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Abstract

Social scientists, including numerous economists, have explored the incidence and importance of social capital embedded networks as a governance mechanism in business operations. The buyer-seller dyads represented by twelve large-scale dairies and seven feed suppliers were studied to contribute to our understanding of network capital in business-to-business (B2B) transactions. A high incidence of institutional and personal trust was found in these buyer-seller networks. Trust facilitates economic exchange through uncertainty management, information sharing, and time savings.

“The standard economic model is one where we’re very self-interested. But even among strangers, the people who are trusting make more money than those who are not.”

Vernon Smith, 2002 Nobel Laureate

The Wall Street Journal, October 2, 2000, p.B4

Introduction

Prices, contracts, and hierarchy form the current triumvirate of managerial mechanisms for governing transactions in our market economy. Yet a close inspection of business transactions reveals explanatory limitations associated with these governance tools in our turbulent, complex, and fast-paced marketplace. Prices often are not fully contingent, contracts are imperfect, and transaction costs are prohibitively high (Arrow). These three mechanisms fail to explain completely the heterogeneity in observed governance strategies because of their inability to simultaneously capture the challenges of uncertainty, asymmetric information, and timeliness (UIT) in decision-making.

Uncertainty, in the Knightian sense, goes beyond probability assessments to the recognition of possibility (Shackle). Surprises and shocks characterize our possibilistic, non-distributional world. Managers “earn their pay” dealing with unexpected crises within and outside the organization. In addition, business decisions are rarely made with anything near perfect information. Managers have different capacities to gather and

process pertinent information. Opportunism within and outside the firm misleads, distorts, disguises, and confuses the information available to the decision maker (Williamson 1985). Finally, a finite time horizon constrains decision processes. Managers regard their time as their scarcest resource. Executives, therefore, allocate a significant percentage of their time asset to relationships with people who can reduce the vulnerability of the firm to adverse economic events (Kotter). In summary, our three conventional governance tools fall short capturing managerial reality because “. . . (a) processing information is itself costly; (b) perfect knowledge of the underlying structure of the economy is unrealistic; (c) all behavior that is fully pre-planned is not consistent with free choice; (d) maximization ignores firm decision-making structures; and (e) global probability statements cannot analytically encompass novelty and surprise.” (Mirowski, p. 161).

An embryonic, but growing, understanding among many social scientists and management theorists points to “a fourth cord in the governance rope” in economic exchanges—business networks based on trust (Coleman; Fukuyama; Granovetter; Uzzi). These intra- and inter-firm relationships allow management to meet the UIT challenge by more efficiently and effectively coping with unforeseen events, facilitating information needs, and economizing on their time. This fourth cord of network capital, along with prices, contracts, and hierarchy, forms the governance portfolio for the business firm (Wilson).¹

This paper investigates the incidence, nature, and economic implications of network capital in B2B (business-to-business) exchanges. Specific emphasis is given to how networks respond, or do not respond, to the UIT challenge. The paper begins with a brief summary of the reported role of network capital in business decisions. Case analysis from 12 buyers, 7 suppliers, and 27 B2B dyads documents the economic nature

of network capital in these exchanges. The paper concludes with a response to sympathetic critics of network capital research.

Network Capital in Business

I define network capital as bilateral or multilateral associations where interaction between individuals or groups produces mutual value. Selected operational characteristics or value flows of network capital are goodwill, flexibility, mutual forbearance, loyalty, reciprocity, reputation, sympathy, trust, and understanding. Many organizational analysts consider network capital as a legitimate means for governing economic exchanges between agents (Powell; Powell and Smith-Doerr). Certain types of exchanges rely more heavily on relationships, mutual interests, and reputation than common market transactions. Business networks provide management a means for overcoming most UIT challenges at relatively low cost.² Figure 1 illustrates the network of feed suppliers (S) and dairy buyers (B) in this study.

