

**THE PROBLEM OF SEARCH AND  
DELIBERATION IN ECONOMIC ACTION:  
WHEN NETWORKS REALLY MATTER**

**by**

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Printed at INSEAD, Fontainebleau, France.

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**May 1998**

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I have benefited greatly from conversations with numerous colleagues at INSEAD, and from comments I received in seminars at Harvard University's Center for Business and Government, and London Business School's Strategic Leadership Research Program. I am indebted in particular to Martin Gargiulo, Ranjay Gulati, Xueguang Zhou, Antonio Fatas, Bjorn Louvas, Marla Tuchinsky, Renée Mauborgne, Raymond Vernon, F. M. Scherer, Mun Ho, and Shang-Jin Wei for their valuable time and feedback, and to Raghu Rau for research assistance. I also thank Bruce Kogut and Robert Lawrence for the encouragement they gave me in developing this paper.

# The Problem of Search and Deliberation in Economic Action: When Networks Really Matter

## Abstract

Economic sociologists have argued that social networks are a key determinant of firms' economic actions--i.e., actions oriented toward the allocation of scarce resources. Economists, on the other hand, tend to disregard social relations and emphasize the role of prices. How do we reconcile these positions? Are prices and networks substitutes or complements in explaining economic action? And, more broadly, when do networks really matter? The line of generalization explored here argues that the significance of social networks in explaining patterns of allocative actions and outcomes will be greatest in those spheres of economic activity where *search* and *deliberation* are problematic. Here, search refers to acts involved in identifying potential exchange partners, and deliberation refers to acts involved in assessing their reliability and trustworthiness. Search grows more important the more spatially dispersed economic opportunities become, and deliberation grows more important the more costly it becomes to reverse allocative actions or their effects. When search and deliberation are important but problematic, actors tend to rely on their social networks, because, frequently, the latter can help alleviate problems of search and deliberation, and enable actors to exploit economic opportunities furnished by the price mechanism. In these instances--contrary to common perception--networks and prices operate as complements, and social structure-influenced allocative actions will tend to be consistent with standard economic rationality. By implication, under circumstances of problematic search and deliberation, actors embedded in well-elaborated social networks will tend to enjoy information advantages by virtue of which they will adapt and respond more proficiently to new economic opportunities. These propositions are explored in an empirical study with controls contrasting multinational and non-multinational enterprises' international trade responses to exchange rate changes.

# **The Problem of Search and Deliberation in Economic Action: When Networks Really Matter**

In his felicitous essay on embeddedness, Mark Granovetter (1985) has argued that even in modern capitalist societies social networks are a key determinant of economic action. Recalling Max Weber, Granovetter (1992: 32) defines economic action as action that is oriented toward the allocation of scarce resources to alternative uses. But in modern capitalist societies the allocation of scarce resources to alternative uses is what, in principle, the price mechanism is supposed to do best (Hayek, 1945). The question, hence, arises: Are prices and networks substitutes or complements in explaining economic--i.e., *allocative*--actions and outcomes? And, more broadly, *when* do networks really matter?

It is important to address these questions because if theory does not acknowledge and sketch boundary conditions then it runs the risk of making overstated or unfalsifiable claims. Granovetter (1992: 26) himself has urged that "Part of the contribution of a theoretically vital economic sociology should be a specification of the circumstances" under which network scholars' claims are correct and under which the claims of most economists--that social relations "can be set aside"--are correct.

Yet, it would appear that network theories of organizational behavior and action have not expressly addressed this important issue. To be sure, Granovetter (1985) and other scholars who have contributed to this literature (e.g., Eccles, 1981; Palmer, 1983; Baker, 1984; Bradach and Eccles, 1989; Powell, 1990; Burt, 1992; Nohria, 1992; Portes and Sensenbrenner, 1993; Podolny, 1994; Gulati, 1995a, b; Romo and Schwartz, 1995; Uzzi, 1997) have variously highlighted key elements--such as trust, uncertainty, information, and co-specialization--that have a clear bearing on the question of when networks matter. But, as Smelser and Swedberg (1994) observe, the very proliferation of explanations points to a growing and genuine need for synthesis.

As for the question of whether prices and networks are substitutes or complements, most economists, it is clear, adopt atomistic assumptions wherein social

relations “can be set aside.” On the other hand, even though network scholars recognize and acknowledge the importance of prices (e.g., Romo and Schwartz, 1995; Uzzi, 1997), much of the network literature imparts the impression that since competition is so seldom perfect and atomistic, prices “can be set aside.” In this latter view, it would seem, networks always matter and, frequently, they supersede the price mechanism. Unfortunately, rather than fostering “complementary articulation” (Smelser and Swedberg, 1994: 20), this tone tends to needlessly reinforce the “mutual separation” between economics and sociology. In consequence, our ability to understand and explain the economic behavior and actions of organizations is hindered.

It would appear then, that even while embracing as eminently sensible the view that social networks influence firms’ economic actions, it remains to sketch more clearly: (i) when networks really matter, and (ii) how networks and prices interact. It is these questions that I would like to explore in this paper. Without a doubt, important patches of theory relevant to these questions have been developed by Granovetter (1973; 1985), Burt (1992), Uzzi (1997), and other scholars working in this area, as well as by some economists (including Coase, 1937; Stigler, 1961; Arrow, 1974; Simon, 1979; Carlton, 1989; Grossman, 1989) who have contemplated these issues. I draw inspiration from these earlier works and attempt a synthesis that is expressly germane to network explanations of firms’ economic actions.

The line of generalization explored here argues that while social networks are ubiquitous, their significance in explaining patterns of allocative actions and outcomes will be greatest in those spheres of economic activity where search and deliberation are problematic. Here, search refers to acts involved in identifying potential exchange partners, and deliberation refers to acts involved in assessing their reliability and trustworthiness. Search grows more important the more spatially dispersed economic opportunities become, and deliberation grows more important the more costly it becomes to reverse allocative actions or their effects. In several instances, institutions--such as organized markets and rating agencies--and innovations--such as advertising

and warranties--have emerged to relieve the problems of search and deliberation, and, in these instances, the price mechanism tends to operate as anticipated.

However, in many important instances--in labor markets and international trade, for example--such institutions and innovations don't exist or don't work well enough. In these instances, search and deliberation remain problematic, and, because of the resulting information insufficiency, the price mechanism does not operate as normally anticipated. Economic opportunities exist but asocial market mechanisms alone cannot provide a cost-effective way to uncover and exploit them. Such situations of problematic search and deliberation likely form an important category among the classic circumstances under which actors--i.e., firms and individuals--turn to their social networks, and under which actors' social structures and relations assume significance in shaping and explaining allocative actions and outcomes. The reasoning behind this is that, frequently, social networks alleviate problems of search and deliberation and thereby enable actors to capitalize on economic opportunities furnished by the price mechanism. In these frequent instances--contrary to common perception--networks and prices operate as complements, and social structure-influenced allocative actions will tend to be consistent with standard economic rationality.

Of course, even in circumstances where search and deliberation are problematic social structure-influenced outcomes need not always be benign. In fact, whether networks and prices will operate in the complementary manner just described, will, holding economic opportunities constant, depend upon the composition and nature of the focal actor's social network. In general, under problematic search and deliberation, actors embedded within well-elaborated social networks will tend to enjoy information advantages by virtue of which they will adapt and respond more proficiently to new economic opportunities.

Before proceeding to elaborate on these propositions, let me outline the five-part structure of the remainder of this paper. In the first part, I draw upon Hayek (1945) and develop the circumstances under which prices will tend to have a determining influence on economic action and when networks can be set aside. I then introduce in

the second part the problems of search and deliberation and discuss why in their presence the determining influence of price wanes. In the third part, I bring in social networks and discuss why and how they frequently alleviate problems of search and deliberation. In this discussion, I specify the circumstances under which networks will tend to have a determining influence on economic action, and I spotlight the complementarity between networks and prices. In the fourth and empirical part, I try to demonstrate the plausibility of my theoretical arguments by contrasting U.S. multinational and non-multinational enterprises' international trade responses to common exchange rate changes. Previous work has established that search and deliberation are problematic in international trade. The latter provides, therefore, a suitable empirical setting within which we can explicitly factor-in prices (read exchange rates) and explore whether firms embedded in better-elaborated social networks (read MNEs) respond more proficiently to new economic opportunities. To set correct expectations, I should note that my empirical analysis draws upon methods and norms of work in international trade (rather than classic "social network analysis"). I will, of course, explain the design of my study, show how it links to my theory, and discuss its limitations. In the fifth and final section, I draw together what has been learnt and discuss courses of future research.

## **ECONOMIC ACTIONS AND OUTCOMES**

Since society's resources are scarce and have alternative uses, it matters what is produced, how it is produced, and to whom the output is allotted. These issues form the core of society's economic problem, and it is, hence, suitable that the term economic action refers to the allocation of scarce resources. Other things equal, the economy is better-off--i.e., tends toward greater allocative efficiency--when firms economize on the use of or produce more of a relatively scarce resource. Of course, to impel firms to behave in this "economically rational" manner presents a formidable challenge. It was this challenge that Hayek (1945) contended the price mechanism was particularly well-suited to handling. Arguably, Hayek (1945) saw prices as a well-matched solution to

the problem of economic action and, in particular, he did not ascribe a role to social networks. Therefore, if we wish to understand when, in explaining economic action, social networks “can be set aside,” it might be instructive to examine Hayek’s assumptions about the price mechanism.

Hayek made two critical assumptions in arguing that an unfettered price mechanism would have a determining influence on economic action: (i) Arbitrageurs existed and they would ensure that, net of transport costs, the law of one price held; and (ii) when confronted with better prices, actors would readily adjust their allocations via substitution. The first assumption meant that buyers were relieved of the burden of identifying and monitoring the prices of potential exchange partners (including those who operated in markets other than their own). Hence, *search*, as we defined it above, would not be problematic. Moreover, this division of labor was enabled by the price mechanism itself because it provided profit opportunities that arbitrageurs could avail of by monitoring and extinguishing discrepancies in prevailing prices. The second assumption meant that purchase price information provided buyers a sufficient basis for the decision to substitute. Accordingly, *deliberation* would not be problematic either. The second assumption also implied that in the buyer’s market economic objectives had primacy over noneconomic objectives (perhaps because selection pressures were high there or because there was no scope for social relations between buyer and seller).

So within the bounds of Hayekian arbitrage and substitution--*where search and deliberation are not problematic and where noneconomic objectives don’t dominate economic ones--we have the rough conditions under which prices ought to have a determining influence and social relations might be set aside in explaining economic action.* The correct interpretation of this is not that actors are necessarily indifferent about whom they trade with or how and where they allocate resources. It is simply that, from the standpoint of explaining or influencing the economic quality (or rationality) of economic actions and outcomes, social relations can, under these circumstances, be set aside. It follows then that in circumstances where the Hayekian arbitrage and substitution assumptions hold, exchange relations will be organized in

such a manner that even if actors were to abandon any noneconomic objectives they presently held, they would not (by changing exchange partners) become economically better-off. To clarify, I will refer to two examples.

The first was narrated to me by a European manager working at a major Japanese trading company. This manager was proud that even in the face of stiff competition from the major multinational oil companies, for the past 15 years he has continued to supply jet fuel to a major European airline at Asia's most important airport. His explanation was that from the time he and the airline's current procurement manager had first met, they had established a rapport, and over the course of the years become family friends. The men shared a common enthusiasm for motorcycling and their kids had sleepovers. So today, so long as his trading company's jet fuel prices are in line with or lower than competing bids, the sizable contract stays with him. The manager is fully cognizant though that in the competitive international airline business, jet fuel is often the second major item of cost, and, therefore, if the need arose, price would supersede friendship.

