



Spanning the Institutional Abyss: The Intergovernmental Network and the Governance of Foreign Direct Investment

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Global economic transactions such as foreign direct investment must extend over an institutional abyss between the jurisdiction, and therefore protection, of the states involved. Intergovernmental organizations (IGOs), whose members are states, represent an important attempt to span this abyss. IGOs are mandated variously to smooth economic transactions, facilitate global cooperation, and promote cultural contact and awareness. We use a network approach to demonstrate that the connections between two countries through joint-membership in the same IGOs are associated with a large positive influence on the foreign direct investment that flows between them. Moreover, we show that this effect occurs not only in the case of IGOs that focus on economic issues, but also on those with social and cultural mandates. This demonstrates that relational governance is important and feasible in the global context, and for the most risky transactions. Finally we examine the interdependence between the IGO network and the domestic institutions of states. The interdependence between these global and domestic institutional forms is complex, with target-country democracy being a substitute for economic IGOs, but a complement for social and cultural IGOs.

Recent decades have seen a substantial increase in economic transactions that span national borders, a phenomenon known widely as economic globalization. As with international interactions of all types, economic globalization presents intriguing questions regarding governance. Theories of the governance of economic transactions have been developed mostly in the domestic context. The state is always conspicuous in these theories, as the ultimate institutional authority within a country, and therefore the backbone of the relevant institutional framework, even when private institutions are prominent in that framework. In stark contrast, there is no equivalent of the state to serve as the ultimate authority over international transactions. In terms of extant accounts of governance which depend on the state even if they don't focus on it, such transactions must cross an institutional abyss.

The bridges across this abyss are organizations, specifically multinational corporations (MNCs) and intergovernmental organizations (IGOs). MNCs may subsume international economic transactions within their bureaucracies when they operate interdependent units in different countries. This phenomenon, called foreign direct investment (FDI), is the fastest growing economic indicator of globalization. Between 1980 and 2003 the stock of FDI as a percentage of world GDP increased by 240%, much faster than the trade to GDP ratio, which increased 22% over that period (Guillen, 2006). The role of IGOs, which are organizations of states, is to provide international institutional rules that may facilitate international surety, coordination and trust (Fligstein and Stone-Sweet, 2002). In this paper we consider the interdependence between these two forms of organizational governance by investigating how FDI extending from a company based in one country to another country is affected by the connections between

the two countries forged by simultaneous joint membership in IGOs. In other words, the phenomenon of MNCs investing in operations that span borders is our dependent variable, and the network of IGO connections between countries is our main explanatory variable.

Our approach is motivated by the recognition that FDI is at the same time a solution to some of the challenges of governing international economic exchange, and a source of unique governance problems. FDI enables some global transactions by enfolding them in the organizational structures of MNCs, where bureaucratic rules and policies may govern them. This role is particularly important to facilitate the transfer of intangible assets, such as the knowledge or reputation of an MNC across borders (Teece, 1985; Carr, Markusen and Maskus, 2001). On the other hand, FDI creates and exacerbates other governance problems because, relative to the alternative of trade, it represents greater investments of capital and intangible assets by the company, and therefore increases the risk. FDI also typically is accompanied by some (perhaps temporary) transfer of workers between countries, which creates a type of transaction cost which is typically absent in trade.

It is because FDI presents notable governance challenges that we ask what other sources of institutional support may facilitate FDI. Here, we build on recent work that has identified the network of bilateral connections forged by IGOs as an important influence on the management of international relations of many types. Many IGOs exist explicitly to promote collective global goals, such as peace and efficient trade. However, it is only recently that evidence has begun to accumulate in support of the idea that they contribute to these ends. The foundation for this new evidence is the recognition that

IGOs operate by forging a network of connections between countries, and infusing that network with institutional content¹. We show that when two countries become more strongly connected through the IGO network, FDI flows between them increase. Furthermore, our analysis indicates that it is not only connections through IGOs formed for economic purposes that matter, but that connections through social and culture IGOs also promote FDI. Social and cultural IGOs operate to promote familiarity, goodwill and trust between nations, so our finding that they also promote FDI shows that social mechanisms are also important for the governance of international economic transactions.

We further investigate the operation of IGOs to promote FDI by asking whether IGO governance is more effective for some countries than others. The uneven flow of FDI has been cited as a major inhibition to economic development. Indeed, in his criticism of the failure of IGOs such as the IMF, World Bank and WTO to promote development in poor countries, Stiglitz (2003:6) specifically cites the inability of African countries to attract foreign investment as fundamental to the problem (see also Easterly, 2006). To explain country-variation, we analyze whether the efficacy of IGO connections depends on the level of democracy in the target country. Democracy and the democratic division of powers may allow target-country governments to credibly commit to MNCs to protect their investments, and therefore may be a substitute for the governance that IGO connections provide. Our results indicate that this substitution between domestic and global institutions does in fact occur in the case of economic IGO connections. Surprising to us, social/cultural IGO connections and target-country

¹ The “network turn” of IGO analysis has recently yielded important evidence that IGOs influence important bilateral outcomes such as the incidence of war (e.g., Russett and Oneal, 2001; Gartzke, 2002; Hafner-Burton and Montgomery, 2006) and trade (Ingram, Robinson and Busch, 2005) and encourage the production of global collective goods such as environmental sustainability (Ward, 2006).

democracy have the opposite interdependence: They complement rather than substitute for each other.

The Challenge of International Economic Exchange

How different is international economic exchange from its domestic equivalent? A telling result is Anderson and van Wincoop's (2003) finding that national borders reduce trade between the US and Canada by about 40% and among other industrialized countries by about 30%. By comparing the magnitude of border effects to those of distance in gravity-models of trade, Helliwell (2002) concludes that the effect of a border to discourage trade is equivalent to adding 10,000 miles of distance between the traders. This equivalency is all the more impressive in light of the fact that effect of physical distance to discourage trade is substantial, more than would be expected merely from transportation costs.