Like other forms of capital, most investments are made in network capital with the expectation of a potential flow of future benefits. Network capital creates positive externalities for the business by exploiting economic gains in business activities beyond the association or dyad. In a production economics framework, network capital can substitute for or complement other inputs. Like buildings, machinery, and even human capital, network capital requires maintenance on the behalf of the parties in the association. These relational associations depreciate and appreciate in value as well as suffer from obsolescence.

Nonrivalness, the use of an asset by one party not depleting the asset for another party, differentiates network capital from other more physical assets. A second differentiation concerns the mutuality of association. If one agent withdraws from the network, then the association and the capital embedded in that relationship most likely

will disappear unless the business relationship resides with an organization. Finally, the difficulty in measuring network capital differentiates this asset from physical resources. Tangible assets can be given value through generally accepted accounting and economic procedures. The costs and benefits of network capital, have not to this point, lent themselves to straightforward monetary measurement.

In spite of continuing measurement challenges, applied analyses of these bilateral and multilateral associations regularly appear in the academic literature. Adler and Kwon's review of the business management literature reveals that network capital (1) influences career success and executive compensation, (2) assists in job searches, (3) facilitates the efficient use of resources, (3) reduces labor turnover rates and business breakups, (4) facilitates entrepreneurship, and (5) strengthens interfirm relationships. A recent study in the agricultural sector reports that the existence of sympathetic network capital alters the terms of trade in farmland purchases (Robison, Myers and Siles). Based on a study of thousands of respondents in 29 countries, Knack and Keefer report that the presence of network capital, principally trust, reduces the costs associated with the UIT challenge, thereby producing economic benefits for society.

Ethnographic study of business networks provides additional, useful insights into the economic nature of these associations. Larson found that reciprocity, reputation, and trust explained the duration and stability of exchange structures for a wide range (e.g. telecommunications, clothing manufacturing and sales, and computer manufacturing) of 58 firms. The capital in the network provided an efficient means of timely communication. Competitive pricing was a necessary but not sufficient condition for network stability since a regular demonstration of commitment was required to maintain the network. "We move quickly for that company" was a frequent characteristic of these

B2B exchanges. Useful business information was nested in the good or service transaction.

Uzzi studied the supplier and buyer networks of 23 entrepreneurial businesses in New York City. This study discovered that network capital promoted economies of time. Trustworthiness became an operational heuristic that economized on the cognitive resources, time, and attention process without jeopardizing effective decision-making. Managers worked out interfirm problems “on the fly”. The author found a common cord of altruism in interfirm relations where managers made decisions in the interests of others and against their own short-term interests. Yet Uzzi warns that some firms had passed a network capital threshold beyond which their relationships constrained economic performance by insulating the firm from market and technology information available outside the network (i.e. “bad” network capital).³

The Economic Role of Trust

I define trust as the assurance that a party in a two-party transaction will not opportunistically exploit the vulnerability of the other party. A trustworthy person exhibits trust in their day-to-day business dealings. Trust and trustworthiness are difficult to measure but serve as critical components of network capital. Some economists argue that trust is nothing more than far-sighted self-interest and not worthy of dedicated research (Williamson 1993). However, most of the economic and management literature cited in this paper reports persuasively on the economic value of trust, with Arrow claiming that trust may be the most efficient mechanism for governing economic transactions.⁴

Trust and trustworthiness ease the UIT challenge by reducing transaction costs, increasing productivity through greater information sharing, strengthening interfirm alliances, managing unforeseen contingencies, and facilitating timely transactions (Dyer;

Gulati; Jefferies and Reed; Lorenz). Empirically, the nature and variability of trust has been shown to be important in small-business transactions (Wilson and Kennedy), business associations (Rademakers), buyer-seller exchanges (Sako), exporting clusters (Schmitz), and student-based experiments (Glaeser, et. al.).

All human economic exchanges contain some type of trust. In pure market exchanges we base our decisions on nearly perfect information and zero transaction costs. In authority-enforced contracts or hierarchies trust arises from confidence in the institutional environment. In relational or personal transactions, the assurance of non-opportunistic behavior centers on the trustworthiness of the other party. Parties in personal-based economic transactions infrequently exhibit calculative behavior on a daily basis.

