GOVERNANCE AND THE EFFICIENCY OF ECONOMIC SYSTEMS
GESY

Discussion Paper No. 179

The Impact of ISO 9000 Diffusion on Trade and FDI: A New Institutional Analysis

Joseph A. Clougherty*
Michal Grajek**

November 2006

*Joseph A. Clougherty, Wissenschaftszentrum Berlin (WZB), Reichpietschufer 50, 10785 Berlin, Germany.
Tel: +49 30 25491 427, Fax: +49 30 25491 444. clougherty@wz-berlin.de
**Michal Grajek, Wissenschaftszentrum Berlin (WZB) and Humboldt-University of Berlin

Financial support from the Deutsche Forschungsgemeinschaft through SFB/TR 15 is gratefully acknowledged.

The Impact of ISO 9000 Diffusion on Trade and FDI: A New Institutional Analysis

Joseph A. Clougherty

Wissenschaftszentrum Berlin (WZB) and CEPR

Michał Grajek

Wissenschaftszentrum Berlin (WZB) and Humboldt-University of Berlin

Abstract: The effects of ISO 9000 diffusion on trade and FDI have gone understudied. We employ panel data reported by OECD nations over the 1995-2002 period to estimate the impact of ISO adoptions on country-pair economic relations. We find ISO diffusion to have no effect in developed nations, but to positively pull FDI (i.e., enhancing inward FDI) and positively push trade (i.e., enhancing exports) in developing nations.

Keywords: FDI, Trade, Transaction Costs, Institutions

JEL Codes: C51, F23, L31

* Corresponding author: Joseph A. Clougherty, Wissenschaftszentrum Berlin (WZB), Reichpietschufer 50, 10785 Berlin, Germany; Tel: +49 30 25491 427; Fax: +49 30 25491 444; E-Mail: clougherty@wz-berlin.de. Michal Grajek gratefully acknowledges financial support from the German Federal Ministry of Education and Research (project 01AK702A). We appreciate substantive conversations with Witold Henisz and Jean-Francois Hennart that helped in the early development of the work. Comments by Derek Kellenberg, Ken Scheve, Harbir Singh, Maurizio Zanardi, and seminar participants at Tanaka Business School/Imperial College, London School of Economics, Nijmegen School of Management, IUI in Stockholm and the 'Conference on the PE of Regulating MNCs & FDI' at Penn-State were helpful in further developing the work. Kemal Azun, Enno Schroeder and Christopher Xitco provided excellent research assistance. The errors, however, are our own.

Introduction

The Geneva based 'International Organization for Standardization' was constituted in 1946; however, unlike many of the other post-World War II international institutions (e.g., United Nations, IMF, World Bank, International Health Organization, International Civil Aviation Organization) this organization has experienced its most striking success over the last two decades. The ISO 9000 certification system for firm quality was introduced in 1987, and by the end of 2002 some 560,000 certificates had been awarded to sites in 159 nations (Corbett, 2003). In short, ISO 9000 (sometimes simply referred to as ISO here) certification for firm quality has been far-and-away the most successful and widespread set of standards implanted by the 'International Organization for Standardization' (Casper & Hancké, 1999; Mendel, 2002).

The remarkable spread of ISO has spawned a recent literature that attempts to define what drives the global diffusion of ISO 9000 certification (e.g., Guler *et al*., 2002; Mendel, 2002; Corbett, 2003) and ISO 14000 – a sister-standard for environmental processes – certification (e.g., Delmas, 2000, 2002; Christmann & Taylor, 2001; Corbett & Kirsch, 2001; Prakash & Potoski, 2006a, 2006b). With regard to ISO 9000 standards (the focus of this study), a number of diffusion drivers have been identified: the role of government directives (particularly the EU), government agencies mandating contractor adoption, Multinational Enterprises requiring supplier adoption, and extensive adoption by trading-partner and trading-competitor nations. Yet, the macro-level economic impact of ISO 9000 certification has been an under-investigated topic.

We aim to look not at the macro-level drivers of ISO 9000 adoption and diffusion, but instead consider the economic impact of ISO 9000 adoption on country-pair economic relationships. More specifically, we are interested in how the adoption of ISO 9000 standards influences the two primary means (trade and foreign direct investment) by which firms conduct cross-border economic activity. ISO 9000 standards – via their quality-signaling, common-

language, and conflict-settling properties – potentially alter the costs involved with trade and foreign direct investment activity. In short, ISO 9000 may reduce the transaction costs and information asymmetries involved with arms-length interactions between businesses from different nations (thereby, enhancing trade) and with engaging in international greenfields, joint-ventures and acquisitions (thereby, enhancing FDI).

This paper is organized as follows in order to support the analysis. We begin by setting the research question in the International Business (IB) literature, giving credit to New Institutional Economics (NIE) insights as conceptually fundamental, and supporting the ISO 9000 system as representative of an international institution. Next, we consider the properties of ISO 9000 and generate formal propositions with respect to how diffusion may directly impact country-pair trade flows and FDI stocks. Further, we analyze the potential for the ISO effect to depend on the type of country-pair; i.e., whether the proposed effects hold systematically. We then employ panel data on trade and FDI reported by OECD nations, discuss estimation issues, and empirically test the impact of ISO 9000 adoption on country-pair economic relationships. Finally, we conclude and discuss.

A New Institutional Analysis of ISO 9000 in an International Business Context

International Business researchers have for quite some time been interested in the factors that affect cross-border economic relationships. Dunning's (1981, 1988) OLI paradigm helps both contextualize and conceptualize the importance of institutional factors: in particular, the location-specific advantages of host country environments represent the key influence as to where foreign production takes place, as they create climates that facilitate an MNE exploiting its ownership-specific and internalization advantages. Both non-institutional factors (e.g., market size, market growth, labor costs, production costs, transportation costs, natural resources, and

distance) and institutional factors (e.g., governance structures, trade barriers, FDI specific policies, macroeconomic policies, political stability, and tax regulations) have been identified in the literature as prominent location-advantages (Sethi *et al*., 2003; Li & Resnick, 2003). The range of potential institutional factors is, accordingly, quite extensive: from the well studied importance of political constraints on executive discretion that secure property rights (e.g., Henisz & Zelner, 2001; Henisz, 2002) to exploratory notions on how antitrust policy might impact foreign direct investment (Brewer, 1993; Li & Resnick, 2003).

A striking omission in the above list of location-advantages is the status of managerial practice in the host nation environment. Clearly, foreign investors will not only consider factors like the natural resources, human resources, and political context in a country, but also consider the general excellence of managerial practice in that same environment. While the empirical literature on factors driving FDI has neglected the importance of managerial practice and standards, these factors have, nevertheless, been explored conceptually. For instance, Dunning (2001: 181) notes that commercial infrastructure and business culture certainly enhance location attractiveness. Consider also the recent IB scholarship that stresses the existence of FDI motivated by MNE's looking to gain access to resources and capabilities; hence, some studies (e.g., Anand & Kogut, 1997; Anand *et al.*, 2005) examine the geographical pull of host country skills. While these skills are typically considered to be embodied in the capabilities of workers, Anand and Kogut (1997) observe that a nation's capabilities also reside in firms and industrial networks; and that IB researchers often ignore the important role played by resources embedded in firms. Consider also, the recent call by Ricart *et al*. (2004) for the JIBS community to embrace the importance of specialized intermediaries: institutions that help consummate transactions by reducing the information asymmetries and transaction costs involved with identifying the relevant resources embedded in firms.

Our main interest resides in how the diffusion of ISO 9000 practices – the internationally recognized standard for quality management – impacts the economic relationships between countries. By empirically considering the impact of ISO 9000 diffusion on both FDI and trade in international country-pair environments, we hope to add to the extensive IB literature on location advantages. Furthermore – and akin to the recent IB literature that identifies firm-based sources of capabilities – we think it important to consider the properties of firms and the role of institutional intermediaries. In our case, the overall properties of firms in a particular national environment and the intermediary role played by the ISO 9000 system might impact the macro-level phenomenon of cross-country trade and FDI. In short, we argue that the diffusion of internationally recognized managerial practices in a country – in addition to natural, human and political resources – represents an important factor that drives FDI and trade decisions.

Before delving further into our analysis of the potential impact of ISO 9000 diffusion, it behooves us to institutionally ground our analysis via two additional means. First, we must lay out how institutions are considered by New Institutional Economics scholars (e.g., Williamson, 1985; North 1990), as that perspective (focusing on how alternative forms of governance economize on transaction costs) represents the core theoretical backdrop to our analysis. Second, we must establish the accuracy of understanding the ISO 9000 system as an institution – at least an informal-decentralized international institution – in order to engage in such an analysis.

New Institutional Economics

The work of Robert Coase and Oliver Williamson is fundamental to the NIE perspective. Coase (1937) identified transaction costs as explaining why some exchanges were done within firms, and others were governed by markets. Williamson (1975, 1985) expanded on Coase's work by identifying bounded-rationality and individual opportunism as heightening transaction

costs and eliminating exchange from the market. Institutions play a critical role in NIE scholarship, as they reduce uncertainty by providing dependable and efficient frameworks for economic exchange (North, 1990). The 'New Institutionalism' in organizational theory and sociology (see Scott, 1995 and DiMaggio & Powell, 1991 for good reviews) has one particular concern with the NIE approach that is germane to our study: institutions and organizations do not necessarily lead to beneficial outcomes. Instead, New Institutionalism holds that actors often construct institutions that never manifest the desired outcomes. For instance, DiMaggio and Powell (1983: 147) state that "forms of organization change occur as the result of processes that make organizations more similar without necessarily making them more efficient".

In line with the NIE approach and the New Institutionalism critique, we will stress the external – not the internal – benefits of ISO 9000 certification. Hudson and Jones (2003: 1004) observe that ISO 9000 may generate benefits "both because quality is more effectively signaled and also because there may be an actual increase in quality [and/or] better cost control". Writing from the New Institutionalism tradition, Walgenbach (1998) found – from interviews with German quality managers – that ISO 9000 certification generated very little change in actual quality or efficiency. A number of survey-based studies in specialty journals also elicit similar findings with respect to the internal benefits of certification (Simmons & White, 1999; Juran, 1999). Furthermore, Delmas (2002) notes that firms seek ISO 9000 irrespective of whether they expect actual quality improvements. Terziovski *et al.* (2003) begin to make sense of the mixed internal performance record for ISO 9000 by observing that firms at early stages of the quality process may find certification to spawn internal benefits, but companies with good quality systems may find ISO 9000 certification to generate internal losses due to the added costs, delays and burdensome documents necessary for certification. Accordingly, we will not analyze the impact of any potential efficiency or quality improvements due to certification, but instead focus

simply on external benefits. While the internal effects of ISO 9000 certification might be complementary to the external effects, neglecting potential internal benefits is consistent with our NIE approach (focusing on the external problems of transaction costs and information asymmetries), consistent with New Institutionalism's critique (efficiency is often not realized), and consistent with the literature on ISO's internal benefits (a mixed performance record).

In sum, we engage in an NIE analysis of the ISO 9000 system as the NIE approach is well suited to making sense of institutional remedies for transaction cost and information asymmetry problems: the heart of our interest in ISO's potential beneficial impact on FDI and trade. We move forward then with the idea that institutions (and the ISO 9000 system in particular) emerge or take specific forms to solve problems and facilitate commerce. Yet, we remain open to New Institutionalism's charge that new forms may not generate the intended consequences: i.e., ISO 9000 diffusion may not lead to the intended benefits vis-à-vis trade and FDI.