The effect of borders to discourage trade derives from two sources. The first is that (ideally) states provide institutions to facilitate economic exchange domestically, and these institutions do not operate across borders because of the limitations on any one state's jurisdiction. The relevant institutions may be roughly divided into those that provide surety and those that facilitate coordination. In the realm of surety, strong laws that enforce contracts, protect property rights, and otherwise reduce transaction costs at the domestic level enable exchange partners to credibly commit to future actions, and reduce the risk of malfeasance (North, 1990). And while private actors also provide surety for economic transactions, in doing so they typically depend on the background of formal institutions of the state, as when private bargaining over contract disputes takes

place “in the shadow of the law” (Macaulay, 1963) or when organizations that make assurances, such as auditors, stock exchanges, and banks, rely on state regulation to facilitate their own credible commitments. As for state institutions that facilitate coordination, the most obviously relevant is the provision of a common currency, a critical ingredient for smoothing exchange (Rose, 2001). Likewise, almost all states support communications and travel within their borders, and provide exchange-relevant standards (e.g., for measurement).

The second source of border effects is the distribution of social networks and norms. Normative governance may facilitate exchange in markets where formal institutions of the state are absent or insufficient. For example, DiMaggio and Louch (1998) have shown that buyers in what might otherwise be “markets for lemons” (e.g., used cars) are particularly likely to transact with relatives. And Clay (1997) shows how coalitions of merchants employing social sanctions facilitated trade in early 19th century California, when there was no state enforcement of contracts. Of course, social relations *sometimes* span national borders, but they are overwhelmingly more common within a country. Gravity-model analyses of outcomes such as migration and telephone calls show that there is a massive border effect for social relations as well as economic ones (Rietveld and Janssen, 1990; Helliwell, 1998).

Although the evidence of border effects in global exchange has developed through the analysis of trade, we expect that they are even more discouraging of FDI than of trade. FDI avoids some of the challenges of international economic transactions, by subsuming them within the organizational structure of a multinational firm. This is particularly useful for transacting intangibles, such as knowledge or permission to use a

valuable brand. In many cases, communication mechanisms and intellectual property rights are insufficient to allow such intangibles to be transferred across borders in any other way than by a multinational company that extends its operations via FDI (Vernon, 1971). Even in the case of intangibles, however, some familiar border effects apply. In particular, the internal operations of a multinational corporation cannot completely resolve coordination problems because even though the corporation may standardize within, its various national operations must, in some ways, integrate with their local environments.

There are also border effects that are unique to FDI, or worse in the case of FDI than trade. Foremost among these is the exposure of investments in and profits from a target country to some form of expropriation by the target-country government. Such expropriations may range from the nationalization of a plant to a domestic legal change that makes it more difficult for a multinational to extract profits from a target country. Compared to trade, the exposure of FDI investments are notable because they are typically larger, and they are mainly to the target-country government, rather than to private companies that may be engaged in trade.

Culture is another barrier that is uniquely problematic for FDI. “Cultural distance”, that is, the extent of differences between countries regarding important cultural values, has been argued to discourage international transactions because it inhibits communication and knowledge transfer (Siegel, Licht and Schwartz, 2006; Kogut and Singh, 1988). Further, FDI, unlike trade and some other international transactions, typically involves *some* transfer of persons. Employees of the multinational company often relocate, even if temporarily, to the target country to set up operations, coordinate

with the parent firm, facilitate the transfer of intangible and tangible assets between the parent firm and the FDI operation, and protect those assets. Thus, FDI between culturally distant countries represents an added cost of submerging employees in a national environment they may find confusing, stressful, or even hostile. At the least, this increases concrete costs to the multinational due to premium pay and turnover. At the most, firms may forego altogether some profitable FDI opportunities because the prospect of “living there” is so unappealing to managers and other employees.

The Governance Role of IGOs

If border effects exist because the traditional bases of governance of transactions—states and networks—are more relevant within than between countries, a natural source of relief would be from institutional structures that are explicitly international. There is no more likely candidate than the IGO, which is an organization with three or more states as members. Prominent examples are the UN, the International Monetary Fund (IMF), and the World Bank, but there are currently more than three hundred IGOs operating in the world system. While the majority of IGOs receive little public attention, all of them work to promote collective international goals, and many of these are specifically aimed at smoothing global economic transactions. Many of these efforts facilitate FDI.

The most heavy-handed FDI influence comes from IGOs such as the IMF and World Bank, which encourage neo-liberal economic reforms. For example, Polillo and Guillen (2005:1775) quote a letter of intent from the Indonesian government to the IMF wherein the government reports amending the banking law to, among other things, “permit major improvements in...openness to FDI.” Similarly, Henisz, Zelner and

Guillen (2005) show that pressure from the IMF and the World Bank increased privatization and regulatory reform in telecommunications and electricity industries around the world, opening the door to increased FDI in these important sectors. While these studies expose a coercive element of some important IGOs to push neoliberal policy on dependant countries, these same organizations promote less controversial policies which may be even more important for FDI. Critical in this regard is the IMF's sponsorship of convertible currency. Its members agree to "promote international monetary cooperation, exchange stability, and orderly exchange arrangements...(IMF, 2006)."

Some IGOs provide dispute resolution processes that may encourage MNC's to take the commitments of target governments as credible, and thereby reduce the perception of risk associated with FDI. A sample of the IGOs that facilitate such credible commitment includes the African Reinsurance Corporation, the European Court of Justice, and the Permanent Court of Arbitration. Many other IGOs promote the recognition and protection of property rights, among them the European Patent Office, the International Patent Cooperation Union, and the World Intellectual Property Organisation. Still others promote communication and standardization, including the International Bureau of Weights and Measures, a number of postal unions, railway congresses, aviation councils, information banks, and centers for statistics.

With so many IGOs so clearly aimed at reducing international transaction costs, we might expect that their effect on FDI would already be well documented. In fact, we are aware of only one analysis relevant to this question, that of Buthe and Milner (2005), which looks at the effect of only one IGO (the GATT/WTO). More than that, until

recently there was very little evidence that IGOs promote economic outcomes of any type.² The previous failure to find evidence of IGO influence was probably due to under-attention to the network structure through which IGOs operate. Earlier research focused on the effects of membership of a single IGO. By focusing only on one IGO, previous studies miss the interdependence of overlapping institutions and the complexity of dyadic connections.

Recent research that specifies the influence of IGOs as working through multiple and simultaneous IGO memberships of countries, has documented substantial influence of IGOs on a number of bilateral outcomes, including reduction in the incidence of war (Hafner-Burton and Alexander, 2006), and increased trade (Ingram et al., 2005) and environmental cooperation (Ward, 2006).