I adapted Barney and Hansen's definitions of trust to classify this characteristic of network capital in B2B transactions:

Market Trust: exchanges where there is limited opportunity for one party to exploit the other. Neither party is vulnerable, the quality of the goods and services can be evaluated at low cost, and no money or time needs to be invested in contracts.

Institutional Trust: exchanges where vulnerabilities exist but you are protected by formal or informal contract, leverage on the other party's reputation if he fails to comply, or by membership in a governing organization that will enforce compliance.

Personal Trust: exchanges where vulnerabilities exist but you are protected by a set of shared values, principles, and standards of the other party that have been internalized by the other individual or firm. Any exploitation of your vulnerabilities would be against the values, principles, and standards of behavior you share with the other party.

Data Acquisition and Analysis

Research concerning the economic content of network capital and trust has suffered from definitional confusion, the lack of preciseness, and a paucity of measurement. Conceptual models of network capital and trust have produced an

understanding of business relationships but largely have failed in the areas of generalizability and prediction. I utilized mainstream case study research practices in my attempt to produce useful conceptual insights for further research (Yin; Eisenhardt; Kennedy and Luzar). With this methodological approach, any conceptual contribution produced by the study emerges at the end of the case study, not at the beginning. Helper challenges economists to recognize that field research of this genre “can make us better economists—whatever our current technique—by increasing our understanding of the objectives, constraints, and incentives that economic actors face.” (p. 231).

The research team interviewed a purposive sample of twelve dairy owners/operators or managers (buyers (B)) and seven owners/salesmen (sellers (S)) selling and delivering feed supplements and grain to large dairies in central Arizona. An extension dairy specialist selected the buyers with the objective of achieving variability in business performance, herd size, and managerial attitudes. Table 1 captures the similarities and differences between the twelve buyers.

Buyer and seller interviews utilized distinctive interview protocols.⁵ Both protocols covered current operations, business challenges, and the relationships with sellers or buyers. We conducted the pretesting of the buyer protocol over an intensive two-day period on a non-surveyed business site. Individual buyer and seller interviews normally lasted 2-3 hours. All interviews were tape-recorded and transcribed with the prior approval of the respondent.

During the dairy interviews, the buyer classified, on a five point Likert scale, the type of trust associated with his business transaction involving his three most important feed suppliers. We provided the three definitions of trust presented earlier in this paper and a classification page to the buyer with 1= market trust, 3= institutional trust, and 5= personal trust. During and following the classification process we asked the buyer to

explain his thinking in detail. Respondents could change their classifications during this discussion. The interviewer continually emphasized the governance structure of the transaction during the session.

Based on the earlier seller classifications of the buyers, we selected seven sellers to obtain an understanding of mutual trust. No alfalfa suppliers were selected due to the large number of geographically dispersed forage suppliers among the buyers. The seven principal sellers deliver feed supplements, minerals, vitamins, and grains to the buyers. We asked sellers to classify their exchange relationship with each buyer who currently was their customer. During the discussion, sellers explained their classification and, like the buyers, could change their classification at any time during the interview.

Results

Three general observations concerning the empirical results introduce the specific findings. First, the respondents validated the ongoing claim that economic transactions are embedded with social variables that have economic implications. Nearly all B2B exchanges were classified with some degree of personal trust for both parties. Secondly, the buyers and sellers easily responded to the trust classification system and explained their choices thoughtfully. Decision makers clearly understood the economic value of network capital in UIT management. Like physical and human capital, these owners of network capital recognize the investment, depreciation, maintenance and obsolescence characteristics associated with this asset. Finally, respondents noted the dominant role of a competitive price for successful B2B relationships. Both buyers and sellers noted, however, that price alone was not a sufficient condition for a successful and long-term trading relationship. Price, quality, reliability, communication, and integrity all serve as key considerations in “cost effective” transactions.

