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COMMUNITY ENFORCEMENT OF
INFORMAL CONTRACTS:
JEWISH DIAMOND MERCHANTS IN NEW YORK

Barak D. Richman

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Harvard Law School
Cambridge, MA 02138

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ABSTRACT:

The diamond industry is home to many unusual features: the predominance of an ethnically homogeneous community of merchants, the norm of intergenerational family businesses, and a rejection of public courts in favor of private contract enforcement. This paper explains that the diamond industry's unique attributes arise specifically to meet the particularly rigorous hazards of transacting in diamonds. Since diamonds are portable, easily concealable, and extremely valuable, the risk associated with a credit sale can be especially costly. However, the industry enjoys valuable organizational efficiencies if transactions occur on credit between independent, fully incentivized agents. Thus, an efficient system of exchange will find ways to induce merchants who purchase on credit to fulfill their payment obligations.

The very features that give the diamond industry an unusual profile are responsible for providing institutions to support credit sales. A system of private arbitration spreads information regarding merchants' past dealings, so a reputation mechanism to monitor merchants can take hold. Intergenerational legacies, though restricting entry only to those who can inherit good reputations from family members, resolve an end-game problem and induce merchants to deal honestly through their very last transaction. And the participation of Ultra-Orthodox Jews, for whom inclusion and participation in their communities is equally paramount to their material wealth, serve important value-added services as diamond cutters and brokers without posing the threat of theft and flight.

Chambers of Judge Bruce M. Selya
Federal Courthouse
One Exchange Terrace
Providence, RI 02903
(401) 751-7140

155 Walden St., #2
Cambridge, MA 02140
(617) 661-1222
bdrichma@post.harvard.edu

^{*} Please send all correspondence to bdrichma@post.harvard.edu

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Why are America's diamond merchants primarily Jewish? Jewish predominance in the diamond trade spans several centuries and continents, and activity in the modern day industry is most concentrated in Jewish communities populated by the Ultra-Orthodox, a highly ritualistic Jewish sect. This paper argues that community institutions within the Orthodox Jewish community support diamond transactions and generate efficiencies that alternative economic organizations cannot achieve. Consequently, community institutions serve critical economic functions and give Jewish merchants competitive advantages over rivals.

The Jewish community's role in the diamond industry has helped sustain what appears to be an interesting paradox. On one hand, trade in diamonds invites extraordinarily lucrative opportunities for industry players to cheat (i.e. steal the diamonds). Liquidity constraints and efficiency considerations discourage simultaneous exchange, so most diamond transactions cause individual diamond dealers or brokers to possess hundreds of diamonds that they have not paid for. On the other hand, diamond traders have systematically rejected the courts and state-created law to resolve disputes. Diamond merchants reliably fulfill contractual obligations without the threat of state intervention, and this reliability enables them to credibly commit to fulfilling the obligations of time-inconsistent exchange.¹ Moreover, while one might expect large integrated firms to arise to address security or principal-agent problems,² the diamond industry remains largely disintegrated, predominated by independent merchants and family firms. This very paradox is what propels the Jewish community's success: disintegration provides the industry's economic actors with little insulation from market pressures, thus maintaining high incentive intensities for the industry's economic actors, yet the community does not suffer despite lacking traditional mechanisms, such as the public courts or the internal policing of integrated firms, to enforce contracts. A trading system that can enforce mutual exchange by fully incentivized merchants will have efficiency advantages over alternative organizations. Jewish diamond merchants are able to organize diamond transactions within such an efficient system.

¹ "Time-inconsistent exchange" is an important concept that deserves an explicit definition. Such exchange occurs when parties A and B contract to exchange items of value, but time elapses between the moment party A gives a good to B and the moment B gives a good to A, i.e. there is a separation between the "quid" and the "quo". A paradigmatic example is the credit sale, where the buyer receives the goods and pays the seller at a later date.

² This issue is addressed in detail in Section III below.

Section I begins with a fuller articulation of the historical puzzle presented by Jewish predominance in the diamond industry, and Section II describes with particularity the structure of the diamond trade and invests special attention to the unique difficulties, or contracting hazards, of typical diamond transactions. Section III then briefly discusses New Institutional Economics, the economic theory that serves as this project’s theoretical foundation, and explains how community institutions can generate efficiency advantages over alternative forms of economic organization that have no community-based support. This is a critical step because explaining *how* ultra-Orthodox Jewish merchants organize the diamond trade – the central focus of this paper – is relevant only after establishing that efficiency considerations explain *why* Jewish merchants enjoy a competitive advantage that allows the community to maintain its industry leadership. Section IV then addresses the *how* question: if efficient exchange involves independent, strongly incentivized agents, then the central challenge to diamond traders regards governance. This discussion examines the economic players in the diamond industry, many of whom are Orthodox Jews, and explains how they are induced to cooperate with fellow diamond merchants and, despite profound attractions to cheat, comply with their contractual obligations. Section V briefly reviews how diamond networks in some other diamond centers – Antwerp, Mumbai, Hong Kong, and Israel – similarly manage contract enforcement, and Section VI offers concluding remarks.

Previous Scholarship

The diamond industry is already the beneficiary of two valuable examinations, and several other important papers discuss related topics, such as the interplay between communities and market exchanges. It is important to articulate how this paper is distinct from previous work and identify its contribution to scholarly literature.

The first examination of transactions in diamonds was by Roy Kenney and Benjamin Klein, who examined De Beers’ restrictive sales policy of “block booking.”³ De Beers, which sells rough (i.e. unpolished) diamonds atop the distribution chain, only sells diamonds in heterogeneous bundles and charges a single, nonnegotiable price.⁴ Thus, instead of pricing individual diamonds according to their market value, De Beers bundles many heterogeneous diamonds together and charges the approximate average price. Kenney and Klein observed that block booking is actually a strategy to minimize transaction costs. Unpolished diamonds command highly uncertain value – the stone’s eventual value is a function of how it is cut, to whom it is later marketed, and for what purpose it is used (finding the ‘right’ buyer for a given stone can substantially increase the sale price)⁵ – and maximizing a stone’s value requires a significant expenditure of resources in examining, evaluating, and sorting the diamonds. De Beers policy of block booking allows the company to transfer the transaction costs of sorting and inspecting the stones to the downstream dealers who have greater exposure to market information and need only inspect their individual bundles. The Kenney and Klein analysis is particularly

³ Roy W. Kenney & Benjamin Klein, “The Economics of Block Booking” 26 JOURNAL OF LAW AND ECONOMICS 497 (October 1983).

⁴ The distribution chain is discussed in further detail in Section IV.

⁵ This very important issue resurfaces in Sections II and IV.

valuable in its illustration of how the diamond industry allocates responsibilities with a transaction-cost minimizing purpose, revealing that the generations-old industry has hidden efficiencies. The transaction costs discussed in the Kenney and Klein article are also important to the analysis here, but this paper examines transactions that are further downstream than those stemming from De Beers sales. This emphasis is on transactions between wholesale merchants, their brokers, diamond cutters, and end users (usually jewelry manufacturers).

A second work by Lisa Bernstein inspects these downstream transactions and, like this examination, focuses on transactions in New York.⁶ Bernstein was the first to appreciate the truly unique nature of the downstream diamond industry, and her important work describes how diamond merchants achieve valuable efficiencies by shunning formal legal instruments and instead relying on reputation-based enforcement mechanisms. Merchants consummate agreements governed by their own industry rules and resolve disputes through a specialized private arbitration board. Consequently, disputes are adjudicated swiftly by individuals with industry expertise, governed by rules and sanctions tailored to diamond transactions, and resolved without the costly litigation typical of public courts. Moreover, parties transact only with merchants with reliable reputations, and merchants' reputations are damaged if they do not abide by the arbitrators' rulings or if they become subject to a legitimate claim by a fellow merchant in good standing. The reputation-based system punishes merchants who fail to fulfill their contractual obligations by denying them the profits of future transactions. The diamond industry is a sharp, modern-day example of a reputation-based system of exchange that is much more common to pre-modern eras before reliable contract law took hold⁷ or in countries that lack effective legal systems.⁸

However, like many pioneering articles, Bernstein's analysis left open many unresolved puzzles. One remaining question asks why the diamond industry rejects public courts rather than simply employing them as a supplemental enforcement mechanism. This problem arises since the Bernstein analysis rests chiefly on a comparison of the costs of employing public law and state courts versus those of relying on the industry's own rules and specialized courts, and she concludes that diamond merchants benefit from lower litigation costs and more accurate adjudication. However, while these benefits certainly are nontrivial, this paper argues that the fundamental issue confronting diamond transactions concerns credible contract enforcement, not efficient

⁶ Lisa Bernstein *Opting Out of the Legal System: Extralegal Contractual Relations in the Diamond Industry*, 11 JOURNAL OF LEGAL STUDIES 115 (1992).

⁷ See, e.g., Paul Milgrom, Douglass C. North, & Barry R. Weingast "The Role of Institutions in the Revival of Trade: The Law Merchant, Private Judges, and the Champagne Fairs" *ECONOMICS AND POLITICS* vol. 2, no. 1 (March 1990); Avner Grief "Reputation and Coalitions in Medieval Trade: Evidence on the Maghribi Traders" *THE JOURNAL OF ECONOMIC HISTORY* vol. XLIX, no. 4 (Dec. 1989); Avner Grief "Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders' Coalition" *AMERICAN ECONOMIC REVIEW* vol. 83, no. 3 (June 1993).

⁸ See John McMillan and Christopher Woodruff, *Interfirm Relationships and Informal Credit in Vietnam*, *Quarterly Journal of Economics* (Nov. 1999); Marcel Fafchamps *The Enforcement of Commercial Contracts in Ghana*, *World Development* 24, 3 (1996); Abhijit V. Banerjee and Esther Duflo, *Reputation Effects and the Limits of Contracting: A Study of the Indian Software Industry*, *Quarterly Journal of Economics* (Aug. 2000);

dispute adjudication. Wholesale rejection of public law is motivated by the state courts' incapacity to govern diamond transactions. As is discussed below in Section IV, diamonds impose substantial threats to transacting parties because they are portable, concealable, and extremely valuable. Opportunities for theft and resale are readily available, and public courts are ill equipped to find and punish violators. A diamond thief's ability to escape to a distant jurisdiction and promptly sell stolen diamonds renders the public legal system wholly incapable – not just marginally inefficient – at enforcing diamond sales contracts. Consequently, the emergence of a system of private ordering does not rest on its marginal improvements over the public courts; instead, as this paper argues, private ordering is better explained by its ability to handle the diamond transaction's uniquely imposing hazards for which standard law enforcement is ill-equipped. This paper illustrates in detail how the diamond industry's system of private enforcement reliably secures transactions that public law is unable to enforce.

A focus on the comparison between public versus private enforcement is also problematic because it precludes consideration of other alternative systems of economic organization. Specifically, tenets from institutional economics teach that firms often arise to internalize transactions that present enforcement difficulties,⁹ yet diamond transactions overwhelmingly occur between independent merchants. The diamond industry, then, presents a provocative case study as an industry with significant enforcement challenges yet with little vertical integration. Thus, any explanation of the industry's organizational efficiencies must articulate why it eschewed firm-based exchange in addition to rejecting public courts. This issue makes necessary a broader comparison of alternative systems of exchange, provided below in Section III, that aims to understand the underlying transactional and organizational efficiencies that support the diamond industry.

A final conundrum remaining after the Bernstein analysis concerns the mechanisms that provide teeth to the diamond industry's private system of contract enforcement. One of Bernstein's central contributions was the identification of a reputation-based system in the diamond industry, and she has employed a similar meta-analysis to uncover similar mechanisms in other industries.¹⁰ However, as it is applied to the diamond industry, the examination of a reputation system would benefit from a more detailed investigation since a traditional reputation mechanism cannot support cooperation for diamond transactions. Reputation mechanisms, in which transactions are sustained because the one-time profits from cheating are outweighed by the long-term prospects of cooperation, are adequate in explaining long-term cooperation for most goods; for diamond transactions, however, a single defection – namely, stealing the diamonds – produces a one-time gain that overwhelms future profits and causes the

⁹ This principle has become widely accepted in the industrial organization literature, see, e.g., Jean Tirole *THE THEORY OF INDUSTRIAL ORGANIZATION* (MIT Press, 1988), though it originated as a foundation for transaction cost economics. See Oliver Williamson *MARKETS AND HIERARCHIES* (Free Press, 1975).

¹⁰ See, e.g., Lisa Bernstein "Private Commercial Law in the Cotton Industry" 99 *MICH. L. REV.* 1724 (2001).

standard reputation mechanism to break down.¹¹ In this important respect, diamonds are unique from other commodities, and sustaining long-term cooperation in the diamond industry requires reputation mechanisms that provide rewards for cooperation, and punishments for defection, that move beyond the simple comparison of profits (since such a comparison will always favor theft). This paper argues that supplemental mechanisms, specifically certain institutions and traditions in the Orthodox Jewish community, provide complementary rewards and punishments that play a critical role in supporting exchange in diamonds. These community institutions are central in explaining the diamond industry's success in instituting its system of private law, and they are responsible for Jewish predominance in the industry. Bernstein by no means neglects the importance of these community bonds, and she makes mention of "secondary social bonds" and the role of a "homogeneous group regime" in enforcing reputation mechanisms. But these factors are chiefly characterized as supplemental forces that support enforce extralegal contracts and remain at the periphery of her examination.¹² The approach employed here suggests that they instead deserve to occupy the center. Without supporting community institutions, the diamond industry would be unable to secure a reputation-based system of exchange. Understanding New York's efficient diamond exchange requires a detailed familiarity of the Orthodox Jewish community in which these transactions are entrenched.

This paper is further informed by assorted disciplines and thus joins several other bodies of scholarship. It joins a broader literature on reputation mechanisms that examine how contracts are enforced despite the presence of multiple trading parties and the absence of a reliable legal regime.¹³ Since most of those writings chiefly concern merchant circles in regimes that lack sophisticated legal systems, this paper adds the innovation of presenting a modern day example of successful informal contract enforcement.¹⁴ In articulating how community institutions serve economic functions, this essay joins a third body of literature that examines the economic role of social structure, or alternatively "social capital,"¹⁵ but the enforcement mechanisms offered in typical

¹¹ As one colleague coined it, "the interesting question here is: what happens to reputation mechanisms when you add a lot of zeros to the equation?" Another colleague called this "the Google Effect." The main message is that standard reputation mechanisms cannot withstand the temptations that diamonds pose for a one-time defection.

¹² See Bernstein, pp. 138-143. An additional limitation of Bernstein's treatment is that her analysis relies on assertion, and this readily invites an empirical follow-up. The proposition that ethnic ties facilitate economic transactions requires an illustration of specific mechanisms. This examination attempts to provide a specific articulation – with empirical support – of how these ethnic and community enforcement mechanisms support exchange.

¹³ See Milgrom, et al. (1990); Grief (1989); Grief (1993).

¹⁴ Similar modern-day instances of informal contract enforcement appear in Robert C. Ellickson *ORDER WITHOUT LAW* (Harvard Univ. Press, 1991); Robert C. Ellickson, *A Hypothesis of Wealth Maximizing Norms: Evidence from the Whaling Industry*, 5 J. L. Econ. & Org. 83 (1989); McMillan and Woodruff (1999); Fafchamps (1996); Banerjee and Duflo (Aug. 2000); see also Karen Clay, *Trade Without Law: Private-Order Institutions in Mexican California*, 13 J. L. Econ. & Org. 202 (1997). Many of these works are the progeny of Stewart Macaulay's influential work *Non-Contractual Relations in Business: A Preliminary Study*, 28 *American Sociological Review* 55 (1963).

¹⁵ See e.g. Robert Putnam *MAKING DEMOCRACY WORK: CIVIC TRADITIONS IN MODERN ITALY* (Princeton University Press, 1993); Clifford Geertz "The Rotating Credit Association: A 'Middle Rung' in Development" *ECONOMIC DEVELOPMENT AND CULTURAL CHANGE* 10 (April 1962);

social capital frameworks and standard reputation models can only explain long-term economic cooperation for less valuable goods and do not apply to exchange in diamonds. More significant, this project articulates specific enforcement mechanisms and relies on a formal economic model that is not typical in works discussing social capital. This is perhaps the paper's greatest contribution: it is the first to introduce specific mechanisms and offer empirical support to explain how an insular ethnic community can execute economic transactions that non-members cannot.¹⁶ Finally, this paper contributes to the body of new institutional economics research by examining the efficiencies achieved by embedded governance structures and articulating specifically how some community-based governance structures function. It thus gives concrete substance to assertions that certain human relationships include mechanisms that induce cooperation.¹⁷ The community institutions discussed here pave the way for effective contract enforcement, thus allowing Orthodox Jews to enjoy efficiency advantages over large firms and other traditional institutions of capitalism.

I. An Historical Puzzle

Jewish merchants have long played an important role in the world's diamond industry. Two Jewish brothers, living in 11th century Cairo as prominent bankers and diamond merchants, supplied the Fatimid Caliph Empire with precious stones. In the Middle Ages, when India was the world's leading source of raw diamonds, Jewish communities throughout the Indian Ocean trade routes, Egypt, Maghreb, and the shores of southern Europe were home to diamond traders and cutters. Beginning in 1492, Sephardic Jews escaping the Inquisition in Spain and Portugal built the world's then-biggest diamond market in Holland and enjoyed a virtual monopoly for several centuries. In 17th and 18th century Germany, a sizable Jewish community in Hamburg monopolized the diamond trade to the courts of Europe. And when 18th century England's trade with India made London a diamond trade center, a majority of the East India Company's diamond importers were Jewish.¹⁸ These high-level connections in the diamond world

Shirley Ardener "The Comparative Study of Rotating Credit Associations" *JOURNAL OF THE ROYAL ANTHROPOLOGICAL INSTITUTE OF GREAT BRITAIN AND IRELAND* 94 (1964); Carlos G. Velez-Ibanez *BONDS OF MUTUAL TRUST: THE CULTURAL SYSTEMS OF ROTATING CREDIT ASSOCIATIONS AMONG URBAN MEXICANS AND CHICANOS* (Rutgers University Press, 1983).

¹⁶ It is, however tempting, difficult to generalize beyond the cases examined here. The notion that ethnic communities enjoy significant trust-based relations that have beneficial economic consequences is not new. (See, e.g. Ronald Dore, *TAKING JAPAN SERIOUSLY* (Stanford University Press, 1989), Chapter 9; Janet T. Landa "A Theory of the Ethnically Homogenous Middleman Group: An Institutional Alternative to Contract Law" *THE JOURNAL OF LEGAL STUDIES* vol. 10 (June 1981)). And the dearth of empirical pieces explicating how these trust-based relations function in economic settings invites one to apply the model discussed here to other communities. But such an application suggests that other ethnic communities function similarly to the Orthodox Jewish community, which may or may not be true. This issue is further discussed at the conclusion of Section IV.

¹⁷ See Mark Granovetter "Economic Action and Social Structure" *AMERICAN JOURNAL OF SOCIOLOGY*, vol. 91, no. 3 (November 1985).