Similarly, we expect that connections through the IGO network are the best way to operationalize the institutional governance that IGOs provide for FDI between two states. This approach is aimed directly at capturing the dyadic nature of FDI. Often, a given IGO is only useful for promoting FDI between two countries if both are part of the IGO and therefore subject to its policies. This is obviously true in the case of IGOs that promote coordination. It is also likely in the case of IGOs that promote FDI-friendly reforms, which align the economic systems of rich members and poor ones. Moreover, this approach recognizes institutional interdependencies across IGOs: investing in a country may not depend on common membership in a single IGO, but in common

² One notable exception is research in international economics, which has looked at the impact of GATT/WTO membership on bilateral trade flows, with mixed results: Rose (2004) concludes that a GATT/WTO connection does not promote trade, while Subramanian and Wei (2007) conclude it does and estimate an increase in 120% of world trade due to GATT/WTO connectedness.

membership in a group of IGOs that complement and reinforce each other. Thus we expect that

Hypothesis 1: FDI flows will be stronger between two countries when the connection between them in the IGO network is stronger.

IGOs and Social Governance

The preceding argument reflects the role of the many IGOs that aim explicitly to smooth economic transactions (we will refer to these as economic IGOs, or EIGOs). There are, however, a substantial number of IGOs that exist to promote social and cultural cohesion between nations (social/cultural IGOs, or SCIGOs). The effect of SCIGOs on FDI is also worth considering, particularly because cultural differences between nations are an important impediment to FDI. If cultural distance inhibits FDI (Kogut and Singh, 1988) and increases the failure risk of foreign ventures (Zaheer, 1995), then SCIGOs that aim to close that distance, and reduce the “foreignness” of other countries’ corporations, may produce FDI. Many SCIGOs encourage awareness through cultural contact, such as with the Asia-Europe Foundation, whose mission is “to foster contacts and intercultural dialogue among people from all walks of life in Asia and Europe” (www.asef.org), or the Bureau International des Expositions, which promotes world fairs (www.bie-paris.org). Many other SCIGOs promote cohesion between the peoples of two countries through the pursuit of shared goals, such as the eradication of disease and the improvement of human rights.

The possibility that SCIGOs, and not only EIGOs increase FDI evokes the claim from sociology’s theory of embeddedness that social relations between traders can be the basis of trust, and therefore reduce transaction costs (Granovetter, 1985; Uzzi, 1996).

Greif (1989) provides historical evidence of the social governance of international business by documenting the role of kinship in trading relations in the 11th century Mediterranean region. Contemporary analyses have shown that there is more trade between countries whose populations have more trust for each other (Guiso, Sapienza and Zingales, 2004) and that bilateral connections through SCIGOs are associated with higher trade (Ingram et al., 2005). And most directly, Bandelj (2002) shows that FDI is more likely to flow to Central and Eastern European countries from investor countries that had stronger cultural ties to the target countries, as indicated by historical immigration. This evidence, combined with arguments that cultural differences are particularly deleterious for FDI suggests that IGOs that promote social and cultural ends may also affect this important economic outcome. Therefore we expect that

Hypothesis 2: FDI flows will be higher between countries that are more strongly connected through SCIGOs, and not only through EIGOs.

IGOs and Domestic Institutions: Target Country Democracy

The most salient risk of FDI is that that government of the target country will expropriate the profits from the investment, or even the investments itself (Li, 2006). This can occur outright through nationalization, or if the government changes policies regarding taxes, the repatriation of profits, or competition. These possibilities suggest that the efficacy of IGO connections to promote FDI may depend on domestic institutions in the target country. To put it simply, we suspect that IGOs will do more to promote FDI for target countries whose domestic governments are unable to make credible commitments to investing MNCs. In other words, we see IGO governance and domestic institutions as potential substitutes.

The risk to an MNC's investment in a target country is generally understood to be higher when the political institutions of the target are more autocratic, because democracies do a better job of ensuring that investments are secure (Olson, 1993). Evidence from economic history supports the idea that absolute power reduces a sovereign's ability to make credible commitments to investors, and that the democratic division of power increases that ability (North and Weingast, 1989). Li (2006) reports that 564 expropriation acts in 56 developing countries between 1960 and 1995, only 59 occurred in democracies, and the level of democracy was negatively related to expropriation in a multivariate regression. Buthe and Milner (2005) find that the division of political powers increases the inflow of FDI to developing countries.

There are alternative arguments of the relationship between democracy and FDI. Li and Resnick (2003) argue that democracies are more exposed to public demands for the redistribution of capital, to demands for improved labor practices, and to arguments by domestic competitors against advantageous competitive positions held by MNCs. They find that after controlling for the democratic protection of property rights, the residual effect of democracy is to reduce investment flows to developing countries. These arguments, however, apply specifically to developing countries, where poverty is highest and MNCs may be attracted by cheap labor and poorly regulated competition. The fact remains that most FDI inflows are to developed countries (Guillen, 2006). Further, previous analyses of the influence of democracy on FDI may have suffered from misspecification, because they did not consider the simultaneous impact of IGO connections

If democracies do indeed provide better surety for FDI, then the role of IGOs for this purpose would presumably be smaller, suggesting that target-country democracy and IGO connectedness will be institutional substitutes. This leads us to test the following interaction hypothesis:

Hypothesis 3: Connections in the IGO network will do less to increase FDI to target countries that are more democratic.

Method

We use gravity models to test our hypothesis. Gravity models, originally created to explain bilateral trade flows, "have produced some of the clearest and most robust empirical findings in economics" (Leamer and Levinsohn, 1999). The widespread acceptance of gravity models in international economics has been reinforced by continuous efforts to link them to different trade theories (Anderson, 1979; Bergstrand 1989; Feenstra, Markusen and Rose, 2001, and Evenett and Keller, 2002) and by recent econometric research that has improved their statistical reliability (Anderson and Wincoop, 2003; Santos and Tenreyro, 2006). Based on their successful application in the analysis of international trade, gravity models have also been applied to other dyadic empirical contexts, such as migration flows (Heliwell, 1997), equity flows (Portes and Rey, 2005), and FDI flows (Brenton et al. 1999; Brainard, 1997; Carr et al., 2001).

