Spatial Concentration of Sourcing in International Trade: The Role of Institutions[1]

Fariha Kamal[2]
Center for Economic Studies
U.S. Census Bureau
4600 Silver Hill Road
Washington, DC 20233
U.S.A
fariha.kamal@census.gov
+1 (301) 763 4575

Asha Sundaram
Department of Economics
University of Auckland
6103, Owen G Glenn Building
12 Grafton Road, Auckland 1010
New Zealand
assundar.wk@gmail.com
+64 (0) 22 525 0759

Abstract

This paper examines the role of source country institutions in shaping the patterns of spatial concentration of suppliers from these countries selling to individual U.S. importers. We exploit detailed data on U.S. import transactions from suppliers in partner countries in HS4 products to construct an Ellison-Glaeser-type index of spatial concentration of sourcing. We find that the quality of a partner country's institutions is inversely related to the spatial concentration of sourcing in that country. Our findings are consistent with a role for business networks operating within defined geographic boundaries in mitigating the costs of matching and transacting imposed by weak institutions.

JEL Classification: F1, F6, F14, R12
Keywords: exporter-importer match, sourcing, contract enforcement, institutions, trade

[1] Any opinions and conclusions expressed herein are those of the authors and do not necessarily represent the views of the U.S. Census Bureau. All results have been reviewed to ensure that no confidential information is disclosed. We thank Mark Kutzbach, Ben Zissimos, and participants of the lunch seminar at the 2014 Center for Economic Studies, U.S. Census Bureau, 2015 Georgetown Center for Economic Research Conference, Midwest International Trade Meetings, European Trade Study Group (Paris), Syracuse University Trade, Development, and Political Economy seminar series, and 2016 3rd Workshop on Institutions, Trade, and Economic Development for their invaluable comments. All errors and omissions remain our own.

[2] Corresponding author.

1. Introduction

A long line of research has established that the quality of institutions in a country can determine a range of economic outcomes including economic development (Acemoğlu, Johnson and Robinson, 2001), comparative advantage and trade patterns (Antràs and Helpman, 2008; Nunn, 2007; Levchenko, 2007). Weak contract enforcement and tenuous property rights can hamper investments in physical and human capital, thereby undermining economic growth. A poor contracting environment can also result in high transaction costs and frequent losses for firms from hold-ups or reneging by either party in a business transaction.

Often, where the legal system cannot effectively uphold contracts, the literature has argued that informal institutions can substitute for them, thereby mitigating some of the costs weak institutions impose. Greif (1993) demonstrated that 11th century Maghribi traders relied on cooperative coalitions to circumvent commitment problems with employing overseas agents, giving rise to a type of informal institution that disciplined agents' incentives to behave opportunistically. McMillan and Woodruff (1999) show that Vietnamese suppliers offered more credit to customers identified through a business network proposing that business networks can provide information on the reputation and reliability of the supplier and act as a sanction on defaulting customers.

In this paper, we explore the association between the quality of a country's institutional environment and the tendency for U.S. importers to source in a spatially concentrated manner from within that country. Specifically, we ask if U.S. importers source in a more spatially concentrated manner from countries where institutions are weak. We posit that in environments with weaker institutions, particularly weaker contract enforcement, business networks that typically operate within geographical boundaries may help temper the costs of weak institutions by providing information on potential buyers and suppliers or by sanctioning default, leading to spatially concentrated sourcing patterns.

We believe that this question is important for two reasons. First, importers benefit from access to suppliers who are productive, and can hence supply at lower cost. Weak institutions that restrict access to suppliers in particular regions by increasing the cost of matching and maintaining a trade relationship with them can erode these benefits and lead to inefficient matches for importers. Next, weak institutions may differentially dampen the competitiveness of suppliers in more remote regions, making them less attractive to potential foreign buyers, thereby depriving them of export opportunities. This may exacerbate regional inequality, and is of particular concern to developing countries, where national and regional governments that are grappling with generating jobs and spurring growth view exporting as a means to achieve these objectives.

We use 2011 confidential U.S. customs data maintained by the U.S. Census Bureau on merchandise import transactions in our analyses. We observe an individual U.S. importer's imports from each supplier across partner countries and the city in which the supplier is located. For each individual U.S. importer, we construct an index of supplier concentration within individual source countries for each HS4 product imported à la Ellison and Glaeser (1997). Thus, the supplier concentration index varies at the importer-product-country level. It is specific to a HS4 product and accounts for the overall concentration of exporters to the U.S. in the product, thus capturing country and product specific tendencies to agglomerate. Our measure of supplier spatial concentration hence isolates importer level deviations from overall sourcing concentration within a product-country pair.

Results suggest that in countries with weaker institutions, U.S. importers source in a more concentrated manner, consistent with predictions derived from our conceptual framework. We find that a decrease of ten (decrease of a hundred) in the number of procedures (days) required to legally enforce a contract is associated with a decrease in the EG spatial concentration index of 0.5 (0.1). This result is robust to including a battery of control variables,

an instrumental variables estimation strategy, alternate measures of both spatial concentration of sourcing and institutions and holds across several years.

Our finding is consistent with the idea that U.S. importers may have a greater propensity to rely on business networks that can provide information on a supplier's reputation and reliability and sanction defaults in environments where institutions are weak. In such environments, where a potential hold-up of supplies or a delay in delivery is more likely to occur and costly to fix, informal business networks may in part substitute for the absence or weakness of formal institutions, providing an incentive for importers to source in a spatially concentrated manner. We hence propose that reliance by importers on geographically proximate business networks could shape patterns of sourcing across countries with varying levels of institutional quality.

Our study highlights an additional role for institutions in influencing international trade. The literature shows that the quality of institutions can affect the type of goods that firms import from source countries, the organizational structure that the firm chooses to engage with in trade (Bernard, Jensen, Redding, and Schott, 2010a), firm export dynamics (Araujo, Mion, and Ornelas, 2016), and comparative advantage of countries (Levchenko, 2007; Nunn, 2007). Firms import differentiated intermediate inputs from countries where contract enforcement is stronger, and prefer to vertically integrate, rather than outsource intermediate input production in countries where contract enforcement is weaker. Exporters start with higher export volumes and sell for longer periods in countries with better contracting institutions, although, conditional on survival, export growth declines with institutional quality. Countries with good institutional quality tend to specialize in the production of goods that rely more heavily on relationship-specific investments. Complementing this rich body of work, our study underscores the importance of institutional quality in determining spatial patterns in international sourcing strategies adopted by importers.

This study relates to several strands of literature in international trade, economic development, and urban economics. First, it relates to the literature on the role for networks and resulting knowledge spillovers in encouraging exports (Koenig, 2009; Koenig, Mayneris, and Poncet, 2010). Furthermore, it relates to the role of buyer-specific geographic neighbors in facilitating buyer-seller matches in international trade (Kamal and Sundaram, 2016). Second, it relates to the literature explaining how informal cooperative coalitions promote efficiency by reducing agency and other transactions costs in the absence of formal enforcement institutions (Greif, 1993). Finally, our study extends the application of the Ellison and Glaeser index, traditionally used to measure industrial economic activity in purely domestic contexts[3], to a novel setting – measurement of spatial sourcing patterns in international trade. This novel application allows us to summarize complex spatial sourcing patterns in a succinct manner. The paper closest in spirit to ours using the Ellison-Glaeser index is Lovely, Rosenthal, and Sharma (2005). The authors provide evidence that U.S. exporters selling to more "difficult" countries tend to concentrate in space in order to gain specialized knowledge of foreign markets.