ISO 9000 as an International Institution

Douglas North (1991: 97) defines institutions as humanly devised constraints that structure economic interaction and consist of both informal constraints (e.g., sanctions, taboos, customs, traditions, and codes of conduct) and formal rules to create order and reduce uncertainty in exchange. Hence, an important breakthrough with the NIE approach was recognizing the importance of both formal and informal institutions (Henisz & Williamson, 1999). Prior scholarship generally neglected the importance of informal institutions by essentially taking a formal-legalism approach to institutional analysis: "a central role for formal rule or laws enacted and effectively enforced by a hierarchical authority" (Yarbrough & Yarbrough, 1990). Indicative of the importance of both informal and decentralized institutions, North (1991: 100) argues that a mixture of voluntary and semi-coercive institutions enabled long-distance trade in the Middle

Ages. Accordingly, despite the voluntary and decentralized nature of the ISO 9000 system, it is very much an institution. In fact, ISO 9000 is indicative of a trend toward increased private sector involvement in areas of governance that had traditionally been part of the state. Neumayer and Perkins (2005: 239) observe that "in the absence of a global state, the task of designing, implementing, and enforcing standards has been increasingly assumed by various regional and/or global institutions, some of which are nongovernmental". King *et al.* (2005) concur when they surmise that the ISO management standards represent examples of decentralized institutions.

Understanding the ISO 9000 system as an international institution can be further enhanced by considering the discourse within International Political Economy (IPE). The domain of IPE focuses on the social, political and economic arrangements that impact the global systems of production and exchange: i.e., what institutional conditions promote international cooperation (Strange, 1988; Krasner, 1983; Keohane 1984). For IPE scholars, international regimes (i.e., international institutions) represent multilateral agreements that promote cooperative behavior, regulate relations, and stabilize the international order in particular issue areas. Dimaggio and Powell (1991) – in surveying New Institutionalism's impact on IPE – note that some international institutions are formal organizations, while others are complex sets of rules, ***standards*** and agencies. Dimaggio and Powell further note that regimes are institutions in that they build upon, homogenize and reproduce standard expectations. Accordingly, IPE scholars could consider the 'International Organization for Standardization' and its' ISO 9000 standard as an international regime. But ISO's formal inclusion of non-state actors (industry and consumer representatives) suggests that this international institution must be understood in a post-Westphalian sense

(Keohane, 1984); thus, ISO is an international regime not wholly dependent on nation-states (Bernstein & Cashore, 2000; Perez, 2004; Börzel & Risse, 2005).[1]

Furthermore, the decentralized nature of the ISO 9000 system yields some estimation benefits when it comes to empirical testing. Consider the dichotomous nature of most institutional conditions: i.e., you are either in or out. Rose (2004) cites this dynamic as crucial to his finding the WTO to have no significant impact on trade flows.[2] One of the problems with a dichotomous measure for institutional membership is that it cannot capture significant variation in institutional commitments: e.g., non-members to an institution attempting to join probably exhibit different behavior than non-members with no ambition of joining.[3] A decentralized institution – like ISO 9000 – that depends on the choices of a myriad of local firms allows us to elicit a finer measure of effective national commitments to institutional principles. In short, the greater the diffusion of ISO 9000 practices in a country, the greater the essential commitment to those managerial principles in that national environment.

Country-Pair Trade Flows

The stated objective behind the formation of the International Organization for Standardization was to promote the development of standards in order to facilitate international trade in goods and services (Hayes, 1994). Additionally, the diffusion of ISO 9000 reportedly received a great boost by the EU's use of the standard to accelerate establishment of a single market (Conti, 1999; Anderson *et al.*, 1999). At the firm-level, it has been argued that businesses

[1] Other IPE scholars (e.g., Prakash & Potoski, 2006a, 2006b) conclude that ISO is more non-governmental organization (NGO) than regime due to its multiple stakeholder nature and non-traditional negotiation strategies; yet, NGOs are also a type of institution.
[2] See http://faculty.haas.berkeley.edu/arose/Eureka.htm for an interesting insight into how Andrew Rose came to the conclusion that gaining entry into a club may not actually generate intended benefits.
[3] We could imagine differences in commitments by members as well: some 'very' and others 'moderately' committed to an institution.

consider the improvement—or maintenance of—international sales as a motivation behind adopting ISO (e.g., Simmons & White, 1999; Guler *et al.*, 2002). If the above motivations are founded on accurate assessments of the benefits of ISO certification, then ISO 9000 diffusion should generate enhanced international trade at the macro-level.

While our research focus resides in the macro-level – not micro-level – effects of ISO 9000 diffusion, it behooves us to consider the micro-foundations behind how ISO certification affects the relationships between businesses that hail from different nations. Foss and Pedersen (2004) underscore the importance in IB of identifying explanatory mechanisms at deeper levels. Additionally, Snowdon and Stonehouse (2006) – in reviewing Michael Porter's contributions – highlight the importance of grounding theoretical constructs in actual behavior. Basing our theoretics on micro-foundations is pivotal as "nations do not trade but firms do" (Murray *et al*., 1995: 195). Accordingly, we focus here on three particular properties (quality signal, common language, and conflict settling) by which ISO adoption may enhance trade between firms from different nations and thereby enhance country-pair trade.

First, ISO 9000 firms can credibly claim that they have a documented quality system that is implemented and followed: ensuring that products are made to exacting specifications (Guerin & Rice, 1996). While Rao *et al*. (1997) find cross-national evidence supporting ISO certification as positively impacting firm quality, Conti (1999: 458) reports that the quality assurance elements of ISO 9000 help in business-to-business contractual relations "when a supplier's capability to design and supply conforming products need to be demonstrated". Terlaak and King (2006) argue that ISO can signal a firm's superior but unobserved attributes—in line with this argument, they find ISO certification to increase facility growth when buyers face multiple suppliers and the attributes of suppliers are intangible. Foreign suppliers of intermediary products clearly manifest difficulties in demonstrating product quality: informational, linguistic, cultural, regulatory and

managerial barriers all conspire to enhance 'liability of foreignness' when one considers purchasing from foreign suppliers. In short, ISO 9000 offers a 'low-cost' signal of a firm's commitment to quality. Accordingly, the signaling implications of ISO certification help reduce trade barriers between businesses from different nations and thus facilitate trade by reducing the search costs involved with identifying quality valuing foreign suppliers.

Second, ISO certification has been reported to facilitate communication between businesses: i.e., it involves common-language properties (Casper & Hancké, 1999; Dissanayaka *et al.*, 2001; Grajek, 2004). ISO 9000 certification ensures that an organization has a documented quality management system that is codified into a comprehensive manual (Mendel, 2002). Consequently, certification establishes an efficient-means to both communicate internal systems to customers and provide a common procedural language to be used across organizations. Not only does ISO 9000 provide purchasers with a means (language) to decipher a firm's commitment to quality, but the purchasing firm is freed from designing and paying-for the quality system (Hayes, 1994). The common-language properties of ISO 9000 thus represent an efficient improvement upon the situation where each business customer specifies unique requirements for quality control. For instance, the adoption of the ISO standard by the U.S. auto firms for their supplier relations eliminated three other quality standards (Anderson *et al.*, 1999). In this vein, Chen *et al.* (2006) empirically support that exporters concentrate on fewer foreign markets when they must comply with separate country-specific standards. Accordingly, the common-language properties of ISO certification help reduce trade barriers between businesses from different nations by allowing for the ready communication of a firms production system and by eliminating costly multiple quality standards.

Third, codified procedures a la ISO 9000 may also help settle – and reduce – organizational disputes, as the authority of the documented system can "be employed overtly in

everyday battles of organizational contestation" (Mendel, 2002: 414). Lee (1998) reports 'better team spirit' and 'less staff conflict' as prominently cited benefits of ISO adoption. Casper and Hancké (1999: 968) argue that ISO "makes links between different production units more transparent and, hence, more easily amenable to improvement". Consider how Matthews (1986) departs from Williamsonian opportunism by emphasizing the purely cognitive costs of organizing and monitoring transactions even when participants are honest. Accordingly, ISO can help clarify situations where faults are unintended and not due to opportunistic behavior; thus, preventing escalation of inter-organizational conflict. As evidence, Hayes (1994: 56) reports that executives from ISO-adopting firms consider certification to signal that they are "easier to deal with". The ISO working procedures help clarify the division of labor and responsibilities involved with complex inter-organizational production, and by doing so minimize inter-organizational conflict. Accordingly, the conflict-settling properties of ISO certification help reduce trade barriers between businesses from different nations by setting reasonable working procedures that smooth inter-firm relations and reduce instances of conflictual holdup.

In sum, we argue here that the ISO 9000 program helps standardize practices and terminology, mobilize resources, and structure efforts across organizations. The quality-signal, common-language and conflict-settling properties lower the transaction costs and information asymmetries involved with business-to-business relations across borders, thus making arms-length trading relations less costly. Conti (1999: 455) suggests these effects when he states "ISO 9000 stemmed from the need to rationalize quality issues in contractual business-to-business (or business-to-administration) relations".

Implicit throughout the above discussion is that ISO's mitigation of the transaction-cost and bounded-rationality problem is most germane for the home-country (what we sometimes refer to as the 'push effect') when it comes to country-pair trade. ISO 9000 adoption in the home-

nation signals the overall quality and reliability of exports (the quality-signal, common-language and conflict-settling effects); hence, we would expect home-nation diffusion of ISO certification to robustly 'push' exports in various country-pairs. ISO 9000 adoption in the host-nation (what we sometimes refer to as the 'pull effect') should involve the common-language and conflict-settling properties discussed above (i.e., it will be easier to sell to firms that speak the same language and involve less risk of dispute); yet, the quality-signaling implications are likely to be absent for the host-effect. In general, home-nation firms would likely exhibit, at-best, moderate concern as to whether their customers were ISO certified or not; instead, selling firms are simply generally open to sending their products to whoever is willing to pay the going price. In other words, we hypothesize that ISO adoption matters more on the selling-end of the transaction than on the buying-end of the transaction.[4] From the micro-foundations outlined above, we can generate three simple macro-level propositions:

> **Proposition 1a:** Home-nation diffusion of ISO 9000 certification (the selling-end) is likely to generate enhanced exports within country-pair economic relationships.
>
> **Proposition 1b:** Host-nation diffusion of ISO 9000 certification (the buying-end) is likely to generate enhanced exports within country-pair economic relationships.
>
> **Proposition 1c:** The impact of home-nation diffusion (the selling-end) is likely to be more robust than the impact of host-nation diffusion (the buying-end).

Country-Pair FDI Positions

While we have focused to this point on the effects of diffusion on trade, Neumayer and Perkins (2005: 239) note that the goal of ISO 9000 "has been to facilitate international trade ***and***

[4] In line with the diffusion literature where ISO is found to be a 'do as I say not as I do' phenomenon: i.e., firms that have ISO-certified suppliers are no more likely to be certified than firms with non-ISO-certified suppliers. See King *et al.* (2005) for a discussion focusing on the selling-end's importance; though, they focus on ISO 14000 adoptions.

investment by harmonizing otherwise diverse and conflicting national standards with international ones". Accordingly, ISO 9000 diffusion may also impact country-pair FDI stocks by affecting the costs involved with engaging in foreign investment. Recall that FDI consists of both joint-ventures (JVs) and wholly owned subsidiaries—where wholly owned subsidiaries can be obtained via acquisition or greenfield. We analyze the potential impact of ISO adoption on FDI while considering the same three ISO properties: quality-signal, common-language and conflict-settling. As with the trade propositions, we consider the firm level micro-foundations behind how the three ISO properties may lower the costs of foreign direct investments. More specifically, we analyze how ISO 9000 certification lowers the transaction costs and information asymmetries involved with firms making foreign investments. By attempting to explore the micro-foundations behind how ISO certification reduces the costs of engaging in joint-ventures, acquisitions and greenfields, we base our theoretical propositions on deeper-level explanatory mechanism.