Equation (1) represents a basic specification for a gravity model that explains FDI flows between countries i and j (Y_{ij}) as a function of country specific variables (X_i and X_j), such as GDP or population, and dyadic variables (X_{ij}) such as joint income, joint economic size, physical and cultural distance between country pairs, etc.

$$Y_{ij} = \beta_0 X_i^{\beta_1} X_j^{\beta_2} X_{ij}^{\beta_3} \eta_{ij} \quad (1)$$

η_{ij} is an error term assumed to be statistically independent of X_i , X_j and X_{ij} , and with $E(\eta_{ij}|X_iX_jX_{ij}) = 0$.

The standard practice is to log-linearize equation (1) and estimate the coefficients β by ordinary least squares (OLS) using the following equation:

$$\ln(Y_{ij}) = \ln(\beta_0) + \beta_1 X_i + \beta_2 \ln(X_j) + \beta_3 X_{ij} + \ln(\eta_{ij}) \quad (2)$$

However, Santos and Tenreyro (2006) raise two issues with this approach. First, it relies heavily on the assumption that η_{ij} and $\ln(\eta_{ij})$ are statistically independent of the covariates, an assumption that is normally violated when error terms are heteroskedastic³. As a result, OLS estimates of equation (2) would be inconsistent. Second, when the dependent variable is equal to zero the log-linearization is infeasible. This issue is especially important in our empirical context because only a few countries account for most of the FDI⁴ and zero flows are common among the remaining countries. Although several methods are used to overcome this limitation, such as dropping the pairs where the dependent variable equals zero, using $\ln(Y_{ij} + 1)$ as the dependent variable instead of $\ln(Y_{ij})$, or using Tobit estimation, no method guarantees that the coefficients are properly estimated.

To address these problems, Santos and Tenreyro (2006) suggest a variation of the traditional gravity model that does not use a log-transformation of the dependent variable. This model, estimated by Poisson pseudo-maximum likelihood and using a robust

³ Because $E(\ln y) \neq \ln E(y)$, that is, the expected value of the logarithm of a random variable y is not equal to the logarithm of its expected value (Jensen's inequality), the independence assumption between the log value of error terms and log values of covariates holds only under very specific conditions of the error term. When there is heteroskedasticity in the data, the independence does not hold.

⁴ USA, Japan, and the countries of the European Union accounted for 78% of the senders and 50% of the receivers of FDI, (World Development Report 2005).

covariance matrix⁵ instead of OLS, produces consistent estimators even in the presence of heteroskedasticity. Following their approach, we estimate the following equation:

$$FDI_{ijt} = \beta_1 \ln(trade_{ijt}) + \beta_2 \ln(GDPcap_{it} * GDPcap_{jt}) + \beta_3 (democ_{jt}) + \beta_4 \ln(IGO_{ijt}) + \Sigma\phi_{ij} D_{ij} + \Sigma\alpha_t Y_t + \varepsilon_{ijt} \quad (3)$$

where i and j denote the countries in the dyad, t represents time, and:

- FDI_{ijt} is the real value of the FDI flow from country i to country j in year t .
- $trade_{ijt}$ is the bilateral trade flow between countries i and j in year t .
- $GDPcap_{it}$ is the GDP per capita in real terms for country i in year t .
- $democ_{jt}$ is the sum of the democracy and autocracy (reverse coded) scores (taken from the Polity III Database) of country j in year t .
- IGO_{ijt} is IGO connectedness, the number of IGOs that countries i and j are simultaneously members of in year t .
- D_{ij} is a set of fixed effects at the dyad level.
- Y_t is a set of year fixed effects.

To examine hypothesis 2, we decompose the variable for IGO connectedness into two subcomponents:

- $EIGO_{ijt}$ is economic IGO connectedness, the number of economic IGOs that countries i and j are simultaneously members of in year t .
- $SCIGO_{ijt}$ is social/cultural IGO connectedness, the number of social/cultural IGOs that countries i and j are simultaneously members of in year t .

We use dyad fixed effects to account for the dependence of observations in our data and to control for all static dyadic influence in FDI flows, such as distance between

⁵ We obtain robust standard errors by bootstrapping.

the two countries, and whether they share a common language, border, religion, or colonial history. Similarly, we use year fixed effects to control for historical events that affect all dyads, such as global economic shocks, the opening of Eastern European markets and technological changes. These two sets of fixed effects control for all influences on FDI flows except those that vary simultaneously across time and within a dyad.

Data

Our dependent variable comes from two sources: the OECD, whose data for the year 2005 recorded FDI flows for 31 countries representing 87% of all outflows (World Investment Report, 2005), and the UNCTAD, providing data for FDI flows among countries that are not members of the OECD. Using both inflow and outflow data, we are able to identify unidirectional FDI flows between almost 200 countries from 1980 to 2000.

Some idiosyncrasies of the FDI data require further comment. If both countries in the dyad are in the dataset, the same unidirectional FDI flow is reported twice. For example, our dataset registers the FDI flow from Canada to the USA twice: (1) as outflow from Canada to the United States, reported by the Canadian government, and (2) as inflow in the United States from Canada, reported by the American government. Unfortunately, a pair of data points associated with the same flow may be different since the OECD and the UNCTAD build their dataset based on figures provided by national governments, which differ on the definition of what constitutes FDI⁶. That is, the outflow figure from Canada to USA may differ from the inflow figure to the USA from

⁶ Although OECD countries comply with the definitions for FDI contained in the IMF Balance of Payments Manuals (BPM5) and the OECD Benchmark Definition of FDI (BMD), they still have some freedom to define the level of foreign ownership required.

Canada due to differences in what each country defines as FDI. We dealt with the problem of duplicated flows in three ways: using their average, randomly choosing one of the reported flows as the actual flow, or selecting the flow reported by the country with the largest overall level of FDI. Although all three approaches produce similar results, we use average flows in our main analysis and introduce the alternative approaches in robustness checks.

Countries also vary on the way they report zero FDI flows. Although some countries report them explicitly, most countries exclude zero FDI flows from their data. In most cases, zero FDI flows occur between country pairs where at least one country shows low values in the democracy variable. Therefore, excluding these observations may decrease heterogeneity in our independent variables and cause a bias toward flows among developed and democratic countries. To avoid this potential problem, we consider missing reported values as zero FDI flows. Specifically we follow two steps. First, we consider conservatively that a missing reported value is equal to zero only for those years between two non-zero FDI flows for a given country pair. For example, if in our data we observe a non-negative FDI outflow from Latvia to Mozambique for the years 1995 and 1997, we assume that the outflow is zero for the year 1996. We call this approach interpolation⁷. Second, we consider missing FDI data points equal to zero if we observe at least one non-zero FDI observation before or after for the dyad. We call this approach extrapolation⁸. In the previous example, we will assign zero FDI outflows from Latvia to

⁷ The average difference of interpolated zero FDI flows with reported contiguous data points is 0.7. This low value reinforces a detailed inspection of the data where the interpolated zero FDI flows occur within data points that are either zero or close to 0.