The next section outlines our conceptual framework followed by Section 3 where we develop our empirical specifications. Section 4 provides a description of the data sources and summary statistics followed by our results in Section 5. The final section concludes.

2. Conceptual Framework

In this section, we lay out a conceptual framework to guide our thinking on the relationship between institutional quality and spatial concentration of sourcing. We build on the framework of global sourcing proposed in Antràs (2015) and Antràs, Fort, and Tintlenot

[3] See Rosenthal and Strange (2004) for a survey of notable empirical studies utilizing the Ellison and Glaeser measure of geographic concentration of domestic economic activity in the urban economics literature.

(2016). Consider an economy with two sectors. The homogenous good sector produces a freely traded good, whose production is linear in a single factor, labor. We treat this as the numeraire good. Perfect competition in the homogenous good market determines the wage rate. The differentiated good sector is monopolistically competitive with heterogeneous firms with productivity φ. Each firm produces a differentiated variety by combining headquarter services and a manufacturing input using a Cobb-Douglas production function with parameter η. Let $a_{jc}(\varphi)$ be the unit labor requirement to produce an input in city j of country c, and $a_{ih}^{H}(\varphi)$ be the unit labor requirement for headquarter service provision in city i of country h. The manufacturing input can be procured from any city j of country c. Hence, as in Eaton and Kortum (2002), firms ultimately source from the least-cost city.

Firm φ in city i of country h pays a city-specific fixed cost $f(\varphi)_{ihjc}$ to source from city j of country c; in addition to a country-specific fixed cost $f(\varphi)_{hc}$ both expressed in labor units. The intuition behind a city-specific fixed cost is that sourcing from a new city involves costs like searching for a reliable input supplier and establishing transport links in the city. Note that fixed costs are firm-specific. This captures the idea that firms face varying costs of entering a city, due to certain city-specific advantage they may have, including the presence of networks. The share of total consumer expenditure E on the differentiated good is β. Preferences are CES over differentiated varieties with the elasticity of substitution given by $\sigma > 1$. The cost of sourcing the manufactured input for firm of productivity φ from city j of country c is $\tau_{hc}a_{jc}(\varphi)w_c$ where τ_{hc} is an iceberg transport cost applicable to shipping between countries and w_c is the wage rate in country c. Firm φ draws $a_{jc}(\varphi)$ from a Fréchet distribution.

$$Pr(a_{jc}(\varphi) \leq a) = e^{-Tc}a^{-\theta} \qquad (2.1)$$

Here, T_c is a technological parameter capturing absolute advantage of country c. Note that $a_{jc}(\varphi)$ is revealed to the firm only after it incurs the city-specific fixed cost to add city j in country c to the set $J_{ih}(\varphi)$, which is the set of cities for which the firm has paid the fixed

cost of sourcing. Antràs (2014) refers to this set as a "sourcing strategy". In this framework, firms benefit by adding a new city to their sourcing strategy because it gives them another cost draw that reduces their marginal cost and hence increases profits. The firm adds an additional city to its sourcing strategy if the increase in its variable profits from sourcing from that additional city at least cover the city-specific fixed cost of sourcing. Since the firm makes zero profits in equilibrium, its country-level profits have to equal zero for all c. Hence, a firm sources from country c if its total profits (net of city-specific fixed costs) from the cities j that are in its sourcing strategy in country c just cover the country-level sourcing fixed cost. In our data, we only observe U.S. importing firms and their import transactions with countries and cities they import from. Hence, we focus on a U.S. firm's sourcing decision within a particular country c conditional on sourcing from it.

We assume that firms face efficiency losses associated with weak institutions that reduce profitability. For instance, if contracting institutions are not well developed, or if the rule of law is weak, firms have to incur costs to mitigate risks against hold-up problems or expropriation. However, there may be local mitigating factors in a city that may temper these losses. These may include, for instance, better information in a city, either about individual input suppliers, their reputation and reliability, or about doing business in the city environment. Formally, we capture the losses incurred due to a weak institutional environment by $\Gamma_{ihjc} < 1$, which reduce firm profits (net of fixed costs). Hence, the profit of a U.S. firm of productivity φ in city i that sources from city j of country c is given by

$$\pi_{ihjc}(\varphi) = \left((a_{ih}^{H} w_h)^{\eta} \left(\tau_{hc} a_{jc} w_c\right)^{1-\eta}\right)^{1-\sigma} B \varphi^{\sigma-1} \Gamma_{ihjc} - f(\varphi)_{hc} w_c \qquad (2.2)$$

where, $B = \left(\frac{1}{\sigma}\right)\left(\frac{\sigma}{(\sigma-1)P}\right)^{1-\sigma} \beta E$.

Here, P and E refer to the price index and expenditure for the final good variety. We assume that $\Gamma_{ihjc} = \Gamma(\bar{\Gamma}_{hc},\ \mu(\varphi)_{ihjc})$ such that $\bar{\Gamma}_{hc} < 1$ and $\mu(\varphi)_{ihjc} < 1$. In other words, losses

can be decomposed into a country-specific component, driven by country-specific institutional factors, and a city-specific component, driven by city-specific factors. The city-specific component captures mitigating factors like access to information via business networks that operate at the city level. The better the contracting environment $\bar{\Gamma}_{hc}$, the larger is Γ_{ihjc}. Or, $\Gamma_1 > 0$, where the sub-script denotes the partial derivate with respect to the first argument. Also, the greater the mitigating city-specific factors, the larger is Γ_{ihjc}. Or, $\Gamma_2 > 0$. Finally, we assume that $\Gamma_{21} > 0$. In words, the impact of city-specific mitigating factors is lower in countries with a better institutional environment. The idea here is that in countries with weak institutional environments, city-specific mitigating factors may be more important than in countries with strong institutions.

After drawing $a_{jc}(\varphi)$ for each city in its sourcing strategy $J_{ih}(\varphi)$, the firm chooses the least-cost location to source from that solves $min_{jc}\{\tau_{hc}a_{jc}(\varphi)w_c\}$. Given the properties of the Fréchet distribution, the firm will choose a positive measure of input from each city in its sourcing strategy. Also, the likelihood of sourcing from a city j in c, conditional on sourcing from c (thus allowing us to focus on the firm's decision to source across cities within a single country c) is given by

$$\chi_{ihjc}(\varphi) = \frac{T_c\left(\tau_{hc}w_c(\Gamma_{ihjc})^{\frac{1}{(1-\eta)(1-\sigma)}}\right)^{-\theta}}{\Theta_{ih}(\varphi)} \qquad j_c \epsilon J_{ih}(\varphi) \qquad (2.3)$$

$$= 0 \qquad otherwise$$

where $\Theta_{ih}(\varphi) = \sum_{k\epsilon J_{ih}(\varphi)} T_c\left(\tau_{hc}w_c(\Gamma_{ihkc})^{\frac{1}{(1-\eta)(1-\sigma)}}\right)^{-\theta}$.

Proposition The likelihood of sourcing from city *j* relative to a city *ω* with an average value of mitigating factors, $\tilde{\mu}(\varphi)_{ih\omega c}$, in the firm's sourcing strategy for country c is higher if city *j* contains higher mitigating factors $\mu(\varphi)_{ihjc}$.