First, the quality-signal properties of ISO 9000 may be of assistance to firms interested in making FDI decisions. High information barriers exist regarding the assessment of other firms' quality-properties—barriers which are further heightened when those firms reside in foreign nations. To the degree that ISO 9000 represents a low-cost signal of a firm's commitment to quality in its premises, this directly impacts the costs of engaging in international joint-ventures and acquisitions. Recall that inadequate target evaluation (and the lack of a quality pre-acquisition decision process) is often credited to be a factor in failed acquisitions and JVs (Haspeslagh & Jemison, 1991; Hitt *et al.*, 1998; Srivastava & Datta, 2006). For instance, Hitt *et al.* (1998) make clear that Ecolab's unsuccessful acquisition of Chemlawn was driven by Chemlawn's low managerial and worker productivity—something only discovered post-acquisition. Related to the practice of neglecting target evaluation, Singh (2006) recently pointed out that business scholars have failed to delineate the actual drivers of target selection. Ricart *et*

al. (2004) implicitly argue that the role of essential institutional intermediaries – which help consummate transactions by evaluating quality and matching potential buyers and sellers – is one place to begin looking for the drivers of target selection.

We submit here that ISO 9000 certification provides a quality-signal that reduces the search costs involved with identifying 'quality valuing' firms to either purchase or joint-venture with. It should be stressed that we do not consider ISO 9000 certification to be the penultimate standard of production quality nor the only indicator which firms might use to search for JV and acquisition partners: witness, for instance, the fact that ISO certification is for a plant or premise and not a firm, hence it will be – depending on the nature of the transaction – a noisy signal at times. Yet, Hudson and Jones (2003) highlight that standards do not have to generate full confidence or full information on the part of buyers to be helpful; instead, as long as they convey some information and are cost efficient, they become one signal included in the optimal signaling set. We argue then that ISO 9000 represents an important – though not the only – signal that reduces the information barriers and transaction costs with regard to finding foreign firms (or plants/premises) with which to engage in partnerships and M&As.

While the analysis above highlights the impact of ISO 9000 on the joint-venture and acquisition forms of FDI, it should be made clear that ISO 9000 diffusion may also impact greenfield-type foreign investments. Almost all forms of FDI will rely on the internal markets in the host environment to provide some inputs into the production process. Yet one of the chief barriers to undertaking a greenfield foreign investment is the inability to detect what firms in the host environment can be valuable up-stream suppliers by providing quality inputs: this represents one of the principal liabilities of foreignness, and is why many firms seek to acquire local knowledge and contacts through acquisitions and JVs. Akin to our constructs in the trade section,

ISO 9000 diffusion in a host environment reduces the search costs involved with identifying good local suppliers and by doing so lowers the costs of engaging in greenfield-type FDI.

Second, the common-language properties of ISO 9000 may be of assistance to firms interested in making FDI decisions. Recall that both practitioners (Cartwright & Cooper, 1993) and scholars (e.g., Shrivastava, 1986; Hunt, 1990; Datta, 1991; Pablo, 1994; Larsson & Finkelstein, 1999) generally agree that inadequate integration represents the single most important factor in explaining failure in acquisitions and JVs. Moreover, integrating firms and/or units from different nations generates further challenges due to the distance in culture and managerial practices (Geringer, 1988; Brown *et al.*, 1989; Fey & Beamish, 2001). Nevertheless, a great deal of research finds similarity between firms to enhance integration and thereby enhance success (e.g., Harrigan, 1988; Brown *et al.*, 1989; Datta, 1991; Fey & Beamish, 2001). Coff (2002) sums the above up well when he argues that you need some type of related experience to successfully acquire and integrate strategic assets. Fey and Beamish (2001) go further to uncover the organizational foundations behind the positive relationship between firm-similarity and successful-integration of JVs and acquisitions. In particular, Fey and Beamish find differences in managerial practices and values to generate process losses—losses that derive from ineffective communication, uncertainty over control systems, and difficulties over organizing work; hence, organizational costs increase substantially when you attempt to integrate dissimilar organizational climates via an M&A or JV.

We submit here that ISO 9000 certification provides a common language (i.e., common routine, shared experience, similar climate, etc.) that helps firms from different nations consummate (i.e., successfully integrate) international acquisitions and joint-ventures. The common language properties assist firms with regard to inter-firm cooperation by enhancing communication, reducing uncertainty with regard to control systems, and providing a common

approach to organizing work. In support of this conjecture, Bergman (1994) provides a number of examples from the healthcare industry where similarity in quality management systems eased the integration of new joint-ventures and acquisitions; she states "these management tools can be useful when working out the big and little details of joint ventures, mergers and similar negotiations" (1994: 44). Furthermore, Shani and Rogberg's (1994) case-based research finds ISO 9000 to be helpful in addressing the internal change brought on by a merger. In short, ISO 9000 provides a language by which integrating entities can use to peer inside and communicate with each other, and thus aids the all-important integration process.

Third, the conflict-settling properties of ISO 9000 may be of assistance to firms interested in making FDI decisions. While we covered above the pivotal need for integration if a JV or M&A is to succeed, integration is often fraught with tensions for the employees of acquired firms or junior joint-venture partners. In particular, acquired entities are customarily required to substantially alter their organizational style: i.e., they bare the brunt of the change in terms of operations, control, planning systems and procedures, and even human resource issues (Buono & Bowditch, 1989; Haspeslagh & Jemison, 1991). Accordingly, the formal controls necessary for substantive integration may breed resentments on the part of acquired firms' employees—resentments which manifest themselves in poor morale, employee stress, increased absence, employee turnover and lowered productivity (Cartwright & Cooper, 1993). Larsson and Lubatkin (2001) point out that acquiring firms face a tradeoff between 'properly integrating' and 'harmoniously acculturating' the new acquisition—an acquirer, simply put, can not have both. In fact, recent research suggests that the greatest employee resistance is elicited when the success of the inter-firm combination depends on gains from integrating similar production and marketing operations (Larsson & Finkelstein, 1999); hence, the above tradeoff is most present exactly when integration is most necessary.

We submit here that ISO 9000 certification might mitigate the conflicts (i.e., employee resistance) noted above and allow integration to take place without substantial tensions. This dynamic owes to ISO certification on the part of target firms potentially meaning that less change is necessary for target-firm employees; hence, less conflict will result from integration. Related to the common-language properties previously discussed, ISO certified target firms will have systems in place which allow the acquiring firm to gain information and take control of the firm; thus, less resentment-augmenting change will be required during the integration process. In fact, Larsson and Finkelstein (1999) empirically support management style similarity to increase both organizational-integration and employee-cooperation; and further find organizational-integration and employee-cooperation to generate merger synergies. Larsson and Finkelstein conclude that "when management styles are similar across organizations, the level of cooperation is often enhanced and perceptions of the degree of change taking place may be cushioned" (1999: 8); thus, the cooperation of the new employees allows interaction and coordination to take place which in turn increases the likelihood of success. In short, to the degree that ISO certification smoothes relations between integrating firms from different nations (attenuating employee resistance yet allowing integration to take place), this directly lowers the costs of engaging in international joint-ventures and acquisitions.

We previously proposed that ISO's mitigation of the transaction-costs involved with trade would be more robust for home-nations (the selling-end) than for host-nations (the buying-end). The disproportionate effect of ISO 9000 diffusion on the selling-end is likely to be replicated for FDI; however, with FDI the buying-end (now the home-nation) and selling-end (now the host-nation) are reversed. To illustrate the imbalance between the host-nation and home-nation effects, consider the quality-signal benefits of ISO diffusion on FDI. ISO diffusion in the host-nation environment reduces the search costs involved with identifying 'quality-valuing' local firms to

either purchase, joint-venture with, or source inputs from (i.e., the costs of foreign acquisitions, JVs, and greenfields are all reduced); thus, we would expect ISO adoption in the host-country to robustly 'pull' FDI via the quality-signal effect. Yet, the diffusion of ISO in the home-nation environment should only significantly affect joint-venture type FDI: where it would be in the interest of firms in the host-country to make efficient pairings with ISO certified firms from the home-country. Host-nation firms interested in being acquired are unlikely to fully value ISO 9000 certification of home-nation suitors; instead, price will be the overwhelming criteria by which to judge suitors. In other words, a target firm will be relatively uninterested in the degree to which an acquiring firm can signal its quality and relatively more interested in the bottom-line: no price discount will be given to ISO certified bidders. The same type of dynamic will be present for Greenfield-type FDI: where host-nation suppliers are unlikely to discriminate between ISO-certified and non-ISO-certified home-nation MNEs interested in buying their products.

Accordingly, host-nation adoption of ISO 9000 provides clear benefits for home-nation firms interested in going abroad to engage in international JVs, acquisitions and greenfields: the quality-signal, common-language and conflict-settling effects should all help illuminate the target environment for outward FDI. Yet, home-nation adoption of ISO 9000 provides relatively few benefits for home-nation firms interested in making foreign direct investments—the benefits being mostly restricted to home firms seeking international joint-ventures. In other words, we again hypothesize that ISO adoption matters more on the selling-end of the transaction than on the buying-end of the transaction. From the micro-foundations outlined above, we can generate three simple macro-level propositions:

Proposition 2a: Home-nation diffusion of ISO 9000 certification (the buying-end) is likely to generate enhanced FDI within country-pair economic relationships.

Proposition 2b: Host-nation diffusion of ISO 9000 certification (the selling-end) is likely

to generate enhanced FDI within country-pair economic relationships.

Proposition 2c: The impact of host-nation diffusion (the selling-end) is likely to be more robust than the impact of home-nation diffusion (the buying-end).

Country-Pair Heterogeneity

An analysis of how ISO 9000 impacts FDI and trade in country-pair economic relationships cannot end with the idea that the direct effects of ISO diffusion universally hold. We must also factor that ISO's proposed effect on FDI and trade may vary in intensity across different types of country-pairs. In a recent paper, Blonigen and Wang (2004) focus directly on the question of whether it is appropriate to empirically pool data from different nations; moreover, they find that "the underlying factors that determine the level of FDI activity vary systematically across LDCs and DCs" (2004: 17). Thus, Blonigen and Wang deliver the message that it is inappropriate to assume that FDI plays the same role in developing nations as it does in developed nations. While not the focus of their research, a few IB researchers (Sethi *et al.*, 2003; Globerman & Shapiro, 2003) have also found the impact of their explanatory constructs on FDI to vary substantially between developed and developing nations.

There appears then to be empirical support behind the need to differentiate between developed and developing nations when one studies the drivers of FDI. Indicative of the importance of this finding, Kobrin and Wu (2005) recently observed that the Blonigen-Wang prescription to not automatically pool country-pair data is quickly becoming common knowledge and practice. It should be pointed out that the Blonigen-Wang insight is a new one; hence, the theoretical justifications behind the developed/developing distinction and the potential for other types of distinctions (e.g., transition nations, newly industrial countries, colonial legacy etc.) have gone unstudied. Mindful that other types of distinctions are possible, we nevertheless consider

whether our proposed ISO effects hold for both developed and developing nations. Furthermore, we will propose two theoretical justifications as to what might be behind any developed/developing distinction when it comes to ISO's influence on trade and FDI.