¹⁸ See Solomon Grayzel *A HISTORY OF THE JEWS* (Jewish Publication Society 1968), pp. 426-7; Salo Baron, et al., *ECONOMIC HISTORY OF THE JEWS* (Schocken Books 1975), pp. 158-161; and Abe Michael Shainberg "Jews and the Diamond Trade" *THE JEWISH DIRECTORY AND ALMANAC* (1982) pp 301-311.

perhaps culminated with the Jewish family-controlled De Beers syndicate, which in the 1960s managed the production and marketing of nearly 100% of the world's uncut diamonds and today controls approximately 65%.¹⁹

This predominance has lasted into the 20th century, as Jewish merchants remain disproportionately represented in the world's diamond centers of Antwerp, Tel Aviv, and New York. Interestingly, the modern-day Jewish presence in these diamond centers reaches deeply and most categorically into the supporting occupations diamond cutting and diamond brokering for large diamond dealers. Eighty percent of all of Amsterdam's 10,000 cutters in the early 20th century were Jewish, and in Antwerp one third of all cutters and three quarters of all brokers were Jewish. Similar percentages have been maintained into New York's 10,000 diamond workers, Antwerp's 10,000 workers, and, more obviously, Israel's 7,000 cutters and 400 factories.^{20 21} In New York's diamond industry, which is the focus of this paper, the Jewish presence is most profound at the ground level since the industry's brokers and cutters are disproportionately comprised of Ultra-Orthodox Jews, an extremist and highly ritualistic version of Jewish practice.^{22 23} The New York Diamond Dealers Club (DDC), the locus of the city's diamond trade, is a reflection of how thoroughly the Orthodox Jewish influence has pervaded the New York diamond world and has created a unique flavor to New York's industry.²⁴ During any normal business day, the DDC's main trading hall brings to life a snapshot from the past. Most traders are men with long untrimmed beards, speaking Yiddish, and dressed in a black suit with a black overcoat and a black hat or caftan. The Club also serves only kosher food and has a *Beit Midrash*, where diamond brokers regularly attend daily worship services and study traditional Jewish texts. Were it not for the modern-day building environment and sophisticated security system, the Diamond Dealers Club could

¹⁹ De Beers's control of the supply of rough diamonds has declined in recent years as some mines have begun selling directly to diamond merchants. See *infra* note 38.

²⁰ Abe Michael Shainberg "Jews and the Diamond Trade" *THE JEWISH DIRECTORY AND ALMANAC* (1982) pp 301-311.

²¹ These figures reflect the number of workers in the early 1980s, but the current number is significantly lower. Beginning in the early 1980s, Indian merchants established low-cost cutting operations that have supplanted much of the polishing in New York, Antwerp, and Israel. Nonetheless, while these cities have far fewer cutters than they did two decades ago, Jewish cutters remain predominant in those who remain.

²² For a thorough discussion of ultra-Orthodox Jewry, including a description of its origins and modern-day expression, see Samuel Heilman *DEFENDERS OF THE FAITH* (Schocken Books Inc: New York, 1992) and Silber (1992).

²³ Ultra-Orthodox Jews also play central roles in Antwerp's diamond industry, and are important to Israel's, London's markets as well. See section V, *infra*, for some discussion of these other markets. The focus of this paper, however, is the New York market.

²⁴ There is a very small, but growing, non-Jewish component of the DDC's 1,800 members. Approximately 10% (up from two percent ten years ago) of current DDC members are Indian and have connections to India's prosperous diamond trade. Robin Pogrebin "Struggling to Bring Back the Glitter" *NEW YORK TIMES* August 23, 1998, section 14, pg. 1. The Indian community's role in the diamond industry is discussed *infra* in Section V, but it is worth noting here that the Indian merchants come disproportionately from a single insular sect, the Palanpuri Jain, who claim strong ethnic ties and have a tradition of family-based businesses. The mechanisms that enforce agreements between Jewish merchants may have parallel mechanisms in the Indian community.

While intra-ethnic exchange may rely on similar mechanisms across ethnic groups, inter-ethnic exchange likely relies on a slightly different explanation. See *infra* note 90.

be mistaken for a meeting place in an Eastern European village (or *shtetl*) in the late 18th century.²⁵ The New York Times called the DDC and New York's diamond district, which spans only a single block on 47th Street, "an anachronism, a 17th-century industry smack in the middle of a 21st century city."²⁶

Jewish predominance in the industry is somewhat of a puzzle. One possible explanation relies on path dependence, characterizing the modern-day presence of Jewish diamond merchants as a product of historical momentum.²⁷ Several factors can explain why Jewish merchants traded in diamonds centuries ago. In pre-Enlightenment Europe, Jewish businesses were excluded from Western agriculture and ousted from traditional brands of handicrafts, so they were forced into becoming suppliers of finished goods and credit facilities. Jewish communities also suffered a history of expulsions and forced emigrations from Christian rulers, so they were drawn to professions with easily portable inventories.²⁸ Jewish communities were similarly marginalized in many middle-eastern and north African countries and thus similarly searched for professions that required small fixed investments.²⁹ The diamond trade met these conditions and thus became attractive to early Jewish merchants. While these observations fail to articulate why Jewish diamond merchants excelled over their non-Jewish counterparts, they do explain why there was an early match between Jewish merchants and the diamond trade. Consequently, if the diamond trade is characterized by significant barriers to entry, internal economies of scale, or some other mechanism that allows one generation of Jewish merchants to bequeath their industry leadership to their community successors, then path dependence may be able to explain current as well as past Jewish dominance.

There are a number of attractive features of the path dependency argument, including, as this paper discusses below, the observation that there are substantial barriers to enter the diamond trade (though no internal scale economies). But a community-based path dependency argument is an unusual contention since, unlike corporations or political

²⁵ The Jewish presence in the DDC goes far beyond appearance. DDC transactions are consummated with the Hebrew words "mazel u'vracha" (luck and blessing), and Jewish law plays an important role in arbitration hearings (see DDC By-Laws, Article XVIII Section 1.). Moreover, the Jewish community's history of marginalization in Europe remains central in merchants' self-perception. Writing in the 1982 Jewish Almanac, then-Executive Director of the DDC (more prominent as a diamond merchant than as a historian) wrote:

"Charting the history of Jews in the diamond industry is similar to recounting our persecuted past and our reactions as a people. Jews in general have crowded into certain trades due to reasons closely related to being Jewish. Many countries have kept us as socio-economically backward as possible due to their jealousies, fears, and outright hatreds. These national biases have forced Jewish people to stay within their own districts for purposes of residence and livelihood."

²⁶ Lauren Weber "The Diamond Game" NEW YORK TIMES April 8, 2001, Section 3, pg. 1.

²⁷ Path dependency is a popular theory in political science literature, popularized in the seminal article Alexander Gerschenkron "Economic Backwardness in Historical Perspective" in ECONOMIC BACKWARDNESS IN HISTORICAL PERSPECTIVE (Harvard University Press, 1962). A good modern example is John Zysman "How Institutions Create Historically Rooted Trajectories of Growth" INDUSTRIAL AND CORPORATE CHANGE vol. 3, no. 1 (1994).

²⁸ See Marcus Arkin ASPECTS OF JEWISH ECONOMIC HISTORY (Philadelphia: Jewish Publication Society of America, 1975). See also Cecil Roth "The Economic History of the Jews" ECONOMIC HISTORY REVIEW, vol. 14, issue 1 (1961).

²⁹ Ibid.

institutions, diamond merchants have limited lifespans.^{30 31} Path dependency requires a mechanism that allows one generation to bequeath its industry leadership to its descendants. This could take one of two forms. Either today's diamond merchants can pass along a competitive competency to their families and community members that they cannot confer to non-community members (or diamond merchants simply chose to never confer such competencies to outsiders), or that Jewish community-based institutions themselves sustained the competitive competencies and bestowed upon subsequent Jewish entrants a competitive advantage over non-Jewish entrants. These contentions illustrate that a 'pure' path dependency argument – 'pure' in the sense that entry barriers alone are responsible for the historical consequence and not competitive market forces – relies on unwieldy assumptions. They are based upon the implausible assertion that Jewish families or institutions have developed know-how that only their descendants and their community members are able to acquire.

A second possible explanation for Jewish predominance relies on an "ethnic cartel" model.³² In this model, merchants in an insular community pledge to charge competitive prices only to its own community members and to sell goods only at oligopoly prices to non-members. As a result, entry into the market is tilted towards community members, causing the industry to eventually become dominated by the ethnic community. The community as a whole, in turn, enjoys oligopoly rents. Though community merchants would be tempted to deal more favorably with outsiders, since they could easily undercut fellow merchants who abide by their pledge to offer inflated prices, those who offer discounts to outsiders are denied future business by fellow community members who dominate the industry.

The biggest problem with the ethnic cartel model, particularly as it is applied to the centuries-old diamond industry, is that it is not an efficient outcome. Cartels restrict entry and output while inflating prices, and they remain vulnerable to both efficient entrants and defection by members. In contrast, the diamond industry has weathered over 500 years of technology changes, continental wars, and transglobal migration while retaining a seemingly anachronistic distribution system. Market forces have certainly had sufficient time to devise a superior industry structure to unseat a Jewish regime, if such a regime operated under the ethnic cartel model, and it is safe to assume ex-post efficiency.

Moreover, certain empirical observations of the diamond industry contradict ethnic cartel predictions. First, though entry has been limited, history has shown that the profile of the diamond industry sometimes changes over time. For example, there has

³⁰ Samuel Huntington noted "Keynes' percipient remark that 'In the long run we are all dead' applies to individuals, not institutions." POLITICAL ORDER IN CHANGING SOCIETIES (Yale Univ. Press, 1968)

³¹ Bernstein (1992) may be home to a path dependency argument since it accredits current Jewish predominance in the industry to Jewish concentration in early diamond centers. The past's "fortuitous" coincidence is responsible for the structure of today's industry. See Bernstein, note 54, pg. 140; see infra note 36.

³² See, e.g., Robert Cooter "Law From Order: Economic Development and the Jurisprudence of Social Norms" in Mancur Olsen & Satu Kahkonen, eds., A NOT-SO-DISMAL SCIENCE: A BROADER, BRIGHTER APPROACH TO ECONOMIES AND SOCIETIES (New York: Oxford University Press, 2000).

been impressive entry from Indian merchants in the past decade.³³ Second, the ethnic cartel model predicts that insiders will restrict output to outside merchants, but in fact we see diamond merchants engage in active, competitive marketing of wholesale diamonds to buyers of a different ethnic community. This suggests that ethnic predominance is explained not by cartel behavior but rather by a certain competitive advantage that community members enjoy.

This paper follows a third approach that refutes the ethnic cartel analysis and encompasses some path dependency questions within an efficiency analysis. Rather than explaining current Jewish diamond merchants as products of history, institutional inertia, or collusion, this alternative method presupposes that today's Jewish merchants dominate the diamond trade because they enjoy efficiency advantages over competitors. The inquiry then asks why Jewish merchants are uniquely able to organize an efficient system of diamond transactions whereas other traders are not. If the answer hinges on aspects of the Jewish community that have remained unchanged over time, then it would explain both historical and modern-day Jewish predominance in the industry since the efficiency advantages that benefit modern-day Jewish merchants also would have benefited their ancestors.

This third approach argues that there are some complementarities between the demands for efficient diamond transactions and the traditional structure of Jewish communities.^{34 35} The traditional social structure – very insular and ritualized community – remained largely unchanged in the Jewish community for several centuries up to the Enlightenment and continues (though with a very different emphasis) into

³³ See supra note 24. The proper inquiry, then, is what do these entrants have in common with those who dominate the industry? This paper argues that the answer is successful entrants enjoy similar supporting community institutions.

³⁴ The question, as it is posed here, focuses on how Jewish community institutions support the success of Jewish diamond merchants. Certainly, other ethnic groups could have community institutions that similarly aid their merchants. While this paper examines the specific attributes and consequences of certain Jewish community institutions, nothing limits the social structure argumentation to the Jewish community, as other ethnic groups may have institutions that operate identically. Equally possible is that other groups have community institutions that aid diamond merchants but through *different* mechanisms. Section V revisits this issue in discussing Chinese networks in Hong Kong and Indian networks in Mumbai and Gujarat.

³⁵ A final possible explanation, one that only deserves mention and little more, was offered by Werner Sombert (1863-1941) in *Jews and Modern Capitalism*. Sombert, attempting to refute Weber's *Protestant Ethic and the Spirit of Capitalism*, identifies a Jewish ethos as the foundation for capitalism rather than Calvinism or Puritanism. Sombert attributed Jewish commercial success to a "Jewish genius" whose roots lie in the "rational approach of Judaism towards economic problems," such as Jewish law permitting usury for non-Jews and requiring just prices. While Jewish law may have a role in aiding the community's diamond trade (a topic discussed below), Sombert's argument should be swiftly discarded. First, he does not tailor his argument to explain Jewish predominance in specific industries. Second, and more important, his argument reeks of the eugenics movement that was attractive during his time of writing. Sombert reveals this bias when he pledged his support for the Nazi regime in 1934.

I mention Sombert here to highlight an important distinction. Many European scholars in the past, like Sombert, have inquired into the causes of Jewish commercial success by asking "The Jewish Question". The approach in this paper, like other examinations of how social structure can influence economic performance (e.g. Putnam (1993); Dore (1989)), is starkly different. This is an examination of institutions, not genes, and this methodology is applicable to other communities with similar community institutions.

modern-day New York's Ultra-Orthodox communities. In this important respect, it distinguishes itself from Lisa Bernstein's original examination of the diamond industry, which argued, "The original reasons for [Jewish] involvement in the diamond trade were largely fortuitous."³⁶ While the Bernstein approach acknowledges the strong presence of ethnic insularity among diamond merchants, it does not argue that ethnic homogeneity is essential in supporting the diamond industry. In contrast, this paper contends that the diamond industry found its way to Jewish communities because of efficiency considerations, and since the traditional social structure remains intact in New York's ultra-Orthodox communities, an understanding of what generates their current competitive advantage can also serve to explain Jewish merchants' historical predominance in the diamond industry. Specific attributes of Jewish community institutions support efficient exchange, and this paper aims to understand precisely how those attributes create a competitive advantage for Jewish merchants.

II. Diamond Transactions

A Diamond's Path & Time-Inconsistent Exchange

A diamond's path from the mine to the consumer goes through several intermediaries.³⁷ The journey for most stones begins in African, Australian, and Canadian mines, and approximately 65% then go to the De Beers-controlled Central Selling Organization (CSO) in London.³⁸ The CSO distributes its supply of rough diamonds through four brokers, who sell presorted boxes of diamonds to 125 specific merchants, known as "sightholders", during individual "sights," or viewing sessions, in London.³⁹ These bundles are sold at a non-negotiable price, and if the sightholder refuses, he will not be invited to future sightings.⁴⁰ Accordingly, sightholders rarely refuse since they reap substantial rents from their valuable position atop the distribution chain.

³⁶ Bernstein (1992) note 54, page 140.

³⁷ In 1997, the sale of rough diamonds from mines was \$6.8 billion, and the value of diamond content in global retail jewelry sales totaled \$12.8 billion. See WORLD DIAMOND INDUSTRY DIRECTORY AND YEARBOOK. Annual diamond jewelry sales total \$55 billion. David Buchan, et al., "The Deadly Scramble for Diamonds in Africa" FINANCIAL TIMES July 10, 2000, pg. 6.

³⁸ The De Beers cartel owns the mines of approximately 50% of the world's diamonds, with the additional 15% entering its control through exclusive purchase agreements. As recently as the 1990, De Beers controlled 80% of the world's diamonds and controlled 100% in the 1960s. The recent decline in market share resulted from mines in Russia, Australia, and Canada electing to market their diamonds directly in Antwerp instead of participating in the CSO cartel. These developments, plus others (see infra note 39) have prompted De Beers to change its business strategy away from market control and towards marketing a brand name. See Weber (2001); Emma Muller "De Beers Leads the Diamond Trade Downstream" FINANCIAL TIMES February 1, 2001, pg. 40.

³⁹ De Beers has reduced the number of sightholders over the past few years. In 1982, Kenny & Klein spoke of approximately 300 sightholders. Bernstein in 1992 wrote about 150-200 sightholders. Recent reports now list 125 sightholders, and some indications suggest that De Beers plans to further reduce that number to as little as 60. This is part of De Beers' recent effort to consolidate the industry. Muller (2001).

⁴⁰ The efficiency implications of this distribution method were mentioned briefly above. See Kenny & Klein, supra note 3.

Sightholders then sell their rough diamonds to a network of individual dealers, approximately 80% going first to the diamond bourse in Antwerp. Then, the process of cutting and sorting begins, where Antwerp merchants either arrange for polishing the stones themselves or sell the rough diamonds to other dealers who arrange for cutting in India, China, Israel, New York, and other cutting locations. Dealers continue to resell the rough and polished diamonds, in increasingly smaller bundles the farther along in the distribution chain they find themselves, until they reach a jewelry manufacturer for commercial sale. Many dealers also use brokers, who work on small commissions, to assist these sales and find the best price for a given stone.

The multiple transactions reflect the significant variability of valuations for individual stones. Different end consumers place very different values on a given stone (depending both on an intended use for a diamond and on subjective judgments), so finding the optimal buyer for a specific stone is a very profitable enterprise. However, as Kenny & Klein observe, the process of inspecting and selecting diamonds is a time-consuming process.⁴¹ Consequently, the industry is home to many middlemen who create value and collect revenues merely by matching buyers with certain types of stones. These middlemen provide important value-added services since finding the optimal buyer for a given stone generates substantial profit increases. In one day, a diamond can move from one end of New York's 47th Street diamond center to the other, doubling in value after passing through seven or eight hands.⁴²

Accordingly, a diamond will pass through many transactions before it reaches a consumer. This frequent trade and barter is typical of the diamond industry, particularly in Bourses that are designed to house these transactions. In addition, diamond merchants display a unique zeal for these diamond trades. One insider shared the following parable:

One diamond dealer said to another, "The most magnificent diamond has come into my hands – you simply have to buy it." The other inspects the diamond, agrees that it is exceptional, and the two negotiate a price. A few days later the first dealer finds the second and says, "Do you still have that diamond? I've never seen such beauty, and I hope you'll let me buy it back from you." They agree on a price 15% above the original purchase price. More days pass, and the second dealer approaches the first and says "You know, I've done nothing but think about that diamond, and I simply must repurchase it." They agree on a price with another 15% mark-up. One more time the first dealer finds the second and says, "That diamond was so perfect – I would love to buy again." The second apologizes and informs the first that he sold it to a jewelry manufacturer, to which the first responds, "But why? We were doing such wonderful business!"⁴³

This story may capture the passion that dealers have for diamond trades, but it does not quite capture the fervor and intensity that swirl around the trading floors. Price, payment schedule, method of payment, and credit security are all variables that enter into a deal.⁴⁴

⁴¹ See Kenny & Klein, *supra* note 3.

⁴² Weber (2001).

⁴³ Interview with the author, August 2000.

⁴⁴ In one visit to the DDC, the author overheard a vigorous debate over how a buyer would pay for a diamond consignment. The final phase of the debate – long after the price and payment schedule were agreed – had the buyer offering to pay with a certified check while the seller demanded a bank check (this was an instance where the transactors did not know each other and agreed to a simultaneous exchange,

Different proposals shoot back and forth, sometimes with brokers consulting simultaneously on a cell phone with the dealer they represent, and some liken the intense negotiations to heated talmudic debates that are typical in *Yeshivas* (traditional houses of learning) and study sessions in the DDC's *Beit Midrash*.