Buyer to Seller Trust

Table 2 presents the trust classifications of the twelve buyers and their three most important feed suppliers. Ten of the twelve buyers classify, on average, the exchange relationship with their buyers between institutional and personal trust. Two buyers (B7 and B9) lean more to market classifications of their exchange relationships where vulnerability in their minds is limited and buyer-seller relationships can be severed with little cost. These two buyers reported relatively low performance measures (average production) compared to the other dairies (table 1).

Crises involving supply shortages, untimely deliveries, and low quality feed dominate the uncertainty component of the UIT challenge for buyers. How the seller responds to these crises determines the trust classification. Buyers recognize that there are “honest mistakes” and “occasional screwups” and if they are rectified in a fair manner they are soon forgiven. The seller must have the ability to fix problems in a timely manner. The most trustworthy sellers respond in a positive manner to adversity. If the seller “doesn’t make it right” then that seller loses business quickly. When asked what it would take to sever a business relationship, most buyers responded that one dishonest mistake would trigger the severance of the link. However, buyers responded that it would take 3-6 “fixable” human errors, depending on the buyer, before the dairy would seek a replacement supplier.

From the buyer perspective, timely and informative communication between buyer and seller maintains a productive link or dyad. Buyers want sellers to offer available discounts even if this action goes against the best financial interests of the seller. Buyers appreciate knowing about potential future supply bottlenecks (e.g. railroad delays) and feed shortages. Buyers want sellers to tell them when and when not to buy based on their market information. Information sharing reduces vulnerability and fosters

“piece of mind.” Suppliers who earned a personal trust classification all demonstrate effective communication skills.

Time represents the third component of the UIT challenge. The opportunity cost of the buyer’s time played a critical role in classifying a dyad as “personal trust.” Trustworthy sellers “produced time” for the buyer by freeing time for other managerial activities—“It means I can concentrate on the things I need to do.” Buyers reported the economic value of their time as the major barrier to severing a buyer-seller relationship. The time necessary to develop another business relationship with a replacement supplier and monitor their initial performance represented the opportunity cost or value of the existing relationship. Buyers noted that cow performance could decline temporarily if an existing seller needed to be replaced with a new supplier due to the switching costs of starting a new business relationship.

Seller to Buyer Trust

The location and importance of a firm along the value chain determines the predominant governance form (Wilson and Kennedy). Retailers classify most of their buyer-seller relationships as market trust while firms in the wholesale and production sectors demonstrate more institutional and personal trust. In this study, seller trust classifications varied across suppliers, ranging from S5 with a leaning towards institutional trust to sellers S2 and S6 with personal trust in all transactions (table 3). Seller respondents, as salesmen, are accustomed to serving their clients’ needs in a patient manner. The two common reasons, reported by the sellers, for severing a supplier-buyer relationship would be non-payment, or frequent hassles and rejected feed deliveries.

The aggregate trust classification for a single buyer for multiple suppliers reveals a more sector-wide view of the buyer. Buyers 1 and 6 have a consistent classification

among the suppliers. Buyers 3, 5 and 10 demonstrate a relatively high level of trust variability with their suppliers. Sellers classified few B2B trust relationships as pure market or near market trust.

Sellers manage B2B uncertainty by solving problems without lawyers. Suppliers recognize that mistakes will happen and a high level of personal trust in the exchange enables a fair and efficient resolution to the problem. Sellers noted that they respond to delivery and quality problems immediately, mutually working out problems with the buyer.

Feed suppliers noted the critical role information sharing plays in their business relationship with the dairies. Given the ease of price discovery in a numerically small dairy sector, sellers regard a “level playing field” in pricing as a critical component of business success. Buyers expect sellers to look after the buyer’s interests, like advising them on when to buy and when not to buy. Most information is transferred verbally and in some cases, in person.