The story illustrates a repeat-interaction situation where social relations exist but they don't influence the economic quality of allocative action--i.e., the buyer can't get a lower price if he abandoned his friendship and switched suppliers, and the seller can't get a higher price if he were to supply someone other than his friend. Eccles' (1981) study of the construction industry revealed a similar pattern. Eccles observed stable and long-lived relationships between general contractors and subcontractors. But, he found, social relations did not influence (or undermine) the *economic* quality of exchange because (i) everybody knew what the 'going rate' was for different types of work--"This information [was] efficiently transmitted in the market" (Eccles, 1981: 353), and (ii) "switching subcontractors [was] fairly easy" (Bradach and Eccles, 1989: 110). So not in every instance in which we witness enduring social relations can we conclude that the price mechanism is superseded; rather it might be that in such instances, "In an inversion of Granovetter's (1985) embeddedness argument,...the

presence of market prices...enables the creation of stable exchange relationships” (Bradach and Eccles, 1989: 110).

By extension of the arguments made above, we know that the determining influence of price on economic action will erode as the arbitrage and substitution assumptions are weakened. In the first instance then, when actors’ noneconomic objectives—such as fairness, sociability, and the desire to maintain family ties—are not dominated by concerns of narrow (i.e., strictly economic) self-interest, Hayek’s substitution assumption will no longer be valid. This could be the case where selection pressures are not strong (Granovetter, 1992) or where, even in the face of strong selection pressures, noneconomic values dominate economic ones (see Romo and Schwartz, 1995; Uzzi, 1997). In these circumstances, prices need no longer have a determining influence on economic action and social influences may supersede.

Network scholars such as Granovetter (1985) have underlined the role of noneconomic objectives, but they have also noted the risk that pursued too far this reasoning gets us into the “oversocialized” territory where “economics [becomes] all about how people make choices; [while] sociology [becomes] all about how they don’t have any choices to make” (James Duesenberry quoted in Granovetter, 1985: 485). I acknowledge that noneconomic objectives can play a crucial role in influencing economic action—it is fruitless to argue otherwise. However, in this paper, I want to focus on the problems of search and deliberation since they circumscribe another prevalent set of circumstances where the Hayekian assumptions of arbitrage and substitution fail to hold, and where, at the same time, networks tend to assume real significance in influencing and explaining economic actions and outcomes.

### **The Problem of Search and Deliberation**

Although the terms search and deliberation can be interpreted broadly (see Conlisk, 1996), I will for the purposes of this paper limit myself to a relatively narrow use of these terms. By “search” I refer to acts involved in identifying potential exchange partners. Firms engage in search (as defined here) when they sense that response to a

perceived economic opportunity or threat involves action that might lie outside the pattern of current activities and exchange relationships. Search grows more important the more spread out potential exchange partners are. For instance, when changes in federal safety regulations tightened ground-to-bumper height tolerances for vehicles, GM's Chevrolet division decided to make more intensive use of "leaf springs" (Corey, 1978: 39-41). But GM confronted search problems in identifying new suppliers of "leaf springs" because stocks of such materials are not traded on an organized exchange nor are the suppliers spatially clustered in one location. Eventually, using sources such as "trade association directories and word of mouth," the buyer in-charge developed a list of 50 potential suppliers (most of whom, upon verification, turned out not to have the right type of capacity). Ultimately, GM managed to procure the materials from two suppliers.

The problem of search has been discussed in many contexts including that of buyer-supplier relations (Webster and Wind, 1972), labor markets (Granovetter, 1973; Okun, 1981), interfirm alliances (Gulati, 1995a, b), international trade (Liang and Parkhe, 1997; Rauch, 1997), and new industries (Nohria, 1992; Kogut, Shan, and Walker, 1993). In the last instance, actors have agglomerated spatially (e.g., in the Route 128 area or Silicon Valley), reduced dispersion, and, thereby, ameliorated their search problems. Indeed, early markets emerged as a meeting place for economic exchange in response to dispersion of economic opportunities (Polanyi 1975 [1944]: 58).

But potential exchange partners cannot always arrange themselves in proximity to one another. Dispersion remains a fact of life in many areas of economic activity and firms often face a challenge of *cost-effectively* sending or receiving supply and demand signals from *all* potential exchange partners. Stigler (1961) addressed this very issue in his article on the economics of information and he advanced the notion of optimal search. However, as Herbert Simon (1979) has stressed, the marginal cost-marginal benefit calculus of search is, in reality, so seldom tractable (see Conlisk, 1996 for a discussion) that in many spheres of economic activity search remains problematic.

Arbitrageurs, by monitoring markets, are meant to patch things up. Except, arbitrage entails costs and given that arbitrageurs work to make a profit, they tend to be present in markets where volumes or per-unit margins are sufficiently high (as they might be, say, in the case of spot oil or CEO placement) to justify the allocation of time and effort in search (Telser and Higinbotham, 1977). Scale factors help explain why organized markets and arbitrageurs tend to prosper in sectors involving homogeneous rather than made-to-order products (Carlton, 1989).

Nevertheless, the problem of search emerges not in the product's characteristics *per se*, but in the dispersion of those who would potentially trade in it. Hence, for instance, even though heterogeneity of products is a datum in Geertz's (1978) Moroccan bazaar, "there is a high degree of spatial localization...[and if] one wants a kaftan or a mule pack made, one knows where, how, and for what sort of person to look." In short, *spatial dispersion is at the core of the search problem*. A corollary is that distance erodes economic exchange; distance "*always shows up* as a crucial determinant of trade" (Krugman, 1995: 1273; italics mine). Importantly, "shipping costs are quite small for most goods that can be shipped at all; yet trade falls off quite strongly with distance." Krugman suggests that distance may be a "proxy for more subtle transaction costs involving the difficulty of maintaining personal contact..." (p. 1273, fn). In this connection, network research would suggest (see Gulati 1995b; Burt, 1997) that some of these difficulties can sometimes be overcome by good social networks. We will pick up this point momentarily.

Let us turn now to the problem of deliberation. By "deliberation," I refer to acts involved in assessing the reliability and trustworthiness of potential exchange partners. Like search, deliberation is also an information-intensive process. However, search is aimed at reducing incomplete information about the present, whereas, deliberation is aimed at reducing incomplete information about the present and especially the future. Deliberation is a non-issue if actors can be certain or nearly certain about: (i) the quality of what is to be exchanged, and (ii) the manner in which exchange partners will discharge mutual obligations in the future. Then Hayek's substitution assumption

holds, and at least known prices will have a determining influence on allocative action. *But in the absence of certainty, deliberation enters the picture and it grows more important the more costly it becomes to reverse allocative actions or their effects.* When actors think deliberation is important but they find it problematic to resolve, Hayek's substitution assumption will tend not to hold--i.e., confronted with lower prices, actors will not automatically exhibit a ready inclination to substitute.

Thus, Granovetter (1985: 496) has noted that it is "a commonplace in the literature on industrial purchasing that buying and selling relationships rarely approximate the spot-market model of classical theory." A good part of the explanation is known to lie in the fact that in many buyer-supplier relationships switching-out and switching-in are costly (Webster and Wind, 1972; Sheppard and Tuchinsky, 1996). As in labor markets, assessing the reliability, timeliness, and capabilities of a new exchange partner is a process of discovery. As this process of discovery unfolds the buying firm might be: (i) placing in circulation a stock of inferior products that upon discovery will be costly to recover and upgrade (e.g., the recall of vehicles fitted with defective components); (ii) developing costly-to-reverse dependencies with the new supplier (as might happen when a firm turns over the management of its computer and information systems to an outside vendor); and (iii) closing-off a return to previous exchange partners since the latter are likely to have tied up with other custom or even exited the business altogether. These are some of the key drivers of uninsurable costs that firms are bound to weigh before switching or settling upon exchange partners. As these drivers gain salience, firms will sense a greater need to obtain reliable information about a potential exchange partner. If, however, the requisite information cannot be assembled, firms are wont to forego potential profit opportunities.

Romo and Schwartz's (1995) study documenting the reluctance of businesses to migrate production out of high-cost New York State is illustrative. On purely comparative-cost considerations business location decisions appear straightforward. Of course, in reality, firms hesitate to migrate long distances because should things not work out the decision will be costly to reverse. Uncertainty about making a successful

relocation is a backdrop to the decision-making process, but the costly-to-reverse nature of the decision is likely to be a key force stemming against the enticement of producing in a low-cost region. This is to suggest that *uncertainty may be necessary but it is not a sufficient condition for actors to forego economic opportunities*. This was evident in Eccles (1981) construction industry study where although “uncertainty [was] high,” “switching [was] relatively easy” (Bradach and Eccles, 1989: 111), and, consequently, general contractors did not pay above-market prices in order to work with known or long-established subcontractors.

Undoubtedly, asset specificity--which Williamson (1991: 282) has described as a syndrome of “bilateral dependency and... contractual hazards”--can play an important role in making allocative actions costly to reverse (see Palay, 1985). This reasoning is likely to be evident in industries where co-specialization is an unavoidable outgrowth of business relations. Co-specialization, like other switching costs, induces stickiness in relationships (or what economists refer to as “hysteresis”), so that, “even if subsequent information suggested that the initial choice was wrong, it would not pay [meaning, it would cost a lot] to reverse the decision later on” (Arrow, 1974: 41). Yet, as studies such as those by Podolny (1994) and Romo and Schwartz (1995) illustrate, it should be clear that asset specificity is only one source and certainly not a necessary condition for allocative actions or their effects to be perceived as costly-to-reverse.

In reality, firms are regularly encountering allocative actions that to lesser or greater extents are costly to reverse, and deliberation is, hence, frequently important. In some cases adequate information might be ascertained from rating agencies and at other times entities such as better business and consumer bureaus bestow certifications that signal worth. In yet other instances, actors bind themselves via enforceable warranties or transfer risk to themselves in other ways. In some of these cases, the problem of deliberation might ease sufficiently so as to enable action. Still, in many spheres of economic activity where deliberation is important, it remains unresolved by asocial mechanisms, and, in consequence, prices tend to be dispersed in more than just a temporary manner (see Pratt, Wise, and Zeckhauser, 1979). Markets for labor, venture

capital, international trade and investment, and many buyer-supplier relationships fall in this category. In these instances, because of information insufficiency, actors tend to be inhibited from entering mutually beneficial exchange relationships. Economic opportunities, like proverbial “dollar bills on the sidewalk,” lay waiting to be picked up.

### **Social Networks and Search and Deliberation**

Problematic search and deliberation likely form a prevalent set of circumstances under which actors tend to look to their social networks, and social networks, in turn, tend to assume significance in shaping and explaining allocative actions and outcomes. Well-elaborated social networks bridge “structural holes” (Burt, 1992) and they include many rather than few actors. Other things equal, well-elaborated networks can be ideally suited to identifying economic opportunities where the latter are dispersed spatially. Such networks can aid efficient and successful search because they are more likely to interconnect actors with non-redundant and pertinent information (Granovetter, 1973; Burt, 1992; Swedberg, 1994; Gulati, 1995b; Mizruchi, 1996; Uzzi, 1997). Only in the abstract can social networks help an actor reach all potential exchange partners, but in reality networks offer a cost-effective way of enhancing the probability of uncovering at least some of the relevant but latent economic opportunities out there.

Gould’s (1994) study of immigrants’ trade effects provides an illustration. Gould (pp. 302-303) states that immigrants bring many things with them, “perhaps key among these being...ties or links...[back] to their home country...” These social ties, he notes, “can lower...[the] costs associated with obtaining foreign market information and establishing trade relationships.” Gould hypothesizes that immigrants’ social ties ought to lead to a “direct increase in [trade] between the host and home countries,” and he finds support for this view in his empirical analysis.

Search conducted via social networks tends to be cheap, expeditious, and, frequently, effective. Search conducted via social networks tends to be cheap because “information can be acquired...by use of social relations that are maintained for other purposes” (Coleman, 1988: S104). Further, actors already have an idea as to whom to

contact, and the main obligation they might incur, and that too is normally contingent upon the outcome, is in terms of reciprocity (Powell, 1990). As for the actors being contacted, they are typically being requested to simply retrieve information they might already have in their possession or to “be on the lookout” for information that is likely to present itself to them in the normal course of events. This is why search conducted via social networks tends to be cheap and expeditious. Of course, the key advantage with well-elaborated networks is that actors are able to tap into distributions of information that don’t overlap much with one another and especially with the distribution of the focal actor’s own information. Ultimately, this tendency is what makes social networks an effective aid to search (Montgomery, 1992).