Despite the steady stream of diamond transactions, neither the flow of diamond supply and nor the flow of demand is fluid. On the supply end, there are ten CSO sights each year, one held approximately every five weeks. The sight holders are required to pay the CSO in full within seven days of the sight, but it can take three-four months for a manufacturer to sort, polish, and sell all of the diamonds in the bundle. Similarly, dealers who are not sight holders purchase their supply of diamonds on a cycle that follows, but lags behind, the schedule of sights. They also, as well as others farther down the supply chain, receive their diamonds in discrete increments. On the demand side, retail demand for diamonds is highly seasonal, as 30-40 percent of all U.S. sales occur in November and December. Meanwhile, the pace of manufacturing, particularly diamond cutting and polishing, is constant since the cutting process involves one cutter and one stone at a time.⁴⁵ Therefore, efficient utilization of diamond cutters requires polishing stones throughout the year, despite the irregularity of supply and demand.

Historically, diamond merchants have always had to balance capacity constraints in manufacturing with waves of supply and demand. An economic boom in 1820 Amsterdam led to the emergence of many new factories, but work was never constant and cutters were hired on a temporary basis while maintaining consistent work elsewhere. When sailing ships came into port from Brazil with rough diamonds, the factories bustled to cut and polish the new shipment. And when the consignment was polished and the dealers scurried to sell the polished stones throughout the Royal Courts of Western Europe, work ceased.

Consequently, selling diamonds on credit is far more preferable than simultaneous exchange. Credit sales allow merchants to balance their inventories and manufacturing schedules to the ebbs and flows of supply and demand. Moreover, liquidity constraints are very tight for merchants since most merchants work for themselves as individuals, not for heavily capitalized corporations, and many dealers concede that they can get a better

which is a less common but not unusual arrangement). For both simultaneous and time-inconsistent transactions, considerable care is invested in even the small details of such sales.

⁴⁵ In fact, cutting technology for large stones has changed very little over the past centuries. Cutters hold a diamond firmly in a metal grip and deliberately place it at a desired angle against a rotating grinding wheel. In earlier generations, the grinding wheel was rotated mechanically by hand cranks or foot pedals, whereas modern grinding wheels are electric and use more sophisticated grips, but the underlying process is essentially the same. The 1982 Jewish Directory and Almanac contains a dramatic illustration of this technological constancy: a 1850 original engraving of a diamond cutter, a 1912 picture of diamond cutters in an Antwerp attic, and a picture of a large warehouse for diamond cutting in the early 20th century show diamond cutters sitting before a grinding wheel. One would see a similar sight in several small offices along 47th street in Manhattan. (Some mechanical and high-volume processes, however, have been developed for smaller, less valuable stones; these processes are much more common to cutting centers in India and China than in Antwerp and New York).

price if they extend credit to their buyers.⁴⁶ Efficiency considerations thus lead to time-inconsistent exchange, where there is a separation of the quid from the quo, and the terms of future payment become a principal element of negotiations in a transaction. The role of credit in diamond transactions is so central that Bernstein (1992) called the market for diamonds “an implicit capital market.”

The New York Diamond Dealers Club

Nearly half of the world’s diamond jewelry sales are in the United States, and 47th Street merchants handle over 95% of the diamonds imported into the U.S.⁴⁷ Manhattan’s crowded diamond district and its New York Diamond Dealers Club (DDC), the district’s bourse and the industry’s epicenter, serve as the gateway to the American market.

The DDC is also home to a very unique and insular business environment. Comprised of 1,800 members, the DDC issues trading rules to govern diamond sales and provides a mandatory private arbitration system to resolve all disputes between merchants. This private system replaces any opportunity to seek redress from a state court, and any member that does resort to outside courts will be fined or expelled from the club.⁴⁸ The DDC’s organization of private law and private ordering has been hailed as efficient and effective governance mechanisms to enforce executory agreements.⁴⁹

However, the DDC’s private arbitration system, on its own, is wholly incapable of enforcing agreements and is toothless in punishing diamond theft. Most of its shortcomings mirror the reasons public courts are also incapable of preventing theft.⁵⁰ Because diamonds are portable, concealable, and universally valuable, a diamond thief can easily escape to a hidden location and dispose of stolen diamonds.⁵¹ Moreover, many

⁴⁶ An alternative to selling diamonds on credit is for a diamond merchant to seek credit elsewhere. However, as Bernstein (1992) explains, diamond merchants can obtain credit from each other at a lower cost than they could elsewhere. First, they save the additional set of transaction costs that accompany a third party, such as a bank or other provider of credit. Second, if diamond merchants transact with each other regularly, they have more information about the buyer’s creditworthiness than would a bank, thus reducing adverse selection costs.

⁴⁷ Nearly half of the world’s diamond jewelry sales are in the United States, and over 95% of the imported diamonds are handled by 47th Street merchants. Thomas J. Lueck “Diamond District Tries to Dispel Its Private Bazaar Image” NEW YORK TIMES December 12, 1997, Section B, pg. 1.

⁴⁸ See DDC By-laws, Art. 12, Sect. 1c.

⁴⁹ Bernstein (1992).

⁵⁰ The expertise of the DDC’s arbitration board, however, is one aspect in which it is superior to public courts. Diamond merchants are familiar with the process of identifying diamonds, so the evidentiary process of recognizing stolen goods is probably less costly in the private system than in the public courts. Other benefits of the private versus public system result from the DDC’s expediency, accuracy & consistency (products of expertise), and reduction in court-related transaction costs. See Bernstein (1992), pp. 135-8, 148-151. Of course, these mean nothing without the ability to enforce rulings.

⁵¹ The usefulness of formal law enforcement is particularly weak in diamond disputes since a stolen diamond is indistinguishable to the untrained eye from another. Interestingly, this is not a limitation of the DDC’s arbitration board. A remarkable feature of diamond merchants is that they are able to recognize specific diamonds, thus enabling a dealer to lend one of his diamonds to another for temporary inspection.

dealers, particularly middleman brokers, are essentially judgment proof, so both public and private ordering are unable to recover restitution from a person who has squandered another's diamonds and becomes unable to pay.⁵² The arbitration board can revoke an individual's Club membership or fine him, but those sanctions are only effective if the party intends to continue transacting in diamonds. An individual can ignore the board's ruling if he decides never to transact again. While decisions by the DDC's arbitration committee are enforceable in New York's state courts,⁵³ such appeals very rarely happen since it resolves none of these barriers to enforcement. Illustrating the limitations of both public and private enforcement mechanisms is the following admission by one diamond dealer: "the truth is that if someone owes you money, there's no real way to get it from him if he doesn't want to pay you."

It is revealing, given the centrality of time-inconsistent exchange and its associated dangers, that diamond traders rely on an enforcement system that is effective only on cooperating parties. The reach of the DDC arbitration board is limited to restricting a diamond merchant's future transactions – it can only act prospectively against merchants who place value in maintaining a good reputation. The strength of the DDC's dispute resolution system rests on the degree to which it supports reputation mechanisms and precludes past cheaters from future business. The DDC fulfills this role by serving two extremely important functions.

When the potential buyer returns the diamond, the dealer is able to confirm that the diamond he received was the correct one.

⁵² Concerns about payment are contractual hazards that place a risk on the seller. A second category of contractual hazards involves risks assumed by the buyer. While nearly all diamond purchasers are able to roughly assess the value of a diamond along the Gemological Institute of America's dimensions (the 4Cs – carat, cut, clarity, and color), there are certain risks that they cannot confirm. One example is that diamonds can receive laser treatments that improve the stone's color, but a treated diamond is less valuable than an untreated diamond of equal color. Since only a complex laser examination can detect whether a diamond is treated, a buyer often makes a purchase based on a seller's representation.

Similarly, a diamond's origins cannot be verified upon inspection. This has become increasingly relevant with the rise of "conflict diamonds", diamonds mined in some African nations (particularly Angola, Sierra Leone, and Congo) by political-military organizations determined to overthrow a recognized government. Since the conflict diamonds sales fund some of the most brutal military campaigns, many consumers refuse to purchase them and many jewelers refuse to use them (note: none of the diamonds sold by the Central Selling Organization are conflict diamonds). They nonetheless make their way through an elaborate global network from the African mines to Antwerp for sale. De Beers estimates that conflict diamonds constitute 4% of the world's market, though the US and UK governments suspect that the figure is significantly higher. See David Buchan, et al., "The Deadly Scramble for Diamonds in Africa" *FINANCIAL TIMES* July 10, 2000, pg. 6; Alex Duval Smith "The Gem Trail" *THE INDEPENDENT* February 13, 1999, pg. 18; Nicky Oppenheimer "Diamonds and Dictators" *WASHINGTON POST* December 29, 1999, op-ed, pg. 27. Some mines have tried to resolve this hazard by using a laser to inscribe a trademark on their rough diamonds. See, e.g., James Brooke "Canada Tries to Make Clear Its Diamonds Are Different" *NEW YORK TIMES* August 12, 2000, Section A, pg. 1. For most diamonds, however, this is a contractual hazard that places risks on the buyer.

⁵³ A party can appeal an arbitration board decision to New York state court only if there is a procedural irregularity. The board's substantive decisions are not reviewed. See *Rabinowitz v. Olewski*, 100 A.D. 2d 539; 473 N.Y. 2d 232; see also *Goldfinger v. Lisker*, 508 N.Y.S. 2d 159.

The DDC's first, and foremost, function is to facilitate a flow of information about market participants and business opportunities.⁵⁴ Indeed, this historically was the role of diamond bourses and their informal predecessors. The Jewish Directory and Almanac writes:

Diamond clubs sprang from café meeting places where dealers congregated to exchange information and create business. The cafes lead to private houses, used as places for the conducting of business in a private and safe setting. The origin of the word Bourse (trading exchange) can be traced back to the city of Bruges, Belgium in the 15th century where international diamond dealers met in the house of a nobleman named Van der Beurse.⁵⁵

This short history illustrates that diamond merchants always relied on an infrastructure to organize a network of dealers. Networks first revolved around private relationships, either among colleagues at cafes or an intimate gathering at an individual's home, and allowed merchants to become familiar with the parties with whom they transact. As the industry grew, cafes and private homes could not provide the infrastructure to support the required information networks and were replaced with formal bourses. Bourses now serve as vital fountains of information, as the need to be familiar with business partners remains central to diamond transactions. When interviewed, New York's diamond dealers continually emphasize their demand to know and to trust their business partners (sometimes an acceptable substitute is to get character recommendations from a familiar source that they trust). New and unfamiliar traders are heavily distrusted.

The DDC supports information exchange with several mechanisms. First, the floor of the trading hall is bustling with information about parties and market conditions, and some traders spend time on the trading floor just to keep abreast of available information. Traders on the floor will ask others about potential business partners and get references, and supplementary credit reports about diamond buyers float throughout the trading community.⁵⁶ Certainly, DDC members share information outside the Club's halls as well, and enjoying mere membership gives a merchant entry into a global information network. Thus, the Club creates both a physical and a psychic infrastructure that facilitates information sharing between members. A second mechanism is the wall of the trading floor. The wall posts the pictures, background, and references of any visitor to the Club, providing easy referral for potential business dealings (most visitors also require a sponsor by a member, who is cited along with the visitor's picture), and also invites comment from members regarding the induction of dealers applying for Club membership. More important, the judgements of all arbitration boards determinations are posted on the wall along with the pictures of any party who is responsible for an

⁵⁴ Bernstein (1992) writes, "The bourse is an information exchange as much as it is a commodities exchange. As one member put it, "the bourse grapevine is the best in the world. It has been going for years and moves with the efficiency of a satellite communications network ... Bourses are the fountainhead of this information and from them it is passed out along the tentacles that stretch around the world."

⁵⁵ Shainberg. Pg. 308

⁵⁶ The *Rapaport Diamond Report* collects information about all participating diamond purchasers, particularly jewelry manufacturers, and assigns each a credit rating. It is the Moodys of the diamond industry. Diamond dealers are very hesitant to sell to a buyer who does not have a credit rating. Interestingly, such credit ratings are often necessary but not sufficient to convince a seller to sell on credit, as most also demand a personal reference.

outstanding debt. This information is shared with all of the world's bourses, so pictures of delinquent debtors from across the world are prominently posted in the NYDDC trading hall. Conversely, maintaining good standing as a DDC member – and preventing your picture from ever reaching the wall – also becomes well known and functions as an important information signal. Section IV describes how this flow of information enables reputation mechanisms to enforce contracts.

The second important function relates to the DDC's membership.⁵⁷ As was noted above, nearly 85-90% of DDC members are Jewish, and a visitor is struck by a pervasive presence of Ultra-Orthodox Jewry in the Club. Since Orthodox Jews tend to live in specific, insular communities, this means that familiar business relationships are also familiar community relationships, and the members' ties to each other do not end at the Club's door. Moreover, many Club members were sponsored by close family members, creating extended family networks within the Clubs larger community and reinforcing the intimate familiarity Club members have with each other (in this sense, the term 'club' accurately reflects the DDC's culture). The other significant contingent of the DDC's membership is Indian, who comprise approximately 10% of all members and, importantly, enjoy family and community relationships that exhibit many of these same qualities. Indian diamond business networks are also family and clan-based, and business dealings are deeply intertwined with private community affairs (Indian diamond traders are discussed at length in Section V). Consequently, the Club's membership profile – even for the small minority of non-Jews – is such that sharing information about business dealings is facilitated by community connections and personal relationships.

Given the intimate nature of the DDC's business community, it may not be surprising that the Club elects to resolve business disputes without resorting to outside state courts.⁵⁸ Nonetheless, the predominance of time-inconsistent exchange and the limited reach of the arbitration board's power pose a genuine puzzle as to how sales contracts are reliably enforced. The issue of enforcement is addressed comprehensively in Section IV. The main points to emphasize at the close of this section and to introduce the next section concern the unique nature and context within which diamond transactions take place. Efficient transacting has a diamond delivered before payment, and the DDC is home to unique business mechanisms and ethnic connections that support reputation mechanisms.

⁵⁷ The DDC currently has approximately 2,000 members, and in most years there is a waiting list for membership. Dealers petitioning for membership must survive a rigorous informational review, with more lenient requirements governing the admission of immediate family members. See DDC By-laws, Art. 3, Sect. 8., regarding entry requirements (Applicants must (1) have worked in the industry for at least two years, (2) comply with the board of directors' requests for information, and (3) have his picture posted on the trading floor wall for ten days so members have an opportunity to comment). See DDC By-laws, Art.3, Sect. 3b regarding membership requirements for immediate relatives of current DDC members in good standing.

⁵⁸ The flip side of the Club's intimacy is its intense commitment to privacy and hostility to outsiders. Arbitration hearings are intensely secret, and Club members are extremely hesitant to share any information about the Club with outsiders. Most of the author's interviews with DDC members began with the interviewer asking who the interviewer was and whether he had any family members in the diamond trade. These were requests for character recommendations, much like reference requests commonly made to potential business partners.

III. Discrete Structural Alternatives

This section serves as a brief yet critical bridge between the preceding and following sections. Section II illustrates the advantages of purchasing diamonds on credit, but replacing simultaneous exchange with time-inconsistent exchange replaces one set of problems with another. While purchases and sales on credit expand the number of transactions a given merchant can execute within a liquidity constraint, they introduce multiple contracting hazards, notably the threat of late payment or no payment. Section IV explains how the diamond industry's institutions and Jewish community institutions team together to enforce these executory agreements, which is the central question in this inquiry. The mechanisms described there, however, are not the only available means to ensure that the possessors of another's diamonds do not steal or cheat, and the efficiency of the industry's enforcement mechanisms must be evaluated in comparison to these alternatives. This section examines the comparative efficiency of New York's reputation-based system with other possible governance mechanisms found within the diamond industry.

The enormous and costly threat of diamond theft and the inadequacy of public law enforcement to punish diamond thieves limit a diamond owner to a small number of mechanisms that can effectively govern time-inconsistent exchange. One monitoring strategy that has proven to be effective is to internalize transactions into a firm where managers can tightly supervise employees. This is the strategy successfully utilized by diamond miners and other large-scale operations that employ many workers. To illustrate, large-scale mining operations require directing workers to perform functions in which they will assume possession of diamonds that belong to their employers. Mine operators manage this risk by confining all employee handling of diamonds to discrete physical locations where x-ray machines and other tools guard against employee theft. In fact, some mines have earned notorious reputations for intrusive employee monitoring. South Africa's Truth and Reconciliation Committee criticized De Beers-operated mines for forcing their employees to live away from their families and in grim hostels on the mining site.⁵⁹ Worse, the Revolutionary United Front, the rebel movement that controls several diamond mines in Sierra Leone, brutally restrict the movement of thousands of men and boys, who some have labeled "today's slaves."⁶⁰ Such intense monitoring is, in part, a response to creative attempts at theft that include workers swallowing diamonds or hiding them in the heels of their shoes. One racket at a Namibian mine involved pigeon fanciers who recruited miners to bring homing pigeons into the mine in lunchboxes and strap diamonds to their feet.⁶¹

⁵⁹ Alex Duval Smith "The Gem Trail" THE INDEPENDENT February 13, 1999, pg. 18,1. In De Beers defense, Harry Oppenheimer, who controlled the company from 1954-1994, was an outspoken critic of Apartheid as a member of South Africa's Parliament. Donald G. McNeil, Jr., "A Diamond Cartel May Be Forever" NEW YORK TIMES January 12, 1999, Section C, pg. 1.

⁶⁰ David Buchan, et al., FINANCIAL TIMES July 10, 2000.

⁶¹ Alex Duval Smith THE INDEPENDENT February 13, 1999.

In addition to mining and extracting operations, large diamond cutting and polishing factories also use firm-based monitoring mechanisms.⁶² While many cutters, including those in New York, are self-employed and are not carefully monitored by those who contract with them, most diamond cutting occurs in large factories in India, Thailand, and China that employ inexpensive, low-skilled labor. These large factories employ governance mechanisms that resemble the careful employee monitoring that occurs in diamond mines.⁶³ Other diamond activity where agents are intrusively monitored includes diamond grading, such as is done by the Gemological Institute of America, where gemologists examine and grade diamonds within a closed, tightly secured complex.

Many diamond transactions, however, occur outside the boundaries of firms and are beyond the reach of firm-based monitoring. These time-inconsistent transactions exclusively take place within relationships characterized by mutual trust. The *New York Times* editorial notebook wrote:

In the Diamond District, mutual trust enriches everyone. To reach scattered customers, dealers trust intermediaries with stones of considerable value. Their security is guaranteed by the middleman's signature on a memorandum receipt. ... On that slender record, gems worth thousands of dollars traverse the street, and are distributed among buyers from Bombay and Buenos Aires, Pawtucket and Dubuque.⁶⁴

This is a theme that diamond dealers continually emphasize in conversations. Trust relations determine with whom they transact and with whom they contract to polish or broker their stones. Moreover, large deals are consummated by handshakes and verbal pledges, and merchants' livelihoods thrive on their reputations as trustworthy individuals.⁶⁵

⁶² Small diamond cutting firms have enjoyed successful monitoring of employees for generations. A series of fascinating examples occurred in the years during World War II, when some of Antwerp's and Amsterdam's Jewish diamond merchants and factory owners fled Nazi persecution. Many landed in nations, such as Cuba and Mexico, that previously had no history with the diamond trade. Nonetheless, many of these refugees were able to establish small cutting operations by employing local workers. See David Federman "Diamonds and the Holocaust" MODERN JEWELER March 1986.