All sellers noted that their relationships with their customers took years to develop and in most cases would take years to develop new clients up to the same level of trust. Sellers view the time component of the UIT challenge as responding quickly to customer concerns and solving problems on a mutually satisfactory basis. As one seller noted, “Trust saves time so I place a high value on the buyer’s and my time.”

One seller (S6) has used personal trust to establish a competitive advantage in the market for grain and feed additives, demonstrating a “we” perspective in his business’ transactions. S6 has established a personal relationship with all his customers where he cultivates and maintains reciprocal or mutual trust. S6 concludes all agreements with a handshake. This seller views any problems with his products as “our fault” and goes to extreme measures to resolve the issue in favor of the buyer. The statement, “I am paid to

solve situations.”, captures S6’s key operational philosophy. S6 attributes his competitive advantage - “protected from other suppliers”- to his competitive pricing, quality service, and his relationships with the buyers.

Reciprocity or Mutual Trust

The intriguing research question I turn to now concerns the degree to which the buyer’s trust of the supplier is reciprocated by the seller. Significantly different or asymmetric trust classifications would be a possible indicator of a one-way relationship that could lead to opportunistic behavior by one of the parties in the transaction dyad. I explore the question, “Does reciprocity exist in these B2B exchanges?” Scant empirical research on reciprocity or mutual trust exists in the economics or management literatures.

In 27 dyads, sellers classified their trust relationship with buyers as more personal in 13 of the 27 cases (table 4).⁶ Ten of the 27 dyads reveal symmetric trust (Difference = 0). Five of the links represent asymmetric trust (Difference ≥ 2) while the remaining dyads exhibit close reciprocity (Difference = 1) in these interfirm transactions. The greatest trust asymmetry occurred when buyers classified the exchange as market or institutional (n = 12) while the seller classified the transaction more personal (e.g. B7/S2, B9/S7). On the other hand, only one seller characterized a link as institutional trust (S4/B4, S4/B11). None of the sellers classified their trust relationship with a buyer as market trust. The Pearson correlation coefficient between buyer and seller rankings is 0.36.

Mutual, symmetric trust characterizes the dyads between six dairies and S6. All parties in this network classified their relationship with each other as personal trust. Dairies perceive S6 “as somebody who has made them money, given them timely information, and performed in a timely manner.” So buyers reciprocate with personal trust and a competitive advantage for S6.

Responding to Critics

Nobel Laureate Robert Solow (1995, 2000) has supported the fledgling professional efforts over the last decade to understand the economic role of network capital in societies. The important allocative role of these social norms in the economy, according to Solow, should not be ignored by economists. Nevertheless, Solow joins other economists in criticizing what they perceive to be the inappropriate use of economics to analyze social norms. Much of this criticism centers on the struggle to develop a parsimonious theory of network capital and test that theory with standard empirical tools. Until network capital can be analyzed rigorously like human capital and escape its label as a description of “behavioral patterns”, this potentially useful intellectual endeavor will languish in a backwater of economic research, according to Solow.

A closer evaluation of the economic literature reveals that research on the economic nature of network capital and these “behavioral patterns” has not been in an academic backwater during the last 20 years. Behavioral assumptions relating to network capital saturate game theory models. Trust games, trust-honor games, principal-agent models, repeated prisoner dilemmas, and dynamic coordination games all have social norms embedded in the economic choices (Kreps, James). In this case study research, agents reveal a B2B assurance game that is at equilibrium (figure 2). Both buyers and sellers prefer to “honor” the transaction if the other agent acts honestly. If not, then the agent prefers exploitation.

The assurance solution mirrors Axelrod’s tit for tat strategy that dominated all other strategies in his Prisoner Dilemma round robin tournament. Choosing to honor a player’s trust on the first move and then mimicking the player’s next move in every period produced the highest score in Axelrod’s tournament. Within this strategy players

do not seek conflict (nice); they do not punish cheaters for long periods of time (forgiving), penalties exist for cheating (provocable); and the decision rule is transparent (clear). We observe all four characteristics in the B2B transactions in the Arizona dairy sector. Buyers and sellers generally choose cooperation over conflict, extend forgiveness for mistakes, “pull the trigger” when provoked, and exhibit a transparent business style.