Now if search outside networks is costly, and if, hence, actors tend to search locally and within their networks, then actors with economic needs who are structurally embedded in well-elaborated networks are more likely to: (i) enjoy lower search costs; (ii) be actually matched with counterparts capable of satisfying those needs; and (iii) in particular, respond faster. These are advantages that are clearly posited in arguments about the strength of weak ties (Granovetter, 1973) and structural holes (Burt, 1992), and it is easy to see that they are especially pertinent to the problem of search.

Correspondingly, the information advantages posited in Granovetter’s (1985) notion of embeddedness are especially pertinent to the problem of deliberation. Recall that, to large extent, deliberation involves an attempt to resolve incomplete information about the future behavior of exchange partners. In this endeavor, it is natural that we look to exchange partners’ antecedents, because, rightly or wrongly, we believe past behavior can offer us valuable clues about future behavior. It follows then that relational embeddedness can aid deliberation because the confidence with which we can assess the reliability and trustworthiness of a potential exchange partner tends to be much higher when we ourselves or someone we know well has had “concrete personal relations” with the actor in question (see Gulati, 1995a; Portes and Sensenbrenner, 1995; Uzzi, 1997). To quote Granovetter (1985: 490):

Better than the statement that someone is known to be reliable is information from a trusted informant that he has dealt with that individual and found him so. Even better is information from one's own past dealings with that person.

Palay's (1985) study of the "informal, legally unenforceable" pricing, volume, and service arrangements that U.S. rail-freight carriers made with their industrial and auto manufacturing shippers provides a relevant example of how embeddedness can aid deliberation and clear the way for economic action. Prevented by regulators from entering into enforceable contracts that would protect costly-to-reverse low-price announcements and relatively customer-specific investments (in equipment, tunnel clearance heights, etc.), managers within rail-freight companies operated on the basis of informal, personal, often oral, agreements that they entered into with counterparts in the shipping organization. In one instance, it was economically attractive for a carrier to lower its price because it could "capture volume traveling by truck...and the additional volume would justify...the investment in specialized service and equipment." But the carrier was worried that if its competitor followed suit with a lower price, then the shipper might divide traffic between the two carriers "leaving it in a worse financial situation than it would have been in hauling the smaller volume at a higher rate." The carrier lowered the price only after the shipper's transportation officer "personally assured that the traffic was forthcoming." But why did the carrier take a costly-to-reverse economic action merely on the basis of a personal promise? Because, "After many years of dealing with [this officer, the carrier] felt confident in his promise" (Palay, 1985: 167).

Social networks, in this context as elsewhere, are collective repertoires of prior experiences--ours and those of others we know--that we may be able to draw upon to reduce doubt and clear the way for economic action. Perhaps most importantly, as Palay's (1985) study showed, when embeddedness enables deliberation actors move markedly from simply *assessing* reliability and trustworthiness of potential exchange partners toward *anticipating* reliability and trustworthiness from the latter. This is (to borrow a word from Hayek's essay on the price mechanism) the "marvel" of embeddedness that Granovetter has taken pains to emphasize. As Uzzi (1997)

explains, these “expectations are emergent features of a social structure that creates and reproduces them through time” (p. 45). In the context of embeddedness, these expectations “operate not like a calculated risk but like a heuristic—a predilection to assume the best when interpreting another’s motives and actions. This heuristic quality is important because it speeds up decision making and conserves cognitive resources” (p. 43).

Once search and deliberation problems are alleviated, those economic opportunities that were foreclosed in a price-only-no-networks situation now become accessible. Economic action that is consistent with economic rationality may now be enacted, and allocative efficiency in the economy can be advanced. When this chain of events has run its course, we can say that prices and networks operated as complements with the former furnishing the “economic opportunities” and the latter ensuring information sufficiency. Based on the preceding arguments, we can state:

**Proposition 1:** In spheres of economic activity where search and deliberation are important but problematic, social structures and relations will tend to assume significance in shaping and explaining allocative actions and outcomes. More specifically,

**Proposition 1a:** In spheres of economic activity where search and deliberation are important but problematic, actors embedded in more elaborated structural and relational networks will, other things equal, tend to *exhibit greater responses* to common economic opportunities; and

**Proposition 1b:** In spheres of economic activity where search and deliberation are important but problematic, actors embedded in more elaborated structural and relational networks will, other things equal, tend to *exhibit speedier responses* to common economic opportunities.

To illustrate the relevance of networks in the context of problematic search and deliberation, I undertook an empirical study of multinational and non-multinational enterprises’ international trade responses to real exchange rate changes. I use the word

“illustrate” intentionally because broad propositions such as the ones stated above are difficult to “test” in any strict sense of the word. My aim rather is more limited: it is to examine whether the patterns we observe in a subset of U.S. trade data are consistent with the arguments we formulated above. Rather than attempting to pin down a single statistic as conclusive evidence, I will, in the spirit of hypotheses falsification, subject these data to several low-order tests and discuss key alternative explanations.

## **METHOD**

### **Setting: International Trade in Manufactured Goods**

If the term “structural holes” has an analog in the international setting, it must be “national borders.” For most managers around the world, family and community ties, school and university ties, banking and boardroom ties, chamber of commerce and trade association ties, and ties to employers and co-workers, all tend to be largely local or national. As a result, more than distance, language, and culture separates managers and the firms they work in from counterparts residing outside their national borders. It should come as no surprise then that despite some commentators’ claims that we live in a “borderless” world, statistics stubbornly show that economic activity adheres disproportionately within the boundaries of local, regional, and national markets.

One well-known study (McCallum, 1995) examined the trade effects of the seemingly “innocuous” U.S.-Canada border on the grounds that “if borders didn’t matter” this one must provide the prototypical case. But, after controlling for market size and comparative advantage, this study found that in 1988, the year of the data, Canadians were 22 times more likely to trade with fellow Canadians than with persons *equally distant* but residing in the United States. Other studies (e.g., Wei, 1996) have reported smaller quantitative effects but they too support the consensus that there is a marked “home bias” in economic activity.

While work on a search for answers is underway, it would appear that any full accounting of the phenomena is likely to include the fact that international trade, like the labor market in the domestic setting, is afflicted by the problems of search and

deliberation that we outlined above. Studies both on international exchange and organizational buying confirm this latter contention (see Webster and Wind, 1972; Egan and Moody, 1992; Gulati, 1995a; Martin, Mitchell, and Swaminathan, 1995; Gordon and Bovenberg, 1996). A recent review article (Liang and Parkhe, 1997: 510-511) notes that, “Domestic vendor selection is more often a ‘choice’ situation... International vendor selection, on the other hand, often is a ‘search’ situation, where the information processing load has a higher probability of exceeding the bound of human rationality.” “Often the favored search approach is simply to call and rely upon a known contact for a recommendation [Liang and Stump, 1996]; objective information available in government sources is largely ignored [Min and Galle, 1991]” (p. 509).

Deliberation too is a problem of considerable proportions in international exchange. U.S. importers who participated in one interview-based study expressed that they “prefer long-term, stable, and direct relationships because [such relationships] ‘make good business sense’” (Egan and Moody, 1992: 325). “Finding and evaluating” new suppliers abroad is costly, buyer-supplier mutual learning (what we termed co-specialization) is “cumulative,” and any “mutual obligation and trust develops incrementally.” International buyers, this study noted, “are therefore reluctant to lose this advantage and start over with new partners” (p. 325). The fingerprints of costly-to-reverse allocative actions are clearly visible here. Further, consistent with our network arguments, “*When evaluating potential suppliers, virtually all buyers first seek information within their own network...of product-specific buyers and suppliers... The first source of information is the personal judgement of other buyers*” (italics mine). Finally, given that both search and deliberation are problematic in international exchange, by our earlier reasoning, we would anticipate that the price mechanism does not operate too well in economic activity that occurs across national borders. This contention too receives empirical support: price dispersion, lagged adjustment, and visibly modest price elasticities are persistent quandaries in international trade (see Krugman and Baldwin, 1987; Lawrence, 1990; Engel and Rogers, 1996).

What really remains to be seen is whether actors embedded in well-elaborated cross-border networks exhibit greater and speedier responses to international economic opportunities than other actors who face equivalent opportunities but are part of a less well-elaborated social network. This, in a nutshell, conveys why it is of interest to compare the trade responses of multinational and non-multinational enterprises to common real exchange rate changes.

Multinational enterprises, by virtue of the fact that they operate in two or more countries, have the potential of being simultaneously embedded in two or more distinct social networks (Kogut, 1983; Ghoshal and Bartlett, 1990). Most established multinationals (MNEs) have actualized this potential by developing concrete relations with local suppliers, customers, labor, and financial institutions. These external ties are supplemented to lesser or greater extents by internal ties within the MNE (usually at least between the headoffice and the various foreign affiliates). According to one empirical study of the “information sources” used by U.S. MNE managers, “When a headquarters executive in an [MNE] acquires external information, the most likely single source of this information is the corporation’s own staff abroad (Keegan, 1974: 414).” Internal ties among managers in an MNE emerge from both formal and informal interaction, rotation, and other socialization processes (Edstrom and Galbraith, 1977; Prahalad and Doz, 1987; Bartlett and Ghoshal, 1989). This no doubt costly investment has long been thought to place the MNE in an advantageous position vis-à-vis non-multinational enterprises (Vernon, 1979; Kogut, 1983; Dunning and Rugman, 1985; Lessard, 1986). John Stopford (1994: 67) has noted that “in terms of their ability to lower the transaction costs of the global market,” this advantage better allows multinationals to “work towards integrating country-specific factors as they transform their internal resources.”

The sequence of events that leads to the possession of this advantage can be sketched as follows. An MNE locates and operates facilities in another advanced country when demand for its products in that country (and the neighboring region) grows sizable and is served best through a local facility. Routine operation of the

foreign facility generates a set of business relationships and a continually replenished stock of information about actual prices, the existence, location, and precise needs and capabilities of buyers and, importantly, suppliers in that region. In his early study of U.S. multinationals' expansion abroad, Knickerbocker (1973: 26) put it thus:

When firm A starts to manufacture in country X, its subsidiary management, and perhaps its headquarters management, are exposed to factor inputs and technologies that may differ in terms of type, quality, or cost from those previously encountered in the United States or elsewhere. In responding to this new matrix of factors, firm A may find that it can use new raw materials, or it may devise new manufacturing processes, or it may even uncover new product possibilities. Moreover, information about the discoveries can be transferred to other parts of A's organization.

Of course, experiences are likely to vary quite a bit across firms and locations; it can hardly be otherwise. But, in general, over time, there will be a tendency for the MNE to become structurally and relationally embedded in the host environment. Its previously anonymous human and financial capital will be given via social forces a concrete local existence. The end result of this general accretive process will be new social capital.

Against this setting, imagine that in response to a change in exchange rates the MNE's home facility wants to explore the feasibility and economics of sourcing intermediate inputs from the foreign country. The MNE's home facility ought to be able to do so relatively easily because the search and deliberation necessary to exploit the new economic opportunity is likely to be behind it. The MNE's purely domestic counterparts, on the other hand, will tend to confront a more difficult situation because information and connections required to operate at home are invariably different from that required for buying and selling abroad. Moreover, local presence is frequently a necessary condition for exchanging information reliably and for settling transactions under advantageous terms (Keegan, 1974; Egan and Moody, 1992).

This is not to bluntly deny that non-multinationals working via arm's length relationships will have no trade responses. On the contrary, given the growing intensity of competition, the large size of exchange rate changes over the last years, and the fact that international trade existed long before anyone heard of multinational

enterprises, we fully anticipate non-multinationals to respond and there is a voluminous empirical research that tells us they do (Stern, Francis, and Schumacher, 1976). But, relative to their purely domestic counterparts, MNEs will tend to be embedded abroad in better-elaborated social networks. This characteristic of better structural and relational embeddedness ought to provide MNEs with information advantages (*vis-à-vis* the problems of search and deliberation), and, in turn, on the back of these information advantage MNEs ought to exhibit speedier and more vigorous import responses. The reasons for greater speed are obvious, and the reasons for greater vigor can be stated as follows: As argued earlier, deliberation problems tend to weaken firms' willingness to substitute on the basis of price. Relative to non-multinational enterprises, MNEs, for reasons just laid out, face smaller deliberation problems. Other things equal then, MNEs ought to exhibit higher exchange rate elasticities. Further, the costs of search and deliberation can be considered as additive to the purchase price (Stigler, 1961). Firms that face higher net prices will tend to trade smaller volumes than those that face lower net prices. By this logic too, MNEs ought to exhibit higher exchange rate elasticities.