⁸ The average difference for extrapolated zero FDI flows within reported data points within a pair is 0.3. The low value suggests that the extrapolated values are not different from existent data.

Mozambique from 1980 to 1995 and from 1997 to 2000⁹. Although our results are similar when we exclude interpolated and extrapolated observations, we present our main results using the extended dataset. Dyads for which there were no explicit reports of FDI, zero or otherwise, in our data were excluded from the analysis.

Our key independent variable, the IGO network, is built using is the time-varying listing of IGOs and their members compiled by Pevehouse et al. (2003). According to their definition, an IGO must:

- (1) include three or more members of the Correlates of War-defined state system;
- (2) hold regular plenary sessions at least once every ten years; and
- (3) possess a permanent secretariat and corresponding headquarters.

We first aggregate all IGOs (AIGOs) regardless of their mandates. We then classified the IGOs into economic or social/cultural based on their mandates as described in the Yearbook of International Organizations. We defined economic IGOs (EIGOs) as those whose mandates stipulate any of the following: (1) perform multiple economic functions, monitor and enforce international economic transactions, establish international trade agreements or protect property rights; (2) promote standards and conventions that smooth international transactions; (3) promote development or manage international public goods; or (4) address issues regarding the international structure and operations of specific industries. This definition yielded 126 EIGOs in 1980 and 158 in 2000. Social/cultural IGOs (SCIGOs) are those that: (1) engage in activities related to conservation and environment; (2) address health, disease, disaster, social welfare or

⁹ Some restrictions still apply. For example, if a country did not exist as a political entity for any year within the range of interpolation or extrapolation, we do not consider a non-existent FDI flow as a zero FDI flow.

cultural issues; or (3) promote education, technology and scientific research. Using this definition, we identified 77 IGOs as social/cultural in 1980 and 116 in 2000.

For AIGOs, EIGOs and SCIGOs, we used the IGO-member listing to create time-varying affiliation matrices of connectedness between two countries. The affiliation matrix for AIGOs at time t , A_t , is produced by multiplying X_t , a matrix whose cells indicate whether a country is a member of a given at time t , by its transpose X_t^T . Thus, A_t is a symmetric country-by-country matrix where the cell a_{ijt} indicates the number of AIGOs in which country i and country j share joint membership at time t , the measure we call AIGO connectedness. Similarly, E_t is a symmetric country-by-country matrix where the cell e_{ijt} indicates the number of EIGOs in which country i and country j share joint membership at time t , the measure we call EIGO connectedness. Finally, the affiliation matrix for SCIGOs, S_t , is created in the same way by multiplying Y_t , a country-by-SCIGO matrix whose cells indicate whether a country is a member of a given SCIGO at time t , by its transpose Y_t^T . We take the natural logarithms of the IGO connectedness variables for consistency with the treatment of other independent variables in the gravity model.

We tap different sources to obtain the other country-level variables used in our models. Our trade data comes from the compilation of unilateral trade flows generated by Feenstra & Lipsey (2005) that is rapidly becoming the standard in trade data. GDP per capita data comes from the World Development Indicators (WDI) from the World Bank. With the WDI data, we also calculate the GDP deflators per country-year required to obtain real figures for FDI and trade flows. Data for the democracy variable come from the Polity III Database, a widely used dataset in political science and international relations research. Democracy is the aggregate of two orthogonal ten-point sub-scales,

one representing the presence of autocratic institutions in a state (reverse coded), the other the presence of democratic institutions. The original range, from -10 to 10, is transformed into a 1 to 21 scale to allow for the log transformation. Thus 21 is the maximum democratic score with the value 1 capturing the most autocratic states.

Unless otherwise indicated, the IGO independent variables in our analyses are lagged one year. Table 1 shows the summary statistics and correlation matrix for our variables.

Results

Model 1 in Table 2 contains our control variables. Model 2 adds the measure for connectedness through all IGOS, AIGO connectedness. Consistent with our fundamental assertion (hypothesis 1) the FDI flow from country i to country j is significantly greater as a function of the number of IGOs that they are jointly members in. The Poisson regression model is multiplicative, so the magnitude of the coefficient represents the impact of a change in AIGO connectedness on the ceterus paribus rate of FDI from i to j . The coefficient in model 2 indicates that a one-standard deviation increase in logged AIGO Connectedness is associated with an eighty-two percent increase in FDI ($e^{1.421 * 0.42} = 1.816$). Model 3 adds the interaction between AIGO Connectedness and the level of democracy of the target country. The interaction term has a negative and significant coefficient. Consistent with hypothesis 3, IGO connections and target-country democracy are substitutes.

Model 4 examines hypothesis 2 by decomposing the aggregate AIGO connectedness variable into two subcomponents, E IGO connectedness and SCIGO connectedness. Both of these variables are interacted with the democracy level of the

target country to reflect our argument that IGO efficacy depends on target country institutions. The main effect of SCIGO connections between countries is not significant, while the interaction between SCIGO connectedness and target country democracy is significant and positive. For EIGO connectedness, the main effect is positive, and the interaction with target-country democracy is negative. Figure 1 plots the combined main and interaction effects of SCIGO and EIGOs ties (both evaluated at their mean level) over the range of target-country democracy. The cross-over point where the combined main and interaction effects of SCIGO connectedness acts to increase predicted FDI is at a target-country democracy of four or higher. This includes 95% of our dyads, so there is general support for hypothesis 2, that SCIGO connectedness are associated with more FDI¹⁰. However, hypothesis 3 suggested that IGO connectedness and target-country democracy would be substitutes. This relationship is apparent for EIGO connectedness, whose efficacy decreases with target-country democracy, but SCIGO connectedness appear to complement target-country democracy. We consider this unpredicted result in the discussion section.