Substituting terms in (2.3),

$$\chi_{ihjc}(\varphi) = \frac{T_c(\tau_{hc}w_c)^{-\theta}[\Gamma(\bar{\Gamma}_{hc},\ \mu(\varphi)_{ihjc})]^{\frac{-\theta}{(1-\eta)(1-\sigma)}}}{(\tau_{hc}w_c)^{-\theta}T_c\sum_{k\epsilon J_{ih}(\varphi)}[\Gamma(\bar{\Gamma}_{hc},\ \mu(\varphi)_{ihjc})]^{\frac{-\theta}{(1-\eta)(1-\sigma)}}} \quad (2.4)$$

$$= \frac{[\Gamma(\bar{\Gamma}_{hc},\ \mu(\varphi)_{ihjc})]^{\frac{-\theta}{(1-\eta)(1-\sigma)}}}{\sum_{k\epsilon J_{ih}(\varphi)}[\Gamma(\bar{\Gamma}_{hc},\ \mu(\varphi)_{ihjc})]^{\frac{-\theta}{(1-\eta)(1-\sigma)}}}. \quad (2.5)$$

Hence,

$$\frac{\chi_{ihjc}(\varphi)}{\chi_{ih\omega c}(\varphi)} = \frac{[\Gamma(\bar{\Gamma}_{hc},\ \mu(\varphi)_{ihjc})]^{\frac{-\theta}{(1-\eta)(1-\sigma)}}}{[\Gamma(\bar{\Gamma}_{hc},\ \tilde{\mu}(\varphi)_{ih\omega c})]^{\frac{-\theta}{(1-\eta)(1-\sigma)}}}. \quad (2.6)$$

Since $\Gamma_2 > 0$, from (2.6), the likelihood of sourcing from city j relative to the average city in country c is higher if firm φ has more mitigating factors $\mu(\varphi)_{ihjc}$ relative to the average in city j.

We note here that if the firm utilizes a continuum of intermediate inputs, then as long as all inputs are technologically symmetric[4], the likelihood of sourcing from a city can be interpreted as the share of inputs sourced from the same city. Interpreting the sourcing likelihood as a share concept is more in line with our empirical analysis, where we examine the concentration of input suppliers to U.S. firms. One implication of the framework presented above is that given an initial distribution of input suppliers to firm φ across cities in country c, if firms are able to tap into their supplier network to gain information, a larger number of existing suppliers will mean a greater likelihood of firm φ sourcing from city j. In other words, firms will be more likely to source from cities with more input suppliers relative to the mean, leading to higher concentration. Additionally, since $\Gamma_{21} < 0$, we expect the positive effect of mitigating factors on the likelihood of sourcing from city j over city ω in country c to be much stronger in institutionally weak environments. Hence, we hypothesize that concentration of input suppliers will be higher in countries with weaker institutions.

[4] In other words, the unit labor requirements for all inputs are the same as long as they are produced in the same city.

3. Empirical Specification

In order to analyze a U.S. importer's supplier concentration for a particular product within a source country, we adopt the Ellison-Glaeser (EG) index that is widely used to measure geographic concentration of economic activity following Ellison and Glaeser (1997). We construct the EG index in the context of our study as follows:

$$EG_{mcp} = \left\{\sum_{j=1}^{N_{cp}}(s_{mjcp} - x_{jcp})^2 - \left[1 - \sum_{j=1}^{N_{cp}}(x_{jcp})^2\right]\sum_{k=1}^{S_{mcp}}(z_{kmcp})^2\right\} \Big/ \left[1 - \sum_{j=1}^{N_{cp}}(x_{jcp})^2\right]\left[1 - \sum_{k=1}^{S_{mcp}}(z_{kmcp})^2\right] \quad (3.1)$$

where $s_{mjcp} = \frac{value_{mjcp}}{value_{mcp}}$ and $x_{jcp} = \frac{value_{jcp}}{value_{cp}}$. s_{mjcp} represents the total value of imports of product p that importer m buys from city j as a share in the total value of imports of product p bought by importer m from country c; x_{jcp} represents the total value of U.S. imports of product p from city j as a share in total U.S. imports of product p from country c; $z_{kmcp} = \frac{value_{kmcp}}{value_{mcp}}$ refers to importer m's imports of product p from each supplier, k, as a share of importer m's total imports of product p from country c. N_{cp} refers to the total number of cities in country c supplying product p to the U.S. S_{mcp} refers to the total number of suppliers in country c supplying product p to importer m. Product p is a four-digit HS product code. In a robustness exercise, we reconstruct the index using the count of suppliers instead of trade value.

Here, we note two properties of the EG index measure defined in (3.1). First, the index is comparable across countries and controls for the degree of overall concentration of exports (to the U.S.) in product p in the source country. Thus, EG_{mcp} captures concentration across cities within a source country by a particular U.S. importer above and beyond the local agglomeration of exports (to the U.S.). Additionally, the index accounts for the fact that U.S. importers that source a larger share of imports from fewer suppliers (and hence source in a

concentrated manner across suppliers) are more likely to source in a concentrated manner across cities, since fewer suppliers are likely to be spread across fewer cities.[5]

To explore the relationship between institutions and spatial concentration of sourcing, we estimate the following equation.

$$EG_{mcp} = \alpha + \beta I_c + \gamma X_c + \theta X_{cp} + \delta_m + \vartheta_p + \epsilon_{mcp} \quad (3.2)$$

I_c refers to institutions in country c, X_c a set of country specific control variables, and X_{cp}, a set of country-product specific control variables. Country specific variables include information and transport infrastructure, GDP per capita, population, land area, industrial concentration (measured with night-lights data) and common language with the U.S. Country-product variables include the total number of suppliers and total number of cities for each product in the country being sold to the United States. δ_m and ϑ_p refer to a set of importer and product fixed-effects, respectively. ϵ_{mcp} is an idiosyncratic error term. In all our tables, we report robust standard errors clustered by country. We hypothesize that $\beta < 0$ or that better institutional quality is associated with lower supplier concentration.

The empirical specification implies that we exploit across country variation in supplier concentration for each U.S. importer to identify the relationship of interest after accounting for importer and product specific characteristics. We are hence able to account for unobserved importer and product specific factors that might determine institutions and concentration jointly, for instance, an importer's choice of source country. A remaining concern is the existence of unobserved country specific factors that drive both institutional quality and sourcing concentration simultaneously.

In order to address potential simultaneity bias, we adopt an instrumental variables strategy, where we instrument for institutions with legal origins at the country level, derived

[5] Note that given the nature of the EG index, we cannot calculate it for importers that source from a single supplier in a given product-country pair. Hence, single supplier importer-product pairs are excluded that account for 40% of the total number of importer-product pairs but only 20% of trade value.

from Nunn (2007). The idea here is that the legal origin of a country is likely to have determined institutional quality (given persistence in institutions), while it is unlikely to drive contemporaneous economic outcomes in any significant capacity. We find that our result is robust to the instrumental variables strategy. We also show that our result is robust to employing alternate measures of both concentration and institutional quality and holds across multiple years.