The lack of quantification or measurability represent the Achilles heal of network capital research. The unavailability of useful secondary data that would facilitate the study of network capital using standard econometric techniques continually challenges the researcher. The relatively high cost of collecting network capital data deters validation and generalizability. But suppose we utilize a measurable asset in the study of a wide variety of economic transactions—time. Managerial and labor time is renewable each day but can be the scarcest and most valuable resource for the decision maker. Research indicates that intra- and inter-firm network capital enhances productivity. So consider a firm with physical (K), human (H), and network (N) capital as well as labor (L) and management (M) inputs measured in time (e.g. hours). Let the firm’s production function be denoted as,

$$(1) Q = F(K,H,N,L,M)$$

where Q represents output. Now control for K and H. The impact of N on firm efficiency can be tested econometrically by regressing Q on N, L, and M. If N has a positive influence on Q then we have evidence that firms with more network capital get more production from labor and management time. So with a Cobb-Douglas production function, we could estimate,

$$(2) Q = (g(N)L)^\alpha (h(N)M)^\beta = g(N)^\alpha h(N)^\beta L^\alpha M^\beta = f(N)L^\alpha M^\beta,$$

where $g(N)$, $h(N)$, and $f(N)$ are functions that express the effect of network capital on the efficiency of L and M. As noted earlier, L and M are measured in time and N is

measured by a constructed index of the degree of trust between L and M (intrafirm) and the level of mutual trust between M and external agents (B2B). Fafchamps successfully uses a variation of this model to measure the contribution of network capital on business productivity in Africa.

Kranton and Minehart (KM) recently argue that many of the buyer and seller transactions in the economy are not anonymous. People exchanging goods and services know each other and this link adds value to the transaction. KM argue that links reduce information asymmetries, reduce transaction costs, facilitate cooperation, investment and exchange. Network capital enables the parties in the transaction to manage uncertainty and enhance their competitiveness. The empirical results reported in this paper support KM's conceptual model and postulates. KM conclude that efficient networks are an equilibrium outcome between buyers and sellers—a result validated by the apparent stability of the exchange network in the Arizona dairy sector

Indeed, new business startups rely more heavily on market and institutional trust to establish their place in the market. But with the passage of time, personal trust becomes an important governance tool as some B2B networks reach an assurance equilibrium. As noted by outgoing Federal Reserve Board Chairman Alan Greenspan:

“Trust is at the root of any economic system based on mutually beneficial exchange. In virtually all transactions, we rely on the word of those with whom we do business. Were this not the case, exchange of goods and services could not take place on any reasonable scale. Our commercial codes and contract law presume that only a tiny fraction of contracts, at most, need be adjudicated. If a significant number of business people violated the trust upon which our interactions are based, our court system and our economy would be swamped into immobility.”

Endnotes

1. In this section, the concepts of social capital and networks have been joined into the phrase “network capital” to produce greater clarity and simplicity in the analysis.
2. I recognize “the good, the bad, and the ugly” characteristics of network capital in the business, political, and social arenas. Over embedded business relationships can thwart the resolution of UIT challenges to the benefit of the firm in question (the bad). Or strong networks of multilateral associations can produce a social environment of hate, discrimination, and preferential treatment for a minority (the ugly). Given the nature of this research, I have chosen to focus on the efficiency enhancing impact of network capital as the rule rather than the exception in modern B2B transactions (Kranton and Minehart).
3. Networks can become over embedded where “groupthink” limits the participants’ ability to respond efficiently and effectively to market changes (Grabher). Cliquishness within the network can deter innovation and weaken competitiveness.
4. I recognize that trust may create rigidities of loyalty and reciprocity that reduce flexibility and competitiveness (Nooteboom). Yet blind trust in business is rare because past performance and reliability are evaluated periodically and the opportunistic temptation to defect from trustworthy behavior is observable and immediately handled.
5. Copies of the protocols are available from the author.
6. Not all links in figure 1 were classified for mutual trust due to the existence of alfalfa growers and other suppliers not accounted for in the buyers’ three most important suppliers.