⁶³ Some of these cutting factories also deserve notorious reputations for their treatment of employees. A major diamond labor union recently issued a writ complaining that thousands of diamond cutters in Gujarat, India worked in conditions that violated Indian labor laws. One advocate described their employment conditions as "bonded labor." "Notice to Labour Commission on Diamonds Workers' Plight" THE TIMES OF INDIA September 16, 2001. Indian cutters are also subject to severe sanctions by their employers if suspected of stealing diamonds. See, e.g., "Diamond Cutter Beaten to Death" THE TIMES OF INDIA May 29, 2000.

⁶⁴ Roger Starr "The Real Treasure of 47th Street" NEW YORK TIMES March 26, 1984, Section A, pg. 18. Many diamond merchants suggest that the dollar value of the diamonds belongs in the millions, not thousands.

⁶⁵ Not all transactions in New York occur within a relationship where the parties trust each other. When transacting parties do not know or trust each other, sales can occur if simultaneous exchange – usually at less favorable terms – replaces purchases on credit. When exchange is time-inconsistent, trust governs the business relationship. The favorable terms and flexibility of credit sales are reasons why merchants who enjoy the trust of their colleagues have competitive advantages over untrustworthy or unknown parties.

Accordingly, two distinct monitoring systems – alternatively described as trust and non-trust mechanisms – govern the vast majority of diamond transactions. Both are discrete structural alternatives in governing time-inconsistent exchange. It is important to note, however, that both systems of exchange are not readily available to prospective diamond merchants. Opening a factory and closely monitoring workers involve technology that is likely available to any careful entrepreneur, and thus it is reasonable to conclude that activities that employ the non-trust system are not subject to any imposing entry barriers. Indeed, diamond mining has witnessed several new entrants in recent decades, including the Argyle mines in Australia in 1983 and the Yellowknife mines in the Northwest Territories of Canada in 1991. Similarly, diamond cutting is new to Thailand and China, allowing many new cutters to enter the trade, though the owners of these factories have tended to be long-term players. In contrast, trust-based relationships are relationship-specific, and an unfamiliar entrant does not enjoy the trust of existing players in the trade. While the non-trust system may be available to all, trust-based exchange is only available to insiders.

Section IV discusses how trust-based exchange is sustained, for trust is only the consequence of several instruments that can enforce agreements and punish defectors (i.e. trust is not exogenous). That question, however, is only important because trust-based mechanisms enjoy certain organizational efficiencies over non-trust systems. Certainly, New York’s diamond industry could organize exchange within the non-trust equilibrium. The city’s cutters would work within a large, contained warehouse where diamond owners would monitor them carefully, and diamond middlemen would only possess and sell their employer’s diamonds within a contained, carefully monitored trading hall. New York’s arrival at a trust-based system – and why merchants who sustain trust-based business relationships, such as Jewish merchants, enjoy industry leadership – stems from the efficiency advantages trust-based relationships generate over non-trust relationships.

The trust-based system of exchange is more economically desirable for a number of reasons. First, such exchange economizes on monitoring costs. Mining operations expend significant sums on x-ray equipment, security, and other methods of supervision. Trust-based systems, alternatively, require expenses for mechanisms that spread information about individuals’ reputations. These two different categories of expenditures may not lend themselves to a direct comparison, but it is safe to conclude that the costs to support the DDC’s information mechanisms – such as posting notices with pictures, or creating a common space for members to congregate and converse – are far less than the costs of heavy machinery and restrictive employment devices that mine operators and large factory owners assume.

Second, trust-based exchange does not require agents to remain in a single location. This is less useful for polishing since the cutter is tied to his cutting machinery, but because the search for the optimal buyer can create substantial value for a seller, a diamond owner will benefit from employing salespeople who search for buyers. Trust-based systems allow for such use of brokers or salespeople, whereas they otherwise would have to rely on buyers coming to secure locations. However appealing this argument seems, it is limited by the observation that most of the world’s diamond sales

occur in specific, secure locations, such as the world's bourses. Instead of sellers seeking buyers, the industry often has buyers traveling to bourses or other central trade centers to seek sellers. Shifting search burdens from sellers to buyers may not have any efficiency implications.

A third advantage of trust-based exchange, and perhaps the most compelling, is drawn from New Institutional Economics, which offers a system to evaluate the comparative efficiencies of alternative systems of economic organization. Trust-based exchange occurs between autonomous agents, such as self-employed brokers and cutters, whereas reliance on firm-based monitoring requires internalizing diamond transactions within a firm and enduring the associated costs of bureaucracy. Such costs chiefly include an unavoidable dilution of market incentives, and thus agents acting inside a firm are less sensitive and responsive to changes in price or demand than are corresponding agents who are self-employed.⁶⁶ Responding swiftly to market information is of paramount importance in diamond transactions. As was noted above, much of the value in diamond sales lies in optimally matching a specific buyer with a particular stone, so the acquisition of market information about potential buyers leads to larger profit margins. The efficiency of the dis-integrated system of exchange is, in part, a consequence of instilling dealers with high-powered incentives to acquire this information.⁶⁷ As a result, if a system rests upon contracts between autonomous diamond merchants who are fully exposed to these market incentives yet can credibly assure payment, then it achieves efficiency gains and has a competitive advantage over the integrated firm.

Considering the comparative efficiency of trust-based systems, why then do we not observe only trust-based exchange, including throughout the cutting and mining industries? One potential response is the rigorous conditions, and their limited availability, that trust-based exchange requires, such as the community and family institutions that are described in detail in Section IV.⁶⁸ Another answer is that certain

⁶⁶ Oliver Williamson attributes a firm's incapacity to mimic market incentives to "the impossibility of selective intervention" on the part of managers and the "Fundamental Transformation" in which non-specific relationships acquire specificity when internalized within the firm. Oliver Williamson *MECHANISMS OF GOVERNANCE* (New York: Oxford University Press, 1996), pg. 49-50. For a detailed discussion of the costs of bureaucracy, see Oliver Williamson *THE ECONOMIC INSTITUTIONS OF CAPITALISM* (New York: Free Press, 1985), chapter 6.

⁶⁷ There is no doubt that diamond merchants are highly incentivized (recall, for instance, the parable above in section II). The halls of the DDC bustle with merchants huddling around prospective buyers and trying to gain information about market trends. Diamond brokers, who are compensated with a small commission for each diamond they sell, are especially active on the diamond hall. They often wait in the trading hall for new buyers and spring into action when one is spotted. Others make regular visits to jewelers on 47th street and elsewhere looking for a sale. Aggressive bargaining is also a staple of the trading hall and another indication of merchants' strong incentives. The intense dealings can be likened to rigorous Talmudic debates, and perhaps the Club's cultural homogeneity make dealers comfortable to be blunt and aggressive. Such high incentives and aggressive bargaining create lots of competition. One dealer said with frustration, "Diamonds are the best deal around – there's absolutely no room for profit!"

⁶⁸ The assertion that there is a limited availability of trust-based exchange networks is, albeit incomplete, very attractive. It can explain the concentration of trust-based exchange in high-wage countries and the proliferation of firm-based exchange in low-wage countries. Presumably, if there were a sufficient number of low-wage workers who share relationships based on mutual trust, then, holding wages constant, we

activities, such as mining and cutting, are labor-intensive activities and invite significant savings from strategies that employ inexpensive labor. Such cost savings will eventually outweigh the efficiencies gained from selecting a superior system of economic organization. However, if trust-based exchange is superior to non-trust exchange, *ceteris paribus*, a remaining question is why there is Orthodox Jewish predominance among diamond merchants but not among diamond miners. A better approach articulates why mining does not offer compelling efficiencies from trust-based exchange that are available in downstream diamond sales. Diamonds are available for mining only in specific locations and are subject to the economics of property rights.⁶⁹ A system that makes scarce land resources available to numerous independent miners leaves property rights poorly defined and invites chaos.⁷⁰ Internalizing mining activity into a single firm firmly establishes property rights and invites appropriate investments in land. A dis-integrated system, albeit with highly incentivized workers, cannot secure appropriation of value from land.

Property rights are, however, easily defined when the economic activity involves sales of individual diamonds, and a dis-integrated system of downstream diamond distribution, resting on highly incentivized merchants who exhibit trustworthy behavior, can achieve significant efficiencies. This economic potential of trust-based systems has not gone unnoticed. For example, James Coleman has observed that some Japanese communities have used trust between transactors to enjoy secure contracts without diluting market incentives. He writes:

A major reason for backward vertical integration of firms, incorporating suppliers within the hierarchical organization, is to be able to exercise greater administrative control of scheduling, quality, and meeting of design specifications. The arguments for backward integration have to do with transaction costs, which include these uncertainties and unpredictabilities involved in dealing

would observe trust-based exchange in these labor-intensive activities as well. But if trust-based systems are not widely available, non-trust systems will emerge when savings on labor and related efficiencies eventually outweigh potential organizational efficiencies from trusting parties. Such traditional (non-organizational) efficiencies are greatest for labor-intensive activities, where reducing the wage for employees translates into significant savings.

Consistent with this formulation, non-trust monitoring mechanisms are concentrated in labor-intensive activities in low-wage countries while transactions that take place between individual agents and rely on trust occur predominantly within high-wage countries. Thus, the benefits of trust-based exchange are maximized by applying its limited availability to high-wage activities. This approach is also compelling in explaining why we see diamond cutting both by independent agents (generally Orthodox Jews or other long-term players) and in large factories of employees. Diamond cutting is performed by parties within trust-based networks, but such cutters – who have specifically acquired skills – have limited capacities. Entrepreneurs must look beyond such cutters to satisfy excess demand for diamond cutting. Similarly, we observe that trusted cutters cut the most precious gems whereas large factory employees cut less valuable stones.

⁶⁹ See Harold Demsetz “Toward a Theory of Property Rights” *AMERICAN ECONOMIC REVIEW* vol. 57, no. 2 (May 1967).

⁷⁰ Equating the creation of property rights with the disappearance of chaos was noted by Ronald Coase in “The Federal Communications Commission” *JOURNAL OF LAW AND ECONOMICS* vol. 2, no. 3 (October 1959). Such chaos has been documented by visitors to some of Africa’s “public” lands where diamonds are occasionally found, where miners swing large sticks to ward off competing scavengers from their small finds. See Andrew Cockburn “Diamonds: The Real Story” *NATIONAL GEOGRAPHIC* (march 2002) pp. 10-11.

with independent firms. But integration is done at the cost of sacrificing the economic benefits of a market, which prevents monopolistic behavior on the part of a supplier. Once a productive activity is internalized within a firm, it has a partial or complete monopoly vis-à-vis the departments it supplies. Even with decentralization of organization, great difficulties arise in establishing appropriate transfer prices in the absence of a true market, and in the presence of the interests of each department in setting as high a price on its services as possible. Many of the benefits of a hierarchical organization without the disadvantages can be achieved if there is a high level of trustworthiness (in the sense of meeting design, scheduling, and quality obligations) on the part of independent organizations that could supply parts and services.⁷¹

Thus, “trustworthiness” combines the efficiencies of high-powered incentives with the security and certainty that executory agreements will be fulfilled. The challenge to economists, Coleman argues, is to understand the sources of such trustworthiness and how it affects actors’ aggregate behavior (he laments “economics has not been able to cope with the social organization of trust”⁷²). Social structure, or other hidden variables that create an environment where contracting parties trust each other, is in need of much greater exploration and formalization. With a certain social structure, an economic system can have its governance cake while eating its incentives cake. Deciphering the foundations of “the elusive notion of trust” can reveal the source of significant efficiencies.⁷³

Following Coleman’s call for a search for trustworthiness, this examination into the diamond industry is as much an examination of the social structure that underlies the industry. It seeks to explicate within a formal model how the social structure of the Jewish community is an important component of the industry’s efficiency (and, while the body of the argument is tailored to modern-day New York, the conclusions may be extrapolated to explain the Jews historic dominance in the trade; Section V discusses further extrapolations). This approach reveals that the research question is not simply why the industry has chosen to enforce diamond contracts with private arbitration instead of the public courts. Rather, the examination involves a comparison several feasible systems of enforcing agreements, and social structure and community institutions can play roles of varying prominence in the different alternatives. In other words, diamond merchants have not simply chosen to “opt out” of public courts, as Bernstein writes; they have arrived at a distinct and comprehensive system of economic organization that involves highly incentivized independent contracting parties who are embedded within a particular social structure and are consequently able to engage in trust-based transactions. This unique formula of industry demands and community institutions enable this private system to be more efficient than other structural alternatives.

This leads to section IV, which is the centerpiece of this discussion. The logic in this section only holds if the diamond industry’s private institutions can enforce contracts. The governance question is both the most crucial and most interesting issue in diamond transactions.

⁷¹ James S. Coleman “Introducing Social Structure into Economic Analysis” *AMERICAN ECONOMIC REVIEW* vol. 74, no. 2 (May 1984), pp. 87-88.

⁷² *ibid.*, p. 85.

⁷³ See Diego Gambetta “Can We Trust Trust?” in Diego Gambetta, ed., *TRUST: MAKING AND BREAKING COOPERATIVE RELATIONS* (Oxford: Basil Blackwell, 1988), pp. 213-237.

IV. Enforcing Informal Contracts

The diamond industry employs several mechanisms to enforce informal contracts. Its success is attributed to institutional complementarities – a unique combination of the industry’s structure and supporting community institutions. This section first formalizes the contracting challenge, then introduces the particular parties involved in diamond contracts, and lastly models how industry and community institutions induce each party to cooperate. A final discussion explores some efficiency implications.

The Challenge

Diamonds are easily portable and command extreme value throughout the world.⁷⁴ While these qualities make diamonds highly desirable to consumers, they also are responsible for creating uniquely difficult contracting challenges. A diamond thief can escape detection and find black market buyers with little difficulty. Malicious intentions aside, diamond dealings also present immense temptations to otherwise honest merchants. In contrast to the enormous profit that stealing diamonds offers, the industry’s competitiveness makes profit margins very thin and broker’s commissions as low as 1-2%, so payoffs from honest dealings are not large.⁷⁵ Moreover, credit sales involve large quantities of diamonds and brokers regularly have many diamonds in their possession that they do not own, presenting merchants each day with opportunities to cheat.⁷⁶

The challenge in its most simple form resembles the Prisoner’s Dilemma formulation.⁷⁷ Parties to a transaction will try to cheat their counterpart unless both parties know that there will be many more opportunities to play the same game such that the present value of future payoffs exceed the one-time gain from cheating. The Prisoner’s Dilemma for the diamond transaction presents a particularly difficult hurdle for cooperation because cheating produces a tremendous gain whereas cooperating yields only minimal profits. **Cooperation becomes even more difficult to explain if it is present**

⁷⁴ One illustration of this is the repeated observation that fugitives often transfer their assets into diamonds before escaping law enforcement. A recent example is Martin Frankel, the troubled fugitive financier whose collapsed financial schemes prompted federal prosecution, and his attempted escape from US authorities. He arranged a shadowy purchase of several million dollars of diamonds before his flight from the United States. See Ellen Joan Pollack *THE PRETENDER* (The Free Press, 2002).

⁷⁵ Profit margins tend to vary according to a merchant’s location on the distribution chain. Merchants who are perched atop the distribution chain, in particular DeBeers sightholders, likely benefit from some oligopoly rents and do enjoy lucrative businesses. The paradigmatic challenge remains, however, particularly as an end-game problem.

⁷⁶ Cheating in the paradigmatic sense is refusing to pay for diamonds received from another merchant, but cheating opportunities are by no means limited to theft. Other ways merchants can cheat – and issues that cause serious concern among diamond merchants – include submitting payment late and lying about a diamond’s quality or origin. Note that both sellers and buyers confront these lucrative opportunities to cheat. See supra note 52.

⁷⁷ See Appendix A for a more formal representation of this Prisoner’s Dilemma framework.

throughout a market, not just between a single pair of players, and players do not know with whom they will transact in the future.

Given these features of the diamond transaction, trade that is unsupported by strong enforcement institutions is very unlikely to lead to cooperation. Nonetheless, diamond merchants do not use formal institutions to enforce contracts, begging the question how reliable enforcement is achieved. The secret to how the private arbitration system works lies in the unique incentives of the parties and their relation to the rest of the industry.

The Parties

The driving force behind diamond merchants' ability to participate in trust-based exchange is their membership to unique socio-demographic groups. This is a system that bases the credibility of one's commitments on his identity, and a merchant's membership to these intimate groups is what enables him to make contractual promises that fellow merchants will believe. This ability to make trustworthy promises – to commit credibly to a contractual obligation – is what gives New York's diamond merchants competitive advantages over outsiders. They can purchase goods on credit and gain valuable market information from an insular network.

The diamond industry is home to two distinct categories of identities: long-term players, who enjoy family connections to the industry, and “diamond-studded paupers”, religious community members who are in possession of enormously valuable caches of diamonds yet maintain austere lifestyles devoted to traditional religious observance – their pervasiveness is a truly striking feature of the diamond industry. One fascinating aspect of the diamond industry is that a merchant's identity tends to predict his role in the distribution network: long-term players are primarily dealers or buyers and religious paupers serve chiefly as contractors, such as brokers or cutters.

The contrasting roles of dealers and contractors are illustrated by the different transactions in which each participates. Section II described a diamond's path as it travels from the mine to the consumer, noting that after a diamond reaches New York, it is likely to pass through many hands before arriving at the end of its path. Two general types of transactions take place. One could be called a “vertical transaction” that leads the diamond down the supply chain and occurs between a diamond seller and a diamond buyer. Most of these transactions take the form of a credit sale. The other, a “horizontal transaction”, occurs between a diamond owner and a hired party who provides a service. Hired, or contracted, parties include brokers, who search for a buyer and retain a small sales commission, and diamond cutters, who cut or polish a diamond for a fixed fee.⁷⁸ Both brokers and cutters assume possession of the diamond but never own it, and they do not give a payment or security to the diamond owner when they take possession.

⁷⁸ Note that a horizontal transaction can occur ‘within’ a vertical transaction. For a brokered sale, a diamond goes from a seller to a broker to a buyer. The first transfer is the horizontal transaction, but it is entrenched within a vertical sale where the buyer will pay the seller on credit.

There is some overlap between the categories. For example, some brokers maintain a small inventory of diamonds and sell for capital gains rather than commissions. Similarly, some dealers carry another's diamonds and serve as a broker. Certain individuals do not fit neatly into a professional category. Nonetheless, it is safe to generalize that all transactions could be characterized as either vertical or horizontal, and all economic actors fit into the roles of dealers (sellers), buyers (which include jewelry manufacturers), or contractors (brokers and cutters). Figure 1 diagrams the diamonds path into these vertical and horizontal transactions.

[Insert Figure 1 Here]

The long-term players find their paths into the industry through family connections. They are largely but not exclusively Jewish (recall that many DDC members are Indian), and only a certain percentage of them are Ultra-Orthodox, but nearly all of them work in small family businesses and were brought into the diamond trade by close relatives.⁷⁹ Their participation in the family business sustains intergenerational legacies that they expect to bequeath to their descendants.