4. Data

We test our hypotheses using confidential U.S. firm-trade transaction linked data in conjunction with measures of institutional quality and additional country level controls obtained from the World Bank and the Fraser Institute. Availability of firm level trade transactions data that identifies both trading parties in the transaction allows us to construct measures of spatial concentration of sourcing for each U.S. importer-product-country triad. Given our interest in understanding the role of institutions in shaping the patterns in the spatial concentration of sourcing by a U.S. importer from within a country, we utilize measures of contract enforcement or the ease with which contracts can be legally enforced. Since institutions change very slowly over time, measures of institutional quality are fairly stable in the time-series and derive most of its variation within a cross-section. Thus, our main analysis utilizes data from 2011.[6]

4.1 Firm-Trade Transactions Data

We focus on arm's length U.S. merchandise import transactions in the Linked Firm Trade Transactions Database (LFTTD). We exclude related party transactions since sourcing strategies from subsidiaries or parents as compared to unaffiliated parties are likely governed

[6] Our choice of year is also motivated by the extensive cleaning of the Manufacturer ID in 2011 (Kamal and Monarch, 2016), an identifier variable that allows us to distinguish suppliers and their location.

by very different economic forces. We also exclude natural resource-intensive products whose production location is more likely to be governed by natural advantages.[7] The import transactions data contain an identifier for the U.S. importer and the foreign exporter is uniquely identified by the "Manufacturer ID" (MID). The Manufacturer ID is a required field on Form 7501, which U.S. importers must file with the U.S. Customs and Border Protection (CBP).[8]

The MID identifies the manufacturer or shipper of the merchandise by an alphanumeric code that is constructed using a pre-specified algorithm with a maximum length of 15 characters.[9] The last three characters in the MID designate the city where the manufacturer is located. We consider each distinct three-letter code as a unique city within a country. We carry out robustness checks to address concerns that there may be instances where there exist multiple cities within a country that begin with the same first three letters[10]. We also exclude observations for countries in the sample that are associated with only one city, representing a tiny share (less than 0.01%) of the overall sample.

4.2 Country-level Data

The country-level measures are sourced from public-use databases provided by the World Bank. Our primary measures of institutions utilizes data from the World Bank's Doing Business project. We use measures of contract enforcement capturing the cost, days and procedures involved in the legal enforcement of contracts. We then calculate the principal component of these measures and employ this as our baseline measure of the legal enforcement

[7] Resource-intensive products are defined as two-digit HS categories 2-14 (agricultural products) and 25-27 (mineral products).

[8] See form http://forms.cbp.gov/pdf/cbp_form_7501.pdf.

[9] See Block 13 (pg. 7) for description of MID and Appendix 2 (pg. 30) for instructions on constructing MID at http://forms.cbp.gov/pdf/7501_instructions.pdf.

[10] Since we identify cities within a country using the three letter city codes extracted from the MID, it is possible that for cities that begin with the same three letters, a single code many actually represent multiple cities and introduce measurement bias in our spatial concentration index. However, as long as the incidence of such cases is not systematically correlated with our measures of country institutions, our coefficient estimates of these measures of interest will remain unbiased. Nonetheless, a test excluding the largest five countries by population with the premise that larger countries are likely to have larger number of cities that may share the same first three letters shows that our results are qualitatively robust.

of contracts. We normalize the measure so that higher values correspond to stronger institutions. The World Bank Doing Business measures of contract enforcement have been used extensively in prior research (for examples, see Feenstra, Hong, Ma, and Spencer, 2013; Araujo, Mion, and Ornelas, 2016).

We also utilize data from the Fraser Institute's Economic Freedom of the World index that provides a wide coverage of countries. The Fraser Institute's economic freedom index consists of five separate components – legal system and property rights; freedom to trade internationally; regulations of credit markets, labor markets, and business; size of government (expenditure, taxes, enterprises); and access to sound money.[11] We focus on the first two areas. First, in a robustness exercise, we employ the index of legal system and property rights as an alternative index measuring institutional quality, which we argue is a broader measure of contract enforcement. The index ranges from 0 to 10 where higher numbers indicate stronger institutions.

We use the regulatory trade barrier component in the freedom to trade internationally index as a control variable in all our regressions. The regulatory trade barriers measure non-tariff trade barriers as well as the compliance costs of importing and exporting. We believe that both dimensions of institutions - legal system and property rights and regulatory trade barriers (including non-tariff barriers involving bureaucratic costs of trading) - may be moderated by geographic networks. The indices range from 0 to 10 where higher numbers correspond to better institutional quality. Finally, in a robustness exercise, we use data on freedom from corruption from the Heritage Foundation as an alternate measure of contract enforcement[12].

We include two main measures of infrastructure within a country from the World Bank's World Development Indicators (WDI) database.[13] First, we measure internet

[11] See http://www.freetheworld.com/2015/economic-freedom-of-the-world-2015.pdf for detailed description of the index.
[12] Accessed at http://www.heritage.org/index/download.
[13] See http://data.worldbank.org/data-catalog/world-development-indicators for details on data coverage.

technology presence in a country as the number of internet users per 100 people. Internet users are defined as "individuals who have used the internet (from any location) in the last 12 months. Internet can be used via a computer, mobile phone, personal digital assistant, games machine, digital TV etc". This measure captures the ease of information transmission between buyers and sellers for instance, via company websites, portals and electronic communication in general. Our hypothesis is that superior information infrastructure can mitigate the need for exploiting spatially proximate networks in sourcing decisions. Second, we include the percentage of paved roads as a share of all the country's roads, measured in length, to capture physical infrastructure barriers to dispersed sourcing. The WDI also provides the GDP per capita (in 2010 U.S.D), total population, and land area, all of which enter our specification in logs as control variables for the level of development and country size (Mitton, 2008).

Even though our EG index accounts for the concentration of exports in each product at the country level, we additionally control for differences in industrial concentration across countries. We exploit data on night-lights from Henderson, Storeygard, and Weil (2012).[14] This data measures lights from human settlements and is therefore a reflection of human activity. Moreover, lights as the measure of economic activity is measured consistently across the world at the same spatial scale. We use the within-country Gini measure of night-lights as a control variable in our analysis. Next, to capture the idea that language barriers might deter information flows and reinforce the need for networks in obtaining suppliers, we include an indicator variable if the partner country and the U.S. share a common language sourced from CEPII.[15] Finally, in addition to the country level variables, we construct and include two additional product-country variables as controls - the log number of suppliers to the U.S. per product-

[14] Note that the latest available year is 2008. Therefore, we utilize the 2008 log Gini night-lights measure in our baseline regressions.

[15] Accessed at http://www.cepii.fr/cepii/en/bdd_modele/presentation.asp?id=19.

country and the log number of cities from which exports to the U.S. originate per product-country.

4.3 Analysis Sample

In order to construct our analysis sample, we begin with the 2011 LFTTD, specifically, data on import transactions linked to the U.S. importer undertaking the transaction.[16] We first aggregate the transaction level data at the importer, foreign supplier, and product (HS4) level. About 40 percent of importers source a HS4 product from a single supplier accounting for only about 20 percent of total trade value. By definition of the EG index, single-supplier importers of a particular product will be excluded from our analysis. Therefore, our analysis sample necessarily focuses on importers that source from more than a single supplier within a product-country cell. Once we create an EG index for every importer-product-country triad we obtain a dataset with about half a million observations. We trim our analysis dataset for the top and bottom 1 percent of the EG index, dropping about 2 percent of the observations. We then link in country level measures of institutional quality and other control variables. The number of observations differ in each of our specifications due to differential availability and coverage of the country level variables.