First, the fact that developed and developing nations tend to experience different types of FDI and trade may partly contribute to any developed/developing distinction. Horizontal FDI (foreign direct investment in the same industry abroad as the firm's domestic industry) is generally found when the home and host nations have similar attributes (factor endowments, level of development and size); in practice, this means that FDI between two developed nations tends to be horizontally-based. Further, higher trade costs tend to generate higher levels of horizontal FDI; hence, trade is often considered a substitute for horizontal FDI. Vertical FDI (investment abroad to source inputs or sell outputs from home production) is generally found when the home and host nations have dissimilar attributes; in practice, this means that FDI from a developed home-nation to a developing host-nation tends to be vertically-based. Further, higher trade costs tend to generate lower levels of vertical-FDI; hence, trade is often considered a complement for vertical FDI. Accordingly, the fact that developing nations tend to experience more vertical-type relations in their trade and FDI, while developed nations tend to experience more horizontal-type relations in their trade and FDI might then influence the impact of ISO 9000 diffusion. Recall that transaction cost and holdup problems tend to be most germane in vertical relationships where the buyer – as well as the seller – is a firm (Williamson, 1985). We might then expect the influence of ISO certification to be most robust in vertical-type economic relationships (i.e., in developing nations), as this is where transaction cost and information asymmetries can be most problematic.

Second, the fact that developed and developing nations tend to differ with regards to the presence of institutional intermediaries may also partly explain any developed/developing

distinction. Ricart *et al.* (2004) note that developing nations often experience institutional voids (defined as a shortage of the specialized institutional intermediaries needed to consummate transactions); in particular, the lack of soft institutions via which to locate possible transaction partners undercuts commerce. For instance, consider that government agencies, trade associations, commercial banks, and export management companies often perform information-gathering and matchmaker services for domestic firms desiring to expand overseas via exporting and/or investment (Hill, 1998). These services play instrumental roles in bridging the financial, logistical, business-practice and cultural divides that are endemic to international business. Yet, these services that help mitigate the information asymmetry and transaction costs of international trade and FDI are less prevalent in the developing world. In this vein, Anderson and Marcouiller (2002) make the argument that capital-abundant nations trade disproportionately with each other – and not with capital-poor nations – specifically because they have the strong institutions which support trade security. Simply put, governments in developing nations find it more difficult to financially support such public services and the market options (e.g., commercial banks, and export management companies) are less evolved in the developing world; ironic, in that developing nations are the very locations where such services would be most valuable. While Delmas (2002) posits that the developing world's lack of institutions might dampen diffusion of ISO certification, we want to point out that what diffusion actually taking place will involve significant effects due to the dearth of other institutional means via which to reduce information asymmetries and transaction costs. Accordingly, we might expect the influence of ISO certification to be most robust in vertical-type economic relationships (i.e., in developing nations), as this is where fewer substitutes exist for ISO certification.

In sum, we submit here that firms from developing nations will face substantial challenges in readily conveying product-quality, internal production processes and conflict free

relations due to two reasons: the vertical nature of their international economic relationships; and the shortage of institutions to help mediate transaction cost and information asymmetry problems. Thus, ISO certification of firms located in the developing world will be helpful in attracting developed-world customers for exports and developed-world buyers for investment purposes; i.e., the beneficial effects of ISO diffusion will be most robust in developing nations. A simple proposition captures the argument above:

> **Proposition 3:** The impact of ISO 9000 diffusion on both trade and FDI is likely to be greatest in developing nations as compared to developed nations.

Data Issues

Data for our empirical analysis are compiled from different sources including UN's 'Comtrade', IMF's 'International Financial Statistics', World Bank's 'World Development Indicators', World Economic Forum's 'Global Competitiveness Report', and others—see table #1 for the full list of variable definitions and sources. The primary data consist of bilateral (i.e., country-pair) trade flows and FDI stocks over the 1995-2002 period. While trade data is available for virtually all country-pairs, the bilateral FDI data is reported solely by OECD nations—though the OECD nations report the FDI stocks in both directions for their economic relationships with both non-OECD and OECD nations. Accordingly, the home-nations and host-nations for the various country-pair economic relationships include then 52 OECD and non-OECD members.

The majority of macro-level empirical scholarship on FDI has employed OECD, U.S. or Scandinavian data. The U.S. and Scandinavian data are generally regarded as having better quality due to the ability to distinguish affiliate sales in the host market. We employ the OECD data, because looking only at the U.S. or Scandinavian data would leave us with little variation in terms of home-nation ISO 9000 adoption; thereby, substantially limiting the ability to investigate

both the 'push' and 'pull' performance of ISO 9000 (see Ekholm, 1995; Brainard, 1997; Blonigen *et al*., 2003 for discussions of similar issues). While the OECD Statistical Compendium reports both FDI flows and stocks, we employ the stock data as the flow data involves repatriation of profit issues that can lead to inappropriate measurement of a particular nation's foreign investment position. Additionally, Hejazi and Safarian (2001) point out that stock data has the added advantage of mitigating simultaneity issues between FDI and trade.

Our explanatory variables aim to control standard factors driving export and FDI activities beyond the proposed ISO 9000 effects: gravity force (GDP), infrastructure (airline passengers carried, paved road network, and electricity production), financial and wealth conditions (relative exchange rate, and relative stock market index), political risk (Henisz's (2002) veto-points index), trade costs (tariff and non-tariff barriers to trade, and presence of free trade agreements), labor costs (hiring and firing practices), and capital costs (presence of bilateral investment treaties, and restrictions to foreign capital market access). Table #2 reports summary statistics for our full list of variables. An array of other factors is implicitly taken into account by means of fixed country-pair and period effects. Country-pair specific effects account for common border, common language, colonial ties, and other unobserved factors that do not vary over the sample period. Period specific effects account for variation in world GDP and other annual trends.

One tradeoff involved with the extensive list of control variables is that each variable contains a number of missing observations. Moreover, the missing observations for each control variable unfortunately do not line up: e.g., hiring-and-firing practices may be missing for Argentina but present for Uruguay, yet network of paved roads may be present for Argentina but missing for Uruguay. Accordingly, the number of feasible observations drops significantly (by over 90%) when the full set of control variables are included in the estimations. We face then a tradeoff between having a large sample and having a rigorous estimation procedure with a

number of controls. Our model specification, which we carefully explain in the next sections, needs to strike a balance between the sample selection problem and the benefits of including an extensive set of control variables.

Estimation Issues

We build and estimate a system of two gravity equations for both FDI and exports. In order to properly estimate the two gravity equations, it behooves us to return to the nature of the FDI-trade relationship, as this directly determines the proper estimation technique for the two equations. As already alluded to, it is appealing to consider the trade-FDI relationship to be substitutable where horizontal FDI dominates (e.g., developed-developed country-pairs), and complementary where vertical FDI dominates (e.g., developed-developing country-pairs). Recall also that empirical scholarship found horizontal FDI to outweigh vertical FDI; hence, scholars were surprised when early empirical work began to find a complementary—as opposed to a substitutable—relationship between trade and FDI (Hejazi & Safarian, 2001). Grubert and Mutti (1991) began the process of reconciling these findings by pointing out that much of that empirical work suffered from endogeneity by regressing exports on an indicator of direct investment activity. More specifically, the complementarity findings may be driven by unobserved variation in tastes, technology, comparative advantage and government policy which could all create a positive correlation between trade and FDI.

A more recent empirical literature takes into account the above endogeneity issues and continues the debate over the complementarity (see Clausing, 2000; Head & Ries, 2001) or substitutability (see Belderbos & Sleuwaegen, 1998; Blonigen, 2001) of trade and FDI. The Blonigen (2001) study is particularly important: using product-level data, he identifies substitution (as well as complementarity) between trade and FDI. He suggests that the inability

for some researchers to find substitution rests both with an aggregation-bias and with substitution effects being a sudden – not gradual – phenomenon. Accordingly, we move forward with the idea that trade and FDI exhibit a substitutive relationship that can best be detected via exogenous price indicators; though, we are mindful that complementarity will also be at play in our country-pair level data. As seen below, this pulls us in two different econometric directions.

The substitution argument roughly corresponds to idealized horizontal FDI; or more specifically, to the decision whether to supply a foreign market with arms-length trade or with foreign-subsidiary sales. This decision will be determined by the relative costs associated with the two types of foreign presence modes. From the econometric viewpoint, trade flows and FDI are not interdependent—e.g., FDI does not cause trade—in an idealized horizontal world. They are, however, jointly determined, which naturally leads to Zellner's (1962) seemingly unrelated regressions (SUR) model. Moreover, each of the control variables – which directly affect the cost of at least one foreign presence mode – will appear in both the FDI and export equations, since what matters in choosing between substitutes is relative costs. The resulting SUR model will then have identical regressors. Error terms are also likely to be correlated across the two equations due to omitted variables (the factors affecting trade might also affect FDI via the substitution argument) and common shocks.

The complementarity argument better corresponds to a state where cross-border economic activity is vertical in nature: driven by parts of the value chain being located in different nations due to production efficiency. Complementarity between trade and FDI leads to a different econometric specification than that for the substitutability of exports and FDI (i.e., the horizontal world). In this case, the decision to move production abroad comes prior to the trade decision: first, you establish foreign subsidiaries for sourcing home production; second, you source the foreign subsidiaries with inputs and then re-import processed goods. In other words, a direct

causal relationship exists between FDI and trade in an idealized vertical world, as FDI outward stocks 'cause' both incoming and outgoing trade flows. However, no reciprocal causality exists in this context, as trade does not cause FDI. This implies a triangular model (see Lahiri and Schmidt, 1978, for the estimation of triangular systems) in the econometric context: FDI variables appear in the export equation, but trade variables do not appear in the FDI equation.

As we are not able to separate out the horizontal and vertical type activities in our country-pair level data, our model must simultaneously account for both activities. Unfortunately, the two models—SUR with identical regressors and a triangular model—cannot be nested and consistently estimated in a single model without further restrictions. Estimating a triangular model generally requires the application of instrumental variable techniques to account for endogeneity; in the current context, the endogeneity of FDI in the export equation. The horizontal nature of the trade/FDI relationship, however, suggests that what impacts trade will also impact FDI; thus, rendering identification of the export equation parameters impossible.[5]

Ignoring the vertical-world (i.e., omitting the inward and outward FDI variables from the export equation) and estimating the SUR model with just exogenous indicators of the relative attractiveness (i.e., prices) of operating abroad via exports or FDI represents one possibility. Grubert and Mutti (1991) advocate such an approach; and in light of our previous discussion, we could interpret this approach as the estimation of a reduced form model. Although econometrically correct, a reduced form model yields difficulties in interpreting coefficient estimates. In particular, we would not be able to distinguish the direct effect of ISO diffusion on exports from the indirect effects of ISO diffusion on exports via FDI.

Another possibility involves assuming uncorrelated error terms across equations, thus leading to a special type of triangular model known as a recursive model. An appealing feature of

[5] Technically speaking, the order condition fails.

the recursive model is that structural parameters are easily identified. The right-hand side parameters in the FDI equation are identified due to exogeneity of the independent variables. Hence, FDI serves as its own instrument in the export equation, as it is a linear combination of exogenous variables and the FDI equation's error term is uncorrelated with the export equation's error term. The assumption of uncorrelated errors is, however, a strong one. As we mentioned earlier, it would be violated in the presence of omitted variables and common shocks to trade and FDI. An additional benefit of such an approach is that the complementarity-driven indirect effects in the export equation should be channeled through the inward and outward FDI variables, rather than through the other explanatory variables. We stress 'should', however, as the broad nature of the FDI data (not distinguishing between vertical and horizontal FDI) suggests that these vertical effects may be difficult to fully control. Bearing in mind the potential endogeneity problem, we follow the recursive approach. The FDI and export equations then read:

$$\ln FDI_{ijt}^{OUT} = X_{ijt}'\gamma_{FDI} + \kappa_t + \theta_{ij} + \psi_{ijt}, \tag{1}$$

$$\ln EXPORTS_{ijt} = \beta_1 \ln FDI_{ijt}^{OUT} + \beta_2 \ln FDI_{ijt}^{IN} + X_{ijt}'\gamma_{EXP} + \lambda_t + \eta_{ij} + \varepsilon_{ijt}, \tag{2}$$

where the subscripts i, j, and t respectively stand for home nation, host nation, and year. In order to apply standard estimation techniques, the gravity equations (1) and (2) are log-linearized. Vector X_{ijt} includes the logged values of all regressors identical across equations. Additionally, we include time effects (λ_t and κ_t) and country-pair specific effects (η_{ij} and θ_{ij}). Such an approach allows for autocorrelated and heteroscedastic error terms, but not for correlation across equations. Under these assumptions, we can consistently estimate equations (1) and (2) with equation-by-equation OLS after removing from the data the unobserved heterogeneity imbedded in the country-pair specific effects. Primarily, we use a within transformation leading to fixed-effects

estimators; though alternatively, we apply first differencing. Furthermore, all regression estimations are robust to heteroscedasticity and autocorrelation by using robust standard errors.