The contractors come from a very different mold. These players are Ultra-Orthodox Jews and find their way into the industry through community connections.⁸⁰ They generally are not connected to family businesses and do not build up a business that they hope to bequeath to a child. In fact, these Ultra-Orthodox prefer that their sons commit their lives to Torah study and find financial support without having to work regularly; similarly, they hope to accumulate sufficient resources for themselves so they too can devote their time to religious study.⁸¹

The important observation is that members from these very different groups are motivated and constrained by different forces. Note that all parties – in both vertical and horizontal transactions – engage in a type of time-inconsistent exchange where delivery of the diamond precedes any payment. But since the parties are from two very different groups, they are connected to different community institutions, are constrained by different individuals or institutions, have different business incentives, and have different tastes.⁸² Consequently, different mechanisms are required to induce the two types of

⁷⁹ After nearly 50 interviews, the author has met only one diamond dealer who did not inherit a place in the industry from a relative, and this individual stressed that he is a very rare exception. Other interviewees agree that diamond dealers can only enter the business with family introductions and sponsorship.

⁸⁰ Daily buses carry scores of workers directly from Boro Park, Monsey, and Williamsburg – all homes to concentrated Ultra-Orthodox Jewish communities – to the diamond district on 47th street.

⁸¹ See Eli Berman, "Sect, Subsidy, and Sacrifice: An Economist's View of Ultra-Orthodox Jews" *QUARTERLY JOURNAL OF ECONOMICS* (August 2000). Berman describes a process where one generation accumulates capital specifically so their children can engage in full-time religious study well into their productive adult years.

⁸² Just as there is overlap between the professional categories, there also is sociological overlap between the two groups. Some dealers are deeply embedded within the Orthodox community and are constrained by the same community institutions that constrain brokers, but the opposite is not true – there are very few independent brokers who are not a part of the Ultra-Orthodox community. This is important because the conclusion is that everyone is constrained either within the mechanisms designed for dealers or within the

parties to comply with their contractual obligations. What induces one group to cooperate cannot explain the behavior of the other.

Long Term Players

Though dealers and buyers rely on different industry skills and occupy different locations in the distribution system, a key commonality they share is that both are long-term players in the industry. Sellers have a steady supply of diamonds that they will need to sell, and buyers, most of whom are jewelry manufacturers, rely on being able to purchase precious stones to keep up with demand. Following the Prisoner's Dilemma paradigm, this long-term market participation allows the prospects of future sales to induce cooperation for current sales.

As was discussed above, the diamond industry introduces two important complications to the simple Prisoner's Dilemma. First, the industry involves many players who do not necessarily know with whom they will transact in the future, so the prospects of future dealings with a current business partner are not sufficiently certain to induce cooperation. The second is that the extreme value of diamonds may require an unusually credible mechanism to assure endless exchange (a solution to the end-game problem) and an unrealistically high discount rate to support cooperation. These complications are addressed in turn.

Sustaining Multilateral Cooperation. For cooperation to be sustained when there are many industry players, each player must always be induced by the prospects of future business with other players. In other words, when a player transacts with business partner (B) in time period ($t=0$), he must be induced by the prospect of future transactions with partners ($\neq B$) in periods ($t>0$). This is accomplished by a reputation mechanism. If a player's past dealings are known, i.e. all potential business partners know whether a certain merchant has cheated in the past, and all merchants refuse to transact with an individual who has cheated, then players will be sufficiently induced to cooperate with a business partner even if the two will never do business together again.

Illustrating how a reputation mechanism can induce cooperation under these conditions does not require a complex mathematical proof. Individual players will cooperate so long as the system credibly promises that their long-run returns will exceed the potential profits from cheating.⁸³ The burdensome features of the proof are its very demanding assumptions: widespread information, accurate information, and coordinated punishment. These conditions are necessary for a reputation mechanism to support multilateral exchange.

The diamond industry has all three. Section II discussed the numerous information sources that educate dealers about potential business partners. The NYDDC

social structure surrounding the hired contractors (see below). Some who overlap the two categories are constrained by both mechanisms. No one is unconstrained.

⁸³ The basis for this model is found in Milgrom, North, & Weingast (1990). See also Grief (1989) and Grief (1993); see *supra* note 7.

is structured to support valuable information networks where dealers share information with each other, and the arbitration committee publicizes its decisions in order to disseminate its findings about who it has determined has not complied with their obligations. As a result of these information mechanisms, any member can research into the past of a potential business partner and can learn whether he was non-compliant in a previous transaction. Reputations are known.

The availability of information does not guarantee its accuracy, yet the reliability of a perceived reputation is crucial to ensure proper incentives to cooperate. One source of guaranteeing accuracy is the DDC's arbitration board. First, the arbitration board is comprised of insiders who are extremely familiar with the nature of the industry and the difficulties involved in entering diamond contracts. This expertise is a valuable tool in ensuring the accuracy of reputation information. Also, the board can respond to misinformation, not just a dispute over specific transaction, and can punish any party responsible for spreading inaccurate information about another's reputation. In one case, a dealer falsely accused another of stealing his stone. He later realized that he actually misplaced the stone and apologized to the dealer, but the accusation had already become common knowledge. The second then brought the first before the arbitration committee for impugning his reputation, and the board ordered the false accuser to make a public apology and donate fifty thousand dollars to a Jewish charity.⁸⁴

Another source of information accuracy is a social norm that finds its roots in Jewish law. Consider the following tale imparted by the prominent 19th Century Rabbinic scholar, the *Chafetz Chaim*:

A man goes before his Rabbi and admits to having spread harmful information about his neighbor. He asks the Rabbi what he should do to repent. The Rabbi says "You need to do the following: go home, find a feather pillow, and release the feathers into the wind." The man follows the Rabbi's instructions and returns the next day. The Rabbi then says, "Now, to gain forgiveness, you must go back to your home and retrieve all of the feathers." "But Rabbi," the man exclaims, "The feathers by now have scattered throughout the village!" "Precisely!" the Rabbi says. "And so too has the damage you have caused to your neighbor's reputation."⁸⁵

The Talmudic parable encapsulates an aversion to gossip, or *La'shon Ha'rah*, that is very pronounced in Jewish teachings. As a complement to a system that relies on information about individuals, this community norm serves as a filter for misinformation and unnecessary information. Interviews with diamond merchants confirm this norm. Those dealers who do grant interviews are extremely careful not to share concrete information about specific individuals and share insights only at an extremely high level of generality. Other interviews reveal a serious deliberateness in exchanging information. One dealer asked another about an unfamiliar buyer that was on the DDC trading hall. The second replied, "I hear he is good. I hear he is very good. But don't take my word. Be sure to ask for his references and talk to members who have dealt with him in the past." Another dealer, after sharing in an interview that he had some real difficulty securing payment from a certain merchant (and did not name the merchant), admitted:

⁸⁴ Bernstein (1992), pg. 127.

⁸⁵ Chafetz Chaim, SEFER CHAFETZ CHAIM (1873), Chapter 1, Paragraph 10.

That frustrating experience – that is the kind of information I would share with my close colleagues and relatives. If they asked me about what kind of businessman this individual is, I'd tell them that he has given me some trouble. But truthfully, I would only share the information if I were asked – I wouldn't spread it around on my own initiative. Also, I think I'd only share the information with people I knew well. If a colleague that I don't know so well asked me about this person, I'd probably just say that I don't know anything.⁸⁶

Accordingly, reliable information is available upon request from colleagues, but it does not float around without purpose. This point should not be overstated – teachings that discourage gossip will never be strong enough to overcome common frailties of insular communities, and they certainly will not prevent merchants from sharing valuable and accurate information that the system needs to enforce its reputation mechanism. Nonetheless, the prohibitions serve as useful information filters that extract functional information from reliable sources while deterring less constructive and less accurate communication.

The third necessary condition for an effective reputation mechanism is coordinated punishment. An individual will be deterred from cheating only if he knows that none of the diamond merchants will transact with him after he cheats. Conceivably, after an individual cheats and thus acquires a bad reputation, he may convince another merchant to do business if he sufficiently lowers his prices (the losses from selling at discounted prices could be less than the one-time gain from cheating). But this does not happen. Merchants are extremely risk averse and will stay away from individuals who they know have not complied with payment obligations in the past, in part because their own reputation will suffer if they are known to transact with previous cheaters.

The blockade of a merchant who has previously cheated is not necessarily a categorical rule. There are instances where individual fails to comply with a commitment he made, and after suffering harm to his reputation, an elder merchant – motivated as much by compassion as by profit – will agree to a deal with him. One dealer described the process as follows:

There are a lot of pressures in the trade. A dealer often has many transactions he has to be aware of, and sometimes he just doesn't make the right calculation and he is left short of cash when a payment is due. These actions are not condonable – all of us need to keep track of our finances – but they are understandable. And when it happens to someone you think is basically a good person, sometimes one of the senior Club members will try to help him out and let him recover.⁸⁷

The elder enters into an agreement with the fallen dealer as a way to allow him to recover and rebuild a reputation – reputations are fragile and extremely difficult to recover once damaged, but rehabilitation is sometimes possible and is substantially aided if a well-respected industry member offers assistance. Note that such generosity is most likely to be effective if they are undertaken by a senior leader who commands respect from other dealers. Otherwise, the action would not be a sufficient signal to convince others that the recovering dealer is worth a second chance. This sort of story adds a human

⁸⁶ Interview with the author, July 2001.

⁸⁷ Interview with the author, March 2001.

dimension to the otherwise very strict rules that reputation games require. It reflects the balance between the serious need to deter cheating with the compassionate recognition that individuals have human frailties. The challenge – a critical one – is to distinguish between individuals who are either untrustworthy or unreliable from those who made a mistake they are unlikely to repeat.⁸⁸ The reputation system seems to follow the individuals who have the most information about the individual in question and who have the most experience in judging character.

Note that in this discussion of punishing individuals who do not cooperate, there is no discussion of the arbitration board that assesses damages. Consistent with the discussion in Section II about the DDC, the arbitration system alone cannot force compliance and thus cannot explain consistent contractual performance. Nonetheless, the arbitration board wields real power. Its muscle lies in accurately publicizing individuals who fail to cooperate. This leads to a very interesting conclusion. The purpose of the NYDDC's arbitration board is not to enforce contracts; it is to maintain the accuracy of reputations. Individuals only comply with the board's rulings so they can continue to transact in the DDC. The board's decisions have no inherent power.^{89 90}

Securing an Infinite Time Horizon and a High Discount Rate. If cheating brings extreme one-time rewards, even the threat of banning an individual from all future diamond transactions may not be enough to force compliance. Moreover, individuals present an end-game problem if their participation in the trade reaches an inevitable end. Cooperation is sustained only if parties have an endless future of exchanges and an unlikely low discount rate.⁹¹ The diamond industry's consistent presence of family-based

⁸⁸ This is best described as an equilibrium condition. If there are enough people who would transact with someone who cheated (or simply was not sufficiently dedicated to complying with contractual obligations), then the effective deterrence from breaching agreements is too dilute to induce compliance.

⁸⁹ Milgrom, North, & Weingast (1990) reach a similar conclusion about the system of private judges in the Champagne Fairs.

⁹⁰ An alternative model that can explain sustained cooperation is if there are two (or more) groups with easily identifiable individuals. If an individual from group A cheats an individual from group B, then all the members of group B will never do business again with the members of group A. Consequently, the prospects of the whole group losing significant future business induces each group to police its own members and to expel any individual who behaves dishonestly. See, e.g., Avner Greif "Self-enforcing Political Systems, Organizational Innovations, and Economic Growth: Genoa During the Twelfth and Thirteenth Centuries." Working Paper, 1997.

Since a vast majority of DDC members are from the same ethnic group, this group-based reputation mechanism is unlikely to support most transactions, but it could be responsible for some types of cooperation. First, it could be a plausible explanation for why Jewish and non-Jewish parties cooperate with each other. This is becoming an increasingly frequent occurrence with the introduction of many Indian merchants to the DDC. Second, as is discussed below, an individual's reputation is largely connected to his family's reputation. So a group model, where individuals are defined by family membership and not ethnic identity, may characterize cooperation between members of different families. Accordingly, all parties will comply with their contractual obligations regardless of the identity of their business partners – Jewish or non-Jewish – to preserve their family-based reputations.

⁹¹ Some diamond dealers enjoy sizable incomes (DeBeers would want to maintain stable downstream distributors and thus is likely to share some of its monopoly rents with dealers), suggesting that the threat of individual sanctions may be sufficient to induce cooperation. A precise comparison between the benefits of cooperation versus the profits from cheating is very difficult. Nonetheless, the end-game problem –

firms accomplishes both of these. The intergenerational nature of the family firms extends the time horizon for cooperation beyond the limited lifespan of an individual dealer. So long as a diamond dealer is concerned about his family's reputation and not just his own, he will continue to have incentives to cooperate even if he plans to retire soon. Parties would cheat if they knew there were only a finite number of future transactions.

For this mechanism to work, reputation information has to be family-specific, not just individual-specific. This is, in fact, how reputation operates in the diamond trade. While an individual is trusted and receives business based on his reputation, a young dealer inherits the reputation of his family mentor. Part of this is because the elder sponsors the young relative for his early dealings (i.e. the elder explicitly promises to cover any losses anyone incurs by dealing with his young relative), but an individual's family connections and associations are very important in attracting business trust even when that sponsorship ends. The NYDDC by-laws also reflect how extended family relationships extend trustworthiness. Article 3, which governs the process for gaining membership, imposes easier membership requirements for spouses, widows, sons, daughters, and sons- and daughters-in-laws.⁹² Reputation capital can also extend beyond the immediate family, as cousins, nieces, and nephews of respected dealers enjoy some initial trust when they enter the industry.

The value of a family's reputation has three important economic implications. First, if an individual entering the trade is supported by a family reputation, then he has an important advantage over an identical entrepreneur who has no family connection. The result is a powerful barrier to entry. Observations from interviews support this conclusion. Dealers repeatedly note that one way they feel they can trust an individual is if they know his family, and several stated that the only way an individual can enter the industry is if they have a relative who brings them into the family business.⁹³ In fact, the presumption of a family connection to the industry – and the desire to interact only with individuals who have this family connection – caused some dealers to grant an interview only if the author had a family member who was a familiar diamond merchant.

Second, and most obviously, the family-based nature of businesses secures future riches for relatives holding entry-level positions. Young relative employees who handle their elder's diamonds have the very reasonable expectation that they will inherit the business. This is enough to make their individual time horizons very long and induce them to cooperate.

The third economic consequence to family reputations, and the one most critical to sustaining cooperation for multiple generations, is that reputation can be both bequeathed and leveraged. If a leader of a family business has a good reputation, he can

presented as each long-term merchant approaches the end of his career – forces the diamond industry to develop a creative solution to the Prisoner's Dilemma paradigm.

⁹² NYDDC by-laws, Art. 3 Sections 2a and 3b.

⁹³ See *supra* note 79. There are some exceptions to this rule, but very few, and even the exceptions describe themselves as very unusual anomalies.

bequeath the reputation to several descendants. Accordingly, the elder merchant is motivated by the prospect of a larger number of future transactions than just the number he would execute if he lived forever. So an individual's imminent retirement is no cause for an end-game problem. In fact, the opposite may be true – when a dealer nears the end of his career, he knows that his reputation will influence the transactions of several relatives. Mathematically, this causes the dealers discount rate (δ in Appendix A) to be very high. Conceivably, an individual who has many descendants could actually have a discount rate that is greater than 1. This premium on future transactions is critical to sustain cooperation in the face of large returns from one-time defections.

Note that in this discussion of long-term players, the role of Jewish community institutions is mostly secondary to the importance of family connections and industry rules. This section argues that Jewish norms and the intimacy of the Jewish community plays valuable functions in spreading information among industry players and in coordinating punishment, but the Jewish community is not alone in its ability to spread accurate information. The only irreplaceable aspect of the long-term players is their predominant tendency to be connected to intergenerational family businesses, and that feature is by no means exclusive to the Jewish community. The value of family here is paramount, and the value of the Ultra-Orthodox participation is necessary only in the short-term players in the following section.

“Diamond Studded Paupers”

The Ultra-Orthodox brokers and cutters, who constitute the second category of diamond merchants, provide important value-added services and are critical in making the diamond industry profitable. However, since they are much less likely to bring their descendants into the diamond trade, the prospects of future exchange is insufficient to induce them to cooperate. In fact, because of their commitment to Ultra-Orthodox Judaism and love for traditional learning, they would like nothing more than to stop working and engage in full-time study. Their incentives to cooperate must take effect within a much shorter time period.

These individuals pose another interesting challenge to basic, profit-maximizing economic theory. Unlike many successful dealers and jewelry manufacturers, they are not wealthy people. This is striking given the industry in which they work – they have lots of diamonds, but no money. Brokers do not have any real human capital, allowing free entry into their profession, and cutters have skills that are learned fairly easily. Thus, the labor markets for brokers and cutters are very competitive and incomes are very low. The consequence is an observation that is striking to the observer: scores of diamonds fall from the fingertips of these workers, yet the rest of their bodies are covered with tattered clothes.⁹⁴

⁹⁴ There should be no doubt that these workers have extreme value in their possession. Several interviews proceeded as follows:

Author: “So let me get this straight, brokers carry around thousands of dollars worth of diamonds...”

Interviewee (with a laugh): “Thousands???”

Author: “OK, tens of thousands of...”

These workers also operate with a tremendous degree of informality. At their level of transactions, contracts are the least formal and many operate essentially paperless businesses. A diamond cutter will have piles of diamonds before him, each wrapped with a small piece of paper and placed in an envelope. Clients will drop off such envelopes, writing the owner's name on the cover and leaving some cutting instructions inside, and they leave without asking for a receipt. As I was marveling at how casually an owner would leave diamonds with another without written security, the cutter prepared to polish his next diamond. It was the size of a grape. He cradled it in the back of his hand, admiring its beauty before proceeding with the grinding wheel.⁹⁵

What prevents an individual from taking the pile of giant diamonds and leaving the country? Clearly, diamond brokers and cutters have a set of motivations very different from most businessmen. While such phenomena have traditionally been in the domain of sociologists and anthropologists, an economic analysis can make important contributions both to explain the underlying behavior and the efficiencies that the behavior generates. The challenge to the economist is to connect the individuals' unique motivations with rational action and characterize them in a model that assumes optimizing behavior.

Scholars of religious sects have employed a "club good" model to explain seemingly non-economic behavior.⁹⁶ In clubs, members have preferences both for standard consumption goods and also for excludable club-specific goods. Only club members can enjoy these club goods, and each member of the club experiences externalities from each member's behavior. Consequently, the club will manipulate consumption of club goods in order to induce certain behavior.

Following Iannaccone (1992) and Berman (2000),⁹⁷ the club good model represents a club member's utility as a joint function of consumption of normal secular goods, *S*, and participation in club-specific religious goods or activities, *R*. Members also derive utility from the "quality" of the group's collective religious activities, *Q*, which is an externality and rises with the number and average participation of the other members. Formally, a club member's utility is:

Interviewee: "*Tens* of thousands??" (another laugh) "Do you know how much diamonds are worth?"

⁹⁵ The conversation concerning the giant diamond followed other conversations about dollar amounts in the industry (see note 51):

Author: "Wow! How many thousands of dollars do you think that is worth?"

Interviewee (with a laugh): "*Thousands*??"

Author: "OK, how many tens of thousands of..."