4.4 Summary Statistics

In this section we provide descriptive evidence in support of our hypothesis that in partner countries with weaker contract enforcement regimes, U.S. importers tend to source in a spatially concentrated manner. Table 1 shows average values in the sample for our main institutional variables and the EG index. In our analysis sample in 2011, the average Ellison-Glaeser index, EG_{mcp}, is 0.67 while the median is 0.23. The average costs, days and procedures required to enforce a contract legally are given by 20 percent of claims, 485 days and 36

[16] In robustness exercises where we show results for years other than 2011, the analysis datasets are constructed in a similar manner.

procedures, respectively. Table 2 shows the average concentration index by broad product categories.[17] Overall, we find that broad product categories that display the highest (lowest) average spatial concentration of sourcing tend to be in more (less) hi-tech, capital-intensive industries, with the exception of vegetable products, leather and footwear.

Figure 1 displays a world map showing values of the average EG index across countries. Darker colors correspond to greater concentration while lighter colors indicate lower concentration. We note that there is substantial variation in the concentration index even within country groups defined across various dimensions like land area (medium levels of concentration in China and Canada versus high concentration in Russia), population (India versus China) and level of development (variation in concentration within Africa and Europe and across middle-income countries like Brazil, Russia and South Africa).

Table 3 further displays the average spatial concentration by importer size and institutional quality. In panel A, importers are classified as large (employs 500+ workers), medium (employs 250-499 workers), and small (employs <250 workers). We find that large importers have higher values of the EG index compared to small and medium importers. In panel B, countries are classified into three quantiles by the principal component measure of enforcement of contracts using the World Bank's three separate measures of contract enforcement. We find that countries in the top quantile with the strongest institutions display much lower spatial concentration of sourcing relative to countries in the middle and lower quantiles, consistent with our hypothesis in this paper.

From Table 4, column 1, we find that an importer sources from 1.79 countries on average. However, this masks variation by importer size. We find that large and medium importers source from 2.4 to almost 3 countries respectively, while small importers source from

[17] The broad product classifications are based on groupings of various two-digit HS product categories. See http://www.foreign-trade.com/reference/hscode.htm.

1.57 countries on average. In column 2, we present corresponding figures by importer-product pair. We find that an importer-product pair sources from about 1.4 countries on average. Larger importers tend to source from more countries than smaller importers. On average, large importers source from 1.79 countries, while medium and small importers source from 1.46 and 1.24 countries, respectively.

Next, in Table 5, we document the number of suppliers per importer-product-country. In panel A, as expected, we find that larger importers tend to source from more suppliers on average within a particular product and country compared to medium and small importers. Panel B reveals that importers, on average, tend to source more from countries with better institutional quality. Overall, the summary statistics support our hypothesis that higher institutional quality is associated with lower spatial concentration of sourcing by U.S. importers. In the next section, we test this hypothesis more rigorously by estimating versions of equation (3.2).

5. Results

5.1 Institutions and spatial concentration of sourcing

Table 6 presents regression results following equation (3.2) estimated using confidential U.S. firm-import transactions linked data in 2011. Columns (1) through (3) present results for the various measures of contract enforcement capturing the cost, procedures and days involved in the legal enforcement of contracts. The World Bank measures contract enforcement by the cost required to complete procedures, measured as a percentage of claim, the number of procedures required to enforce a contract through the courts, and the number of days required to complete procedures. In column (4), we use the principal component of these measures as the key measure of institutional quality, which we use in all subsequent regressions

as our baseline measure of institutions. Column (5) presents results from an instrumental variables regression.

Specifications across all columns include controls for infrastructure quality and regulatory trade barriers. We also control for the source country's level of development (GDP per capita), population, land area, common language with the U.S., concentration of economic activity (Gini of night-lights) and the total number of suppliers and cities per country-product. Finally, all columns include importer and product fixed effects to account for importer and product heterogeneity.

From columns (1) through (4), we find that with the full battery of control variables, except for column (1), our measures of contract enforcement are negatively related to the spatial concentration of sourcing as hypothesized. Coefficients are statistically significant at the five percent level. Results from column (2) (column (3)) indicate that a decrease of ten (decrease of a hundred) in the number of procedures (days) required to legally enforce a contract is associated with a decrease in the EG spatial concentration index of 0.5 (0.1).

A potential explanation for the absence of a statistical relationship between the cost of contract enforcement and the spatial concentration of sourcing from column (1) is that the cost of contract enforcement is a noisy measure of actual ease with which contracts can be legally enforced. We note that this measure only captures the formal costs associated with contract enforcement and does not include informal costs like bribes. Countries with high levels of corruption are characterized by more onerous regulations (Ahsan, *forthcoming*) that are more easily exploited by dishonest officials to extract bribes (for example corruption can drive up trade costs (De Jong and Bogmans, 2011)) such that in institutionally weak environments, bribes are likely to be a significant proportion of enforcement costs. We argue that the time and number of procedures involved in enforcing contracts are measures less likely to suffer from measurement error leading to attenuation bias.

Overall, we do not find evidence that weak infrastructure and regulatory trade barriers are related to the spatial concentration of sourcing, lending support to our idea that it is the potential costs related to hold-up and other contractual frictions that encourages U.S. importers to concentrate sourcing. A country's level of development, population, number of cities exporting to the U.S. from a country-product and concentration of economic activity in the country are positively related, while land area, common language and the number of suppliers to the U.S. in a country-product are negatively related to the spatial concentration of sourcing.

In column (5), we perform an instrumental variables estimation. We instrument for contract enforcement with legal origins following Nunn (2007). The key idea is that the quality of contemporary institutions varies across countries with different legal origins that are rooted in history. The exclusion restriction is derived from the premise that while a country's legal origins are likely to be correlated with current institutional quality (given path-dependence in institutions), they are less likely to be correlated with the current spatial concentration of sourcing. Specifically, we expect that countries with legal origins rooted in British common law are likely to have stronger institutions compared to countries with legal origins rooted in German, Scandinavian or French (civil) law. We treat countries with a Socialist legal origin separately in our analysis, since these countries, comprising primarily of former Soviet Union and Eastern European countries, may have transitioned to pre-World War II legal systems over time (La Porta, Lopez-de-Silanes and Shleifer, 2008).

In our first stage regression, we regress dummies for civil legal origin (French, German or Scandinavian), Socialist legal origin and British legal origin (the left-out category) on the principal component measure of contract enforcement in 2011. The first stage is significant (F-statistic =13.99) and we find a negative relationship between the civil legal origin dummy and contract enforcement. This is consistent with the idea that relative to common law, a legal origin rooted in civil law is associated with weaker institutions. We find a positive relationship

between contract enforcement and the Socialist legal origin dummy. The Hansen J-statistic is 1.93 with a p-value of 0.17 indicating that we are unable to reject the null hypothesis that the over-identifying restrictions are valid and hence guarding against weak instruments.

Second stage results are presented in column (5). Our results reinforce our baseline finding from column (4) showing a negative and significant relationship between institutional quality and the spatial concentration of sourcing. The instrumental variables result shows a stronger negative relationship between institutions and the spatial concentration of sourcing, suggesting that our OLS results potentially under-estimate the impact of institutions on concentration.

5.2 Robustness Checks

Tables 7 and 8 provide results from further robustness checks of our baseline result in column 4, Table 6. In columns (1) through (3) of Table 7, we estimate equation (3.2) with all our control variables for each year, separately, between 2008 and 2010. The coefficient on contract enforcement is remarkably robust across the different sample years varying between -0.13 and -0.15, suggesting that the choice of sample year is not the main driver of our results.