In summary, for the purposes of exploring the propositions advanced above, international trade in manufactured goods provides a quite suitable setting. In this setting: (i) new economic opportunities appear regularly in the form of sizable changes in real exchange rates; (ii) search and deliberation are known to be important and problematic; (iii) two sets of actors--multinationals and non-multinationals--operate within the context of different social structures; and (iv) by comparing the trade responses of these two sets of actors we can obtain some insight into how networks and prices interact to influence economic actions and outcomes. In particular, based upon the complementarity highlighted between networks and prices, we anticipate both larger elasticities and shorter lags in MNEs' responses to real exchange rates.

To be sure, the idea of integrating multinational, organizational, and network theory is not novel (see Evans, 1981; Hedlund, 1986; Ghoshal and Westney, 1993; Kogut, Shan, and Walker, 1993; Nohria and Ghoshal, 1997; Doz and colleagues,

1997). Indeed, Ghoshal and Bartlett (1990: 604) have remarked that “an entity such as [an MNE] can be more appropriately conceptualized as an interorganizational grouping rather than as a unitary ‘organization’...[and] that the concept of a network...can provide a useful lens through which to examine such an entity.” However, to my knowledge, no previous study has actually attempted to follow-through empirically on this conception.

### **Operationalization of the Study**

The spirit of the analysis to be conducted is as follows. Using the United States as the focal country, let us pick an industry, partner country, and a time period. Having done that, let us examine in the industry and period chosen the speed and elasticity with which U.S. imports from that partner country respond to changes in the U.S. dollar’s real exchange rate (vis-à-vis the currency of that partner country). Let us now compare the results so obtained to estimates of the same coefficients in the same industry, partner country, and time period, but for U.S. imports from U.S. multinationals that have operations in that partner country. Controlling for industry, country, and time period in this manner, we should, according to our propositions, observe that U.S. imports from MNEs exhibit statistically larger elasticities (i.e., greater responses) and shorter lags (i.e., speedier responses) in adapting to the common real exchange rate changes. Of course, any observed differences will be consistent with our network advantage propositions only if we can rule out MNE advantages that arise from other important sources such as their size and sophistication. We will, therefore, attempt to control for these potentially confounding factors.

Let me state here that I am conducting my analysis under the assumption that MNEs are embedded in better elaborated networks in the partner country. In the preceding paragraphs I have laid out my justification for making that assumption. Were I comparing responsiveness across and among a set of MNEs, explicit network measures would be indispensable. But my focus is not on cross-MNE comparisons. Further, even if explicit network measures would make the study more ideal, I am

unaware of any secondary sources that could provide the necessary network information, especially over the eighteen-year time window that we will be exploring.

### **Data Sources and Coverage**

Data used in the analysis come from three sources: the U.S. Department of Commerce, the OECD, and the IMF. Industry by country by year U.S. import data were obtained from the U.S. Department of Commerce. Nominal exchange rates are from the IMF's *International Financial Statistics*. GDP data and industry-and-country-specific producer prices (that are used to calculate industry-by-country-specific real exchange rates) are from the OECD's *Indicators of Industrial Activity*. Data on R&D expenditure are from the OECD (1997) publication entitled *Research and Development in Industry*. Estimates of U.S. importers' employment size (used as an indicator of U.S. importers' firm size) are based upon employment figures reported in the OECD (1997) publication entitled *Globalisation and Small and Medium Enterprises: Volume 2*. All data pertaining to U.S. multinationals are from the U.S. Bureau of Economic Analysis' (BEA) annual surveys of the operations of U.S. multinationals and their foreign affiliates. Since these latter data are available only on an annual basis, the analysis below is conducted only on annual data (using averages in the case of exchange rates and year-end data for all other variables).

Coverage is guided primarily by the availability of data (particularly on the operations of U.S. multinationals). Accordingly, the analysis below pertains to U.S. imports between 1977 and 1994 of manufactured goods in four industries--food and related products, chemicals and allied products, non-electrical machinery, and electric and electronic products, and from nine countries--Australia, Canada, France, Germany, Italy, Japan, Netherlands, Switzerland, United Kingdom. U.S. imports in the four industries from the nine countries accounted in 1994 for \$123 billion or a little over a fifth of all U.S. manufacturing imports in that same year. Depending on the specification estimated, the number of observations range from around 300 to one thousand. The lower limit is driven by the U.S. MNE data which frequently are

missing. In particular, between 1979-1981 the BEA did not conduct surveys of U.S. MNEs' foreign operations; therefore, MNE data for those three years are unavailable.

Nevertheless, by focusing on U.S.-headquartered MNEs we gain an important advantage deriving from the fact that by 1977, the first year covered in our study, these entities had already established operations in Europe, Canada, Australia, and Japan. In fact, according to the data, between 1977 and 1994, the number of U.S. MNE parents in manufacturing actually declined slightly from 1,842 to 1,543 (perhaps not inconsistent with the consolidation that has taken place domestically); and the number of foreign affiliates of these parents in the nine countries of interest declined slightly as well (mainly in Canada) going from 11,771 to 11,189 (*USDIA 1977*: Tables, B and C; *USDIA 1994*: Tables II.A.1 and II.A.2). This relative stability in MNE affiliates abroad ought to mitigate concerns about both shifts in the composition of the sample and any potential simultaneity bias. Moreover, in the industries and countries we are studying, less than 10 (typically less than 5) percent of the output of U.S. firms' foreign affiliates is destined for shipment back to United States. The point being, these affiliates were not set up as low-cost export platforms to serve the U.S. market, rather their priority from the start has been to serve local and regional markets abroad. This assures us that our sample data are not biased in favor of the hypotheses we will be exploring.

It must be noted, however, that although the MNE trade figures used in this study are the only set reported on a country-by-industry basis, these data are primarily intrafirm trade data. Of the U.S. imports originated by U.S. MNEs' foreign affiliates nearly 80 percent are shipped to the U.S. parent. However, contrary to appearances, this is not a cause for remorse. Existing views on intrafirm trade fall in two camps: one that believes that intrafirm trade is or ought to be no different from arm's length trade (see Bergsten, Horst, and Moran, 1978; Caves, 1996), and one that believes that such trade is or ought to be actually *less* responsive than arm's length trade (see Helleiner, 1978; Cho, 1990). Exponents of the latter view argue that since intrafirm trade occurs within the MNE "hierarchy" it is likely to be less responsive to prices than trade that

occurs in arm's length markets. These views make more conservative our experiment because neither camp argues that MNE trade ought to be more responsive to price changes. Yet, since MNE intrafirm trade is likely to embody both internal and external ties and benefit from the hypothesized information advantages, we will be looking for exactly this latter result.

Oliver Williamson (1991) has touched upon these adaptation issues but his arguments appear difficult to interpret. A narrow (reflexive) interpretation would put him in the second camp--arguing that arm's length "markets" respond better to price changes than "hierarchies." But a broader interpretation would construe his prediction that hierarchies will tend to do better on "less contested coordinated realignments" (p. 279) as not inconsistent with the propositions advanced in this paper. Except, Williamson would appear to emphasize "fiat" or authority, not network ties and more reliable information, as the cause of any anticipated superior adaptation. I will address the intrafirm-internalization issue in my main analysis. I will also discuss results from tests on data not drawn around multinational enterprises, and highlight findings from studies by other researchers.

### **Dependent Variable**

In working with international trade we have, in principle, a choice to focus on imports or exports. Although the latter is often the focus of empirical and policy oriented research, in our case, it is not as suitable as imports. The reason for this is straightforward: multinational enterprises are, in a sense, congenitally identified with exports and success in export markets (Vernon, 1966; Dunning, 1974; Caves, 1996). Hence, by sticking to imports we avoid biasing the results in favor of MNEs. For instance, in the case of imports, there is no destination-market advantage to be had by MNEs. Purely domestic firms ought to be equally "at home" in the United States.

Import behavior also provides an excellent example of *economic action* in that it deals with allocation of scarce resources. Adam Smith (1776) noted, "It is the maxim of every prudent master of a family never to attempt to make at home what it will cost

him more to make than to buy... If a foreign country can supply us with a commodity cheaper than we ourselves can make it, better buy it of them.” Gauging by the size and growth of U.S. imports, which between 1970 and 1996 went from 5 to 12 percent of U.S. GDP (*IFS*: 1997), it would appear that U.S. firms are in increasing compliance with Smith’s dictum. This leads to a related point, which is, given that United States is thought to be a more open economy than most, U.S. imports are likely to be a better register (than exports) of responses to new international economic opportunities. In other words, by selecting imports, variation in the dependent variable is likely to be enhanced.

Accordingly, the dependent variable used in the analysis is the log of U.S. imports from a particular country in a given industry and year. Ideally, we would want to state imports in volume terms, however, since country and industry-specific import prices are not available, we use nominal import value figures. The main effect of using nominal trade values is that the estimated price elasticities will tend to be smaller (see Junz and Rhomberg, 1972; Lawrence, 1990). Since we will use nominal figures for both MNEs and overall U.S. imports, this should not throw off our comparative analysis in any way. Of course, transfer prices emerge as a potential issue and I will discuss it below.

### **Independent Variables**

The first independent variable of interest is the real exchange rate (which is stated in terms of foreign currency units per U.S. dollar). We want to examine both the magnitude of the elasticity and the pattern of lags exhibited by U.S. MNEs and average U.S. importers in responding to the level of this independent variable. While most studies tend to use exchange rates that are simply averaged across countries, we measure this variable in country, industry, and year specific terms. For instance, in the case of U.S. imports of chemicals from Germany, we construct the real exchange rate by adjusting the mark-dollar nominal rate to reflect producer prices in the U.S. and

German chemical industries. In this manner, we construct an index of real exchange rates for the years 1977 through 1994 and use it in log terms in the analysis.

Another independent variable of interest is the interaction term between the real exchange rate and an MNE dummy variable. In regressions that pool MNE and average-U.S. importer responses, we would anticipate the coefficient on this interaction term (MNE\*exchange rate) to be positive and statistically significant. That is, after controlling for industry, year, partner country, and other variables stated below, MNEs, by virtue of their embedded ties abroad, ought to exhibit greater responsiveness to the level of the exchange rate than the average (non-multinational) U.S. importer.

### **Control Variables**

There are several control variables that warrant inclusion in our analysis. First, we want to recognize that the decisions of U.S. firms to source inputs from abroad are influenced not only by exchange rates, but also by changes in the levels of their business activity. We, therefore, include as a control variable price-adjusted U.S. industry-specific GDP (gross domestic product). This is an important variable in its own right, but here it gives us added insight, because, when their activity levels change, organizations (we assume) are simply adjusting quantities purchased up or down, they are not switching suppliers and they do not have to search or deliberate. According to our theory, in the absence of search and deliberation, adjustment should be prompt and vigorous. We would anticipate, therefore, that any lags on this variable would be shorter than those observed on exchange rates. And, without ruling out other causes for this, we would also anticipate that the coefficient on this variable to be positive and larger than the coefficient on exchange rates.

Importantly, to the extent that MNEs' greater experience, size, and sophistication enable them to trade better, we should pick this up in an MNE\*GDP interaction term. According to our theory, a positive coefficient on this interaction term would suggest the presence of advantages not related to superior networks and information. By implication, the MNE\*GDP coefficient might serve as a sort of control

against which we can compare the MNE\*exchange rate coefficient (anticipating the latter to be larger and statistically different from the former).