Interviewee: "*Tens* of thousands??"

⁹⁶ Berman (2000), *supra* note 81, describes several seemingly uneconomic practices in the Ultra-Orthodox community, including the expenditure of significant family resources and time to practice religious rituals. See Richard Cornes and Todd Sandler *THE THEORY OF EXTERNALITIES, PUBLIC GOODS, AND CLUB GOODS* (Cambridge University Press, 1986) for a good theoretical overview of club goods.

⁹⁷ Laurence R. Iannaccone "Sacrifice and Stigma: Reducing Free-Riding in Cults, Communes, and Other Collectives" *JOURNAL OF POLITICAL ECONOMY* vol. 100, no. 2 (1992); Berman (2000).

$$U_i = U(S_i, R_i, Q) \quad \text{for } i = 1 \text{ to } N \text{ members, where } Q = \sum_{i \neq j} R_j / (N-1)$$

$$\text{and} \quad \partial U_i / \partial S_i, \partial U_i / \partial R_i, \partial U_i / \partial Q > 0$$

$$\text{and} \quad U(0, \bullet, \bullet) = U(\bullet, 0, \bullet) = U(\bullet, \bullet, 0) = 0$$

Only the broad themes of this model are necessary to explain the cooperation of the Orthodox brokers and cutters, and the most important lessons are embedded within the elementary assumption $U(0, \bullet, \bullet) = U(\bullet, 0, \bullet) = U(\bullet, \bullet, 0) = 0$. $U(0, \bullet, \bullet) = 0$ means that an individual cannot survive without material goods or money, which is no more than a basic rule. $U(\bullet, 0, \bullet) = 0$ means that an individual has zero utility if he receives no club goods from the community. Consequently, he will avoid excommunication from his community at all costs, and more usefully, he will get zero utility if he steals millions of diamonds if it means he will have to live away from his fellow Orthodox Jews. $U(\bullet, \bullet, 0) = 0$ has essentially the same meaning, that the individual gets zero utility if he is without his community.

The assumption $U(\bullet, 0, \bullet) = 0$ answers the core of the puzzle. Ultra-Orthodox cutters and brokers will not steal diamonds because they either will have to flee the community to escape prosecution or the community will punish them by withholding community goods and in the most severe circumstances will excommunicate them. Any of these outcomes will lead $R_i = 0$ for the guilty community member, i . The variable Q gives the Ultra-Orthodox community the required incentives to punish unethical behavior since such behavior reduces each member's utility. As a consequence, the community will establish certain norms and institutions that will induce ethical behavior and punish transgressions.

As with the long-term players, proving that this hypothetical model can induce idealized cutters and brokers to comply with their contractual obligations does not require a rigorous mathematical proof. The more difficult task is to find evidence of the assumptions underlying the model and proof that the model accurately reflects the Ultra-Orthodox community. The required evidence is: individual Ultra-Orthodox members are motivated by non-standard religious goods (i.e. that R_i belongs in the joint utility function), the Ultra-Orthodox consider contractual compliance to be a religious act (i.e. that breaching a contract lowers R_i thus, via the variable Q , reduces the utility of all members), and the Ultra-Orthodox have norms and community institutions that punish unethical behavior (i.e. the community acts to ensure that Q remains high).

Religious Goods. Proving that Ultra-Orthodox have preferences for goods beyond standard consumption goods is the easiest of these three tasks. Berman (2000) illustrates how preferences for religious club goods result in outcomes that appear truly perverse to standard price theory, and casual observations reveal that the Ultra-Orthodox have intense preferences for activities that are unique to their sect. One interesting feature is that the Ultra-Orthodox preference for religious goods fits very comfortably into the notion of a utility function. They truly gain enjoyment – the definition of utility – by participating in religious activities such as attending synagogue, studying religious

texts, and performing holiday or life-cycle rituals. Moreover, many of these activities require the participation of fellow community members, thus one member's enjoyment from these activities is partly dependent on the character of his colleagues. Thus, the model passes a basic smell test.

The important feature of the club good utility function that compels Orthodox Jews to remain in their community, the $U(\bullet, 0, \bullet) = 0$ condition, also enjoys broad support from casual observation. In interviews, Ultra-Orthodox brokers and cutters thought it absurd when asked what prevents them from stealing the diamonds. Never was the answer that they would get caught – which they may, but that was not the primary deterrent. Most conversations proceeded as follows:

Author: So none of these diamonds before you belong to you?

Cutter: That's right. I polish them and then I return them to the owner.

Author: Why don't you just take them?

Cutter: What?

Author: These are worth a tremendous amount of money. They could support you and your family probably forever. Why don't you just take them?

Cutter: (smiling) Where would I go?⁹⁸

The cutter asked the last line rhetorically and with some bewilderment that the author would conceive of such a question. This sort of conversation is hard to translate into statistical certainties, but they convey the pervasive and unmistakable sentiment that the Ultra-Orthodox are deeply tied to their community. There is no other place that this interviewee would want to go and raise his family. Stealing the diamonds would certainly prevent him from returning to the community, and the rest of the world has no adequate substitute. Accordingly, any increase in secular goods, S , that result from the theft are more than offset by the loss of all religious goods, R , that the thief suffers from leaving his community. Such location-specific preferences serve as credible assurances against flight.

Contractual Compliance as a Religious Act. Ancient and medieval Jewish scholarship is surprisingly lacking of works in economics. While Hellenistic and early Muslim scholars made progress in the early study of positive economics, Jewish teachers focused on legal and philosophical studies. Consequently, “the emphasis upon ethics and psychology far outweighed a realistic conceptualism” and we are left only with normative examinations of economic life.⁹⁹ Even Maimonides, the Jewish twelfth-century rational philosopher who codified the modern sciences for Jewish scholars, neglected the studies of economics, writing:

“On all these matters philosophers have written books which have been translated into Arabic, and perhaps those that have not even translated are even more numerous. But nowadays we no longer require all this, namely the statutes and laws, since man's conduct is [determined] by the divine regulations”¹⁰⁰

⁹⁸ Interview with the author, August 2000.

⁹⁹ Baron, et. al. *ECONOMIC HISTORY OF THE JEWS* (Schocken Books, 1975), p. 48.

¹⁰⁰ Moses Maimonides *TREATISE ON LOGIC (Millot ha-Higgayon)*. Translation by Israel Efros. 18f.

Just as Maimonides viewed individuals' economic behavior as a function of divine law, so do the Ultra-Orthodox view their economic behavior as reflections of the divine. This is, in part, because Maimonides remains an important ingredient of Ultra-Orthodox study (thus answering an obvious question as to why a twelfth-century scholar may represent the values of modern-day Ultra-Orthodox). Clearly efficient institutions such as private ownership and crop rotation rested on ethical and religious justifications, not economic reasoning.¹⁰¹ Complying with contractual obligations thus take on an awesome, divine quality. Fulfilling one's contractual obligations is an act that, like other religious behavior, is commanded by the divine law. Fulfilling this commandment increases an individual's R_i , and individuals who violate these ethical precepts reduce the value of Q for the entire community.

Jewish legal commandments for ethical behavior in commerce extended beyond contract compliance. The doctrine of the "just price" and the theory of "misrepresentation" also used religious language and divine incentives to compel efficient behavior. The just price doctrine led to strict rules for accurate weights and measures, leading Maimonides to abandon certain sensitivities and warn:

The punishment for [incorrect] measures is more drastic than the sanction on incest, because the latter is an offense against God, while the former affects a fellow human. He who denies the law concerning measures is like one who denies the Exodus from Egypt which was the beginning of this commandment.¹⁰²

Similarly, the theory of misrepresentation prohibited a merchant from overcharging or even undercharging for a certain good. Jewish law carved out certain exceptions, particularly for items that were hard to value, but the sanction allowed the injured party to nullify any sale.¹⁰³ While these additional Jewish legal principles don't speak directly to contract enforcement, they further illustrate how Jewish law infuses commercial dealings with ethical precepts. Merchants are not permitted to exploit or mislead their business partners, and a businessman who achieves success by honest dealings enjoys both monetary and divine rewards.

These ethical principles are very much alive in today's Ultra-Orthodox community, as brokers and cutters draw a direct relationship between contractual

¹⁰¹ Baron, et. al. (1975). P. 49-54.

¹⁰² Moses Maimonides, *Yad, Genevah* 7, 1-3, 12; 8, 1, 20, with reference to BB89b.

¹⁰³ One will generally see Jewish law adapt functionally to economic and social demands. Salo Baron writes:

[The Rabbinic Tradition] made it possible for scholars to read into the established texts of Bible and Talmudic provisions, as well as limitations, to suit the changing needs of Jewish society. In this way the people's intellectual leaders were able to preserve a measure of continuity within a bewildering array of diverse customs and usages. [In] many cases the communal leaders, rabbinic and lay, often personally immersed in a variety of economic enterprises and this acquiring much practical experience, consciously made interpretive alterations to reflect genuine social needs. ... They thus lent Jewish economic rationales the same kind of unity within diversity that permeated the entire Jewish socioreligious outlook on life. Baron, et al. (1975), p. 54.

This flexible, functional, yet philosophically consistent approach led to a Jewish economic doctrine that prescribes efficiency-enhancing rules that are justified with religious and divine principles.

performance and ethical behavior. The most common instance occurs when one is asked with whom they do business. The answer goes beyond whether the individual is considered reliable and always assumes an undertone of moral judgment, such as:

Who do I do business with? Well, who do I trust? Is the person is a good, reliable, trustworthy individual? Is he an honest and decent human being? Does he come from a good family and a good community? These things are important.¹⁰⁴

Similarly, Ultra-Orthodox merchants view their actions as a part of moral example they assume as members of a religious community and as providers for their families. Another common response when asked why they don't pursue obvious wealth by shirking contractual duties is, "That's not what I want to teach my kids."¹⁰⁵

Critically, the ethical commitment to these community values is a two-way street, where potential transactors' dedication to the principles underlying the community goods – specifically, the religious ideals of the Ultra-Orthodox Jewish community – is carefully weighed. The threat of flight from the community, though extremely unlikely, is possible, and Ultra-Orthodox communities do watch some members leave for less observant communities or other Ultra-Orthodox sects. Such defections from the community can dilute the effectiveness of community enforcement, and membership in the Ultra-Orthodox community may be a necessary but not a sufficient condition to induce sufficient confidence that a given community member is trustworthy with another's diamonds. Accordingly, diamond merchants will look for other assurances that will keep a diamond contractor committed to cooperation, such as a merchant's family or social connections to the community, comparable to the requested references diamond merchants will ask from a long-term player. Interestingly, Ultra-Orthodox community institutions do much of this filtering themselves. Berman (2000) discusses several signaling mechanisms that the community institutes to determine who is worthy of economic support, such as an invitation to participate in the diamond trade. One such signal involves the expectation that a male will remain a full-time student of religious studies for several years after he has begun a family.¹⁰⁶ By the time a male begins assuming economic responsibilities, he already has a spouse and children entrenched within the community and is far less likely to depart. Such entwinement with the community serves as an additional commitment device.

Moreover, there is some thematic overlap between how the moral tone of business affects a merchant's utility and how the rhetoric is employed in reputation mechanisms.

¹⁰⁴ Interview with the author, October 2001.

¹⁰⁵ The harsh language used by Maimonides and other commentators to prohibit unethical behavior in the marketplace may also contribute to the Orthodox's meticulousness in preserving a good reputation. Such meticulousness, of course, translates into economic benefits in the diamond trade, and merchants accordingly zealously protect the quality of their reputations. For example, the DDC arbitration board allows a member to accuse another for smearing his reputation and recover damages, even if the two never engaged in a transaction.

¹⁰⁶ Berman (2000) discusses the conflicting pressures to commit many years to study while fulfilling the biblical commandment to "be fruitful and multiply" by marrying young and having many children. A young couple frequently will live with their in-laws for several years or will receive community stipends until the male's studies are complete, which may not happen until he is 40 years old.

One may argue that use of moral language to characterize an individual is merely an efficient way to characterize his reputation. However, for the equilibrium to support exchange it is critical for the moral rhetoric to do more than serve as efficient communication; it must also have a direct impact on a merchant's utility function. The following model illustrates this. One could imagine an equilibrium where contract breach is very rare, and members of the community are inclined to forgive a transgressor when one occurs since they know he is unlikely to transgress again. While this would dilute deterrence, it would be an efficient outcome if members' utilities were functions only of secular wealth and religious participation (excluding the religious utility from contract performance) since a punishment of withholding religious goods is a loss to everyone. However, if per se contract performance affects an individual's utility, and thus every community member's utility, then there is an additional incentive to deter contract breach. The equilibrium outcome would provide better deterrence against contract breach, and the community sentiment towards contractual performance would be a wealth-increasing norm.¹⁰⁷

Community Institutions as Enforcement Mechanisms. While violating a contractual obligation reduces an individual's R_i and thus reduces his utility, breaching his contract could still bring an overall gain in utility if the monetary gains, from a larger S_i , outweigh the loss from the reduction in R_i . Consequently, the community cannot rely on individuals to police themselves. They must use community institutions to supplement enforcement.¹⁰⁸

One blunt instrument is to use rabbinical courts to excommunicate an offender. This is an extremely severe sanction, as the construction of the joint utility function

¹⁰⁷ A similar outcome could be achieved even if there are not any negative externalities from an individual's contract breach. If an individual gained a small positive utility from every contract he fulfills, then the costs of losing future sales from a one-time breach are far greater than merely lost profits. This additional loss in utility may be sufficient to induce an individual to cooperate, and the effect of externalities may not be necessary.

¹⁰⁸ This discussion is an effort to articulate specific mechanisms of how community institutions help support exchange. It is specific example of the phenomena of Embeddedness. See, e.g. Mark Granovetter, supra note 17.

Interestingly, the features described here are not limited to inducing ethical economic behavior, and the Ultra-Orthodox community uses coordinated sanctions and the denial of community goods to force other behavior that state courts cannot induce. One prominent and controversial example is the plight of the *Agunah*, or "chained wife", the woman who is separated from her husband but has not yet secured a divorce. According to Jewish law, wives cannot unilaterally divorce their husbands, and previously married women cannot remarry unless their husbands grant them a religious divorce. Many Husbands refuse to grant the religious divorce either to extort concessions from their wives or simply to spitefully exercise control over their wives' personal lives. Consequently, some communities mobilize to compel husbands to grant their wives divorces. Such compulsions include the denial of community honors or synagogue participation, and others rely on force and threats of violence. These are the same enforcement mechanisms that assume economic importance in the diamond industry.

For an overview of the Jewish legal issues concerning the *Agunah*, see Bernard S. Jackson "Agunah and the Problem of Authority", lecture delivered on March 13th 2001 under the auspices of the Institute of Advanced Legal Studies. <http://www.accentuate.freewire.co.uk/hebfont/Melilah/agunah2.htm>. For a personal perspective of the plight of the *Agunah*, see <http://www.agunot-campaign.org/stories.htm>.

illustrates, but while it is rarely invoked its use is not unprecedented.¹⁰⁹ Rabbinical courts are more likely to impose less severe measures, such as stripping an individual of a community honor (examples discussed below) or an order to make a charitable contribution to a community charity. Nonetheless, the mere power to excommunicate, even if it is rarely invoked, is probably the most effective instrument the rabbinic courts have to induce cooperation. The DDC arbitration committee itself can initiate a proceeding in a rabbinical court, and the close connection between the two forums illustrates the diamond industry's reliance on community institutions to help enforce contracts.

Less formal institutions also play a role in enforcing contractual compliance. When the community is familiar with a member's failure to comply with contractual obligations, a withholding of excludable community goods, R, often occurs. Excludable religious goods include participation roles in daily prayer, honors in life-cycle ceremonies, and access to classes or teachers that are in limited supply or enrollment in particularly select educational institutions (this is more relevant to a dealer trying to get access for his children). Hovering throughout these specific goods is community respect, which certainly brings an individual direct utility but also is expressed through the assorted community events listed here. One outstanding expression of community respect pertains to how easily – and with how prominent a family – parents can arrange their children to marriage. Arranged marriage is the norm in many Ultra-Orthodox communities, and a family's community status is both a leading factor and a direct reflection of with whom they arrange their children to marry.¹¹⁰

Importantly, Orthodox Judaism is replete with concrete, identifiable community goods that have subtle hierarchies. Small distinctions can translate into either valued honors or disappointing slights, and the large number of religious goods offers community leaders a broad menu of punishment options. The following passage, which

¹⁰⁹ Bernstein (1992) reports that the DDC arbitration board initiated an excommunication proceeding against Martin Rapaport, the diamond dealer who began the *Rapaport Diamond Report*, see supra note 56. The DDC board opposed his reporting of market prices, arguing that it disclosed the Club's private information. Rapaport and the board later reconciled, and Rapaport enjoys wide support as his newsletter flourishes. His reinstatement perhaps reveals the DDC's attraction to efficient information systems, even if there is a small cost to being unable to control some information categorically.

¹¹⁰ Heilman (1992) writes about the role *shadchanim*, or matchmakers, play in arranging marriages in some communities. "In the haredi (Ultra-Orthodox) community, the *shadchan* is like the college or army recruiter. He or she comes near graduation time and knows exactly where and when to find prospects." The central challenge of a *shadchan* is to find a young boy and girl who enjoy (or suffer from) a comparable social status, based on their families' histories, their families' wealth, the boy's academic background and prowess, and to a small degree, their relative attractiveness. *Shadchanim* make offers and counteroffers to the children's parents until both sets of parents agree to a match. "The marriage is kind of a *contractual* arrangement, a deal, with the couple having the right of refusal but little else. But more than that, it is also a *social* arrangement, a way to locate the couple in the community, a way of institutionalizing their passage into the next phases of their lives so that they may stay in that community." (emphasis in original) pp. 277-286.

Heilman adds that Ultra-Orthodox communities vary in the degree of autonomy they grant the children in selecting their mates. But a young man will always consult with his parents, his community, and his religious teachers before making any decision. Powerful forces combine to correlate a family's community status with the quality of their children's mates.

an Ultra-Orthodox diamond merchant shared with the author, is a wonderful encapsulation of how a community would withhold club goods:

It really doesn't happen very often, but sometimes an individual has poor judgment and is unable to deliver on a business promise. Usually his business partners and he are able to renegotiate something fair and little damage is done, or maybe someone else comes to his aid and, for a small price, helps him out. But there's no avoiding that we knew he made a mistake and that we are disappointed. We don't try to punish him – you have to understand the financial pressures that come with the business and with the burdens of raising a large family. But we remember. So he probably doesn't get *shishi*.¹¹¹

Shishi, which means 'sixth' in Hebrew, refers to the sixth *aliyah*, or Torah reading, during the Sabbath services. Every Saturday morning, seven portions are read from the Torah, and seven individuals from the community are asked to read the blessings that come before and after each reading. Being asked to say the blessings for any *aliyah* is an honor – certainly not the community's greatest honor, but an honor nonetheless. Some Ultra-Orthodox communities consider the sixth *aliyah* to bestow the greatest honor of the seven since human beings (Adam and Eve) were created on the sixth day. So the speaker is saying that the community can make very small distinctions that give honor to respected individuals while withholding respect from others. Such distinctions are not major undertakings and do not expend community resources, but they do decrease the utility of the individual found in breach. They are done with deliberation, not haste, and the punishments are tailored to match the severity of the harm done. They have an appropriately substantial deterrent effect.¹¹²

The passage illustrates another nice feature of this form of community disciplining: it's done with compassion. Interviews reveal that there are inevitable interconnections between an individual's commercial behavior and the community respect he subsequently receives, but the community always responds with a forgiving overtone. Community members understand the temptations of ambitious deals, the difficulties of managing liquidity constraints, and the costs of inexperience. Punishments, when invoked, are accompanied with sympathy and, when necessary, some financial assistance. The only requirement to accomplish the necessary deterrence is that the loss in utility from a withholding of religious goods, R , be at least as great as the corresponding gain in utility from the additional secular goods, S . This is accomplished easily as long as a one-time cheat results in a reduction of R for many subsequent time periods. A breach in trust, whether due to calculativeness or carelessness, remains in community members' memories, and the subject in the passage above will not enjoy a *Shishi aliyah* for quite some time.