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Will be provided at a later date.

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Table 1: Sample buyer characteristics (central Arizona dairies)

<u>Buyer</u>	<u>Total Production (Millions of Pounds)</u>	<u>Average Production (Lbs./Cow/Day)</u>	<u>Employees (Full time)</u>	<u>Total Cows/Cows Milked</u>	<u>Milking Frequency (Times Per Day)</u>	<u>Land Owned (Acres)</u>	<u>Cow Breeding with AI (%)</u>	<u>Feed Bill as % of Total Costs</u>
B1	126	68	98	6,000/5,000	3	640	75	40
B2	60	75	26	2,500/2,100	3	149	68-70	46-50
B3	102	80	41	4,000/3,500	4	186	68	54
B4	42	72	19	1,971/1,610	2	120	0	53
B5	NA	76	NA	NA	NA	NA	NA	NA
B6	12	70	40	2,300/2,000	2	1,500	100	38-40
B7	25	60	12	1,600/1,450	2	160	0	55
B8	119	62	70	7,700/6,200	2	310	65	45
B9	NA	65	18	1,800/1,500	2	40	0	70
B10	NA	70	15	1,250/1,050	3	120	60-70	49
B11	NA	62	10	1,000/780	2	200	0	40
B12	NA	NA	17	1,700/1,500	2	160	70	51

NA= Not Available

Table 2: Buyer trust classification for three most important suppliers

<u>Buyer</u>	<u>Seller (Most Important)</u>			<u>Mean Classification</u>	<u>Std. Dev.</u>
	<u>#1</u>	<u>#2</u>	<u>#3</u>		
B1	5	3	2	3.3	1.5
B2	5	4	3	4.0	1.0
B3	5	5	5	5.0	0.0
B4	3	5	5	4.3	1.2
B5	5	5	5	5.0	0.0
B6	5	5	3	4.3	1.2
B7	2	1	3	2.0	1.0
B8	5	3	3	3.7	1.2
B9	3	2	3	2.7	0.6
B10	4	3	5	4.0	1.0
B11	5	3	3	3.7	1.2
B12	5	5	4	4.7	0.6

Table 3: Seller classification of buyer trust relationships

Seller	Buyer												Mean	
	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	Classification	Std. Dev.
S1				4	4	4	3	4	4	5	4	4	4.0	0.5
S2	5	5		5			5	5			5	5	5.0	0.0
S3	4	4	3	4		4	4	4	3		4	4	3.8	0.4
S4	5			3				3		4	3	5	3.8	1.0
S5		4			2	4			4				3.5	1.0
S6	5	5	5		5	5				5			5.0	0.0
S7	4	3		3	4	4	4	4	4	2	4	4	3.6	0.7
Mean Classification	4.6	4.2	4.0	3.8	3.8	4.2	4.0	4.0	3.8	4.0	4.0	4.4		
Std. Dev.	0.5	0.8	1.4	0.8	1.3	0.4	0.8	0.7	0.5	1.4	0.7	0.5		