Separately, a firm size\*exchange rate interaction term warrants inclusion because larger firms (read MNEs) can more readily justify the costs of having on their staff exchange rate specialists and persons proficient in foreign languages. Also, to the extent search and switching costs are fixed they will be more easily borne by large rather than small firms. Finally, larger firms may possess greater experience and, hence, expertise in executing the logistics required for successful international trade. On the other hand, it is well-known that size can be a mixed blessing: large firms are more susceptible to “internal opportunism” and inter-divisional “logrolling” both of which can impede flexibility and responsiveness (Williamson, 1975). Large firms are also more likely to be unionized and this may influence their ability and willingness to substitute home content with imports. Lastly, large size might confer scale economies that make short-run adjustments suboptimal. In any event, firm size is measured here by the average number of employees per U.S. firm in a given industry and year. Employment figures are not available for U.S. importers; estimates based on figures for U.S. exporters are used instead. For MNEs, the figures used are average MNE employment by industry. These data are also entered in log terms in the firm size\*exchange rate interaction term. (Firm size is not entered by itself as an independent variable since it introduces perfect collinearity with the industry dummies in any given year and industry.)

R&D/Sales ratios are also included as a control since research intensity is believed to influence international trade—at least exports (see Dunning, 1993; Kobrin, 1991). Since U.S. imports from country X are country X’s exports to the U.S., we control for foreign (i.e., country X’s) industry-specific R&D/Sales ratios. Since research efforts typically take time to get reflected in new products and increased sales, this variable is entered on a two-year lagged basis. (Alternative lag structures, including zero lags, do not change the results.) Deviating from the ideal, these partner country R&D/Sales ratios are used as well in equations explaining U.S. MNE-related

imports because comparable industry-by-country data are not available for U.S. MNE's foreign operations.

A time trend is also entered in the regressions to account for advances in technology, the rise in capabilities abroad and the attendant rise in competition, and greater liberalization in the world economy. Lastly, to control for unobserved influences, dummy variables for eight out of the nine countries and three out of the four industries are included. In the regressions, then, the constant term stands for the omitted country and industry, which, in our case, will be the United Kingdom and machinery.

### Model Estimation and Results

Equations explaining U.S. imports are estimated as variations of the following specification:

$$\text{U. S. Imports}_{ijt} = \alpha_{ij} + \beta * \text{U. S. GDP}_{it} + \gamma * \text{Exch. Rate}_{ijt} + \delta * \text{Importer Firm Size}_{it} * \text{Exch. Rate}_{ijt} \\ + \varepsilon * \text{Time}_t + \zeta * \text{Lagged Foreign R \& D/Sales}_{ijt} + \eta * \text{MNE}_{ijt} * \text{Exch. Rate}_{ijt} + \theta_{ijt}.$$

The subscripts  $i$ ,  $j$ , and  $t$ , stand, respectively, for industry, country, and year. With the exception of the time trend and the R&D/Sales ratios all variables are entered in natural logs. The coefficients on these latter variables, therefore, represent the elasticity of U.S. imports to a one percent increase in the respective independent variables. Pooling observations across industries and countries violates normal OLS assumptions. To correct bias in parameter estimates, a *least squares dummy variable* approach is adopted. Such fixed-effects models constrain the coefficients on the independent variable to be the same across observations, but they allow unobserved cross-sectional heterogeneity to be captured in the different intercepts. This approach is well suited to panel datasets that, like ours, are “short and wide” (Greene, 1990: 482-485).

Tables 1a and 1b report descriptive statistics and correlations for the variables used, and Table 2 presents the first set of results. The results in Table 2 appear clearly

consistent with proposition 1a which suggests that under circumstances of problematic search and deliberation, MNEs would exhibit greater responsiveness to common real exchange rate changes. Consider the estimates under columns 1 and 2 in Table 2. These models include the GDP, exchange rate, firm size, and the country and industry dummy variables. The first equation explains U.S. overall--meaning MNE *and* non-MNE related--imports from the nine countries in the four industries over the 1977-1994 period. The second equation explains U.S. imports originating from U.S. MNEs' foreign affiliates. In both equations, the coefficients on U.S. GDP are, as anticipated, positive, relatively large, and statistically significant. On the other hand, the coefficient on the (contemporaneous) real exchange rate is positive but not statistically significant for U.S. overall imports; for MNE imports though, this coefficient is positive, significant, and larger than the coefficient on the GDP variable. When a time trend is added to the models (see columns 3 and 4), the pattern of the exchange rate coefficients remains unchanged. However, not surprisingly, the time trend cancels out much of the effect associated with the rise in GDP. Adding the R&D/Sales ratios (in columns 5 and 6) does not change the results much either: for MNE imports (but not for U.S. overall imports) the coefficient on the real exchange rate remains relatively large and statistically significant. As indicated by the adjusted *R*-squares--that range from 0.58 to 0.78--the models explain a significant amount of the variation in the dependent variable.

Turn now to Table 3 which explores the question of relative speed of adjustment. Not only do the results presented in this table reinforce those shown in Table 2, they are also clearly consistent with proposition 1b according to which MNEs ought to exhibit speedier responses. Consider the results separately. Columns 1 and 2 in Table 3 both contain the contemporaneous and one-year lagged exchange rates. The one-year lagged exchange rate coefficient for U.S. overall imports now assumes statistical significance. This is also the case for MNE imports, although, contemporaneous exchange rates continue to be large and significant for MNE imports. When two-year lagged exchange rates are added (in columns 3 and 4 of Table 3), their coefficients assume significance for both U.S. overall and MNE imports. However,

the sum of the exchange rate coefficients shows a marked difference between U.S. overall and MNE imports: for the former they sum up to 0.97, while for the latter, they sum up to 4.31. (Column 5 in Table 3 shows that adding the lagged R&D/Sales variable does not affect these results. Likewise, when a lagged GDP term was added to the models in columns 3 and 4 in Table 3, it did not take on a statistically significant coefficient.)

In Table 4, we pool the overall and MNE-only observations and estimate regressions with MNE dummy variable interaction terms on the exchange rate and the GDP. In this table, we also explore the robustness of our results by running regressions on selected sub-samples of the available data. First let us note that the MNE\*Real exchange rate interaction term is positive throughout and statistically significant in all but one of the models shown in Table 4. That is, MNEs with operations in the partner country exhibit a greater responsiveness to the level of the exchange rate than the average U.S. importer does. Also, in this pooled sample (see column 1, for instance), the coefficient on the contemporaneous exchange rate assumes statistical significance. The coefficients on the GDP are also significant and relatively much larger (in the absence of the time trend), and the adjusted *R*-square for the model in column 1 is (at 0.73) quite high.

Consider next the results in column 2 of Table 4. This regression excludes Canada and it was run to explore, albeit crudely, the “fiat” argument. The reasoning was as follows: Relations between Canadian affiliates and U.S. MNE parents are more likely to be influenced by “fiat” than relations with Australian, European, Japanese affiliates. Therefore, if without Canada the MNE\*exchange rate interaction term does not remain positive and significant, then the information advantage story might appear to be weakened considerably. In fact, the magnitude of the coefficient does drop but it remains positive and significant. “Fiat,” it would appear is not what drives our results and other regressions we will review momentarily also suggest this.

Turn now to column 3 of Table 4. In many of the industry-country-years, especially for MNEs, import values are small. To see whether these were driving the

results, I ran a regression with only those observations where import values were greater than \$100 million. As we can see in column 3, the MNE\*exchange rate coefficient loses significance and drops in magnitude although it remains positive. The adjusted *R*-square for the model drops considerably as does the *F*-stat. Upon inspection, I discovered two patterns in the raw MNE data. First, out of the nine countries in the study, three--Australia, Italy, and Switzerland--had fragmentary and very small trade figures. Second, in the early 1980s when the dollar was appreciating sharply, in certain industries MNE imports from countries like France and Germany had risen to above \$100 million from about \$70-80 million. Excluding the latter observations did not make sense and selecting another arbitrary cutoff (especially one based on the data) did not make sense either. Instead, I decided to run a regression excluding Australia, Italy, and Switzerland, and those results are presented in column 4 of Table 4. As we can see, the MNE\*Exchange rate coefficient regains statistical significance and rises in magnitude. This is also accompanied by significant improvements in the adjusted *R*-square and the *F*-stat.

Next, in order to explore MNE size and sophistication as sources of superior MNE adjustment, I included an MNE\*GDP interaction variable to the model just reviewed. As column 5 of Table 4 shows, the MNE\*GDP interaction term is positive and statistically significant. This finding is consistent with the view that MNEs enjoy adjustment advantages that might derive from greater international experience, superior communication and logistics capabilities, and possibly "fiat." Yet, the coefficient on MNE\*exchange rate interaction term is much larger than that on MNE\*GDP (2.24 compared to 0.51). Further, the appropriate *t*- and *F*-tests based upon restricted and unrestricted regressions (not shown) indicate that the coefficients are statistically different from one another. Running the model shown in column 5 with all available observations (see results in column 6 of Table 4) weakens the difference between the two coefficients but does not alter the basic finding. (The same holds true for specifications that exclude the firm size\*exchange rate interaction term).

Lastly, based on industry-by-industry regressions, Table 5 reports the MNE\*exchange rate interaction term for each of the four industries covered in the study. In all four cases the MNE\*Real exchange rate interaction term is positive and in three of them it is also statistically significant. Table 5 also shows in the second row estimates made by Robert Hall (1988) of price-cost markup ratios in U.S. manufacturing. Notice that the rank order of the coefficients and the markups in the four industries is the same. Although this is speculation, we might explain the pattern as follows: more competitive industries experience lower price-cost markups; selection pressures in these industries tend to be high and all firms, be they multinational or not, are more likely, therefore, to respond to changes in relative prices; as a result, relative network benefits in such industries tend to be lower. This suggests, paradoxically (but consistent with our jet-fuel story and findings reported in Rauch, 1997), *that relative network benefits are highest where selection pressures are lowest and vice versa.*

The unreported results of two more regressions merit mention. First, in order to check whether the search and deliberation story holds even in the absence of MNE-related data, I ran regressions using only overall U.S. import data. Reasoning that search and deliberation ought to be relatively easier for U.S. importers when they have to switch away from foreign suppliers back to U.S. suppliers, I examined whether the exchange rate coefficient was statistically larger on dollar depreciations than dollar appreciations. Not only was the contemporaneous exchange rate coefficient larger during depreciations (1.31 compared to -0.53 during appreciations), it was also statistically significant at the 5 percent level. (The other coefficients took predictable values.) The second set of results pertains to effects over time. Notwithstanding search and deliberation problems, since technology has advanced and “selection pressures” are likely to have ratcheted up over the last twenty years, it would appear that the relative price (i.e., exchange rate) responsiveness of all firms ought to have trended up. This was indeed confirmed by a positive and highly significant coefficient on a Time\*Real exchange rate interaction term. Further, when a similar interaction term

for MNEs was added to the same model, it too took a coefficient that was positive and significant but of smaller magnitude.

### **Discussion: Alternative Explanations and Limitations**

We set out to illustrate the relevance of networks in the context of problematic search and deliberation. International trade gave us a suitable setting in which to pursue this objective. In this setting firms are spatially dispersed (making search problematic), they view exchange relations as costly to reverse (making deliberation important), and they indicate a wide reliance on social networks to help identify and exploit cross-border economic opportunities. It was natural to anticipate that networks would complement prices in this setting and, albeit only as a first step, the MNE, non-MNE comparison allowed us to explore this proposition. Consistent with our theoretical arguments, we found that: (i) the price mechanism operated sluggishly--in particular, relative to the coefficients on the GDP term, exchange rate coefficients were smaller and exhibited long lags; (ii) actors with better-elaborated networks--in our setting, MNEs--exhibited greater responsiveness to common economic opportunities; and (iii) actors with better-elaborated networks--again, in our setting, MNEs--exhibited speedier responses to common economic opportunities. Though emerging from a quite different setting, these central findings of our empirical study are consistent with Uzzi's (1997: 61) claim that "embeddedness is a unique logic of exchange that results from the distinct social structure of organization networks and the microbehavioral decision-making processes they promote."