¹¹¹ Interview with the author, March 2001.

¹¹² The "spotlight effect" also probably plays a role in deterring a merchant from contract breach. While a withholding of a community honor may not seem significant to a third party, its effect is more acute to the targeted individual. This mismatch between the perceptions of the target individual versus bystanders allows a community to effect measurable deterrence with little effort or attention. See Gilovich, T., Medvec, V.H., & Savitsky, K. "The Spotlight Effect in Social Judgment: An Egocentric Bias in Estimates of the Salience of One's Own Actions and Appearance" JOURNAL OF PERSONALITY AND SOCIAL PSYCHOLOGY, vol. 79, pp. 211-222 (2000).

The remarkable features of these community enforcement mechanisms is not that they work perfectly – no enforcement system is perfect, and the Orthodox community experiences theft like all others – but that they are intimately intertwined with the natural community fabric. Ethical business behavior is, simply, ethical behavior, and an honorable businessman is an honorable community member. There appears to be nothing inherently Jewish about these values, but Jewish law and the community’s system of disbursing excludable community religious goods have become intimately enmeshed with the enforcement needs of the business world. Such a combination of institutional complementarities has created a remarkably effective system. While all of those interviewed noted that there have been and will continue to be merchants who cheated, made mistakes, or somehow deviated from their contractual obligations, these occurrences are extremely infrequent given the quantity of transactions and amount of credit in which merchants engage. The Ultra-Orthodox have managed to institute a remarkably effective system without measurably adulterating their religious community.

Conclusions and Implications

Before entering the discussion in Section V of other diamond industry centers, it is useful to summarize how New York’s trade has overcome the dangers of time-inconsistent exchange. New York’s diamond merchants can be divided into two groups of players. Long-term players enter the industry through family connections and are induced to cooperate because maintaining a good reputation invites the promise of inheriting the family business and later bequeathing it to their descendants. Independent contractors who do not have the prospects of family legacies come overwhelmingly from the Ultra-Orthodox community. They cooperate in time-inconsistent exchange because failing to do so would prompt the denial of excludable community goods. This combination of family-based reputation mechanisms and community-based enforcement institutions allows New York to organize credible time-inconsistent exchange.

The implications of this two-pronged system of enforcement is that all players who are trusted with another’s diamonds must belong to one of the two categories and be subject to its respective punishment devices. The system embodies what Yoram Ben-Porath called “the F-Connection” where trade networks organized around families and friends (i.e. community members) can execute implicit contracts that enjoy efficiencies unavailable to formal, arms-length transactions.¹¹³ However, when phrased in generalizable language or in an overarching model (such as the model articulated by Ben-Porath), it would seem that these unique transactional features and enforcement mechanisms are not limited to Jewish family connections and Ultra-Orthodox Jewish community membership. Nothing appears to preclude successful enforcement of informal contracts between non-Jews and non-Orthodox Jews so long as either family or community connections assure cooperation, and nothing limits enforcement mechanisms to the type employed by the Ultra-Orthodox in New York.

¹¹³ Yoram Ben-Porath “The F-Connection: Families, Friends, and Firms and the Organization of Exchange” POPULATION AND DEVELOPMENT REVIEW, vol. 6, no. 1 (March 1980).

An important question then emerges: if the mechanisms do not appear to be specific to Jewish merchants, why is there Jewish predominance in the industry? This is a difficult question to answer, particularly because – as Section V illustrates – other communities appear to have developed private enforcement mechanisms and thus enter into the diamond industry. Perhaps while Jewish family or community connections may not be necessary, core features of Jewish history and the traditional organization of the Jewish community can explain why Jewish merchants were more likely than other ethnic groups to dominate the diamond trade. Section I discussed why medieval Jewish merchants were attracted to trades with portable commodities, and the benefits of intergenerational family businesses tended to keep certain families and ethnicities within the industry while leaving others out. While Section I notes that a path dependency argument does not appreciate how the industry’s organization economizes on transaction costs and enjoys efficiencies from time-inconsistent exchange, intergenerational connections do impose significant entry barriers that create a trajectory where today’s industry players are the descendants of past leaders. Furthermore, Section IV discusses features within the Ultra-Orthodox that create incentives to identify uncooperative businessmen and provide a capacity to issue coordinated punishments. Religion-based norms facilitate the sharing of personal information – and ensure the accuracy of such information – and establish a critical link between merchants’ business reputations and their community standing. Jewish law further espouses values that easily support reputation-based systems of exchange, and the insularity of the community establishes clear demarcations that distinguish trustworthy insiders from unfamiliar outsiders. Frequent participation in religious activities creates a widespread demand among the Ultra-Orthodox for excludable religious goods, the ritualistic nature of Ultra-Orthodox religious practice makes these religious goods easily identifiable and discernable, and the structure of religious life provides concrete systems that disburse – and importantly, withhold – these excludable club goods. Finally, the paramount personal importance of religious life in an irreplaceable community and the thorough entanglement of community members with community institutions virtually preclude the risk of flight. Other communities may house similar mechanisms, but these community features reach a complexity and precision that are difficult to replicate, suggesting that the traditional Jewish community is particularly situated to support the enforcement of informal contracts.

In sum, Jewish history illustrates why Jewish merchants were attracted to the diamond trade, Jewish community institutions can help explain why Jewish communities were particularly able to enforce informal contracts, and the advantages of intergenerational firms sustained early Jewish industry leadership. The traditional Jewish community does not enjoy a monopoly over these traits, but the combination of these factors offer a plausible explanation why Jewish merchants usurped and maintain industry leadership. Since the diamond trade is also home to many non-Jewish merchants, they too must be subject to either family or community enforcement mechanisms. The following section tests these implications in other settings that confront the same contractual hazards.

V. Other Settings for Informal Contracts

The success of the Ultra-Orthodox in enforcing informal contracts mirrors the success of other ethnically homogeneous communities who have built prosperous networks of commerce. One prominent and well-studied example is Chinese family businesses in Southeast Asia.¹¹⁴ In both Jewish and Chinese networks, community members serve as brokers between merchants and execute time-inconsistent exchange without relying on formal court ordering. Some have generalized to construct a comprehensive theory on the “Ethnically Homogeneous Middleman Group” (EHMG),¹¹⁵ but this is not to presuppose that these extremely different communities employ similar enforcement mechanisms. However, while New York’s Ultra-Orthodox and Java’s Chinese may have similarly insular communities and closely knit families, it is hard to imagine that these communities with very different cultures and ethnic heritages employ the same enforcement mechanisms. The arrival at a broad theory may be premature.

Nonetheless, diamond transactions present the same contracting challenges regardless of the identity of the transacting parties, and the presence of non-Jewish diamond merchants, even if they do not control a market share as large as their Jewish counterparts, present a test to the implications from Section IV. If either a family or a community connection were required to support time-inconsistent exchange, then the same institutional conditions would be present in other diamond centers populated by different ethnic and national groups. Examining these and other instances where informal contracts are an efficient method of economic organization can serve as a quasi-empirical test to the Section IV argument.¹¹⁶

Antwerp

Belgium’s diamond trade traces its roots to the port city of Bruges, where merchants began importing diamonds from India in the Middle Ages. Shipping traffic shifted to nearby Antwerp in the late 14th century, and with Vasco da Gama’s discovery in 1498 of a direct sea route to India, the Lisbon-Antwerp route to India gained popularity. Antwerp’s leadership in diamonds came in the 15th and 16th century when Jewish cutters were expelled from Spain and Portugal and fled to Antwerp and Amsterdam. Antwerp yielded global leadership to Amsterdam when Spanish attacks in 1585 drove away many merchants, but its trade revitalized when diamonds were

¹¹⁴ See, e.g., Alice G. Dewey PEASANT MARKETING IN JAVA (1962); Cyril S. Belshaw TRADITIONAL EXCHANGE AND MODERN MARKETS (1965); Murray Wiedenbaum & Samuel Hughes THE BAMBOO NETWORK: HOW EXPATRIATE CHINESE ENTREPRENEURS ARE CREATING A NEW ECONOMIC SUPERPOWER IN ASIA (New York: Martin Kessler Books, 1996).

¹¹⁵ Landa (1981).

¹¹⁶ A structural comparison of the different diamond centers is far from an ideal test. A formal, empirical analysis is more reliable, and testing the hypotheses developed in Section IV on observations from other diamond communities is extrapolation. A preferred test would mirror the methods employed by McMillan and Woodruff (1999) or Banerjee and Duflo (2000), see *supra* note 8, in which survey data is obtained from a specific merchant community and allow for empirical tests. Unfortunately, due to the extremely secretive and closed nature of the Jewish diamond world, collecting reliable data from Jewish merchants is unfeasible. Instead, this study relies on the anecdotal evidence supplied in Section IV and the investigation into other diamond centers in Section V.

discovered in South Africa in 1870, and a dispute between diamond merchants and the Dutch government further caused the trade to move back to Antwerp. While Antwerp Jewry was largely decimated in World War II, 500 dealers transferred the city's diamonds to London during the German occupation and allowed the city's industry to revive after the War.

Of all the world's diamond centers, Antwerp most closely resembles New York. The city's diamond trade is dominated by 1,600 family-based companies whose members largely belong to three distinct ethnic groups: native Belgian, Jewish, and Indian. While the Indian traders are relatively recent arrivals, as they are in New York, the Jewish and Belgian family businesses have long histories in the country, and many of the Belgian families trace their roots to the original traders in Bruges. The family businesses are concentrated around four interconnected bourses that, like the NYDDC, have arbitration systems and serve primarily as a central meeting place. In short, Antwerp's industry rests on long-term players in intergenerational family businesses and institutions to share information and support reputation mechanisms.

Also like New York's trade, Antwerp's brokers and cutters have been predominantly Orthodox Jews. In the beginning of the 20th century, Jews constituted three quarters of the city's diamond brokers and an even higher percentage of the factory owners. Today, cutting factories in India, enjoying cheaper labor costs, have supplanted most of the cutting in Antwerp, and the city has seen its peak of 30,000 workers fall to less than 3,000. Nonetheless, the Ultra-Orthodox presence remains strong in Antwerp, as Ultra-Orthodox continue to serve as brokers and providing other services to the Jewish family businesses.

Antwerp's trade fits neatly into the model prescribed by New York's trade. Diamond merchants belong to family-based companies who have been involved in the trade for centuries, and Orthodox Jews predominantly serve as the city's cutters and brokers.

Mumbai

For nearly two and one half millennia, from the first discoveries in 800 B.C. to the diamond finds in Brazil in 1844, the Indian subcontinent was the world's only source of diamonds. Thus began a remarkable history in diamonds and gemstones. Indian mines have produced some of the world's most famous diamonds, including the Koh-i-Nur, which was the object of tribal battles from 1304 through 1850, when the East India Company presented it to Queen Victoria (it later adorned the crown worn by Queens Alexandria, Mary, and Elizabeth), and the Hope Diamond, which was purchased by King Louis XIV, stolen in the French Revolution, and eventually repurchased by Harry Winston who later donated it to the Smithsonian.

Despite this illustrious history, however, Indian diamond merchants did not have a major impact on the global market until the mid-1970s. Only then did Indian diamond merchants translate their diamond expertise into major cutting operations that, only one

decade later, developed into global trading networks that captured large shares of the international market. Bharat Shah, founder and chairman of India's largest private empire, boasted "We went to the bottom end of the market, buying and cutting diamonds which the Jews had rejected" and set up large cutting operations specializing in small stones.¹¹⁷ Now, Mumbai is home to an active bourse, and thousands of cutting factories populate nearby Gujarat province. Over 700,000 Indians work as diamond cutters¹¹⁸ polishing nine out of every ten stones sold in the global market.¹¹⁹

Like their Jewish counterparts, Indian diamond merchants rely on both family and community connections to support their trading networks. Family connections are evident in each Indian company, regardless of its location. Basant Johari, Chairman of the Indian Diamond and Colorstones Association (a New York trade group), reported, "My father was in the diamond and gemstone business, and his father was too, as was his father and his father before him.... The business goes back in my family generation after generation for centuries. All of today's merchants have the same family story."¹²⁰ In addition to having vertical roots, current family networks reach horizontally by positioning relatives in all the important diamond centers. Gita Piramal, an Indian business historian, describes one such network:

Buying roughs in London, an Indian sends them to his brother in Bombay who after polishing them, forwards them to another brother in Antwerp, who in turn instructs cousins in New York and Hong Kong to sell them to jewelry manufacturers.¹²¹

The diamond connections also rest on community and tribal foundations, as a small ethnic minority has dominated India's diamond industry. For centuries, the Jains of Palanpur, a religious minority (Jainism, an offshoot of Buddhism, accounts for 0.5% of all Indians) from a parched, dusty village in northern Gujarat, have served as India's diamond cutters. Palanpuris developed their roots in the diamond industry as diamond cutters, and while there were some non-Palanpuri family diamond businesses, the Palanpuri controlled all cutting know-how.¹²² Before India's diamond boom, Palanpuri cutters owned and operated their own small units and remained unconnected to market dominated by cutters in Israel and Antwerp. This cutting expertise was harnessed to propel India's global expansion, as entrepreneurial Palanpuris turned to the master

¹¹⁷ Gita Piramal *BUSINESS MAHARAJAS* (Penguin Books, 1996).

¹¹⁸ Nicky Oppenheimer, 1999.

¹¹⁹ Manjeet Kripalani "Polishing India's Diamond Business" *BUSINESS WEEK* September 11, 2000, pg. 126, E8. Note that this statistic reflects the number of stones cut, not the market share value they represent (which is substantially less than 90%). Also, this figure further overstates the role of India's cutting since some stones are polished several times.

¹²⁰ Interview with the author, February 2002.

¹²¹ Gita Piramal "Sparkle on Indian Diamond Market Dims" *FINANCIAL TIMES* June 19, 1990, pg. 8. One diamond merchant lamented to Piramal, "This business demands personal attention and trust. Only your family can give both. I have remained a small diamond exporter because I do not have a brother whom I can send to live in Antwerp." *ibid.*

¹²² Compare this to the similar role of the Ultra-Orthodox Jewish merchants, who also enjoy particular dominance in the value-added services. The model developed in Section IV does not necessarily suggest that community connections govern value-added services and family connections govern trading and dealing, but this seems to be the global pattern.

craftsmen in their home villages to guide their cutting operations. While many of today's cutting operations are large factories that utilize non-trust mechanisms to monitor non-Palanpuri employees, they are predominantly owned by Palanpuris and rely on Palanpuri cutting expertise. Over 95% of the 2,400 members of India's Gem and Jewelry Export Promotion Council and the leaders of all seven of the nation's largest companies, which control 25% of the country's diamond exports, are Palanpuri Jain. Like the Ultra-Orthodox, the Palanpuris are a very tightly knit community and have developed active community associations in the diamond centers where they reside.¹²³

Interestingly, another ethnic sect is active in the diamond industry. Angadias, which in Gujarati means "one who carries valuables" or "trustworthy person," serve the important role of transporting diamonds from the Mumbai to Gujarat for cutting. Angadias are recruited only from the Patel community in Gujarat's Mehsana district and have traveled the Mumbai-Gujarat route for more than 125 years, beginning with camel caravans and now traveling third-class on express trains. A typical troupe of 30 Anagadias – plainly dressed, unarmed, and carrying unmarked canvas sacks – will transport \$4 million in diamonds each day while earning salaries of less than \$50 a month. Like the Ultra-Orthodox, the Anagadias are secretive and insular, with one noting, "Anagadias like me will bring only persons that we know into the business because our personal honor and career is at stake."¹²⁴

The central role of community connections in India's diamond industry is consistent with the model developed for the Ultra-Orthodox merchants, but that does not suggest – nor does the model imply – that Patel Anagadias and Palanpuri diamond cutters use the same enforcement mechanisms found in New York's Ultra-Orthodox communities. How those communities police behavior and appropriately punish uncooperative individuals is, while tremendously interesting, beyond the scope of this paper. It is probably safe to speculate that the communities distribute some form of excludable community club good in a way that the Ultra-Orthodox dole out community religious goods, and thus the members of the Anagadia and Palanpuri communities may also have a form of joint utility function. Nonetheless, the critical conclusion here is that these middlemen and independent contractors pose the same end-game problem presented by diamond brokers, and the community connection that enforced contracts in New York seems to have a counterpart in the Indian hinterland.

More generally, the structure of the Indian diamond networks provides particularly strong evidence for the Section IV hypotheses that articulate how Jewish diamond merchants enforce their informal contracts. Both Indian and Jewish merchants have achieved prominence but through independent historical paths. The similarities of the two ethnic-based diamond networks illustrate that each group has developed near-identical responses to the difficulties of transacting diamonds. Family and community institutions are efficient responses to the hazards implicit in diamond contracts.

¹²³ Gita Paramal BUSINESS MAHARAJAS; Gita Piramal FINANCIAL TIMES June 19, 1990;

¹²⁴ Manjeet Kriplani, September 11, 2000; Sanjoy Hazarika "India's Flourishing Couriers" NEW YORK TIMES September 23, 1985, Section D, pg. 10; Jonathan Karp "Call Them the Icemen: India's Angadias Tote Diamonds in the Rough" WALL STREET JOURNAL March 9, 1999, pg. A1.

Hong Kong

Asians are relative newcomers to the world of diamonds. First, only recently did Asian societies become sufficiently affluent to serve as significant consumers of luxury goods such as diamonds. Now, merchants from all of the world's diamond centers come to Asian markets, particularly to Hong Kong's bourse, to sell their finished goods (as one traveling salesman emphasized, "People think we come to Asia to buy diamonds. No no. We come here to *sell* diamonds."¹²⁵). Many Indian and Jewish family businesses have relatives living in Hong Kong selling the stones their relatives send from Antwerp, Israel, and elsewhere.

Asia also has recently assumed a second role as a cutting center. Many Israeli and Indian companies have set up operations in Thailand, China, and other nearby countries, taking advantage of low labor costs and trying to recreate the success of Indian cutting factories. Rough diamonds are brought to Hong Kong, sold to a local concern, and then brought to a cutting factory in Mainland China. Like much other commerce in China and Southeast Asia, the Asian companies that deal in diamonds and organize cutting enterprises are family-based networks.¹²⁶ Complicated joint ventures between non-Chinese investors and Chinese businessmen provide for the introduction of Indian and Israeli cutting technology to these factories, but the family networks assume the difficult tasks of transporting the diamonds to the factories in China and supervising the workers.