There are deep and reciprocal interdependencies between inter-state economic and political relationships, so the issues of causality and endogeneity in our models deserve careful attention. To begin, we highlight that in the models we have so far shown, the dependent variables are lagged one year, so there is no possibility of reverse

¹⁰ The fact that SCIGO-ties at very low levels of target-country democracy, and EIGO connectedness at high levels of target-country democracy are associated with reductions in the expected level of FDI was surprising to us. It is not clear why an IGO tie would ever decrease the expected level of FDI. Supplementary analysis suggests that these outcomes are attributable to the influence on our models of a small set of outlier observations. If we exclude the 100 of our 64,485 observations for which the actual FDI is most in excess of our estimate (these observations are mostly associated with states in obviously unusual circumstances, such as Argentina during the hyper-inflation period we obtain estimated multiplier effects for SCIGO connectedness that go up from one and for EIGO connectedness that decline to one as target-country democracy increases, but are never less than one.

causality in the simplest sense that our dependent variable causes the independent variable. A much bigger worry is that both FDI and IGO connectedness could be driven by some common cause which was not reflected in our model. Certainly, there are many dimensions of the dyadic relationship between states that affect both FDI and IGO connectedness, such as geographic proximity, language, a history of colonial relationships, and common religious or cultural heritage. All of these influences, however, are accounted for by the dyad fixed effects in our model, which represent all of the time invariant features of a dyad. Similarly, our year fixed effects account for global trends over time that might influence both FDI and IGO connectedness, such as technological changes that increase bi-national awareness and sympathy (the internet and cheaper air travel come to mind), shocks to the global system such as the fall of the Berlin Wall, or a diffuse cultural trend of globalization. What our fixed effects don't account for are variables that change within a dyad over time, but the two that seem most likely as simultaneous influences on FDI and trade are directly controlled for in our models: (1) the wealth of the countries in a dyad; and (2) the trade between the countries in a dyad.

While we believe that the most likely common cause variables are accounted for in our model specification, there are other possibilities that our controls do not preclude. It is therefore worth highlighting just what an alternative explanation would have to account for. It is not sufficient merely to account for a positive association between IGO connectedness and FDI; our theory also predicts, and our results show, a negative interaction between IGO connectedness and target-country democracy. A credible alternative explanation would also have to account for this interaction. Furthermore, our

results show very different effects of EIGO and SCIGO connectedness as target-country democracy increases. Although we had not predicted this *a priori*, we will explain in the discussion that these findings are consistent with our position that EIGO and SCIGO connectedness represent very different mechanisms of governance.

The set of omitted variables and alternative explanations that might account for this complex, but theoretically consistent, pattern of IGO tie effects is vanishingly small. Add to this some important facts about the processes that bring about IGO connectedness and FDI. First, different agents are responsible for these two outcomes—states engage in IGOs, while companies engage in FDI. Thus, alternatives must explain the mobilization of these two agents, and cannot rely only on the initiative of states, or that of companies. Furthermore, IGO connectedness are not easily focused on a signal dyadic relationship—when a country joins an IGO it adds a tie with at least two countries, and typically many more. This frustrates alternatives that derive from purely dyadic mechanisms. Altogether, the hurdles for alternative explanations to the causal logic we present loom very large. Nevertheless, we conducted additional analyses to test our approach in model 5, which relies on five-year lags of our IGO tie variables. All of the coefficients for EIGO connectedness, SCIGO connectedness, and their interactions with target-country democracy are comparable whether IGO connectedness are lagged one or five years. This is consistent with our theoretical claims, because the information, trust and affect impact of an IGO tie would be expected to endure over time. The result further raises the bar for alternative explanations by demanding that they account for this lag.

The subsequent models establish in table 2 demonstrate robustness of our results regardless of assumptions about the level of FDI between dyad-years for which we don't

have explicit reports of FDI. In model 6 we include only dyads for which we have at least one positive FDI report in the year for one of the countries in the dyad (which demonstrates that they participated in FDI reporting in the year). In model 7 we include only observations for which we have an explicit report of FDI, making no interpolation or extrapolation of zero FDI flows for countries that did not report. These screens reduce our number of observations by roughly two-thirds, but the results are comparable in all substantive ways to our full model.

In table 3 we reproduce the specifications of models 1-5 three times, using different approaches for reconciling the flow of FDI from country i to country j as reported by i and by j . (Recall in table 2 we took the average of duplicate reports). In models 6-10 we choose randomly between duplicate reports; in models 11-15 we take the report of the country that engages in more FDI; and in models 16-20 we use a three-year moving average of reported flows. In all cases results correspond to those in table 2 in all substantive ways.

Our robustness checks serve another purpose, as a response to concerns about multicollinearity. As would be expected, there is a large positive correlation (.80) between $\ln(\text{EIGO connectedness})$ and $\ln(\text{SCIGO connectedness})$. Could the opposite signs on the main effects of these variables and on their interactions with target-country democracy be attributable to multicollinearity? The consistency of our results across six different samples and versions of our data suggests no. As Greene (1997) suggests, multicollinearity results in coefficients that are sensitive to small changes in the construction of variables, or the inclusion of observations. Across the models reported here, and many other estimations conducted in supplementary analysis, the pattern of

influence of EIGO and SCIGO connectedness, across the range of target-country democracy, remained the same.

Discussion

Economic globalization presents severe governance challenges. The insufficiency of states as a source of surety for transactions that transcend national borders creates an opportunity for an increased role for organizations in the global institutional framework. In this paper we applied a network methodology to show how one type of organization, the IGO, facilitates the cross-border investments of another type, the MNC. We further document a fascinating interdependence between domestic institutions, specifically democracy, and the international institutions represented by IGOs. The results help to understand which countries attract FDI, and from which senders. They also point to an emerging rivalry between states and organizations as sources of governance in the global economy.

We show that *both* economic and social/cultural IGO connectedness increase the FDI that flows between two countries. The social/cultural effect is the more novel of these two, and it is provocative for both FDI and theories of governance. For FDI, the influence of SCIGO connectedness reinforces arguments that social and cultural differences are a major barrier to cross-border investment, and therefore to global economic integration. More optimistically, the result also suggests that IGOs are a mechanism for reducing social/cultural differences, or at least for reducing the negative effect of those differences on FDI. For governance, this result highlights the role the social mechanisms can play in smoothing even the most high-stakes economic exchanges. Sociologists have long argued that socially embedded sentiments, such as

trust, empathy and affinity, support exchange (e.g., Granovetter, 1985). Nevertheless, unambiguous evidence in support of that claim is scarce, mostly because important and ongoing exchange relations often co-occur with social relations, making it difficult to isolate the benefit of social governance (Uzzi, 1996; Gibbons, 1999). The distinction between economic and social/cultural IGOs provides a rare opportunity to compare economic and social governance mechanisms. Furthermore, as Figure 1 suggests, SCIGO connectedness have a more positive affect on FDI than EIGO connectedness when target-country democracy is greater than 10, a condition that is met for roughly three-quarters of our observations. That SCIGO connectedness are not only a positive influence on FDI, but often more positive than EIGO connectedness is a victory for one of economic sociology's core assumptions, that social governance is sometimes the best support for transactions, and not merely a second-best alternative to more formal governance mechanisms.