Table 4: Mutual trust in buyer/seller dyads

<u>Buyer to Supplier</u>	<u>Trust Classification</u>	<u>Supplier to Buyer</u>	<u>Trust Classification</u>	<u>Difference</u>
B1/S2	3	S2/B1	5	-2
B1/S6	5	S6/B1	5	0
B2/S2	4	S2/B2	5	-1
B2/S5	3	S5/B2	4	-1
B2/S6	5	S6/B2	5	0
B3/S6	5	S6/B3	5	0
B4/S1	5	S1/B4	4	1
B4/S4	3	S4/B4	3	0
B5/S6	5	S6/B5	5	0
B6/S1	5	S1/B6	4	1
B6/S3	4	S3/B6	4	0
B6/S6	5	S6/B6	5	0
B7/S2	2	S2/B7	5	-3
B7/S3	2	S3/B7	4	-2
B8/S1	3	S1/B8	4	-1
B8/S2	5	S2/B8	5	0
B8/S3	5	S3/B8	4	1
B9/S1	3	S1/B9	4	-1
B9/S5	3	S5/B9	4	-1
B9/S7	2	S7/B9	4	-2
B10/S1	4	S1/B10	5	-1
B10/S6	5	S6/B10	5	0
B11/S2	3	S2/B11	5	-2
B11/S4	3	S4/B11	3	0
B11/S7	3	S7/B11	4	-1
B12/S1	5	S1/B12	4	1
B12/S2	4	S2/B12	5	-1

Figure 1: Network of selected feed suppliers (S) and dairy buyers (B) in the central Arizona dairy sector

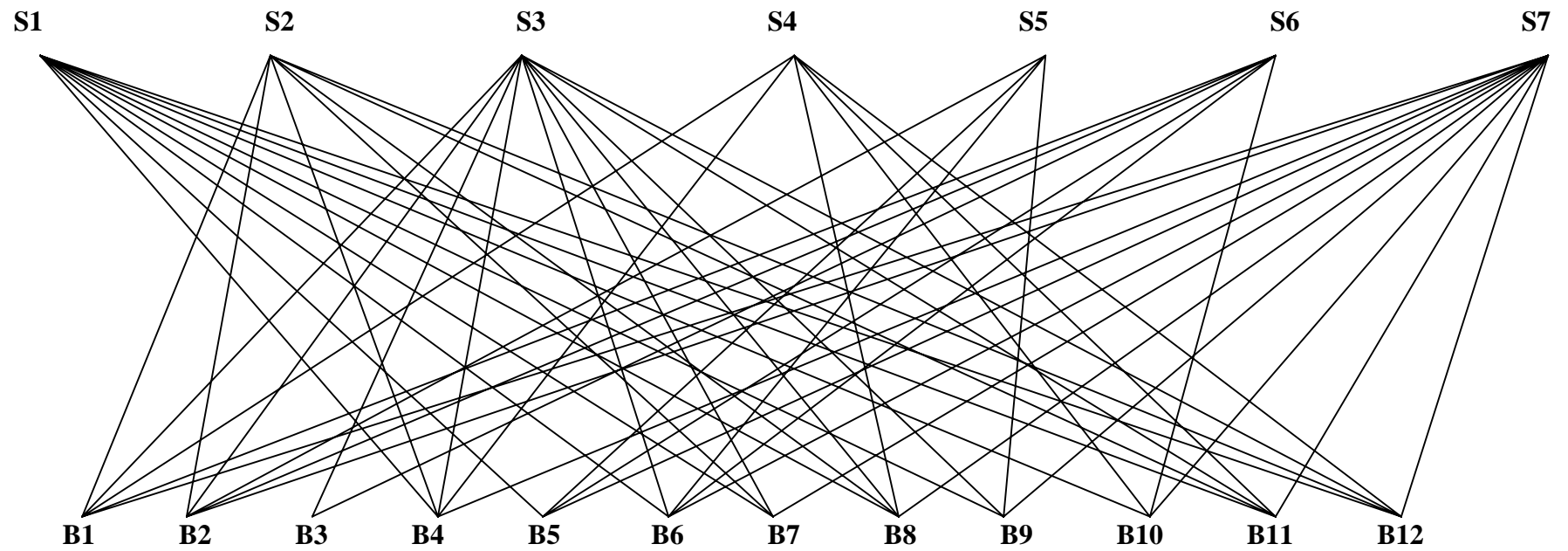


Figure 2: The B2B assurance game

		Seller	
		Honor	Exploit
Buyer	Honor	20,20	5,15
	Exploit	15,5	10,10