS10 codes are then mapped to IO2007 industries via the IO2002-HS10 concordance provided by the BEA and the NAICS 2002 to NAICS 2007 concordances from the US Census Bureau. For each IO2007 industry, we then calculate the share of HS10 codes within each IO2007 code that are classified as neither reference-priced nor traded on an organized exchange (the 'liberal' classification). Contractibility is defined as 1 minus this share.

The **value added share** in industry sales is calculated directly from the Annual Survey of Manufactures. The data contain a variable giving the dollar value of value added in an industry-year. We divide this value by industry sales measured by total value of shipments in the ASM data.

The **intermediation** variable is taken from the Antràs and Chor (2013) dataset who in turn took their data from Bernard, Jensen, Redding, and Schott (2013). They measure the importance of wholesalers as intermediaries in 1997 at the industry level from establishment-level data on wholesale employment shares. Antràs and Chor (2013) describe how they map the data from the original HS2 level to IO2002 industries in their paper in Appendix B, p. 2202. We take their data off the shelf and convert the IO2002 industries to IO2007 industries using the Input-Output tables from the BEA and NAICS 2002 to NAICS 2007 concordances provided by the US Census Bureau.

**Country-Industry Interactions** We take **rule of law** from the World Governance Indicators (Kaufmann, Kraay, and Mastruzzi, 2010), capital abundance is measured as physical capital per worker from the Penn World Tables version 9.0 (Feenstra, Inklaar, and Timmer, 2015) and **skill abundance** is measured as average years of schooling at all levels from the Barro and Lee (2013) dataset.

The following data have all come from the dataset that accompanies Antràs (2016), but have been compiled by different sources which we mention here. **External (financial) dependence** comes from Rajan and Zingales (1998), and **(asset) tangibility** from Braun (2002) . **Credit / GDP** measures credit provided by the banking sector as a percentage of GDP from the World Development Indicators. **(Labor market) flexibility** and **sales volatility** come from Cuñat and Melitz (2012). Where applicable, we convert the IO2002 codes from Antràs (2016) to the IO2007 codes used in our paper.

## References


Antràs, P., and D. Chor (2013): "Organizing the Global Value Chain," *Econometrica*, 81(6), 2127–2204.

Antràs, P. (2016): *Global Production: Firms, Contracts, and Trade Structure*. Princeton University Press.

Barro, R., and J.-W. Lee (2013): "A New Data Set of Educational Attainment in the World, 1950-2010," *Journal of Development Economics*, 104, 184–198.

Bernard, A. B., J. B. Jensen, S. Redding, and P. K. Schott (2013): "Intra-Firm Trade and Product Contractibility," *US Census Bureau Center for Economic Studies Paper No. CES-WP-13-12.*

Braun, M. (2002): "Financial Contractibility and Assets' Hardness: Industrial Composition and Growth," *mimeo, Harvard University.*

Broda, C., and D. E. Weinstein (2006): "Globalization and the Gains from Variety," *Quarterly Journal of Economics*, 121(2), 541–585.

Cuñat, A., and M. J. Melitz (2012): "Volatility, Labor Market Flexibility and the Pattern of Comparative Advantage," *Journal of the European Economic Association*, 10(2), 225–254.

Feenstra, R. C., R. Inklaar, and M. P. Timmer (2015): "The Next Generation of the Penn World Table," *American Economic Review*, 105(10), 3150–3182.

Kaufmann, D., A. Kraay, and M. Mastruzzi (2010): "The Worldwide Governance Indicators : A Summary of Methodology, Data and Analytical Issues," *World Bank Policy Research Working Paper No. 5430.*

Nunn, N. (2007): "Relationship-Specificity, Incomplete Contracts and the Pattern of Trade," *Quarterly Journal of Economics*, 122(2), 569–600.

Nunn, N., and D. Trefler (2008): "The Boundaries of the Multinational Firm: An Empirical Analysis," in *The Organization of Firms in a Global Economy*, ed. by E. Helpman, D. Marin, and T. Verdier, pp. 55–83. Harvard University Press.

——— (2013): "Incomplete Contracts and the Boundaries of the Multinational Firm," *Journal of Economic Behavior and Organization*, 94, 330–344.

Pierce, J. R., and P. K. Schott (2012): "A Concordance Between Ten-Digit U.S. Harmonized System Codes and SIC/NAICS Product Classes and Industries," *Journal of Economic and Social Measurement*, 37(1-2), 61–96.

Rajan, R. G., and L. Zingales (1998): "Financial Dependence and Growth," *American Economic Review*, 88(3), 559–586.

Rauch, J. E. (1999): "Networks versus Markets in International Trade," *Journal of International Economics*, 48, 7–35.

Schott, P. K. (2008): "The Relative Sophistication of Chinese Exports," *Economic Policy*, 53, 5–49.