Yet, even after having viewed these results it is difficult not to wonder about the influence of MNE "internalization" advantages (Rugman, 1980; Hennart, 1982) relative to the search and deliberation advantages of MNE networks that has been the focus of this paper. The main point to keep in mind, it would seem, is that internalization is primarily a theory about the *size* of the firm (Coase, 1937; Williamson, 1975) not about the properties of concrete external and internal relations of actors within a firm. The latter is the focus of an embeddedness theory of networks and its implications are more

pertinent in explaining relative adjustment to new economic opportunities. As

Granovetter (1985: 502) writes:

insofar as internalization within firms does result in a better handling of complex and idiosyncratic transactions, it is by no means apparent that hierarchical organization is the best explanation. It may be, instead, that the effect of internalization is to provide a focus (see Feld 1981) for an even denser web of social relations than had occurred between previously independent market entities. Perhaps this web of interaction is mainly what explains the level of efficiency, be it high or low, of the new organizational form.

In the context of multinationals, Ghoshal and Bartlett (1990: 606) argue that "The efficacy of fiat is particularly limited...not only because some of the subsidiaries happen to be very distant and resource-rich but, more so, because they control critical linkages with key actors in their local environments...[including] the host government....local customers, suppliers, and investors..."

Not inconsistent with the view that MNEs might enjoy internalization and size advantages, we found that the MNE\*GDP coefficient took positive and significant values, however, we also found that the MNE\*exchange rate interaction coefficient took much larger values and the latter would suggest that problematic search and deliberation and network advantages are key explanators here. We also found that the average firm size\*exchange rate variable took either a statistically insignificant or a significant but negative coefficient. This finding might be explained by the role of scale economies, but it is not inconsistent with the view expressed in a recent OECD study on globalization (1997, Vol. 1: 54): "Size does hold some importance, especially in successfully taking the first steps to internationalisation, but once there, it does not seem to matter much...[S]maller size can often be an advantage."

Of course, the internalized trade issue does raise the question of transfer prices. Intrafirm MNE transactions are typically made at internal transfer prices and internal exchange rates that tend to be rigid (Lessard, 1986). But if transfer prices tend to remain stable in originating country currency terms and if company internal exchange rates lag actual exchange rates (say because of the presence of currency hedge contracts), then, *ceteris paribus*, MNE import values will register smaller not bigger

changes. (We can see in Table 1b that the correlation coefficient between MNE imports and exchange rates is virtually zero.) MNE transfer pricing practices would, therefore, actually strengthen rather than weaken our findings and explanation.

Moreover, there is a growing body of empirical work (based on data unrelated to the MNE trade figures we have used) whose findings are consistent with our emphasis on the importance and advantages of social networks in international trade (see Williamson, 1986; Scherer, 1992; Gould, 1994; Rauch, 1997). Rauch (1997) reports that regardless of product category--commodities traded on organized exchanges, reference priced goods such as bulk chemicals, and differentiated manufactures--distance is equally negatively and significantly related to cross-border trade. That finding is consistent with our contention that search is primarily a function of dispersion rather than product heterogeneity. More pertinently, Rauch also finds that although network links (proxied by the existence of colonial ties and a common language between two countries) take positive and statistically significant values for all of his three product categories, their trade promoting effects are much greater for differentiated products than for commodities traded on organized exchanges. This would be consistent with our earlier arguments if it were true, as would seem plausible, that trade in differentiated products represents allocative action that is more costly-to-reverse than trade in commodities.

Nevertheless, our research does have shortcomings and much work remains to be done. For instance, even though the theory in the paper talks about micro-foundations, the data in the paper are at the industry and country level. A related potential criticism of this work is that it is "oversocialized" in the sense that "atomization has not been eliminated, merely transferred to the...higher level of analysis" (Granovetter, 1985: 487). That is, by treating multinationals as distinct from non-multinationals we are ignoring the actual content of the cross-border ties. In reality, the actual extent and mechanisms by which multinationals embed themselves in different markets is likely to vary both across firms and across host countries. This is a legitimate criticism and, in fact, it highlights an avenue for fruitful future research. This

future research at the level of firms and their networks ought to allow a more fine-grained exploration of the propositions outlined in the paper. Except, this firm-level analysis is unlikely to allow empirical testing on the large scale and over as many years as we have carried out here. Hence, these approaches ought to be viewed as complements rather than as substitutes.

One other point remains to be made. We have argued and illustrated that in spheres of economic activity where search and deliberation are problematic, there is a significant potential for social networks to complement prices and advance allocative efficiency. But we must emphasize that this potential is actually realized only when social networks alleviate the problems of search and deliberation. Of course, social networks do not always help in this manner. In particular, when the network's composition is such that it cannot adequately resolve the search and deliberation needs at hand, then actors, rather than abandon their networks and act upon the basis incomplete information, are more likely to abandon the economic opportunities. This simple logic is likely to play a role in explaining the "home bias" in economic activity. In these instances, the "socially constructed" rationality diverges from the standard economic rationality, and here we can say that networks superseded prices. It was precisely an instance like this that Romo and Schwartz (1995) fleshed out in their study of business migration decisions out of New York State.

## CONCLUSION

Organizations take economic actions--i.e., allocate scarce resources--everyday. When will networks most tend to influence these economic actions and how will they affect the economic quality (i.e., rationality) of those actions? This is simply a reformulation of the questions we asked at the start of the paper: When in the context of economic action do networks really matter? and How do networks and prices--the *de facto* guide to rational action--interact? As Bradach and Eccles (1989) have observed, for a variety of reasons, much organizational research characterizes economic decision-making as being driven by polar forces of networks and prices, or markets and hierarchies, or

trust and authority. Although unidimensional influences will in certain circumstances have a determining impact on organizations' economic actions, often, as Bradach and Eccles note, the influences coexist.

That said, however, it is important to sketch the boundary conditions where one or another dimension tends to assume greater significance. It is also important to state how, when influences coexist, they interact. In the case of networks and prices, such argumentation has not been adequately developed. Partly as a result, most economists continue to emphasize prices to the neglect of network-based explanations of economic action, and, for their part, most network theorists appear more skeptical of prices than they might be in the presence of such theorizing. The penalties we experience might include an incorrect understanding of how our organizations and economies operate, an inability to resolve empirical puzzles we might view as important, and some wrong turns in advancing our research.

Addressing the gap just described is a formidable enterprise and this paper should be construed only as a small part of this larger effort. In this paper, we have explored the role of prices and networks in influencing economic actions and outcomes. Integrating perspectives from economics, organization theory, and sociology, we have tried to refine our understanding of the circumstances under which prices might have a determining influence on economic action (i.e., when networks "can be set aside"), specified when and why the influence of price might weaken, how firms' social networks enter the picture and assume significance in explaining their economic actions, and how the two forces--prices and networks--interact. We have advanced a logic that focuses squarely on the role of information--reliable information. The criticality of the latter for organizational decision-making and economic action is self-evident.

Our logic is built upon two simple ideas: (i) When the identification and assessment of potential exchange partners is problematic, a situation of information insufficiency obtains and the price mechanism is weakened. In this state, we argued, actors are impeded from taking economic action that would be "rational" in the sense of producing more of or conserving on the use of a scarce resource. (ii) Social networks,

through their informational properties, can, and frequently do, help actors alleviate problems of search and deliberation. Beyond influencing actors' preferences (both noneconomic and economic), social networks enable actors to tap cost-effectively *and*, to lesser or greater extents, reliably into clumps of knowledge dispersed across society and strung over previous moments in time. In this manner, by reaching back or reaching out, firms are frequently able to assemble the necessary information to clear the way for economic action that is intimated but not unequivocally signalled by the price mechanism.

When these two simple ideas are juxtaposed, we can see how networks and prices might operate as complements. This is a sharp contrast to the common impression of networks and prices as substitutes. As to when ever-present social networks get activated in the manner just described, we have postulated that when economic opportunities are dispersed spatially or when allocative actions or their effects are perceived as costly to reverse, then social networks will assume significance in influencing the economic quality of allocative actions. These propositions help delineate in an empirically testable manner when prices alone will tend not have a determining influence on firms' economic actions (and, by implication, when the reverse will tend to be the case).

In these ways, the paper has sought to synthesize our understanding on when, in the context of *economic action*, networks really matter and how in this context they interact with prices. Besides trying to synthesize our understanding of existing network and price theories of economic action, we also took the study of networks into a relatively untoiled but demonstrably fertile empirical setting, namely, international exchange. And here, we demonstrated the plausibility of our theoretical propositions in the context of international trade. At a minimum, our research suggests that embeddedness analysis can, as Granovetter's (1985: 507) has urged, be used "in explicating proximate causes of patterns of macro-level interest..." Our research also suggests that network theories of organizational behavior can improve our understanding of international exchange and help explain why the latter might exhibit

lagged adjustment and a “home bias”--both enduring puzzles to international economists. To put it more strongly, the micro-foundations of how international markets work would appear to rest to a large extent upon constructs developed in sociology-based organization theory (as opposed to in economics), and, consequently, a scholarly alliance between these disciplines may not be just fruitful but perhaps vitally necessary.

Likewise, for sociology-based organization theory, this work suggests that the territory of complementarity between prices and networks merits much further development. This work also suggests that it will be useful to develop meaningful measures of spatial dispersion and costliness-to-reverse. As independent variables, these factors are likely to increase the power of network explanations of firms' economic actions. For MNE research, this work would suggest that we ought to deepen our understanding of how MNEs develop and manage external and internal network ties. The role of local recruitment (of employees, suppliers, and lead customers) and rotation (across geographies) merits greater attention.

In the new environment of growing economic integration, firms want to bring together resources from different parts of the world to deliver high-quality low-cost products and services. Orchestrating this global production sharing is a formidable challenge and our paper has touched upon some key issues that are likely to be directly relevant to the comparative success of firms pursuing global strategies. In this connection, we might venture that technological advances such as the Internet and the formation of new organized markets (such as EASDAQ) are more likely to provide benefits in terms of search-type information. But embeddedness and social ties will, however, continue for the foreseeable future to be the most reliable source of high-quality deliberation-type information. The noticeable and growing tendency of companies to appoint foreign nationals to their boards is consistent with this view, as is the decline of trading companies and the ascendancy of multinationals.

In closing, I want to note that Hayek (1945) wrote a normative essay on the price mechanism, whereas Granovetter (1985) wrote a descriptive essay on social

networks. Granovetter does not argue that social networks improve or worsen allocative actions and outcomes--to him networks could do both. What I hope to have done in this essay is to clarify a bit the sources of this ambivalence, and sharpen a bit our understanding of how networks and prices--dual "marvels"--interact with one another and influence economic actions and outcomes in society.

## References

- Arrow, Kenneth J., 1974. *The limits of organization*. New York and London: W. W. Norton & Co.
- Baker, Wayne E., 1984. "The social structure of a national securities market." *American Journal of Sociology*, January, 89 (4): 775-811.
- Bartlett, Christopher A. and Sumantra Ghoshal, 1989. *Managing across borders: The transnational solution*. Boston, Massachusetts: Harvard Business School Press.
- Bergsten, C. Fred, Thomas Horst, and Theodore H. Moran, 1978. Washington, D.C.: The Brookings Institution.
- Bradach, Jeffrey L. and Robert G. Eccles, 1989. "Price, authority, and trust: From ideal types to plural forms." *Annual Review of Sociology*, 15: 97-118.
- Burt, Ronald S., 1992. *Structural Holes: The social structure of competition*. Cambridge, Massachusetts: Harvard University Press.
- Burt, Ronald S., 1997. "The contingent value of social capital." *Administrative Science Quarterly*, June, 42: 339-365.
- Carlton, Dennis W., 1989. "The theory and the facts of how markets clear: Is industrial organization valuable for understanding macroeconomics?" In: Schmalensee, Richard, and Robert D. Willig (eds.). *Handbook of industrial organization: Volume 1*. North Holland: Elsevier Science Publishers B.V.
- Caves, Richard E., 1996. *Multinational enterprise and economic analysis: Second edition*. USA: Cambridge University Press.
- Cho, Kang Rae, 1990. "The role of product-specific factors in intra-firm trade of U.S. manufacturing multinational corporations." *Journal of International Business Studies*, 21 (2): 319-330.
- Coase, Ronald, 1937. "The nature of the firm." *Economica*, 4: 386-405.
- Coleman, James S., 1988. "Social capital in the creation of human capital." *American Journal of Sociology*, S95-S120.
- Conlisk, John, 1996. "Why bounded rationality?" *Journal of Economic Literature*, June, 34: 669-700.
- Corey, E. Raymond, 1978. *Procurement management: Strategy, organization, and decision-making*. Boston: CBI Publishing Company.
- Doz, Y., K. Asakawa, J. Santos, and P. Williamson, 1997. "The Metanational Corporation." Working paper no. 97/60/SM, INSEAD, Fontainebleau, France.
- Dunning, John H., 1974. *Economic analysis and the multinational enterprise*. London: Allen & Unwin.
- Dunning, John H. and Alan Rugman. 1985. "The influence of Hymer's dissertation on theories of foreign direct investment." *American Economic Review*, 75 (May): 228-32.
- Dunning, John H., 1993. *Multinational enterprises and the global economy*. UK: Addison-Wesley.