To conclude this section, we need to acknowledge that three additional sources of endogeneity exist beyond the interdependence of trade and FDI in our gravity equations system. First, the gravity force itself is subject to endogeneity problems as exports necessarily enter GDP in national accountings. Hummels and Levinsohn (1995) report, however, that correcting for the endogeneity of GDP with instrumental variables makes very little difference to coefficient estimates. Second, our research focus is on the macro-level impact of ISO diffusion on trade flows and FDI stocks; yet, we would like to be able to make inferences with regard to the micro-level: the agents (firms) that make trade and FDI decisions. For instance, we would appreciate some degree of confidence that it is the ISO certified firms that are actually engaging in more exports and foreign investment. Exogeneity of the ISO variables would allow us to interpret the coefficient estimates as indicating whether ISO certified firms actually experience increased international business activity at the micro-level.

Third, and most importantly, endogeneity may owe to reciprocal causation between ISO 9000 diffusion and both FDI and exports. Recall that the dominant literature on ISO 9000 attempts not to explain diffusion effects but to explain diffusion drivers. For instance, Guler *et al.* (2002) find ISO adoption in trading-partner and trading-competitor nations, and a nation's overall inward (though not outward) FDI to enhance ISO 9000 diffusion in a particular country. We instead hold that trade and FDI benefit from ISO standardization due to lower transaction costs and information asymmetries; yet, Casella (1996) notes that the standardization process might be determined by intensity of foreign trade and FDI (both of which indicate the openness of an economy). Our country-pair level of analysis somewhat mitigates this problem, however, as the level of trade and FDI in one particular country-pair is unlikely to have a large effect on national

diffusion of ISO 9000. Recall that the Guler *et al.* (2002) results suggest that overall trade and FDI intensity drive national ISO adoption, but do not suggest that one particular country-pair economic relationship would generate a strong influence on national diffusion.

We apply Sims-type and Hausman-type exogeneity tests in order to support the above intuitions: (1) validity of a recursive econometric approach; (2) likely trivial impact of gravity forces on endogeneity; (3) ability to make inferences with regard to the micro-level; (4) mitigated concern over reciprocal causation. First, we run a Sims test procedure that incorporates lead explanatory variables to the estimated equation and tests their joint significance (see Wooldridge, 2002 for the fixed-effects model application). The underlying logic is that future explanatory variable realizations should not affect present exports and FDI. Finding such a relationship indicates a violation of the strict exogeneity assumption, thus rendering fixed-effects' estimators inconsistent. Second, we apply a Hausman test to a comparison of the fixed-effects coefficients with the first-differencing coefficients. Under strict exogeneity, both estimators are consistent and have the same probability limit; thus, finding a significant difference between the two estimates indicates violation of strict exogeneity (Wooldridge, 2002). We apply both tests to all the explanatory variables as a group (see 'overall' in the tables), and then simply for the two ISO variables (see 'ISO' in the tables) of primary interest.

Empirical Results

As already introduced, we follow a panel data approach that allows accounting for unobserved heterogeneity pervading cross-sectional studies. Beyond our main fixed-effects estimations (table #3), we also estimate all regression equations while using a first-differencing method (table #4). Comparing in detail first-differencing with the fixed-effects results allows a means of checking the robustness of the primary fixed-effects estimations. Following Blonigen

and Wang (2004), we distinguish between three distinct country-pair types: developing to developed (LDC → DC), developed to developing (DC → LDC), and developed to developed (DC → DC).[6] Accordingly, each table presents six specifications: with one trade and one FDI equation for each type of country-pair. Furthermore, since all variables in the estimated equations (1) and (2) are in logs, we can interpret the coefficients in tables' #3 and #4 as elasticities. The period and the country-pair specific effects are suppressed for the fixed-effects estimations.

The previously mentioned sample-size/extensive-controls tradeoff – along with space limitations – requires us to make a choice concerning what empirical results to present. Unreported empirical estimations support the robustness of the ISO effects to the sequential introduction of all control variables one at a time; yet, such results are too cumbersome to present succinctly. Accordingly, we decided to take a conservative approach (the 'from general to specific' variable selection process) that strikes a balance between sample selection and rigorous estimation. In the first step, we selected only the control variables – beyond the central ISO and gravity forces – that were statistically significant in the particular FDI and trade equations (the unreported estimations noted above) when only one control variable was included at a time.[7] In the second step, we eliminated one-by-one the control variables that turned out to be insignificant in both the trade and FDI equations for a given country-pair type; thus, in line with the substitutability of trade and FDI, we keep control-variable-symmetry across trade and FDI equations for each country-pair type. As a result, the equation specifications reported in table #3 include control variables that are symmetric across trade and FDI equations for each country-pair type and significant in at least one – trade or FDI – equation.

[6] We follow Blonigen & Wang's distinction between developed and developing nations. The 20 developed nations in our sample include Australia, Austria, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, UK, and the US. Note that it was also possible with our data to elicit 'some' developing to developing (LDC → LDC) country-pairs; though, we dropped such pairs due to small observation numbers and lack of clear priors from the theoretical literature.

[7] These 'full' estimation results are available from the authors upon request.

Given that endogeneity is a potential concern in our econometric analysis, table #3 reports a series of diagnostics that indicate the severity of the problem. Reviewing the results, we find endogeneity to be somewhat evident for the explanatory variables as a whole. The Sims-test for regression #4 and the Hausman-tests for regressions #1 through #4 indicate endogeneity potential. As we pointed out in the previous section, no easy solution exists for constructing instrumented variables due to our inability to separate out the vertical from the horizontal activities with our data. Consequently, we are unable to consistently estimate the hypothesized effect of vertical FDI on triggered trade flows: i.e., the coefficient estimates on inward and outward FDI in the export equation are unreliable (e.g., the FDI variables in table #3 are mostly insignificant). Yet, we do generally find the ISO variables to be exogenous in the estimated equations—with the exception of ISO's Hausman-test in regression #1. While we need to further consider the indication in regression #1, the diagnostics generate confidence in the core focus (the ISO effects) of the paper. In short, the diagnostics suggest that our equations – particularly the export equations and the developing-to-developed FDI equation – suffer from some endogeneity; yet importantly, the ISO variables of primary concern do not appear to be the problem variables.

The examination of coefficient estimates for the standard factors driving trade and FDI provides another validity check for our results. Here, we discuss the fixed-effects results for both the main and selected control variables: GDP, inward & outward FDI, infrastructure, capital market access, and hidden trade barriers.

Interestingly, we find that our main controls – the gravity forces – work asymmetrically in the estimated equations: GDP appears to pull exports much stronger than push exports. The strong 'pull' effect on exports is stable across different country-pair types; though, the relatively weaker home-nation 'push' effect is only present in the equations considering exports to developed nations (table #3, regression #1 & #3). These findings—strong 'pull' and weak

'push'—conform to the pre-existing empirical literature using panel data techniques to estimate gravity-based trade equations (e.g., Freund and Weinhold, 2004). In terms of the FDI equations, the host-nation GDP 'pull' also seems relatively stable across different types of country-pairs, but is insignificant in the developing-to-developed country-pairs (regression #4): where the econometrics are weakest and where we lack precedent theoretics. Additionally, we do not find the 'push' (home-nation GDP) to be significant for the FDI equations in table #3. Furthermore, our controls for FDI-driven trade – outward and inward FDI stocks in the trade equations – are mostly positive, as expected, but only significant for inward FDI in regression #2.

Host-nation infrastructure, as proxied by number of airline passengers, is positive and significant in the export equation for all country-pair types (except LDC → DC), and negative, though generally insignificant, in the FDI equations. Similar results are found for the paved-road-network infrastructure variable, though only in the developed-to-developed country-pairs. These findings conform to the expectation that infrastructure improvements boost both horizontal-type and vertical-type trade. Furthermore, it appears that the negative effect of infrastructure on horizontal FDI (via the substitution of trade for FDI when infrastructure costs are low) is potentially countervailed by the positive effect of infrastructure on vertical FDI.

Foreign capital market access (host_FCM) also turned out to be among the factors that significantly affected cross-border economic activities for developed-to-developing country-pairs. The positive and significant coefficient estimates in table #3 for the exports and FDI equations (regression #2 & #5) suggests that lax restrictions regarding the access to capital markets in developing nations spurs both imports and FDI from developed nations. This conforms to the expectation that financial market openness (via easier billing procedures, profit repatriation, etc.) reduces the cost of doing business for both importers and foreign investors.

Finally, hidden trade barriers – as measured by the World Economic Forum's trade cost index (host_TCI) – turned out to be significant in the developing-to-developed FDI equation (table #3, regression #4). Hence, fewer hidden-trade-barriers in developed nations generate greater FDI from developing nations. While this estimate is consistent with how vertical-type FDI will respond positively to the lowering of trade costs, it should be treated with extreme caution for a few reasons. As already alluded to, regression #4 indicates the poorest econometric performance among our set of estimated equations. Notice that this is the only equation where both the Sims and Hausman tests reject exogeneity of the 'overall' explanatory variables. The R^2 in this equation is also much lower than in the other table #3 regression equations. Furthermore, the coefficient estimate for hidden-trade-barriers is not significant in the first-differenced estimations (table #4, regression #4). The inconsistent results do not surprise given the relative lack of theoretical guidelines for FDI from developing nations to developed nations.

We should also point out that a number of control variables were significant when introduced one at a time (recall our explanation of the variable selection process), but lost significance when we simultaneously introduced additional controls. Accordingly, the following control concepts are absent from table #3 but did indicate significance in other estimations: host-nation tariffs in the developed-to-developing export equation; electricity production, real exchange rate, and the Henisz (2002) index of political constraints in the developed-to-developing FDI equation; and the relative stock market index in the developed-to-developed exports equation. Moreover, the narrow nature of our panels (only eight years) makes it difficult to elicit sufficient variation in many of these standard control concepts. Accordingly, the fact that these controls were not robust enough to be introduced in the presented estimations does not suggest that they are unimportant drivers of cross-country economic activity.

Having discussed the performance of our control variables, we can finally turn to the impact of ISO 9000 diffusion on trade and FDI—the focus of the paper. The empirical results presented in table #3 indicate three areas where ISO diffusion significantly impacts trade and FDI: home-nation ISO in LDC→DC exports; host-nation ISO in DC→LDC FDI; and host-nation ISO in LDC→DC FDI.