As for economic IGO connections, their influence, is from one perspective unsurprising. After all, many economic IGOs are formed explicitly to facilitate global economic exchanges such as trade and FDI, so this result may be seen as merely confirming that they serve their intended function. On the other hand, the fact that an IGO performs its intended function may be surprising to many, particularly in the face of popular and scholarly arguments that these organizations are either ineffectual or shells through which powerful and rich countries legitimize their exploitation of the poor and weak (examples include Stiglitz, 2003; Rose, 2004; and Easterly 2006).

Whether or not our main EIGO result is viewed as surprising, it indicates the empirical utility of the "network turn" in research on international organization. Only a

few years ago, there was little evidence that IGOs did *anything at all*. The great leap forward in the evidence of IGO efficacy occurred with the methodological innovation of considering the network of bilateral connections created by IGOs, rather than merely counting the numbers of IGOs in the world, or the number of IGOs a given country was part of. The demonstrated utility of this approach for the field of international organization suggests an opportunity for the field of organizational theory. We began this paper by pointing to the equivalence of IGOs and MNCs as organizational responses to the governance challenges of global economic exchange. Just as many bilateral transactions are better understood by conceptualizing the influence of IGOs in network turns, we would argue that a kindred approach would add much clarity regarding the influence of MNCs. We foresee a network where nodes are countries, and the edges are connections forged by MNCs that operate in both countries. Just as we have differentiated ties forged by SCIGOs and EIGOs, the MNC network could be differentiated by key characteristics of the MNCs, such as experience, ownership structure, and strategy. We predict that an MNC network thus conceived would predict many of the same outcomes that the IGO network predicts: trade, FDI, political change, and war. This line of research would provide a path to a more fully integrated account of international political economy, and clarify MNC interdependence with and influence relative to states, IGOs, and NGOs.

Some reconciliation between our evidence that IGO connections encourage FDI and criticisms that certain IGOs are ineffective or worse comes through the interactions we estimate between IGO connectedness and target-country democracy. As the critics have observed, IGO connections do less to encourage FDI flows to *some* countries.

Intriguingly, the impact of EIGO and SCIGO connections move in opposite directions with increases in the democracy and relative power of target countries. When the target country is more democratic, EIGO connections do less and SCIGO connections do more to increase FDI flows. The negative interdependence between EIGO connections and target-country democracy suggests a substitution between international and domestic governance mechanisms. This effect is intriguing because it suggests that even though FDI is a transaction that spills over the legal jurisdiction of any one state, the commitments of target-country governments, which are more credible if those governments are more democratic (Henisz, 2000), go a substantial way to assuring MNCs that their investments will be safe. This estimation also helps to clear up a baffling finding in previous research, that FDI was sometimes found to be less likely to flow to democratic countries. When we consider the interaction between target-democracy and IGO connections, the main effect of democracy switches to be positive. This suggests that previous analyses may have suffered from misspecification, and that, consistent with theory on states' capacity to commit to foreign investors and business folk wisdom as reflected in country risk rankings, democracies *are* more attractive targets for FDI.

Target democracy interacts in the opposite way with SCIGO connections, to increase the flow of FDI, an effect that surely derives from the unique governance mechanisms embedded in networks of social/cultural, as opposed to economic, relations. One explanation for this is that the sources of FDI are overwhelmingly the "first world" democratic countries (Guillen, 2006). The social/cultural connections of these sender countries to potential targets may be more effective if those targets are more democratic due to an international equivalent to interpersonal homophily. When an SCIGO brings

the citizens of two democracies together, political similarity may enhance trust, smooth communication, and facilitate relationship building. Another explanation is that non-democratic targets may not get as much out of SCIGO connections because they are less open, and therefore less willing to exploit to the fullest opportunities for social and cultural contact. Consider for example the stereotype that the contingents from Eastern Bloc countries at international events during the cold war were heavily guarded, constrained and otherwise inhibited. Either way, the result indicates that for states as for individuals, employing social governance requires a certain capacity for sociability—the ability to strike up and maintain social relationships with others that are sufficiently positive that they may be the basis of trust, empathy and affect.

If the direct implications of this paper are to inform as to what institutional conditions make FDI more or less likely, a very important indirect implication is with regard to the interdependence between institutional forms. The contest between states and international organizations for institutional primacy is shaping up to be one of the fundamental political economy issues of our time. One characterization of this contest is that international organizations are winning it, affecting what Strange (1996) has called a retreat of the state. Our results support this as they show a substitution effect between states and IGOs, at least for the EIGOs which are explicitly targeted at governing global economic transactions. On the other hand, it could be argued that the mere fact that target democracy affects FDI at all signals a victory for the relevance of the state for global transactions. Even more significant is that there is a *positive* interdependence between SCIGOs and target democracy, a relationship that is largely unforeseen in a literature that has highlighted rivalry between international organizations and states, and

attended more to the influence of EIGOs such as the IMF and the World Bank than on SCIGOs which rely on very different governance mechanisms.

The resulting conclusion must be that the interrelationship between domestic and international governance is more complex than previous accounts have recognized. And while our findings may give hope to those who see a substantial role for the state as economic globalization progresses, there can be no claim that the network forged by international organizations is not massively and increasingly important in this regard. We have argued that inter-governmental networks fill an institutional chasm, by forging relationships that span country borders. The evidence supports this argument: The connections between states through both economic and social/cultural IGOs weigh positively and heavily as influences on which states receive FDI from which others.