- Eccles, Robert., 1981. "The quasifirm in the construction industry." *Journal of Economic Behavior and Organization*. 2 (December): 335-357.
- Edstrom, A. and J. R. Galbraith, 1977. "Transfer of managers as a coordination and control strategy in multinational organizations." *Administrative Science Quarterly*, 22: 248-263.
- Egan, Mary Lou, and Ashoka Mody, 1992. "Buyer-seller links in export development." *World Development*, 20 (3): 321-334.
- Engel, Charles and John H. Rogers, 1996. "How wide is the border?" *American Economic Review*. 86: 1112-1125.
- Evans, Peter B., 1981. "Recent research on multinational corporations." *Annual Review of Sociology*, 7: 199-223.
- Feld, Scott L., 1981. "The focused organization of social ties." *American Journal of Sociology*, 86 (5): 1015-1035.
- Gargiulo, Martin, and Mario Benassi. "The dark side of social capital." Working paper, INSEAD, Fontainebleau, France, and Università di Trento, Trento, Italy.
- Geertz, Clifford, 1996. "The bazaar economy: information and search in peasant marketing." *American Economic Review*. 68 (Supplement): 28-32.
- Ghoshal, Sumantra and Christopher A. Bartlett, 1990. "The multinational corporation as an interorganizational network." *Academy of Management Review*, 15 (4): 603-625.
- Ghoshal, Sumantra and D. Eleanor Westney (eds.), 1993. *Organization Theory and the Multinational Corporation*. New York: St. Martin's Press.
- Gordon, Roger H. and A. Lans Bovenberg, 1996. "Why is capital so immobile internationally? Possible explanations and implications for capital income taxation." *American Economic Review*, December, 86 (5): 1057-1075.
- Gould, David M., 1994. "Immigrant links to the home country: empirical implications for U.S. bilateral trade flows." *The Review of Economics and Statistics*, May, 76 (2): 302-316.
- Granovetter, Mark, 1973. "The strength of weak ties." *American Journal of Sociology*, 78: 1360-1380.
- Granovetter, Mark, 1985. "Economic action and social structure: the problem of embeddedness." *American Journal of Sociology*, November, 91 (3): 481-510.
- Granovetter, Mark, 1992. "Problems of explanation in economic sociology." In Nohria and Eccles (eds.), *Networks and organizations*. Boston, Massachusetts: Harvard Business School Press.
- Greene, William H., 1990. *Econometric analysis*. New York: Macmillan Publishing Company.
- Grossman, Sanford J., 1991. *The informational role of prices*. Cambridge, Massachusetts: The MIT Press.

- Gruber, W., D. Mehta, and Raymond Vernon, 1967. "The R&D factor in international trade and international investment of United States industries." *The Journal of Political Economy*, 75: 20-37.
- Gulati, Ranjay, 1995a. "Does familiarity breed trust? The implications of repeated ties for contractual choice in alliances." *Academy of Management Journal*, 1995, 38 (1): 85-112.
- Gulati, Ranjay, 1995b. "Social structure and alliance formation patterns: A longitudinal analysis." *Administrative Science Quarterly*, 40 (4): 619-652.
- Hayek, F. A., 1945. "The use of knowledge in society." *American Economic Review*, September, 35 (4): 518-530.
- Hedlund, Gunnar, 1986. "The hypermodern MNC--a heterarchy?" *Human Resource Management*, Spring, 25 (1): 9-35.
- Helleiner, Gerald K., 1978. "Transnational corporations and trade structure: the role of intra-firm trade." In Giersch, Herbert (ed.), *On the economics of intra-industry trade*, Tübingen: J.C.B. Mohr, Paul Siebeck (159-181).
- Hennart, Jean-Francois, 1982. *A theory of multinational enterprise*. Ann Arbor: University of Michigan Press.
- IMF Statistics Department, 1997. *International Financial Statistics Yearbook: Vol. L*. Washington, D.C.: International Monetary Fund Publication Services.
- Jones, Candace, William S. Hesterly, and Stephen P. Borgatti, 1997. "A general theory of network governance: Exchange conditions and social mechanisms." *Academy of Management Review*, 22 (4): 911-945.
- Junz, Helen B., and Rudolf R. Rhomberg, 1973. "International trade: Price competitiveness in export trade among industrial countries." *American Economic Review*, May, 63 (2): 412-418.
- Keegan, Warren J., 1974. "Multinational scanning: a study of the information sources utilized by headquarters executives in multinational companies." *Administrative Science Quarterly*, September: 411-421.
- Kobrin, Stephen J. 1991. "An empirical analysis of the determinants of global integration." *Strategic Management Journal*, 12: 17-31.
- Kogut, Bruce. 1983. "Foreign direct investment as a sequential process." In Kindleberger, Charles P. and David B. Audresch (eds.). *The Multinational Corporation in the 1980s*, Cambridge, MA: The MIT Press (38-56).
- Kogut, Bruce, Weijian Shan, and Gordon Walker, 1993. "Knowledge in the network and the network as knowledge: The structuring of new industries." In Grabher, Gernot, (ed.). *The embedded firm: On the socioeconomics of industrial networks*. London: Routledge.
- Krugman, Paul R., and Richard E. Baldwin, 1987. "The persistence of the U.S. trade deficit." *Brookings Papers on Economic Activity*, 1: 1-55.
- Krugman, Paul, 1995. "Increasing returns, imperfect competition and the positive theory of international trade." In Grossman, Gene, and Kenneth Rogoff (eds.). *Handbook of International Economics: Vol. III*. North Holland: Elsevier Science Publishers B.V.

- Lawrence, Robert Z., 1990. "U.S. current account adjustment: An appraisal." *Brookings Papers on Economic Activity*, 2: 343-392.
- Leamer, Edward E., and James Levinsohn, 1995. "International Trade Theory: The evidence." In Grossman, Gene, and Kenneth Rogoff (eds.). *Handbook of International Economics: Vol. III*. North Holland: Elsevier Science Publishers B.V.
- Lessard, Donald R., 1986. "Finance and global competition: exploiting financial scope and coping with volatile exchange rates." In Porter, Michael E., editor. *Competition in Global Industries*. Boston: Harvard Business School Press (147-184).
- Lessard, Donald R. and John B. Lightstone, 1986. "Volatile exchange rates can put operations at risk." *Harvard Business Review*, July-August: 107-114.
- Liang, Neng and Arvind Parkhe, 1997. "Importer behavior: the neglected counterpart of international exchange." *Journal of International Business Studies*, Third Quarter: 495-530.
- Liang, Neng and Rodney L. Stump, 1996. "Cognitive heuristics in overseas vendor search and evaluation: A proposed model of importer buying behavior." *International Executive*, 38 (6): 779-806.
- Martin, Xavier, Will Mitchell, and Anand Swaminathan, 1995. "Recreating and extending Japanese automobile buyer-supplier links in North America." *Strategic Management Journal*, 16: 589-619.
- McCallum, John, 1995. "National borders matter: Canada-U.S. regional trade patterns." *American Economic Review*, June, 85 (3): 615-623.
- Montgomery, James D., 1992. "Job search and network composition: implications of the strength-of-weak-ties hypothesis." *American Sociological Review*, October, 57: 586-596.
- Min, Hokey and William P. Galle, 1991. "International purchasing strategies of multinational U.S. firms." *International Journal of Purchasing and Materials Management*, 2: 9-18.
- Mizruchi, Mark S., 1996. "What do interlocks do? An analysis, critique, and assessment of research on interlocking directorate." *Annual Review of Sociology*, 22: 271-298.
- Nohria, Nitin, 1992. "Information and search in the creation of new business ventures: The case of the 128 venture group." In Nohria, Nitin and Robert G. Eccles, (eds.). *Networks and Organizations: Structure, form, and action*. Boston, Massachusetts: Harvard Business School Press.
- Nohria, Nitin and Sumantra Ghoshal, 1997. *The Differentiated Network: Organizing Multinational Corporations for Value Creation*, San Francisco: Jossey-Bass.
- Okun, Arthur M., 1981. *Prices & quantities: A macroeconomic analysis*. Oxford, England: Basil Blackwell.
- Organization for Economic Co-operation and Development, 1997. *Globalisation and small and medium enterprises*, Vols. 1 and 2, Paris: OECD.

- Palay, Thomas M., 1985. "Avoiding regulatory constraints: Contracting safeguards and the role of informal agreements." *Journal of Law, Economics, and Organization*, Fall, 1 (1): 155-175.
- Palmer, Donald, 1983. "Broken ties: Interlocking directorates and inter-corporate coordination." *Administrative Science Quarterly*, 28 (1): 40-55.
- Podolny, Joel M., 1994. "Market uncertainty and the social character of economic exchange." *Administrative Science Quarterly*, 39 (3): 458-483.
- Polanyi, Karl, 1944 [1975]. *The Great Transformation*, New York: Octagon Books.
- Portes, Alejandro and Julia Sensenbrenner, 1993. "Embeddedness and immigration: notes on the social determinants of economic action." *American Journal of Sociology*, May, 98 (6): 1320-50.
- Powell, Walter W., 1990. "Neither market nor hierarchy: Network forms of organization." *Research in Organizational Behavior*, 12: 295-336.
- Prahalad, C. K. and Yves L. Doz, 1987. *The multinational mission*. New York: The Free Press.
- Pratt, John W., David A. Wise, and Richard Zeckhauser, 1979. "Price differences in almost competitive markets." *The Quarterly Journal of Economics*, May, XCIII (2): 189-211.
- Rauch, James E., 1997. "Networks versus markets in international trade." Working paper, Department of Economics, University of California, San Diego, La Jolla, CA, and National Bureau of Economic Research, Cambridge, MA, USA.
- Romo, Frank P., and Michael Schwartz, 1995. "The structural embeddedness of business decisions: The migration of manufacturing plants in New York State, 1960 to 1985." *American Sociological Review*, December, 60 (6): 874-907.
- Rugman, A. M., 1980. "Internalization as a general theory of foreign direct investment, a reappraisal of the literature." *Weltwirtschaftliches Archiv*, 116, 2: 365-379.
- Scherer, F. M., 1992. *International high-technology competition*. Cambridge, Massachusetts: Harvard University Press.
- Sheppard, Blair H. and Marla Tuchinsky. "Interfirm relationships: A grammar of pairs." *Research in Organizational Behavior*, 18: 331-373.
- Simon, Herbert A., 1979. "Rational decision making in business organizations." *American Economic Review*, September, 69 (4): 493-513.
- Smelser, Neil J., and Richard Swedberg, 1994. "The Sociological Perspective on the Economy." In: Smelser, Neil J., and Richard Swedberg, (eds.). *The handbook of economic sociology*. Princeton, N.J.: Princeton University Press.
- Stern, Robert M., Jonathan Francis, and Bruce Schumacher, 1976. *Price elasticities in international trade: An annotated bibliography*. London: The Macmillan Press.
- Stigler, George J., 1961. "The economics of information." *The Journal of Political Economy*, June, 69 (3): 213-225.

Stopford, John, 1994. "The growing interdependence between transnational corporations and governments." *Transnational Corporations*, February, 3 (1): 53-76.

Swedberg, Richard, 1994. "Markets as social structures." In Smelser and Swedberg (eds.): 255-282.

Telser, Lester G. and Harlow N. Higinbotham, 1977. *Organized futures markets: Costs and benefits.* *Journal of Political Economy*, 85 (5): 969-1000.