First, the fixed-effects coefficient estimate on home-nation ISO adoption is significant and positive in the developing-to-developed export equation (regression #1). The results of the diagnostic tests point, however, to some concern about strict exogeneity of our explanatory variables in general and the exogeneity of the ISO variables in particular: both Hausman test statistics are significant. This calls for a detailed examination of the first-differencing results (table #4) where the ISO 'push' in the developing-to-developed export equation is confirmed by a significant coefficient estimate. Note that the ISO 'push' effect is significantly lower in table #4 (0.063) than in table #3 (0.116). This might be due to the ISO variable accounting for the impact of other trending omitted variables in the fixed-effects estimation. First-differencing, by eliminating deterministic time trends, is more immune to such effects. Moreover, the difference between the fixed-effects and first-differencing coefficient estimates for home-nation ISO may also be due to the samples not fully overlapping: i.e., we lose many observations when first-differencing unbalanced panels (from 868 to 613 in our case). Wooldridge (2002) notes that positive Hausman tests may owe to inconsistent sampling between the fixed-effects and first-differencing estimations. The bottom line is that we should treat the magnitude of the ISO 'push' effect in table #3 with caution, yet be reassured as to the significance of this effect.

Second, the fixed-effects coefficient estimate on host-nation ISO diffusion is significant and positive in the developed-to-developing FDI equation (regression #5). The diagnostics (both the Sims and Hausman tests) also indicate exogeneity for the explanatory variables as a whole

and for the ISO variables in particular; plus, the first-differencing coefficient estimate in table #4 corroborates. Hence, ISO diffusion in developing host-nations appears to robustly attract FDI from developed nations.

Third, the fixed-effect coefficient estimate for host-nation ISO is significant and negative in the developing-to-developed FDI equations (regression #4). This result suggests that ISO diffusion in developed nations acts a barrier to foreign investment from developing nations. Recall from our discussion of hidden-trade-barriers that regression #4 is the most troubling estimation in terms of econometrics (both the Sims and Hausman tests indicate endogeneity) and theoretics (where the phenomenon of FDI from the developing world to the developed world is not well studied). Moreover, the significance of this effect does not hold up in the first-differencing estimation (table #4, regression #4); hence, we treat this weak and puzzling result as a statistical artifact.

Our empirical results also yield evidence concerning our proposed expectations for how ISO diffusion would impact cross-country economic relationships:

- Per Proposition 1a and 2b, we expected ISO diffusion in the selling-end (the home-nation for exports and the host-nation for FDI) to respectively generate increased trade and FDI. The empirical results provide some evidence in favor of these propositions in the developing-to-developed exports equation and the developed-to-developing FDI equation.
- Per Proposition 1b and 2a, we expected ISO diffusion in the buying-end (the host-nation for exports and the home-nation for FDI) to respectively generate increased trade and FDI. The empirical results reject these propositions, as nowhere does buying-end ISO diffusion enhance trade or FDI.
- Per Proposition 1c and 2c, we expected ISO diffusion in the selling-end to be more robust than the buying-end. Evident from above, the empirical results do provide some evidence in favor of the selling-end effects being most robust.
- Per Proposition 3, we expected the above ISO effects to be most pronounced in developing nations. The empirical results provide strong evidence in favor of this expectation, as the positive effects of ISO 9000 on the selling-end of the transaction—home-nation for exports and host-nation for FDI outward positions—in the developing world are confirmed.

In sum, our results support the hypothesized benefits of ISO 9000 adoption (the quality-signal, common-language and conflict-settling properties) empirically manifesting themselves on the selling-end of both trade and FDI transactions. Moreover, splitting the sample into different country-pair types, per Blonigen and Wang (2004), elicits strong support for the heightened importance of ISO diffusion in developing nations. Accordingly, the emergence of the ISO institution in developing nations seems to be quite effective in solving the information asymmetry and transaction cost problems involved with FDI and trade. We were not able, however, to clearly tease out vertical from horizontal cross-border activities; thus, the mixing of these activities in our data partly explains the endogeneity in our econometric analysis. Still, the main empirical findings concerning the effects of ISO diffusion seem undisturbed by endogeneity.

Conclusion & Discussion

Motivated by the lack of literature analyzing the macro-level impact of ISO 9000 diffusion, we set out to study the effects of a nation's ISO certification on country-pair economic relationships. We suggest three properties of ISO 9000 (quality signal, common language, and conflict settling) that ease the costs of conducting cross-border trade and investment. We also posit that these ISO effects will be more robust in developing nations, as firms from these nations face particularly high information asymmetries and transaction costs both when exporting and when attempting to attract foreign investment. Empirical tests based on data covering the country-pair trade flows and FDI stocks of OECD nations over the 1995 to 2002 period yield two major findings: 1) ISO 9000 diffusion in developed nations does not appear to enhance trade and FDI between nations; 2) ISO 9000 diffusion in developing nations does appear to enhance trade (exports to developed nations) and FDI (investment from developed nations) between nations. The empirical results yield a number of implications—four of which we discuss here.

First, our results may contribute directly to the New Institutional Economics (NIE) scholarship that considers how institutions play a complementary role to other institutions. Milgrom *et al*. (1990) found that the medieval institutions of judges and champagne-fairs helped further the effectiveness of the 'reputation system' used at that time to reduce the transaction costs of exchange. They state "institutions sometimes arise to make … [a] mechanism more effective by communicating information" (Milgrom *et al*.,1990: 19). The ISO 9000 quality system appears to be an example of an institution whose principal aim is to convey information to a community. In the case of ISO, the community consists of worldwide businesses interested in either exporting or investing abroad, and ISO appears to complement the WTO system—at least in the developing world. The ISO 9000 system may then assist the WTO in realizing its' stated goal: help exporters, importers, and producers of goods and services conduct their business.

Second, our results also generate clear policy implications for developing nations if we re-consider our empirical findings from a country's perspective. Recall that ISO diffusion in developing-nations was found to have a positive 'push' with regard to exports to developed nations, and to not significantly 'push' outward FDI to developed nations. ISO diffusion in developing-nations was also found to have a positive 'pull' with regard to inward FDI from developed nations, and to not significantly 'pull' in imports from developed nations. Taking this from a developing country's perspective—where the nation will be both a home and a host to international economic flows—suggests the following: large scale adoption of ISO generates increased exports to (but not significant increased imports from) developed nations, and increased inward FDI from (but not significant increased outward FDI to) developed nations. Hence, from a neo-mercantilist (or developmental) point of view, ISO diffusion in a developing nation appears to generate the two public policy goals (increased exports and increased investment interest from abroad) that reside behind the foreign economic policies of many nations.

Third – and related to the above discussion on developing-nation policy implications – our results provide some evidence as to where the principal benefits of globalization amass. International Business scholars (e.g., Eden & Lenway, 2001; Buckley & Ghauri, 2004) have recently expressed concern as to whether the benefits of globalization accrue to the relatively rich (capital exporting) countries or to the relatively poor (capital importing) countries. Many pundits and scholars (see Dunning, 2003) have opined that developed nations benefit substantially from globalization, while developing nations experience few – if any – benefits. Our results are striking in that they support the global diffusion of ISO 9000 practices to be beneficial for developing nations; hence, the global diffusion of managerial practices potentially ameliorates – not exacerbates – global inequalities of wealth.

Fourth, our results speak to two additional International Business dialogues: the long-lasting dialogue on location advantages, and the recent dialogue on institutional intermediaries. The empirical results suggest that institutional intermediaries can indeed play a fundamental role in supporting commerce. In our case, the diffusion of ISO 9000 managerial practices (an informal-decentralized international institution) in developing nations generates increased inward FDI from developed nations and enhanced exports to developed nations. These findings conform to the prior that firms in developing nations face substantial barriers to earning both export markets and foreign investment interest due to insufficient government or market remedies for transaction-cost based problems. In other words, the impact of ISO 9000 is quite robust in developing nations where – due to institutional voids – few substitutes exist. The ISO 9000 system appears then to be an important factor affecting cross-border economic relationships; thus, international institutions that signal managerial quality may represent an important location advantage that helps explain the destination for FDI and the source of trade flows.

References

Anand, J., Capron, L. and Mitchell, W. (2005) 'Using acquisitions to access multinational diversity: thinking beyond the domestic versus cross-border M&A comparison', *Industrial and Corporate Change*, **14**: 191-224.

Anand, J., and Kogut, B. (1997) 'Technological Capabilities of Countries, firm Rivalry and Foreign Direct Investment', *Journal of International Business Studies*, **28**: 445-465.

Anderson J.E. and Marcouiller, D. (2002) 'Insecurity and the Pattern of Trade: An empirical Investigation', *Review of Economics and Statistics*, **84**(2): 342-252.

Anderson, S.W., Daly, J.D. and Johnson, M.F. (1999) 'Why Firms Seek ISO 9000 Certification: Regulatory Compliance or Competitive Advantage?', *Production and Operations Management,* **8**(1): 28-43.

Baier S.L., and Bergstrand J.H.. (2006) 'Do Free Trade Agreements Actually Increase Members' International Trade?', *Journal of International Economics*, forthcoming.

Belderbos, R. and Sleuwaegen, L. (1998) 'Tariff Jumping DFI and Export Substitution: Japanese Electronics Firms in Europe', *International Journal of Industrial Organization,* **16**: 601-638.

Bergman, R. (1994) 'TQM Merger trailblazer? Quality tools provide common ground for 'doing the deal'', *Hospitals and Health Networks*, **68**(24): 44-46.

Bernstein, S. and Cashore, B. (2000) 'Globalization, Four Paths of Internationalization and Domestic Policy Change: The Case of EcoForestry in British Columbia, Canada', *Canadian Journal of Political Science,* **33**(1): 67-99.

Blonigen, B.A. (2001) 'In Search of Substitution between Foreign Production and Exports', *Journal of International Economics,* **53**: 81-104.

Blonigen, B.A., Davies, R.B. and Head, K. (2003) 'Estimating the Knowledge-Capital Model of the Multinational Enterprise: Comment', *American Economic Review,* **93**(3): 980-994.

Blonigen, B.A. and Wang, M. (2004) 'Inappropriate Pooling of Wealthy and Poor Countries in Empirical FDI Studies', Working Paper No. 10378, National Bureau of Economic Research, Cambridge, MA.

Börzel, T.A. and Risse, T. (2005) 'Public-Private Partnerships: Effective and Legitimate Tools of International Governance?', in E. Grande and L.W. Pauly (eds.) *Complex Sovereignty: Reconstituting Political Authority in the Twenty-First Century*, University of Toronto Press: Toronto, pp. 195-216.

Brainard, S.L. (1997) 'An Empirical Assessment of the Proximity-Concentration Trade-off Between Multinational Sales and Trade', *American Economic Review,* **87**(4): 520-544.

Brewer, T.L. (1993) 'Government Policies, Market Imperfections, and Foreign Direct Investment', *Journal of International Business Studies*, **24**: 101-120.

Brown, L., Rugman, A. and Verbeke, A. (1989) 'Japanese joint ventures with western multinational: Synthesizing the economic and cultural explanations of failure', *Asia Pacific Journal of Management*, **6**: 225-242.

Buono, A.F. and Bowditch, J.L. (1989) *The Human Side of Mergers and Acquisitions*, Josey-Bass: San Francisco.

Buckley, P.J., Ghauri, P.N. (2004) Globalisation, economic geography and the strategy of multinational enterprises', *Journal of International Business Studies*, **35**: 81-98.

Cartwright, S. and Cooper, C.L. (1993) 'The role of culture compatibility in successful organizational marriage', *Academy of Management Executive*, **7**(2): 57-70.