In columns (1) and (2) of Table 8, we present results using two alternate measures of institutional quality. We use the Fraser Institute's comprehensive index of legal system and property rights, and the Heritage Foundation's freedom from corruption measure. The former is a broader measure of institutional quality as it pertains to legal enforcement of contracts, while the latter captures an alternate dimension of institutions that impacts contract enforcement. Corruption introduces uncertainty in economic relationships that may exacerbate the ability of importers to seek legal redress in the event of default. The results support our hypothesis – institutional quality is negatively associated with the spatial concentration of sourcing. In column (3), we use a count-based EG index instead of a value-based EG index to measure concentration. This alternate index uses the number of suppliers, instead of value of

imports sourced from these suppliers to calculate the EG measure of concentration. Again, we find that our result holds qualitatively.

Overall, results in Tables 7 and 8 provide support for our hypothesis that weaker institutions are associated with greater concentration of sourcing by U.S. importers, consistent with the idea that networks might be more relevant in settings where formal institutions are inadequate, especially in the ability to uphold contracts.

5.3 Extensions

Our goal thus far has been to establish a robust negative relationship between source country institutional quality and the propensity for importers to source in a spatially concentrated manner. In this section, we explore the nature of this relationship further by analyzing the role of firm heterogeneity in mediating the impact of institutional quality on spatial concentration of sourcing. Summary statistics in Tables 4 and 5 indicate that sourcing patterns in terms of number of source countries and number of suppliers differ across importers of different sizes. Firm size and productivity and consequently, profitability are highly correlated. Therefore, we may expect larger importers to be able to source from suppliers spread out across various cities within a country as they may command additional resources that allow them to gain information and guard or insure against opportunistic behavior.

In order to explore this possibility, we interact our measure of institutional quality with two measures of firm size. One is the total employment at the firm (in logs) and the second is the firm's total number of establishments (in logs). We expect the coefficient on the interaction between size and institutions to be positive. In other words, we expect that the negative relationship between institutions and concentration would be mitigated for larger firms.

Columns 1 and 2 in Table 9 presents results using these two measures of size respectively. In both columns, the contract enforcement measure is negative and statistically significant and although the interaction terms fail to gain statistical significance, they are

positive as hypothesized. In column 4, we include an interaction term between firm age and institutions to test if older importers may be able to utilize experience to better navigate in markets characterized by weaker institutions. As in the previous two columns, the contract enforcement measure is negative and statistically significant and again the interaction term is statistically insignificant but positive.

We also explore if intermediaries behave differently from importers that only produce or engage in a combination of production and consumption. We follow Bernard, Jensen, Redding, and Schott 's (2010b) measure of an intermediary – firms with 100 percent of their U.S. employment in the wholesale or retail sectors. Intermediaries are less sensitive to market size and can subsequently enter more difficult markets than the other types of firms (Ahn, Khandelwal, and Wei, 2011). We thus expect the interaction with the institutional quality measure to be positive. Similar to our results on importer size, we find in column 4 of Table 9 that while the contract enforcement measure is negative and statistically significant, the interaction term fails to gain statistical significance but is positive as hypothesized.

From Table 9, we are unable to reject the null hypothesis that importer heterogeneity, at least along the dimensions of firm size, age, and sector, does not matter for mediating the relationship between supplier concentration within a country and institutional quality in that country. The results are hence consistent with both small and large, young and old, as well as intermediary and non-intermediary importers benefiting uniformly from spatially proximate networks that can mitigate the matching and transacting costs imposed by weaker institutions.

6. Conclusion

This paper tests the role of a partner country's institutional environment in shaping the patterns of spatial concentration of sourcing to U.S. importers. We find that weaker institutions are associated with greater concentration of sourcing by U.S. importers. The empirical evidence

we present is consistent with the idea that in weaker institutional environments, networks might help importers lower the costs of matching and transacting with suppliers. Hence, our study highlights the role for institutions in driving spatial patterns in U.S. sourcing strategies and augments the literature on informal institutions and their role in fostering economic activity.

References

Acemoğlu, Daron, Simon Johnson, and James A. Robinson. 2001. "The Colonial Origins of Comparative Development: An Empirical Investigation," *American Economic Review* 91(5): 1369-1401.

Ahn, JaeBin, Amit Khandelwal, and Shang-Jin Wei, 2011. "The Role of Intermediaries in Facilitating Trade," *Journal of International Economics* 84(1): 73-85.

Ahsan, Reshad. forthcoming. "Does Corruption Attenuate the Effect of Red Tape on Exports," *Economic Inquiry*.

Antràs, Pol, 2015. *Global Production: Firms, Contracts, and Trade Structure*. Princeton University Press.

Antràs, Pol, Teresa C. Fort, and Felix Tintelnot. 2016. "The Margins of Global Sourcing: Theory and Evidence from U.S. Firms," mimeo.

Antràs, Pol, and Elhanan Helpman. 2008. "Contractual Frictions and Global Sourcing." In *The Organization of Firms in a Global Economy*, eds. Elhanan Helpman, Dalia Marin, and Thierry Verdier, 9-54. Cambridge, MA: Harvard University Press.

Araujo, Luis, Giordano Mion, and Emanuel Ornelas. 2016. "Institutions and Export Dynamics," *Journal of International Economics*, 98: 2-20.

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

Bernard, Andrew A., J. Bradford Jensen, Stephen J. Redding, and Peter K. Schott. 2010b. "Wholesalers and Retailers in U.S. Trade," *American Economic Review Papers and Proceedings* 100 (2): 408-413.

De Jong, Eelke, and Christian Bogmans. 2011. "Does Corruption Discourage International Trade" *European Journal of Political Economy* 27: 385-398.

Eaton, Jonathan and Samuel Kortum, 2002. "Technology, Geography, and Trade," *Econometrica* 70(5): 741-1779.

Ellison, Glenn, and Edward L. Glaeser. 1997. "Geographic Concentration in U.S. Manufacturing Industries: A Dartboard Approach," *Journal of Political Economy* 105(5): 889-927.

Feenstra, Robert, Chang Hong, Hong Ma, Barbara J. Spencer. 2013. "Contractual versus Non-Contractual Trade: The Role of Institutions in China," *Journal of Economic Behavior and Organizations* 94:281-294.

Greif, Avner. 1993. "Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders' Coalition," *American Economic Review* 83(3): 525-548.

Henderson, J., Vernon, Adam Storeygard, and David N. Weil. 2012. "Measuring Economic Growth from Outer Space," *American Economic Review* 102(2): 994-1028.

Jarmin, Ron, S., and Javier Miranda. 2002. "The Longitudinal Business Database," U.S. Census Bureau Center for Economic Studies Working Paper 02-17.

Kamal, Fariha, and Ryan Monarch. 2016. "Identifying Foreign Suppliers in U.S. Import Data," mimeo.

Kamal, Fariha, and Asha Sundaram. 2016. "Buyer-Seller Relationships in International Trade: Do your Neighbors Matter?" *Journal of International Economics* 102: 128-140.

Koenig, Pamina. 2009. "Agglomeration and the Export Decisions of French Firms," *Journal of Urban Economics* 66: 186-195.

Koenig, Pamina, Florian Mayneris, and Sandra Poncet. 2010. "Local Export Spillovers in France," *European Economic Review* 54: 622-641.