Uzzi, Brian, 1997. "Social structure and competition in interfirm networks: The paradox of embeddedness." *Administrative Science Quarterly*, March, 42: 35-67.

Vernon, Raymond, 1966. "International investment and international trade in the product cycle." *Quarterly Journal of Economics*, May, 80 (2): 190-207.

Vernon, Raymond, 1979. "The product hypothesis in a new international environment." *Oxford Bulletin of Economics and Statistics*, 41: 255-267.

Webster, Frederick E., Jr., and Yoram Wind, 1972. *Organizational Buying Behavior.* Englewood Cliffs, New Jersey: Prentice-Hall.

Wei, Shang-Jin, 1996. "Intra-national versus international trade: How stubborn are nations in global integration?" Working paper, National Bureau of Economic Research, April, Paper No. 5531.

Williamson, Oliver E., 1975. *Markets and Hierarchies: Analysis and antitrust implications.* London, England: The Free Press, Collier Macmillan.

Williamson, Oliver E., 1991. "Comparative economic organization: The analysis of discrete structural alternatives." *Administrative Science Quarterly*, 1991, 36: 269-296.

Williamson, Peter J., 1986. "Multinational enterprise behavior and domestic industry adjustment under import threat." *The Review of Economics and Statistics*, August, LXVIII (3): 359-368.

Table 1a

**Descriptive Statistics for Analysis of U.S. Overall and U.S. MNE Imports**

<i>Variable</i>	<i>U.S. Overall</i>	<i>MNE</i>
	<i>Mean (s.d.)</i>	<i>Mean (s.d.)</i>
Log Imports	6.57 (1.34)	4.33 (1.88)
Log U.S. Industry GDP	5.10 (0.25)	5.10 (0.25)
Log Real Exchange Rate	4.49 (0.18)	4.49 (0.18)
Log Firm Size*Log Real Exchange Rate	29.07 (2.46)	40.78 (2.66)
Time	9.5 (5.19)	9.5 (5.19)
Two-year lagged R&D/Sales ratio in percentage	2.69 (2.36)	2.69 (2.36)
Number of observations	648	361

Table 1b

**Correlations among Variables Used, U.S. Overall and U.S. MNE Imports\***

<i>Variable</i>	2	3	4	5	6
1. Log Imports	0.339 0.282	-0.114 0.003	-0.257 -0.282	0.349 0.249	0.111 0.050
2. Log GDP		-0.104 -0.104	-0.434 -0.469	0.827 0.827	0.521 0.521
3. Log Real Exchange Rate			0.565 0.704	-0.082 -0.082	-0.048 -0.048
4. Log Firm Size*Log Real Exchange Rate				-0.239 -0.236	-0.237 -0.320
5. Time					0.156 0.156
6. Two-year lagged R&D/Sales ratio in percentage					

\*: Upper number in each vertical pair is correlation in U.S. overall imports; lower number is correlation in MNE imports.

Table 2

**Regressions Explaining U.S. Imports: Models with Firm Size, Time, and R&D/Sales**

Variable	U.S.		U.S.		U.S.	
	Overall (1)	MNE (2)	Overall (3)	MNE (4)	Overall (5)	MNE (6)
Constant	-6.93 *** (1.41)	-9.14 *** (2.40)	-0.99 (2.53)	-2.73 (3.32)	-1.05 (2.85)	-1.76 (3.44)
U.S. industry GDP	2.33 *** (0.20)	1.99 *** (0.35)	1.06 ** (0.50)	0.42 (0.66)	1.03 * (0.55)	0.85 (0.67)
Real exchange rate	0.24 (0.37)	2.60 *** (0.91)	0.56 (0.39)	3.03 *** (0.92)	0.49 (0.47)	2.79 *** (0.93)
Firm size*Real exchange rate	0.05 (0.05)	-0.17 ** (0.08)	0.00 (0.05)	-0.20 ** (0.08)	0.02 (0.06)	-0.23 *** (0.09)
Time			0.05 *** (0.02)	0.08 *** (0.03)	0.05 ** (0.02)	0.05 (0.03)
Lagged R&D/Sales					0.05 (0.03)	-0.18 *** (0.04)
Chemical products	-0.53 ** (0.22)	-0.36 ** (0.17)	-0.29 (0.23)	-0.33 * (0.17)	-0.40 (0.28)	-0.04 (0.18)
Food products	-0.77 *** (0.21)	-0.77 * (0.42)	-0.77 *** (0.21)	-0.97 ** (0.42)	-0.64 ** (0.27)	-0.99 ** (0.45)
Electrical products	-1.24 *** (0.15)	-1.15 *** (0.22)	-0.96 *** (0.18)	-0.90 *** (0.23)	-1.09 *** (0.24)	-0.20 (0.28)
Australia	-1.87 *** (0.14)	-3.96 *** (0.24)	-1.87 *** (0.14)	-3.95 *** (0.24)	-1.79 *** (0.16)	-4.10 *** (0.23)
Canada	0.74 *** (0.14)	1.09 *** (0.19)	0.74 *** (0.14)	1.09 *** (0.19)	0.81 *** (0.15)	0.93 *** (0.18)
France	-0.35 ** (0.14)	-1.39 *** (0.19)	-0.35 ** (0.14)	-1.39 *** (0.19)	-0.34 ** (0.15)	-1.38 *** (0.18)
Germany	0.32 ** (0.14)	-0.38 ** (0.19)	0.32 ** (0.14)	-0.36 * (0.19)	0.32 ** (0.15)	-0.51 *** (0.19)
Italy	-0.65 *** (0.14)	-1.68 *** (0.18)	-0.65 *** (0.14)	-1.66 *** (0.18)	-0.55 *** (0.16)	-2.07 *** (0.20)
Japan	0.94 *** (0.14)	-1.83 *** (0.26)	0.93 *** (0.15)	-1.86 *** (0.25)	0.99 *** (0.16)	-2.06 *** (0.25)
Netherlands	-1.06 *** (0.14)	-1.48 *** (0.19)	-1.06 *** (0.14)	-1.47 *** (0.19)	-1.10 *** (0.15)	-1.45 *** (0.18)
Switzerland	-1.19 *** (0.14)	-3.53 *** (0.21)	-1.19 *** (0.14)	-3.53 *** (0.21)		
No. of observations	648	361	648	361	512	310
Adj. $R^2$	0.61	0.77	0.62	0.78	0.58	0.77
F-stat	73.40 ***	87.60 ***	69.77 ***	83.85 ***	48.70 ***	69.20 ***

\*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels respectively. All variables (except R&D/Sales) are entered in their natural logs. The dependent variable is U.S. industry-country-year specific import values. Exchange rates are also industry-country-year specific. U.S. GDP is industry-and-year specific. Firm size is measured in terms of average employees per firm in the U.S. and is industry-and-year specific.

Table 3

**Regressions Explaining U.S. Imports: Models with Lagged Exchange Rates**

Variable	U.S.		U.S.		U.S.
	Overall	MNE	Overall	MNE	Overall
	(1)	(2)	(3)	(4)	(5)
Constant	-0.85 (2.60)	-2.59 (3.44)	-1.48 (2.64)	-3.79 (3.49)	-2.25 (2.87)
U.S. industry GDP	0.92 * (0.50)	0.54 (0.66)	0.84 * (0.50)	0.45 (0.66)	0.88 (0.55)
Real exchange rate	0.07 (0.47)	2.87 *** (0.96)	0.33 (0.52)	3.42 *** (1.00)	0.34 (0.58)
1-year lagged real exchange rate	0.69 ** (0.33)	0.96 * (0.52)	-0.10 (0.52)	0.03 (0.72)	-0.10 (0.59)
2-year lagged real exchange rate			0.74 ** (0.36)	0.86 ** (0.47)	0.79 ** (0.41)
Firm size*Real exchange rate	-0.01 (0.05)	-0.30 *** (0.09)	-0.01 (0.06)	-0.31 *** (0.08)	-0.00 (0.06)
Time	0.05 *** (0.02)	0.04 (0.03)	0.05 *** (0.02)	0.04 (0.03)	0.05 ** (0.02)
Lagged R&D/Sales					0.04 (0.03)
Chemical products	-0.24 (0.25)	-0.14 (0.18)	-0.27 (0.26)	-0.12 (0.17)	-0.33 (0.29)
Food products	-0.76 *** (0.22)	--0.37 (0.45)	-0.83 *** (0.25)	-0.33 (0.45)	-0.61 ** (0.28)
Electrical products	-0.92 *** (0.18)	-0.70 *** (0.24)	-0.92 *** (0.19)	--0.68 *** (0.24)	-1.04 *** (0.25)
<i>(Country coefficients not reported)</i>					
No. of observations	612	339	576	339	512
Adj. R <sup>2</sup>	0.61	0.78	0.61	0.78	0.59
F-stat	61.28 ***	73.60 ***	54.42 ***	69.98 ***	43.94 ***

\*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels respectively. All variables (except R&D/Sales) are entered in their natural logs. The dependent variable is U.S. industry-country-year specific import values. Exchange rates are also industry-country-year specific. U.S. GDP is industry-and-year specific. Firm size is measured in terms of average employees per firm in the U.S. and is industry-and-year specific.

Table 4

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**Pooled Regressions Explaining U.S. Imports: Models with Interaction Terms**


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*U.S. Overall and MNE pooled*

<i>Variable</i>	<i>All available observations</i>	<i>Without Canada</i>	<i>Import values &gt; \$100 mill.</i>	<i>Without Australia, Italy, and Switzerland</i>	<i>Without Australia, Italy, and Switzerland</i>	<i>All available observations</i>
<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>	<i>(5)</i>	<i>(6)</i>	<i>(6)</i>
U.S. industry GDP	2.16 *** (0.18)	2.12 *** (0.19)	1.90 *** (0.15)	2.39 *** (0.19)	2.23 *** (0.21)	1.96 *** (0.19)
Real exchange rate	0.65 ** (0.33)	0.86 ** (0.35)	0.17 (0.26)	0.79 ** (0.35)	0.72 ** (0.35)	0.57 * (0.33)
Firm size*Real exchange rate	-0.05 (0.03)	-0.05 (0.04)	0.02 (0.03)	-0.06 * (0.04)	-0.06 (0.04)	-0.04 (0.03)
MNE	-7.53 *** (1.68)	-5.78 *** (1.77)	-3.60 ** (1.76)	-10.96 *** (1.81)	-14.34 *** (2.67)	-11.83 *** (2.48)
MNE*Real exchange rate	1.23 *** (0.39)	0.80 ** (0.41)	0.39 (0.40)	2.09 *** (0.42)	2.24 *** (0.43)	1.42 *** (0.40)
MNE*U.S. industry GDP					0.51 * (0.30)	0.65 ** (0.28)
<i>(Country and industry coefficients not reported)</i>						
No. of observations	1,009	889	775	685	685	1,009
Adj. R <sup>2</sup>	0.73	0.72	0.63	0.73	0.73	0.73
F-stat	172.28 ***	151.21 ***	84.11 ***	141.45 ***	131.94 ***	163.22 ***

\*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels respectively. The dependent variable is U.S. industry-country-year specific import values. Exchange rates are also industry-country-year specific. U.S. GDP is industry-and-year specific. Firm size is measured in terms of average employees per firm in the U.S. and is industry-and-year specific.

Table 5

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**MNE Interaction Coefficients in Regressions Explaining U.S. Imports, and Price-Cost Markup Ratios by Industry**


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<i>Variable</i>	<i>Industry</i>			
	<i>Food products</i>	<i>Chemical products</i>	<i>Machinery except electrical</i>	<i>Electrical products</i>
MNE*Real exchange rate	2.11 *** (0.72)	2.91 *** (0.74)	0.16 (0.61)	1.25 ** (0.59)
Hall's (1988) estimates of price-cost markup ratios	5.29	20.11	1.43	3.09

\*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels respectively. To obtain the coefficients reported in the first row, observations for U.S. overall and MNE imports were pooled and regression model 6 from the previous table was run separately for each of the industries shown above. The price-cost markups shown in the second row are from Robert E. Hall (1988: 941, Table 5).