Casella, A. (1996) 'Free Trade and Evolving Standards', in J. Bhagwati and R. Hudec (eds.) *Fair Trade and Harmonization: Prerequisites for Free Trade?*, MIT Press: Cambridge, MA, pp. 119-156.
Casper, S. and Hancké, B. (1999) 'Global Quality Norms with National Production Regimes: ISO 9000 Standards in the French and German Car Industries', *Organization Studies*, **20**(6): 961-985.
Chen, M.X., Otsuki, T. and Wilson, J.S. (2006) 'Do Standards Matter for Export Success?' World Bank Policy Research Working Paper No. 3809.
Christmann, P. and Taylor, G. (2001) 'Globalization and the Environment: Determinants of Firm Self-Regulation in China', *Journal of International Business Studies,* **32**(3): 439-458.
Clausing, K.A. (2000) 'Does multinational activity displace trade?', *Economic Inquiry,* **38**(2): 190-205.
Coase, R.H. (1937) 'The Nature of the Firm', *Economica,* **4(**16): 386-405.
Coff, R.W. (2002) 'Human Capital, Shared Expertise, and the Likelihood of Impasse in
Corporate Acquisitions', *Journal of Management*, **28**(1): 107-128.
Conti, T. (1999) 'Vision 2000: positioning the new ISO 9000 standards with respect to total quality management models', *Total Quality Management,* **10**(4&5): 454-464.
Corbett, C.J. and Kirsch, D.A. (2001) 'International Diffusion of ISO 14000 Certification', *Production and Operations Management,* **10**(3): 327-342.
Corbett, C.J. (2003) 'Global Diffusion of ISO 9000 Certification through Supply Chains', UCLA Anderson School of Management, Manuscript.
Datta, D.K. (1991) 'Organizational Fit and Acquisition Performance: Effects of Post-acquisition Integraton', *Strategic Management Journal*, **12**(4): 281-297.
Delmas, M.A. (2000) 'Barriers and Incentives to the Adoption of ISO 14001 by Firms in the United States', *Duke Environmental Law and Policy Forum,* **11**(1): 1-38.
Delmas, M.A. (2002) 'The diffusion of environmental management standards in Europe and in the United States', *Policy Sciences,* **35**: 91-119.
DiMaggio, P.J. and Powell, W.W. (1983) 'The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields', *American Sociological Review,* **48**(2): 147-160.
DiMaggio, P.J. and Powell, W.W. (1991) 'Introduction', in W.W. Powell and P.J. DiMaggio (eds.) *The New Institutionalism in Organizational Analysis,* University of Chicago Press: Chicago, pp. 1-38.
Dissanayaka, S.M., Kumarsawamy, M.M., Karim, K. and Marosszeky, M. (2001) 'Evaluating Outcomes from ISO 9000-certified Quality Systems of Hong Kong Constructors', *Total Quality Management,* **12**(1): 29-40.
Dunning, J.H. (1981) *International Production and the Multinational Enterprise,* Allen and Unwin: London.
Dunning, J.H. (1988) 'The Eclectic Paradigm of International Production: A Restatement and Some Possible Extensions', *Journal of International Business Studies,* **19**(1): 1-32.
Dunning, J.H. (2001) 'The Eclectic (OLI) Paradigm of International Production: Past, Present and Future', *International Journal of the Economics of Business,* **8**(2): 173-190.
Dunning, J.H. (ed.) (2003) *Making Globalization Good: the Moral Challenges of Global Capitalism,* Oxford University Press: Oxford.
Eden, L. and Lenway, S. (2001) 'Introduction to the Symposium Multinationals: The Janus Face of Globalization', *Journal of International Business Studies*, **32**(3): 383-400.

Ekholm, K. (1995) *Multinational Production and Trade in Technological Knowledge*, Studentlitteratur Printing Office: University of Lund, Sweden.
Fey, C.F. and Beamish, P.W. (2001) 'Organizational Climate Similarity and Performance: International Joint Ventures in Russia', *Organization Studies*, **22**(5): 853-882.
Foss, N.J. and Pedersen, T. (2004) 'Organizing knowledge processes in the multinational corporation: an introduction', *Journal of International Business Studies*, **35**: 340-349.
Freund, C.L. and Weinhold, D. (2004) 'The effect of the Internet on international trade', *Journal of International Economics,* **62**(1): 171-189.
Geringer, M. (1988) *Joint venture partner selection: Strategies for developed countries*, Quorom: Westport, CT.
Globerman, S. and Shapiro, D. (2003) 'Governance infrastructure and US foreign direct investment', *Journal of International Business Studies*, **34**(1): 19-39.
Grajek, M. (2004) 'Diffusion of ISO 9000 Standards and International Trade', Discussion Paper SPII 2004-16, Wissenschaftszentrum Berlin.
Grubert, H. and Mutti, J. (1991) 'Taxes, Tariffs and Transfer Pricing in Multinational Corporate Decision Making', *Review of Economics and Statistics,* **73**(2): 285-293.
Guerin, J.M. and Rice, R.W. (1996) 'Perceptions of Importers in the United Kingdom, Germany, and the Netherlands Regarding the Competitive Advantage of ISO 9000', *Forest Products Journal,* **46**(4): 27-31.
Guler, I., Guillén, M.F. and Macpherson, J.M. (2002) 'Global Competition, Institutions, and the Diffusion of ISO 9000 Quality Certificates', *Administrative Science Quarterly,* **47**: 207-232.
Harrigan, K. (1988) 'Joint ventures and competitive strategy', *Strategic Management Journal*, **9**: 141-158.
Haspeslagh, P. and Jemison, D. (1991) *Managing acquisitions: Creating value through corporate renewal*, Free Press: New York.
Hayes, H. M. (1994) 'ISO 9000: The New Strategic Consideration', *Business Horizons,* **37**(3): 52-60.
Head, K. and Ries, J. (2001) 'Overseas Investment and Firm Exports', *Review of International Economics,* **9**(1): 108-122.
Hejazi, W. and Safarian, A.E. (2001) 'The Complementarity Between U.S. Foreign Direct Investment Stock and Trade', *Atlantic Economic Journal,* **29**(4): 420-437.
Henisz, W.J. (2002) 'The Institutional Environment for Infrastructure Investment', *Industrial and Corporate Change,* **11**(2): 355-389.
Henisz, W.J. and Williamson, O.E. (1999) 'Comparative Economic Organization – Within and Between Countries', *Business and Politics,* **1**(3): 261-277.
Henisz, W.J. and Zelner, B.A. (2001) 'The Institutional Environment for Telecommunications Investment', *Journal of Economics and Management Strategy,* **10**(1): 123-147.
Hill, C.W.L. (1998) *International business: competing in the global marketplace*, Irwin/McGraw Hill: Boston.
Hitt, M.E., Harrison, J., Ireland, R.D. and Best, A. (1998) 'Attributes of Successful and Unsuccessful Acquisitions of US Firms', *British Journal of Management*, **9**(2): 91-114.
Hudson, J. and Jones, P. (2003) ' International Trade in 'Quality Goods': Signalling Problems For Developing Countries', *Journal of International Development*, **15**: 999-1013.
Hummels D. and Levinsohn, J. (1995) 'Monopolistic Competition and International Trade: Reconsidering the Evidence', *Quarterly Journal of Economics,* **110**(3): 799-836.
Hunt, J.W. (1990) 'Changing Pattern of Acquisition Behaviour in Takeovers and the Consequnces for Acquistion Processes', *Strategic Management Journal*, **11**(1): 69-77.

ISO (2003) 'The ISO Survey of ISO 9000 and ISO 14000 Certificates, Twelfth cycle – 2002', ISO Central Secretariat, Geneve.
Juran, J.M. (1999) 'Commentary', *Quality Progress*, **32**(6): 30-31.
Keohane, R.O. (1984) *After Hegemony*, Princeton University Press: Princeton.
King, A.A., Lenox, M.J. and Terlaak, A. (2005) 'The Strategic Use of Decentralized Institutions: Exploring Certification with the ISO 14001 Management Standard' *Academy of Management Journal*, **48**(6): 1091-1106.
Kobrin, S.J. and Wu, X. (2005) 'Reason, Imitation or Coercion? The Liberalization of FDI Policy in Developing Countries 1992-2001', Paper presented at 'The Political Economy of Regulating Multinational Corporations and Foreign Direct Investment' Conference at Pennsylvania State University, October, 14-15, 2005.
Krasner, S. (ed.) (1983) *International regimes*, Cornell University Press: Ithaca.
Lahiri, K. and Schmidt, P. (1978) 'On the Estimation of Triangular Structural Systems', *Econometrica,* **46**(5): 1217-1221.
Larsson, R. and Finkelstein, S. (1999) 'Integrating Strategic, Organizational, and Human resource Perspectives on Mergers and Acquisitions: A Case Study of Synergy Realization', *Organization Science,* **10**(1): 1-26.
Larsson, R. and Lubatkin, M. (2001) 'Achieving acculturation in mergers and acquisitions: an international case study', *Human Relations,* **54**(12): 1573-1607.
Lee, Y.T. (1998) 'The Development if ISO 9000 Certification and the Future of Quality Management', *International Journal of Quality & Reliability Management,* **15**(2): 162-177.
Li, Q. and Resnick, A. (2003) 'Reversal of Fortunes: Democratic Institutions and Foreign Direct Investment Inflows to Developing Countries', *International Organization*, **57**: 175-211.
Matthews, R.C.O. (1986) 'The Economics of Institutions and the Sources of Growth', *Economic Journal,* **96**: 903-918.
Mendel, P.J. (2002) 'International Standardization and Global Governance: The Spread of Quality and Environmental Management Standards', in A.J. Hoffman and M.J. Ventresca (eds.) *Organizations, Policy and the Natural Environment: Institutional and Strategic Perspectives,* Stanford University Press: Stanford, pp. 407-424.
Milgrom, P.R., North, D.C. and Weingast, B.R. (1990) 'The Role of Institutions in the Revival of Trade: The Law-merchant, Private Judges, and the Champagne Fairs', *Economics and Politics*, **2**(1): 1-23.
Murray, J.Y., Kotabe, M. and Wildt, A.R. (1995) 'Strategic and Financial Performance Implications of Global Sourcing Strategy: A Contingency Analysis', *Journal of International Business Studies*, **26**: 181-202.
North, D.C. (1990) *Institutions, Institutional Change and Economic Performance*, Cambridge University Press: Cambridge, UK.
North, D.C. (1991) 'Institutions', *Journal of Economic Perspectives*, **5**(1): 97-112.
Neumayer, E. and Perkins, R. (2005) 'Uneven Geographies of Organizational Practice: Explaining the Cross-National Transfer and Diffusion of ISO 9000', *Economic Geography*, **81**(3): 237-259.
Pablo, A.L. (1994) 'Determinants of Acquisition Integration Level: A Decision Making Perspective', *Academy of Management Journal*, **37**(4): 803-836.
Perez, O. (2004) 'Global Legal Pluralism and Electronic Democracy', Working Paper No. 3-04, Faculty of Law, Bar-Ilan University.
Prakash, A. and Potoski, M. (2006a) 'Racing to the Bottom?: Trade, Environmental Governance, and ISO 14001', *American Journal of Political Science,* **50**(2): 347-361.