La Porta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer. 2008. "The Economic Consequences of Legal Origins," *Journal of Economic Literature* 46(2): 285-332.

Levchenko, Andrei. 2007. "Institutional Quality and International Trade," *Review of Economic Studies* 74(3): 791-819.

Lovely, Mary E., Stuart Rosenthal, and Shalini Sharma. 2005. "Information, Agglomeration, and the Headquarters of U.S. Exporters," *Regional Science and Urban Economics* 35: 167-191.

McMillan, John, and Christopher Woodruff. 1999. "Inter-firm Relationships and Informal Credit in Vietnam," *Quarterly Journal of Economics* 114(4): 1285-1320.

Mitton, Todd. 2008. "Institutions and Concentration," *Journal of Development Economics,* 86: 367-394.

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

Rosenthal, Stuart and William Strange. 2004. "Evidence on the Nature and Sources of Agglomeration Economies," in J. V. Henderson and J. F. Thisse (eds.), *Handbook of Regional and Urban Economics*. Vol. 4, Elsevier North-Holland, pp. 2119-2171.

Table 1. Summary Statistics, 2011

Variable	Mean	Standard Deviation
Contract Enforcement - Cost	20.291	19.044
Contract Enforcement - Days	484.629	277.034
Contract Enforcement - Procedures	36.155	4.681
Contract Enforcement – Principal Component	0.009	1.252
EG Index (value)	0.669	2.842

Notes: This table displays average institutional quality and spatial concentration of sourcing per importer-country. The World Bank measures contract enforcement by the cost required to complete procedures and measured as a percentage of claim (Contract Enforcement - Cost), the number of days required to complete procedures (Contract Enforcement - Days), and the number of procedures required to enforce a contract through the courts (Contract Enforcement - Procedures).

Table 2. Spatial concentration of sourcing using EG Index, by Product Classification, 2011

Broad Product Categories	Mean	Standard Deviation
Animal & Animal Products	0.555	2.837
Vegetable Products	0.737	3.185
Prepared Foodstuffs	0.514	2.612
Chemical & Allied Industries	0.993	3.579
Plastics & Rubber	0.718	2.932
Raw Hides, Skins, Leather, & Furs	0.799	3.133
Wood & Wood Products	0.497	2.320
Textiles	0.584	2.789
Footwear & Headgear	0.694	3.182
Stone & Glass	0.539	3.033
Metals	0.705	2.948
Machinery & Electrical	0.749	2.838
Transportation	0.781	2.938
Miscellaneous	0.654	2.762
All	0.678	2.873

Notes: This table displays the average supplier concentration measured as the Ellison-Glaeser index as defined in (3.1) by two-digit HS product categories following http://www.foreign-trade.com/reference/hscode.htm.

Table 3. Spatial concentration of sourcing using EG Index, 2011

Panel A: By Importer Size	
Firm Size	**Average (s.d)**
Large (500+)	0.698 (2.973)
Medium (250-499)	0.643 (2.907)
Small (< 250)	0.651 (2.740)
Panel B: By Source Country Institutional Quality	
Country Group	**Average (s.d)**
High	0.469 (1.851)
Middle	0.865 (3.380)
Low	0.752 (2.774)

Notes: This table displays the average supplier concentration measured as the Ellison-Glaeser index as defined in (3.1) with standard deviation in parentheses. Importers are classified into three size bins: “large” employs more than 500 workers, “medium” employs between 250 and 500 workers, and “small” employs less than 250 workers. Countries are divided into three quantiles of institutional quality captured by ease of contract enforcement.

Table 4. Number of source countries, 2011

Firm Size	Average	
	Importer	**Importer-Product**
Large (500+)	2.42	1.79
Medium (250-499)	2.92	1.46
Small (< 250)	1.57	1.24
All	1.79	1.40

Notes: This table displays the average number of countries that an importer (Column 1) and importer-product pair (Column 2) sources from. Importers are classified into three size bins: "large" employs more than 500 workers, "medium" employs between 250 and 500 workers, and "small" employs less than 250 workers.

Table 5. Number of suppliers per importer-product-country, 2011

Panel A: By Importer Size	
Firm Size	**Average (s.d)**
Large (500+)	5.24 (11.98)
Medium (250-499)	4.15 (9.40)
Small (< 250)	3.51 (4.29)
Panel B: By Source Country Institutional Quality	
Country Group	**Average (s.d)**
High	5.04 (10.34)
Middle	3.77 (5.60)
Low	3.97 (8.95)

Notes: This table displays the average number of suppliers per importer-product-country triad with standard deviation in parentheses. Importers are classified into three size bins: "large" employs more than 500 workers, "medium" employs between 250 and 500 workers, and "small" employs less than 250 workers. Countries are divided into three quantiles of institutional quality captured by ease of contract enforcement.

Table 6. Spatial Concentration of Foreign Suppliers and the Role of Institutions, 2011

Dependent Variable:	(1)	(2)	(3)	(4)	(5)
EG Index Value	**Cost**	**Procedures**	**Days**	**P.C.**	**IV**
Contract Enforcement	0.001	-0.049**	-0.001**	-0.169**	-0.228*
	(0.002)	(0.019)	(0.000)	(0.085)	(0.121)
Regulatory Trade Barrier	-0.146	-0.070	-0.027	-0.135	-0.124
	(0.139)	(0.120)	(0.127)	(0.142)	(0.149)
Internet per 100 people	-0.014	-0.015*	-0.010	-0.009	-0.008
	(0.011)	(0.008)	(0.010)	(0.011)	(0.011)
% Paved Roads	-0.002	0.002	-0.002	-0.001	-0.000
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Log GDP Per Capita (constant 2010 USD)	0.485*	0.673***	0.708**	0.621**	0.672**
	(0.257)	(0.235)	(0.269)	(0.269)	(0.291)
Log Population	0.170+	0.152*	0.330***	0.180*	0.189*
	(0.110)	(0.087)	(0.122)	(0.106)	(0.111)
Log Land Area	-0.126	-0.083	-0.244**	-0.085	-0.078
	(0.109)	(0.085)	(0.113)	(0.098)	(0.100)
Common Language	-0.219+	-0.230**	-0.581***	-0.355**	-0.404**
	(0.147)	(0.111)	(0.165)	(0.164)	(0.196)
Log Gini Lights (2008)	1.577*	1.662**	2.925***	1.591**	1.657**
	(0.899)	(0.659)	(0.950)	(0.791)	(0.819)
Log # Suppliers per Product-Country	-0.584***	-0.453***	-0.419***	-0.416***	-0.363***
	(0.095)	(0.073)	(0.082)	(0.090)	(0.114)
Log # Cities per Product-Country	0.582***	0.405***	0.332**	0.358**	0.286
	(0.149)	(0.128)	(0.138)	(0.153)	(0.187)

Notes: Number of observations equals 245,000 and rounded for disclosure avoidance. Column headings for columns 1 through 4 list the various measures of contract enforcement used as the key independent variable. Column 5 uses legal origins as an instrument for the principal component of contract enforcement. The dependent variable is as defined in (3.1). All columns include Importer and HS4 fixed effects. Standard errors clustered by country in parentheses. * < 0.10, ** < 0.05; *** < 0.01.