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TABLE 1
DESCRIPTIVE STATISTICS

Variable	Mean	Std. Dev	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) FDI _{ij}	92.44	1,194	1								
(2) ln(Trade _{ij})	10.06	4.27	0.103	1							
(3) ln(GDP per capita _i x GDP per ca	17.05	2.13	0.098	0.449	1.000						
(4) ln(Target Democracy)	2.61	0.70	0.037	0.177	0.328	1.000					
(5) ln(All IGO Ties _{ij})	3.60	0.42	0.107	0.406	0.300	0.245	1				
(6) ln(Economic IGO Ties _{ij})	2.97	0.40	0.107	0.440	0.315	0.258	0.960	1			
(7) ln(Social/Cultural IGO Ties _{ij})	2.30	0.43	0.103	0.281	0.203	0.227	0.905	0.797	1		

TABLE 2
FIXED EFFECTS (Dyad and Year) GRAVITY MODELS OF UNILATERAL FDI FLOWS_{ij}, 1980-2000. POISSON

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ln(Trade _{ij})	0.05 (2.80)**	0.054 (3.23)**	0.054 (2.68)**	0.054 (3.18)**	0.047 (3.09)**	0.054 (3.70)**	0.054 (3.61)**
ln(GDP per capita _i x GDP per capita _j)	0.193 (1.28)	0.159 (0.87)	0.097 (0.64)	0.113 (0.81)	0.166 (1.11)	0.797 (3.08)**	0.797 (3.43)**
ln(Target Democracy)	-0.954 (7.28)**	-0.976 (8.51)**	2.13 (2.06)*	2.606 (2.85)**	1.861 (2.12)*	1.399 (1.21)	1.143 (1.02)
ln(All IGO Ties _{ijt-1})		1.421 (2.75)**	3.587 (4.64)**				
ln(All IGO Ties _{ijt-1}) * ln(Target Democracy)			-0.841 (3.04)**				
ln(Economic IGO Ties _{ijt-1})				4.62 (6.37)**		2.829 (2.79)**	2.519 (2.18)*
ln(Social/Cultural IGO Ties _{ijt-1})				-0.952 (1.39)		-1.286 (1.53)	-1.298 (1.54)
ln(Economic IGO Ties _{ijt-1}) * ln(Target Democracy)				-1.77 (6.02)**		-1.307 (3.52)**	-1.204 (2.99)**
ln(Social/Cultural IGO Ties _{ijt-1}) * ln(Target Democracy)				0.784 (2.50)*		0.793 (2.47)*	0.782 (2.30)*
ln(Economic IGO Ties _{ijt-5})					3.683 (3.95)**		
ln(Social/Cultural IGO Ties _{ijt-5})					-2.218 (2.44)*		
ln(Economic IGO Ties _{ijt-5}) * ln(Target Democracy)					-1.812 (5.23)**		
ln(Social/Cultural IGO Ties _{ijt-5}) * ln(Target Democracy)					1.147 (3.94)**		
Dyad fixed effect	Y	Y	Y	Y	Y	Y	Y
Year fixed effect	Y	Y	Y	Y	Y	Y	Y
Observations	65,039	64,485	64,485	64,485	61,373	23,819	20,185
# of dyads	1,952	1,949	1,949	1,949	1,925	1,733	1,712

z statistics in parentheses. Standard errors corrected via bootstrapping

* significant at 5%; ** significant at 1%

TABLE 3
FIXED EFFECTS (Dyad and Year) GRAVITY MODELS OF UNILATERAL FDI FLOWS_{it}, 1980-2000. ALTERNATIVE DEPENDENT VARIABLES

	Unilateral flows are chosen randomly when duplicates exist					Unilateral flows are chosen by precedence when duplicates exist					Unilateral flows are calculated as a 3 year moving average				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
ln(Trade _{ij})	0.044 (2.51)*	0.048 (2.67)**	0.048 (2.73)**	0.047 (2.96)**	0.048 (2.76)**	0.038 (2.19)*	0.041 (2.43)*	0.041 (2.11)*	0.041 (2.18)*	0.043 (2.47)*	0.041 (2.21)*	0.046 (2.62)**	0.046 (2.71)**	0.046 (2.54)*	0.047 (2.86)**
ln(GDP per capita _i x GDP per capita _j)	0.173 -1.24	0.146 -1.06	0.118 -0.77	0.144 -1.01	0.135 -0.77	0.293 -1.53	0.28 -1.56	0.242 -1.26	0.3 (2.39)*	0.28 -1.21	0.75 (2.64)**	0.667 (2.25)*	0.542 (1.99)*	0.617 (2.15)*	0.525 -1.73
ln(Target Democracy)	-1.1 (9.56)**	-1.132 (9.59)**	0.403 -0.31	-1.11 (10.87)**	1.233 -1.2	-1.027 (7.77)**	-1.044 (7.06)**	1.426 -0.92	-1.023 (6.67)**	2.203 (2.37)*	-1.031 (7.49)**	-1.061 (9.43)**	2.482 -1.65	-1.052 (9.75)**	2.719 (2.58)*
ln(All IGO Ties _{ijt-1})		1.554 (2.94)**	2.653 (2.46)*				1.08 (2.01)*	2.828 (2.27)*				1.745 (3.12)**	4.281 (3.86)**		
ln(All IGO Ties _{ijt-1}) * ln(Target Democracy)			-0.416 -1.2					-0.67 -1.59					-0.956 (2.43)*		
ln(Economic IGO Ties _{ijt-1})				-0.245 -0.42	3.889 (3.60)**				-0.707 -1.05	4.264 (4.67)**				0.238 -0.38	4.951 (4.63)**
ln(Social/Cultural IGO Ties _{ijt-1})				1.353 (2.62)**	-1.208 -1.45				1.448 (2.24)*	-1.201 -1.21				1.107 (2.37)*	-0.612 -0.99
ln(Economic IGO Ties _{ijt-1}) * ln(Target Democracy)					-1.479 (3.45)**					-1.8 (5.45)**					-1.71 (4.97)**
ln(Social/Cultural IGO Ties _{ijt-1}) * ln(Target Democracy)					0.926 (2.39)*					0.964 (2.50)*					0.628 (2.15)*
Dyad fixed effect															
Year fixed effect															
Observations	65,425	64,871	64,871	64,871	64,871	64,951	64,397	64,397	64,397	64,397	58,526	58,526	58,526	58,526	58,526
# of dyads	1,952	1,949	1,949	1,949	1,949	1,952	1,949	1,949	1,949	1,949	1,959	1,959	1,959	1,959	1,959

z statistics in parentheses. Standard errors corrected via bootstrapping

* significant at 5%; ** significant at 1%