The central role of family businesses in Hong Kong's diamond trade, though consistent with the pattern in other diamond centers, is not a remarkable feature for Chinese commerce. The fascinating addition Hong Kong's trade makes to this discussion is its handling of disputes. Like other diamond centers, Hong Kong has a bourse with an arbitration board, procedures for dispute resolution, and trading rules that structure exchange. The rules allow merchants from other centers to trade with Chinese merchants and with each other within a system of exchange that resolves disputes and enforces reputation mechanisms like those in other bourses.¹²⁷ However, the bourse's arbitration system is never used to resolve disputes *between two Chinese* businessmen. The only reasonable inference is that the Chinese networks resolve their disputes through different, and secretive, mechanisms. Whatever those mechanisms are, they – or supplemental mechanisms – must also spread information about individuals' actions, support reputation mechanisms,¹²⁸ and serve the other functional purposes that New York's arbitration system fulfills.

¹²⁵ Interview with the author, October 1996.

¹²⁶ See, e.g., Wiedenbaum & Hughes (1996).

¹²⁷ These rules and arbitration system are also in place so the Hong Kong bourse can conform to the standards set by the World Federation of Diamond Bourses.

¹²⁸ This supposes that Chinese networks rely on some form of reputation mechanism as well. This need not be the case. Other methods of private ordering – including violence – can adequately police behavior and punish non-cooperation. Nonetheless, any enforcement mechanism must have access to sufficient and reliable information about individuals' actions.

In sum, Hong Kong's diamond trade provides further support to the centrality of family businesses in trading diamonds. But the real lesson the city offers is that New York's system of private ordering is not the only available mechanism. The Chinese networks somehow disseminate information and enforce informal contracts without relying on the bourse's arbitration system. The overlying structure may be the same, but the details are strikingly different.

Israel

Immigrants from Amsterdam and Antwerp first brought the diamond trade to Palestine in the 1920s and 1930s, but Palestine's cottage industry did not experience significant growth until after World War II began. Palestine became a refuge for Jewish diamond merchants during the German occupation of the Netherlands and Belgium and quickly became a major diamond center. Palestine's diamond industry suffered briefly during the years leading up to Israel's War of Independence in 1948 (which, in part, helped Antwerp regain its prominence after World War II) but again experienced rapid growth in the 1950s and eventually became the world's largest exporter in the early 1980s.

Israel's current diamond industry has many of the same features present in the other diamond centers, particularly New York. Diamond companies are family-based companies, and Israel's diamond bourse, the Israel Diamond Exchange, will now only admit new members who are relatives of current members. Also like New York, many Ultra-Orthodox occupy the Diamond Exchange serving as brokers for large diamond merchants, and between 30-40% of all Exchange members are Ultra-Orthodox. Family relationships and the Ultra-Orthodox community are both important components in operating the industry.

The development of Israel's diamond cutting industry, however, reveals a slightly different institutional picture than those in other centers. During the industry's growth in the 1950s and 1960s, there were more opportunities for entry than there were in other cities. This appears to be a small exception to the requirement of a family or community connection. Many of Israel's early diamond merchants have stories similar to the path that brought Moti Owenstein's father into the industry. Moti tells his story:

"My father was 19 when he came to Israel as a refugee from Europe. When he came, he had no family and no profession, but he came upon a diamond merchant who gave him an entry-level job as a polisher. Slowly he learned the trade, and eventually he acquired an inventory of his own, opened up his own factory, and became a successful dealer."¹²⁹

The possibility of a New York or Antwerp diamond merchant hiring an unknown individual who is not in his intimate religious circle is nearly unthinkable, and it is very unlikely in modern-day Israel as well. Nonetheless, Israel's early industry grew on these kinds of stories. Refugees and recent arrivals obtained jobs in small cutting facilities that employed no more than 10-15 people. After acquiring industry knowledge and skills,

¹²⁹ Interview with the author, February 2002.

they, perhaps with a partner or two, opened their own small operations with 10-15 workers. Accordingly, the industry grew rapidly and incorporated more and more new workers.

Today, such free entry is unavailable at least partly because Israel's cutting industry has, like Antwerp's, gone overseas to where labor is less expensive. While Israel still has a large cutting industry, most of Israel's new activity in diamond cutting involves the export of cutting technology to factories in Asia and India, and much of this international activity is conducted by family businesses that send relatives to remote sites across the globe. The industry was open to outsiders only during its rapid expansion, and the second generation of diamond merchants, who are less in need of new workers than their forefathers, have not opened the industry to outsiders.

It is tempting to discount the brief period of entry to extenuating circumstances. During the 1950s, Israel's industry was growing rapidly and was in desperate need for new labor to support a promising industry in an otherwise struggling economy. Also, Israel was home to thousands of World War II refugees who were desperate for work, and several Israeli government agencies were active in searching for new sources of diamonds as a way to buttress the emerging polishing trade. These explanations, however, discount the contracting challenges and the threat of theft. A better explanation probably lies in a strong, pan-national connection that Israelis shared in the aftermath of the Holocaust, where fervent national ties simulated intimate ethnic relations. Even so, the leap from family and community relationships to broader national connections is a difficult one to make, but perhaps the enforcement mechanisms that govern the Ultra-Orthodox have an analog for countrymen in a small and intimate nation. For sure, the early days of the State of Israel were unique, and the nation's diamond industry during those years appears to be a narrow exception to the family-community hypothesis.

Jewish Merchants and Other Trades with Informal Contracts

The previous discussions in this section illustrate that diamond merchants outside of New York also rely on similar family and community ties to govern diamond exchange. A further implication of the model described in Section IV is that if Jewish diamond networks indeed were structured to enforce informal contracts, then those same networks should manage commerce in other goods that similarly rely on informal contracts and private ordering. Consequently, one would expect to see Jewish merchants, using the same family and community relationships, transacting in commodities that present difficult contracting hazards for time-inconsistent exchange.

One obvious modern-day example of commodities that rely on informal contracts is illegal goods. Sales contracts for illegally traded goods are not enforceable by public courts, so any time-inconsistent exchange would rely on private ordering. Consistent with this implication, several Jewish diamond merchants have been associated with such illegal activity. In 1999, Russian authorities apprehended several Ultra-Orthodox Jews for illegally smuggling assorted goods from the country, including diamonds and antique

Hebrew books.¹³⁰ More dramatic, The New York Daily News reported that Israeli drug dealers harnessed Jewish diamond networks to smuggle Ecstasy into New York, where Ultra-Orthodox couriers typically transported 30,000 to 45,000 pills and as much as \$500,000 in drug proceeds.¹³¹

History contains more examples of Jewish activity in commerce involving difficult to contract time-inconsistent exchange. Goods, like diamonds, that were small, portable, and valuable commodities all created contracting difficulties before there was reliable enforcement of contract law. Jewish merchants transacted in many of these trades. In the Middle Ages, Jews became prominent in the trade for expensive dye-stuffs, as Jewish merchants based in Egypt and Tunisia managed the distribution of reseda from India and exported saffron and indigo from Tunisia and Egypt to Southern Europe. They remained active in the trade through the reign of the Ottoman Empire.¹³² Jewish craftsmen in the Middle Ages also found lucrative careers working in fine metals, as many of 12th century's goldsmiths in Egypt, Iraq, Persia, Yemen, and Maghreb were Jewish. Jews also were prominent goldsmiths in 15th century Spain and Portugal (where some even transgressed Jewish law to manufacture Christian religious artifacts) and in central Europe in the 17th and 18th centuries.¹³³ Since the social structure of the Jewish community before the Enlightenment in the eighteenth century was insular, intimate, and fostered interdependency – very similarly organized as today's Ultra-Orthodox community – it is likely that community institutions and norms were critical in governing these trades.

Above all other commercial activity, pre-Enlightenment Jewish businessmen engaged in banking and money lending, a trade in which time-inconsistent exchange is central.¹³⁴ Jewish historian Cecil Roth writes, “The Jew was the classic money-lender of the Middle Ages, and the classic profession of the medieval Jew was money-lending.”¹³⁵ Jewish bankers emerged in Baghdad in the ninth century, engaging in what was called by their Caliphite and Fatimid rulers called *Jahbadhiyya*, a form of banking based on the savings of the whole Jewish merchant class (as opposed to the savings of a few rich

¹³⁰ “Israeli held on charges of smuggling diamonds.” Jewish Telegraphic Agency, March 3, 1999.

¹³¹ Samuel M. Katz, “Israel Has Long Been Known For Its Wholesome Carmel Oranges and Leather Sandals. Today, Israelis Have a Virtual Monopoly on the Global Trade of Ecstasy.” MOMENT August 2001, pg. 89-91.

¹³² Baron, et al. (1975), pp. 162-3.

¹³³ *ibid*, pp. 164-5. Baron, et al., also note, “That this was a widespread Jewish occupation in Muslim countries may be explained by the contempt in which artisans were held by the Arabs.”

¹³⁴ When Jews lent money to non-Jews, they tended to secure their loans through rent charges on fixed property, i.e. they secured the right to receive for a limited time revenues flowing from a building or farm (they generally were not permitted to own property outright, or they feared expropriation). Other securities included a diverse assortment of pledges, including the armor of impoverished knights to the books of university students. These securities translated a loan and repayments into a sort of simultaneous exchange. See Marcus Arkin ASPECTS OF JEWISH ECONOMIC HISTORY (Jewish Publication Society: Philadelphia, 1975), p. 67.

The centrality of time-inconsistent exchange arose when Jewish bankers pooled their community's resources. They were able to collect deposits from their community members and credibly assure repayment and interest.

¹³⁵ Cecil Roth “Essays in Bibliography and Criticism XLV. The Economic History of the Jews.” ECONOMIC HISTORY REVIEW vol. 14, no. 1 (1961).

individuals, which was a far more common means to accumulate and dispense capital). Europe saw its first Jewish bankers within the administration of the Merovingian kings in 481. With the rise of the First Crusade in the 11th century and rising repression throughout the 12th-15th centuries, when Jewish merchants were precluded from most crafts and endangered when traveling for commerce, Jews turned chiefly to loan-banking for sustenance. A typical story occurred in the southern French town of Perpignan. As the city experienced rapid economic growth in the 13th century, local artisans experienced a shortage of capital and saw a high interest rate. In response, a notable influx of Jewish settled in the town, and eventually 80 percent of the sizable Jewish community engaged in money lending to their Christian neighbors. When the local economy slowed, Jewish merchants either turned to less lucrative roles as pawnbrokers or sought opportunity elsewhere.¹³⁶ Such economic cycles provided sufficient demand for Jewish capital throughout the Middle Ages, and Jewish activity in European banking circles lasted through the 19th and into the 20th century.¹³⁷

Jewish economic history reveals that Jewish merchants excelled in trades that relied on time-inconsistent exchange of valuable and portable goods. The history certainly reveals that oppression from European and Arab rulers steered Jewish merchants into these trades, either because they were excluded from other professions or because they preferred trades that did not require fixed investments vulnerable to state confiscation. Nonetheless, Jewish merchants would not have found success in these professions had they been unable to govern time-inconsistent exchange. The sources of success for modern day Jewish diamond traders are likely to resemble the sources of success for these other Jewish merchants in history.

VI. Conclusion

Jewish predominance in the diamond industry is explained by the community's efficient enforcement of informal contracts. This paper illustrates how community institutions within the Jewish community provide Jewish merchants with a competitive advantage over outsiders and how the private system of diamond exchange is superior to institutional alternatives. Intergenerational family firms enable reputation mechanisms to enforce cooperation among long-term dealers, and intimate community institutions police the behavior of short-term, independent players. The result is an active system of commerce characterized by highly incentivized independent agents, reliable contracts that enable time-inconsistent exchange, and a private enforcement system that rejects public courts. Community institutions are central in explaining both the industry's infrastructure and the industry's leaders.

The particularly interesting feature of this system of economic organization is the role assumed by Ultra-Orthodox Jews. The Ultra-Orthodox provide critical value-added services that add significant efficiency to the system of exchange. They work as skilled

¹³⁶ R. W. Emery THE JEWS OF PERPIGNAN IN THE THIRTEENTH CENTURY: AN ECONOMIC STUDY BASED ON NOTARIAL RECORDS (Columbia Univ. Press: New York, 1959); see also Roth (1961) and Arkin (1975), pp. 57-63.

¹³⁷ *ibid*, 211-225.

diamond cutters whose polishing increase the sales prices of stones, and they play the essential role of middlemen brokers who match certain stones with the buyers who most value them. Their ability to assure compliance of informal contracts makes their valuable participation difficult to replace and provides the Jewish merchants with a competitive advantage over rival merchant groups without such community foundations. This paper makes the empirical contribution of articulating specifically how these community institutions serve important economic functions. Where the literature connecting social structure with economic performance frequently rests on generalities, this paper provides a detailed investigation and a formal economic model that explains with precision how a community induces cooperation from its members.

However, the end of the Ultra-Orthodox's role in the diamond trade may be at hand. Two major recent developments are exerting powerful forces that may irreversibly change the diamond industry and obviate the contributions the Ultra-Orthodox make. The first, mentioned periodically in Section V, is the utilization of low-cost labor to cut and polish diamonds. Previous to the explosion of Indian cutting factories, diamonds were chiefly polished in Antwerp, New York, and Israel by family businesses and independent cutters. Now, while cutters in those diamond centers still polish most of the largest and most valuable stones, small stones, which comprise a vast majority of cutting activity, are polished in large factories in India and, increasingly, in Asia. The cutting jobs in Antwerp and Israel are fractions of what they used to be – over the last two decades, Antwerp has lost nearly 90% of its cutting jobs and Israel approximately 70%. Indian and Chinese laborers are assuming the positions long-held by the Ultra-Orthodox, and technological innovations, mostly in the form of cutting machinery that replaces skilled labor, will accelerate that trend.

A second development is De Beers' new marketing strategies. In July 2000, De Beers, facing a decline in its market share and thus a dilution of its monopoly rents, announced plans to brand its diamonds and market them directly to consumers. A cornerstone of the company's plan was forming a joint venture in early 2001 with LVMH Moët Hennessy Louis Vuitton, a French luxury goods conglomerate, that will market "designer diamonds" with either an unusual number of facets or a new shape. In addition, De Beers is requiring its sightholders to devise similar strategic plans to market brand diamonds to high-end consumers.¹³⁸ If these marketing strategies work, then consumers will be able to purchase a diamond like any other commodity, thus bypassing the entire search process where brokers match buyers with specific stones. Similar strategies are being pursued by some Internet diamond brokerages. Web sites list an inventory of diamonds with GIA-certified features and a high-resolution picture, and interested buyers negotiate directly with owners without intervening middlemen. By one statistic, Internet sales comprise 15% of all sales in the US, but most merchants are skeptical that a picture and GIA categories can relay sufficient information about a

¹³⁸ See Lauren Weber "The Diamond Game: Shedding Its Mystery" NEW YORK TIMES Section 3, pg. 1. Some designer diamonds have already emerged, such as the Escada Diamond with 97 facets (the traditional diamond has only 58) or the patented Leo Diamond with 66 facets.

stone.¹³⁹ A sophisticated brand, however, may reduce enough uncertainty to facilitate sales where buyers do not examine the stone they purchase.

The diamond industry is now changing rapidly, and the ultimate success of new cutting ventures and marketing strategies – and with them, the eventual fate of the Ultra-Orthodox – may be known soon. The next decade could mark an important turning point in the 1,000 year history of Jews in the diamond trade.

¹³⁹ Sharon Berger “Diamonds in the Rough” THE JERUSALEM POST April 6, 2001, pg. 4B.

Appendix A

Consider the following formal depiction of the Prisoner's Dilemma for the diamond transaction. A simultaneous game where a party decides either to cooperate or to defect qualifies as a Prisoner's Dilemma game if (1) each individual gains more from cheating regardless of the other party's actions, (2) the outcome from both parties cooperating is a Pareto improvement over the outcome when both parties cheat, and (3) if the result from either party defecting is socially inferior to an outcome with mutual cooperation. Mathematically, if both parties receive a pay-off of 1 if they cooperate, the definitional conditions are $\alpha > 1$ and $\alpha - \beta < 2$.

| | Cooperate | Defect |
|-----------|--------------------------|-------------------------|
| Cooperate | (1, 1) | (- β , α) |
| Defect | (α , - β) | (0, 0) |

Figure 2: The Traditional Prisoner's Dilemma

The result from playing the game only once is that both parties will defect, a Pareto-inferior outcome. In a "Grim Strategy," cooperation is sustained until one party cheats, after which the cheated party (and thus the cheating party as well) will continually defect. The Prisoner's Dilemma for the diamond transaction is unique because the one-time benefit from cheating is far above the minimal profits from cooperation; in other words, $\alpha \gg 1$. Long-term cooperation is sustained, given discount rate δ (where $0 < \delta < 1$), only if $1/(1-\delta) > \alpha$. Accordingly, if $\alpha \gg 1$, parties achieve an equilibrium of cooperation only if δ is high and if the players are certain they will benefit from many future transactions.

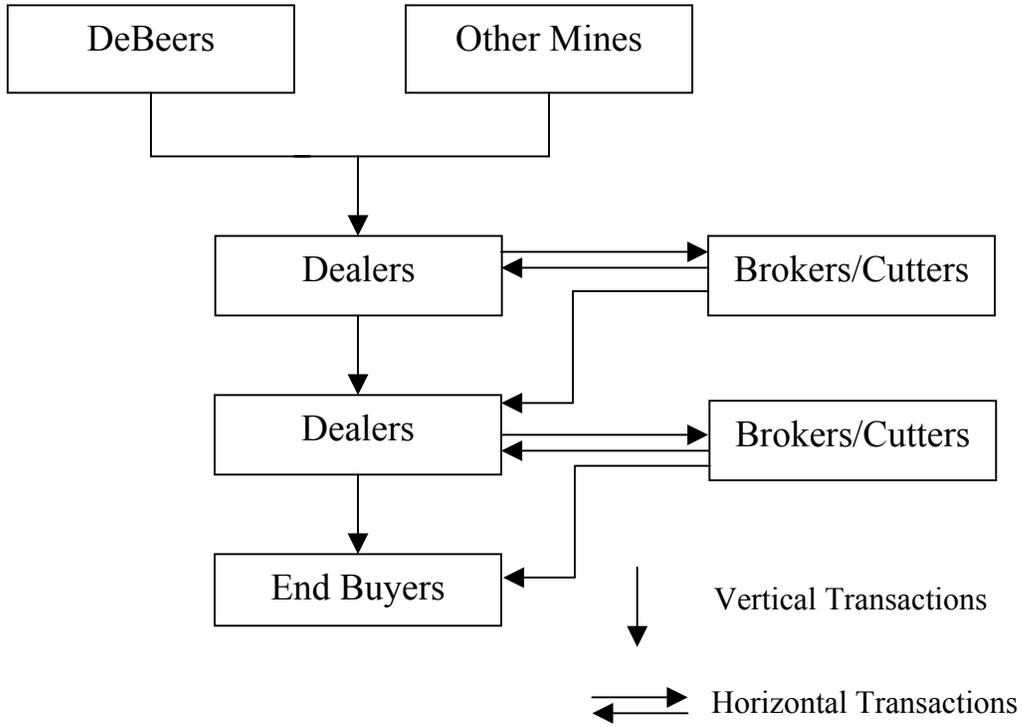


Figure 1: Overview of Diamond Transactions