Prakash, A. and Potoski, M. (2006b) 'New Dependencies: FDI and the Cross-Country Diffusion of ISO 14001 Management Systems', Paper presented at 'The Political Economy of Regulating Multinational Corporations and Foreign Direct Investment' Conference at Pennsylvania State University, October, 14-15, 2005.
Rao, S.S., Ragu-Nathan, T.S. and Solis, L.E. (1997) 'Does ISO 9000 Have an Effect on Quality Management Practices? An International Empirical Study', *Total Quality Management,* **8**(6): 335-346.
Ricart, J.E., Enright, M.J., Ghemawat, P., Hart, S.L. and Khanna, T. (2004) 'New Frontiers in international strategy', *Journal of International Business Studies*, **35**: 175-2000.
Rose, A. (2004) 'Do We Really Know That the WTO Increases Trade?', *American Economic Review*, **94**(1): 98-114.
Scott, W.R. (1995) *Institutions and Organizations,* Sage Publications: Thousand Oaks, CA.
Sethi, D., Guisinger, S.E., Phelan, S.E., and Berg, D.M. (2003) 'Trends in foreign direct investment flows: a theoretical and empirical analysis', *Journal of International Business Studies*, **34**(4): 315-326.
Shani, A.B., and Rogberg, M. (1994) 'Quality, Strategy and Structural Configuration', *Journal of Organizational Change Management*, **7**(2): 15-30.
Shrivastava, P. (1986) 'Post-merger integration', *Journal of Business Strategy*, **7**(1): 65-76.
Simmons, B.L. and White, M.A. (1999) 'The Relationship Between ISO 9000 and Business Performance: Does Registration Really Matter?', *Journal of Managerial Issues,* **11**(3): 330-343.
Singh, H. (2006) Comments Before the PDW Workshop 'Using M&A As a Context For Studying Organizations' at the Annual Meeting of the Academy of Management, Atlanta, GA, August 12, 2006.
Snowdon, B. and Stonehouse, G. (2006) 'Competitiveness in a globalised world: Michael Porter on the microeconomic foundations of the competitiveness of nations, regions, and firms', *Journal of International Business Studies*, **37**: 163-175.
Srivastava, R.P., and Datta, D.K. (2006) 'Evaluating Mergers and Acquisitions: A Belief Function Approach', in R.P. Srivastava and T. Mock (eds.) *Belief Functions in Business Decisions*, Springer-Verlag: Heidelberg (forthcoming).
Strange, S. (1988) *States and Markets*, Basil Blackwell: New York.
Terlaak, A. and King, A.A. (2006) 'The Effect of Certification with the ISO 9000 Quality Management Standard: A Signaling Approach', *Journal of Economic Behavior and Organization*, **60**(4): 579-602.
Terziovski, M., Power, D., and Sohal, A.S. (2003) 'The longitudinal effects of the ISO 9000 certification process on business performance', *Production, Manufacturing and Logistics*, **146**: 580-595.
Walgenbach, P. (1998) 'Zwischen Showbusiness und Galeere. Zum Einsatz der DIN EN ISO 9000er Normen in Unternehmen', *Industrielle Beziehungen*, **5**(2): 135-164.
Williamson, O.E. (1975) *Markets and Hierarchies*, Free Press: New York.
Williamson, O.E. (1985) *The Economic Institutions of Capitalism*, Free Press: New York.
Wooldridge J.M. (2002) *Econometric Analysis of Cross Section and Panel Data*, MIT Press: Cambridge, MA.
Yarbrough, B.V. and Yarbrough, R.M. (1990) 'International Institutions and the New Economics of Organization', *International Organization*, **44**(2): 235-259.
Zellner, A. (1962) 'An Efficient Method of Estimating Seemingly Unrelated Regressions and Tests of Aggregation Bias', *Journal of American Statistical Association,* **57**: 500-509.

Table #1 Variable definitions.

Variable	Source	Definition
Exports	UN's Comtrade	Exports from home to host country (in millions of U.S. dollars)
FDI_out	OECD Statistical Compendium	Home country's FDI stock in host country (in millions of U.S. dollars)
FDI_in	OECD Statistical Compendium	Host country's FDI stock in home country (in millions of U.S. dollars)
home_GDP	IMF's IFS	Home country's GDP (in millions of U.S. dollars)
host_GDP	IMF's IFS	Host country's GDP (in millions of U.S. dollars)
home_ISO	ISO(2003)	Number of home ISO 9000 certifications
host_ISO	ISO(2003)	Number of host ISO 9000 certifications
host_Passengers	World Bank's WDI	Number of passengers carried by aircrafts departing from host country's airports per capita
host_Road	World Bank's WDI	Total network of paved roads per sq. km in host country
host_Electricity	World Bank's WDI	Host country's electricity production (in kWh per capita)
rel_REER	IMF's IFS	Real effective exchange rate based on relative consumer prices (higher value indicates real depreciation of home vs. host currency)
rel_SMI	World Bank's WDI	Relative stock market index given by market capitalization of home relative to host country
host_Polcon	Henisz (2002)	Index of political constraints in host country based on veto points (higher value indicates tighter control over politicians' decisions)
host_TCI	World Economic Forum's GCR	Trade cost index reflecting hidden barriers to imports of host country (1=highest, 7=lowest)
host_Tariffs	OECD Statistical Compendium and World Bank's WDI	Custom and other import duties as a fraction of total imports in host country; OECD data were used if available, otherwise World Bank's data.
host_FCM	World Economic Forum's GCR	Restrictions to access foreign capital markets in host country (1=highest, 7=lowest)
host_HF	World Economic Forum's GCR	Hiring and firing practices in host country (1=impeded by regulations, 7=flexibly determined by employers)
BIT	UN	Bilateral investment treaty between home and host nation (0/1)
FTA	Baier & Bergstrand (2006) and sources listed there	Free trade agreement between home and host nation (0/1)

Table #2 Summary statistics.

	LDC→DC			DC→LDC			DC→DC		
Variable	Obs.	Mean	Std. Dev	Obs.	Mean	Std. Dev	Obs.	Mean	Std. Dev
Exports	968	2038.7	4116.6	1796	1908.4	5924.5	1271	5996.0	14076.2
FDI_out	1043	170.7	397.9	1858	1492.8	3760.9	1315	7069.7	21027.4
FDI_in	950	1423.6	2351.9	1099	194.9	574.3	1204	7399.8	23227.0
home_GDP	1043	224847	229507	1858	1442356	2350017	1315	1313508	2257529
host_GDP	1043	1002276	1206128	1858	214753	232848	1315	1196615	1921242
home_ISO	1043	3302	6827	1858	14789	16952	1315	12054	15493
host_ISO	1043	14732	17537	1858	3039	6835	1315	11182	16123
host_Passengers	875	1.01	0.58	1858	0.45	0.81	1315	1.43	0.93
host_Road	647	167.6	91.8	1348	65.2	111.0	1315	118.0	85.3
host_Electricity	1043	8292.0	4493.8	1858	3373.6	2031.3	1315	9936.6	6056.1
rel_REER	584	0.99	0.16	1112	1.03	0.16	1315	1.00	0.12
rel_SMI	915	0.99	2.53	1576	139.81	934.99	1042	17.11	62.48
host_Polcon	1043	0.77	0.05	1804	0.61	0.23	1315	0.76	0.04
host_TCI	1043	5.82	0.68	1858	4.69	0.90	997	5.85	0.79
host_Tariffs	741	0.01	0.01	1225	0.03	0.03	1121	0.01	0.01
host_FCM	999	6.48	0.38	1858	4.95	1.19	954	6.37	0.47
host_HF	1043	3.40	0.92	1838	3.94	0.91	997	3.71	0.94
BIT	690	0.42	0.49	1198	0.48	0.50	957	0.00	0.05
FTA	690	0.12	0.33	1198	0.10	0.30	957	0.63	0.48

Table #3 Gravity equation for Exports and outward FDI: Fixed-effects estimation results

	Exports			FDI		
	LDC→DC	DC→LDC	DC→DC	LDC→DC	DC→LDC	DC→DC
Regression #	(1)	(2)	(3)	(4)	(5)	(6)
home_GDP	0.272**	0.237	0.288**	-0.354	-0.360	0.174
	(0.121)	(0.158)	(0.125)	(0.293)	(0.286)	(0.311)
host_GDP	0.803***	0.650***	0.523***	0.568	0.536***	0.850***
	(0.240)	(0.076)	(0.087)	(0.588)	(0.176)	(0.320)
home_ISO	0.116**	0.033	-0.008	-0.079	-0.059	0.064
	(0.057)	(0.050)	(0.037)	(0.097)	(0.126)	(0.104)
host_ISO	0.085	0.018	0.043	-0.330*	0.148**	-0.022
	(0.087)	(0.031)	(0.033)	(0.190)	(0.071)	(0.112)
FDI_out	-0.004	0.021	0.005			
	(0.016)	(0.023)	(0.011)			
FDI_in	0.043	0.023*	0.016			
	(0.029)	(0.013)	(0.010)			
host_Passengers		0.212***	0.289***		-0.099	-0.363
		(0.078)	(0.100)		(0.187)	(0.339)
host_Road			0.006*			-0.004
			(0.003)			(0.007)
host_TCI	-0.577			1.210**		
	(0.393)			(0.528)		
host_FCM		0.263***			0.406*	
		(0.076)			(0.223)	
Sims test (overall)[a]	1.35	1.30	1.02	2.31**	0.63	1.02
	(7, 162)	(8, 216)	(8, 244)	(5, 224)	(6, 390)	(6, 275)
Sims test (ISO)[a]	2.19	0.48	0.65	2.12	0.05	1.15
	(2, 162)	(2, 216)	(2, 244)	(2, 224)	(2, 390)	(2, 275)
Hausman test (overall)[b]	22.26***	31.92***	39.61***	16.06***	6.44	3.03
	(7)	(8)	(8)	(5)	(6)	(6)
Hausman test (ISO)[b]	6.74**	1.69	1.63	4.33	2.07	0.19
	(2)	(2)	(2)	(2)	(2)	(2)
R^2	0.227	0.323	0.220	0.070	0.250	0.207
Observations	868	918	1136	1043	1858	1315
Clusters (Panels)	218	278	295	233	410	318

* denotes p<0.1, ** p<0.05, *** p<0.01; cluster-robust standard errors are in parentheses.
All variables are in logs; country-pair specific and time specific effects are suppressed.

[a] The test statistic is F-distributed; degrees of freedom in parentheses.

[b] The test statistic is χ^2-distributed; degrees of freedom in parentheses.

Table #4 Gravity equation for Exports & Outward FDI: First-differencing estimation results

	Exports			FDI		
	LDC→DC	DC→LDC	DC→DC	LDC→DC	DC→LDC	DC→DC
Regression #	(1)	(2)	(3)	(4)	(5)	(6)
home_GDP	0.294***	0.474***	0.589***	-0.211	-0.377	0.260
	(0.064)	(0.162)	(0.133)	(0.221)	(0.372)	(0.367)
host_GDP	0.879***	0.559***	0.253***	0.802**	0.364*	0.326
	(0.169)	(0.094)	(0.080)	(0.399)	(0.191)	(0.427)
home_ISO	0.063**	0.089	-0.044	-0.023	-0.187	0.108
	(0.028)	(0.057)	(0.027)	(0.053)	(0.120)	(0.121)
host_ISO	0.086	0.004	0.062**	-0.045	0.109*	-0.055
	(0.059)	(0.032)	(0.027)	(0.149)	(0.061)	(0.121)
FDI_out	-0.001	0.002	0.020*			
	(0.010)	(0.022)	(0.011)			
FDI_in	0.028	0.016	-0.008			
	(0.021)	(0.016)	(0.012)			
host_Passengers		0.027	0.059		-0.184	-0.624
		(0.052)	(0.084)		(0.269)	(0.383)
host_Road			0.008***			-0.005
			(0.003)			(0.011)
host_TCI	-0.185			-0.240		
	(0.154)			(0.418)		
host_FCM		0.229***			0.167	
		(0.056)			(0.215)	
R^2	0.133	0.216	0.100	0.020	0.067	0.077
Observations	613	524	625	761	1185	754
Clusters (Panels)	159	217	245	182	375	272

* denotes p<0.1, ** p<0.05, *** p<0.01; cluster-robust standard errors are in parentheses.
All variables are in logs and first differenced.