Table 7. Spatial Concentration of Foreign Suppliers and the Role of Institutions, Alternate Years

Dependent Variable: EG Index Value	(1)	(2)	(3)
	2008	**2009**	**2010**
Contract Enforcement	-0.149**	-0.142**	-0.132*
	(0.066)	(0.070)	(0.074)
Regulatory Trade Barrier	-0.238	-0.171	-0.216
	(0.142)	(0.123)	(0.141)
Internet per 100 people	-0.001	-0.007	-0.008
	(0.008)	(0.008)	(0.009)
% Paved Roads	-0.002	-0.001	0.001
	(0.004)	(0.004)	(0.003)
Observations	222,000	214,000	242,000
Fixed Effects		Importer, HS4	

Notes: Number of observations rounded for disclosure avoidance. Column headings for columns 1 through 3 list years corresponding to the sample used. The dependent variable is as defined in (3.1). The following control variables are included in all specifications: log GDP per capita (constant 2010 USD), log population, log land area, common language indicator, log gini lights, log number of suppliers per product-country, log number of cities per product-country. Standard errors clustered by country in parentheses. * < 0.10, ** < 0.05; *** < 0.01.

Table 8. Spatial Concentration of Foreign Suppliers and the Role of Institutions, Alternate Enforcement and EG Index Measures

Dependent Variable: EG Index	(1) **EG Index Value**	(2) **EG Index Value**	(3) **EG Index Count**
Contract Enforcement			-0.120***
			(0.024)
Legal System & Property Rights	-0.232***		
	(0.080)		
Freedom from Corruption		-0.017**	
		(0.006)	
Regulatory Trade Barrier	-0.075	-0.059	-0.017
	(0.129)	(0.123)	(0.049)
Internet per 100 people	-0.003	-0.008	0.022***
	(0.008)	(0.007)	(0.005)
% Paved Roads	0.000	0.000	0.005**
	(0.003)	(0.004)	(0.002)
Observations	245,000	245,000	245,000
Fixed Effects	Importer, HS4		

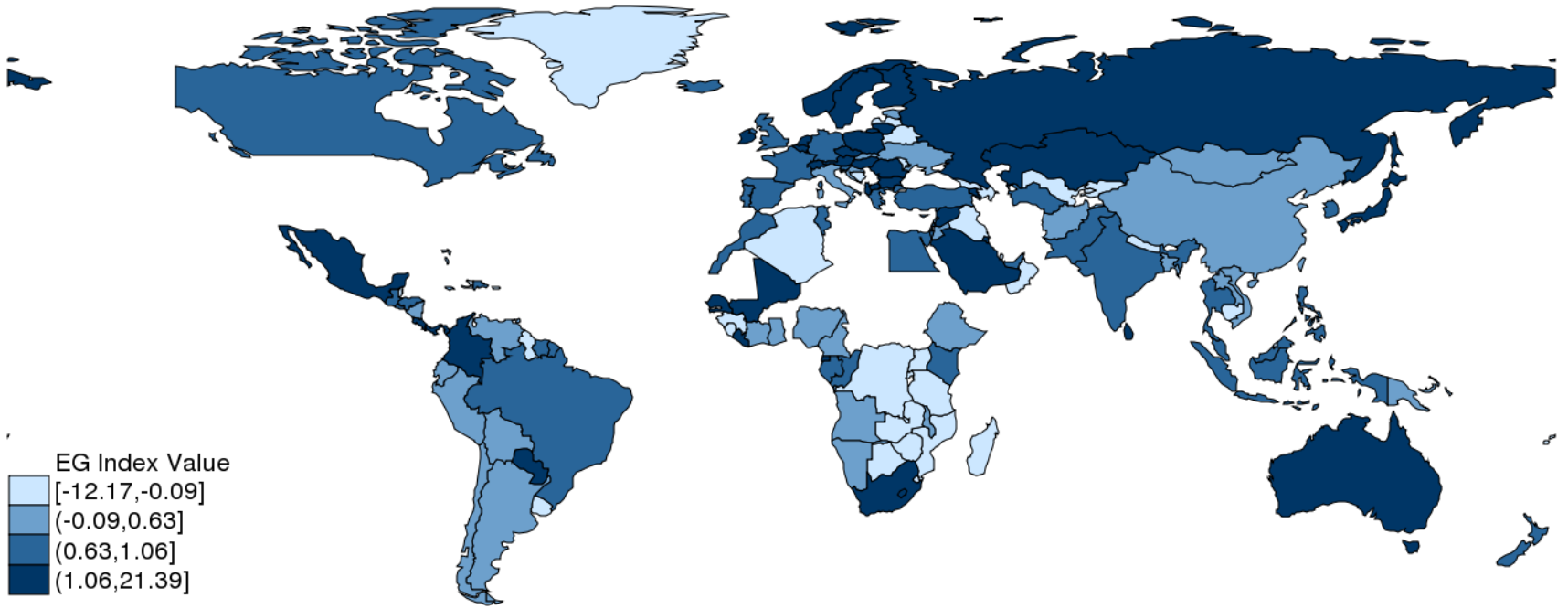
Notes: Number of observations rounded for disclosure avoidance. The dependent variable in columns 1 and 2 is as defined in (3.1) and in column 3 is similarly defined, except it uses the count of suppliers. In column 1, we use an alternate measure of institutional quality from the Fraser Institute. In column 2, we use the freedom from corruption measure from the Heritage Foundation. The following control variables are included in all specifications: log GDP per capita (constant 2010 USD), log population, log land area, common language indicator, log gini lights, log number of suppliers per product-country, log number of cities per product-country. Standard errors clustered by country in parentheses. * < 0.10, ** < 0.05; *** < 0.01.

Table 9. Spatial Concentration of Foreign Suppliers and the Role of Institutions, Firm Heterogeneity

Dependent Variable: EG Index	(1)	(2)	(3)	(4)
	Size		**Age**	**Intermediary**
	Employment	**Establishments**		
Contract Enforcement	-0.164*	-0.163*	-0.174*	-0.160**
	(0.087)	(0.091)	(0.103)	(0.083)
Contract Enforcement x Log Employment	0.002			
	(0.002)			
Contract Enforcement x Log Establishments		0.001		
		(0.002)		
Contract Enforcement x Log Age			0.005	
			(0.009)	
Contract Enforcement x Intermediary				0.008
				(0.016)
Regulatory Trade Barrier	-0.129	-0.129	-0.129	-0.128
	(0.141)	(0.141)	(0.141)	(0.140)
Internet per 100	-0.009	-0.009	-0.009	-0.009
	(0.011)	(0.011)	(0.011)	(0.011)
% Paved Roads	-0.001	-0.001	-0.001	-0.001
	(0.004)	(0.004)	(0.004)	(0.004)
Observations			225,000	
Fixed Effects			Importer, HS4	

Notes: Number of observations rounded for disclosure avoidance. The following control variables are included in all specifications: log GDP per capita (constant 2010 USD), log population, log land area common language indicator, log gini lights, log number of suppliers per product-country, log number of cities per product-country. Column 1 presents interactions with importer's log total employment; column 2 presents interactions with importer's log total establishments; column 3 presents interaction with importer's log total age; and column 4 presents an interaction with an intermediary dummy which is 1 if the importer has 100% of its employment in NAICS two-digit industries 42, 44, or 45. Standard errors clustered by country in parentheses. * < 0.10, ** < 0.05; *** < 0.01.

Figure 1. Spatial Concentration of Sourcing using EG Index, 2011



Notes: This figure displays the average EG index by country. Darker (lighter) shades of blue correspond to higher (lower) values of the index indicating greater (smaller) supplier concentration.